Intensive Case Management and Compliance with Psychiatric Treatment in the Severely Mentally Ill

A thesis submitted to the University of Manchester for the degree of

Doctor of Philosophy in the Faculty of Medicine

2000

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ProQuest Number: 10756952

ProQuest 10756952

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Abstract

Poor compliance with psychotropic medication and psychiatric services is a well recognised problem in patients with severe mental illness. It has been suggested that the beneficial effects of models of community care such as Case Management and Assertive Community Treatment for patients with severe mental illness can be partly attributed to improved compliance with psychiatric treatment, but little attempt has been made to investigate this systematically.

The current randomised controlled trial tests the hypothesis that Intensive Case Management, by mental health professionals carrying a smaller caseload of patients with psychotic illnesses, will result in improved compliance both with medication and psychiatric services compared with standard care.

One hundred and fifty eight patients with psychotic illnesses who gave informed consent were randomly allocated to receive either Intensive Case Management or standard care for a two year period. Compliance rates with psychotropic medication and psychiatric services were calculated for all patients during the two years of the trial and for the two years prior to trial entry. Clinical and social assessments were made at baseline and at the end of the trial period.

Compliance with medication and psychiatric out-patient appointments improved for all patients during the trial period compared with the two years prior to trial entry, but the improvement was only significant for the Intensive Case Management group. Compliance with medication was particularly enhanced for those Intensive Case Management patients prescribed depot neuroleptic medication during the trial. There was no difference between the intensive and standard groups in dropout from psychiatric services, but the number of patients dropping out was low. Compliance with

medication and psychiatric services during the trial was not significantly predictive of outcome at the end of the trial. The best predictor of compliance with medication and psychiatric services during the trial was compliance with medication and services just prior to trial entry.

Therefore, the introduction of Intensive Case Management had a beneficial effect on compliance with psychiatric treatment for patients with severe mental illness, although this did not affect clinical or social outcomes. The mechanisms contributing to the improved compliance in the Intensive Case Management group may have included intensive case managers having more time to develop a positive therapeutic alliance with their patients and being able to monitor their patients' compliance more carefully, as well as offering practical support to enhance their patients' compliance with medication and psychiatric services.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification at this or any other university or other institute of learning.

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Acknowledgements

I would like to thank the following:

All the patients who gave their time to participate in this study.

Professor Francis Creed for his considerable support, advice and encouragement during the study.

The case managers and community psychiatric nurses at Manchester Royal Infirmary for their co-operation and helpfulness.

Barbara Tomenson, Statistician, Manchester Royal Infirmary, for advice and assistance with statistical aspects of the study.

Mrs Christina Mayo for her secretarial support.

Consultant Psychiatrists at Manchester Royal Infirmary who kindly gave their permission for their patients to be approached.

Dedication

I would like to dedicate this thesis to Philip, Jessie and Jack who tolerated my absences and provided a welcome distraction.

Dr Theresa Tattan MRCPsych. M.Sc.

The author is a Senior Registrar in Psychiatry. She trained in psychiatry in Manchester and passed the MRCPsych in 1994. In 1996 she was awarded the M.Sc. and submitted a thesis investigating risk factors associated with non-compliance with depot neuroleptic medication. She was awarded the Professor Neil Kessel Postgraduate Prize in 1996 for the highest mark in the M.Sc. in Psychiatry at the University of Manchester.

The study was conducted whilst the author was a Honorary Senior Registrar at Manchester Royal Infirmary.

CHAPTER 1. INTRODUCTION

Non-compliance with psychotropic medication and psychiatric services by patients with severe mental illness is a well recognised problem. Non-compliance rates of over 50% for medication and psychiatric out-patient attendance have been regularly reported (Hogan et al, 1983; Axelrod & Wetzler, 1989; Adams & Howe, 1993; Strakowski et al, 1998; Killaspy et al, 2000). It is often suggested that the beneficial effect of models of community care such as case management and Assertive Community Treatment (ACT) can be attributed to improved compliance with psychiatric treatment, but whether this is true or not is unclear because few studies have investigated this. This may be because compliance is difficult to measure reliably (Mueser et al, 1998), but it may be part of a larger problem, whereby few attempts have been made previously to tease out which components of these models are effective (Holloway et al, 1995; Kent & Burns, 1996).

This literature review will firstly describe the definition, methods of assessment and prevalence of non-compliance with medication and psychiatric services. The literature investigating factors associated with non-compliance related to the patient, the patient's illness, the medication prescribed and the administration of treatment will then be presented and critically evaluated.

The latter half of the review is devoted to interventions to improve compliance with psychiatric treatment. Interventions designed specifically to improve compliance will be described initially, and then the potential role of case management and ACT to improve compliance will be explored. The research evidence for case management and ACT having an effect on compliance with treatment for the severely mentally ill will be evaluated and the possible underlying mechanisms will be described.

1.1. DEFINITION, MEASUREMENT AND PREVALENCE OF NON-COMPLIANCE WITH MEDICATION AND PSYCHIATRIC SERVICES

1.1.1. INTRODUCTION

It is important to clearly distinguish efficacy (the potential benefit of a treatment) from effectiveness (the results obtained under clinical conditions). Studies of effectiveness or naturalistic studies show poorer results than efficacy studies in all areas of medicine. A major reason for this discrepancy is poor compliance (Guscott & Taylor, 1994).

Reported rates of non-compliance with medication and psychiatric services vary widely, reflecting differing definitions of non-compliant behaviour as well as differences in the populations studied and the methods used to measure compliance.

It is likely that reported rates of non-compliance are underestimated, as taking part in any study necessitates some degree of compliance and poor compliance tends to disappear under scrutiny (Blackwell, 1976).

This chapter will review the literature regarding:

1. Definition of compliance

2. Methods of measuring non-compliance for medication and psychiatric services

3. Prevalence of non-compliance with medication and psychiatric services

1.1.2. DEFINITION OF COMPLIANCE

Compliance has been defined as 'the extent to which a person's behaviour coincides with medical or health advice' (Haynes, 1979). Blackwell (1976) expands this further, noting that non-compliance encompasses a variety of behaviours including failure to enter a treatment programme, premature termination of treatment and incomplete implementation of instructions.

In the USA especially, the coercive connotation of the term 'compliance' has resulted in increased use of 'adherence' as an alternative (Blackwell, 1976). It is thought that

compliance has a subservient and authoritarian connotation regarding the patient-doctor relationship, whereas adherence conveys the preferred implication of choice and mutuality in treatment planning (Eisenthal et al, 1979). Despite this, compliance is the term often used in clinical settings.

Even the term 'adherence' has been criticised as not taking the user very far from compliance (Mullen, 1997). In 1997 The Royal Pharmaceutical Society of Great Britain's working party on medicine recommended that concordance should replace the term compliance (Royal Pharmaceutical Society of Great Britain, 1997). Concordance was defined as an agreement reached after negotiation between a patient and a healthcare professional that respects the beliefs and wishes of the patient in determining whether, when and how medicines are to be taken.

Milburn & Cochrane (1997) criticise the concordance model as not always being appropriate. They make the following points:

a) If compliance is incomplete during clinical trials of new medication, conclusions about the effectiveness may be inaccurate.

b) Compliance and non-compliance are patterns of behaviour resulting from a complex interaction of many different factors, and research into the human behaviour of medication taking is related to compliance and does not fit the concordance model.

c) With a potentially lethal infectious disease, there are ethical problems if patients are allowed the freedom of deciding which, if any, medication to take.

d) Some patients do not wish to be involved in a partnership making decisions about their medication and their wishes should be respected (Dickinson et al, 1999).

The definition of good or poor compliance is variable and often arbitrary as illustrated in Table 1 (pages 33-37). Table 1 includes compliance definitions from patients' self

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reports, reports from healthcare professionals and objective sources of data. Compliance is often described in a manner which is inadequate to permit independent replication either because the rating scales are vague and open to interpretation, or points on a scale of compliance are not fully defined (Hogan et al, 1983; Drake et al, 1991; Weiden et al, 1995).

The literature on poor compliance with medication is mostly confined to errors of omission which may refer to taking less than the prescribed amount or taking none at all. Studies have mainly used categorical measures of compliance with a few exceptions in the more recent literature (Heyscue et al, 1998; Demyttenaere, 1998). The cut-off point for good or poor compliance is arbitrary and variable ranging from using a dichotomous variable (Van Putten et al, 1976) to a seven point scale (Kemp et al, 1996). For example, Van Putten et al (1976) asked mental health staff to allocate patients to one of two groups - either drug refusers or drug compliers. Patients who did not fit into either group, which was 42 patients out of 101, were excluded from the study. In reality, the literature suggests that there is a range of compliance rates and compliance is rarely an all-or-none phenomenon (Fenton et al, 1997). It may also be difficult to obtain information on patients who are totally non-compliant, either because they are lost to psychiatric services and hard to trace or because they refuse to take part in a study. Similarly, patients who are totally compliant may be functioning well and may be reluctant to give time to study participation in their more active lives.

Using a continuous measure of compliance has advantages because it does not rely on arbitrary cut-off points to define good or poor compliance, does not discount patients for not fitting into certain categories and is a more sensitive measure of compliance rates. Some studies have analysed a categorical measure of compliance as if it was a continuous measure (McEvoy et al, 1989a; Weiden et al, 1995). This is a questionable

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practice as the categorical measure does not have a normal distribution and it is difficult to appreciate what a mean (s.d.) score of 1.35 (0.62) on a scale of 1 to 4 signifies in real terms.

1.1.3. METHODS FOR MEASURING COMPLIANCE

The methods used for measuring compliance with medication and psychiatric services vary widely and little attempt has been made to test their validity and reliability. Studies mainly use subjective measures of compliance which rely on recall from patients, families or healthcare professionals, as opposed to more objective measures. No single method is widely accepted for measuring compliance (Owen et al, 1996) and concordance across different measures of compliance is often low (Fenton et al, 1997). The methods for measuring compliance are described below, first for medication compliance and then for compliance with psychiatric services.

1.1.3.1. MEASURING COMPLIANCE WITH MEDICATION

a.   Objective Measurements:

Medical or community casenotes.

These provide a record of the patient's progress and compliance with medication. They contain information from contact with patients, families and mental health professionals from out-patient appointments, home visits, phone calls and Care Programme Approach meetings. They are reliant on the record keeping skills of the clinician however, as well as casenotes not getting lost.

Depot medication cards.

An accurate record is kept for each patient prescribed depot neuroleptic medication regarding the type, amount and frequency of administration of depot medication. If a

depot is missed, this is accurately recorded and any known reasons for missing the depot injections, for example holidays or admission to hospital, are documented.

Prescription cards.

These are especially relevant for in-patients, where it is accurately recorded whether a patient has received their prescribed medication or not. However, some patients may still secretly dispose of their medication (Ballinger & Irvine, 1999).

Prescription renewals from General Practitioners.

General Practitioners keep a record of whether patients have collected repeat prescriptions from their surgeries. This is not a guarantee of compliance but may act as a guide.

Blood sampling.

Patients prescribed lithium and carbamazepine often have blood levels taken as part of clinical practice to determine if the blood level is within the therapeutic range.

The presence or absence of certain neuroleptic drugs can also be determined by taking blood samples. However this is extremely expensive, only carried out in a few centres in the country and there is enormous variation in plasma levels of most neuroleptics in patients on the same dose (Van Putten et al, 1991).

Urine analysis.

Urine analysis can ascertain the presence or absence of a drug excreted in a patient's urine. There are various methods used to do this, for example chromatography or estimation of amphetamine-like substances. Urine analysis is problematic for several reasons including errors of collection, laboratory errors and differences in metabolism between individual patients. False positive results may occur during oestrogen therapy, with liver failure or during pregnancy (Blackwell, 1976). Some drugs, for example phenothiazines, continue to be excreted in urine at high levels for some time after the

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dose has been reduced or the drug discontinued, which could result in rates of non-compliance being underestimated.

Saliva analysis.

Human saliva has been used for checking compliance and therapeutic drug monitoring with a variety of psychotropic medications. Saliva can be obtained easily with minimal discomfort to the patient. Saliva and blood concentrations are highly correlated for carbamazepine (Liu & Delgado, 1999) and clozapine (Dumortier et al, 1998). Saliva monitoring has been used in a depot neuroleptic clinic and a methadone maintenance programme (El Guebaly et al, 1981). but is generally not widely accepted in clinical practice.

Hair analysis.

There has been some interest in using human scalp hair for therapeutic medication monitoring, including neuroleptic and antidepressant medication. Human scalp hair retains information about the degree and duration of medication exposure over several months. To obtain accurate information from hair analysis however, the rate and uniformity of hair growth must be examined and hair colour, sampling techniques and washing procedures can affect the contents of medications in hair (Uematsu, 1994). This procedure has not been used to rate compliance with medication as yet.

Pill counts.

Random pill counts can give an indication of whether the patient has been taking their tablets. However, this relies on the patient not disposing of their untaken tablets by other means. Porter (1969) found that 3 out of 19 patients prescribed imipramine had negative urine tests but accurate pill counts. In general, pill counts overestimate the consumption of medication (Meredith, 1998).

Electronic monitoring devices.

Electronic monitoring approaches use devices incorporated into the medication dispensing system, for example, electronic caps on medication containers. They are reported to be superior to any other available monitoring approach (Meredith, 1998), but are too expensive for application in routine patient care.

b.   Subjective measurements:

Most studies rely on subjective recall from patients, informants or mental health professionals at set time intervals. This may not be an accurate record as it is subject to errors of recall and depends on how well an informant knows the patient. The patient may also find it difficult to admit to poor compliance. Willcox et al (1965) found that 31% of psychiatric out-patients who claimed to be taking their medication had a negative urine test. McClellan & Cowan (1970) found that psychiatrists erred in up to 20% of their predictions concerning which out-patients were taking their medication. Most of the mistakes were in the direction of believing that patients were not taking their medication when in fact they were.

Cuffel at al (1996) found no significant correlation between patient's and informant's ratings of medication compliance using a 5 point scale at baseline and six month follow up.

1.1.3.2. MEASURING COMPLIANCE WITH PSYCHIATRIC SERVICES

a.   Objective Measurements:

Medical or community casenotes.

These provide a record of every out-patient attendance as well as recording missed appointments and if patients have dropped out of services. They may also record whether a formal or informal carer attended with the patient.

Hospital database systems.

These are useful to check the reliability of casenotes as attendance or non-attendance at out-patient appointments is recorded for every patient.

b.   Subjective measurements:

Some studies rely on subjective recall from patients, informants or mental health professionals at set time intervals. However, as can be seen in Table 1b (page 37), most studies use the objective measures outlined above.

1.1.4. PREVALENCE OF NON-COMPLIANCE

Compliance rates are dependent upon various factors including the population studied, the stage of illness, the treatment setting and the treatment prescribed. These should all be clearly defined in a study of compliance.

Table 2 (pages 38-42) illustrates compliance rates with medication and psychiatric out-patient appointments for psychiatric patients of different diagnostic groups in different treatment settings. The studies range from those which just did an evaluation once (Ballinger et al, 1974) to a follow up study over 17 years (Lindstrom, 1994). Some studies quote compliance rates after an intervention but these were not included in the table.

Table 2a (pages 38-40) lists 48 studies of non-compliance with medication. In 16 of these there are reports of non-compliance rates of over 50%, at least in some groups of patients. The majority of studies show non-compliance rates of between 20% and 40%.

Table 2b (pages 41-42) lists 15 studies of non-compliance with psychiatric out-patient appointments. Again, approximately a third of studies have non-compliance rates of over 50%. Therefore, non-compliance with medication and psychiatric out-patient

appointments is a major clinical problem, putting patients at risk of relapse of illness and hospitalisation.

1.1.4.1. RATES OF NON-COMPLIANCE WITH MEDICATION

a.   Differences in the populations studied

Non-compliance with medication is a significant problem, but not only for psychiatric patients. Non-compliance with prescribed medication occurs in as many as one-third to one-half of general medical patients. Rates of non-compliance among psychiatric patients are likely to be at least as high as 50% (Amdur, 1979).

Most of the studies on psychiatric patients have focused on out-patients with schizophrenia (Table 2a, pages 38-40), with rates of non-compliance ranging from 4% to 80% (Heyscue et al, 1998; Serban & Thomas, 1974). These figures from Table 2a are similar to those of Fenton et al (1997) who quote 15 subsequent studies using varying definitions of non-compliance for patients taking oral and depot medications. They reported a median one month to two year non-compliance rate of 45% (range 23%-76%). The lower non-compliance rate of 4% in Table 2a (Heyscue et al, 1998) was from a particular study which attributed this to the intense relationship between patients and healthcare workers at the sites of the study.

The compliance rates quoted in Table 2a illustrate the diversity even within the same diagnostic group. This is most likely to be a reflection of the different methodologies employed and the need to standardise methods of studying compliance (Wright, 1993).

Compliance rates for patients with bipolar affective disorder prescribed lithium were originally quoted as being quite low comparatively. In a review of seven studies, Van Putten (1975) refers to 20% - 30% of patients who discontinued lithium against medical advice. More recent studies have quoted higher rates of non-compliance for

this patient group, ranging from 34% to 67% (Strakowski et al, 1998; Jamison et al, 1979; Miklowitz et al, 1986, see Table 2a).

Compliance rates for patients with unipolar depression who are seen in psychiatric out-patient clinics range from 6% to 54% (Johnson, 1974; Frank et al, 1992; Demyttenare et al, 1998, see Table 2a). The rates of compliance for patients with depression seen at general practice surgeries are lower, with non-compliance rates of 32% to 65% quoted (Johnson, 1974; Maddox et al, 1994; Peveler et al, 1999, see Table 2a).

Therefore, although there are only a few studies on compliance with medication in patients with affective disorders, they do suggest that it is a significant problem.

b.   Differences in stage of illness

In general, compliance is said to be poorest when the illness is prolonged, treatment is prophylactic or suppressive and the consequences of stopping treatment are delayed. In disorders sharing these features, compliance declines over time (Blackwell, 1973). Weiden et al (1991) found non-compliance rates for patients with schizophrenia discharged from hospital to be at least 50% after one year and 75% at two years. Serban & Thomas (1974) found similar results for patients with chronic schizophrenia. From Table 2a (pages 38-40), another group which seem to be at risk are patients with the first onset of their illness. Serban & Thomas (1974) compared patients with chronic schizophrenia to patients with the first onset of schizophrenia and found that non-compliance with medication was higher at baseline for the first onset patients (80% as opposed to 42%) and also at 2 year follow up (80% as opposed to 64%). Johnson (1974), investigating general practice patients with depression also found a higher non-compliance rate for new patients compared with chronic patients (65% as opposed to 46%).

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c. Differences in treatment setting

Compliance rates for psychiatric patients depend upon the treatment setting. Table 2a (pages 38-40) illustrates that the least compliant group when considering psychiatric patients as a whole, are out-patients (35% - 67% non-compliance), (Willcox et al, 1965; Irwin et al, 1971; Ruscher et al, 1997), then day-patients (37% non-compliance), (Hare & Willcox, 1967) and finally in-patients (6% - 32%), (Hare & Willcox, 1967; Irwin et al, 1971; Ballinger et al, 1974; Hoge et al, 1990; Ballinger & Irvine, 1999). It has been postulated that this is related to the amount of direct patient supervision (Irwin et al, 1971).

d. Differences in medication prescribed

Depot versus oral neuroleptic medication

Most of the literature relates to oral and depot neuroleptic medication (Table 2a, pages 38-40). There is uncertainty about whether patients prescribed depot medication are more compliant than patients prescribed oral medication (Weiden et al, 1995).

A 1986 review of 26 studies using a variety of definitions and detection methods to assess medication compliance among out-patients with schizophrenia reported a mean default rate of 41% (range 10%-76%) with oral medication and a lower rate of 25% (range 14%-36%) with depot injections over time periods up to one year (Young et al, 1986).

Conversely, studies which have recruited patients poorly compliant with oral medication and changed them over to depot medication have found little improvement in compliance rates (Van Putten et al, 1976; Falloon et al, 1978). Weiden et al (1995) converted half of their sample of in-patients with schizophrenia to depot medication, leaving the other half on oral medication and followed them up for one year. There was no difference at a year in compliance rates between the two groups, but the patients

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were not randomly assigned to the depot or oral regimens and so it is difficult to draw firm conclusions.

Atypical versus traditional neuroleptic medication

There has been interest in the atypical oral neuroleptic medications enhancing compliance because of their favourable side effect profiles (Hale, 1993), but there is little research evidence to substantiate this so far. Clozapine is thought to be particularly promising as it also involves regular, initially weekly contact, with the patients for blood testing.

Table 2a (pages 38-40) describes three studies investigating compliance with clozapine. Two of them compared compliance with clozapine and a traditional oral neuroleptic medication and in both instances compliance with clozapine was superior (Claghorn et al, 1987; Rosenheck et al, 1997). The third study followed up patients who had been prescribed clozapine for up to 17 years and report a remarkable low non-compliance rate of only 7% (Lindstrom, 1994).

1.1.4.2. RATES OF NON-COMPLIANCE WITH PSYCHIATRIC SERVICES

Non-compliance with psychiatric services is a significant problem, but has not been investigated to the same extent as non-compliance with psychotropic medication, even though some aspects may be simpler to monitor via hospital database systems (Corrigan et al, 1990).

Non-compliance with psychiatric services includes in-patient discharge against medical advice; non-compliance with out-patient appointments for a variety of treatments including medical care, psychosocial interventions, psychology and psychotherapy; non-compliance with day treatment and non-compliance with appointments in the community with mental health professionals or community services including general practice.

Psychiatric out-patient attendance is the service setting most studied, perhaps because it is a relatively standard form of service delivery available in most services and it remains the most common model used for monitoring patients in the community (Killaspy et al, 2000).

This review will concentrate on compliance with psychiatric out-patient appointments as this is investigated in the main trial. As with medication compliance, compliance rates for out-patient attendance vary according to the populations studied and the stage of illness of those patients, as well as the referral procedure (Table 2b, pages 41-42).

a. Differences in the populations studied

Rates of non-attendance at out-patient clinics is reported to be twice as high for psychiatric patients compared with most other specialities (McGlade et al, 1988). McGlade et al (1988) reviewed 167 patients referred to all out-patient clinics by their general practitioners over a three month period and found that 20% of patients did not attend their appointments. Amongst the psychiatric patients, the rate of non-compliance was 40%, but the numbers involved were low and this finding needs to be replicated. Jones (1987) reviewed all out-patient appointments for all specialities in Wales over a six week period and found a non-compliance rate of 17% which is similar to McGlade et al (1988). Jones did not divide the patients by specialities however.

Little research has compared diagnostic groups attending psychiatric out-patient clinics, but a study by Wilder et al (1977) found that patients with schizophrenia had the highest non-compliance rate (73%). This was replicated by Sparr et al (1993) who reported that schizophrenia or schizoaffective disorder were the most common diagnostic groupings for poor out-patient attendance, representing 32% (n=42) of the total sample.

b.   Differences in stage of illness

Table 2b (pages 41-42) presents fourteen studies investigating compliance with psychiatric out-patient appointments for new referrals and chronic patients.

In psychiatric out-patient clinics, the first appointment for a new patient has been the focus of most research because of the high rate of missed appointments and because more staff time is allocated for initial appointments compared to follow up appointments (Sparr et al, 1993).

In Table 2b, the rate of non-compliance with out-patient appointments for new referrals ranges between 26% to 86% and for follow up appointments between 19% and 64%. This does suggest that rates of non-compliance are higher in new referrals, but there is a wide range and the results should be interpreted cautiously.

c.   Differences in source of referral

Compliance rates with initial out-patient appointments are lower for patients referred from emergency services than patients referred from other sources such as their general practitioner (Chameides & Yamamato, 1973; Craig et al, 1974; Whyte, 1975; Wilder et al, 1977; Eisenthal et al, 1979; Carpenter et al, 1981, see Table 2b).

It has been postulated that some patients who use the emergency services may not attend a subsequent out-patient appointment because they prefer to continue using emergency services for the convenience of the extended opening times and because it requires few negotiations other than appearing and waiting (Wilder et al, 1977).

1.1.5. CONCLUSION

Non-compliance with medication and out-patient appointments is a significant problem for psychiatric patients with at least a third of patients having non-compliance rates of over 50%. Despite the compliance data being heterogeneous, involving various populations, different methodologies and definitions of good and poor compliance, there can be no doubt about the scale of the problem.

Proposals for standardised methods of investigating compliance should be welcomed. In 1979, Sackett and Snow reviewed 537 studies and found no more than 40 that satisfied their criteria: design, sample selection and specification, description of illness, description of therapeutic requirements, definitions of compliance and measures for assessing non-compliance. The anticipated length of the treatment and duration of follow up were also required. Therefore there is a lack of studies which are methodologically sound and reported adequately.

Ideally compliance should be measured using as many objective measurements as possible over an extended period of time. It is more practicable and non-invasive to use measures which are recorded routinely as part of clinical practice such as prescription cards, medical and community casenotes and hospital database systems. This is much more labour intensive than asking for subjective opinions from patients and their carers which may explain why it is less favoured. It should be made explicit how compliance was defined. It is preferable if compliance is expressed as a continuous variable rather than using categories which rely upon arbitrary cut-off points for good or poor compliance and may not be sensitive to subtle changes in compliance over time.

The next chapter will assess the factors which are associated with compliance with psychiatric treatment as a prelude to a description of possible interventions to improve compliance.

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Table 1.

Examples of rating scales for compliance
a. Medication

Author	Rating scale	Any further modification to rating scale
Patient's self report:		
Lin et al, 1979; Agarwal et al, 1998	Patient's self report. Non-compliant if: 1. Patient claimed not to be taking medication 2. Patient claimed he/she took medication only when he/she had a supply 3. The patient's family, case worker, GP or consultant claimed he/she had not been taking medication regularly 4. Patient discontinued medication on the disappearance of perceived symptoms	
Miklowitz et al, 1986; Cuffel et al, 1996; Owen et al, 1996	Patient's self report scale: 1 - never missed taking medication 2 - missed a couple of times but essentially took all prescribed doses 3 - missed several times but took at least half of the prescribed doses 4 - took less than half of the prescribed doses 5 - stopped taking medication altogether	Owen et al (1996): 1, 2 = compliant 3, 4, 5 = non-compliant
Miklowitz et al, 1988	Patient's, family's and clinician's reports and serum lithium levels: Non-compliant = at least one 3 month period in which patients were missing at least 1 dosage per week. Compliant = missed a maximum of 1 or 2 dosages per month throughout the 9 month follow up period.	
Tarrier et al, 1988; Tattan & Creed (in press)	Patient's and family's reports, depot cards and blood testing: 0 = complete compliance. 1 = medication missed for 1 month and/or occasionally missed oral medication or injections not resulting in the patient being without medication for 1 month 2 = medication missed for more than 1 and up to 4 months 3 = medication missed for more than 4 months	
Kelly & Scott, 1990	Patient's self report on following errors: 1. Ceased medication 2. Drinking alcohol instead of taking medication 3. Taking more or fewer doses in one day than prescribed 4. Taking a larger or smaller dose than prescribed	Drug discontinuation = patient took none of prescribed medication on 1 or more days during preceding week. Dosage deviation = patient took more or fewer of prescribed number or amount of doses on 1 or more days.
Adams & Howe, 1993	Patient's self report: 0%, 25%, 50%, 75% or 100% compliance	
Gardner & Hill, 1994	Patient's self report of failure to take prescribed depot medication for a period of 2 weeks to one year.	

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Author	Rating scale	Any further modification to rating scale
Patient's self report continued:		
Razali & Yahya, 1995	Patient's self report: Good compliance = patient did not miss more than 2 doses of medication on 2 separate occasions or 2 consecutive doses over a period of 2 weeks and did not default on more than 1 follow up visit since discharge. Poor compliance = patient did not meet both criteria.	
Weiden et al, 1995	The Treatment Compliance Interview (TCI). Patient's self report with TCI score of 1 -5: 1 = completely non-compliant 2 = mostly compliant 5 = completely compliant Given to a family member and clinician also and lowest score used. For patients on oral medication only: as above. For patients on depot medication only: ratio of received injections to scheduled injections. For patients on oral and depot medication: depot route used as primary measure of compliance, but the secondary measure of oral compliance could move the TCI score up or down 1 point.	TCI score analysed as a continuous variable initially. Then TCI score analysed as a categorical variable: 1, 2 = poor compliance 3, 4 = fair compliance 5 = excellent compliance
Ruscher et al, 1997	Patient's self report of non-compliance: 1. Changes in medication dosage or timing without discussion with a psychiatrist. 2. Discontinuation of medication since the patient began taking medication.	
Garavan et al, 1998	Patient's self report: 1. 0% - 24% compliance 2. 25% - 49% 3. 50% - 74% 4. 75% - 100%	1,2,3 = irregular compliance 4 = regular compliance
Strakowski et al, 1998	Patient's and clinician's reports: Full compliance - medication taken as prescribed Partial compliance - Some medication was not taken consistently, or that most or all medications were taken intermittently or at dosages lower than prescribed. Total non-compliance - complete discontinuation of all medication.	

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Report from healthcare professional only:

Author	Rating scale	Any further modification to rating scale
Van Putten, 1974	Report from healthcare professional: 1. Active and habitual refusal to continue taking any medication in hospital. The patient may spit out or 'tongue' the medication, and is convinced that it will harm or poison him/her. 2. Active and habitual refusal to take any medication after discharge, but will passively take medication in hospital. 3. Active and habitual refusal to take the prescribed dose, but will take a lesser dose. 4. Can be pressured into taking medication, but strongly dislikes taking it. 5. No drug reluctance. Patient usually 'likes' the medication.	
Van Putten et al, 1976	Report from healthcare professional: The drug refusers - patients who habitually refused to take maintenance medication. The drug compliers - patients who habitually took maintenance medication.	
Hogan et al, 1983	Therapist's 7 point scale from: 'habitual refusal of medication' to 'over-reliant on medication'	Habitual to occasional refusers = non-compliant group. No drug reluctance' and 'over-reliant' categories = compliant group.
McEvoy et al, 1989a	Nurses rated: 1. Active compliance - patient comes readily for medication at scheduled times. 2. Passive compliance - patient must be sought out for medication but does not resist when told to take medication. 3. Resistance - patient 'cheeks' medication but takes medication when they are repeatedly proffered. 4. Overt refusal - medication can only be given against patient's wishes or is not given.	Analysed as a continuous measure of compliance, quoting means and standard deviations.
McEvoy et al, 1989b	Aftercare clinicians asked if patients were: 1. Non-compliant (including partial compliance) 2. Compliant	
Hoge et al, 1990	Non-compliant with medication if 1. The patient indicated overtly by act or statement to the medical nurse their rejection of prescribed medication and 2. The patient maintained that rejection for more than 24 hours	
Drake et al, 1991	Case manager rated on a 5 point scale from: 'highly significant' support/strength to 'highly significant' stressor/weakness	
Sellwood & Tarrier, 1994	Consultant's report: Very non-compliant = in the long-term refused maintenance medication.	
Kemp et al, 1996	Report from patient's primary nurse: 1 = complete refusal 2 = partial refusal (e.g. refused depot) or accepts only minimum dose 3 = accepts only because compulsory, or very reluctant/requires persuasion, or questions need often (e.g. once every 2 days) 4 = occasional reluctance (e.g. questions need once a week) 5 = passive acceptance 6 = moderate participation, some knowledge and interest in medication and no prompting required 7 = active participation, readily accepts, and shows some responsibility for regimen.	

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Objective data sources:

Author	Rating scale	Any further modification to rating scale
Curson et al, 1985	From medical records, compliance with depot medication rated according to: 1. Clinic attendance for depot medication: Regular attender (fails 1 appointment in 100) Irregular attender (fails less than 1 appointment in 3) Intermediate attender 2. Place depot received: In clinic or at GP's more than 90% of the time At home more than 90% of the time Intermediate 3. Injection refusal: Never Once More than once	
Miller & Tanenbaum, 1989	Casenotes during admission. Non-compliant if 1. Refused medication on one or more occasions during admission. 2. Patient discharged him/herself against medical advice.	
Pan & Tantum, 1989	From depot prescription cards: Regular attenders at depot clinic = received injections regularly for at least 12 months before the study without missing a single injection. Irregular attenders at depot clinic = had missed their appointments for injections on 2 or more separate occasions in the previous 12 months with at least one of the missed appointments in the 4 months before assessment.	
Buchanan, 1992	From medical records, compliance with medication and out-patients: Good- more than 75% Average- 25% - 75% Poor - less than 25%	
Frank et al, 1992	Non-compliance if blood levels for imipramine deviated more than plus or minus 1.5 standard deviations on 2 occasions over the follow up period.	
Tunnicliffe et al, 1992	Dropout for patients prescribed depot medication = if treatment ceased on account of active refusal or loss of contact through persistent non-attendance at the clinic or avoidance of contact on home visits.	
Demyttenaere et al, 1998	Percentage of days when the correct dose was taken out of the medication container using an electronic medication event monitoring system	
Heyscue et al, 1998	From depot prescription cards: Compliance = ratio of kept appointments for depot medication to number of scheduled appointments for depot medication.	

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Table 1.

Examples of rating scales for compliance

b. Psychiatric services

Author	Rating scale	Any further modification to rating scale
Eisenthal et al, 1979	From hospital records: Adherence = if patient attended at least 1 treatment interview that was judged to be directly related to the initial acute psychiatric service referral.	
Axelrod & Wetzler, 1989	From hospital records over a 26 week follow up period: Non attenders = those who did not attend aftercare. Dropouts = those who attended aftercare between 1 and 21 weeks and then dropped out. Completers = those who attended aftercare for more than 21 weeks.	
Buchanan, 1992	From medical records, compliance with medication and out-patients: Good- more than 75% Average- 25% - 75% Poor - less than 25%	
Carrion et al, 1993	From records, compliance with out-patients = attending all monthly appointments during the follow up year.	
Sparr et al, 1993	Non-compliance with out-patients = any missed appointment over a 3 month follow up period.	
Owen et al, 1996	From medical records, compliance with out-patient services: 0 = no out-patient services 1 = 1-6 units of service representing up to 1 unit per month on average 2 = more than 6 units 1 unit = one visit to out-patient services during the 6 month follow up period.	
Miner et al, 1997	Non-compliance with out-patients = not attending at least 2 initial out-patient appointments after discharge from hospital.	

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Table 2. Prevalence of non-compliance with medication and psychiatric services for psychiatric patients

a. Medication

Sample	Author	n	Medication	Method	% of non-compliant patients
In-patients and day patients:					
Psychiatric in-patients	Hare & Willcox, 1967	120	Oral neuroleptics, antidepressants and anticholinergic medication	Urine analysis on 3 occasions at weekly intervals	19%
"	Irwin et al, 1971	67 on closed wards; 19 on open wards	Oral neuroleptic medication	Urine analysis on 2 occasions, 4 months apart	7% on closed wards; 32% on open wards
"	Ballinger et al, 1974	236	Oral psychotropic medication	Urine analysis on 1 occasion	6%
"	Hoge et al, 1990	1,434	Neuroleptic medication	Follow up over 6 months from nurse report	7%
"	Ballinger & Irvine, 1999	732	Psychotropic medication	Prescription cards during admission	18%
In-patients with schizophrenia	Claghorn et al, 1987	151	Chlorpromazine and clozapine	Not specified	24% for chlorpromazine, 8% for clozapine
"	Miller & Tanenbaum, 1989	55	Neuroleptic medication	Retrospective case note review during admission for refusal of medication on 1 or more occasions	43% patients with schizophrenia and substance misuse, 52% patients with schizophrenia only
"	Van Putten et al, 1990	91	Oral neuroleptic medication	Blood radioimmunoassay weekly. Time scale not specified	8%
Psychiatric day patients	Hare & Willcox, 1967	27	Oral neuroleptics, antidepressants and anticholinergic medication	Urine analysis on 6 occasions at twice weekly intervals	37%
Out-patients:					
Psychiatric out-patients	Willcox et al, 1965	125	Oral chlorpromazine and/or imipramine	Urine analysis on 2 occasions. Time scale not specified	48%
"	Irwin et al, 1971	40	Oral neuroleptic medication	Urine analysis on 2 occasions, 4 months apart	35%
"	Ruscher et al, 1997	148	Psychotropic medication	Retrospective recall over last 6 months and any previous history from patient's self report	67% in last 6 months. 47% at any time previously.
Out-patients with psychosis	Kelly & Scott, 1990	418	Not specified	Retrospective recall over past week from patient's self report	26%
"	Tunnicliffe et al, 1992	84	Depot neuroleptic medication	Follow up over 1 year. Data source not specified	21%

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Sample	Author	n	Medication	Method	% of non-compliant patients
Out-patients with psychosis	Adams & Howe, 1993	42	Not specified	Retrospective recall over past month before admission from patient's self report	62%
Out-patients with schizophrenia	Van Putten, 1974	85	Oral and depot neuroleptics	Follow up over 2 years post discharge from clinician's report	46%
"	Buchanan, 1992	61	Oral and depot neuroleptics	Follow up over 2 years post discharge from casenotes and urine analysis	41% at 1 year 49% at 2 years
"	Razali & Yahya, 1995	225	Oral and depot neuroleptics	Retrospective recall for 2 weeks before admission from patient's self report	73%
"	Weiden et al, 1995	93	Oral and depot neuroleptics	Follow up over 1 year post discharge from patient's self report	At one month: 8% - depot only, 26% oral only. At 1 year no difference.
"	Favre et al, 1997	59	Oral and depot neuroleptics	Follow up over 1 year of first onset of schizophrenia post discharge. Data source not specified.	More than 50%
"	Agarwal et al, 1998	78	Oral and depot neuroleptics	Retrospective recall over past year from patient's, family's and clinician's reports	38%
"	Garavan et al, 1998	70	Oral and depot neuroleptics	Retrospective recall over last 3 months from patient's self report	20%
"	Renton et al, 1963	124	Oral neuroleptic medication	Follow up over 1 year from patient's, family's and clinician's reports	46%
"	Willcox et al, 1965	125	Oral chlorpromazine	Urine analysis on 2 occasions. Time scale not specified	32%
"	Lindstrom, 1994	122	Clozapine	Follow up over 17 years from hospital records and patient's self report	7%
"	Rosenheck et al, 1997	423	Haloperidol and clozapine	Follow up over 1 year, double blind study from monthly patient self reports and treatment records	72% with haloperidol, 43% with clozapine
"	Johnson & Freeman, 1973	324	Depot neuroleptic medication	Follow up over 3 years. Data source not specified	18%
"	Curson et al, 1985	63	Depot neuroleptic medication	Follow up over 7 years from hospital records and GP casenotes	40%
"	Bartko et al, 1988	58	Depot neuroleptic medication	Follow up over 1 year post discharge. Data source not specified	52%
"	Gardner & Hill, 1994	34	Depot neuroleptic medication	Retrospective recall over 1 year prior to admission from patient's self report	68%
"	Heyscue et al, 1998	98	Depot neuroleptic medication	Retrospective review of depot prescription cards over past year	4%

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Sample	Author	n	Medication	Method	% of non-compliant patients
Out-patients with schizophrenia	Tattan & Creed (in press)	58	Depot neuroleptic medication	Retrospective review of depot prescription cards over past year	26%
"	Serban & Thomas, 1974	641	Not specified	Follow up over 2 years from patient's and family's reports	At baseline: 42% for chronic patients, 80% for first onset patients. At 2 years: 64% for chronic patients, 80% for first onset patients.
"	Hogan et al, 1983	150	Not specified	Retrospective recall by clinician over past year	54%
"	McEvoy et al, 1989b	36	Not specified	Follow up for 1 month after discharge from clinician's report	25%
"	McEvoy et al, 1989b	46	Not specified	Follow up for 2 - 3 years after discharge from clinician's report and casenote review	47%
"	Drake et al, 1991	75	Not specified	Follow up over 1 year from case manager's report	64%
"	Sellwood & Tarrier, 1994	256	Not specified	Clinician's report. Timescale not specified	20%
"	Owen et al, 1996	135	Not specified	Patient's self report for 1 month before admission and 6 months follow up	15% before admission, 36% at 6 month follow-up
Out-patients with affective psychosis	Strakowski et al, 1998	109	Antidepressants, mood stabilisers and neuroleptic medication	Follow up for 1 year after first hospitalisation from patient's, family's and clinician's reports	61%
Out-patients with bipolar affective disorder	Jamison et al, 1979	42	Lithium	Retrospective recall for lifetime history of non-compliance from patient's and clinician's reports	47% stopped once, 34% stopped twice or more
"	Miklowitz et al, 1986	24	Lithium	Follow up over 9 months post discharge with patient's, family's and clinician's reports	67%
Out-patients with unipolar depression, new referrals	Johnson, 1974	167	Antidepressants especially tricyclics	Follow up over 1 month with tablet counts on 2 occasions	54%
Out-patients with unipolar depression	Frank et al, 1992	53	Imipramine	Follow up for 3 years with monthly blood levels	15%
"	Demyttenaere et al, 1998	66	Fluoxetine or amitriptyline	Follow up over 9 weeks with electronic medication monitoring	6% for fluoxetine, 35% for amitriptyline
GP patients with depression	Johnson, 1974	194	Antidepressants especially tricyclics	Follow up over 1 month with tablet counts on 2 occasions and GP records	65% for new patients 46% for chronic patients
"	Maddox et al, 1994	46	Antidepressants	Follow up over 6 weeks from pill counts and GP records	32%
"	Peveler et al, 1999	250	Prothiaden or amitriptyline	Follow up over 1 year with patient's self report and electronic medication monitoring	50-60%

Table 2. **Prevalence of non-compliance with medication and psychiatric services for psychiatric patients**

b. Psychiatric out-patient attendance

Sample	Author	n	Psychiatric Service	Method	Percentage of non-compliant patients
New referrals:					
All psychiatric patients presenting acutely at emergency psychiatric services	Chameides & Yamamoto, 1973	153	First out-patient appointment after emergency visit	Casenotes for record of first follow up appointment	64%
"	Craig et al, 1974	238	"	Not specified	75%
"	Wilder et al, 1977	106	"	Casenotes for record of first follow up appointment	57% for all diagnostic groups; 73% for patients with schizophrenia, 43% for patients with psychotic depression
"	Eisenthal et al, 1979	130	At least one follow up appointment after emergency visit at acute psychiatric services, special programmes, social services or psychotherapy	Hospital database and medical casenotes for record of at least one follow up appointment.	59%
"	Carpenter et al, 1981	1,106	First follow up appointment at community mental health centre	Not specified	31%
New referrals to psychiatric out-patient clinics	Whyte, 1975	68	First out-patient appointment after referral	Not specified	26%
"	Killaspy et al, 2000	224	Out-patient appointments	Follow up over 1 year from casenotes. Patients rated as attenders or nonattenders based on their first appointment during the study period	Overall rate for all patients (new and ongoing): 40%. New attenders: 54% New nonattenders: 86%
Patients with ongoing out-patient appointments:					
Psychiatric out-patients	Sparr et al, 1993	669	Out-patient appointments	Follow up over 3 months. Data source not specified	19%
"	Killaspy et al, 2000	224	Out-patient appointments	Follow up over 1 year from casenotes. Patients rated as attenders or nonattenders based on their first appointment during the study period	Follow up attenders: 29% Follow up nonattenders: 64%
Out-patients with schizophrenia	Carrion et al, 1993	111	Out-patient appointments	Follow up over 12 months from questionnaires rated by clinician	23%

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Sample	Author	n	Psychiatric Service	Method	Percentage of non-compliant patients
Psychiatric patients post discharge	Axelrod & Wetzler, 1989	134	Aftercare programmes including psychiatric out-patient clinics, psychotherapy and day treatment	Follow up over 6 months from hospital records	30% for first appointment only; 60% over 6 month follow up period
Out-patients with schizophrenia post discharge	Serban & Thomas, 1974	641	Out-patient appointments	Follow up for 2 years from patient's and family's reports	41% for chronic patients; 39% for first onset patients.
"	Buchanan, 1992	61	Out-patient appointments	Follow up over 2 years from casenotes	38% at 1 year; 42% at 2 years
"	Owen et al, 1996	135	Out-patient appointments, partial hospitalisation services and case manager contacts	Follow up over 6 months from medical records	29%
Out-patients with schizophrenia and substance misuse post discharge	Miner et al, 1997	49	Out-patient appointments	Follow up of first 2 out-patient appointments post discharge. Data source not specified	37%

a - New referrals refers to patients with their first episode of illness or referral for a new episode of illness.

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1.2 FACTORS ASSOCIATED WITH POOR COMPLIANCE WITH PSYCHIATRIC TREATMENT IN PATIENTS WITH SEVERE MENTAL ILLNESSES

1.2.1. INTRODUCTION

Despite the problems defining and measuring non-compliance with treatment, Fenton et al (1997) are right to observe that: 'Non-compliance is far better documented than understood'.

Most of the literature attempting to understand the reasons for non-compliance with treatment has been on patients with psychotic illnesses and concentrated on medication-related factors, especially neuroleptic medication (Kampman & Lehtinen, 1999). The patient group most represented are patients with schizophrenia. The majority of controlled studies containing detailed statistical analyses of predictive factors for compliance have been published only in the last decade.

Attempts to identify factors associated with non-compliance with treatment have yielded conflicting results with low consensus (Blackwell, 1976; Young et al, 1986). This may be attributed to factors described in the previous chapter including:

a. Differing methods for defining and measuring non-compliance with medication

b. Samples taken from differing populations

c. Low sample numbers

d. Short follow up periods and patients dropping out of follow up

Assessing the significance of separate factors is problematic. The paucity of good studies was highlighted by Kampman & Lehtinen (1999) in their major review of 67 papers on compliance in psychotic patients. They stated the problems of high drop-out rates during follow-up and many reports not including statistical data made it

impossible to produce a meta-analysis of different factors associated with compliance with treatment.

This review will present the literature on factors associated with compliance with psychotropic medication and psychiatric out-patient appointments in patients with severe mental illnesses.

1.2.2. FACTORS ASSOCIATED WITH POOR COMPLIANCE WITH MEDICATION

The variables studied in relation to compliance with psychotropic medication can be divided into four subcategories:

1. Factors associated with the patient.

2. Factors associated with the patient's illness.

3. Factors associated with medication.

4. Factors associated with administration.

1.2.2.1. FACTORS ASSOCIATED WITH POOR COMPLIANCE WITH MEDICATION RELATED TO THE PATIENT

a.   Socio-demographic factors

Socio-demographic variables have seldom been studied in isolation and they have not been consistently associated with compliance with medication (Buchanan, 1992; Fenton et al, 1997).

Fenton et al (1997) reviewed studies of medication compliance in patients with schizophrenia. They found eleven studies which investigated socio-demographic variables (Leff & Wing, 1971; Hoffman et al, 1974; Soskis, 1978; Hogan et al, 1983; Pan & Tantum, 1989; Buchanan, 1992; Draine & Soloman, 1994; Sellwood & Tarrier, 1994; Parker & Hadzi-Pavlovic, 1995; Razali & Yahya, 1995; Owen et al, 1996).

The only positive findings were that two of the studies found non-compliance was associated with age, especially young age; three studies found non-compliance was associated with gender, especially being male; one study found non-compliance was associated with ethnicity and being of African caribbean origin and one study found non-compliance was associated with being single. There was no association with income or educational level in any of the studies.

Since the above review was published, two further studies have also found an association with non-compliance with medication and being younger and male. This does not seem to be restricted to patients with schizophrenia. Demyttenaere et al (1998) investigated factors affecting compliance with antidepressants in 66 patients with major depressive disorder. A logistic regression analysis found that dropout from treatment was predicted by being male, younger in age and also the occurrence of side effects.

Agarwal et al (1998) investigated non-compliance with medication in patients with schizophrenia and also found that non-compliant patients were younger. Age categorisation showed a distinct cut-off at age 30 years, with only about a third of patients below the age of 30 years being compliant. The authors remark that younger patients may have a more assertive attitude in making choices and refer to the 'age 30 transition' described by Levinson (1986), when older adults tend to take life more seriously and go through a period of reappraisal. This theory is supported by the findings of Draine & Soloman (1994) who investigated attitudes to medication in a sample of patients with severe mental illness and found more positive attitudes towards complying with medication at an older age.

There is some evidence that housing stability may be associated with medication compliance. Baekeland & Lundwall (1975) reviewed studies of psychiatric populations and found that less socially stable patients were more likely to drop out of treatment. Drake et al (1991) add support to this, finding significantly poorer compliance with medication among patients who were in unstable housing situations.. They studied 75 patients with schizophrenia or schizoaffective disorder in a rural setting in New England and found that 19 patients had unstable housing situations, and of these three quarters had problems with medication compliance. These results were replicated in an urban area also (Drake et al, 1989).

Therefore the literature suggests that although the evidence for socio-demographic factors being of importance in non-compliance with medication is not absolute, there are some factors which probably do contribute including being male, younger in age and being in an unstable housing situation. Unfortunately the literature suffers from having too few studies which systematically investigate socio-demographic factors as being important in non-compliance with medication.

b.   Previous compliance with medication

One of the most commonly reported findings in research into compliance is that past behaviour predicts future behaviour (Buchanan, 1992). Buchanan studied 61 patients with schizophrenia and found that previous failure to adhere to medication regimens was significantly associated with non-compliance with medication two years later.

c.   Health beliefs, attitudes and illness behaviour.

Health belief models emphasise a patient's subjective assessment of the risks and benefits of treatment in the context of personal values and goals (Fenton et al, 1997). Health belief models are widespread in medicine, but may require modification in

patients with severe mental illnesses as cognition and motivation may be directly affected by illness processes.

The association between specific health beliefs and medication compliance is ambiguous. Kelly et al (1987) found that greater perceived susceptibility to rehospitalisation was associated with better medication compliance. Hogan et al (1983) also found that out-patients with schizophrenia who were rated by their clinicians as generally compliant with medication were more likely to believe that staying on medication would prevent a relapse. Non-compliant patients believed that medication should only be taken when they felt sick, that it was unnatural to take medication and that it would harm them physically.

Indeed, Hogan et al (1983) devised the Drug Attitude Inventory Scale consisting of true or false statements that measured the patient's model of health, their attitudes towards the locus of control in taking medication, their belief in the effect of maintenance medication and their concerns about the potential toxic effects. The scale could accurately assign 89% of 150 patients with schizophrenia to compliant and non-compliant grouping as rated by the patients' therapists. Maximum variability in responding was accounted for by items reflecting how the patient felt on medication, rather than what he knew or believed about it.

In contrast, Pan & Tantum (1989) found no difference in beliefs about the possibility of relapse if maintenance medication was stopped between regular and irregular attenders at a depot clinic. Buchanan (1992) found no association between compliance and self-appraisal of the likelihood of becoming ill again. Serban & Thomas (1974) found that most in-patients with schizophrenia who reported that they did not use prescribed medication between hospitalisations failed to do so despite their expressed beliefs that

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regular medication would be helpful. This disjunction between health beliefs and behaviours is not unique to patients with severe mental illness.

It is interesting to explore the psychological meaning of taking medication for patients in more detail. Patients who feel strongly about authority and control may be particularly prone to non-compliance (Amdur, 1979). Patients who already have feelings of passivity and loss of control as a result of their illness may express autonomy by not complying (Van Putten, 1974). Gutheil (1977) noted that some patients may concretely equate medication with feeling sick and make assumptions such as the higher dose they are on, the sicker they must be and they will stop being sick if they stop taking medication.

Book (1987) describes several dynamic issues affecting compliance including a paranoid patient's experience of feeling controlled, poisoned or invaded by medication; medication being a reminder of illness for patients who make extensive use of denial and the possibility that patients' attitudes to medication are influenced by identification with relatives who received similar medication and experienced poor outcomes such as suicide.

Falloon (1984) noted that some patients fear that prolonged medication may lead to dependence and addiction, or equate the need for medication with having a weak character. Taking medication may also be equated with physical or psychological weakness so that the recovering patient who feels strong enough may stop taking medication (Amdur, 1979). Non-compliance in this context may be a test to determine whether the illness is still present (Morris & Schulz, 1993).

Blackwell (1976) speculates that poor compliance with medication elicits caretaking responses from the environment and mental health services and these enable the patient to avoid the anxieties of independent existence and adopt the sick role.

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1.2.2.2. FACTORS ASSOCIATED WITH POOR COMPLIANCE WITH MEDICATION RELATED TO THE PATIENT'S ILLNESS

a.   Severity of psychiatric symptoms

There are difficulties when comparing severity of illness in compliant and non-compliant groups of patients at any point in time, as a finding of greater severity of symptoms in patients who are poorly compliant may be a result of poor compliance rather than a cause of it (Sellwood & Tarrier, 1994).

One way to approach this is to establish whether severity of illness is a predictor of later compliance. In their review of factors affecting medication compliance in patients with schizophrenia, Fenton et al (1997) found that four studies reported a positive association with symptom severity on discharge from hospital and later medication non-compliance as an out-patient (Renton et al, 1963; Van Putten et al, 1976; Kelly at al, 1987; Pan & Tantum, 1989). Another study found symptom severity and poor attitudes to compliance to be significantly associated (Draine & Soloman, 1994).

The review quotes only one study (Ayers et al, 1984) which found no relationship between symptom severity at discharge and subsequent medication compliance. However, Bartko et al (1988) report similar findings.

Therefore, overall the majority of evidence suggests that greater severity of symptoms is a predictor of subsequent medication non-compliance.

b.   Illness profile

Psychotic symptoms

Several studies have shown no difference in symptom profile between patients with schizophrenia who are compliant and those who are poorly compliant with medication (Pan & Tantam, 1989; Buchanan, 1992).

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However, two studies suggest that grandiosity occurring in an acute episode of either schizophrenia or hypomania is associated with poorer medication compliance (Van Putten et al, 1976; Bartko et al, 1988). Both studies rated grandiosity using the Brief Psychiatric Rating Scale (Overall & Gorham, 1962). They interpret the findings to mean that some patients may prefer an ego-syntonic grandiose psychosis to a relative drug-induced normality (Van Putten et al, 1976).

The presence of persecutory delusions were implicated as affecting compliance by Wilson & Enoch (1967) but their sample number was small and other authors have failed to replicate these findings (Van Putten et al, 1976; Bartko et al, 1988).

Non psychotic symptoms

The literature investigating the association between non psychotic symptoms, for example depression and anxiety, with non-compliance with medication in patients with severe mental illness suffers as studies have not used valid and reliable specific rating scales for depression and anxiety.

Hence the studies have conflicting results. Pan & Tantam (1989) found that irregular attenders at a depot clinic were significantly more depressed than regular attenders. Depression was measured as a single item on the Manchester Scale - a global measure of psychopathology (Krawiecka et al, 1977). The authors state that 30% of the patients who were poorly compliant compared with 17% of the patients who complied well suffered from clinically significant depression (a score of two or more on the Manchester Scale).

However, Van Putten et al (1976) found that patients who complied with medication actually rated significantly higher for anxiety and depression as measured on the Brief Psychiatric Rating Scale (Overall & Gorham, 1962) compared with patients who refused medication.

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Negative symptoms of schizophrenia

There is a considerable lack of studies investigating the possibility of an association between negative symptoms of schizophrenia and poor compliance with medication (Hale, 1993).

There is only one study which has investigated compliance with medication and negative symptoms of schizophrenia using a standardised measure of negative symptoms (Tattan & Creed, in press). The authors found a significant association between poor compliance with depot neuroleptic medication and greater severity of negative symptoms using the Scale for the Assessment of Negative Symptoms (Andreasen, 1982). Avolition, apathy and alogia were the most influential negative symptoms. The authors speculate that patients with avolition and apathy may find it difficult to motivate themselves to receive their medication. They may be reluctant to attend for depot medication as they feel it does not help these residual symptoms. They may not appreciate the beneficial effects depot medication has on their positive symptoms, tending to focus on the limited effect medication has on the negative symptoms from which they still suffer. Patients with alogia (impoverished thinking and cognitions) may lack understanding about the illness and the need to take medication and also have difficulties with social interactions at the clinic and communication about depot arrangements.

The only other references to negative symptoms and compliance in the literature involve certain aspects of negative symptoms being rated using more global measures of psychopathology. Pan & Tantam (1989), using the Manchester Scale (Krawiecka et al, 1977) and Bartko et al (1988), using the Brief Psychiatric Rating Scale (Overall & Gorham, 1962) found no significant differences in negative symptom severity between

the compliant and non-compliant patients, but this could be attributable to the assessment instruments used.

Insight

David (1990, 1992) has divided insight into the following three dimensions:

1. The patient's recognition or awareness of the illness and the realisation that the illness is mental.

2. The patient's ability to relabel the experience of certain mental events as pathological.

3. Treatment compliance.

Fenton et al (1997) reviewed studies assessing the relationship between insight and medication compliance in patients with schizophrenia. Insight was measured using a variety of self-report measures of illness awareness. They found that poor insight was consistently associated with non-compliance with medication and divided the studies into four categories:

1. Four studies reported a significant association between poor insight at hospital admission, on discharge or at the post discharge assessment and subsequent poor out-patient compliance with medication (Nelson et al, 1975; Van Putten et al, 1976; Bartko et al, 1988; MacPherson et al, 1996a, 1996b).

2. Three studies reported a significant association between poor insight assessed at admission or during hospitalisation and medication non-compliance among in-patients (Lin et al, 1979; Marder et al, 1983; McEvoy et al, 1989a).

3. One study reported that an awareness of illness and medication compliance were related only when measured concurrently, perhaps reflecting that both insight and compliance can fluctuate according to the patient's clinical state (Cuffel et al, 1996).

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Therefore, a significant relationship between insight and compliance has been replicated in a variety of treatment settings. However, the situation is more complex as some patients who have little insight into their illness still accept medication and not all patients with insight will take medication. To illustrate this, Van Putten et al (1976) compared 29 patients who habitually refused medication with 30 patients who complied with medication. All patients had schizophrenia and had been admitted to hospital. Drug compliance was assessed by staff member who had the closest relationship with the patient and had known them for a number of years. Insight was determined using the World Health Organisation definition and it was found that 7 of the 29 patients who refused medication had insight into their illness compared with 18 of the 30 patients who complied with medication.

c. Social functioning

Patients with schizophrenia may have poor social functioning, especially if their illness is chronic. Draine & Solomon (1994) sought to determine the relative roles of social relations, social activity and social networks in explaining attitudes towards medication compliance. They studied 96 patients with severe mental illness and found that more extensive social relations, indicating a tendency to having engaged in a variety of daily activities, made a significant contribution in explaining more positive attitudes towards medication compliance. Attitudes towards medication was measured by a questionnaire devised by Streicker & Dincin (1986).

The authors speculate that building and enhancing social skills, which may have been affected since the onset of illness, enables participation in activities available to the patient and makes community life seem worth living. This may have an impact on medication compliance to try to keep well and therefore maintain their existence in the community.

The authors measured subjective attitudes to medication compliance by the patients rather than measuring compliance itself. There is an advantage to this, as if compliance itself had been measured only, those who were compliant with medication may have had better social relations partly because of improved symptomatology.

Draine & Soloman (1994) studied a population with a need for intensive out-patient care. However, Taylor & Perkins (1991) studied a group of long-term rehabilitation patients and found the opposite, that good performance in social activities and community skills was related to poor compliance with medication.

d.   Cognitive function

Studies considering cognitive functioning and compliance are rare and the effect of cognitive disturbances on compliance in patients with severe mental illnesses is unclear (Kampman & Lehtinen, 1999).

Neither premorbid IQ (Adams & Howe, 1993; Kemp & David, 1996), Mini Mental State Examination score on discharge (Folstein et al, 1975; Buchanan, 1992; Kemp & David, 1996) nor neurobehavioural cognitive status examination results (Cuffel et al, 1996) have been predictive of subsequent compliance. The potential association between specific neuropsychological deficits and compliance has not been explored. A significant proportion of out-patients however attribute non-compliance with medication to forgetting (Hoffman et al, 1974) or indicate that reminders to take medication would be helpful (Serban & Thomas, 1974).

e.   Comorbidity with substance abuse

Comorbidity with alcohol or other illicit substances is common among patients with severe mental illness. The Epidemiologic Catchment Area study found that 47% of patients with schizophrenia had a life-time diagnosis of a substance misuse disorder

(Regier et al, 1990). There is evidence that substance abuse is a strong predictor of non-compliance with medication (Fenton et al, 1997).

Owen et al (1996) reported that substance abuse in the month before admission was the strongest predictor of non-compliance among patients with schizophrenia at the six month follow up assessment. Substance abuse increased the risk of non-compliance eight fold and interacted with poor out-patient attendance to result in poor clinical outcome.

Two studies have investigated the relationship between alcohol abuse only and medication compliance. Drake et al (1989) investigated 115 patients with schizophrenia and found that 45% were occasional and 23% were heavy alcohol users. More severe alcohol abuse was associated with medication non-compliance, homelessness, disorganised and hostile behaviour, medical problems and frequent hospitalisations over the one year follow-up period. Pristach & Smith (1990) studied 42 patients with schizophrenia admitted to an acute psychiatric in-patient unit and gained information about the use of alcohol prior to the admission. During the month before admission, 57% of patients admitted to drinking alcohol. The majority of these patients (72%) were non-compliant with prescribed medication prior to hospital admission and 62% reported being non-compliant specifically when drinking alcohol.

Of potential relevance to the relationship between substance abuse and medication non-compliance are reports that tardive dyskinesia and akathisia may be more prevalent among patients who abuse alcohol (Dixon et al, 1992).

f.   Illness history

Duration of illness and treatment and previous hospitalisations

Razali & Yahya (1995) found that non-compliant patients with schizophrenia had a longer history of treatment than compliant patients. Buchanan (1992) however found

no association between compliance and duration of illness and McEvoy et al (1984) found no association between compliance and age of first hospitalisation.

Data relating the number of previous hospitalisations to compliance are also contradictory. Among patients with severe mental illnesses who were non-compliant with medication at an index admission, three studies found they had more previous hospitalisations (Nelson et al, 1975; Pan & Tantum, 1989; Sellwood & Tarrier, 1994); two studies found fewer previous hospitalisations (Reilly et al, 1967; McEvoy et al, 1984) and one study found no difference (Hogan et al, 1983). These data do not support the contention that patients learn to adhere to medication after repeated relapses, but hospitalisation may improve compliance in the period immediately after discharge. Patients recently discharged from hospital most often follow the prescriptions carefully and the levels of compliance decline with time (Kane, 1985).

Previous compulsory detention under the Mental Health Act (1983)

Buchanan (1992) found that compulsory detention into hospital at the onset of his study significantly predicted poor compliance with drug treatment at two year follow up. Nineteen of the 61 patients studied had been detained under the Mental Health Act (1983) at the start of the study. Kemp et al (1996) also found that involuntary admission was predictive of poorer compliance with medication six months later.

Buchanan (1992) stated that perhaps compulsory detention against the patient's will made it less likely that he or she would conform with further treatment. Or perhaps there was another confounding variable, for example lack of insight, which meant the patient was compulsorily detained and this then persisted over time so they felt there was no need to take medication.

1.2.2.3. FACTORS ASSOCIATED WITH POOR COMPLIANCE WITH MEDICATION RELATED TO THE MEDICATION ITSELF

a.   Side effects of neuroleptic medication

Neuroleptic medication can potentially cause a wide range of side effects involving extrapyramidal, anticholinergic, hormonal, metabolic, cardiovascular and haematological systems. Extrapyramidal side effects are usually the most problematic (Johnson, 1977). Generally, the traditional neuroleptic drugs with greater potency for blocking D_2 dopamine receptors in the brain, for example fluphenazine and flupenthixol are more likely to cause extrapyramidal side effects than those of lower potency, for example chlorpromazine and thioridazine. Extrapyramidal side effects include:

- **Parkinsonism.** A syndrome of muscle rigidity, bradykinesia and tremor.

- **Acute dystonia.** Dystonia involves involuntary muscle contractions especially of the head and neck and can be acute or chronic.

- **Akathisia.** a distressing sensation of inner and motor restlessness, most prominent in the lower extremities.

- **Tardive dyskinesia.** This is characterised by involuntary choreoathetoid movements especially of the face, lips and tongue. It usually appears after prolong periods of neuroleptic therapy (Johnson, 1977).

Low potency drugs are more likely than high potency drugs to block receptors other than those of the dopaminergic system, thereby causing other adverse effects. For example, alpha-adrenergic blockade causes orthostatic hypotension; histamine H_1-blockade causes sedation and the blockade of muscarinic receptors causes anticholinergic side effects, for example dry mouth and blurred vision. Weight gain,

lower seizure threshold and cholestatic jaundice can also occur with low potency agents. Blockade of dopamine receptors may cause an increase in serum prolactin levels, resulting in amenorrhoea, galactorrhoea, impotence in men and decrease libido in both sexes.

The relative importance of side effects in determining medication compliance in patients with severe mental illnesses has been insufficiently explored (Sellwood & Tarrier, 1994; Kemp & David, 1996).

Assessing the presence of extrapyramidal side effects may be problematic for several reasons:

- Some studies only rely on clinical judgement for the presence or absence of extrapyramidal side effects (Curson et al, 1985; Buchanan, 1992) which depends upon the clinical skills of the researcher.

- Patients sometimes take anticholinergic drugs to treat extrapyramidal side effects and this is often not stated in the assessment of the presence of extrapyramidal side effects.

- The prevalence of extrapyramidal side effects is low, thereby large scale studies are required to see the size of effect. Curson et al (1985) in a seven year follow up study examined 63 patients taking neuroleptic medication for the presence of extrapyramidal side effects. They found a low prevalence of parkinsonian side effects over the seven years ranging from 3% for rigidity in a limb to 25% exhibiting tremor. All but one case was mild. There was no history of acute dystonic reactions amongst the 63 patients; 10 patients had akathisia which was mild in all cases and only 3 patients showed clinical evidence of mild tardive dyskinesia.

Marder et al (1983) found no difference in the history of side effects between two groups who either consented to or refused medication. However, they relied on the patient's subjective recall of a history of side effects.

Similarly, Pan & Tantam (1989) found no difference in the presence of extrapyramidal symptoms between 40 regular and 40 irregular attenders at a depot clinic using standardised measures of extrapyramidal side effects. They found on the whole that the extent of extrapyramidal side effects were mild. They state that their findings lend support to the impressions of Irwin et al (1971) and Hogan et al (1983) that mild extrapyramidal side effects are not associated with poor compliance with medication.

However, some studies have suggested that certain individual side effects are in fact related to poor compliance. Van Putten (1974) found that akathisia was more closely related to poor compliance than other side effects of phenothiazines. Buchanan (1992) found that the occurrence of akinesia was significantly related to poor compliance with neuroleptic medication two years later when he studied 61 patients with chronic schizophrenia. Other side effects such as drowsiness, akathisia, tremor and dystonia were not related to poor compliance. All measures of side effects were made on the clinical judgement of the researcher.

Some authors have actually found that patients who have side effects with phenothiazines comply better with their medication (Willcox et al, 1965). Reporting similar findings, Irwin et al (1971) suggested that the explanation for this was that patients may feel that the medication was "doing something".

b.   Subjective sense of well-being

There is evidence to suggest that patients who comply with medication have a greater sense of subjective well-being. They are more likely to report feeling better (Marder et al, 1983), feel that they are getting help (Buchanan, 1992), and endorse a direct (Hogan

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et al, 1983; Razali & Yahya, 1995) or indirect (Adams & Howe, 1993) beneficial effect of medication on their well-being.

Conversely, there is a significant association between an initial dysphoric response to a test dose of neuroleptic medication and subsequent medication non-compliance (Van Putten et al, 1981, 1984). A negatively changed subjective state, including slowing of thinking, inner restlessness, paralysis of volition, lack of psychic energy or a subjective experience of severe anxiety, also lead to negative attitudes and impaired compliance (Awad, 1993).

c. Medication regimes

Complexity of the medication regime

Parkin et al (1976) found that two aspects of medication regimes were linked with compliance: frequent divided doses and the total number of medications prescribed.

However, in a review of studies on medication compliance in patients with schizophrenia, Fenton et al (1997) found that only one (Razali & Yahya, 1995) of four studies identified a significant association between increased complexity of medication regimen and medication non-compliance. Hoffman et al (1974), Hogan et al (1983) and Buchanan (1992) found no such association.

Buchanan (1992) noted that nearly half of the 61 patients with schizophrenia he studied were prescribed medication three or four times a day at discharge from hospital without any associated decline in their compliance rates at two year follow up. The author states that this may be because the complexity of the drug regime had already been accurately titrated against the patient's capacity to understand and comply before they were discharged from hospital.

Dosages of medication

Among out-patients rated as less compliant with maintenance medication, there is discrepancy among neuroleptic dosages prescribed. Higher (Pan & Tantum, 1989), lower (Nelson et al, 1975) and no different (Hogan et al, 1983) dosages have been quoted for non-compliant patients. A curvilinear relationship between dosage and compliance seems likely, with very low doses associated with lack of efficacy and very high doses associated with excessive side effects (Fenton et al, 1997).

Type of medication

Few data are available that assess differential compliance rates to different agents. Carman et al (1984) found non-compliance rates as measured by serum and urine assays to be significantly higher among patients taking high-potency compared with low-potency agents (65% versus 13%).

i. Oral and depot preparations

Most of the literature relates to compliance rates with oral versus depot neuroleptic medication. This has been addressed in the previous chapter (pages 28 and 29) and the consensus is that patients prescribed depot rather than oral medication have improved compliance (Young et al, 1986). Also, the relapse rate among patients prescribed depot medication was lower than patients prescribed oral medication in a review of 35 studies (Davis et al, 1993). The authors suggest that was due to poorer compliance with oral medication.

However, changing patients to depot preparations does not seem to be an effective strategy to eliminate non-compliance. Van Putten et al (1976) found that 83% of habitually non-compliant patients with schizophrenia who were switched to depot medication from oral medication did not return with any regularity for their depot injections. Likewise, Falloon et al (1978) reported that 73% of patients discharged from

hospital, who had been irregular taking oral medication also missed at least one depot injection in the following year.

Although depot injections do not necessarily ensure medication compliance, non-compliance can be detected quickly and with certainty. Such non-compliance allows for an assessment of clinical impact for the individual patient and may trigger assertive interventions. For this reason, the major advantage of depot medication may be the ability to eliminate covert non-compliance as a cause of relapse (Schooler & Keith, 1993).

ii. Atypical and traditional neuroleptic medication

Atypical neuroleptics occupy D_2 receptors to a lesser extent than traditional neuroleptics and are characterised by equal or greater binding at 5-HT_{2A} sites. They therefore have a more tolerable side effect profile, with negligible extrapyramidal side effects at initial or moderate dosages (Marder, 1998).

Most of the literature regarding compliance with atypical neuroleptic medication has focused on clozapine. Clozapine is indicated for use in patients who have chronic schizophrenia, who are either refractory to other neuroleptics or intolerant of them. Between 30% and 61% of patients who were previously unresponsive to neuroleptic medication derive clinically significant advantages from treatment with clozapine (Lieberman et al, 1994). Patients who are treatment resistant are at high risk for non-compliance as there is little or no perceived benefit to taking medication (Marder, 1998).

In a comparative study with chlorpromazine, Claghorn et al (1987) demonstrated that treatment with clozapine in psychotic in-patients resulted in significantly better compliance: 24% of chlorpromazine treated patients discontinued medication, compared with only 8% of clozapine treated patients. A recent double-blind study that

compared clozapine (n = 205) with haloperidol (n = 218) in patients with treatment resistant schizophrenia found that 57% of clozapine treated patients continued taking their medication for the entire follow up year, compared with only 28% of haloperidol treated patients (Rosenheck et al, 1997). Clozapine treated patients experienced fewer extrapyramidal side effects and no tardive dyskinesia and had fewer mean days of hospitalisation compared with those treated with haloperidol.

1.2.2.4. FACTORS ASSOCIATED WITH POOR COMPLIANCE WITH MEDICATION RELATED TO ADMINISTRATION

a.   The relationship between doctor and patient

The process of interaction between doctor and patient has not been widely studied and the substantial methodological problems involved in investigating the nature of the relationship make it difficult to draw conclusions (Buchanan, 1992).

However, certain features seem to be important. Howard et al (1970) assessed psychiatrists by directly observing their interview technique and concluded that those with low dropout rates conducted more personalised interviews with a clearer structure and focus.

Eisenthal et al (1979) studied 120 new attenders at a psychiatric out-patient clinic who were then referred on for further psychiatric treatment. Thirteen per cent of these has psychotic illnesses. They found that compliance with later treatment was significantly related to negotiation at the initial interview, especially patient's participation in disposition and the clinician's understanding of the patient's request.

The evidence that a therapeutic alliance facilitates medication compliance finds empirical support in three studies. Nelson et al (1975) found that the single best predictor of medication compliance among patients with schizophrenia discharged from

hospital was the patient's perception of the clinician's interest in him or her as a person. Marder et al (1983) found that schizophrenic in-patients who accepted medication rated themselves as more satisfied with ward staff and their own clinicians, felt that their clinicians understood them, had their best interests in mind and had explained the reasons for taking medication and their potential side effects, compared with patients who refused medication.

Frank & Gunderson (1990) found that 74% of patients with schizophrenia who had only fair or poor therapeutic alliances rated at six months into psychotherapy failed to comply fully with prescribed medication regimens during the following eighteen months. In contrast, only 26% of patients with schizophrenia who had a good alliance with their therapist were subsequently non-compliant. In this study, the association between therapeutic alliance and medication compliance was independent of the patient's severity of psychopathology, type of dosage of medication or status as an in-patient or out-patient.

Given the unremitting, dysfunctional status of many patients with chronic severe mental illnesses and the expectation of little treatment gain, the clinician can easily assume an adversarial or paternalistic relationship with the patient (Corrigan et al, 1990). Countertransference, or feelings and attitudes evoked in the clinician by the patient, has also been described as potentially undermining medication compliance. Hopelessness and frustration in the face of patient non-compliance and a desire to see the patient 'taught a lesson' by suffering a relapse have been described as common countertransference reactions (Weiden et al, 1986; Book, 1987). The urge to abandon or humiliate the non-compliant patient may also be felt. In this respect, allowing the non-compliant patient who leaves treatment against medical advice to do so with

dignity can at least set the stage for more collaborative interactions should the patient return in the future (Diamond, 1983; Frances & Weiden, 1987).

From the patient's viewpoint in the context of a relationship perceived as authoritarian, the physical effects of medication may be perceived as rejecting, hostile or threatening (Sarwar-Foner, 1960) or as a bodily attack or invasion (Gutheil, 1977). Other interpretations may cast the prescription as a negative dismissal of the patient, or the patient may fear that a reduction of symptoms will be accompanied by a parallel reduction in the clinician's interest and attention.

An aspect that can undermine patient's commitment to the treatment plan is frequent changes of clinician or case manager (Amdur, 1979). Also the clinician's attitude to medication may be important. Irwin et al (1971) studied 40 out-patients with schizophrenia prescribed phenothiazine medication and looked for an association between medication compliance as assessed by analysis of urine and the clinician's attitude to the importance of neuroleptic medication. They found a trend towards increased compliance with doctors who thought medication was an essential component of out-patient management but this did not reach statistical significance. However the sample number was small.

b.   Supervision of patients

Supervision in the hospital setting

There is general agreement that increased supervision is associated with improved compliance with therapeutic regimes (Hare & Willcox, 1967; Irwin et al, 1971).

Irwin et al (1971) found a significant difference in medication compliance between closed locked wards where the staff: patient ratio was high at 13:10 and open wards where the staff: patient ratio was lower at 6:10. On the closed wards, 7% of patients

with psychotic illnesses stopped taking their medication, whereas on the open wards 32% of patients stopped taking medication. Hare & Willcox (1967) tested the compliance rates of 120 psychiatric in-patients, 27 day patients and 125 out-patients using urine analysis. Only 6% of in-patients had not been taking their medication for at least 24 hours before the time of the urine test compared with 15% of day patients and 33% of out-patients. No tests of significance were quoted, but this study confirms that the level of supervision in different settings corresponded with the level of medication compliance.

Discharge planning

Once a patient leaves hospital, the level of supervision that he or she receives in the community is determined by discharge planning. Caton et al (1984) studied the discharge planning processes at psychiatric in-patient units and their impact on 119 patients with chronic schizophrenia. The adequacy of discharge planning varied significantly amongst the in-patient units. The author attributed this to difference in communication between in-patient and out-patient staff, staff to patient ratios and staff effort. The authors found that the adequacy of discharge planning for aftercare treatment significantly influenced treatment compliance at three month follow up.

Supervision in the community by informal carers

A consistent finding has been the positive effects of a supportive family in ensuring medication is taken as prescribed (Blackwell, 1976; Kampman & Lehtinen, 1999).

Fenton et al (1997) found eight studies which indicated that patients with schizophrenia living with relatives or whose medication were supervised by relatives were more likely than those lacking such support to maintain compliance with prescribed neuroleptic medication (Parkes et al, 1962; Renton et al, 1963; Reilly et al, 1967; Hoffman et al,

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1974; Nelson et al, 1975; Van Putten et al, 1976; Buchanan, 1992; Razali & Yahya, 1995).

Sweeney et al (1984) found that 80% of a sample of patients with chronic mental illness who were accompanied to an out-patient appointment by family members subsequently took prescribed medication, whereas only 55% of a sample of unaccompanied patients subsequently complied with medication.

In some instances however, family dynamics may be detrimental. Families may be overconcerned about the patient's treatment compliance, especially families that are excessively enmeshed in the patient's activities, anxious and confused and overburdened by the patient's illness with unrealistic expectations about the patient's performance. Patients may react with resentment and acting out behaviour. Alternatively, families may be detached and unconcerned about the patient's treatment and patients may not receive the support and assistance they need (Corrigan et al, 1990). Medication may be an area around which family or interpersonal conflicts are enacted, so patients stop medication to express anger toward a relative or mental health professional (Kane, 1983).

Mantonakis et al (1985) looked for an association between negative attitudes to medication by families and the social and psychopathological background of the patients and relatives. They found no significant associations with the exception of a correlation between negative attitudes to medication and poor education of the relatives.

c.   **Treatment setting**

Patients who are subjected to long waits to see a psychiatrist in out-patients may have poor compliance to the instructions they receive from their clinician (Craig et al, 1974).

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The unattractive, institutional appearance of many clinics is a barrier to co-operation also (Corrigan et al, 1990).

1.2.3. FACTORS ASSOCIATED WITH POOR COMPLIANCE WITH PSYCHIATRIC OUT-PATIENT ATTENDANCE

There has been little research into the factors associated with poor compliance with psychiatric out-patient attendance as most of the literature has focused on compliance with psychotropic medication (Carrion et al, 1993). However, it is thought that the reasons for missed appointments are numerous and complex (Jones, 1987).

Psychiatric out-patients who are followed up in clinic mainly have a diagnosis of schizophrenia or bipolar affective disorder, whereas new referrals mainly have anxiety or depression (Johnson, 1973; Killaspy et al, 2000). A few studies suggest that patients with psychotic illnesses comply less well with out-patient attendance. Sparr et al (1993) found that 65% of non-attenders in a psychiatric clinic had a psychotic illness and Wilder et al (1977) found that those patients who did not attend for their follow up out-patient appointment after an emergency assessment were more likely to have a diagnosis of schizophrenia or psychotic depression.

This review will concentrate on patients with psychotic illnesses who are followed up in out-patients. They are the group investigated in the main trial and also appear to be the group of patients most at risk of non-attendance at out-patients.

The factors studied in relation to compliance with psychiatric out-patient attendance can be divided into two categories:

a. Factors related to the patient and the patient's illness.

b. Factors related to administration.

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1.2.3.1. FACTORS ASSOCIATED WITH POOR COMPLIANCE WITH OUT-PATIENT ATTENDANCE RELATED TO THE PATIENT AND THE PATIENT'S ILLNESS

Overall, socio-demographic variables are not particularly helpful in predicting poor compliance with out-patient attendance and factors related to demographic variables have not been replicated (Eisenthal et al, 1979; Carrion et al, 1993).

However, a few studies have had positive findings which suggest that being male or being young has a detrimental effect on out-patient compliance (Myers, 1975; Wilder et al, 1977; Sparr et al, 1993; Miner et al, 1997). They could be linked to a study by Perreault et al (1996) who investigated 464 patients' satisfaction with psychiatric out-patient services and found that their satisfaction significantly increased with age and women were more satisfied than men.

As regards illness variables, Killaspy et al (2000) followed up 365 psychiatric out-patients over a year and found that for follow-up patients, non-attenders had greater severity of mental illness and had lower social functioning than those who attended.

A few studies have found that patients with concomitant substance misuse are less likely to attend psychiatric out-patient clinics (Dubinsky, 1986; Sparr et al, 1993).

As regards previous history, Killaspy et al (2000) found that non-attenders were significantly more likely to have had an admission under the Mental Health Act (1983) and Buchanan (1992) found that non-attenders had a previous history of poor attendance at psychiatric out-patient appointments. The latter finding was replicated by Frankel et al (1989) who investigated medical and surgical out-patients and found that

twice as many non-attenders admitted to previous non-attendance at out-patient clinics compared with the patients who did attend.

Some studies have directly asked patients why they did not attend their appointment. The main reason was forgetting the appointment (Carrion et al, 1993; Sparr et al, 1993; Killaspy et al, 2000). Other common reasons were transportation difficulties (Carrion et al, 1993) and being too unwell (Killaspy et al, 2000).

1.2.3.2. FACTORS ASSOCIATED WITH POOR COMPLIANCE WITH OUT-PATIENT ATTENDANCE RELATED TO ADMINISTRATION

Again the research evidence is limited. Non-attendance at psychiatric out-patient appointments has been related to long waiting lists (Carpenter et al, 1981; Carrion et al, 1993; Eisenthal et al, 1979), elaborate intake procedures (Carrion et al, 1993), distance to the clinic (Carpenter et al, 1981) and fewer days between discharge from hospital and the first scheduled out-patient appointment (Axelrod & Wetzler, 1989).

However, these results conflict with other studies and it is difficult to draw conclusions (Sparr et al, 1993; Killaspy et al, 2000). Killaspy et al (2000) found that with psychiatric follow up patients there was no difference between attenders and non-attenders regarding waiting times, how often patients were seen or which clinician they saw.

1.2.4. CONCLUSION

The literature on factors associated with or predictive of non-compliance with treatment in patients with severe mental illnesses suggests that there are multiple possible causes of non-compliance. As non-compliance can have many causes, its

statistical association with any single factor is diluted by the presence of patients in the sample for whom other factors are causal (Fenton et al, 1997).

Also when an association is found between a factor such as alcohol abuse and non-compliance with medication, there may be confounding variables which complicate the picture, such as evidence that tardive dyskinesia and akathisia are more prevalent in patients who abuse alcohol.

Despite these difficulties, there is evidence to suggest that some variables are significantly associated with poor compliance with treatment for patients with severe mental illness. These can be divided into **patient factors**, for example being younger, male, having housing instability and a history of previous poor compliance with treatment or compulsory detention; **illness factors** including greater symptom severity, negative symptoms, grandiosity, diminished insight and comorbidity with substance abuse; **medication factors** including the type of medication and some side effects of medication and **administrative factors** including having a poor therapeutic alliance with the clinician and the level of supervision by formal and informal carers.

There is reasonable overlap in the factors associated both with poor compliance with medication and poor compliance with out-patient attendance in patients with severe mental illness.

There is conflicting evidence regarding some of the other possible variables studied, for example health beliefs and attitudes and social and cognitive functioning. This may be due to a lack of studies particularly focusing on these factors using standardised rating instruments, and also in some cases large sample numbers would be required if the

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factor under investigation was relatively rare, for example, the presence of some extrapyramidal side effects.

Information on factors associated with compliance with medication and psychiatric out-patient attendance is necessary if effective strategies for preventing non-compliance are to be formulated and at risk groups are to be targeted.

1.3. INTERVENTIONS TO IMPROVE COMPLIANCE WITH PSYCHIATRIC TREATMENT

1.3.1. INTRODUCTION

This chapter will review the literature on general and specific interventions designed to improve compliance with psychiatric treatment in patients with severe mental illness and, when possible, the clinical effects of changes in compliance rates.

Many strategies to improve compliance with treatment have been suggested, but few have been systematically evaluated (Kemp et al, 1996). One of the problems is that non-compliance can have many causes as detailed in the previous chapter and so the potential impact of interventions that focus on a single cause, for example, inadequate knowledge, is limited to those patients in the sample whose non-compliance derives from that cause (Fenton et al, 1997).

Ethical standards for compliance research dictate that attempts to increase compliance, with the potential resultant cost implications and risks to the patient such as side effects, must be judged by their clinical benefits, not just their effect on compliance rates (Haynes et al, 1999). Therefore in this chapter the effect that interventions to improve compliance have on clinical outcomes will be evaluated as far as possible. General guidelines to enhance compliance will be presented first and then the literature on more specific interventions will be described and critically evaluated.

1.3.2. GENERAL INTERVENTIONS TO IMPROVE COMPLIANCE

It could be argued that the following are not interventions, just good clinical practice in an ideal setting. Prior to considering these measures, each patient should have an assessment of their compliance history and risk factors, including substance misuse and financial or other practical barriers (Falloon, 1984).

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The general interventions that could be considered for firstly medication compliance and then compliance with out-patient appointments are described in Tables 3a and 3b (Blackwell, 1976; Falloon, 1984; Corrigan et al, 1990; Wright, 1993; Fenton et al, 1997).

Table 3a.   General interventions to improve *compliance with medication*

1. Patients and their families:
a. *Educate patient and family* regarding the illness, relapse prevention, and medication side effects. Offer destigmatising analogies to other diseases. Provide information leaflets. Repeat information several times.
b. *Enlist support in the community* including family. Use telephone calls, dosette boxes and other stimuli to *remind patients to take medication.* If needed, arrange for supervised medication administration.
c. *Promote the patient's participation in activities* that can compete with psychosis as sources of gratification and self esteem.
2. Medication:
a. *Maximise efficacy and minimise side effects* in choosing medications and dosages. Attend seriously to all side effects. Prescribe once daily dosages if possible.
b. *Consider treatment holidays or intermittent medication* when symptoms of relapse occur[a].
3. Doctor - patient relationship:
a. Use a *negotiated approach* to medication. Create a therapeutic environment where deviations from recommendations can be discussed openly, rather than concealed. Use simple terms. Show an interest in medication by asking in a nonauthoritarian manner how much is being taken and the effects. Involve the patient in medication treatment by allowing self-regulation of dosage, if possible.
b. If a patient will not comply, *manage countertransference* to allow for a continued relationship and the possibility of future treatment.

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[a]Carpenter & Heinrichs (1983) were able to monitor prodromal symptoms of relapse in schizophrenia and when they surpassed a critical level, medication was temporarily readministered. When the symptoms remitted, the medication was withdrawn. Although strategies based on the intermittent use of medication are associated with significant greater risk of relapse, they may be useful for patients who would otherwise absolutely refuse continued treatment contact.

Table 3b.   General interventions to improve *compliance with out-patient appointments:*

a. *Remind patients about appointments* by phone or by postal reminders.
b. Give *clear instructions* regarding location. Provide adequate car parking facilities.
c. *Improve clinic decor and ambience.* Encourage clerical staff to be pleasant to help avoid patients being socially anxious.
d. *Offer refreshment.*
e. Maintain realistic appointment schedules to *avoid long waits.*
f. *Avoid frequent changes of clinician.*

1.3.3. SPECIFIC INTERVENTIONS TO IMPROVE COMPLIANCE

1.3.3.1. RANDOMISED CONTROLLED TRIALS

Haynes et al (1999) conducted a Cochrane systematic review of randomised controlled trials of interventions to improve medication compliance in all medical specialties. They had stringent inclusion criteria for trials including the requirement to have measures of outcome as well as compliance, at least an 80% follow up rate for each group studied and at least six months follow up for long-term treatments.

The authors identified nineteen randomised controlled trials which fulfilled their criteria; five of these were in psychiatry (Strang et al, 1981; Xiong et al, 1994; Zhang et al, 1994; Chaplin & Kent, 1998; Kemp et al, 1998).

Ten of the nineteen interventions studied significantly improved medication compliance and nine interventions significantly improved treatment outcomes. The trials were too disparate in clinical problems, compliance interventions, measures and reporting of compliance and the clinical outcome measures studied to warrant metaanalysis.

The authors highlighted the following difficulties with the intervention trials:

1. Some studies had *small numbers of patients* and may have lacked power to detect clinically important effects. The authors state that as a general guide, studies with a single intervention group and control group need to include over sixty patients per group if they are to have a power of at least 80% to detect an absolute difference of 25% in the proportion of patients judged to have adequate compliance.

2. None of the studies clearly dealt with *preventing investigators from anticipating and influencing which group* their patients might be allocated to.

3. If 'usual care' was the control, there was no *'attention control'* and any effects observed could have been due to either the intervention proper or just the non-specific effects of increased attention.

4. The interventions that were effective for improving medication compliance were *complex and labour intensive* including various combinations of more convenient healthcare, information, counselling, reminders, self monitoring, reinforcement and other forms of additional supervision. Most studies that assessed successful complex interventions did not assess the separate effects of the components. Some authors did not adequately describe all parts of their interventions.

5. Most studies paid research staff to administer interventions raising the issue of *generalisability* to usual practice settings.

6. Some studies may have underestimated the treatment effects as most of the *measures of compliance were imprecise,* often relying on self-report which is known to overestimate compliance and could easily blur any differences between the groups. The measures were not often objective and, when subjective, the assessors were sometimes aware of the study group of patients, increasing the possibility of biased assessments.

7. None of the studies examined *major clinical endpoints* and the *follow up period was relatively short,* the longest being eighteen months. It has been recommended that any clinically relevant assessment of compliance with maintenance medication requires a follow up period of at least two years (McPhillips & Sensky, 1998).

8. None of the studies *adjusted for multiple comparisons.* Most of the studies had clearly presented univariate analyses but only a few had statistical challenges of the data including multivariate analyses.

9. Even the most effective interventions *did not lead to substantial improvements* in compliance.

10. Most studies failed to assess compliance after the intervention had been discontinued, precluding assessment of the *durability of the effect* in studies with positive findings.

11. The review considered *only published studies* and therefore the findings may overestimate the benefits of the interventions tested to date.

Therefore approximately half of the randomised controlled trials included in the systematic review demonstrated significant improvements in compliance with medication and treatment outcomes, but there were major methodological flaws and so it is difficult to draw conclusions.

The following sections will focus on the different interventions to try to improve compliance with psychiatric treatment, not just including randomised controlled trials.

1.3.3.2. EDUCATION

Education involves informing the patient about the nature of psychiatric illness and the therapeutic effects and side effects of medication (Hayward et al, 1995). One problem with educational programmes is that they often demand a large commitment of patient's and therapist's time (Eckman et al, 1992; Goldman & Quinn, 1988). Patients who attend such groups often have a high level of compliance and insight before the programme begins, and as a result, ceiling effects may make changes in compliance with medication hard to achieve (Smith et al, 1992).

Purely educational measures to improve compliance are based on assumptions that patients lack knowledge about their condition and its treatment and that attempts to

educate them have so far been inadequate (McPhillips & Sensky, 1998). However, evidence supporting these assumptions is equivocal. Clary et al (1992) found that on discharge from in-patient psychiatric care, the majority of patients have incomplete knowledge of the names of their medications and the regimen for taking them. Soskis (1978) found that patients with psychiatric disorders were better informed about side effects and the risks of medication than matched controls with physical illnesses, but less knowledgeable about the names and purpose of medication. Therefore while knowledge of medication among psychiatric patients may be deficient, it appears to be no worse than among medical patients (Soskis, 1978).

Most of the educational studies concentrate on patients with schizophrenia in in-patient and out-patient settings. The results of educational studies should make reference to changes in level of knowledge, compliance with treatment and clinical outcomes, but in practice, this is rarely the case.

The studies demonstrate a significant gain in knowledge by the patients receiving the educational intervention (Seltzer et al, 1980; Streicker & Dincin, 1986; Brown et al, 1987; Goldman & Quinn, 1988; MacPherson et al, 1996a; Chaplin & Kent, 1998). However, a study by Streicker & Dincin (1986) found that the knowledge was not retained at six month follow up.

Most of the studies found that improvements in knowledge did not result in improvements in medication compliance (Streicker & Dincin, 1986; Brown et al, 1987; MacPherson et al, 1996a; Chaplin & Kent, 1998). Seltzer et al (1980) did find improved compliance in a controlled study of a psychoeducational package in 67 in-patients with schizophrenia, but their study was not randomised.

Only two studies have investigated the effect of an educational programme on clinical outcome and the result are conflicting. Goldman & Quinn (1988) compared two groups of in-patients with schizophrenia. One group completed a three week education programme while the other group was involved in the usual ward activities. After the intervention, the experimental group had significantly greater knowledge about their illness and there was a significant decrease in negative symptoms as compared with the control group. However, there was no difference in positive symptom score between the two groups.

Chaplin & Kent (1998) tested whether or not educating patients with schizophrenia about tardive dyskinesia decreased compliance with neuroleptic medication. The results found no significant differences between the study and control patients in terms of medication compliance or clinical deterioration. However, with 28 patients per group in the study, the power to detect a difference in compliance or relapse was low.

Therefore, circumscribed educational interventions aimed at providing information to patients with psychotic illnesses have been mostly ineffective at increasing compliance with psychiatric services (Fenton et al, 1997).

1.3.3.3. BEHAVIOURAL INTERVENTIONS

Even though the number of studies is low, behavioural interventions seem to be more promising than pure education programmes.

Boczkowski et al (1985) compared three groups of out-patients with schizophrenia in a randomised trial: patients receiving a behavioural intervention, patients receiving an educational programme and a control group for whom no specific attempt to focus on medication was made. There were twelve patients in each group. The behavioural

intervention consisted of just one session identifying a highly visible location for storing medication, pairing medication intake with specific routine behaviours and prescribing a self-monitoring calendar with tear-off slips. Compliance was rated using pill counts after three months. Compliance was greatest for the behavioural group. Compliance was the same for the educational group and the control group, even though the educational group were the most knowledgeable about their medication.

Eckman et al (1990) devised an intensive (80 hours), comprehensive behaviourally orientated programme on how to manage medication treatment. This included training sixty patients with schizophrenia in obtaining information about medication, administering medication and evaluating its benefits, identifying side effects and negotiating medication with clinicians. The patients were followed up after three months and there were improvements in knowledge about medication, skill utilisation and compliance which improved from 60% to 80% as rated by clinicians and carers. However there was no control group. A smaller controlled trial (Eckman et al, 1992) confirmed these results, although the data on compliance were not provided.

1.3.3.4. COGNITIVE-BEHAVIOURAL THERAPY

The successful application of cognitive-behavioural techniques in schizophrenia have given rise to numerous treatment manuals. Given the likely relevance to compliance of patient's beliefs and attitudes, cognitive-behavioural techniques might be expected to be helpful (Day & Bentall, 1996). It is surprising that, with only a few exceptions, available treatment manuals offer little specific guidance on optimising compliance.

One cognitive approach is to work with the patient to develop a 'normalising rationale' for his or her disorder based on a stress-vunerability model (Kingdon & Turkington, 1994). Symptoms which respond most favourably to neuroleptic medication are

construed as variants of normality to which everyone is vulnerable under particularly stressful circumstances. Medication can be considered as one method of decreasing such vulnerability as part of a comprehensive analysis of costs and benefits in developing an appropriate management plan with the patient. In this approach, managing medication and other aspects of compliance form an integral part of the therapy.

Another cognitive-behavioural approach which holds much promise and has been rigorously evaluated is Compliance Therapy (Kemp et al, 1996, 1998).

Compliance therapy is a brief, pragmatic cognitive-behavioural therapy applicable to acutely psychotic patients in a standard in-patient environment (Kemp et al, 1996). It was inspired by and adapted from the principles of motivational interviewing. It attempts to establish a collaborative relationship whereby patients are encouraged to articulate their own concerns and the therapist uses these concerns to promote attitude change. The therapy was adapted for use with psychotic patients who may have difficulties with cognitive impairment or inability to generate motivational statements. The modifications for use with psychotic patients included having a more active therapeutic stance, guided problem solving and an increased educational component. Cognitive approaches to psychotic symptoms (Garety et al, 1994) were added especially if they impinged on compliance.

Kemp et al (1996, 1998) conducted a randomised controlled trial comparing compliance therapy with non-specific counselling for 74 in-patients with psychotic illnesses in inner London. 60% of the patients were detained under the Mental Health Act (1983). Most patients initially had on average three hours of therapy or counselling in total. Booster sessions of compliance therapy or counselling were offered at the

three, six and twelve month stages. The elements of Compliance Therapy are described in Table 4.

Compliance with neuroleptic medication was rated by informants immediately after the interventions and at eighteen months follow up using a seven point scale:

1. Complete refusal

2. Partial refusal: refusing depot medication or accepting only the minimum dose

3. Reluctant acceptance: questioning the need for medication often (every two days)

4. Occasional reluctance: questioning the need for medication once a week

5. Passive acceptance

6. Moderate participation: no prompting needed

7. Active participation: taking some responsibility for medication

The compliance therapy group had significantly greater improvements in attitudes to medication, insight into their illness and compliance with medication both immediately and at eighteen month follow up compared with the control group. Global social functioning had also improved in the compliance therapy group, but there was no difference in Brief Psychiatric Rating Scale (Lukoff et al, 1986) psychopathology scores or time spent in hospital over the previous eighteen months. However 35% of patients were lost to follow up at eighteen months - 11 in the compliance therapy group and 15 in the control group.

In summary, the authors stated that compliance therapy was very acceptable to patients as they all completed the course and it was adaptable for use in a busy clinical setting. However, most of the patients were detained in hospital and patients need to have a

reasonable intelligence quotient, be capable of problem solving and not overcome by illness (Haywood et al, 1995). The authors stated that the improvement in the compliance group was clinically meaningful, going from an average score initially of 3.7 (signifying occasional reluctance to take medication) to an average score of 5.6 (signifying moderate participation in taking medication) after eighteen months. The scores for the control group stayed consistent at just over 4 (signifying occasional reluctance to take medication). There was a significant improvement in social functioning after eighteen months, but no change in psychopathology scores. An economic evaluation (Healey et al, 1998) found that compliance therapy was more cost-effective and no more expensive than non-specific counselling at six, twelve and eighteen month intervals.

The authors state that the trial needs to be replicated with a community sample. They are interested in training psychiatric nurses to do compliance therapy at a lower cost than using clinical psychologists in the original trial.

Table 4.   **Elements of Compliance Therapy**

First two sessions:
Patients review their history of illness and conceptualise the problem. Where applicable, links are made between medication cessation and relapse. Negative treatment experiences are acknowledged. Denial of illness or the need for treatment is met with gentle enquiry into the ensuring lifestyle disruption.
Next two sessions:
The patient's ambivalence is explored. The therapist openly predicts certain common misgivings about treatment such as fears of addiction, loss of control, loss of personality. The discussion is more specific focusing on symptoms and side effects of medication. The natural tendency to stop medication when one feels well is discussed and the meaning attached to medication, that is identity as a 'sick' person. The benefits and drawbacks of medication are considered and the therapist concentrates on the benefits, especially when they emerge spontaneously. The therapists highlights the discrepancy between the patient's actions and beliefs focusing on adaptive behaviours. The therapist aims to create a degree of cognitive dissonance in the patient.
Last two sessions:
The stigma of medication is tackled by considering that medication is a freely chosen strategy to enhance quality of life. Analogies with physical illness requiring maintenance treatment are suggested and the prevalence of illness is highlighted with examples of famous sufferers. Self efficacy is encouraged and the value of staying well and therefore the need for prophylactic or maintenance treatment is emphasised. The consequences of stopping medication are predicted and the characteristic prodromal symptoms identified, when early intervention could prevent a full-blown relapse.

1.3.3.5. FAMILY INTERVENTIONS

Family members can potentially exert considerable influence on compliance (Falloon, 1984). Family interventions to improve patient's compliance include educational programmes and cognitive-behavioural interventions. Goldstein (1995) reviewed the range of family interventions which may result in better compliance. Integrating psychotic experience into normal life, accepting vulnerability to future episodes, dependence on psychotropic medication, establishing the significance of life events as stressors and distinguishing personality from disorder were the main components. Goldstein (1995) established the common elements of a variety of family approaches as being early engagement of the family, education about the disorder, communication, problem solving and crisis intervention.

There is some evidence to suggest that family interventions encourage compliance with medication, but data are few and equivocal. Pharoah et al (1999) conducted a Cochrane review of family interventions for schizophrenia and their effect on outcomes, including compliance with medication. To be included in the review, randomised studies were selected if they compared community-orientated family-based psychosocial interventions of more than five sessions to standard care. The follow up period had to be at least six months. Thirteen studies met the inclusion criteria and all had an educational component in their approach to relatives (Goldstein et al, 1978; Falloon et al, 1982; Leff et al, 1982; Hogarty et al, 1986; Tarrier et al, 1988; Glynn et al, 1992; Posner et al, 1992; Vaughan et al, 1992; Xiong et al, 1994; Zhang et al, 1994; Bloch et al, 1995; Buchkremer et al, 1995; Linszen et al, 1996).

The results found that there was a tendency to improved compliance with medication for patients whose relatives received family intervention, although this result was not

statistically significant. If it was assumed that those patients who did not complete the studies were not compliant with medication, the result changed, suggesting that family intervention did significantly encourage medication compliance. Family intervention did not obviously affect the tendency of patients or families to drop out of healthcare.

The review found that family interventions decreased the frequency of relapse, but any improvements in compliance with medication did not fully account for improvements in treatment outcomes (Hogarty et al, 1986). To add support to this, Xiong et al (1994) and Zhang et al (1994) compared family interventions and close follow up, with prescription of medication without formal follow up (usual care) for patients with schizophrenia. In both studies there was no significant effect on compliance, but a significant effect on outcome. Therefore the authors concluded that the effect of family therapy was independent of increased medication compliance in preventing relapse among patients with schizophrenia. These studies are from China and so the generalisability is unclear. Both studies tested an intensive intervention of clinical staff working closely with families and compared this by providing control patients with 'usual care', namely a prescription for three months of medication and then leaving patients to decide themselves whether or not to seek follow up care. It would be difficult to generalise the findings of these studies to settings in which either usual care was more vigorous or the intensive intervention was not feasible.

The authors of the Cochrane review (Pharoah et al, 1999) concluded that clinicians, researchers, policy makers and recipients of family interventions cannot be confident of beneficial effects from the findings of the review. Patients and their families must be willing to spend a significant amount of time in contact with health services to gain

what may be seen as moderate benefit. Further studies are justified as long as their participants, interventions and outcomes are generalisable to routine care.

Other studies not included in the systematic review suggest that family interventions may improve compliance with medication and result in beneficial treatment outcomes also.

In a large study by Kelly & Scott (1990), 418 patients were randomly allocated to a family intervention or standard care. The family intervention included up to three home visits that focused on the development of an individualised behaviourally orientated compliance plan that, if necessary, included family involvement with aftercare. The critical ingredients were frequent repetition and behavioural modelling, rather than appealing to attitudes and beliefs. At six months follow up, there were significant improvements in compliance with medication and attitudes to healthcare services, and hospital readmission rates had decreased. However, one third of patients initially recruited failed to enter the trial and a further 27% failed to complete it.

In a study of the impact of educationally orientated family therapy, Strang et al (1981) randomly assigned to individual supportive therapy (n = 15) or family therapy (n = 17) recently discharged patients with schizophrenia living with a relative who exhibited high expressed emotion. Patients receiving family therapy that included specific behavioural compliance strategies worked out between the patient and their family (Falloon et al, 1982) were more likely to take their prescribed medication, less likely to require a change to depot medication and show higher and more stable neuroleptic plasma levels, despite identical mean daily doses for the two groups. There was also an improvement in outcome as only 6% of the family therapy group had relapsed compared with 53% of the control group.

1.3.3.6. FINANCIAL INCENTIVES

Giuffrida & Torgerson (1997) reviewed the literature to determine if financial incentives (cash, vouchers, gifts) increased patient's compliance with medication, medical advice or medical appointments. They selected eleven randomised trials which had a free treatment comparator. None of the trials were with psychiatric patients except one (Higgins et al, 1991) with patients addicted to cocaine. These patients were given points which could be spent on gifts up to the value of nearly $1000 if they were cocaine free for twelve weeks. The number needed to treat was three to improve compliance by one patient.

Ten of the eleven studies found an improvement in patient compliance with the use of financial incentives. All the studies were from the USA and none compared different amounts of monetary incentives.

The authors argue that financial incentives can be more cost effective than alternative interventions and can achieve compliance at a lower cost, but the results need to be supported by well designed randomised trials in other countries. They do not mention the potential ethical considerations involved of patients complying with treatment just for financial gain or the question of compliance continuing once the financial incentive is removed.

1.3.3.7.   INTERVENTIONS TO IMPROVE COMPLIANCE WITH PSYCHIATRIC OUT-PATIENT ATTENDANCE

In a review of medical services (Macharia et al, 1992) found that compliance with appointments for medical care can be enhanced by a number of strategies. The authors state that patients dropping out of care are unlikely to be receiving any medication and

if those in care average about 50% compliance with medication, keeping patients in care is arguably the most important compliance intervention at present. Perhaps the most important intervention, given its simplicity and effectiveness is recalling patients who miss appointments, making every effort to keep them in care. However, when characterised by institutional surroundings, long waits and impersonal or bureaucratic treatment, mental health clinics may be uninviting in a way that discourages attendance and compliance (Chen, 1991).

Making the setting more appealing by providing reinforcement has improved compliance. Lieberman & Davis (1975) designed a programme to reinforce compliance by serving lunch at a monthly medication clinic and allowing patients who tested positive for neuroleptic medication to select rewards. Compared with patients randomly assigned to a control medication group, the experimental group showed better attendance, higher compliance levels and more positive attitudes towards medication.

Cassino et al (1987) also successfully increased attendance among patients with schizophrenia at a depot clinic from 58% to 76% over a seventeen week period by offering brunch at morning sessions of the clinic.

1.3.4. CONCLUSION

Haynes et al (1996) comment that with the astonishing advances in medical therapeutics during the past two decades, one would think that studies on the nature of non-compliance and on the effectiveness of strategies to help patients overcome it would flourish. On the contrary, little has been published. Compared with the many thousands of trials for individual drugs, there are only a handful of rigorous trials of compliance interventions and these provide little evidence that medication compliance can be improved consistently, within the resources usually available in clinical settings,

and that this will lead predictably to improvements in treatment outcomes (Haynes et al, 1996).

It is apparent that the strategies tested in the studies for improving compliance in the long-term were not very effective despite the amount of effort and resources they consumed. There is no evidence that poor compliance can be 'cured' and therefore it has been recommended that efforts to improve compliance must be maintained as long as the treatment is needed (Haynes et al, 1996).

The largest trial reported in the Cochrane review on interventions to improve compliance with medication (Haynes et al, 1996) had fewer than 500 patients and none of the trials sought effects on major morbidity or mortality. The authors commented that smaller studies are appropriate until an innovation appears to have clinically useful effects. At that point, the innovation should be tested in more substantial trials to document effects on clinically important outcomes including adverse effects, feasibility in usual practice settings and durability. Because the results could be applied so broadly, effective ways to help people follow medication would have far larger effects on health than any treatment itself (Haynes et al, 1996).

1.4. THE ROLE OF ASSERTIVE COMMUNITY TREATMENT AND CASE MANAGEMENT IN COMPLIANCE WITH TREATMENT

1.4.1. INTRODUCTION

The peak of psychiatric bed occupancy in the UK and USA occurred in the mid 1950s and there has been a steady decline since then. Deinstitutionalisation led to fragmentation of care for the chronically mentally ill. The provision of basic needs, psychiatric and medical care, supervision and protection formerly offered in a single location under a single administrative authority, became the responsibility of numerous formal and informal agencies (Borland et al, 1989).

The need to co-ordinate these fragmentary services for the benefit of individual patients led to the conceptual development of models of community care such as case management and Assertive Community Treatment. Case management was developed in the USA (Intagliata, 1982) and acted as a precursor to both social services 'care management' (DoH/SSI, 1990) and health services Care Programme Approach 'keyworking' (DoH, 1990) in the UK. Assertive Community Treatment (ACT) was developed around the same time as case management and is sometimes confused with it.

This chapter will review the literature regarding models of community care and their effect, if any, on compliance with medication and psychiatric services for patients with severe mental illness. The rationale for exploring this possible relationship is:

1. Some models, for example ACT, specifically aim to improve compliance with medication (McGrew & Bond, 1995).

2. Perhaps some positive outcomes such as reduction of time spent in psychiatric hospital as a result of ACT, may be partially due to improved medication compliance (Mueser et al, 1998).

3. Several reviews of community care call for research to differentiate which elements of a model are effective (Taube et al, 1990; Holloway et al, 1995; Mueser et al, 1998).

This chapter will describe the models of community care and which aspects of them might be expected to improve compliance with treatment. The research evidence so far regarding the association of ACT and case management with compliance will then be presented and critically evaluated. The association of compliance with psychiatric treatment and outcome will also be explored.

1.4.2. AIMS AND FUNCTIONS OF COMMUNITY CARE MODELS

The aims of community care systems are 'to enhance the continuity of care and its accessibility, accountability and efficiency' (Intagliata, 1982).

Shepherd (1990) outlined the major components which are focused on the individual patient:

a. Assessment of need

b. Development of a comprehensive service plan

c. Arrangement of service delivery

d. Monitoring and assessment of services

e. Evaluation and follow up

These systems are intended to overcome the fragmentation of services and offer long-term, flexible support. In theory, the approach places emphasis on tailoring

services to the needs of the patients rather than fitting patients into existing provision (Renshaw, 1988).

1.4.3. MODELS OF COMMUNITY CARE

These have been divided into case management and Assertive Community Treatment (ACT).

1.4.3.1. CASE MANAGEMENT

Models of case management have been classified as follows (Mueser et al, 1998):

a. Standard case management: Broker service model

              Clinical case management model

b. Intensive comprehensive care: Intensive case management

c. Rehabilitation-orientated community care: Strengths model

              Rehabilitation model

Whereas ACT programmes trace their lineage to a single model programme in Wisconsin, case management programmes have no such singular origin. As a result, these models tend to be highly diverse with different traditions and governing principles (Scott & Dixon, 1995).

The first articulated approach to case management for patients with severe mental illness was the Brokerage model. In this model, the case manager's primary role is to connect the patient to the services they need and to co-ordinate between different service providers. A limitation of this model is that case managers are expected to connect patients with needed clinical services without acting as clinicians themselves. It assumes that clinical skills are not needed to provide effective case management and

that a provider can always be identified to provide necessary clinical services (Mueser et al, 1998).

The Clinical Case Management model was developed in recognition of the fact that case managers must often act as clinicians by providing direct services. Clinical case managers are concerned with all aspects of their patients' physical and social environment, including housing, psychiatric treatment, health care, entitlements, transportation, families and social networks (Kanter, 1989).

The Intensive Case Management (ICM) model was developed to meet the needs of high service users (Mueser et al, 1998). It emerged out of a growing recognition that many patients with severe psychiatric disorders could not be engaged in treatment using traditional case management services. The ICM model has a low staff to patient ratio and provides assertive outreach and services in the community, similar to ACT, but is not as clearly defined as ACT. One distinction between ACT and ICM models is that caseloads are shared in ACT but not in ICM, although some descriptions of ICM models do refer to shared caseloads (Degan et al, 1990; Aberg-Wistedt et al, 1995) and so distinctions are sometimes blurred.

Another approach to case management is the Strengths model (Modrcin et al, 1988; Rapp & Wintersteen, 1989). The model was developed in response to concerns that approaches to case management for persons with severe mental illness tended to overemphasise the limits and impairments associated with psychiatric illnesses at the cost of overlooking the personal assets that patients have towards achieving individual goals. The focus of the Strengths model is on patients' strengths and self determination, emphasis on the case manager- patient relationship and aggressive outreach (Holloway et al, 1995).

A final model of case management is the Rehabilitation model (Goering et al, 1988). The Rehabilitation model incorporates rehabilitation assessment and planning, co-ordinating and linking patients with community services and monitoring of progress and advocacy (Holloway et al, 1995).

1.4.3.2. ASSERTIVE COMMUNITY TREATMENT (ACT)

No psychosocial intervention has influenced current community mental health care more than ACT (Drake & Burns, 1995). The central idea of ACT is that a community based team provides a full range of medical, psychosocial and rehabilitation services, analogous to care in a hospital, to prevent hospitalisation of patients by maximising their skills and supports in the community (Drake & Burns, 1995).

In the 1970s, Stein & Test (1980) created a programme designed as a community based alternative to the hospital for patients with mental illness presenting for treatment. The original programme that Stein & Test developed, called the Program for Assertive Community Treatment (PACT) was subsequently developed as a specialised care package to meet the needs of patients with more severe psychiatric impairments, usually characterised by either a diagnosis of a severe and chronic psychosis or a pattern of high service use. This approach, commonly referred to as the Assertive Community Treatment (ACT) model was designed to be a comprehensive treatment approach that went beyond the confines of either the broker or the clinical case management models (Mueser et al, 1998).

ACT is delivered by a multidisciplinary team, usually including a psychiatrist. The basic model consists of:

a. Low staff to patient ratios (for example, 1:10, compared with 1: 20-30 for strengths or rehabilitation models and even higher ratios with clinical and brokerage case management models).

b. Most services are provided in the community rather than in the office.

c. Caseloads are shared across clinicians rather than having individual caseloads. The emphasis is on team working with team members working with different patients when required and several members often working together with the same patient.

d. 24 hour coverage.

e. Most services are provided directly by the ACT team and are not brokered.

f. Time unlimited service.

(Stein & Test, 1980; Thompson et al, 1990).

ACT teams invariably practice assertive outreach, meaning they continue to try to contact and offer services to uncooperative patients. ACT places particular emphasis on medication compliance. In a paper on the critical ingredients of ACT as rated by twenty experts, McGrew & Bond (1995) found that medication and symptom management was one of only three items receiving nearly unanimous ratings of being very important.

1.4.3.3. PROBLEMS WITH IMPLEMENTATION OF MODELS OF COMMUNITY CARE

The difficulties with implementing the individual models of community care described above are as follows:

a. In practice and in clinical trials the differences between the models can sometimes be hard to establish as elements of several models are combined (Thornicroft, 1991;

Mueser et al, 1998). For example, sometimes the boundaries between ACT and some ICM models is unclear (Scott & Dixon, 1995). Given the pace of development of mental health services and the absence of consensus on optimal provision, it is not surprising that such variation exists (Burns & Priebe, 1996). The problem facing researchers and planners is how to report variation and to compare like with like in the absence of standardised service descriptions.

b. Application of the individual model has sometimes been adapted to meet the unique needs of specific patient populations and geographical settings. For instance, these models have been applied to the homeless, veterans, dually diagnosed patients and patients with first onset of psychosis (Burns & Santos, 1995).

c. Application of the model may vary from the original conceptualisation because of a shift away from the essential features over time. For example, a survey of twenty experts in the ACT model indicated that only 58% believed 24 hour availability to be a very important feature of ACT (McGrew & Bond, 1995), although such availability was a central feature of the original model (Stein & Test, 1980).

d. Also, even with the best efforts, not all attempts to implement a model are successful (Mueser et al, 1998).

1.4.4. OUTCOMES OF RANDOMISED CONTROLLED TRIALS OF ASSERTIVE COMMUNITY TREATMENT AND CASE MANAGEMENT

There have been two influential Cochrane systematic reviews of case management (Marshall et al, 1999) and Assertive Community Treatment (ACT) (Marshall & Lockwood, 1999) for people with severe mental disorders. These reviews will be summarised below. It is necessary to establish whether these interventions do have beneficial effects before we can hypothesise that these beneficial effects may be due to enhanced compliance with treatment.

1.4.4.1. CASE MANAGEMENT COCHRANE SYSTEMATIC REVIEW

Eleven randomised controlled trials were included in the review, four from the UK (Ford et al, 1995; Marshall et al, 1995; Muijen et al, 1994; Tyrer et al, 1995). The review found that case management increased the number of patients remaining in contact with psychiatric services, but approximately doubled the number of admissions to psychiatric hospital and showed no significant advantages over standard care on symptomatology, social functioning or quality of life. Cost data did not favour case management, but there was insufficient data to draw definite conclusions.

Although case management did increase the number of patients remaining in contact with services, only one extra patient remained in contact with services for every fifteen patients receiving case management.

The authors conclude that case management is an intervention of questionable value and it is doubtful whether it should be offered by community psychiatric services.

1.4.4.2. ASSERTIVE COMMUNITY TREATMENT COCHRANE
SYSTEMATIC REVIEW

Marshall & Lockwood (1999) reviewed trials of ACT compared with three other conditions:

a. **Standard community care** - out-patients and community mental health centre.

b. **Traditional hospital based rehabilitation** - tended to admit control patients initially for stabilisation and then discharge them to the community. No longer widely practised.

c. **Case management.**

Twenty three randomised controlled trials were included in the review. Only one was from the UK (Audini et al, 1994). Similar outcome measures to the case management Cochrane review were investigated, but this time with many more positive findings. The results are summarised in Table 5 below.

Table 5.   **Results of Cochrane review comparing ACT with 3 comparators**

Outcomes	ACT compared with standard community care	ACT compared with traditional hospital based rehabilitation	ACT compared with case management
Number of patients in contact with psychiatric services	ACT superior	Insufficient data	Insufficient data
Number of patients admitted to psychiatric hospital	ACT superior	ACT superior	Insufficient data
Mean duration of hospitalisation	ACT superior	ACT superior	ACT superior
Clinical and social outcomes	ACT superior on accommodation, employment and patient satisfaction, but not on mental state, social functioning or quality of life.	ACT superior on accommodation but insufficient data for other outcomes.	Insufficient data
Costs: In-patient costs Total costs	ACT superior No difference between groups	Insufficient data No difference between groups	ACT superior No difference between groups

The authors concluded that ACT is clinically effective to manage patients with severe mental illness in the community. The cost advantage of ACT was eroded when the total costs of all healthcare were considered and therefore the authors concluded that ACT is probably only likely to achieve cost savings when applied to populations that are already high users of in-patient care.

1.4.4.3.   WEAKNESSES OF STUDIES OF ASSERTIVE COMMUNITY TREATMENT AND CASE MANAGEMENT

The problems associated with evaluating studies of ACT and case management are outlined below. Later in the chapter the studies of ACT and case management investigating compliance with psychiatric treatment as an outcome variable will be

described and an appreciation of the difficulties interpreting these studies will be advantageous.

The problems with studies of ACT and case management are:

a. The majority of studies are from the USA and given the differences in the methods of provision of social and psychiatric care services between countries, the *generalisability* of methods and outcomes reported must be questionable (Holloway et al, 1995).

In their Cochrane review of ACT, Marshall & Lockwood (1999) remark that only two randomised controlled trials of ACT compared with standard community care have taken place outside of the USA. One of these (Audini et al, 1994) was largely unsuccessful. There is a need therefore to establish that the ACT can be generalised beyond the USA.

b. *Treatment fidelity and adequate descriptions of the model* or variations of the model adhered to are essential, as differences in findings across studies may just be a reflection of variations in the model and the success of implementation (Mueser et al, 1998). Conclusions can only be drawn if we compare like with like, but unfortunately a number of studies do not explicitly state the model of community care adopted or adequately describe the range of services being provided (Holloway et al, 1995). Prospective studies of programme fidelity are urgently required (Taube et al, 1990). There is a validated fidelity scale now available for ACT (McGrew et al, 1994).

c. There is rarely anything more than a superficial description of the services offered to the *control group* (Holloway et al, 1995). High quality control interventions may make it more difficult to see a significant difference with the experimental group (Burns & Santos, 1995).

d. Mixed results may be attributed to *methodological difficulties* such as:

i. Differences in patient characteristics and difficulties retaining patients (Mueser et al, 1998). Differences in the point of recruitment of patients. Some patients are recruited on presentation for admission to hospital, others on discharge and others in the community (Holloway et al, 1995).

ii. Marshall et al (1999) recommended that researchers should use well validated instruments and collect and report categorical and count data such as deaths. Means and standard deviations (or standard errors) of all continuous outcome variables should be reported and parametric tests should not be applied to skewed data.

iii. Insufficient follow up time for outcome measures. As severe mental illness is characterised as a long-term disability with incremental recovery, positive outcomes for case management services may be difficult to detect in short follow up periods (Soloman & Draine, 1995). Gains may not be apparent before at least 18 months (Holloway et al, 1995).

1.4.5. THE ROLE OF ASSERTIVE COMMUNITY TREATMENT AND CASE

MANAGEMENT IN COMPLIANCE WITH TREATMENT

The following features of ACT and case management may contribute to improving compliance with psychiatric treatment:

1.4.5.1. ASSERTIVE COMMUNITY TREATMENT

Some studies of ACT give a very detailed description and account of compliance issues. Arana et al (1991) describe how continuous care team staff were frequently in the community to accompany patients to medical and other appointments. Staff provided outreach and proactive treatment whenever a patient missed an appointment or when staff received information that a patient was not doing well. When necessary, probation officers, health or social services workers and others helped to find patients and return them to treatment. Medication was provided in a variety of ways to meet the individual, changing needs of the patients. Some patients came daily for medication, others less frequently. Most patients developed a strong therapeutic relationship with the staff. Some staff found it difficult to tolerate the intensity of the therapeutic relationship and especially the negative feelings generated by the patients' overt or passive-aggressive anger. Nevertheless, the staff believed that the intensity of the relationship was an important factor accounting for the patients' increased compliance with treatment recommendations.

In a study by Bond et al (1988) the ACT staff took concrete steps to try to ensure medication compliance including providing pill counters to patients who had problems reading or following instructions. Patients who neglected to refill a prescription were assured a refill by ACT staff and sometimes the responsibility for a patient's medication

compliance was taken from family members if they were not performing this task adequately.

An integral part of ACT should be medication management (McGrew & Bond, 1995). However, ACT has been criticised for being paternalistic. Some ACT programmes in the USA make reception of social services funds contingent on taking medication. Borland et al (1989) described how case managers used money management through protective payee accounts for patients who had difficulty keeping regular medication or other appointments. Daily spending money was dispensed with daily medication. Money management caused the most frequent conflicts between the case managers and the patients. Staff generally agreed that 'the method of money management was a powerful addition to the therapeutic armamentarium'. However, the authors commented that they never satisfactorily resolved the question of in what circumstances and to what extent caregivers may ethically place contingencies on the disbursal of public funds that have been allocated to disabled individuals.

Although ACT shows promise for enhancing medication compliance, it is difficult to evaluate this, as ACT is not widely practised (Ellison et al 1995). It is expensive to set up an ACT team and for cost reasons, ACT tends to be restricted to high users of in-patient psychiatric services, whereas case management can be offered to a wider variety of patients (Marshall & Lockwood, 1999). Perhaps if ACT is offered to high users of in-patient care, these may also be the patients who are least compliant with medication and psychiatric services.

1.4.5.2. CASE MANAGEMENT

Although there are several models of case management, the essence is the relationship between a patient and case manager (Scott & Dixon, 1995). The case manager has to

engage the patient and act as a single point of accountability for assessment, service planning and linking with outside services and treatment. The standard research measures of effectiveness used in clinical trials do not assess the often intense, respectful and rewarding aspects of the relationship between clinicians and their patients, but these relationships may be critical for the success of long-term rehabilitative interventions (Burns & Santos, 1995) and perhaps compliance with psychiatric treatment.

Case management, like ACT, has the potential to aid compliance in very practical ways, for example, supplying medication and prompting patients to take it and taking patients to appointments (Hornstra et al, 1993). Case managers can educate the patient and their families about medication and engage in a long-term dialogue if necessary about the risks and benefits of taking medication. Intensive case managers have lower caseload sizes and have more time to actively engage patients and assertively follow up patients who are reluctant to comply.

1.4.6. STUDIES INVESTIGATING ASSERTIVE COMMUNITY TREATMENT OR CASE MANAGEMENT AND COMPLIANCE WITH TREATMENT

This section will review the literature regarding the effect of ACT and case management on enhancing compliance with psychiatric treatment. Several reviews and overviews of ACT and case management were scanned to select the studies presented in Tables 6 and 7 (pages 113-116) (Olfson, 1990; Chamberlain & Rapp, 1991; Holloway, 1991; Soloman, 1992; Burns & Santos, 1995; Holloway et al, 1995; McGrew & Bond, 1995; Scott & Dixon, 1995; Mueser et al, 1998; Marshall et al, 1999; Marshall & Lockwood, 1999).

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Most of the trials have taken place in the USA and the diagnostic group most studied are patients with schizophrenia. The relevant studies mainly investigate compliance with medication and these will be presented first, dividing them up into studies of ACT and following with studies of case management. Studies of ACT and case management and compliance with psychiatric services will then be presented.

1.4.6.1. COMPLIANCE WITH MEDICATION AND ASSERTIVE COMMUNITY TREATMENT

Six studies have investigated the effect of introducing ACT on compliance with medication (Table 6a, pages 113-114). Four found an improvement in medication compliance (Stein & Test, 1980; Bush et al, 1990; Wright et al, 1989; Dixon et al, 1997). Two studies found no difference (Bond et al, 1988; McGrew et al, 1995) but it is interesting to note that both of these studies used a measure of medication compliance which had been developed for the study and the validity of these instruments should be questioned. Bond et al (1988) also had a short follow up period of only 6 months.

Stein & Test (1980) found that the beneficial effects on medication compliance found with the introduction of ACT did not persist once ACT was withdrawn.

Studies reporting increased medication compliance in the experimental group also had better outcomes in other domains such as duration of hospitalisation (Stein & Test, 1980; Wright et al, 1989; Bush et al, 1990), number of hospitalisations (Stein & Test, 1980; Wright et al, 1989), symptomatology (Stein & Test, 1980; Dixon et al, 1997), social networks and relationships (Stein & Test, 1980; Bush et al, 1990), quality of life (Stein & Test, 1980, Wright et al, 1989), patient satisfaction (Wright et al, 1989) and costs (Weisbrod et al, 1980; Wright et al, 1989). However, the two studies where ACT

did not have a beneficial effect on medication compliance still found improvements in other outcomes including duration of hospitalisation (Bond et al, 1988; McGrew et al, 1995).

Dixon et al (1997) is the only paper totally devoted to the effect of ACT on medication compliance and the effect of medication compliance on outcome (Table 6a, page 114). This paper followed up 77 homeless patients with severe mental illness who were offered ACT for twelve months. The authors defined what they meant by non-compliance and detailed the assessment used to measure it from a variety of sources. They did find a significant increase in the number of patients who were compliant with medication over the year, from 29% to 57%, and better compliance had a beneficial effect on symptomatology, although not on duration of hospitalisations or housing placements.

The authors stated that this prospective study suggests that ACT intervention rapidly improves medication compliance rates among the homeless, doubling it within the first three months and maintaining the improvement during the twelve months of the trial . Even though this paper is encouraging and unique in focusing mainly on medication compliance, there are some weaknesses. Twenty two (29%) patients dropped out of the study during the year. It was presumed that those who dropped out of the study were not taking medication subsequently but there were no data to support this assumption. Also, conclusions must be tentative in the absence of a control group.

1.4.6.2. COMPLIANCE WITH MEDICATION AND CASE MANAGEMENT

Four studies have investigated the effect of introducing case management on compliance with medication (Table 6b, page 115). Three of these have applied Intensive Case Management: two found it made no difference to medication compliance

(Borland et al, 1989) or attitudes to medication (Soloman & Draine, 1995) but one found a significant improvement compared with the control group (Ford et al, 1997). The negative study by Borland et al (1989) used a compliance scale constructed for the study and the validity of this may be questioned.

The only study to investigate medication compliance and Brokerage Case Management found no difference between the experimental and control groups (Franklin et al, 1987).

The study by Ford et al (1997) which found an improvement in medication compliance with the experimental group receiving ICM did not find an improvement in any of the clinical, social or hospitalisation outcomes measured. The outcomes of the other three studies of case management which had no effect on medication compliance rates were mixed: Soloman & Draine (1995) found no improvement in outcome, Franklin et al (1987) found the case management group had a worse outcome in terms of hospitalisation, although no difference in quality of life and social networks, and Borland et al (1989) found that the case management group had a better outcome in terms of hospitalisation, although other outcomes such as level of functioning stayed the same.

1.4.6.3. COMPLIANCE WITH PSYCHIATRIC SERVICES AND STUDIES OF ASSERTIVE COMMUNITY TREATMENT AND CASE MANAGEMENT

Five studies have investigated the effect of ACT and mainly Intensive Case Management on appointments kept at medication clinics, community mental health centres and psychiatric out-patient appointments (Table 7, page 116). All of the studies found an improvement in compliance with appointments. Again the effect of improved compliance on outcome was mixed; three of the studies found improvements in

duration of hospitalisation in the experimental group (McClary et al, 1989; Arana et al, 1991; Dean et al, 1993), but only one of the studies found any improvement in clinical or social outcome - Arana et al (1991) found an improvement in the global assessment of functioning score.

1.4.6.4. UK STUDIES OF ASSERTIVE COMMUNITY TREATMENT OR CASE MANAGEMENT AND COMPLIANCE WITH PSYCHIATRIC TREATMENT

In the UK, six trials (not including the current trial) have compared ACT or case Management with standard care under the Care Programme Approach (Marks et al, 1994; Muijen et al, 1994; Marshall et al, 1995; Tyrer et al, 1995; Ford et al, 1997; Holloway & Carson, 1998). The studies by Merson et al (1992) and Burns et al (1993) have not been included in line with the Cochrane review of case management studies (Marshall et al, 1999) as these are studies of home based care, involving short term treatment for patients who are acutely ill, but usually not chronically ill. Marshall et al (1999) argued that these interventions should not be classified as ACT or Intensive Case Management which are long-term interventions for chronically ill patients.

Ford et al (1997) is the only UK study to explore compliance with treatment in an depth as outlined in Tables 6b and 7 (pages 115-116). Compliance with medication and psychiatric out-patient appointments improved in the experimental group, but costs were increased and there were no significant differences from controls on outcome measures. Marks et al (1994) conducted the Daily Living Programme, the largest study of ACT in the UK with a sample of 189 patients. There were some positive outcome results as there was a significant decrease in the duration of hospitalisation, although not in its frequency. There were some modest clinical gains after 18 months and

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considerable benefits in terms of patients' satisfaction. As regards medication compliance, the authors just commented that poor initial adherence to medication in about twenty patients (mainly young men with repeated past admissions) improved somewhat over 12 to 18 months.

1.4.7. CONCLUSION

The effect of ACT or case management on compliance with psychiatric treatment is unclear because few studies have investigated this, possibly because it is difficult to measure reliably (Burns & Santos, 1995; Mueser et al, 1998). The application of ACT and case management has had beneficial effects on medication compliance in about half of the studies which have reported it, but the numbers are small and so it is difficult to draw any conclusions. There seems to be more promise for an improvement in compliance with psychiatric appointments, although again the numbers are small.

Nevertheless, there have been some promising results and little attempt has been made previously to tease out which components of these models are effective (Holloway et al, 1995; Kent & Burns, 1996). The positive effects may be due simply to increased attention and time spent by professional carers (Shepherd, 1990). Compliance has rarely been studied in isolation, but if increased compliance proves to one of the effective components, then the next stage is to determine exactly how this is achieved.

The effect of compliance with psychiatric treatment on outcomes is also unclear, but again the number of studies is small. The effects of changes in compliance on hospitalisation data is very mixed, but there seems to be more of a consistent effect on clinical and social outcomes (Tables 6 and 7, pages 113-116), with enhanced compliance being associated with improved clinical and social outcomes.

In summary, there are still many questions to be answered, but little attention has been focused on compliance with psychiatric treatment in studies of ACT or case management for the severely mentally ill. It is becoming clearer which models of community care are most effective and ACT seems to hold the most promise (Marshall et al, 1999; Marshall & Lockwood, 1999) although more trials of ACT in the UK are needed. A critical component of ACT is medication management and perhaps it is this that plays a major part in its effectiveness.

Table 6.   **Compliance with medication in studies of Assertive Community Treatment and case management**

6a. Assertive Community Treatment studies

Study	Design of study	Sample and intervention	Compliance measure and method of measurement	Compliance results	Outcome results
Stein & Test, 1980. Madison, Wisconsin, USA.	Randomised controlled trial. Follow up of 14 months. Assessments every 4 months.	n = 130 E = 65, ACT C = 65, traditional hospital care followed by out-patient services. Patients applying for admission to hospital. Wide range of diagnoses, half were schizophrenic. Attrition rate of 13%	No mention of how compliance was measured.	At 8 and 12 months significantly more patients in the E group were compliant with neuroleptic medication than in the C group.	E group had significantly; Shorter and fewer admissions to hospital Less symptomatology Better occupational functioning Increased social networks and relationships. Also increased quality of life and reduced costs in E group.
Bond et al, 1988. Indiana, USA.	Randomised controlled trial in three centres. Follow up for 6 months	n = 167 E = 84, ACT like programme C = 83, all other mental health services routinely provided. Patients with psychotic disorder at risk for rehospitalisation, mostly with schizophrenia. Attrition rate of 21%	Medication compliance rated by patients and a staff member using forms developed for the study.	No difference in medication compliance between groups at any of the centres.	E group: Signicantly shorter duration of hospitalisation at 2 out of 3 centres. No difference in quality of life or contacts with police. Cost analysis results were mixed.
Wright et al, 1989. Seattle, USA.	Own controls, pre-post design. Follow up of 48 months	n = 196, all received an ACT like programme. Patients who were severely disabled with multiple hospitalisations, mostly with schizophrenia. Attrition rate of 24%	The Patient Monitoring Form was a daily checklist completed by ACT staff for each patient. 17 stress events categories, one of which was noncompliance with medication. Form introduced 24 months into study.	The longer a patient remained in the programme, the fewer distress events occurred. Each patient had 1.43 noncompliance events per month on average.	During the study: Number and duration of hospitalisations significantly reduced Greater patient satisfaction Greater quality of life Reduced jail events Reduced costs.
Bush et al, 1990. Atlanta, USA.	Randomised controlled trial. Follow up of 12 months	n = 28 E = 14, 'Operation Outreach' based on ACT C = 14, standard case management and rehabilitation services. Patients with severe psychiatric disability, mostly with schizophrenia. Attrition rate unknown	No mention of how compliance was measured	E group were significantly more successful in maintaining their medication regimen compared with C group.	E group: Significantly shorter duration of hospitalisation Improved social networks and relationships. No difference in number of admissions between the two groups.

Study	Design of study	Sample and intervention	Compliance measure and method of measurement	Compliance results	Outcome results
McGrew et al, 1995. Indiana, USA.	Own controls, pre-post design. Six sites. Follow up of 18 months, assessments every 6 months.	n = 212, ACT. Poor users of mental health services, mostly patients with schizophrenia. Attrition rate of 26%	The Stricklin/Barker level of functioning rating scale developed by staff in the study. Rating for each of 9 areas of life functioning including medication compliance. ACT staff were given extensive written instructions for administering it and attended a one day workshop. Patients completed the Attitudes to Medication scale (Streicker et al, 1986).	No difference in medication compliance or attitudes to medication at any of the follow up points at 6, 12 and 18 months.	During the study: Number of admissions was decreased by a third and the duration of hospitalisation was decreased by half Social functioning improved as rated by the case managers. Improved qualty of life Increase in jail events No change in vocational functioning.
Dixon et al, 1997. Baltimore, USA.	Own controls, pre-post design. Follow up over 12 months, quarterly assessments	n = 77, all received ACT. Homeless severely mentally ill, mostly with schizophrenia. Attrition rate of 29%	Medication compliance was rated by programme psychiatrists, both the frequency of missed doses and the maximum period of consecutive missed doses. Psychiatrists got information from face-to-face patient contacts, clinicians, family and community supports as well as by blood levels and pill counts. At baseline hospital records and previous providers were routinely consulted. If the patient, either at baseline or during the quarterly follow up assessments, refused medication that the psychiatrist thought would be of benefit or missed more then one consecutive week of medication, that patient was considered to be noncompliant. If any data source suggested noncompliance, the patient was rated as noncompliant.	At baseline 29% of patients were compliant. Compliance significantly increased after 3 months to 57% and remained high throughout the year.	Patients with increased medication compliance had: Fewer psychiatric symptoms at baseline and subsequently. There was no effect on days in hospital or better housing placements.

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6b. Case management studies

Study	Design of study	Sample and intervention	Compliance measure and method of measurement	Compliance results	Outcome results
Franklin et al, 1987. Texas, USA.	Randomised controlled trial. Follow up of 12 months.	n = 417 E = 213, **Brokerage Case Management**. C = 204, services already provided. Mostly patients with schizophrenia. Attrition rate of 36%	Data gathered from patients each time they visited the community centre concerning utilisation of resources in previous week by staff unware of which group patients belonged to. Resources included medication management services.	No difference between the groups in the use of medication management services (mean of 15.7 visits per patient in E group; 14.9 visits per patient in C group).	E group: Duration of hospitalisation was twice as long and increased number of admissions Used more than twice as many community based services Cost more. There was no difference in quality of life or social networks and relationships between the two groups.
Borland et al, 1989. Washington, USA.	Own controls, pre-post design. Follow up for 5 years compared with 2 years before trial entry.	n = 81, all received **Intensive Case Management.** Young, difficult to treat patients, mostly with schizophrenia. Attrition rate of 11%	Medication compliance was rated monthly on scales constructed for the study. Case managers were trained to use them and reliability was measured	After appropriate patients were prescribed depot medication (80% of the sample), medication compliance showed no further significant improvement during the study. Compliance during study could not be compared with compliance prior to study entry.	During the study: Number and duration of admissions significantly reduced Reduced use of emergency services Large increase in the use of structured residential care days No cost savings Level of functioning was the same.
Solomon & Draine, 1995. Philadelphia, USA.	Randomised controlled trial. Follow up for 24 months, yearly assessments.	n = 96 E=48, Consumer **Intensive Case Management.** C=48, Nonconsumer Intensive Case Management. Severely mentally ill, mostly patients with schizophrenia. Attrition rate of 6%	Attitudes towards medication scale (Streicker et al, 1986).	No difference between the groups in attitudes to medication.	No difference between the groups in duration of hospitalisation, symptomatology, social functioning, quality of life, patient satisfaction, jail events or vocational functioning.
Ford et al, 1997. North Southwark, UK.	Randomised controlled trial. Follow up for 18 months	n = 77 E = 39, **Intensive Case Management** C = 38, standard psychiatric services. Long term mentally ill 'most in need', mostly with schizophrenia. Attrition rate of 13%	The Life Skills Profile (Rosen et al, 1989) which includes the professional's view of compliance with medication was rated for the E group by case managers and for the C group by the professional who knew the patient best.	Significantly increase in percentage of patients complying with medication in E group over 18 months from 62% to 84% compared with a change from 64% to 57% in the C group.	E group: Significantly more service contacts. No difference in symptomatology, social outcomes or duration of hospitalisation. E group cost three times as much as C group.

E = experimental group; C = control group

Table 7.   Compliance with psychiatric services in studies of Assertive Community Treatment and case management

Study	Design of study	Sample and intervention	Compliance measure and method of measurement	Compliance results	Outcome results
McClary et al, 1989. Texas, USA.	Own controls, pre-post design. Follow up for 6 months. Three time intervals pre and post entry into study.	n = 64, all receiving **Intensive Case Management.** Young adults with schizophrenia. Attrition rate unknown	Proportion of medication appointments kept compared with those missed (1 = low; 3 = high). Data was collected from medical charts kept on patients.	Significant increase in medication appointments kept during the study (mean of 2.1, 2.3 and 2.0 prestudy; 2.6, 2.4 and 2.4 poststudy).	During the study: Significant improvement in number and duration of admissions Significant increase in the use of other community services Decreased costs.
Arana et al, 1991. Baltimore, USA.	Own controls, pre-post design. Follow up for 15 months	n = 39, all receiving service based on **ACT.** Chronically mentally ill, mostly with schizophrenia. Attrition rate of 18%	Attendance at community mental health centre (CMHC). No mention of how compliance was measured	Significant increase in compliance during the study. During 6 months prior to study, patients kept on average half of their appointments at CMHC; at 6 months and 12 months, they kept more than 80% of their appointments at CMHC.	During the study: Fewer crises Significantly fewer admissions and shorter admissions to hospital Significant increase in global assessment of functioning score.
Dean et al, 1993. Birmingham, UK.	Comparison of two existing services. Follow up 12 months	n = 124 E = 69, **community based service** C = 55, traditional hospital based service All psychiatric patients, mostly with schizophrenia.	Contact with psychiatrist and CPN. Attendance at out-patient appointments. No mention of how compliance was measured	E group: Significantly more patients in contact with a psychiatrist (81% compared with 62% in C group) and community psychiatric nurse (56% compared with 14% in C group). Significantly more out-patient appointments attended (mean (s.d.) 7.2 (4.9) in E group; 3.3 (3.1) in C group).	E group had spent significantly fewer days in hospital. No difference in clinical or social outcomes
Hornstra et al, 1993. Kansas City, USA.	Matched controls. Follow up for 24 months	n = 224 E =112, **Intensive Case Management** C = 112, traditional out-patient services. Patients with chronic schizophrenia. Attrition rate unknown	From patients' charts, the type of visit to the medication clinic (to see a doctor, recive a depot or both), the contact date, the date of the next scheduled appointment, whether or not the patient kept the scheduled appointment, the total number of visits to the clinic.	E group had significantly: More appointments scheduled with the medication clinic More appointments kept at the clinic More doctor's visits than C group.	E group used significantly more community services. No difference in number of admissions or duration of hospitalisation between the two groups.
Ford et al, 1995, 1997. North Southwark, UK.	Randomised controlled trial. Follow up for 18 months	n = 78 E = 39, **Intensive Case Management** C = 39, standard psychiatric services. Long term mentally ill 'most in need', mostly with schizophrenia. Attrition rate of 13%	Number of patients attending psychiatric out-patients. No mention of how compliance was measured.	E group: Significantly more patients attending out-patients after 18 months (29 (74%)) compared with C group (18 (46%)). Significantly more out-patient appointments attended (mean (s.d.) of 5.2 (0.9) in E group; 2.3 (0.5) in C group).	E group: Significantly more service contacts. No difference in symptomatology, social outcomes or duration of hospitalisation. E group cost three times as much as C group.

E = experimental group; C = control group

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1.5. RATIONALE OF THE TRIAL

The current randomised controlled trial will investigate the effect of Intensive Case Management compared to standard care on compliance with psychiatric treatment for people with severe mental illness. The trial was a substudy of the multicentre UK700 case management trial (Burns et al, 1999), taking place at one of the trial centres in Central Manchester. Predictors of non-compliance with treatment will also be investigated as well as the effect of non-compliance on clinical outcome.

In the clinical setting, the individual patient's acceptance or rejection of the prescribed medication regimen is often the single greatest determinant of the treatment's effectiveness (Fenton et al, 1997). With increasing numbers of efficacious, self-administered medications, there is a need for better understanding and management of non-compliance (Haynes et al, 1996). The consequences of poor compliance with medication are substantial both for the patient and for psychiatric services, with patients who do not comply having higher rates of relapse, being more severely ill at the point of admission to hospital, requiring more compulsory admissions, having longer in-patient stays and therefore consuming more resources (McEvoy et al, 1984; Gardner & Hill, 1994). As regards non-compliance with psychiatric services such as out-patient appointments, Frankel et al (1989) commented how few studies have reported on the problem of out-patient non-attendance, especially as it leads to inefficient use of facilities and results in unnecessary costs and delays in assessing patients.

Case management, the engagement of a patient in a system of services by a single, accountable professional has been identified as one of the fastest growing mental health service delivery models in current practice. Despite mixed results in empirical research, case management continues to appeal to administrators and planners as a solution to a

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number of service delivery system problems. These problems include service planning and co-ordination for individual patients, a point of accountability for treatment planning and evaluating and monitoring patients that are difficult to serve (Soloman & Draine, 1995). Although Assertive Community Treatment (ACT) shows more promise than case management in terms of outcomes, it is much less widely practised (Marshall et al, 1999; Marshall & Lockwood, 1999).

Intensive Case Management involves high intensity input to patients by case managers with small caseloads. A core feature of case management is the therapeutic alliance between the case manager and the patient (Scott & Dixon, 1995) which perhaps can encourage and support patients to take their medication regularly, as well as having time to provide practical support such as getting patients to out-patient appointments (Hornstra et al, 1993). If patients will not comply with medication, an assertive outreach approach can detect signs of relapse at an earlier stage and reintroduce medication if possible.

Some interventions to improve compliance with medication have found positive, enduring results, such as Compliance Therapy (Kemp et al, 1996, 1998). However, such interventions are often complex and labour intensive (Haynes et al, 1999) and have certain drawbacks, for example, most of the patients initially receiving Compliance Therapy were detained in hospital under the Mental Health Act (1983) and it is not clear how applicable it would be to a community sample. Intensive Case Management is not a specific intervention just to improve compliance with treatment, but if it does do so, may be more applicable to clinical practice than more specifically designed interventions.

1.6   AIMS OF THE CURRENT TRIAL

This was a randomised controlled trial investigating compliance with medication and psychiatric services in a sample of patients with psychotic illnesses who received either Intensive Case Management or standard care over a two year period.

The aims were:

1) To investigate whether patients receiving Intensive Case Management had better compliance with medication and psychiatric services compared with patients receiving standard care. Some of the mechanisms for improving compliance during the trial were explored. Alternative ways of measuring compliance were compared including using continuous or categorical measures and objective or subjective ratings.

2) To investigate the factors which were important predictors of poor compliance with medication and services during the trial in this group of patients.

3) To investigate the effect of compliance with medication and psychiatric services during the trial on outcome at the end of the trial. Outcome scores included measures of psychopathology, social functioning, quality of life, unmet needs, satisfaction with psychiatric services and the number of days in hospital during the trial.

1.7   HYPOTHESES

1.7.1. MAIN HYPOTHESES:

a. That Intensive Case Management by mental health professionals carrying a smaller caseload of patients with psychotic illnesses will result in better compliance both with medication and psychiatric services compared to standard care.

b. That improved compliance with Intensive Case Management will be due to:

i) Increased frequency of contact between the Intensive Case Managers and their patients compared with standard care.

ii) During the contacts between the Intensive Case Managers and their patients there will be more of a focus on medication compared with standard care.

1.7.2. SUBSIDIARY HYPOTHESES:

a. Compliance with both medication and psychiatric services will be predicted by:

Patient factors, for example being younger, male, having housing instability and a history of previous poor compliance with treatment or compulsory detention.

Illness factors including greater symptom severity, negative symptoms, grandiosity, diminished insight and comorbidity with substance abuse.

Medication factors including the type of medication and some side effects of medication.

Administrative factors including having a poor therapeutic alliance with the clinician and the level of supervision by formal and informal carers.

b. Compliance with medication and psychiatric services during the trial will be predictive of outcome scores at the end of the trial.

CHAPTER 2. METHODOLOGY

In 1993, four centres obtained National Health Service Research and Development funding for a randomised controlled trial of Intensive Case Management compared with standard case management or standard care. This was called the UK700 Case Management Trial, as over seven hundred eligible patients were recruited from the four centres.

Three of the centres were in London: St Mary's Hospital, St George's Hospital and King's College Hospital and one in Central Manchester, Manchester Royal Infirmary.

The current trial was undertaken at the Central Manchester site only as part of the UK700 Case Management Trial. In Central Manchester the acute psychiatric services covered a catchment area of 122,000 people, serviced by 51 in-patient beds and sectorised community teams in early stages of development.

2.1. DESIGN OF THE TRIAL

The trial ran from January 1995 to December 1997. Eligible patients were recruited and a baseline assessment completed prior to randomisation at an independent central trial centre in London. Patients were randomised to two years of Intensive Case Management or standard care, undergoing further research assessments at the end of two years. Data on compliance with medication and psychiatric services were collected for the two years prior to trial entry and the two years the patients were in the trial for each patient. Ethical approval was obtained from the Central Manchester Health Care Trust.

2.2.   SAMPLE

Suitable patients were identified by systematic review of registers of in-patients, out-patients, community mental health team caseloads, care programme approach registers and new referrals or transfers. Lists of all patients discharged over the last two years were examined, so that patients who had dropped out of care since their last discharge were also recruited. The case notes of all potentially suitable patients were reviewed by research workers. The case notes of 308 patients were screened and 207 patients were found to meet the eligibility criteria. Eligible patients were located via their contacts with psychiatric services, housing associations, or via their General Practitioners.

Patients were recruited into the trial using the following inclusion criteria:

- Psychosis, defined as the presence, according to Research Diagnostic Criteria (RDC) of delusions, hallucinations and thought disorder (Spitzer et al, 1978).

- Age 18 to 65 years.

- Hospitalised for psychotic symptoms at least twice, the most recent admission within the previous two years.

- Absence of organic brain damage or primary diagnosis of substance abuse.

- Patients not already involved in some form of case management (such as a specific rehabilitation programme), but permitting "routine" care programme approach.

Patients were either recruited at the point of discharge from hospital or in the community. Out-patients were transferred to their case manager within four weeks of randomisation and in-patients were seen just prior to their discharge from hospital.

158 eligible patients were recruited from Manchester, 79 patients to each arm of the trial. All patients were recruited between January 1995 and March 1996.

All patients who agreed to take part in the trial gave informed consent and completed a baseline assessment prior to randomisation. Patients were individually randomised to Intensive Case Management or standard care independently by the trial centre at the London School of Hygiene and Tropical Medicine by telephone contact. The randomisation process was stratified by:

- Source of patient at point of randomisation - either at discharge from hospital or in the community

- Ethnic origin (it was intended that 30% of patients would be of African-Caribbean ethnicity).

Data were collected on those patients who were eligible but did not enter the trial for a variety of reasons, for example, if they refused or could not be located. These data included socio-demographic variables at the time of possible recruitment and illness history including having a history of poor compliance with medication, being on a section of the Mental Health Act (1983) or Supervision Register and a history of violence or forensic contact.

2.2.1. SAMPLE SIZE

The power calculations were based on the results of a prospective study be Buchanan (1992). This was a UK study of out-patients with schizophrenia which measured

compliance with medication and psychiatric out-patient attendance over two years from inspection of medical casenotes and urine analysis.

a. Compliance with medication

With 77 patients randomised to each arm of the trial, a difference of 23% in the number of patients complying with medication could be detected as statistically significant at the 5% level with 80% power (for example, an increase from 51% to 74% in the number of patients compliant with medication associated with Intensive Case Management).

For comparison, a UK randomised controlled trial by Ford et al (1997) comparing Intensive Case Management to standard psychiatric services over an eighteen month period found an improvement of 22% in the percentage of patients complying with medication in the Intensive Case Management group (from 62% to 84% in the Intensive Case Management group, compared to 64% to 57% in the standard care group).

b. Compliance with psychiatric out-patient appointments

With 78 patients randomised to each arm of the trial, a difference of 22% in the number of patients complying with out-patient appointments could be detected as statistically significant at the 5% level with 80% power (for example, an increase from 51% to 74% in the number of patients compliant with out-patient appointments associated with Intensive Case Management).

2.3. ASSESSMENTS

The assessments used to rate compliance with medication and psychiatric services will be described first and then the clinical outcome assessments.

2.3.1. SOURCES OF OBJECTIVE COMPLIANCE DATA AND MISSING DATA

Compliance was rated over a four year period for every patient in the trial from Central Manchester. Information was taken from medical casenotes and if these were not available, community casenotes held by the intensive and standard community teams were used. Information from depot cards and therapeutic blood level monitoring was also used as appropriate.

Missing data due to sources of data not being available because, for example, case notes were lost, were recorded. The duration of any missing sources of data were recorded in weeks and expressed as a percentage of the total four year period for each patient.

2.3.2. COMPLIANCE RATES

These were calculated for each patient for the two years prior to trial entry as well as the two years during the trial. Data were collected on compliance with medication and compliance with psychiatric services for each patient.

Rating compliance was a two stage process. In the first stage information about compliance with medication and psychiatric services was taken from medical casenotes, depot cards and other relevant sources for each patient onto forms where the patient was given a trial number. In the second stage this information was used to rate compliance for each patient using a structured assessment form. The rater (TT) was

the same in both stages and was aware of which treatment groups the patients had been allocated to. This was necessary for safety reasons when interviewing the patients for the main UK700 trial, as intensive case managers or standard keyworkers were often consulted as to whether it was safe to visit the patients at home.

The timing of collection of compliance data was similar to the collection of outcome data for the main UK700 trial. Compliance data were collected from the randomisation date to the follow up interview two years later. If a patient had to finish in the trial early, (because recruitment ended in March 1996 and the trial finished December 1997), compliance data were collected up to December 1997. If a patient was not interviewed for the year 2 assessment, compliance data was collected up to the year 2 anniversary date.

2.3.3. COMPLIANCE WITH MEDICATION

2.3.3.1. MEDICATION PRESCRIBED

A comprehensive medication record was recorded for each patient for the two years in the trial and for the two years prior to trial entry. This included the type, frequency and dosage of psychotropic medication prescribed and certain administrative procedures, for example, whether a dosette box was used or whether family were involved in encouraging the patient to be compliant with medication. For patients prescribed neuroleptic medication the daily prescribed dose was calculated in chlorpromazine equivalents using criteria from Johnson & Wright (1990) and the British National Formulary (1996).

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2.3.3.2. GENERAL RULES FOR RATING COMPLIANCE WITH MEDICATION:

Medication compliance on each patient was rated over a four year period, for the two years in the trial and for the two years prior to trial entry, using a continuous measure of compliance - the percentage of each two year period that each patient was poorly compliant with medication.

Poor compliance with medication was recorded if there was definite evidence that the patient had not been taking their psychotropic medication as prescribed a) from depot cards or b) if it was clearly stated in medical or community casenotes. If the patient was prescribed more than one psychotropic medication and was taking some but not others as prescribed, this was still rated as poor compliance with medication.

When calculating the percentage of time each patient was poorly compliant with medication, the numerator was the number of weeks of poor compliance and the denominator was the number of weeks compliance data were available for. Compliance data were not available for several reasons, including if the patient had been admitted to hospital (53% of patients were admitted to hospital under a section of the Mental Health Act (1983) during the four year period and so may have had to take medication compulsarily); if the patient had not yet become ill for some of the two year period prior to trial entry or if some information was missing because, for example, the patient dropped out of psychiatric services or depot cards were missing. Any missing data which should have been available, for example, missing depot cards were accurately noted.

2.3.3.3. PATIENTS PRESCRIBED DEPOT NEUROLEPTIC MEDICATION ONLY:

For patients prescribed depot neuroleptic medication only, compliance rates were calculated from depot cards which provided an accurate record of attendance. The percentage of time patients were late receiving prescribed depot medication was calculated. Failure to attend for a depot injection because of poor physical health, hospital admission, imprisonment or holiday were not included as defaults. These had been accurately recorded on depot prescription cards.

If depot cards were missing, medical or community casenotes were scrutinised for any mention of poor compliance.

2.3.3.4. PATIENTS PRESCRIBED ORAL MEDICATION ONLY:

For patients prescribed oral medication only, medical or community casenotes were scrutinised to rate the percentage of time each patient was poorly compliant with oral medication.

For patients prescribed mood stabilisers such as lithium and carbamazepine, therapeutic blood level monitoring was also used as a guide to medication compliance. The percentage of blood levels outside of the therapeutic range taken over the four year period was calculated.

2.3.3.5. PATIENTS PRESCRIBED DEPOT AND ORAL MEDICATION:

If a patient was prescribed depot and oral medication simultaneously, the percentage of time the patient was poorly compliant was rated separately for each as described above and the worse rating was taken to rate overall medication compliance.

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If a patient was prescribed depot and oral medication but at different times, the percentage of time the patient was poorly compliant with each was considered when rating overall medication compliance.

2.3.3.6. OTHER GENERAL RULES FOR RATING MEDICATION COMPLIANCE:

a) If a patient was prescribed more than one type of medication in the same class during the time period, the medication which the patient was prescribed for the longest period of time was referred to when recording the type and dosage.

b) If the medical or community casenotes mentioned that a patient has been poorly compliant with medication but did not give any timescale, it was assumed this referred to the previous week only.

c) If the medical or community casenotes made no mention of whether or not a patient was compliant with medication, it was assumed that the patient was complying.

d) To rate medication compliance, data had to have been collected for at least 50% of the time that compliance data should have been available for. If, for example, it was not possible to rate medication compliance for at least 50% of the time because of missing casenotes, the patient was excluded for that time period.

e) As required (PRN) medication was not included.

f) If a patient was taking a prescribed medication but then persistently refused to take it, the patient was rated as being poorly compliant from the date of refusal to the end of that assessment year in the trial.

g) A patient was rated as being poorly compliant if too much medication was taken as well as taking too little.

h) If a patient was right to stop medication because of, for example, developing vomiting and diarrhoea when considering the risks of dehydration for a patient on lithium, the patient was still rated as being poorly compliant with medication unless it was clearly stated in the notes that the patient was aware of the risks involved and that the decision to stop medication was an informed one.

i) When rating therapeutic blood levels:

1) A low blood level was ignored if the patient was just starting to take the medication and the dose was being increased.

2) If two levels were done within a few days, just one was counted.

3) The therapeutic ranges recommended by the laboratory doing the analysis were used:

	Therapeutic range
Carbamazepine	5 - 12 mg/l
Lithium	0.3 - 1.2 mmol/l
Sodium valproate	50 - 100 mg/l

2.3.4. COMPLIANCE WITH PSYCHIATRIC SERVICES

2.3.4.1. GENERAL RULES FOR RATING COMPLIANCE WITH PSYCHIATRIC SERVICES

Compliance with psychiatric services was rated for each patient in two ways over the four year period:

a) Psychiatric out-patient attendance:

The percentage of psychiatric out-patient appointments each patient attended was calculated. Out-patient attendance was recorded from medical casenotes and cross checked using the computerised hospital database system.

b) Dropout from psychiatric services

This was recorded if a patient a) refused to have contact with psychiatric services including their Intensive Case Manager or standard keyworker, b) was discharged from psychiatric out-patient clinic or c) refused to attend psychiatric day hospital at any point during the trial or in the two years prior to trial entry. The information was collected from medical and community casenotes and by asking the intensive case managers or the standard keyworkers. The reason for dropout was carefully recorded as was the duration of time the patient dropped out for. If possible, the main service if any received since dropout was recorded and compliance data were collected even after the patient had dropped out.

2.3.4.2 OTHER RULES FOR RATING COMPLIANCE WITH PSYCHIATRIC SERVICES:

a) To rate compliance with psychiatric services, data had to have been collected for at least 50% of the time that compliance data should have been available for. If, for

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example, it was not possible to rate compliance with psychiatric services for at least 50% of the time because of missing casenotes, no overall rating was made for that time period.

b) The medical or community case notes had to specifically state that a patient had dropped out of psychiatric services. If there was a gap in the notes when the patient had not been seen, it was not assumed that they had dropped out.

c) For out-patient attendance:

i) Home visits were included as out-patient appointments.

ii) Attendance for court reports was not counted.

2.3.5. SUBJECTIVE MEASURES OF COMPLIANCE WITH MEDICATION

Intensive Case Managers, standard keyworkers and their patients were asked to rate their compliance with medication at the end of the trial for the previous assessment year. They were asked to use a scale similar to the one used to rate compliance developed by Buchanan (1992) for simplicity:

- Good compliance: more than 75% of the time

- Intermediate compliance: between 25 and 75% of the time

- Poor compliance: less than 25% of the time

2.3.6. OUTCOME MEASURES

2.3.6.1. INSTRUMENTS AND TRAINING

Interview data were collected by a research psychiatrist or psychologist who were totally independent of clinical care. The psychiatrist (TT) had had several years of clinical experience assessing patients with severe chronic mental illness. Researchers attended an initial two day training course and completed five pilot interview schedules. Training material included lectures, joint patient interviews, case vignettes and video interviews. Initial interviews were conducted jointly by the psychiatrist and psychologist. In the first year, two monthly meetings with the researchers across all sites were arranged for additional training using mainly patient interviews and case vignettes to prevent instrument "drift". At the beginning of the trial, completed interview schedules were regularly inspected on site for errors and inconsistencies and feedback given to the researchers.

2.3.6.2. CLINICAL AND SOCIAL ASSESSMENTS

All outcome measures and analyses were predefined. All data were recorded on pre-printed forms by the researchers, data entry was done by a contract company and data were then updated by the researchers, supervised by the trial statistical centre. Assessments were completed at baseline and at 2 years. The aim was that all the assessments would be completed no longer than a month either side of the due date, although any data obtained outside of this time was also entered into the analysis. The researchers were not blind as to the treatment group to which each patient belonged, as additional information from Intensive Case Managers or standard keyworkers was often required, for example, to ensure safety. Additional information was collected from relatives and informal carers if possible and from casenotes.

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Unless specified otherwise, all instruments were completed at baseline and year 2 for each patient.

a) Socio-demographic Factors

Patient's age, sex, marital status, number of children, employment status, educational achievement, type of accommodation and ethnic group were recorded.

b) Illness History

The age of onset of illness, age of first admission for psychosis and duration of illness was recorded from casenotes. It was also noted if there was a previous history of poor compliance with medication, being on a section of the Mental Health Act (1983), or a history of violence, forensic contact or parasuicide. This was recorded at baseline only.

c) Diagnosis

The Operational Criteria Checklist for Psychotic Illness (OCCPI, McGuffin et al, 1991) was completed for all patients from casenotes for the time up to the baseline assessment to generate a Research Diagnostic Criteria diagnosis. The OCCPI checklist is based on phenomenological descriptions in the Present State Examination, and includes signs and symptoms used in a wide range of operational definitions of psychiatric conditions (ICD-10, RDC, DSM-3R, etc.). The computer programme OPCRIT (McGuffin et al, 1991) was used to analyse the OCCPI data. Psychopathological data were derived from the Comprehensive Psychopathological Rating Scale (Asberg et al, 1978) and the Scale for the Assessment of Negative Symptoms (Andreasen, 1982), a detailed cross-sectional mental state examination at baseline assessment, and from the patient's medical casenotes.

d) Clinical Features

Psychopathology was measured using the Comprehensive Psychopathological Rating Scale (CPRS, Asberg et al, 1978), which rates sixty five psychopathological items on a 0 - 3 severity scale (maximum score 195). It measures both reported and observed psychopathology over the previous week.

Negative symptoms were measured using the Scale for the Assessment of Negative Symptoms (SANS, Andreasen, 1989). This has 5 global ratings (affect, alogia, avolition, anhedonia and attention) defined in a systematic way and relates to negative symptomatology over the previous month. Each global rating is scored from 0 to 5 (maximum score 25) from observer ratings.

To assess course of illness and associated disabilities longitudinally, the Lifechart instrument from the multi-centre study on course and outcome of schizophrenia (World Health Organisation (WHO), 1992) was used. The Lifechart assesses course of illness in a number of ways over the previous two year period, using clear definitions for all weightings. Course type was rated as episodic (no episode longer than six months), continuous (no remission longer than six months), neither episodic nor continuous, and not psychotic in this period. A "usual severity of symptoms" rating was made to indicate the symptomatic level of the patient during most of the two year period. Ratings were severe (1), moderate (2), mild (3) or recovered (4).

In addition, the Lifechart rated the proportion of the previous two years spent unemployed (time in institutions not counted; full time students and full time housewives were rated as employed), living independently, in hospital, in prison (of any duration, including being held in custody at the police station), or without accommodation ("vagrant"). The Lifechart instrument was completed at baseline and at

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the year 2 interview with information related to the previous two years as appropriate. It was completed from casenotes and interviews with patients.

The total score from the World Health Organisation (WHO) Disability Assessment Schedule (Jablensky et al, 1980), adapted for use with patients and informants (WHO, 1992) was used to measure disability. This is an 11 item questionnaire which incorporates the patients' abilities in self care, social interaction, sexual relations and work over the previous month (maximum score 5).

Patients were screened in a standardised way about their use of sixteen different illicit drugs and also asked about the use of any other illicit drugs.

e) Quality of Life

Quality of life was measured using a structured self report interview to complete the Lancashire Quality of Life Profile (Oliver et al, 1997). It consists of a hundred items assessing quality of life and life satisfaction in nine areas; work/education; leisure/participation; religion; finances; living situation; legal and safety; family relations; social relations and health. Life satisfaction ratings are on a seven point likert scale (1 = cannot be worse, 7 = cannot be better) and relates to the patients' quality of life over the previous month.

f) Need

The Camberwell Assessment of Need (Phelan et al, 1995) assesses twenty two areas of need. It establishes whether there is or has been a need in the previous month by asking about difficulties in that area, and responses are rated on a three point scale (0 = no serious needs; 1 = no serious problem or moderate problem because of continuing

intervention; 2 = current serious problem/unmet need). Patient's subjective ratings only were included.

g) Patient Dissatisfaction

Patients completed a self-report dissatisfaction questionnaire related to nine aspects of satisfaction with mental health services (Tyrer & Remington, 1979). Responses were rated on a 4 point scale (1 = very satisfied, 2 = fairly satisfied, 3 = not very satisfied, 4 = not satisfied at all; maximum score 36). The questions related to satisfaction with information, administrative arrangements, feeling actively involved in treatment, sensitivity for cultural practices and liaison with other services.

h) Hospitalisation data

The number of days each patient had been in a psychiatric hospital and the number of hospital admissions during the trial and in the two years prior to trial entry was recorded. The information was taken from medical casenotes and then cross checked using the computerised hospital database system. All hospital admissions out of the Central Manchester area were also recorded.

i) Neuropsychology

Estimates of premorbid full scale intelligence quotient and performance and verbal intelligence quotient were made at the baseline assessment only, using the National Adult Reading Test (NART, Nelson, 1982).

j) Side effects of medication

Abnormal movements were assessed using the Abnormal Involuntary Movement Scale (AIMS, Guy, 1976) which identifies seven areas of the body and their most common

abnormal movements, which are rated on a 0 to 4 severity scale (none, minimal - extreme, normal, mild, moderate, severe; maximum score: 28).

The Disability Assessment Schedule was summarised by the mean of all scored items, the Lancashire quality of life profile by a mean satisfaction score and all other measures by the sum of all items.

2.4. TREATMENT TEAMS

Patients were either randomly allocated to receive Intensive Case Management or standard care in Manchester. All staff were members of multi-disciplinary teams with access to medical, social work and clinical psychology expertise and to in-patient care if necessary. Most of the staff had trained as mental health nurses originally and had years of experience working in mental health with at least one additional qualification to their basic training (Table 8, page 141). During the trial, three of the original Intensive Case Management staff and none of the original standard care staff moved on to other posts.

For all patients in the trial, Intensive Case Managers and standard keyworkers completed detailed records of every face to face contact with their patients during the trial period and any failed attempts at contact with patients. They recorded the duration of contact, the setting, the focus of the contact, for example, medication, engagement, specific mental health assessment or intervention, daily living skills or housing and whether a depot injection was given at that contact.

2.4.1. INTENSIVE CASE MANAGEMENT TEAM

An Intensive Case Management team consisting of a team leader, five case managers and a case manager assistant was newly established in Central Manchester for the trial. All the Intensive Case Managers had a professional background of nursing or

occupational therapy. The team had supervision from the team leader who met them weekly and from two consultant psychiatrists who they also met weekly who had an interest in case management. A consultant psychiatrist was not allocated to the team specifically.

The case managers each had a maximum caseload of fifteen patients all from the trial. The case managers saw their patients mostly at home. When their patients had to be admitted to hospital, they were able to follow them up there and be actively involved in discharge planning. The team received training in Intensive Case Management from the Sainsbury Centre and from a visiting case management team leader from Boulder, Colorado.

Each patient had an allocated Intensive Case Manager for their two years in the trial who provided the majority of clinical care as well as liaising with and co-ordinating other relevant community and hospital services as required. The case managers worked with patients individually rather than as a team. The team was not available 24 hours, but they were flexible within the working day and could react to crises quickly. The team base was in a house on the outskirts of the hospital site.

2.4.2. STANDARD CARE

Patients who were randomly allocated to standard care were either in contact with a Community Psychiatric Nurse (CPN) or a standard case manager. Unfortunately, due to limited resources, some patients in the trial did not actually have access to a CPN or standard case manager but were just offered regular out-patient appointments at the hospital base with a psychiatrist. The number of patients receiving each aspect of standard care is detailed in Table 9 (page 142).

2.5. ANALYSES

Analyses were carried out by the author using the Statistical Package for Social Sciences with advice from the Department of Medical Statistics at the University of Manchester. The analysis was an intention to treat analysis. For normally distributed data, comparisons between groups were made using t tests and one-way Analysis of Variance. Where continuous data were not normally distributed, comparisons were made using non-parametric test including Mann-Whitney U and Kruskal-Wallis tests. For comparisons between groups of categorical data the Chi-Square test was used. For comparisons of continuous sets of data, Spearman's correlation coefficient was used.

Multivariate comparisons were carried out using step-wise multiple regression to distinguish independent predictors of compliance with medication and out-patient attendance during the trial, and logistic regression to distinguish independent predictors of dropout during the trial.

To investigate the contribution of compliance with medication and psychiatric services during the trial on the year 2 outcome scores at the end of the trial, multiple regression analyses were carried out for each outcome score. The independent variables chosen from the univariate analyses were entered into each regression model and then the compliance ratings for medication, out-patient attendance and dropout were also entered separately to see if they would significantly contribute to the regression model.

If the distribution of data were skewed, logarithmic transformation was carried out.

The conventional 5% significance level was used throughout the analyses to denote statistical significance.

Table 8. Description of the Intensive case managers and standard keyworkers

	Intensive case managers	Standard keyworkers
Mental health nurses Senior nurse (G grade) Registered nurse (F grade and below)	1 3	7 4
Occupational therapists	2	0
Others: Mental health care assistants	1	0
Total	7	11
Caseload size: mean (s.d)	14 (3)	34 (26)
Sex: Male (%)	3 (43%)	4 (36%)
Age: mean (s.d.)	35 (3)	37 (7)
Number of years experience in mental health: mean (s.d.)	7 (3)	12 (6)
Of the mental health nurses, number with an additional qualification[a]	3 (75%)	6 (75%)

[a] Additional qualification e.g. registered general nurse training, CPN certificate, M.Sc. Information missing on 3 standard keyworkers.

Table 9.   **Service provision for patients randomly allocated to standard care**

Standard care provision	Number of standard care patients
Community psychiatric nurse plus out-patient appointments	34 (43%)
Standard case manager plus out-patient appointments	17 (22%)
Out-patient appointments only	28 (35%)
Total	79 (100%)

CHAPTER 3. RESULTS

158 patients were recruited into the trial in Manchester. 308 patients' casenotes were screened for eligibility and of these 207 patients were actually eligible (Figure 1, page 164). 158 patients agreed to enter, 39 refused entry and the remaining 10 patients were not approached (3 could not be located, 3 had a community psychiatric nurse who was already working closely with them and did not want a potential change to an intensive case manager, and 4 patients could not be approached before the time for recruitment ran out).

There were only two significant differences in socio-demography and illness history between the patients who entered the trial and those who refused. The patients who refused to take part in the trial were mainly out-patients and were less likely to have had a previous history of poor compliance with medication (Table 10, page 165).

3.1.   SOURCES OF DATA COLLECTION

3.1.1.   COMPLIANCE DATA

Compliance with psychotropic medication and psychiatric services was rated over a four year period for all patients in the trial - for the two years of the trial and for the two years prior to trial entry. *Compliance with medication* was rated using a continuous measure of the percentage of time patients were poorly compliant with medication.

Compliance with psychiatric services referred to compliance with psychiatric out-patient attendance and dropout from psychiatric services. Out-patient attendance was rated using a continuous measure of the percentage of psychiatric out-patient appointments attended. Dropout was rated using a dichotomous measure of whether the patient had dropped out or not. Dropout referred to patients refusing to have any further contact with any aspect

of psychiatric services, for example, contact with their case manager or keyworker, seeing their doctor in out-patients or refusing to attend day hospital. Dropout for reasons other than refusing services, for example, moving out of area, going to prison or death were not included.

The sources of data collection used to rate compliance with medication and psychiatric services are presented in Table 11 (page 167). For most patients at least two sources of data were utilised to measure compliance with medication- medical casenotes and depot cards or therapeutic blood level monitoring for lithium or carbamazepine. There was no significant difference in the number of sources utilised for intensive and standard patients.

The majority of patients, 105 (67%), had no missing data over the four year period. Missing data referred to data that should have been available for scrutiny, for example, missing depot cards, rather than data that were missing because it was unobtainable, for example, if a patient had moved abroad. Table 11 (page 167) refers to missing data at *any* point over the four year period. If one depot card for example was missing, but other cards for the rest of the four year period were available, the missing card was still recorded. Often missing depot cards or blood levels could be compensated for by reference to the medical or community casenotes for that period.

The average (s.d.) duration of missing data was 25 (48) weeks out of a possible 208 weeks over the four year period. There was no significant difference between the intensive or standard groups in the duration of missing data over the four year period.

To rate compliance with medication and services for each patient for the two years in the trial and the two years prior to trial entry, data on compliance had to be available for at least 50% of the time. (see Methodology, page 111). The number of patients that it was

not possible to rate compliance for was extremely low, as presented in Table 12 (page 168).

3.1.2. OUTCOME DATA

Four (5%) patients in the Intensive Case Management group and 18 (23%) patients in the standard care group were not interviewed at the year 2 assessment. The reasons for non interview are described in Table 13 (page 169). There were no significant differences in compliance with medication and psychiatric services during the trial between those patients who were interviewed at year 2 and those who were not.

There were no differences between the intensive and standard groups in the mean number of sources of information (patient, relative or carer, mental health professional, case notes, others) used to complete the interview schedule at baseline (intensive group 2.8, standard group 2.6). However at the year 2 assessment, there was a significant difference in favour of the Intensive Case Management group (intensive group 2.44, standard group 2.10; t=-3.50, d.f. 154, 95% C.I. -0.58 to -0.16, P=0.001). This was partly explained by fewer patients refusing to be interviewed in the intensive group, but also because more relatives in the intensive group agreed to be interviewed.

Eighty three (61%) patients were interviewed within the one month window either side of their year 2 assessment due date. Most patients interviewed outside of this one month window were interviewed early because they were the last to be recruited and the trial had to be completed by December 1997. Some patients were followed up for longer than two years because of a delay in arranging the interview. There was no difference between the intensive or standard patients in the proportions interviewed early, late or on time (Table 14, page 170).

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3.2. BASELINE CHARACTERISTICS OF SAMPLE

3.2.1. BASELINE COMPLIANCE DATA

Those patients subsequently randomised to receive Intensive Case Management had poorer compliance with medication in the two years prior to trial entry (a mean score of 38% of the time) compared to those later randomised to standard care (a mean score of 29% of the time) but this difference did not reach statistical significance (Table 15, page 171).

Out-patient attendance was very similar in the two groups in the two years prior to trial entry at around 70%. The number of patients who dropped out was also similar - about 27 (34%) of patients in each group. Those who did dropout in the two years prior to trial entry had an average dropout period of 53% of the time for those allocated to Intensive Case Management compared to 42% of the time for the standard care group.

3.2.2. SOCIO-DEMOGRAPHY, ILLNESS HISTORY AND BASELINE ASSESSMENT SCORES

There were no statistically significant differences in baseline characteristics between the patients allocated to intensive or standard groups (Table 16, page 172). Most of the sample were young, single, caucasian, unemployed and living away from family. 21% of patients were African caribbean. Equal proportions of patients were recruited from out-patients and in-patients. Most patients had a Research Diagnostic Criteria diagnosis of schizoaffective disorder. Patients had long histories of illness (mean 11 years; mean of 3 months in hospital in the preceding 2 years). Mean baseline scores for psychopathology, social functioning, quality of life, unmet needs and patients' dissatisfaction were similar in the intensive and standard groups.

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3.3. COMPLIANCE WITH MEDICATION AND PSYCHIATRIC SERVICES DURING THE TRIAL

3.3.1. MEDICATION COMPLIANCE

3.3.1.1. MEDICATION PROFILE

Table 17 (page 173) presents the types of medication prescribed for all patients during their time in the trial. This table refers to the medication prescribed, not compliance with that medication. The majority of patients were prescribed only one or two psychotropic medications for most of their time in the trial.

Seventy eight (49%) patients were prescribed depot neuroleptic medication at some point during the trial. The most popular depot medication prescribed was flupenthixol decanoate.

The majority of patients, 128 (81%), were prescribed oral neuroleptic medication at some point in the trial period. The traditional neuroleptics were the most popular. Only 38 (24%) of all patients were prescribed atypical neuroleptics. The mean (s.d.) dosage prescribed for the longest period of time in chlorpromazine equivalents was 616mg (944mg). Almost 10% of patients were prescribed dosages of neuroleptic medication above the recommended British National Formulary (BNF) limits. Most patients, 90 (57%), were prescribed an anticholinergic medication at some time during the trial period.

Approximately one third of patients were prescribed antidepressant medication during the trial. The most popular antidepressants prescribed were the selective serotonin reuptake inhibitors. Approximately one third of patients were prescribed lithium; the vast majority having some record of lithium levels being taken. A much smaller number were

prescribed carbamazepine. Only six patients in the trial were prescribed sodium valproate.

For patients prescribed oral medication, only 19 (13%) used a dosette box to aid compliance.

There were *no* statistically significant differences in any aspect of medication prescribed for patients receiving Intensive Case Management or standard care during their two years in the trial (Table 18, page 175).

The medication prescribed for all patients in the trial by Research Diagnostic Category criteria is presented in Table 19 (page 177).

3.3.1.2. COMPLIANCE RATES FOR MEDICATION

a.   Overall rates for all patients in the trial

The overall medication compliance rates for all patients for the two years in the trial and the two years prior to trial entry are presented in Table 20 (page 178). There was a highly significant improvement in compliance with medication when considering all the patients in the trial during the trial period.

b.   Medication compliance rates for patients receiving Intensive Case

Management or standard care

There were no significant differences in the medication compliance rates between the patients receiving Intensive Case Management or standard care during the trial period (Table 21, page 179). The medication compliance rates between the two groups were very similar during the trial. Medication compliance improved in both groups during the trial period compared with the two years prior to trial entry, but significantly so only for the patients receiving Intensive Case Management (Table 21, page 179).

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Seventeen (23%) patients in the intensive group and 14 (18%) patients in the standard group had 100% compliance with medication during the trial period. Two (3%) patients in the intensive group and 4 (5%) patients in the standard group had absolutely no compliance with medication during the trial period.

Table 22 (page 180) compares compliance with medication between the patients receiving Intensive Case Management and standard care for the first and the second year of the trial separately. There were no significant differences in the first or second year between the two groups. Compliance with medication in the second year was slightly worse in the standard care group but not significantly different from the first year.

The results so far have utilised a continuous measure of compliance - the percentage of time each patient was poorly compliant with medication. To compare continuous and categorical measures of compliance with medication, the percentage of time each patient was poorly compliant with medication was divided into three categories according to Buchanan (Buchanan, 1992) of good compliance (>75%), intermediate compliance (25-75%) and poor compliance (<25%). The significant difference in change scores between intensive and standard groups when compliance was measured as a continuous variable (Table 21, page 179) was not apparent when a categorical measure of compliance was used (Table 23, page 181).

c.   **Subanalysis for patients prescribed depot medication during the trial**

The analysis comparing medication compliance for patients receiving Intensive Case Management or standard care was repeated considering patients who were prescribed depot neuroleptic medication during the trial only. The results are presented in Table 24 (page 182).

There was a difference in compliance rates for the two years prior to trial entry, with significantly poorer compliance for those subsequently allocated to receive Intensive Case Management. The compliance rates actually during the trial were similar in the intensive and standard groups. However there was a difference in change scores with the depot patients in the intensive group having significantly greater improvement in medication compliance during the trial compared with the two years prior to trial entry. Medication compliance in the standard group hardly changed.

To elaborate this further, the analysis was repeated for the rest of the patients - those not prescribed depot medication during the trial. There were no significant differences between the intensive or standard groups during the trial or in the two years preceding it, although there was a trend towards better compliance in the intensive group during the trial (Table 25, page 183).

3.3.1.3.   NUMBER OF PATIENT CONTACTS

Intensive case managers and standard keyworkers were required to record every contact or failed contact with their patients on a short questionnaire. The primary focus of the contact was recorded using several categories including medication. The results are presented in Table 26 (page 184).

Intensive case managers had on average 0.88 contacts with each of their patients per week; standard keyworkers had on average 0.45 contacts per week. As well as having almost double the number of contacts with their patients, intensive case managers also had double the number of failed contacts.

3.3.1.4. CONTACTS WHEN THE PRIMARY FOCUS WAS MEDICATION

When the primary focus was medication, intensive case managers had more contacts with their patients (n = 492) compared with standard keyworkers (n = 367) (Table 26, page 184). However, the primary focus of a large number of contacts was missing in the standard group especially, (n = 2234).

Considering those contacts when the primary focus was medication, intensive case managers spent significantly more time with their patients (mean of 35 minutes per contact) than standard keyworkers (mean of 21 minutes per contact), (Table 26, page 184). Patients receiving standard care mainly received their depot medication when the focus was medication, whereas only half of the intensive patients did. For patients receiving depot medication, about half of the intensive patients received their depot at home (n = 255), whereas only a small proportion of standard patients did (n = 84).

3.3.2. COMPLIANCE WITH PSYCHIATRIC SERVICES

3.3.2.1. PSYCHIATRIC SERVICES PROFILE

Compliance with psychiatric services was measured using:

1. Psychiatric out-patient attendance for all patients.

2. Dropout from psychiatric services.

Contact with psychiatric services for all patients during their time in the trial is presented in Table 27 (page 185). Almost all patients had access to out-patient appointments and an average of 12 appointments were made for each patient during the trial period. Attendance was good during the trial, with an average attendance rate of 77%. 39% of patients attended at least one out-patient appointment accompanied by their intensive case manager or standard keyworker.

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Overall 29 (18%) patients dropped out because they refused services at some point during their two years in the trial. Patients mainly dropped out because they refused to carry on attending psychiatric out-patient appointments. Those who did dropout did so for a significant amount of time, with the average duration being over six months.

Some patients dropped out of psychiatric services for reasons not directly related to poor compliance. Nine patients moved out of the services catchment area, three were admitted to a high dependency unit long-term, two went to prison and one died by suicide. These patients were not considered as dropouts in the main analysis.

3.3.2.2. COMPLIANCE RATES FOR PSYCHIATRIC SERVICES

a.   Overall rates for all patients in the trial

The overall compliance rates for psychiatric services for all patients for the two years in the trial and the two years prior to trial entry are presented in Table 28 (page 186). There was a highly significant improvement in compliance with psychiatric services during the trial as the rate of out-patient attendance increased and the number of patients who dropped out was reduced.

b.   Compliance rates for psychiatric services for patients receiving Intensive Case Management or standard care.

Table 29 (page 187) depicts compliance with psychiatric services for patients receiving Intensive Case Management or standard care during the trial period. Overall there was an improvement in compliance with psychiatric services in both intensive and standard groups in the trial compared with the previous two years, as out-patient attendance increased and fewer patients dropped out from services (Table 29, page 187).

The improvement was significantly different for out-patient attendance in the intensive group with a better attendance rate during the trial and a greater improvement in attendance during the trial compared with the previous two years.

Table 30 (page 188) describes compliance with psychiatric services between the intensive and standard groups during the trial in more detail:

i)   Psychiatric out-patient attendance during the trial

There was no difference in the number of out-patient appointments available to the intensive and standard patients. Patients receiving Intensive Case Management attended a significantly greater proportion of their out-patient appointments compared with patients receiving standard care. This may have been related to the fact that intensive case managers attended out-patient appointments with their patients more often than standard keyworkers did.

ii)   Dropout from psychiatric services during the trial

The number of patients who dropped out in each group was similar. Of these, Intensive Case Management patients dropped out for longer than standard care patients but this difference was not statistically significant. There were differences in the reasons for dropout with significantly more patients receiving Intensive Case Management refusing to have contact with their intensive case manager and more patients receiving standard care dropping out of attending out-patient appointments.

Table 31 (page 189) compares compliance with psychiatric services between the patients receiving Intensive Case Management or standard care for the first and the second year of the trial separately. Out-patient attendance in the first year of the trial was similar, but in the second year of the trial the Intensive Case Management patients attended

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significantly more out-patient appointments than the standard care patients, but attendance in both groups was still good. There were no significant differences in the first or second year between the two groups as regards dropout.

The results so far have used continuous rather than categorical measures of compliance whenever possible. This was the case for psychiatric out-patient attendance using the percentage of out-patient appointments attended. In order to compare continuous and categorical measures of compliance, the percentage of out-patient appointments attended was divided into three categories according to Buchanan (1992) of good compliance (>75%), intermediate compliance (25-75%) and poor compliance (<25%). The significant difference in out-patient attendance between patients receiving Intensive Case Management or standard care during the trial was apparent using both the continuous and categorical measures of compliance (Table 29, page 187 and Table 32, page 190). However the significant difference in change scores for out-patient attendance in favour of the Intensive Case Management group comparing the two years in the trial with the previous two years was not apparent using a categorical of compliance, only when a continuous measure of compliance was used.

3.4. PREDICTORS OF COMPLIANCE WITH MEDICATION AND PSYCHIATRIC SERVICES DURING THE TRIAL

3.4.1. PREDICTORS OF COMPLIANCE WITH MEDICATION DURING THE TRIAL

To investigate which factors predicted compliance with medication during the trial period, multiple regression analysis with forward stepwise selection of variables was carried out. The dependent variable was the logarithm of the percentage of time patients were poorly compliant with medication during the trial period. The independent variables

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considered were those which were significantly associated with poor compliance with medication during the trial using univariate analyses (Table 33, page 191) plus some variables which may have been expected to contribute to the regression model including which caretype the patients was allocated to- Intensive Case Management or standard care, and the negative symptom score (SANS score), as the author has previously found an association with negative symptoms and compliance with medication in another study (Tattan & Creed - in press).

The results of the multiple regression are presented in Table 34 (page 194). The variable which most significantly contributed to the regression model was the percentage of time the patients were poorly compliant with medication in the two years *prior* to trial entry, accounting for 12% of the variance. The other variables which predicted *poor* compliance with medication during the trial were:

- Sex - being male.

- A younger age at first admission for psychosis.

- Diagnosis of mania - actually predicted *better* compliance during the trial but the number of manic patients was small (n = 12).

- Less negative symptoms at baseline assessment.

- Higher patients' dissatisfaction score at baseline assessment.

- Random allocation to receive standard care.

3.4.2.   PREDICTORS OF COMPLIANCE WITH PSYCHIATRIC
SERVICES DURING THE TRIAL

3.4.2.1.   PSYCHIATRIC OUT-PATIENT ATTENDANCE

To examine which factors predicted psychiatric out-patient attendance during the trial period, multiple regression analysis with forward stepwise selection of variables was carried out. The dependent variable was the percentage of out-patient appointments attended during the trial period. The independent variables considered were those which were significantly associated with out-patient attendance during the trial using univariate analyses (Table 35, page 195) plus some variables which may be expected to contribute to the regression model including which caretype the patients was allocated to- Intensive Case Management or standard care.

The results of the multiple regression are presented in Table 36 (page 198). The variable which most significantly contributed to the regression model was the percentage of out-patients appointments attended in the two years *prior* to trial entry, accounting for 12% of the variance. The other variables selected to predict *good* out-patient attendance during the trial were :

- Sex - being female.

- Random allocation to receive Intensive Case Management.

- Age - being older.

- More negative symptoms at baseline.

3.4.2.2.   DROPOUT FROM PSYCHIATRIC SERVICES

To examine which factors predicted dropout from psychiatric services during the trial period logistic regression was carried out. The dependent variable was whether or not

patients dropped out of psychiatric services during the trial period. The independent variables considered were those which were significantly associated with dropout during the trial using univariate analyses (Table 37, page 199) plus some variables which may be expected to contribute to the regression model including which caretype the patients was allocated to- Intensive Case Management or standard care.

The results of the logistic regression are presented in Table 38 (page 202). The variable which most significantly contributed to the regression model was the percentage of psychiatric out-patient appointments attended in the two years prior to the trial.

The other variables selected were having a diagnosis of major depression, being widowed, divorced or separated and being in jail for a period in the two years prior to the trial. The numbers of patients who dropped out in all of these categories was low however and the results may be spurious. Larger numbers would be needed to confirm these results.

3.5. ASSOCIATION OF COMPLIANCE WITH MEDICATION AND COMPLIANCE WITH PSYCHIATRIC SERVICES

There was a significant association between compliance with medication and compliance with psychiatric services considering all patients both during the two years in the trial and for the two years prior to trial entry (Tables 39 and 40, pages 203-204).

As may have been predicted, attendance at out-patient appointments was negatively correlated with poor compliance with medication and those who dropped out were significantly poorer compliers with medication.

3.6. PATIENTS' AND PROFESSIONALS' RATINGS OF COMPLIANCE WITH MEDICATION

At the end of the trial the patients and their intensive case manager or standard keyworker were asked to rate that patient's compliance with medication retrospectively for the previous year. Medication compliance was rated using the three categories of good compliance (>75%), intermediate compliance (25-75%) and poor compliance (<25%) (Buchanan, 1992) for simplicity. The patient's and the case manager's or keyworker's ratings of medication compliance were compared with the more objective rating for each patient from the main trial (Table 41, page 205).

Intensive case managers and standard keyworkers had better agreement with the objective ratings than their patients did. Patients tended to overestimate their compliance with medication.

Intensive case managers and their patients had better agreement with the objective measures than standard keyworkers and their patients.

3.7. OUTCOME SCORES

Firstly, the year 2 outcome scores will be compared for the Intensive Case Management and standard care groups and then predictors of each year 2 outcome score will be evaluated. Finally some indices of effectiveness will be compared between the Intensive Case Management and standard care groups for the two years in the trial compared with the two years prior to trial entry, including the extent of psychiatric hospital admissions and clinical and social outcomes.

3.7.1. YEAR 2 OUTCOME SCORES

There were no differences in year 2 outcome scores between the patients receiving Intensive Case Management or standard care (Table 42, page 206). Mean psychopathology (CPRS) and social functioning (DAS) scores at year 2 assessment indicated that patients were moderately ill.

During the two year trial period, the number of hospital admissions was similar in the intensive and standard groups, but intensive patients stayed in hospital for longer than standard patients (median of 24 days as opposed to 12 days) although this was not statistically significant. Most patients had a continuous course type defined by no remission longer than six months. Over half of the patients had psychotic symptoms for most of their time during the trial, mainly of moderate severity.

When the year 2 outcome scores were compared with baseline scores, there were no differences in the change scores between the intensive and standard groups (Table 43, page 207).

3.7.2. PREDICTORS OF YEAR 2 OUTCOME SCORES

To investigate the effect of compliance with medication and psychiatric services during the trial period on year 2 outcome scores, multiple regression analyses were carried out for each outcome score.

The dependent variables considered in turn were: the year 2 CPRS score for psychopathology, the year 2 SANS score for negative symptoms, the year 2 DAS score for social functioning, the year 2 Lancashire quality of life profile for quality of life, the logarithm of the year 2 CAN score for unmet needs, the year 2 patient dissatisfaction score and the logarithm of the number of days in hospital during the trial.

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The independent variables entered into the regression analyses were those which were significantly associated with each of the year 2 outcome scores using univariate analyses (Tables 44-50, pages 208-220). Each of the compliance measures - compliance with medication, out-patient attendance and dropout were then entered separately to determine if they would significantly contribute further to the regression model.

The results of the multiple regressions are presented in Tables 51-57 (pages 222-228). For each dependent variable the unstandardised B coefficients and P values are presented for:

a) The independent variables selected on univariate analysis only.

b) The independent variables selected on univariate analysis plus the percentage of time poorly compliant with medication during the trial.

c) The independent variables selected on univariate analysis plus the percentage of out-patient appointments attended during the trial.

d) The independent variables selected on univariate analysis plus dropout from psychiatric services (yes/no) during the trial.

The independent variable which most often significantly predicted year 2 outcome scores was symptom severity during the trial. Compliance with medication or psychiatric services during the trial did not significantly contribute further to any of the year 2 outcome scores.

3.7.3. OUTCOME SCORES DURING THE TRIAL COMPARED WITH SCORES TWO YEARS PRIOR TO TRIAL ENTRY

As there was a significant improvement in compliance with psychiatric treatment in the Intensive Case Management group during the trial compared with the two years prior to trial entry, analyses were carried out to investigate whether this was paralleled by a significant improvement in some clinical and social variables and hospitalisation.

The Lifechart instrument (World Health Organisation, 1992) assesses clinical and social variables and hospitalisation over the previous two years and was completed for each patient at baseline for the two years prior to the trial, and at the year 2 assessment for the two years in the trial. Change scores were calculated for each variable. The variables investigated were number of days in hospital, number of admissions, usual symptom severity, presence of negative symptoms, any history of being in independent living, having a job, being homeless or being in jail in the last two years.

The results are presented in Table 58 (page 230). The only variable where the change score significantly differed between the Intensive Case management and standard care groups was the number of days in hospital, with the standard group having significantly fewer days in hospital during the trial compared with the two years prior to trial entry. Overall, the number and duration of hospital admissions were reduced in both groups during the trial compared with the previous two years.

3.8. SUMMARY OF RESULTS

3.8.1. MAIN HYPOTHESES:

a. Comparing Intensive Case Management and standard care, there was a significant improvement in compliance with medication and psychiatric out-patient attendance for patients receiving Intensive Case Management during the trial compared with the previous two years. Intensive Case Management did not have a significantly beneficial effect on the rate of dropout from psychiatric services compared with standard care, but numbers of patients dropping out were low.

The improvement in medication compliance seems to have been mainly accounted for by the patients prescribed depot neuroleptic medication. Patients receiving Intensive Case Management were significantly more likely to receive their depot medication at home compared with patients receiving standard care who mainly received it at the service setting. The improvement in out-patient attendance may have been related to the fact that more intensive case managers attended out-patient appointments with their patients than standard keyworkers did.

During the trial period itself, patients receiving Intensive Case Management attended more psychiatric out-patient appointments compared with patients receiving standard care, but there were no significant differences in rates of medication compliance or rates of dropout from psychiatric services between the Intensive case Management and standard care groups.

b. Intensive case managers had more successful and unsuccessful attempted contacts with their patients overall during the trial and when the primary focus was on medication

compared with standard keyworkers. Intensive case managers spent more time with their patients when the primary focus was on medication.

3.8.2. SUBSIDIARY HYPOTHESES:

a. The most significant predictor of poor compliance with medication and psychiatric services during the trial was poor compliance with medication and services in the two years prior to trial entry.

Other factors which independently predicted *poor* compliance with medication and out-patient attendance during the trial were being male, being younger and being a younger age at the first admission for psychosis, having fewer negative symptoms at baseline assessment and random allocation to receive standard care.

b. Compliance with medication or psychiatric services during the trial did not predict year 2 outcome assessment scores.
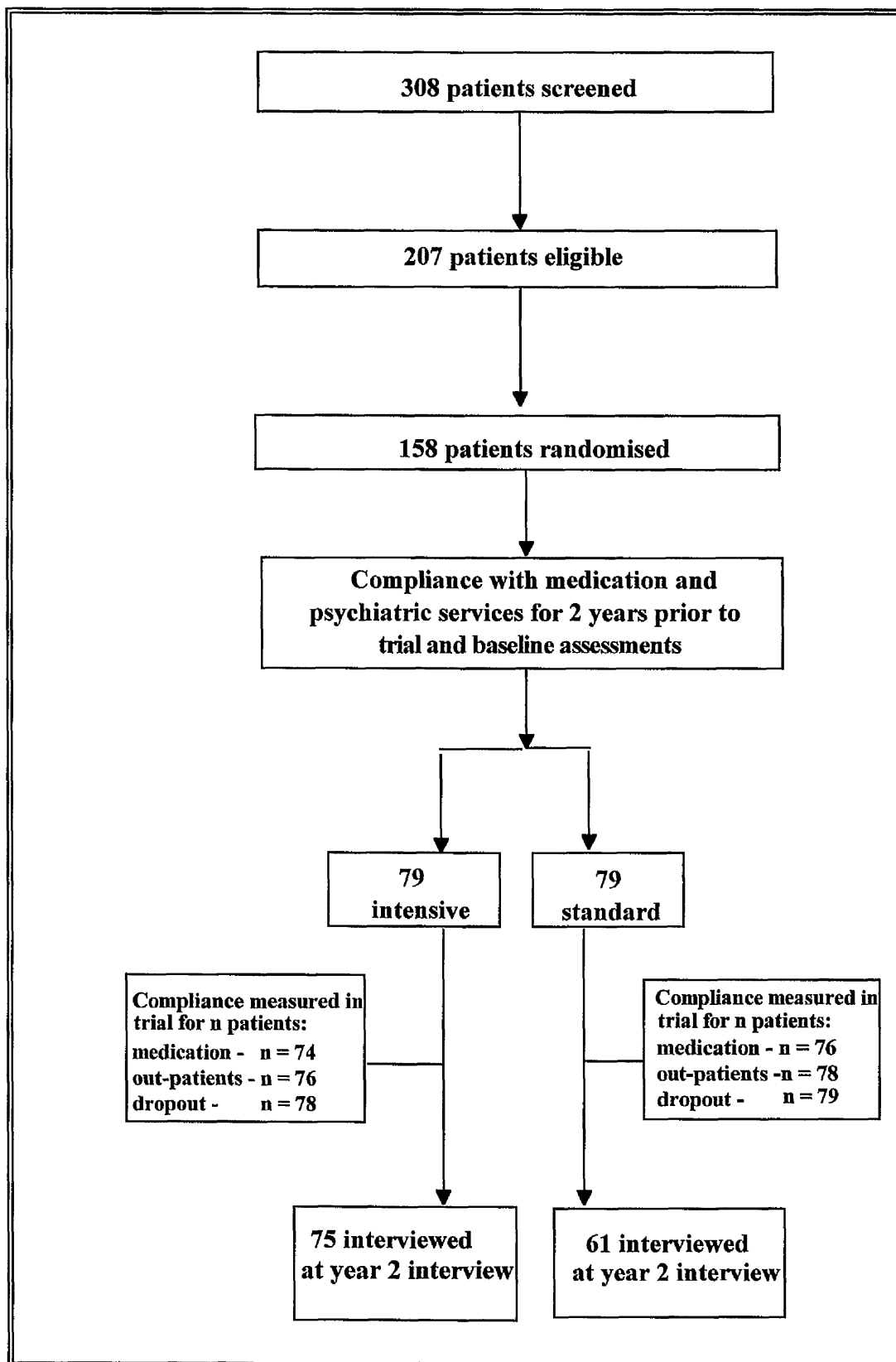
Table 10. Comparison of trial sample with patients who refused to enter the trial

	Missing data	Trial sample n = 158	Patients who refused n = 39	Test statistic	d.f.	P value
Age (years) mean (s.d.)	0	37.1 (10.7)	37.4 (10.3)	t=0.18	195	0.86
Sex Male	0	83 (53%)	18 (46%)	x^2=0.51	1	0.48
Marital status Single Married Divorced, separated or widowed	0	99 (63%) 21 (13%) 38 (24%)	19 (49%) 9 (23%) 11 (28%)	x^2=3.20	2	0.20
Childless	0	92 (58%)	19 (49%)	x^2=1.15	1	0.28
Living independently	0	114 (72%)	32 (82%)	x^2=1.60	1	0.21
Ethnicity Caucasian African caribbean Other	0	99 (49%) 36 (23%) 23 (28%)	19 (49%) 11 (28%) 9 (23%)	x^2=2.80	2	0.25
Employment Unemployed Employed[a] Retired	6 (3%)	132 (87%) 18 (12%) 2 (1%)	36 (92%) 3 (8%) 0	x^2=1.10	2	0.58
Patient status Out-patient In-patient Day patient Not in contact with services	0	76 (48%) 72 (46%) 7 (4%) 3 (2%)	33 (85%) 6 (15%) 0 0	x^2=17.20	3	0.00064 ***
Detained under a section of the Mental Health Act (1983) at trial entry	0	18 (11%)	3 (8%)	x^2=0.45	1	0.5
Number of hospital admissions in last 2 years mean (s.d.)	1 (1%)	1.9 (1.1)	1.7 (0.8)	t=1.30	194	0.2
Age of first psychotic symptoms (years) mean (s.d.)	5 (3%)	26.0 (7.4)	25.2 (6.1)	t=0.62	190	0.53
Age of first admission for psychosis (years) mean (s.d.)	7 (4%)	26.8 (7.5)	25.5 (6.0)	t=0.94	188	0.35
Duration of illness (months) mean (s.d.)	5 (3%)	131.3 (107.5)	140.1 (121.8)	t=0.43	190	0.67
Past history of violence	3 (2%)	44 (28%)	10 (26%)	x^2=0.12	1	0.73
Past history of forensic contact[b]	3 (2%)	37 (24%)	15 (39%)	x^2=3.38	1	0.07
Past history of poor compliance with medication	6 (3%)	120 (79%)	23 (59%)	x^2=6.58	1	0.010*
Past history of being detained under a section of the Mental Health Act (1983)	7 (4%)	115 (76%)	35 (90%)	x^2=3.44	1	0.06
Past history of being on the Supervision Register	8 (4%)	9 (6%)	4 (10%)	x^2=0.88	1	0.35

a. Employment includes being a full-time housewife or student
b. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services

Table 11. **Sources of data collection on compliance rates for the 2 years in the trial and the 2 years prior to trial entry.**

Sources of information on medication compliance, n (%)	
Medical casenotes and depot cards	53 (33%)
Medical casenotes and blood levels	49 (31%)
Medical casenotes only	47 (30%)
Medical casenotes, depot cards and blood levels	9 (6%)
Community or prison notes in addition to the above	8 (5%)
Missing sources of data at any point for any measure of compliance, n (%)	
None	105 (67%)
Depot cards	41 (26%)
Medical casenotes	7 (4%)
Medical casenotes plus depot cards	4 (2%)
Prison medical casenotes	1 (1%)
Duration of missing data (weeks) mean (s.d.)	25 (48)
Percentage of time sources of data are missing mean (s.d.)	14% (s.d. = 26%)

Table 12.   **Patients it was not possible to measure compliance with medication and psychiatric services for.**

	Intensive case management (n = 79)	Standard care (n = 79)	Total (n = 158)
Compliance with **medication** two years *prior to* trial	7 (9%)	8 (10%)	15 (9%)
Compliance with **medication** for two years in trial	5 (6%)	3 (4%)	8 (5%)
Compliance with **out-patient appointments** two years *prior to* trial	6 (8%)	4 (5%)	10 (6%)
Compliance with **out-patient appointments** for two years in trial	3 (4%)	1 (1%)	4 (3%)
Dropout from psychiatric services two years *prior to* trial	3 (4%)	0	3 (2%)
Dropout from psychiatric services for two years in trial	1 (1%)	0	1 (1%)

Table 13. Patients not interviewed at year 2 assessment.

Reason for no interview	Intensive case management n = 79	Standard care n = 79	x^2	d.f.	P value
Year 2 assessment					
Refused	1	7	10.35	1	0.0013**
Moved	1	4			
Not able to contact	1	7			
Deceased	1	0			
Total	4 (5%)	18 (23%)			

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Table 14.   Patients interviewed early or late for year 2 assessment.

	Intensive case management n = 75 interviewed	Standard care n = 61 interviewed	Test statistic	d.f.	P value
Number of patients interviewed early or late	42 (56%)	33 (54%)	x^2=0.83	1	0.36
Interviewed early	32 (43%)	22 (36%)			
Interviewed late	10 (13%)	11 (18%)			
Number of months patients interviewed early or late Mean (s.d.)	3.3 (1.4)	3.2 (1.6)	t=0.32	73	0.75

Table 15. Baseline compliance with medication and psychiatric services for the 2 years prior to the trial.

	Intensive case management	Standard care	Test statistic	d.f.	P value
Percentage of time *poorly* compliant with **medication,** mean (s.d.)	38% (s.d.=35%)	29% (s.d.=31%)	$t = 1.72$	141	0.09
Percentage of **out-patient appointments** attended, mean (s.d.)	70% (s.d. = 24%)	69% (s.d.=22%)	$t = 0.16$	146	0.87
Number of patients who **dropped out,** n (%)	27 (34%)	26 (33%)	$x^2 = 0.12$	1	0.73
Percentage of time **dropped out,** mean (s.d.)[a]	53% (s.d.=31%)	42% (s.d.=26%)	$t = 1.32$	51	0.19

[a]Only those patients who dropped out are included

Table 16.   **Baseline characteristics of trial sample**

	Missing data	Intensive case management n = 79	Standard care n = 79	Test statistic	d.f.	P value
Age (years) mean (s.d.)	0	38 (10)	37 (11)	t = 0.65	156	0.51
Sex Male	0	38 (48%)	45 (57%)	$x^2 = 1.24$	1	0.26
Marital status						
Single		43 (55%)	47 (59%)			
Married		16 (21%)	14 (18%)			
Divorced,separated or widowed	1 (1%)	19 (24%)	18 (23%)	$x^2 = 0.33$	2	0.85
Childless	0	46 (58%)	46 (58%)	$x^2 = 0.0$	1	1
OPCS ethnicity						
White		52 (66%)	47 (60%)			
African caribbean		19 (24%)	17 (21%)			
Other	0	8 (10%)	15 (19%)	$x^2 = 2.49$	2	0.29
Living with family	3 (2%)	23 (30%)	23 (30%)	$x^2 = 0.0$	1	0.96
Employment						
Unemployed		75 (95%)	70 (89%)			
Employed	0	4 (5%)	9 (11%)	$x^2 = 2.09$	1	0.15
Qualifications						
Nil		41 (56%)	31 (40%)			
CSE/GCSE/O level		19 (26%)	29 (38%)			
A level or higher	8 (5%)	13 (18%)	17 (22%)	$x^2 = 3.90$	2	0.14
Status Out-patient		41 (52%)	43 (54%)			
In-patient	0	38 (48%)	36 (46%)	$x^2 = 0.10$	1	0.75
Diagnosis						
Major depression		2 (3%)	1 (1%)			
Mania or bipolar		8 (10%)	4 (5%)			
Schizoaffective		49 (62%)	49 (62%)			
Schizophrenic		16 (20%)	18 (23%)			
Unspecified or functional	0	4 (5%)	7 (9%)	$x^2 = 2.60$	4	0.63
Age of onset of psychosis (years) mean (s.d.)	2 (1%)	26 (7)	27 (7)	t = 0.68	154	0.49
Duration of illness (months) mean (s.d.)	2 (1%)	141 (111)	121 (104)	t = 1.16	154	0.25
Days in hospital in past 2 years mean (s.d.)	0	100 (118)	108 (80)	t = 0.53	156	0.59
Mean (s.d.) scores						
CPRS	1 (1%)	15.3 (11.2)	12.5 (10.4)	t = 1.63	155	0.11
SANS	0	7.2 (5.0)	7.0 (5.2)	t = 0.26	156	0.79
DAS total score	0	1.2 (0.8)	1.1 (0.9)	t = 1.18	156	0.24
Quality of life total score	5 (3%)	4.3 (0.7)	4.3 (0.7)	t = 0.65	151	0.52
Unmet needs	4 (3%)	3.4 (2.3)	3.1 (2.8)	t = 0.81	152	0.42
Patients' dissatisfaction	29 (18%)	18.3 (4.8)	17.3 (4.5)	t = 1.24	127	0.22

Table 17.   **Descriptive Statistics for all patients for the 2 years in the trial.**
             a. Medication

	Missing n	n (%) (Total n = 158)
Number of psychotrophic medications prescribed		
1	1(1%)	60 (38%)
2		48 (30%)
3		34 (22%)
4		13 (8%)
5		2 (1%)
Number of patients prescribed depot neuroleptic medication	1 (1%)	78 (49%)
Type of depot medication prescribed		
flupenthixol decanoate	1 (1%)	45 (58%)
fluphenazine decanoate		13 (17%)
haloperidol decanoate		11 (14%)
zuclopenthixol decanoate		6 (7%)
pipothiazine palmitate		3 (4%)
Depot interval (weeks)		
1	2 (1%)	12 (16%)
2		47 (61%)
3		6 (7%)
4		12 (16%)
Mean (s.d.) time depot medication prescribed (months)	1 (1%)	19 (7)
Number of patients prescribed oral neuroleptic medication	1 (1%)	128 (81%)
Type of oral neuroleptic medication prescribed		
chlorpromazine	1 (1%)	27 (21%)
haloperidol		22 (17%)
stelazine		17 (13%)
thioridazine		15 (12%)
risperidone		12 (9%)
sulpiride		12 (9%)
clozapine		11 (7%)
droperidol		6 (5%)
olanzepine		3 (2%)
loxapine		2 (2%)
flupenthixol		1 (1%)
pimozide		1 (1%)
methotrimeprazine		1 (1%)
Mean (s.d.) time oral neuroleptic medication prescribed (months)	1 (1%)	18 (8)

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	Missing n	n (%) (Total n = 158)
Number of patients prescribed atypical neuroleptic medication	1 (1%)	38 (24%)
Mean (s.d.) dosages of neuroleptic medication prescribed (chlorpromazine equivalents in milligrams)	1 (1%)	616 (944)
Number of patients over BNF limits for dosage of neuroleptic medication prescribed	1 (1%)	15 (9%)
Number of patients prescribed anticholinergic medication	1 (1%)	90 (57%)
Mean (s.d.) time anticholinergic medication prescribed (months)	1 (1%)	12 (8)
Number of patients prescribed antidepressant medication	1 (1%)	56 (35%)
Type of antidepressant medication prescribed fluoxetine paroxetine lofepramine prothiaden venlafaxine sertraline clomipramine amitriptyline fluvoxamine citalopram moclobemide imipramine	1 (1%)	11 (20%) 7 (12%) 6 (11%) 6 (11%) 6 (11%) 5 (9%) 4 (7%) 3 (5%) 3 (5%) 3 (5%) 1 (2%) 1 (2%
Mean (s.d.) time antidepressant medication prescribed (months)	1 (1%)	15 (8)
Number of patients prescribed lithium	1 (1%)	59 (37%)
Number of patients prescribed lithium having lithium levels taken	1 (1%)	55 (93%)
Mean (s.d.) time lithium prescribed (months)	1 (1%)	20 (7)
Number of patients prescribed carbamazepine	1 (1%)	22 (14%)
Number of patients prescribed carbamazepine having carbamazepine levels taken	1 (1%)	9 (41%)
Mean (s.d.) time carbamazepine prescribed (months)	1 (1%)	15 (10)
Number of patients prescribed oral medication using a dosette box	1 (1%)	19 (13%)

Table 18. Comparison of medication prescribing for intensive case management and standard care patients during the trial.

	Intensive case management	Standard care	Test statistic	d.f.	P
Number of psychotrophic medications prescribed					
1	28 (36%)	32 (40%)	$x^2 = 0.79$	4	0.94
2	26 (33%)	22 (28%)			
3	16 (21%)	18 (23%)			
4	7 (9%)	6 (8%)			
5	1 (1%)	1 (1%)			
Number of patients prescribed oral medication using a dosette box	15 (21%)	17 (24%)	$x^2 = 0.24$	1	0.62
Number of patients prescribed depot neuroleptic medication	39 (50%)	39 (49%)	$x^2 = 0.01$	1	0.94
Type of depot medication prescribed					
flupenthixol decanoate	23 (59%)	22 (57%)	$x^2 = 3.76$	4	0.44
fluphenazine decanoate	4 (10%)	9 (23%)			
haloperidol decanoate	7 (18%)	4 (10%)			
zuclopenthixol decanoate	4 (10%)	2 (5%)			
pipothiazine palmitate	1 (3%)	2 (5%)			
Depot interval (weeks)					
1	6 (15%)	6 (16%)	$x^2 = 1.18$	3	0.76
2	22 (57%)	25 (66%)			
3	4 (10%)	2 (5%)			
4	7 (18%)	5 (13%)			
Mean (s.d.) time depot medication prescribed (months)	19 (7)	19 (6)	t = 0.03	76	0.97
Number of patients prescribed oral neuroleptic medication	66 (85%)	62 (79%)	$x^2 = 0.98$	1	0.32
Type of oral neuroleptic medication prescribed					
chlorpromazine	12 (18%)	15 (24%)	$x^2 = 16.25$	12	0.18
haloperidol	12 (18%)	10 (16%)			
stelazine	6 (9%)	11 (18%)			
thioridazine	11 (17%)	4 (6%)			
risperidone	6 (9%)	6 (10%)			
sulpiride	5 (8%)	7 (11%)			
clozapine	5 (8%)	4 (6%)			
droperidol	5 (8%)	1 (1%)			
olanzepine	3 (4%)	0			
loxapine	0	4 (6%)			
flupenthixol	0	1 (1%)			
pimozide	1 (1%)	0			
methotrimeprazine	0	1 (1%)			
Mean (s.d.) time oral neuroleptic medication prescribed (months)	17 (8)	18 (8)	t = 1.24	126	0.22

	Intensive case management	Standard care	Test statistic	d.f.	P
Number of patients prescribed atypical neuroleptic medication	20 (26%)	18 (23%)	$x^2 = 0.17$	1	0.68
Mean (s.d.) dosages of neuroleptic medication prescribed (chlorpromazine equivalents in milligrams)	563 (783)	650 (1063)	$t = 0.58$	152	0.56
Number of patients over BNF limits for dosage of neuroleptic medication prescribed	6 (7%)	9 (11%)	$x^2 = 0.62$	1	0.43
Number of patients prescribed anticholinergic medication	42 (54%)	48 (61%)	$x^2 = 0.77$	1	0.38
Mean (s.d.) time anticholinergic medication prescribed (months)	12 (8)	13 (8)	$t = 0.29$	88	0.77
Number of patients prescribed antidepressant medication	27 (35%)	29 (37%)	$x^2 = 0.07$	1	0.78
Type of antidepressant medication prescribed			$x^2 = 14.65$	11	0.20
fluoxetine	5 (18%)	6 (21%)			
paroxetine	4 (15%)	3 (10%)			
lofepramine	3 (11%)	3 (10%)			
prothiaden	6 (22%)	0			
venlafaxine	3 (11%)	3 (10%)			
sertraline	1 (4%)	4 (14%)			
clomipramine	1 (4%)	3 (10%)			
amitriptyline	2 (7%)	1 (4%)			
fluvoxamine	0	3 (10%)			
citalopram	1 (4%)	2 (7%)			
moclobemide	0	1 (4%)			
imipramine	1 (4%)	0			
Mean (s.d.) time antidepressant medication prescribed (months)	17 (8)	14 (8)	$t = 1.31$	54	0.21
Number of patients prescribed lithium	31 (40%)	28 (35%)	$x^2 = 0.31$	1	0.58
Number of patients prescribed lithium having lithium levels taken	28 (36%)	27 (34%)	$x^2 = 0.44$	2	0.81
Mean (s.d.) time lithium prescribed (months)	19 (8)	22 (5)	$t = 1.92$	53	0.060[a]
Number of patients prescribed carbamazepine	14 (18%)	8 (10%)	$x^2 = 1.99$	1	0.16
Number of patients prescribed carbamazepine having carbamazepine levels taken	6 (43%)	3 (38%)	$x^2 = 0.06$	1	0.81
Mean (s.d.) time carbamazepine prescribed (months)	15 (10)	17 (9)	$t = 0.49$	20	0.63

a - Unequal variance version of the t-test used.

Table 19. Medication prescribed for all patients during the trial by Research Diagnostic Criteria diagnostic categories

	Depot neuroleptic medication	Oral neuroleptic medication	Anticholinergic medication	Antidepressant medication	Lithium	Carbamazepine
Schizoaffective disorder n = 98	46 (47%)	84 (87%)	58 (60%)	40 (41%)	42 (43%)	14 (14%)
Schizophrenia n = 34	25 (74%)	21 (62%)	18 (53%)	2 (6%)	2 (6%)	3 (9%)
Mania or bipolar affective disorder n = 12	1 (8%)	11 (92%)	5 (42%)	5 (42%)	10 (83%)	3 (25%)
Unspecified functional psychosis n = 11	4 (36%)	9 (82%)	7 (64%)	7 (64%)	3 (27%)	2 (18%)
Major depression n = 3	2 (67%)	3 (100%)	2 (67%)	2 (67%)	2 (67%)	0

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Table 20.   Comparison of compliance with medication for *all* patients:
a) for the 2 years in the trial
b) for the 2 years prior to trial entry

	Mean (s.d.)	Paired t test	d.f.	*P* value
a) Percentage of time poorly compliant with medication in the **2 years of the trial**	20% (s.d.=27%)			
		5.13	137	<0.0005***
b) Percentage of time poorly compliant with medication in the **2 years *prior* to trial entry**	34% (s.d.=33%)			

Table 21. Comparison of compliance of patients receiving intensive case management or standard care for the *2 years in the trial compared with the 2 years prior to trial entry.*
a. Medication

	Intensive case management (n = 79)	Standard care (n = 79)	t	d.f.	*P* value
Percentage of time poorly compliant with medication for the **2 years of the trial** (mean (s.d.))	17% (s.d.=25%)	23% (s.d.=29%)	1.45	148	0.15
Percentage of time poorly compliant with medication for the **2 years *prior* to trial entry** (mean (s.d.))	38% (s.d.=35%)	29% (s.d.=31%)	1.72	141	0.088
Change in the percentage of time poorly compliant with medication **before and during the trial** (mean (s.d.))	20% (s.d.=35%)	8% (s.d.=30%)	2.16	133	0.033*[a]

a - Unequal variance version of the t-test used

Table 22.   Comparison of compliance for the *first* and *second year* in the trial.

a. Medication

	Missing n	Intensive case management	Missing n	Standard care	t	d.f.	P value
Percentage of time poorly compliant with medication for the *first* year of the trial (mean (s.d.))	3 (4%)	17% (s.d.=26%)	3 (4%)	20% (s.d.=27%)	0.77	150	0.44
Percentage of time poorly compliance with medication for the *second* year of the trial (mean (s.d.)	9 (11%)	17% (s.d.=27%)	5 (6%)	26% (s.d.=37%)	1.78	134	0.077[a]

a - Unequal variance version of the t-test used

Table 23.   Medication compliance rated using Buchanan's categories

	Intensive case management	Standard care	x^2	d.f.	P value
Compliance with medication for the 2 years of the trial					
good (>75%)	56 (75%)	51 (67%)	1.36	2	0.51
intermediate (25-75%)	14 (19%)	19 (25%)			
poor (<25%)	4 (6%)	6 (8%)			
Compliance with medication for the 2 years *prior* to trial entry					
good (>75%)	32 (45%)	40 (56%)	3.57	2	0.17
intermediate (25-75%)	24 (33%)	23 (33%)			
poor (<25%)	16 (22%)	8 (11%)			
Change in compliance with medication comparing the 2 years prior to trial entry with the 2 years in the trial					
no change	36 (52%)	41 (59%)	2.32	2	0.31
improvement by one or two increments[a]	27 (39%)	19 (28%)			
deterioration by one or two increments[b]	6 (9%)	9 (13%)			

a - improvement by one increment refers to an improvement from being a poor complier to being an intermediate complier or a change from being an intermediate complier to being a good complier during the trial compared to the previous two years.Improvement by two increments refers to an improvement from being a poor complier to being a good complier.

c - deterioration by one increment refers to a deterioration from being an intermediate complier to being a poor complier or a change from being a good complier to being an intermediate complier during the trial compared to the previous two years. Deterioration by two increments refers to a deterioration from being a good complier to being a poor complier.

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Table 24. Comparison of medication compliance of patients receiving intensive case management or standard care for the 2 years in the trial compared with the 2 years prior to trial entry.

a. Patients prescribed depot medication during the trial only

	Intensive case management (n = 39)	Standard care (n = 39)	t	d.f.	*P* value
Percentage of time poorly compliant with medication for the **2 years of the trial** (mean (s.d.))	24% (s.d.=28%)	25% (s.d.=24%)	0.19	71	0.85
Percentage of time poorly compliant with medication for the **2 years *prior* to trial entry** (mean (s.d.))	48% (s.d.=35%)	26% (s.d.=24%)	3.04	62	0.0030[**a]
Change in the percentage of time poorly compliant with medication **before and during the trial** (mean (s.d.))	23% (s.d.=35%)	1% (s.d.=27%)	3.0	65	0.0040[**a]

a - Unequal variance version of the t test used

Table 25. Comparison of medication compliance of patients receiving intensive case management or standard care for the 2 years in the trial compared with the 2 years prior to trial entry.

b. Patients not prescribed depot medication during the trial

	Intensive case management (n = 40)	Standard care (n = 40)	t	d.f.	*P* value
Percentage of time poorly compliant with medication for the **2 years of the trial** (mean (s.d.))	10% (s.d.=19%)	21% (s.d.=33%)	1.85	62	0.069[a]
Percentage of time poorly compliant with medication for the **2 years *prior* to trial** entry (mean (s.d.))	29% (s.d.=32%)	32% (s.d.=36%)	0.34	71	0.73
Change in the percentage of time poorly compliant with medication **before and during the trial** (mean (s.d.))	18% (s.d.=35%)	16% (s.d.=30%)	0.22	69	0.83

a - Unequal variance version of the t test used

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Table 26.   Contacts with patients and intensive case managers or standard keyworkers during the trial

	Intensive case management	Standard care	Test statistic	d.f.	P value
Contacts made (n): Yes No	7218 841	3716 395	$x^2 = 4.94$	1	0.026*
Contacts when primary focus: Recorded Not recorded	7128 90	1482 2234	$x^2 = 5079.76$	1	<0.0001***
Contacts when primary focus was medication:					
Number of contacts	492	367			
Time spent with patient per contact in minutes, mean (s.d.)	35 (32.3)	21 (18.2)	$t = 7.86$	804	<0.0005***a
Depot given during contact Yes No	219 (45%) 273 (55%)	326 (89%) 41 (11%)	$x^2 = 178.0$	1	<0.0001***
Depot given at home Yes No	255 (53%) 224 (47%)	84 (23%) 280 (77%)	$x^2 = 78.25$	1	<0.0001***

a - Unequal variance version of the t test used

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Table 27.   **Descriptive Statistics for all patients during the trial.**
                     b. Psychiatric Services

Psychiatric out-patient attendance:	Missing n	n (%)
Number of patients receiving out-patient appointments	2 (1%)	154 (99%)
Number of out-patient appointments made per patient mean (s.d.)	2 (1%)	12 (5)
Number of out-patient appointments attended per patient mean (s.d.)	4 (3%)	9 (5)
Percentage of out-patient appointments attended mean (s.d.)	4 (3%)	77% (s.d.=21%)
Intensive case manager or standard keyworker present at out-patient appointments	4 (3%)	60 (39%)
Dropout from psychiatric services:		
Patients who dropped out by refusing services	0	29 (18%)
Services refused: refused psychiatric outpatients only refused out-patients *and* intensive case manager / standard keyworker refused psychiatric day hospital only refused intensive case manager/ standard keyworker only	0	14 (48%) 7 (24%) 4 (14%) 4 (14%)
Duration of dropout (weeks) mean (s.d)[a]	0	30 (28)
Duration of dropout as a percentage of time in trial mean (s.d.)[a]	0	33% (s.d.=32%)

[a] Only those patients who dropped out are included

Table 28.   Comparison of compliance with psychiatric services for *all* patients:
a) for the 2 years in the trial
b) for the 2 years prior to trial entry

		Test statistic	d.f.	P value
Percentage of out-patient appointments attended **during the trial**, mean (s.d.)	77% (s.d.=21%)	3.76[a]	145	<0.0005***
Percentage of out-patient appointments attended in the 2 years *prior* to trial entry, mean (s.d.)	69% (s.d.=23%)			
Number of patients who dropped out **during the trial**, n (%)	29 (18%)	9.79[b]	1	0.0017**
Number of patients who dropped out in the 2 years prior to trial entry, n (%)	53 (34%)			

[a]Paired t test
[b]Chi-square using McNemar Test

Table 29. Comparison of compliance of patients receiving intensive case management or standard care for *the 2 years in the trial and the 2 years prior to trial entry.*
b. Psychiatric services

	Intensive case management	Standard care	Test statistic	d.f.	P value
Psychiatric out-patient attendance:					
Percentage of out-patient appointments attended **during the trial,** mean (s.d.)	82% (s.d.=20%)	73% (s.d.=22%)	t = 2.90	152	0.0040**
Percentage of out-patient appointments attended in the **2 years *prior* to trial entry,** mean (s.d.)	70% (s.d.=24%)	69% (s.d.=22%)	t = 0.16	146	0.87
Change in the percentage of out-patient appointments attended before and during the trial, mean (s.d.)	12% (s.d.=24%)	4% (s.d.=24%)	t = 2.0	144	0.047*
Dropout from psychiatric services:					
Number of patients who dropped out of psychiatric services **during the trial,** n (%)	12 (15%)	17 (22%)	x^2 = 1.06	1	0.31
Number of patients who dropped out of psychiatric services in the **2 years *prior* to trial entry,** n (%)	27 (34%)	26 (33%)	x^2 = 0.12	1	0.73

Change in the number of patients who dropped out before and during the trial:
     Dropped out before but not during trial
     No change before or during trial
     Dropped out during trial but not before
	22
	 47
	 7
		17
		 54
		 8
			x^2 = 1.14	2	0.57

Table 30. **Comparison of psychiatric services for intensive case management and standard care patients during the trial.**

	Intensive case management	Standard care	Test statistic	d.f.	P value
Psychiatric out-patient attendance:					
Number of out-patient appointments made per patient, mean (s.d.)	12 (6)	12 (5)	t = 0.12	154	0.91
Percentage of out-patient appointments attended, mean (s.d.)	82% (s.d.=20%)	73% (s.d.=22%)	t = 2.90	152	0.0040**
Number of patients that had an intensive case manager or standard keyworker present at out-patient appointments, n (%)	36 (47%)	24 (31%)	x^2 = 4.46	1	0.035*
Dropout from psychiatric services:					
Patients who dropped out by refusing services	12 (15%)	17 (22%)	x^2 = 1.06	1	0.31
Psychiatric services refused[a]: refused psychiatric out-patients refused intensive case manager or standard keyworker refused psychiatric day hospital	6 9 2	15 2 2	x^2 = 8.23	2	0.016*
Duration of dropout (weeks) mean (s.d)[b]	38 (39)	24 (15)	t = 1.21	13	0.25c
Duration of dropout as a percentage of time in trial (mean (s.d.))[b]	40% (s.d.=41%)	28% (s.d.=23%)	t = 0.95	16	0.36c

a. Number of patients counted under reasons for dropout exceeds number of patients who dropped out because some patients had more than one reason.
b. Only those patients who dropped out are included.
c. Unequal variance version of the t-test used

Table 31. **Comparison of compliance for the *first* and *second year* in the trial.**
b. Psychiatric services

	Missing n	Intensive case management	Missing n	Standard care	Test statistic	d.f	P value
Psychiatric out-patient attendance:							
Percentage of out-patient appointments attended in the *first* year of the trial, mean (s.d.)	3 (4%)	81% (s.d.=22%)	3 (4%)	76% (s.d.=23%)	$t = 1.41$	150	0.16
Percentage of out-patient appointments attended in the *second* year of the trial, mean (s.d.)	9 (11%)	86% (s.d.=21%)	3 (4%)	71% (s.d.=28%)	$t = 3.49$	138	0.0010***[a]
Dropout from psychiatric services:							
Number of patients who dropped out in the *first* year in the trial, n (%)	0	8 (10%)	0	9 (11%)	$x^2 = 0.07$	1	0.79
Number of patients who dropped out in the *second* year in the trial, n (%)	0	9 (11%)	0	12 (15%)	$x^2 = 0.49$	1	0.48

a - Unequal variance version of the t-test used

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Table 32. Psychiatric out-patient attendance rated using Buchanan's categories

	Intensive case management	Standard care	x^2	d.f.	P value
Psychiatric out-patient attendance for the 2 years of the trial					
good (>75%)	54 (71%)	35 (45%)	11.03	2	0.0040**
intermediate (25-75%)	21 (28%)	42 (54%)			
poor (<25%)	1 (1%)	1 (1%)			
Psychiatric out-patient attendance for the 2 years *prior* to trial entry					
good (>75%)	30 (41%)	28 (37%)	0.54	2	0.76
intermediate (25-75%)	40 (55%)	45 (60%)			
poor (<25%)	3 (4%)	2 (3%)			
Change in psychiatric out-patient attendance comparing the 2 years prior to trial entry with the 2 years in the trial					
no change	39 (54%)	41 (55%)	4.91	2	0.086
improvement by one increment[a]	28 (39%)	20 (27%)			
deterioration by one increment[b]	5 (7%)	13 (18%)			

a - improvement by one increment refers to an improvement from being a poor complier to being an intermediate complier or from being an intermediate complier to being a good complier during the trial compared to the previous two years.

b - deterioration by one increment refers to a deterioration from being an intermediate complier to being a poor complier or from being a good complier to being an intermediate complier during the trial compared to the previous two years.

Table 33. Predictors of poor compliance with medication for all patients during the trial
Univariate analysis

a. Categorical variables

	Percentage of time *poorly* compliance with medication			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Sex						
Male	24	3.2	77	t = 1.65	148	0.10
Female	16	3.0	73			
Marital status						
Single	25	3.3	85	F = 3.23	2, 147	0.042*
Married	13	3.8	30			
Divorced/widowed/separated	15	3.1	35			
Childless	23	3.2	84	t = 1.85	148	0.066[d]
Not childless	16	2.8	66			
Ethnicity						
White	18	2.6	94	F = 0.89	2, 147	0.41
African-caribbean	25	5.4	35			
Other	21	5.1	21			
Employed*	24	9.6	11	t = 0.54	148	0.59
Unemployed	20	2.3	139			
Independent community living in last 2 years						
Yes	20	2.3	141	t = 0.07	148	0.94
No	21	8.0	9			
Homelessness in past 2 years						
Yes	49	28.4	3	t = 1.88	148	0.063
No	19	2.2	147			
Diagnosis						
Major depression	43	25.1	3	F = 2.66	4, 145	0.035*
Bipolar/mania	5	2.2	12			
Schizoaffective disorder	18	2.6	92			
Schizophrenia	27	5.1	32			
Unspecified psychosis	31	11.6	11			
Course type in last 2 years[b]						
Episodic	19	2.7	100	F = 0.14	2, 146	0.87
Continuous	22	4.5	35			
Neither episodic nor continuous	20	7.1	14			
Symptom severity in last 2 years						
Severe	23	7.9	13	F = 0.36	3, 145	0.91
Moderate	20	4.3	36			
Mild	26	10.2	12			
Recovered	19	2.8	88			
History of being on a section of MHA (1983)						
Yes	22	2.7	113	t = 1.83	65	0.071[d]
No	13	3.7	31			

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	Percentage of time *poorly* compliant with medication			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Forensic history[c]						
Yes	31	4.9	43	t = 2.73	61	0.0080**[d]
No	16	2.3	104			
History of violence						
Yes	15	12.2	7	t = 0.44	139	0.66
No	20	2.3	134			
In jail in last 2 years						
Yes	47	12.1	10	t = 2.39	10	0.039*[d]
No	18	2.1	139			
Illicit drug use in last year						
Yes	30	4.9	39	t = 2.76	148	0.0060**
No	16	2.3	111			
History of parasuicide						
Yes	18	2.8	72	t = 0.89	144	0.38
No	22	3.3	74			
Depot prescribed in last 2 years						
Yes	24	3.1	76	t = 2.47	134	0.015*[d]
No	13	2.8	60			
Family monitored medication in last 2 years						
Yes	24	6.2	24	t = 0.78	30	0.44[d]
No	19	2.3	126			
Dropout from psychiatric services in last 2 years						
Yes	24	3.9	50	t = 1.55	145	0.12
No	17	2.6	97			
Random allocation						
Intensive case management	17	2.9	74	t = 1.45	148	0.15
Standard care	23	3.3	76			

a. Employment includes being a full-time housewife or student

b. Course type: episodic - no episode longer than 6 months; continuous- no remission longer than 6 months

c. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services

d. Unequal variance version of the t-test used

Shaded area- included in multiple regression as *P* < 0.2.

b. Continuous variables

	Percentage of time *poorly* compliant with medication		P value
	Spearman's correlation coefficient	n	
Age	-0.266	150	0.0010**
Days in hospital in last 2 years	0.105	150	0.21
Number of admissions in last 2 years	0.027	150	0.75
Duration of illness	-0.186	148	0.024*
Age of onset of illness	-0.167	148	0.043*
Age of first admission	-0.165	147	0.046*
Baseline scores :			
CPRS	-0.001	149	0.99
SANS	-0.046	150	0.58
DAS	0.072	150	0.38
Unmet needs	0.052	147	0.53
QOL	-0.008	145	0.93
Patients' dissatisfaction	0.218	123	0.016*
AIMS	-0.029	149	0.73
NART full IQ score	0.123	128	0.17
Percentage of time poorly compliant with medication in the 2 years prior to the trial	0.431	138	<0.0005***
Percentage of psychiatric out-patient appointments attended in the 2 years prior to the trial	-0.267	142	0.0010**

Shaded area- included in multiple regression as $P < 0.2$.

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Table 34.   **Predictors of compliance with medication for all patients during the trial**
Multiple regression analysis

Step	Variable included	Adjusted R^2	P value
1	Percentage of time poorly compliant with medication in the two years prior to trial entry	11.7	<0.0001
2	Sex	16.9	0.001
3	Age of first admission for psychosis	20.3	0.004
4	Mania	22.3	0.026
5	Baseline negative symptom (SANS) score	25.3	0.007
6	Baseline patient dissatisfaction score	27.2	0.015
7	Allocated to intensive case management or standard care	28.7	0.044

Table 35. **Predictors of psychiatric out-patient attendance for all patients during the trial**
Univariate analysis

a. Categorical variables

	Percentage of out-patient appointments attended			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Sex Male Female	72 83	2.5 2.1	82 72	t = 3.37	149	0.0010**d
Marital status Single Married Divorced/widowed/separated	73 83 81	2.4 3.4 3.3	87 30 37	*F* = 3.62	2, 151	0.029*
Childless Not childless	74 81	2.3 2.5	88 66	t = 1.98	152	0.050
Ethnicity White African-caribbean Other	79 72 77	2.0 4.0 5.0	97 34 23	*F* = 1.29	2, 151	0.28
Employed^a Unemployed	74 78	6.6 1.8	12 142	t = 0.58	152	0.56
Independent community living in last 2 years Yes No	77 78	1.8 6.3	144 10	t = 0.11	152	0.91
Homelessness in past 2 years Yes No	69 78	11.6 1.7	3 151	t = 0.69	152	0.49
Diagnosis Major depression Bipolar/mania Schizoaffective disorder Schizophrenia Unspecified psychosis	70 80 78 74 83	17.3 4.3 2.1 4.4 6.1	3 12 95 34 10	*F* = 0.61	4, 149	0.65
Course type in last 2 years^b Episodic Continuous Neither episodic nor continuous	77 82 69	2.2 2.6 7.1	102 36 15	*F* = 1.90	2, 150	0.15
Symptom severity in last 2 years Severe Moderate Mild Recovered	72 83 76 76	5.7 2.8 6.8 2.4	13 37 14 89	*F* = 1.49	3, 149	0.22
History of being on a section of MHA (1983) Yes No	77 77	1.9 4.0	116 32	t = 0.09	146	0.93

	Percentage of out-patient appointments attended			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Forensic history[c]						
Yes	71	3.2	43	t = 2.35	149	0.020*
No	80	2.0	108			
History of violence						
Yes	83	8.3	7	t = 0.73	143	0.47
No	77	1.8	138			
In jail in last 2 years						
Yes	68	6.3	10	t = 1.47	151	0.15
No	78	1.8	143			
Illicit drug use in last year						
Yes	70	3.5	40	t = 2.60	152	0.010*
No	80	1.9	114			
History of parasuicide						
Yes	80	2.4	73	t = 1.54	148	0.13
No	75	2.5	77			
Depot prescribed in last 2 years						
Yes	77	2.5	79	t = 0.40	138	0.69
No	79	2.6	61			
Family monitored medication in last 2 years						
Yes	76	4.6	27	t = 0.35	152	072
No	78	1.9	127			
Dropout from psychiatric services in last 2 years						
Yes	75	3.1	51	t = 0.91	149	0.37
No	78	2.1	100			
Random allocation						
Intensive case management	82	2.2	76	t = 2.90	152	0.0040**
Standard care	72	2.5	78			

a. Employment includes being a full-time housewife or student

b. Course type: episodic - no episode longer than 6 months; continuous- no remission longer than 6 months

c. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services

d. Unequal variance version of the t-test used

Shaded area- included in multiple regression as P < 0.2

b. Continuous variables

	Percentage of out-patient appointments attended		P value
	Spearman's correlation coefficient	n	
Age	0.228	154	0.0050**
Days in hospital in last 2 years	-0.004	154	0.96
Number of admissions in last 2 years	-0.083	154	0.31
Duration of illness	0.198	152	0.015*
Age of onset of illness	0.092	152	0.26
Age of first admission	0.117	151	0.15
Baseline scores :			
CPRS	0.125	153	0.12
SANS	0.082	154	0.31
DAS	0.095	154	0.24
Unmet needs	-0.079	151	0.34
QOL	-0.096	149	0.24
Patients' dissatisfaction	0.076	127	0.41
AIMS	0.007	153	0.93
NART full IQ score	-0.021	131	0.82
Percentage of time poorly compliant with medication in the 2 years prior to the trial	-0.126	141	0.14
Percentage of psychiatric out-patient appointments attended in the 2 years prior to the trial	0.292	151	<0.0005***

Shaded area- included in multiple regression as P < 0.2

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Table 36.   **Predictors of out-patient appointment compliance for all patients during the trial.**
Multiple regression analysis

Step	Variable included	Adjusted R^2	P value
1	Percentage of out-patient appointments attended in 2 years prior to trial	11.9	<0.0005
2	Sex	16.9	0.002
3	Allocation to intensive case management or standard care	20.6	0.005
4	Age	23.9	0.007
5	Baseline negative symptom (SANS) score	26.3	0.016

Table 37. *Predictors of dropout from psychiatric services* for all patients during the trial
Univariate analysis

a. Categorical variables

	Patients who dropped out in trial (n = 29)	Patients who did not drop out in trial (n = 129)	Test statistic	d.f.	P value
Sex					
Male	13 (45%)	70 (54%)			
Female	16 (55%)	59 (46%)	$x^2 = 0.85$	1	0.36
Marital status					
Single	11 (38%)	79 (62%)			
Married	6 (21%)	24 (19%)			
Divorced/widowed/separated	12 (41%)	25 (19%)	$x^2 = 7.17$	2	0.028*
Childless	15 (52%)	77 (60%)			
Not childless	14 (48%)	52 (40%)	$x^2 = 0.62$	1	0.43
Ethnicity					
White	16 (55%)	83 (64%)			
African-caribbean	5 (17%)	31 (24%)			
Other	8 (28%)	15 (12%)	$x^2 = 4.94$	2	0.085
Employed[a]	2 (7%)	11 (9%)			
Unemployed	27 (93%)	118 (91%)	$x^2 = 0.08$	1	0.77
Independent community living in last 2 years					
Yes	28 (97%)	119 (92%)			
No	1 (3%)	10 (8%)	$x^2 = 0.68$	1	0.41
Homelessness in past 2 years					
Yes	0	4 (3%)			
No	29 (100%)	125 (97%)	$x^2 = 0.92$	1	0.34
Diagnosis					
Major depression	2 (7%)	1 (1%)			
Bipolar/mania	0	12 (9%)			
Schizoaffective disorder	16 (55%)	82 (64%)			
Schizophrenia	7 (24%)	27 (21%)			
Unspecified psychosis	4 (14%)	7 (5%)	$x^2 = 10.13$	4	0.038*
Course type in last 2 years[b]					
Episodic	18 (62%)	86 (68%)			
Continuous	9 (31%)	28 (22%)			
Neither episodic nor continuous	2 (7%)	13 (10%)	$x^2 = 1.19$	2	0.55
Symptom severity in last 2 years					
Severe	2 (7%)	11 (9%)			
Moderate	9 (31%)	29 (23%)			
Mild	4 (14%)	10 (8%)			
Recovered	14 (48%)	77 (60%)	$x^2 = 2.28$	3	0.52
History of being on a section of MHA (1983)					
Yes	25 (89%)	95 (77%)			
No	3 (11%)	29 (23%)	$x^2 = 2.21$	1	0.14

	Patients who dropped out in trial (n = 29)	Patients who did not drop out in trial (n = 129)	Test statistic	d.f.	P value
Forensic history[c]					
Yes	9 (31%)	35 (28%)			
No	20 (69%)	91 (72%)	$x^2 = 0.12$	1	0.73
History of violence					
Yes	1 (4%)	7 (6%)			
No	26 (96%)	115 (94%)	$x^2 = 0.18$	1	0.67
In jail in last 2 years					
Yes	5 (17%)	5 (4%)			
No	24 (83%)	123 (96%)	$x^2 = 7.05$	1	0.0079**
Illicit drug use in last year					
Yes	11 (38%)	30 (23%)			
No	18 (62%)	99 (77%)	$x^2 = 2.65$	1	0.11
History of parasuicide					
Yes	17 (63%)	57 (45%)			
No	10 (37%)	70 (55%)	$x^2 = 2.92$	1	0.088
Depot prescribed in last 2 years					
Yes	15 (63%)	65 (55%)			
No	9 (37%)	54 (45%)	$x^2 = 0.50$	1	0.48
Family monitored medication in last 2 years					
Yes	6 (21%)	23 (18%)			
No	23 (79%)	106 (82%)	$x^2 = 0.13$	1	0.72
Dropout from psychiatric services in last 2 years					
Yes	14 (48%)	39 (31%)			
No	15 (52%)	87 (69%)	$x = 3.14$	1	0.076
Random allocation					
Intensive case management	12 (41%)	67 (52%)			
Standard care	17 (59%)	62 (48%)	$x^2 = 1.06$	1	0.31

a. Employment includes being a full-time housewife or student

b. Course type: episodic - no episode longer than 6 months; continuous- no remission longer than 6 months

c. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services

Shaded area- included in logistic regression as $P < 0.2$

b. Continuous variables

	Patients who dropped out in trial (n = 29)	Patients who did not drop out in trial (n = 129)	Test statistic	d.f.	*P* value
Age mean (s.d.)	37.3 (11.9)	37.0 (10.4)	t = 0.11	156	0.91
Days in hospital in last 2 years mean (s.d.)	131.5 (141.5)	97.6 (87.8)	t = 1.24	33	0.23[d]
Number of admissions in last 2 years mean (s.d.)	2.1 (1.1)	1.9 (1.0)	t = 0.82	156	0.41
Duration of illness (months) mean (s.d.)	125.9 (121.7)	132.5 (104.5)	t = 0.30	154	0.77
Age of onset of illness (mean (s.d.)	26.7 (8.0)	25.9 (7.2)	t = 0.52	154	0.6
Age of first admission mean (s.d.)	27.7 (8.5)	26.5 (7.3)	t = 0.76	153	0.45
Baseline scores mean (s.d.):					
CPRS	13.4 (8.1)	13.9 (11.4)	t = 0.24	155	0.81
SANS	6.6 (3.4)	7.2 (5.4)	t = 0.73	65	0.47[d]
DAS	1.0 (0.7)	1.1 (0.8)	t = 0.59	49	0.56[d]
Unmet needs	3.4 (2.6)	3.2 (2.6)	t = 0.35	152	0.72
QOL	4.4 (0.8)	4.3 (0.7)	t = 0.88	151	0.38
Patients' dissatisfaction	19.7 (4.8)	17.4 (4.5)	t = 2.30	127	0.025[*]
AIMS	0.3 (1.2)	1.1 (3.2)	t = 2.26	118	0.026[*]
NART full IQ score	108.0 (9.6)	106.0 (9.6)	t = 0.97	132	0.34
% of time poorly compliant with medication in the 2 years prior to the trial mean (s.d.)	46.7% (s.d. = 33.4%)	30.9% (s.d. = 32.5%)	t = 2.16	141	0.033[*]
% of psychiatric out-patient appointments attended in the 2 years prior to the trial mean (s.d.)	57.8% (s.d. = 26.6%)	72.0% (s.d. = 21.0%)	t = 3.03	146	0.030[*]

d. Unequal variance version of the t-test used
Shaded area- included in logistic regression as *P* < 0.2

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Table 38.   **Predictors of dropout from psychiatric services for all patients during the trial.**
Logistic regression analysis

Step	Variable included	A^1	B^2	C^3	D^4	% Correct	x^2	P value
0		129	0	29	0	81.65		
1	Percentage of out-patient appointments attended in the 2 years prior to the trial	128	1	28	1	81.65	8.39	0.0038
2	Diagnosis of major depression	127	2	26	3	82.28	5.44	0.019
3	Marital status of widowed, divorced or separated	127	2	24	5	83.54	6.88	0.0087
4	In jail in the 2 years prior to trial entry	127	2	23	6	84.18	4.62	0.032

A- no dropout predicted, no dropout observed
B- dropout predicted but no dropout observed
C- no dropout predicted but dropout observed
D- dropout predicted and dropout observed

Table 39. **Correlation of poor compliance with medication with out-patient attendance**
a. During the trial
b. For the 2 years prior to the trial

	Spearman's correlation coefficient	n	P value
a. During the trial:			
Correlation of out-patient attendance and poor compliance with medication	-0.33	149	<0.0005***
b. For the 2 years prior to the trial:			
Correlation of out-patient attendance and poor compliance with medication	-0.31	149	<0.0005***

Table 40. Association of poor compliance with medication with dropout from
psychiatric services
a. During the trial
b. For the 2 years prior to the trial

	Patients who dropped out	Patients who did not drop out	t	d.f.	P value
a. During the trial:					
Percentage of time poorly compliant with medication, mean (s.d.)	41% (s.d.=36%)	15% (s.d.=22%)	3.63	31	0.001**a
b. For the 2 years prior to the trial:					
Percentage of time poorly compliant with medication, mean (s.d.)	50% (s.d.=34%)	25% (s.d.=29%)	4.52	140	<0.0005***

a - Unequal variance version of the t test used

Table 41. Agreement of medication compliance rates for the second year of the trial between:
a. Patients and objective measures
b. Case managers or standard keyworkers and objective measures.

Medication compliance ratings for the second year of the trial	Kappa value
a. Agreement between *intensive* patients and objective measures	0.35
Agreement between standard patients and objective measures	0.18
b. Agreement between *intensive* case managers and objective measures	0.46
Agreement between standard keyworkers and objective measures	0.32

Table 42.   **Year 2 Outcome Scores**

	Missing n	Intensive case management	Standard care	Test statistic	d.f.	P value
Year 2 cross-sectional assessment scores:						
Psychopathology (CPRS) score, mean (s.d.)	22 (14%)	15.6 (12.0)	15.1 (10.4)	t = 0.27	134	0.79
Negative symptom (SANS) score, mean (s.d.)	22 (14%)	7.3 (5.0)	8.1 (5.0)	t = 0.92	134	0.36
Social functioning (DAS) score, mean (s.d.)	22 (14%)	1.2 (0.7)	1.3 (0.8)	t = 0.66	134	0.51
Quality of life (Lancashire QOL) score, mean (s.d.)	24 (15%)	4.9 (0.8)	4.9 (0.8)	t = 0.11	132	0.92
Unmet needs (CAN) score, mean (s.d.)	22 (14%)	1.9 (1.9)	2.1 (2.3)	t = 0.77	134	0.45
Patient dissatisfaction score, mean (s.d.)	24 (15%)	15.1 (4.3)	15.0 (4.2)	t = 0.13	132	0.89
Longitudinal assessments during the 2 years of the trial:						
Days in hospital during the trial, median (IQR)[b]	0	24 (0 - 115)	12 (0 - 74)	MWU	-	0.26
Number of hospital admissions during the trial, mean (s.d.)	0	0.9 (1.2)	0.8 (1.2)	t = 0.33	156	0.74
Course type during the trial[a]: Episodic Continuous Neither episodic nor continuous Never psychotic	2 (1%)	33 (42%) 31 (40%) 2 (3%) 12 (15%)	22 (28%) 32 (41%) 1 (1%) 23 (30%)	x^2 =6.01	3	0.11
Symptom severity during the trial: Severe Moderate Mild Recovered	1 (1%)	7 (8%) 18 (23%) 18 (23%) 36 (46%)	8 (10%) 22 (28%) 16 (21%) 32 (41%)	x^2 =0.81	3	0.85

a - Course type: episodic - no episode longer than 6 months;
                   continuous - no remission longer than 6 months
b - P value using the Mann-Whitney U test as data not normally distributed.

Table 43.   Comparison of baseline and year 2 outcome scores[a]

	Missing n	Intensive case management	Standard care	Test statistic	d.f.	P value
Psychopathology (CPRS), mean (s.d.) Baseline score Year 2 score	22 (14%)	15.3 (11.2) 15.6 (12.0)	12.5 (10.4) 15.1(10.4)	t = 0.85	134	0.40
Negative symptom (SANS), mean (s.d.) Baseline score Year 2 score	22 (14%)	7.2 (5.0) 7.3 (5.0)	7.0 (5.2) 8.1 (5.0)	t = 0.87	134	0.39
Social functioning (DAS), mean (s.d.) Baseline score Year 2 score	22 (14%)	1.2 (0.8) 1.2 (0.7)	1.1 (0.9) 1.3 (0.8)	t = 1.36	134	0.18
Quality of life (Lancashire QOL), mean (s.d.) Baseline score Year 2 score	27 (17%)	4.3 (0.7) 4.9 (0.8)	4.3 (0.7) 4.9 (0.8)	t = 0.01	129	0.99
Unmet needs (CAN), mean (s.d.) Baseline score Year 2 score	25 (16%)	3.4 (2.3) 1.9 (1.9)	3.1 (2.8) 2.1 (2.3)	t = 1.08	131	0.28
Patient dissatisfaction, mean (s.d.) Baseline score Year 2 score	48 (30%)	18.3 (4.8) 15.1 (4.3)	17.3 (4.5) 15.0 (4.2)	t = 1.47	108	0.14

a - Scores for 2 years prior to trial and 2 years during the trial quoted, but statistics are based on the change scores for each group.

Table 44. Predictors of year 2 *psychopathology* (CPRS) score for all patients. Univariate analysis

a. Categorical variables

	CPRS score at year 2			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Sex						
Male	18.3	1.4	73			
Female	12.0	1.1	63	t = 3.46	131	0.001**d
Marital status						
Single	15.8	1.4	79			
Married	14.9	1.7	26			
Divorced/widowed/separated	14.6	1.7	31	F = 0.18	2, 133	0.84
Childless	15.9	1.4	77			
Not childless	14.7	1.2	59	t = 0.65	134	0.52d
Ethnicity						
White	15.8	1.3	87			
African-caribbean	15.1	2.0	31			
Other	13.5	2.0	18	F = 0.32	2, 133	0.73
Employed in last 2 yearsa	8.2	3.5	8			
Unemployed	15.8	1.0	128	t = 1.86	134	0.065
Independent community living in last 2 years						
Yes	13.9	1.0	107			
No	20.9	2.3	29	t = 3.08	134	0.0020**
Homelessness in past 2 years						
Yes	26.7	6.7	3			
No	16.0	1.0	133	t = 1.78	134	0.078
Diagnosis						
Major depression	19.7	5.4	3			
Bipolar/mania	17.4	4.0	10			
Schizoaffective disorder	14.7	1.2	82			
Schizophrenia	16.3	2.0	31			
Unspecified psychosis	14.8	3.7	10	F = 0.32	4, 131	0.86
Course type in last 2 yearsb						
Episodic	13.6	1.1	87			
Continuous	20.4	2.1	35			
Neither episodic nor continuous	13.5	2.5	13	F = 12.55	3, 132	<0.0001***
Never psychotic	9.5	1.6	28			
Symptom severity in last 2 years						
Severe	18.5	3.6	11			
Moderate	19.2	2.4	33			
Mild	16.3	2.2	13			
Recovered	13.1	1.1	78	F = 20.44	3, 132	<0.0001***
History of being on a section of MHA (1983)						
Yes	16.1	1.1	104			
No	10.5	1.8	26	t = 2.28	128	0.024*

	CPRS score at year 2			Test statistic	d.f.	P value
	Mean	SEM	n			
Forensic history[c] Yes No	19.1 13.6	1.8 1.1	39 94	t = 2.64	131	0.0090**
History of violence Yes No	25.7 14.4	4.9 1.0	7 120	t = 2.62	125	0.010*
In jail in last 2 years Yes No	13.0 15.4	1.5 1.0	3 133	t = 0.37	134	0.72
Illicit drug use in last year Yes No	17.0 15.0	2.8 1.0	23 113	t = 0.75	134	0.46
History of parasuicide Yes No	15.5 14.8	1.4 1.4	63 69	t = 0.33	130	0.74
Depot prescribed in last 2 years Yes No	16.3 14.2	1.2 1.5	73 63	t = 1.10	134	0.27
Dropout from psychiatric services in last 2 years Yes No	13.7 15.7	1.8 1.1	23 113	t = 0.75	134	0.45
Random allocation Intensive case management Standard care	15.6 15.1	1.4 1.3	75 61	t = 0.27	134	0.79

b. Continuous variables

	CPRS score at year 2		P value
	Spearman's correlation coefficient	n	
Age	-0.006	136	0.95
Duration of illness	0.127	134	0.14
Age of onset of illness	-0.153	134	0.078
Age of first admission	-0.111	133	0.21
Percentage of time poorly compliant with medication in previous 2 years	0.193	130	0.028*
Percentage of psychiatric out-patient appointments attended in previous 2 years	-0.144	134	0.097
Baseline CPRS score	0.346	136	<0.0005***

a. Employment includes being a full-time housewife or student

b. Course type: episodic - no episode longer than 6 months

continuous- no remission longer than 6 months

c. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services

d. Unequal variance version of the t test used

Shaded area - included in multiple regression as P < 0.2.

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Table 45. Predictors of year 2 *negative symptom* (SANS) score for all patients. Univariate analysis

a. Categorical variables

	SANS score at year 2			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Sex						
Male	9.2	0.6	73			
Female	5.9	0.6	63	t = 4.0	134	<0.0005***
Marital status						
Single	8.3	0.6	79			
Married	6.7	1.0	26			
Divorced/widowed/separated	6.8	0.8	31	*F* = 1.47	2, 133	0.23
Childless	8.0	0.6	77			
Not childless	7.2	0.6	59	t = 0.98	134	0.33
Ethnicity						
White	7.4	0.6	87			
African-caribbean	8.8	0.9	31			
Other	6.8	0.9	18	*F* = 1.19	2, 133	0.31
Employed in last 2 years*	1.9	1.0	8			
Unemployed	8.0	0.4	128	t = 3.52	134	0.001**
Independent community living in last 2 years						
Yes	7.1	0.5	107			
No	9.7	1.0	29	t = 2.54	134	0.012*
Homelessness in past 2 years						
Yes	10.7	2.1	3			
No	7.6	0.4	133	t = 1.06	134	0.29
Diagnosis						
Major depression	3.0	0.6	3			
Bipolar/mania	7.1	1.9	10			
Schizoaffective disorder	7.3	0.5	82			
Schizophrenia	8.8	0.8	31			
Unspecified psychosis	8.6	2.3	10	*F* = 1.29	4, 131	0.28
Course type in last 2 years[b]						
Episodic	7.2	0.5	87			
Continuous	8.9	0.9	35			
Neither episodic nor continuous	7.2	1.4	13			
Never psychotic	4.2	0.7	28	F = 11.65	3, 132	<0.0001***
Symptom severity in last 2 years						
Severe	9.8	1.5	11			
Moderate	7.6	1.0	33			
Mild	8.5	1.2	13			
Recovered	7.1	0.6	78	F = 17.67	3, 132	<0.0001***
History of being on a section of MHA (1983)						
Yes	8.3	0.5	104			
No	4.6	0.8	26	t = 3.52	128	0.001**

	SANS score at year 2			Test statistic	d.f.	P value
	Mean	SEM	n			
Forensic history[c]						
Yes	10.1	0.8	39			
No	6.6	0.5	94	t = 3.86	131	<0.0005***
History of violence						
Yes	10.1	2.2	7			
No	7.3	0.5	120	t = 1.45	125	0.15
In jail in last 2 years						
Yes	6.3	0.3	3			
No	7.7	0.4	133	t = 2.45	134	0.028*d
Illicit drug use in last year						
Yes	8.0	1.1	23			
No	7.6	0.5	113	t = 0.33	134	0.75
History of parasuicide						
Yes	7.3	0.6	63			
No	7.8	0.6	69	t = 0.49	130	0.63
Depot prescribed in last 2 years						
Yes	8.5	0.5	73			
No	6.6	0.7	63	t = 2.24	134	0.027*
Dropout from psychiatric services in last 2 years						
Yes	6.8	1.1	23			
No	7.8	0.5	113	t = 0.87	134	0.39
Random allocation						
Intensive case management	7.3	0.6	75			
Standard care	8.1	0.6	61	t = 0.92	134	0.36

b. Continuous variables

	SANS score at year 2		P value
	Spearman's correlation coefficient	n	
Age	-0.074	136	0.39
Duration of illness	0.036	134	0.68
Age of onset of illness	-0.192	134	0.026*
Age of first admission	-0.154	133	0.076
Percentage of time poorly compliant with medication in previous 2 years	0.239	130	0.0060**
Percentage of psychiatric out-patient appointments attended in previous 2 years	-0.239	134	0.0050**
Baseline SANS score	0.317	136	<0.0005***

a. Employment includes being a full-time housewife or student
b. Course type: episodic - no episode longer than 6 months
                continuous- no remission longer than 6 months
c. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services
d. Unequal variance version of the t test used
Shaded area - included in multiple regression as *P* < 0.2.

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Table 46.   **Predictors of year 2 *social functioning* (DAS) score for all patients.**
Univariate analysis

a. Categorical variables

	DAS score at year 2			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Sex						
Male	1.4	0.1	73			
Female	1.0	0.1	63	t = 3.49	134	0.001**
Marital status						
Single	1.3	0.1	79			
Married	1.1	0.1	26			
Divorced/widowed/separated	1.1	0.1	31	*F* = 1.05	2, 133	0.35
Childless	1.3	0.1	77			
Not childless	1.2	0.1	59	t = 0.98	134	0.33
Ethnicity						
White	1.3	0.1	87			
African-caribbean	1.3	0.1	31			
Other	1.0	0.1	18	*F* = 0.94	2, 133	0.39
Employed in last 2 yearsᵃ	0.3	0.2	8			
Unemployed	1.3	0.1	128	t = 3.75	134	<0.0005***
Independent community living in last 2 years						
Yes	1.1	0.1	107			
No	1.6	0.2	29	t = 2.98	134	0.0030**
Homelessness in past 2 years						
Yes	2.7	0.4	3			
No	1.2	0.1	133	t = 3.44	134	0.0010**
Diagnosis						
Major depression	1.0	0.6	3			
Bipolar/mania	0.9	0.2	10			
Schizoaffective disorder	1.2	0.1	82			
Schizophrenia	1.5	0.2	31			
Unspecified psychosis	1.3	0.3	10	*F* = 1.22	4, 131	0.31
Course type in last 2 yearsᵇ						
Episodic	1.1	0.1	87			
Continuous	1.5	0.2	35			
Neither episodic nor continuous	1.1	0.1	13	*F* = 14.80	3, 132	<0.0001***
Never psychotic	0.7	0.1	28			
Symptom severity in last 2 years						
Severe	1.4	0.2	11			
Moderate	1.3	0.1	33			
Mild	1.5	0.1	13			
Recovered	1.1	0.1	78	*F* = 25.41	3, 132	<0.0001***
History of being on a section of MHA (1983)						
Yes	1.2	0.1	104			
No	1.0	0.2	26	t = 1.26	128	0.21
Forensic historyᶜ						
Yes	1.6	0.1	39			
No	1.1	0.1	94	t = 3.52	131	0.0010**

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	DAS score at year 2			Test statistic	d.f.	*P* value
	Mean	SEM	n			
History of violence						
Yes	1.8	0.2	7			
No	1.1	0.1	120	t = 2.20	125	0.030*
In jail in last 2 years						
Yes	0.9	0.2	3			
No	1.2	0.1	133	t = 0.83	134	0.41
Illicit drug use in last year						
Yes	1.3	0.2	23			
No	1.2	0.1	113	t = 0.65	134	0.52
History of parasuicide						
Yes	1.3	0.1	63			
No	1.2	0.1	69	t = 0.86	130	0.39
Depot prescribed in last 2 years						
Yes	1.4	0.1	73			
No	1.0	0.1	63	t = 2.86	134	0.005**
Dropout from psychiatric services in last 2 years						
Yes	1.2	0.2	23			
No	1.2	0.1	113	t = 0.06	134	0.95
Random allocation						
Intensive case management	1.2	0.1	75			
Standard care	1.3	0.1	61	t = 0.66	134	0.51

b.   Continuous variables

	DAS score at year 2		*P* value
	Spearman's correlation coefficient	n	
Age	0.021	136	0.81
Duration of illness	0.051	134	0.56
Age of onset of illness	-0.072	134	0.41
Age of first admission	-0.029	133	0.74
Percentage of time poorly compliant with medication in previous 2 years	0.306	130	<0.0005***
Percentage of psychiatric out-patient appointments attended in previous 2 years	-0.208	134	0.016*
Baseline DAS score	0.309	136	<0.0005***

a. Employment includes being a full-time housewife or student

b. Course type: episodic - no episode longer than 6 months

                    continuous- no remission longer than 6 months

c. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services

Shaded area- included in multiple regression as P < 0.2.

Table 47.   Predictors of year 2 *quality of life (QOL) score* for all patients.
Univariate analysis

a. Categorical variables

	QOL score at year 2			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Sex Male Female	4.8 5.1	0.1 0.1	72 62	t = 2.19	132	0.031*d
Marital status Single Married Divorced/widowed/separated	4.8 5.1 4.9	0.1 0.2 0.1	78 25 31	*F* = 0.75	2, 131	0.47
Childless Not childless	4.8 5.0	0.1 0.1	76 58	t = 0.96	132	0.34
Ethnicity White African-caribbean Other	4.9 4.9 5.0	0.1 0.1 0.2	87 30 17	*F* = 0.20	2, 131	0.82
Employed in last 2 years[a] Unemployed	5.4 4.9	0.2 0.1	8 126	t = 1.89	132	0.060
Independent community living in last 2 years Yes No	5.0 4.6	0.1 0.2	105 29	t = 1.68	36	0.10[d]
Homelessness in past 2 years Yes No	3.5 4.9	0.1 0.1	3 131	t = 3.22	132	0.0020**
Diagnosis Major depression Bipolar/mania Schizoaffective disorder Schizophrenia Unspecified psychosis	4.4 4.8 4.9 4.8 5.2	0.5 0.3 0.1 0.2 0.2	3 10 81 31 9	*F* = 0.84	4, 129	0.50
Course type in last 2 years[b] Episodic Continuous Neither episodic nor continuous Never psychotic	4.9 4.8 4.7 5.3	0.1 0.2 0.2 0.1	86 34 13 28	*F* = 5.0	3, 130	0.0026**
Symptom severity in last 2 years Severe Moderate Mild Recovered	4.8 4.8 5.0 4.9	0.3 0.2 0.2 0.1	11 32 13 77	F = 11.83	3, 130	<0.0001***
History of being on a section of MHA (1983) Yes No	4.8 5.2	0.1 0.1	102 26	t = 2.26	129	0.025*
Forensic history[c] Yes No	4.8 5.0	0.1 0.1	38 93	t = 1.37	129	0.17

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	QOL score at year 2			Test statistic	d.f.	*P* value
	Mean	SEM	n			
History of violence						
Yes	4.7	0.4	7			
No	4.9	0.1	118	t = 0.66	123	0.51
In jail in last 2 years						
Yes	3.8	0.1	3			
No	4.9	0.1	131	t = 2.42	132	0.017*
Illicit drug use in last year						
Yes	4.7	0.2	23			
No	5.0	0.1	111	t = 1.63	132	0.22[d]
History of parasuicide						
Yes	5.0	0.1	62			
No	4.9	0.1	68	t = 0.40	128	0.69
Depot prescribed in last 2 years						
Yes	4.8	0.1	71			
No	4.9	0.1	63	t = 0.70	132	0.48
Dropout from psychiatric services in last 2 years						
Yes	4.9	0.2	23			
No	4.9	0.1	111	t = 0.03	132	0.98
Random allocation						
Intensive case management	4.9	0.1	75			
Standard care	4.9	0.1	59	t = 0.11	132	0.92

b. Continuous variables

	QOL score at year 2		*P* value
	Spearman's correlation coefficient	n	
Age	0.067	134	0.45
Duration of illness	-0.059	132	0.51
Age of onset of illness	0.118	132	0.18
Age of first admission	0.093	131	0.29
Percentage of time poorly compliant with medication in previous 2 years	-0.262	128	0.0030**
Percentage of psychiatric out-patient appointments attended in previous 2 years	0.179	132	0.041*
Baseline QOL score	-0.127	131	0.15

a. Employment includes being a full-time housewife or student

b. Course type: episodic - no episode longer than 6 months

                  continuous- no remission longer than 6 months

c. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services

d. Unequal variance version of the t test used

Shaded area- included in multiple regression as *P* < 0.2.

Table 48.   Predictors of year 2 *unmet needs (CAN) score* for all patients. Univariate analysis

a. Categorical variables

	Unmet needs score at year 2			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Sex						
Male	2.5	0.2	73			
Female	1.4	0.2	63	t = 3.09	134	0.002**
Marital status						
Single	1.9	0.2	79			
Married	2.0	0.5	26			
Divorced/widowed/separated	2.1	0.4	31	*F* = 0.11	2, 133	0.90
Childless	2.0	0.3	77			
Not childless	1.9	0.3	59	t = 0.22	134	0.83
Ethnicity						
White	1.9	0.2	87			
African-caribbean	2.0	0.4	31			
Other	2.3	0.6	18	*F* = 0.35	2, 133	0.71
Employed in last 2 years[a]	0.6	0.4	8			
Unemployed	2.1	0.2	128	t = 1.90	134	0.060
Independent community living in last 2 years						
Yes	1.8	0.2	107			
No	2.7	0.5	29	t = 1.98	134	0.050
Homelessness in past 2 years						
Yes	5.3	1.7	3			
No	1.9	0.2	133	t = 2.87	134	0.0050**
Diagnosis						
Major depression	0.3	0.3	3			
Bipolar/mania	2.3	0.7	10			
Schizoaffective disorder	2.0	0.2	82			
Schizophrenia	2.3	0.5	31			
Unspecified psychosis	1.3	0.4	10	*F* = 0.92	4, 131	0.46
Course type in last 2 years[b]						
Episodic	2.1	0.3	87			
Continuous	2.0	0.3	35			
Neither episodic nor continuous	1.6	0.5	13	*F* = 5.29	3, 132	0.0018**
Never psychotic	1.2	0.3	28			
Symptom severity in last 2 years						
Severe	1.9	0.5	11			
Moderate	1.9	0.4	33			
Mild	1.9	0.4	13			
Recovered	2.1	0.3	78	*F* = 8.41	3, 132	<0.0001***
History of being on a section of MHA (1983)						
Yes	2.2	0.2	104			
No	1.3	0.4	26	t = 1.84	128	0.068
Forensic history[c]						
Yes	2.4	0.3	39			
No	1.8	0.2	94	t = 1.43	131	0.15

	Unmet needs score at year 2			Test statistic	d.f.	P value
	Mean	SEM	n			
History of violence						
Yes	2.4	0.7	7			
No	2.0	0.2	120	t = 0.54	125	0.59
In jail in last 2 years						
Yes	6.0	0.1	3			
No	1.9	0.2	133	t = 23.34	132	<0.0005***d
Illicit drug use in last year						
Yes	3.1	0.6	23			
No	1.7	0.2	113	t = 2.23	26	0.035*d
History of parasuicide						
Yes	2.0	0.3	63			
No	1.8	0.2	69	t = 0.52	130	0.61
Depot prescribed in last 2 years						
Yes	2.2	0.3	73			
No	1.7	0.3	63	t = 1.36	134	0.18
Dropout from psychiatric services in last 2 years						
Yes	2.0	0.4	23			
No	2.0	0.2	113	t = 0.05	134	0.96
Random allocation						
Intensive case management	1.9	0.2	75			
Standard care	2.1	0.3	61	t = 0.77	134	0.45

b. Continuous variables

	Unmet needs score at year 2		P value
	Spearman's correlation coefficient	n	
Age	-0.062	136	0.47
Duration of illness	0.094	134	0.28
Age of onset of illness	-0.151	134	0.084
Age of first admission	-0.129	133	0.14
Percentage of time poorly compliant with medication in previous 2 years	0.216	130	0.014*
Percentage of psychiatric out-patient appointments attended in previous 2 years	-0.260	134	0.002**
Baseline unmet needs score	0.226	133	0.009**

a. Employment includes being a full-time housewife or student

b. Course type: episodic - no episode longer than 6 months

continuous- no remission longer than 6 months

c. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services

d. Unequal variance version of the t test used

Shaded area - included in multiple regression as $P < 0.2$.

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Table 49. Predictors of year 2 *patient dissatisfaction score* for all patients. Univariate analysis

a. Categorical variables

	Dissatisfaction score at year 2			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Sex Male Female	15.9 14.0	0.5 0.5	72 62	t = 2.66	132	0.009**
Marital status Single Married Divorced/widowed/separated	15.3 14.1 15.3	0.4 0.8 0.9	78 26 30	*F* = 0.80	2, 131	0.45
Childless Not childless	15.4 14.6	0.5 0.6	76 58	t = 1.0	132	0.32
Ethnicity White African-caribbean Other	14.8 15.9 14.8	0.5 0.8 1.1	86 30 18	*F* = 0.72	2, 131	0.49
Employed in last 2 years* Unemployed	14.4 15.1	1.7 0.4	8 126	t = 0.47	132	0.64
Independent community living in last 2 years Yes No	14.6 16.7	0.4 0.6	106 28	t = 2.34	132	0.021*
Homelessness in past 2 years Yes No	17.7 15.0	1.7 0.4	3 131	t = 1.09	132	0.28
Diagnosis Major depression Bipolar/mania Schizoaffective disorder Schizophrenia Unspecified psychosis	18.7 14.2 14.9 15.2 15.2	2.9 0.9 0.5 0.8 1.0	3 10 81 31 9	*F* = 0.68	4, 129	0.61
Course type in last 2 yearsᵇ Episodic Continuous Neither episodic nor continuous Never psychotic	15.1 15.4 13.7 13.7	0.5 0.7 1.0 0.7	86 34 13 28	*F* = 4.0	3, 130	0.0091**
Symptom severity in last 2 years Severe Moderate Mild Recovered	16.0 15.3 14.3 14.9	1.7 0.8 1.0 0.5	10 33 13 77	*F* = 5.28	3, 130	0.0018**
History of being on a section of MHA (1983) Yes No	15.3 14.2	0.4 0.8	102 26	t = 1.17	126	0.24

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	Dissatisfaction score at year 2			Test statistic	d.f.	*P* value
	Mean	SEM	n			
Forensic history[c] **Yes** **No**	16.1 14.7	0.8 0.4	38 93	t = 1.69	129	0.094
History of violence Yes No	16.1 15.0	1.7 0.4	7 118	t = 0.72	123	0.47
In jail in last 2 years Yes No	17.7 15.0	2.3 0.4	3 131	t = 1.09	132	0.28
Illicit drug use in last year **Yes** **No**	17.7 14.5	0.9 0.4	23 111	t = 3.51	132	0.001**
History of parasuicide Yes No	15.0 15.1	0.5 0.5	62 69	t = 0.12	129	0.91
Depot prescribed in last 2 years **Yes** **No**	15.5 14.5	0.5 0.5	73 61	t = 1.46	132	0.15
Dropout from psychiatric services in last 2 years **Yes** **No**	16.3 14.8	0.9 0.4	21 113	t = 1.47	132	0.14
Random allocation Intensive case management Standard care	15.1 15.0	0.5 0.5	74 60	t = 0.13	132	0.90

b.   Continuous variables

	Dissatisfaction score at year 2		*P* value
	Spearman's correlation coefficient	n	
Age	-0.217	134	0.012*
Duration of illness	-0.104	132	0.23
Age of onset of illness	-0.221	132	0.011*
Age of first admission	-0.221	131	0.012*
Percentage of time poorly compliant with medication in previous 2 years	0.249	128	0.0050**
Percentage of psychiatric out-patient appointments attended in previous 2 years	-0.238	132	0.0060**
Baseline dissatisfaction score	0.094	110	0.33

a. Employment includes being a full-time housewife or student
b. Course type: episodic - no episode longer than 6 months
                   continuous- no remission longer than 6 months
c. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services
Shaded area - included in multiple regression as *P* < 0.2.

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Table 50. Predictors of *days in hospital* during the trial for all patients. Univariate analysis

a. **Categorical variables**

	Days in hospital during the trial			*P* value - Mann Whitney U test
	Median	Interquartile range	n	
Sex Male Female	 12 24	 0 - 94 0 - 77	 83 75	 0.99
Marital status Single Married Divorced/widowed/separated	 38 0 14	 0 - 116 0 - 33 0 - 71	 90 30 37	 0.052[d]
Childless Not childless	28 15	0 - 96 0 - 73	92 66	 0.30
Ethnicity White African-caribbean Other	 29 27 0	 0 - 85 0 - 134 0 - 47	 99 36 23	 0.15[d]
Employed in last 2 years[a] Unemployed	0 26	0 - 53 0 - 95	12 145	 0.11
Independent community living in last 2 years Yes No	 16 40	 0 - 72 0 - 105	 123 35	 0.18
Homelessness in past 2 years Yes No	 0 22	 0 - 105 0 - 86	 3 154	 0.46
Diagnosis Major depression Bipolar/mania Schizoaffective disorder Schizophrenia Unspecified psychosis	 150 60 20 11 9	 0 - 198 8 - 100 0 - 79 0 - 82 0 - 138	 3 12 98 34 11	 0.70[d]
Course type in last 2 years[b] Episodic Continuous Neither episodic nor continuous Never psychotic	 42 40 230 0	 22 - 73 0 - 141 0 - 318 0 - 0	 55 63 3 35	 <0.0001***[d]
Symptom severity in last 2 years Severe Moderate Mild Recovered	 230 63 13 10	 141 - 359 0 - 135 0 - 71 0 - 37	 15 40 34 68	 <0.0001***[d]
History of being on a section of MHA (1983) Yes No	 27 0	 0 - 88 0 - 51	 120 32	 0.055

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	Days in hospital during the trial			P value
	Median	Interquartile range	n	
Forensic history[c] Yes No	39 12	0 - 137 0 - 63	44 111	0.040*
History of violence Yes No	90 14	19 - 503 0 - 70	8 141	0.021*
In jail in last 2 years Yes No	47 22	9 - 88 0 - 87	4 153	0.75
Illicit drug use in last year Yes No	36 16	0 - 130 0 - 71	23 135	0.15
History of parasuicide Yes No	23 22	0 - 88 0 - 86	74 80	0.91
Depot prescribed in last 2 years Yes No	26 15	0 - 141 0 - 63	78 79	0.12
Dropout from psychiatric services in last 2 years Yes No	29 22	0 - 115 0 - 80	29 129	0.62
Random allocation Intensive case management Standard care	24 12	0 - 115 0 - 74	79 79	0.26

b. Continuous variables

	Days in hospital during the trial		P value
	Spearman's correlation coefficient	n	
Age	-0.189	158	0.018*
Duration of illness	-0.101	156	0.21
Age of onset of illness	-0.173	156	0.031*
Age of first admission	-0.155	155	0.054
Percentage of time poorly compliant with medication in previous 2 years	0.267	150	0.0010**
Percentage of psychiatric out-patient appointments attended in previous 2 years	-0.038	154	0.64
Days in hospital 2 years prior to trial entry	0.336	158	<0.0005***

a. Employment includes being a full-time housewife or student
b. Course type: episodic - no episode longer than 6 months
                   continuous- no remission longer than 6 months
c. Forensic contact includes being convicted of a crime or contact with forensic psychiatry services
d. Kruskal Wallis test used instead of mann whitney u
Shaded area- included in multiple regression as $P < 0.2$.

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Table 51.   Predictors of year 2 *psychopathology* (CPRS) score - Multiple regression

Variable	Unstandardized B coefficients[a]	P value[a]	Unstandardized B coefficients[b]	P value[b]	Unstandardized B coefficients[c]	P value[c]	Unstandardized B coefficients[d]	P value[d]
Constant	6.78	0.24	6.83	0.26	7.58	0.22	6.31	0.27
Sex	-3.05	0.076	-3.05	0.077	-2.9	0.1	-2.69	0.12
Employed during trial	0.56	0.87	0.55	0.88	0.66	0.85	0.09	0.98
Independent community living during trial	-0.78	0.72	-0.79	0.72	-0.82	0.71	-1.13	0.61
Homelessness during trial	8.33	0.14	8.35	0.14	8.11	0.15	8.82	0.11
Course type during trial								
Episodic	-1.52	0.53	-1.51	0.53	-1.58	0.51	-1.78	0.46
Continuous	-0.56	0.88	-0.57	0.88	-0.43	0.91	-0.94	0.79
Neither episodic nor continuous	-1.30	0.84	-1.29	0.84	-1.15	0.86	-0.94	0.88
Symptom severity during trial								
Severe	13.78	0.0010	13.83	0.0020	13.41	0.0020	14.27	0.0010
Moderate	8.27	0.020	8.30	0.023	8.0	0.030	8.85	0.013
Mild	4.85	0.091	4.87	0.094	4.76	0.10	5.01	0.079
History of being on a section of MHA (1983)	3.45	0.12	3.45	0.12	3.45	0.11	3.45	0.12
Forensic history	2.58	0.18	2.59	0.18	2.55	0.19	2.31	0.23
History of violence	2.69	0.48	2.68	0.48	2.83	0.46	2.49	0.51
Duration of illness	0.01	0.18	0.01	0.19	0.01	0.17	0.01	0.2
Age of onset of illness	0.06	0.58	0.06	0.59	0.07	0.56	0.09	0.45
Baseline CPRS score	0.21	0.012	0.21	0.014	0.21	0.012	0.21	0.012
Compliance measures during the trial[b,c,d]			-0.001[b]	0.97[b]	-0.02[c]	0.72[c]	-3.78[d]	0.083[d]

a - Variables selected on univariate analysis entered only.   b - Variables selected on univariate analysis plus % of out-patient appointments attended entered.

c - Variables selected on univariate analysis plus % of time poorly compliant with medication entered.

d - Variables selected on univariate analysis plus dropouts entered.

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Table 52.　　Predictors of year 2 *negative symptom* (SANS) score - Multiple regression

Variable	Unstandardized B coefficients[a]	P value[a]	Unstandardized B coefficients[b]	P value[b]	Unstandardized B coefficients[c]	P value[c]	Unstandardized B coefficients[d]	P value[d]
Constant	5.69	0.018	5.58	0.23	6.67	0.012	5.36	0.025
Sex	-1.66	0.03	-1.65	0.032	-1.48	0.063	-1.49	0.052
Employed during trial	-3.09	0.049	-3.07	0.052	-2.99	0.057	-3.34	0.033
Independent community living during trial	-0.59	0.53	-0.57	0.54	-0.64	0.49	-0.77	0.41
Course type during trial								
Episodic	0.59	0.57	0.57	0.59	0.55	0.61	0.48	0.65
Continuous	0.56	0.73	0.57	0.72	0.72	0.65	0.41	0.80
Neither episodic nor continuous	-1.71	0.56	-1.73	0.55	-1.45	0.62	-1.50	0.60
Symptom severity during trial								
Severe	6.30	0.0010	6.12	0.0010	5.89	0.0020	6.50	0.0010
Moderate	3.12	0.049	3.04	0.059	2.79	0.085	3.33	0.035
Mild	2.12	0.085	2.12	0.099	2.02	0.11	2.25	0.073
History of being on a section of MHA (1983)	2.48	0.01	2.46	0.1	3.45	0.11	3.45	0.12
Forensic history	1.98	0.021	1.97	0.023	1.93	0.025	1.88	0.028
History of violence	-0.46	0.78	-0.41	0.81	-0.26	0.87	-0.58	0.72
In jail during trial	-3.23	0.18	-3.23	0.18	-3.49	0.15	-2.78	0.24
Depot prescribed during trial	-0.87	0.27	-0.91	0.25	-0.86	0.28	-0.85	0.28
Age of onset of illness	0.02	0.87	0.02	0.88	0.02	0.87	0.01	0.92
Age of first admission	-0.02	0.87	-0.02	0.89	-0.02	0.89	-0.05	0.99
Baseline SANS score	0.1	0.18	0.11	0.17	0.12	0.13	0.1	0.18
Compliance measures during the trial[b,c,d]			0.005[b]	0.76[b]	-0.02[c]	0.38[c]	-1.61[d]	0.091[d]

a - Variables selected on univariate analysis entered only. b - Variables selected on univariate analysis plus % of time poorly compliant with medication entered.
c - Variables selected on univariate analysis plus % of out-patient appointments attended entered. d - Variables selected on univariate analysis plus dropouts entered.

Table 53. Predictors of year 2 *social functioning* (DAS) score - Multiple regression

Variable	Unstandardized B coefficients[a]	P value[a]	Unstandardized B coefficients[b]	P value[b]	Unstandardized B coefficients[c]	P value[c]	Unstandardized B coefficients[d]	P value[d]
Constant	0.93	<0.0005	0.92	<0.0005	0.97	0.002	0.95	<0.0005
Sex	-0.12	0.27	-0.11	0.28	-0.11	0.31	-0.11	0.31
Employed during trial	-0.58	0.009	-0.58	0.011	-0.58	0.01	-0.59	0.008
Independent community living during trial	-0.06	0.64	-0.06	0.66	-0.07	0.63	-0.07	0.62
Homelessness during trial	1.26	<0.0005	1.24	0.001	1.26	<0.0005	1.28	<0.0005
Course type during trial								
Episodic	0.04	0.81	0.02	0.88	0.03	0.82	0.03	0.84
Continuous	0.04	0.85	0.04	0.86	0.05	0.84	0.04	0.87
Neither episodic nor continuous	-0.43	0.29	-0.45	0.27	-0.43	0.29	-0.42	0.30
Symptom severity during trial								
Severe	1.19	<0.0005	1.13	<0.0005	1.18	<0.0005	1.20	<0.0005
Moderate	0.59	0.010	0.56	0.015	0.58	0.013	0.60	0.009
Mild	0.39	0.029	0.38	0.038	0.39	0.033	0.40	0.028
Forensic history	0.33	0.006	0.32	0.008	0.33	0.007	0.32	0.008
History of violence	0.22	0.34	0.24	0.31	0.23	0.34	0.21	0.36
Depot prescribed during trial	-0.11	0.34	-0.12	0.29	-0.11	0.34	-0.11	0.35
Baseline DAS score	0.08	0.26	0.08	0.23	0.08	0.26	0.07	0.28
Compliance measures during the trial[b,c,d]			0.002[b]	0.45[b]	-0.0005[c]	0.86[c]	-0.09[d]	0.50[d]

a - Variables selected on univariate analysis entered only.

b - Variables selected on univariate analysis plus % of time poorly compliant with medication entered.

c - Variables selected on univariate analysis plus % of out-patient appointments attended entered.

d - Variables selected on univariate analysis plus dropouts entered.

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Table 54. **Predictors of year 2 *quality of life* (Lancashire QOL) score - Multiple regression**

Variable	Unstandardized B coefficients[a]	P value[a]	Unstandardized B coefficients[b]	P value[b]	Unstandardized coefficients[c]	P value[c]	Unstandardized coefficients[d]	P value[d]
Constant	5.69	0.02	5.93	<0.0005	5.98	<0.0005	5.98	<0.0005
Sex	0.04	0.76	0.04	0.77	0.05	0.71	0.01	0.92
Employed during trial	0.14	0.59	0.13	0.61	0.14	0.59	0.18	0.51
Independent community during trial	0.05	0.78	0.04	0.83	0.04	0.81	0.07	0.68
Homelessness during trial	-1.29	0.002	-1.27	0.003	-1.32	0.002	-1.33	0.002
Course type during trial								
Episodic	-0.06	0.75	-0.05	0.79	-0.06	0.73	-0.04	0.82
Continuous	0.11	0.68	0.11	0.69	0.12	0.66	0.13	0.63
Neither episodic nor continuous	0.35	0.46	0.37	0.44	0.36	0.45	0.32	0.49
Symptom severity during trial								
Severe	-1.41	0.0010	-1.33	<0.0005	-1.43	<0.0005	-1.45	<0.0005
Moderate	-0.57	0.029	-0.54	0.043	-0.59	0.028	-0.61	0.022
Mild	-0.44	0.040	-0.42	0.054	-0.45	0.039	-0.45	0.036
History of being on a section of MHA (1983)	-0.25	0.12	-0.25	0.13	-0.25	0.13	-0.29	0.081
Forensic history	0.007	0.96	0.02	0.91	0.003	0.98	0.02	0.86
In jail during trial	-0.99	0.017	-0.98	0.02	-1.02	0.017	-1.05	0.012
Age of onset of illness	-0.003	0.7	-0.004	0.65	-0.003	0.71	-0.005	0.55
Baseline QOL score	-0.11	0.24	-0.11	0.24	-0.11	0.25	-0.11	0.21
Compliance measures during the trial[b,c,d]			0.003[b]	0.44[b]	-0.001[c]	0.72[c]	0.23[d]	0.17[d]

a - Variables selected on univariate analysis entered only.
b - Variables selected on univariate analysis plus % of time poorly compliant with medication entered.
c - Variables selected on univariate analysis plus % of out-patient appointments attended entered.
d - Variables selected on univariate analysis plus dropouts entered.

Table 55.

Predictors of year 2 *unmet needs* (CAN) score – Multiple regression

Variable	Unstandardized B coefficients[a]	P value[a]	Unstandardized B coefficients[b]	P value[b]	Unstandardized B coefficients[c]	P value[c]	Unstandardized B coefficients[d]	P value[d]
Constant	0.14	0.52	0.14	0.52	0.24	0.32	0.12	0.58
Sex	-0.11	0.1	-0.11	0.1	-0.11	0.16	-0.11	0.14
Employed during trial	-0.15	0.29	-0.15	0.29	-0.14	0.33	-0.17	0.25
Independent community living during trial	0.007	0.94	0.007	0.94	0.0003	0.98	0.0008	0.99
Homelessness during trial	0.31	0.17	0.31	0.17	0.29	0.19	0.32	0.16
Course type during trial								
Episodic	-0.07	0.49	-0.07	0.49	-0.07	0.45	-0.07	0.46
Continuous	-0.04	0.78	-0.04	0.78	-0.03	0.86	-0.05	0.74
Neither episodic nor continuous	-0.27	0.31	-0.27	0.31	-0.25	0.33	-0.26	0.32
Symptom severity during trial								
Severe	0.34	0.035	0.35	0.043	0.31	0.062	0.35	0.031
Moderate	0.34	0.015	0.35	0.016	0.32	0.028	0.35	0.013
Mild	0.17	0.13	0.17	0.14	0.16	0.16	0.17	0.13
History of being on a section of MHA (1983)	0.12	0.16	0.12	0.16	0.13	0.14	0.13	0.13
Forensic history	0.03	0.69	0.03	0.69	0.03	0.74	0.03	0.74
In jail during trial	0.51	0.024	0.51	0.025	0.48	0.033	0.52	0.021
Illicit drug use in last year	0.06	0.49	0.06	0.49	0.05	0.63	0.07	0.43
Depot prescribed during trial	-0.1	0.16	-0.1	0.17	-0.1	0.18	-0.1	0.16
Age of onset of illness	0.007	0.58	0.007	0.58	0.007	0.58	0.006	0.61
Age of first admission	-0.007	0.58	-0.007	0.58	-0.007	0.59	-0.006	0.65
Baseline CAN score	0.02	0.11	0.02	0.11	0.02	0.11	0.02	0.12
Compliance measures during the trial[b,c,d]			-0.0001[b]	0.93[b]	-0.002[c]	0.37[c]	-0.07[d]	0.44[d]

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a - Variables selected on univariate analysis entered only.
b - Variables selected on univariate analysis plus % of time poorly compliant with medication entered.
c - Variables selected on univariate analysis plus % of out-patient appointments attended entered.
d - Variables selected on univariate analysis plus dropouts entered.

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Table 56.

Predictors of year 2 *patient dissatisfaction* score - Multiple regression

Variable	Unstandardized B coefficients[a]	P value[a]	Unstandardized B coefficients[b]	P value[b]	Unstandardized B coefficients[c]	P value[c]	Unstandardized B coefficients[d]	P value[d]
Constant	17.85	<0.0005	17.4	<0.0005	19.49	<0.0005	18.04	<0.0005
Sex	-1.15	0.13	-1.16	0.13	-0.94	0.23	-1.33	0.083
Independent community living during trial	-0.3	0.76	-0.14	0.89	-0.33	0.74	-0.15	0.88
Course type during trial								
Episodic	-0.34	0.75	-0.46	0.66	-0.43	0.68	-0.32	0.76
Continuous	0.27	0.86	0.28	0.86	0.51	0.75	0.43	0.79
Neither episodic nor continuous	-1.44	0.62	-1.71	0.55	-1.24	0.67	-1.93	0.50
Symptom severity during trial								
Severe	3.08	0.093	2.57	0.18	2.59	0.17	3.05	0.094
Moderate	1.39	0.37	1.23	0.44	1.01	0.53	1.22	0.43
Mild	0.68	0.59	0.54	0.67	0.48	0.70	0.60	0.63
Forensic history	0.47	0.58	0.47	0.58	0.44	0.61	0.62	0.47
Illicit drug use in last year	2.34	0.024	2.43	0.02	2.08	0.049	2.12	0.041
Depot prescribed during trial	-0.53	0.51	-0.69	0.4	-0.48	0.56	-0.68	0.4
Age	0.01	0.81	0.02	0.63	0.02	0.71	0.02	0.71
Age of onset of illness	-0.03	0.85	-0.04	0.81	-0.03	0.82	-0.007	0.96
Age of first admission	-0.06	0.67	-0.06	0.69	-0.06	0.68	-0.09	0.51
Compliance measures during the trial[b,c,d]			0.02[b]	0.39[b]	-0.02[c]	0.21[c]	1.65[d]	0.097[d]

a - Variables selected on univariate analysis entered only.

b - Variables selected on univariate analysis plus % of time poorly compliant with medication entered.

c - Variables selected on univariate analysis plus % of out-patient appointments attended entered.

d - Variables selected on univariate analysis plus dropouts entered.

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Table 57.   Predictors of days in hospital during the trial - Multiple regression

Variable		Unstandardized B coefficients[a]	P value[a]	Unstandardized B coefficients[b]	P value[b]	Unstandardized B coefficients[c]	P value[c]	Unstandardized B coefficients[d]	P value[d]
Constant		-0.17	0.72	-0.15	0.76	-0.38	0.46	-0.18	0.7
Marital status	Married	-0.28	0.16	-0.28	0.15	-0.30	0.12	-0.28	0.15
	Separated, divorced or widowed	0.02	0.89	0.02	0.89	0.02	0.93	0.01	0.96
Ethnicity	White	0.13	0.54	0.12	0.56	0.11	0.58	0.13	0.51
	African caribbean	0.18	0.44	0.18	0.44	0.18	0.43	0.19	0.42
Employed during trial		-0.25	0.34	-0.25	0.34	-0.28	0.3	-0.25	0.35
Independent community living during trial		0.06	0.75	0.06	0.76	0.05	0.79	0.06	0.74
Course type during trial	Episodic	1.55	<0.0005	1.56	<0.0005	1.56	<0.0005	1.56	<0.0005
	Continuous	0.79	0.009	0.78	0.01	0.74	0.015	0.80	0.009
	Neither episodic nor continuous	1.27	0.025	1.28	0.025	1.24	0.030	1.27	0.026
Symptom severity during trial	Severe	0.89	0.013	0.92	0.014	0.98	0.008	0.89	0.014
	Moderate	0.32	0.29	0.33	0.27	0.38	0.21	0.31	0.31
	Mild	-0.18	0.45	-0.17	0.47	-0.14	0.55	-0.18	0.45
History of being on a section of MHA (1983)		-0.15	0.41	-0.16	0.41	-0.18	0.34	-0.16	0.41
Forensic history		0.09	0.57	0.1	0.55	0.12	0.5	0.09	0.58
History of violence		0.43	0.18	0.42	0.19	0.41	0.2	0.43	0.18
Illicit drug use in the last year		0.02	0.93	0.01	0.95	0.05	0.8	0.01	0.95
Depot prescribed during trial		0.12	0.45	0.12	0.44	0.11	0.48	0.12	0.45
Age		-0.008	0.39	-0.009	0.37	-0.01	0.31	-0.008	0.4
Age of onset of illness		-0.009	0.75	-0.009	0.75	-0.009	0.75	-0.009	0.77
Age of first admission		0.01	0.61	0.01	0.61	0.009	0.58	0.01	0.63
Days in hospital in two years prior to trial		0.002	0.003	0.002	0.003	0.002	0.005	0.002	0.004

Variable	Unstandardized B coefficients[a]	P value[a]	Unstandardized B coefficients[b]	P value[b]	Unstandardized coefficients[c]	P value[c]	Unstandardized coefficients[d]	P value[d]
Compliance measures during the trial[b,c,d]			-0.00085[b]	0.79[b]	0.003[c]	0.31[c]	0.05[d]	0.77[d]

a - Variables selected on univariate analysis entered only.

b - Variables selected on univariate analysis plus % of time poorly compliant with medication entered.

c - Variables selected on univariate analysis plus % of out-patient appointments attended entered.

d - Variables selected on univariate analysis plus dropouts entered.

Table 58. **Comparison of clinical, social and hospitalisation scores during the trial compared with two years prior to trial entry[a]**

	Missing n	Intensive case management	Standard care	Test statistic	d.f.	P value
Days in hospital, median (IQR) During 2 years of trial For 2 years prior to trial	0	24 (0-115) 65 (25-123)	12 (0-74) 91 (38-162)	MWU	-	0.0068 **b
Number of hospital admissions, mean (s.d.) During 2 years of trial For 2 years prior to trial	0	0.9 (1.2) 1.9 (1.1)	0.8 (1.2) 1.9 (1.0)	$t = 0.39$	156	0.70
Usual symptom severity, (n (%)): During the trial- Severe Moderate Mild Recovered. In the two years prior to trial- Severe Moderate Mild Recovered.	3 (2%)	7 (9%) 18 (23%) 18 (23%) 36 (45%) 6 (8%) 22 (29%) 7 (9%) 42 (54%)	8 (10%) 22 (28%) 16 (20%) 32 (42%) 7 (9%) 16 (20%) 7 (9%) 49 (62%)	$x^2 = 8.91$	6	0.18
Presence of negative symptoms, (n (%)): During the trial In the two years prior to trial	3 (2%)	45 (57%) 37 (48%)	54 (69%) 47 (60%)	$x^2 = 0.61$	2	0.74
Independent living, (n (%)): During the trial In the two years prior to trial	0	66 (84%) 74 (94%)	57 (72%) 73 (92%)	$x^2 = 3.51$	2	0.17
Homelessness, (n (%)): During the trial In the two years prior to trial	2 (1%)	0 3 (4%)	3 (4%) 1 (1%)	$x^2 = 4.02$	2	0.13
In employment, (n (%)): During the trial In the two years prior to trial	2(1%)	5 (6%) 12 (15%)	7 (9%) 17 (22%)	$x^2 = 1.71$	2	0.43
In jail, (n (%)): During the trial In the two years prior to trial	2 (1%)	3 (4%) 5 (6%)	1 (1%) 5 (6%)	$x^2 = 0.45$	2	0.81

a - Scores for 2 years prior to trial and 2 years during the trial quoted, but statistics are based on the change scores for each group.

b - P value using the Mann-Whitney U test as data not normally distributed.

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CHAPTER 4. DISCUSSION

4.1. PRINCIPAL FINDINGS

4.1.1. MAIN HYPOTHESIS

Compliance with medication and with psychiatric out-patient appointments improved for all patients during the trial period compared with the two years prior to trial entry, but the improvement was only significant for the Intensive Case Management group. The enhanced compliance in the standard group during the trial was mainly just in the first year of the trial, dropping to pre-trial levels during the second year.

During the trial itself, compliance with medication and psychiatric services was similar in the intensive and standard groups. Clinical outcome was also the same for both groups during the trial.

4.1.2. SUBSIDIARY HYPOTHESES

a. The best predictor of compliance with medication and psychiatric services during the trial was compliance with medication and services just prior to trial entry. Compliance with medication was closely correlated with compliance with psychiatric services.

b. Compliance with medication and psychiatric services during the trial was not significantly predictive of outcome at the end of the trial.

4.2. STRENGTHS AND WEAKNESSES OF THE CURRENT TRIAL

4.2.1. STRENGTHS OF THE CURRENT TRIAL

This trial represents a significant contribution to knowledge regarding compliance with medication and with psychiatric services because:

a. There is a *lack of previous research* in this field.

b. The sample is *representative* of the wider population of similar patients with psychotic illnesses and the results are therefore *generalisable*.

c. Overall the trial was *methodologically sound and reported adequately*. It was made explicit how compliance was defined, and as many objective measurements of compliance were used as possible over an extended period of time. Comparisons were made between different sources of data collection - objective sources collected as part of routine clinical care and subjective sources from patients and their intensive case manager or standard keyworker. Also, the methods of rating compliance were compared using continuous and categorical measures.

Each of these points will be considered in detail:

a. Lack of research in this field previously.

No previous randomised controlled trial of case management has been found in the literature which has measured compliance as carefully as the current trial.

The effect of Intensive Case Management on compliance has been unclear because few studies have investigated it. Mueser et al (1998) in their review of research on case management describes the lack of such investigations as 'intriguing' considering the evidence that medication non-compliance is an important contributory factor to relapse

and rehospitalisation. The lack of research probably reflects the difficulty of measuring compliance reliably as outlined in the literature review (pages 21-25).

b. Representativeness of the sample and generalisability of the results.

All potentially eligible patients in the relevant mental health service were screened so that the sample would be representative of patients with psychotic illnesses fulfilling the eligibility criteria of the trial. One of the eligibility criteria used for screening was whether a patient had been admitted in the previous two years, so even those who had since lost contact with psychiatric services were considered and traced via hospital or General Practice databases.

Of the variables examined, there were only two differences in socio-demography and illness history in the sample entered into the trial compared with those patients who refused to enter. Patients who entered were significantly more likely to be in-patients and may have been more of a captive audience, who viewed entry into the trial as part of their discharge care plan. Those who refused had a better history of compliance with medication. They may have been happy with the medication and services they were receiving and not want to alter their regime to enter a randomised controlled trial of case management. This phenomenon of patients who refuse randomisation to stay with a treatment of their choice is well recognised (Torgerson & Sibbald, 1998) and has promoted interest in patient preference designs to complement randomised trials.

Therefore, in all other aspects investigated, the trial sample was representative of the larger population of patients with psychotic illness who fulfilled the eligibility criteria of the trial. Very few previous studies have investigated the representativeness of the sample in such detail (Tattan et al, submitted).

c. Methodological strengths

Measurement of compliance.

The detailed criteria and rules for determining compliance rates were set by the author prior to the rating process as no previous study has published rules in such detail. The rules were applied equally to intensive and standard groups. Stringent criteria were used to rate poor compliance with medication and psychiatric services as described in the methodology (pages 127-132). The data used to rate compliance with medication and services was extremely detailed for each patient over a four year period. Objective sources which were collected as part of routine clinical care, for example, depot cards, medical casenotes and therapeutic blood level monitoring were used as far as possible, which would not be susceptible to subjective biases.

i. Continuous versus categorical measures of compliance.

In this trial both continuous and categorical measures of compliance with medication and psychiatric services were compared. The results were expressed in terms of continuous measures as far as possible and proved to be more sensitive, especially in detecting slight differences in change scores for compliance rates with medication and out-patient attendance, which the categorical measure did not detect.

b. Objective versus subjective measures of compliance.

The data used to measure compliance was as objective as possible. Previous studies on compliance have relied on information from the patient or a healthcare professional closely involved with that patient to rate the patient's compliance (Table 1, pages 33-35). In the current trial, the agreement between the objective ratings of compliance and the patient's own ratings was poor. The agreement between the objective ratings of

compliance and the intensive case manager's or standard keyworker's ratings was better but still quite low.

This indicates the potential weakness of assessing compliance using patient or staff reports. The stringent criteria used to objectively rate compliance in this study is a clear strength compared to previous studies.

iii.   Missing data on compliance rates

It was not possible to rate compliance with medication and psychiatric services for only a small proportion of patients. This is another advantage of using objective measures of compliance, as studies relying on patients' self reports may have more missing data if patients drop out of psychiatric services.

Similarities between the patients allocated to Intensive Case Management or standard care at baseline and in the treatment offered during the trial.

The patients allocated to Intensive Case Management or standard care were comparable at the start of the trial as regards socio-demography, illness history, baseline assessment scores for psychopathology, social functioning, quality of life, unmet needs and patient dissatisfaction and compliance with medication and psychiatric services in the two years just prior to trial entry. The only difference was that Intensive Case Management patients prescribed depot neuroleptic medication during the trial were more poorly compliant with medication in the two years prior to the trial.

During the trial there were no differences in the type of medication prescribed or the number of out-patient appointments offered between the two groups. Therefore the treatment opportunities were similar so patients in one group were not offered a

treatment they may have perceived as more favourable, for example, atypical neuroleptics having fewer side effects than traditional neuroleptics. This is worthy of note as patients may have been more likely to comply with a favoured treatment.

4.2.2. WEAKNESSES OF THE CURRENT TRIAL

a. Assessment of compliance.

Not all potential sources of compliance measurements were utilised. Previous studies have carried out pill counts for example with patients prescribed oral medication, or measured plasma or urine levels of neuroleptic medication (Table 2, pages 38-40). In this trial, the intensive case managers and standard keyworkers who had regular contact with patients were the most likely candidates to do intermittent, regular pill counts. They were reluctant to do so however as they were trying to engage with or maintain an alliance with patients whom they thought may perceive such checks as punitive. Pill counts may not be representative of whether a patient has actually taken their medication, just that it has been disposed of.

As detailed in the literature review, plasma or urine monitoring of neuroleptics is a qualitative not a quantitative measurement and may reflect compliance in the immediate past, not currently, due to the long half-life of some preparations, especially depot medication.

b. Non-systematised collection of data.

One of the main sources of compliance data, especially for patients not on depot medication, was medical casenotes. These recorded references to a patient's compliance with medication and services at out-patient appointments, Care Programme Approach meetings and from messages or phone calls. Most of the entries were made by medical

staff and relied on compliance not only being discussed, but also being documented. The collection of compliance data was therefore reliant on the issue being raised in the casenotes rather than regular checks being made prospectively at pre-determined intervals.

c.   Lack of blinding when rating compliance and outcomes.

Compliance with medication and psychiatric services was rated in two stages and the rater (T.T.) was the same in both stages. Ideally a second blind rater would have been employed, especially for the collection of data in the first stage. The rater (T.T.) was aware of which groups the patients had been allocated to which was necessary for safety reasons when interviewing the patients for the main UK700 trial, as intensive case managers or standard keyworkers were often consulted as to whether it was safe to visit the patients at home.

Therefore, for the same reasons, the researcher (T.T.) was not blind for the collection of outcome assessments data either.

d.   Legitimate reasons for poor compliance.

Patients may stop taking their medication for good reason, for example, due to intolerable side effects, especially if they make an informed decision. In some cases it was clear that medication had been stopped with the agreement of a mental health professional. In other cases such information was not available and the patient was rated as poorly compliant for that period. This effect was the same for both intensive and standard patients.

Similarly, patients may not have been able to attend their out-patient appointments for good personal reasons, but if these had not been recorded in the medical notes, poor compliance was assumed.

e. Possible mechanisms to explain improved compliance.

It was beyond the scope of the current trial to explore all the possible mechanisms which could possibly explain the change in compliance rates found in the patients who received Intensive Case Management, for example, the possibility of improved insight in the intensive group, but there a number of indications as discussed later.

f. Monitoring of compliance.

During the trial intensive case managers had more contact with their patients than standard keyworkers as detailed by the database of patient contacts during the trial. Therefore intensive case managers would have probably had more intimate knowledge of whether their patients were complying or not.

This would have created a bias in favour of recording poor medication compliance more accurately for the intensive patients compared to the standard patients, because unless clearly documented otherwise, it was assumed a patient was complying well. As the standard patients had fewer contacts, there was less chance for their keyworkers to catch them being poorly compliant.

g. The effect of compliance on outcome.

The year 2 outcome assessment schedule was completed for significantly more patients receiving Intensive Case Management, using significantly more sources of data, (4 (5%) patients in the Intensive Case Management group and 18 (23%) patients in the standard care group did not complete it). Intensive patients and their relatives were more likely

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to agree to be interviewed and were easier to contact compared to patients receiving standard care.

It was possible to record some variables using casenotes without interviewing the patient, for example, days in hospital during the trial, socio-demography and course of illness during the trial, but it was not possible to rate recent psychopathology, quality of life, unmet needs, social functioning or patient dissatisfaction at the time of the year 2 assessment. There were no significant differences in any of the outcome scores between the intensive or standard groups at the year 2 assessment, but it is possible that the standard patients who were not interviewed were different from those who were interviewed.

4.3. MEANING OF THE TRIAL

4.3.1. COMPLIANCE WITH MEDICATION

Compliance with medication improved for all patients during the trial but significantly more so for the patients receiving Intensive Case Management. The overall improvement may have been partly attributable to a hawthorne effect, as the patients, intensive case managers and standard keyworkers knew they were participants in a research project. Further evidence for this is derived from the fact that the improvement in patients receiving standard care was only apparent for the first year and was not sustained in the second year of the trial, returning to pre-trial levels. However the improvement in medication compliance compared with the two years prior to trial entry was maintained for both years of the trial for patients receiving Intensive Case Management.

There are several possible mechanisms for this improvement which may have worked in unison:

a. The relationship between the patients and their intensive case managers.

b. Monitoring and education regarding medication.

c. Practical aids to facilitate access to medication.

d. Improved satisfaction with psychiatric services.

a.   The relationship between the patients and their intensive case managers.

The improvement in compliance could have been due to a close relationship between the patients and their intensive case managers. With Intensive Case Management, the case manager-patient relationship is primary and essential (Ford et al, 1997). This positive, personable approach may have suited and endeared some patients to their intensive case manager rather than the more medical model offered by standard care. Patients with their intensive case manager may have identified desired goals and the steps needed to achieve these goals including taking medication regularly to try to stay well.

The therapeutic alliance between the intensive case managers and their patients may have been enhanced by this more positive framework. There has been some interest in the patient-case manager therapeutic alliance (Goering & Stylianos, 1998) and there is some evidence to suggest that it may be related to patient outcome (Gehrs & Goering, 1994; Neale & Rosenheck, 1995).

Studies by Pescosolido et al (1995) and Pescosolido (1991) based on social network theory hypothesise that a critical function of case management is to construct a

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professionally based social support system which shapes the likelihood that patients will comply with treatment recommendations.

An associated area is the level of expressed emotion between professionals and their patients. The author (T.T.) has conducted a study of the expressed emotion levels of the intensive case managers and standard keyworkers in the current trial (Tattan & Tarrier, 2000). This study found that high expressed emotion ratings were significantly associated with individual case managers and standard keyworkers and not to their patient's symptoms or illnesses or whether the patient received Intensive Case Management or standard care. High expressed emotion was not associated with later clinical outcome for the patients. However the presence of a *positive relationship* between the case manager or keyworker with their patients was predictive of significantly improved clinical outcome after one year in psychopathology, social functioning and patient satisfaction. The absence of a positive relationship (a neutral or negative relationship) was significantly predictive of poorer outcomes.

The mechanisms explaining why a positive relationship was predictive of improved clinical outcome was not investigated in this study, but one hypothesis could be that medication compliance was enhanced.

b.   Monitoring and education regarding medication.

Intensive case managers in the current trial had almost double the number of contacts with their patients compared to standard keyworkers and more contacts where the primary focus was regarding medication. When the primary focus was medication, standard keyworkers tended to be giving their patients depot medication (326 (89%) contacts), whereas intensive case managers did this less so (219 (45%) contacts). The duration of each contact was longer in the intensive group. It could be speculated that

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intensive case managers spent more time educating their patients and perhaps their patient's families about their illness and the need for medication, explained about side effects of medication, improved patient's attitudes to medication and acted as an advocate for patients to discuss their medication with other agencies to empower them.

Intensive case managers also had more time to monitor their patient's symptoms and compliance with medication and perhaps pick up poor compliance at an earlier stage and encourage patients to restart their medication. Previous research has suggested that the level of supervision a patient receives is an important factor in medication compliance (Hare & Willcox, 1967; Fenton et al, 1997).

Intensive case managers seemed to have more awareness than standard keyworkers whether their patients were complying with medication or not as their agreement with objective measures of compliance was higher.

c.   Practical aids to facilitate access to medication.

Intensive case managers may also have had more capacity to help patients practically, especially the ones who had difficulty accessing their medication, for example, taking a patient to depot clinic or delivering medication to patient's homes. The improvement in compliance for the Intensive Case Management group comparing the trial period with the previous two years was most profound for patients prescribed depot neuroleptic medication . Intensive case managers gave their patients depot injections at home more often than standard keyworkers did, and this may have been the main contributory factor to the improvement in compliance with medication during the trial.

d.   Improved satisfaction with psychiatric services.

It was hypothesised that one of the mechanisms involved in the improvement in compliance with medication in the Intensive Case Management group could be attributable to improved satisfaction with psychiatric services during the trial, especially as some of the questions were regarding receiving sufficient education about medication and patients being involved in making decisions about their treatment.

Patients' satisfaction with psychiatric services had improved at the end of the trial compared with the baseline assessment in both groups, but not significantly so. The questionnaire referred to the psychiatric services provided as a whole, not just the intensive case manager or standard keyworker and so there may have been a dilution effect.

More patients dropped out of contact with their intensive case manager during the trial compared with standard keyworkers (9 (11%) patients in the Intensive Case Management group compared with 2 (2%) patients in the standard care group). This may have been a reflection of the fact that the Intensive Case Management team was a new team set up for the trial, whereas the standard keyworkers were already established with their patients at the start of the trial, or a few patients may have disliked the intensity of their relationship with their case manager.

4.3.1.1. PREDICTORS OF COMPLIANCE WITH MEDICATION

The best predictor of poor compliance with medication during the trial was poor compliance with medication for a similar period just prior to trial entry. This finding has been demonstrated previously (Buchanan, 1992) and suggests that poor compliance with medication may be an enduring behaviour over time.

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The other variables selected to predict compliance with medication both confirm and refute previous studies. Males were predicted to be poorly compliant with medication. This has been replicated previously especially with patients prescribed depot medication (Wright et al, 1989; Tunnicliffe et al, 1992; Sellwood & Tarrier, 1994) and may be associated with a poorer prognosis for males with severe mental illness (Angermeyer et al, 1990).

The age of first admission for psychosis was also an independent predictor and was closely correlated with the age of onset of psychosis. A younger age of first admission was predictive of poorer compliance with medication. The reasons for this are unclear, but a younger age of onset is a poor prognostic factor for patients with schizophrenia (Carpenter et al, 1985; Eaton et al, 1992). Previous findings show that young patients with schizophrenia and antisocial or borderline personality traits tend to be admitted to hospital more often (Hoffmann, 1994). This nonconformist, critical behaviour of young adult chronic out-patients with antisocial and borderline personality traits and poor compliance is rare beyond the age of 35 (Hoffmann et al, in press).

Poorer compliance with medication during the trial was also predicted by less severe negative symptoms at baseline assessment. The same was true for predictors of compliance with psychiatric out-patient appointments. A previous study investigating compliance with out-patient attendance for patients with schizophrenia and substance misuse also found that having less severe negative symptoms whilst an in-patient was predictive of poorer compliance with out-patient attendance post discharge (Miner et al, 1997). The authors speculate that patients with severe negative symptoms comply better as they are more willing to allow treatment services to supply structure and

stimulation when they cannot satisfactorily regulate their own emotional state. They may also comply better as they lack assertion of will.

Patients allocated to receive Intensive Case Management rather than standard care were predicted to be more compliant with medication during the trial, as were patients who were more satisfied with psychiatric services.

A diagnosis of mania was predictive of good compliance with medication. This finding needs to be replicated however, as the number of patients with this diagnosis was low (n = 12) and it contradicts previous research as outlined in the literature review which found patients with affective disorders to be least compliant (Zito et al, 1965) and grandiose delusions to be associated with non-compliance (Van Putten et al, 1976).

Of the variables selected to predict compliance with medication during the trial, there were only a few which could be amenable to change. The multiple regression suggests that allocating patients to receive Intensive Case Management rather than standard care would be important and also improving patient satisfaction with psychiatric services.

The other variables are useful to predict which patients with severe mental illness may be at high risk for poor compliance with medication. These include patients who have been poorly compliant recently, males with a younger age of first admission for psychosis and those with less negative symptoms. As outlined above, some of these findings have been demonstrated previously and could be useful clinically to target high risk groups.

4.3.2. COMPLIANCE WITH OUT-PATIENT APPOINTMENTS

There were similarities between compliance with medication and compliance with out-patient appointments as both improved for all patients during the trial, but significantly more so for patients allocated to Intensive Case Management. Again, this could be attributable to a hawthorne effect especially as the improvement in out-patient attendance in patients receiving standard care was not sustained in the second year of the trial, returning to pre-trial levels.

However the improvement in out-patient attendance was sustained and continued improving during the second year of the trial for patients receiving Intensive Case Management. It was beyond the scope of the current trial to investigate all the possible mechanisms for the improvement in the intensive group. However they may have been similar to those cited for compliance with medication previously including a better therapeutic alliance and identification of out-patient attendance as important to monitor patients' progress and keep patients well as far as possible to optimise their desired achievements.

The intensive case manager attended significantly more out-patient appointments with their patients than standard keyworkers. Patients may have been more likely to attend with their intensive case manager who may have prompted them, provided transport or perhaps acted as an advocate for their patient's views during consultations.

4.3.2.1. PREDICTORS OF COMPLIANCE WITH PSYCHIATRIC OUT-PATIENT APPOINTMENTS

There has been little research previously investigating factors associated with compliance with out-patient appointments. Most of the previous studies have focused

on patients with a dual diagnosis of mental illness and substance misuse. They suggest that patients with dual diagnosis are less compliant with out-patient attendance than patients with similar mental illnesses who do not misuse substances (Miller and Tanenbaum, 1989; Soloman et al, 1984). Miner et al (1997) investigated this further and found that within the patient group with schizophrenia and substance misuse, males were 14 times more likely to be noncompliant with out-patient attendance after discharge from hospital than females, as were those patients with *less* severe negative symptoms.

The current trial found that the best predictor of poor compliance with out-patient attendance during the trial was poor compliance with out-patient attendance for a similar period just prior to trial entry. Previous studies have also found this (Frankel et al, 1989; Killaspy et al, 2000). Being male and young were also predictors of poor out-patient attendance during the trial. Allocation to Intensive Case Management and greater severity of negative symptoms at baseline were predictive of better compliance with out-patient attendance. These findings replicate those described above and could also be associated with some of the predictors of poor medication compliance, namely poor compliance recently, being male and younger or having a younger age of onset and less severe negative symptoms. Allocation to Intensive Case Management was predictive of good compliance with both medication and out-patient attendance during the trial.

4.3.3. DROPOUT FROM PSYCHIATRIC SERVICES

There was no difference between the Intensive Case Management group or the standard care group in the numbers of patients who dropped out during the trial, but numbers were small (29 (18%) patients dropped out in total). The main predictor of dropout and

out-patient attendance during the trial was the same - compliance with out-patient attendance for a similar period just prior to trial entry.

4.4.   COMPLIANCE AS A CONCEPT

During the trial and for the two years prior to trial entry there was a strong correlation between poor compliance with medication and poor compliance with psychiatric services, namely dropout from services and decreased attendance at out-patient appointments. Therefore patients do not tend to be poorly compliant just in one domain, but if they reject medication are also more likely to reject input from psychiatric services. This has been reported in previous studies. Nageotte et al (1997) found that among patients with schizophrenia, consistent out-patient attendance was significantly associated with better medication compliance. This was also found by Owen et al (1996), who investigated patients with schizophrenia and found a significant association between medication non-compliance, no out-patient contact and substance misuse.

Perhaps patients who are non-compliance with medication and psychiatric services are poorly compliant in other aspects of their lives, not just with treatment for their mental illness.

The current trial suggests that patients who are poorly compliant with treatment present a significant problem as poor compliance endures over time and is pervasive. Patients who are male and younger or have had a younger age of first admission for psychosis with less severe negative symptoms are more likely to be poorly compliant and should be considered as a high risk group for poor compliance with medication and out-patient attendance.

The only independent variable which was selected in predicting both compliance with medication and out-patient attendance which could be amenable to change was allocation to receive Intensive Case Management.

4.5. COMPLIANCE WITH PSYCHIATRIC TREATMENT AND OUTCOMES

The relationship between compliance with psychiatric treatment and clinical and social outcomes is not a straight forward one. In the current trial, compliance with medication and psychiatric services was not predictive of any of the year 2 outcome scores, and the improvement in compliance for the Intensive Case Management group comparing the trial period with the previous two years was not associated with an improvement in clinical or social outcomes.

The finding that an improvement in compliance is not associated with an improvement in outcome is not new. Haynes et al (1996) in their systematic review of thirteen randomised trials of interventions to improve compliance with treatment across specialties found that only four of the seven studies that improved compliance also had positive effects on outcome. The authors remark that some studies may have underestimated treatment effects because of methodological difficulties including imprecise measurement of compliance and small numbers of patients.

In studies of Intensive Case Management and Assertive Community Treatment (ACT) also, some studies have found that even though compliance with treatment improves in the experimental group, this makes no difference to some outcome measures (Hornstra et al, 1993; Ford et al, 1995, 1997; Dixon et al, 1997). Dixon et al (1997) for example measured compliance with medication carefully in homeless patients receiving ACT for 12 months. The significant increase in compliance was associated with fewer psychiatric

symptoms, but not with an improvement in days in hospital, permanent housing or jail, which must have been accounted for by other factors.

To explore this issue further, Weiden & Olfson (1995) attempted to determine the relative cost burden of rehospitalisation from loss of medication efficacy compared with medication non-compliance for neuroleptic responsive out-patients with schizophrenia who had had multiple previous relapses. They reviewed literature on the expected rates of relapse for patients with schizophrenia on maintenance neuroleptic medication. They found that loss of neuroleptic efficacy accounted for about 63% of rehospitalisation costs and neuroleptic non-compliance for about 37%. They found that loss of medication efficacy and medication non-compliance act synergistically on relapse, and suggest that substantial in-patient cost savings could be realised by linking better pharmacologic treatments of schizophrenia with more effective strategies to manage medication non-compliance.

In the current trial the measurement of compliance with treatment and outcomes was robust and the fact that improved compliance with medication and psychiatric services did not predict year 2 outcome is an important negative finding. The possible reasons for this may be:

a) The patients in the trial had long histories of psychotic illness (mean of 11 years) and perhaps a change in their compliance behaviour at this stage of their illnesses was not enough to change their outcome. Severe, but relatively stable symptoms are common among patients with severe mental illness, those patients most often targeted for Intensive Case Management (Mueser et al, 1998). Outcome in the trial was better predicted by severity of illness during the trial for this group of patients.

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b) For some outcome variables, for example, days in hospital during the trial, certain independent variables (episodic illness and severe symptom severity during the trial) account for most of the variance and compliance has little more to offer.

c) Some patients may have been treatment resistant, and so even if they were compliant with medication during the trial, this would not have affected their outcome. This links in with severity of illness being one of the best predictors of outcome.

d) Some outcome variables, for example days in hospital may have been determined by other factors beyond the scope of the current trial to explore. The duration of admission may have been affected by the housing instability or pressure on hospital beds rather than if the patients were compliant.

e) It was not the specific aim of the current trial to intervene to improve compliance directly, using compliance therapy for example. Therefore this is not the definitive trial to explore whether improving compliance results in better outcome.

4.6. UNANSWERED QUESTIONS AND FUTURE RESEARCH

The current trial suggests that introducing Intensive Case Management does have an effect on improving compliance with psychiatric treatment, a finding which has been replicated in previous studies (McClary et al, 1989; Hornstra et al, 1993; Ford et al, 1995, 1997). Unfortunately, it was beyond the scope of the current trial to see if the improvement was sustained when Intensive Case Management was withdrawn for some patients at the end of the trial.

The findings of the current trial could be developed further to identify a subgroup of patients in more detail who would benefit the most from Intensive Case Management. This trial suggests that patients prescribed depot medication would benefit the most,

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but this could be investigated in further detail especially if there were larger numbers of patients who were prescribed depot medication.

Intervention studies with protocols specifically designed to improve compliance with medication have been successful under research conditions (Kemp et al, 1996, 1998). The feasibility of intensive case managers being trained in and having time to deliver such interventions in a clinical setting could be explored as intensive case managers have regular contact with their patients and lower caseload sizes. This could then be compared with intensive case managers with no specific training to improve compliance, to investigate whether compliance could be enhanced by such an intervention within a clinical setting and the effect this has on outcome and costs.

Such structured intervention programmes, if successful in the community, could be targeted at a group identified from the current trial of being at high risk for poor compliance with medication and psychiatric services. In the current trial there was an overall improvement in compliance just by virtue of entering a clinical trial and this would have to be considered when investigating any further improvement in compliance due to a specific intervention.

Assertive Community Treatment (ACT) is more focused on enhancing medication compliance than Intensive Case Management and has had more promising outcome results (Marshall & Lockwood, 1999). The current trial could be repeated with ACT rather than Intensive Case Management to investigate whether ACT improves compliance with medication compared with standard care and, if so, the contribution of enhanced compliance in the ACT group on outcome. It would be interesting to explore whether having shared caseloads in ACT as opposed to an individual case manager allocated to each patient in Intensive Case Management has an effect on the alliance

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and relationship between staff and patients, and whether this is then a factor in compliance with psychiatric treatment.

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Appendix Contents

Patient's Consent Form

I consent to take part in the project comparing Intensive Case Management and standard care which has just been explained to me. I also agree to a relative or carer being contacted. I understand that I am entitled to withdraw this consent at any time without having to give a reason and without detriment to my future treatment.

NAME [Block letters]...

ADDRESS...

SIGNATURE...

DATE...

I confirm that I have fully explained the purpose and nature of this project.

[Researcher]

NAME [Block letters]...

SIGNATURE...

DATE...

Explanatory letter to patient

Dear

I am a Senior Registrar in psychiatry based at Manchester Royal Infirmary. I am writing to ask if you would agree to help with a study looking at the difficulties people may have taking their medication and attending psychiatric services such as out-patients. To find out more about this directly from people who are receiving medication and appointments, I am arranging to see a number of patients under the care of Manchester Royal Infirmary.

At Manchester Royal Infirmary, we are starting a new service, called Intensive Case Management, which is intended to help you link in with the services you need more effectively. Some community nurses and occupational therapists will be organised into an " Intensive Case Management" team. In order to assess whether the new type of service really does offer an opportunity to help with any difficulties with medication and attending appointments, patients will be allocated either to this Intensive Case Management or will carry on receiving their normal service from psychiatry.

If you agree to participate, I would need to see you and, if possible, a carer or relative to check on progress. I would initially see you before you join the project and then once a year for a couple of years. This will involve asking you a series of questions only. Some of the information I would be able to get from your medical notes.

Complete confidentiality will be maintained so we will not disclose any information even to the staff concerned with your care unless we felt your doctor or keyworker needed to know how you were feeling in an emergency [for example if we thought that you were in serious danger of harming yourself]. Your consultant psychiatrist is happy for you to be considered for this research. Your GP would also be aware that you were participating.

You are completely free to choose not to participate without giving reasons and this would have no effect on your future treatment or relationship with your doctor or keyworker. If you do agree to join the study, you could still withdraw from it at any time in the future.

I could see you either at your home or at the team base if that would be more convenient. I will be contacting you by letter or phone again over the next few weeks. If you have any queries, please contact me on 061-276-5379.

I would be very grateful if you felt able to help as this type of research may in the future help to improve care in the community.

Many thanks for your consideration,

Yours sincerely,

Dr. Theresa Tattan
Senior Registrar in Psychiatry

Explanatory letter to relative or carer

Dear

I am a Senior Registrar in psychiatry based at Manchester Royal Infirmary. I am writing to ask if you would agree to help in a study. The study is looking at the effect of introducing a new service for people with mental health problems in the community.

At Manchester Royal Infirmary, we are starting this new service, called Intensive Case Management, which is intended to help your relative link in with the services needed more effectively. Some community nurses and occupational therapists will be organised into an " Intensive Case Management" team. In order to assess whether the new type of service really does offer an advantage, patients will be allocated either to this Intensive Case Management or will carry on receiving their normal service from psychiatry for comparison.

I would like to ask you some questions about your relative, (name), who has given me permission to contact you. The interview would take about half an hour and will involve asking you a series of questions only. It could either be done at your home or at Manchester Royal Infirmary- whichever is most convenient.

You are free not to participate and this would have no effect on future treatment of your relative.

I will be contacting you by letter or phone again over the next few weeks. If you have any queries, please contact me on 061-276-5379.

Many thanks for your consideration,

Yours sincerely,

Dr. Theresa Tattan
Senior Registrar in Psychiatry

Explanatory letter to General Practitioner

Dear Dr.

I am a Senior Registrar in psychiatry working on a research study at the Department of Psychiatry, Manchester Royal Infirmary. I am planning to interview patients with psychotic illnesses who have been in hospital at some point during the past two years.

At Manchester Royal Infirmary, we are starting a new service, called Intensive Case Management, which is intended to help these patients link in with the services they need more effectively. Some community nurses and occupational therapists will be organised into an " Intensive Case Management" team. In order to assess whether the new type of service really does offer an advantage, patients will be allocated either to this Intensive Case Management for two years or will carry on receiving their normal service from psychiatry for comparison.

The study involves interviewing the patient and a relative or carer if possible. The interviews will take place at the patient's home or team base, whichever is most convenient. The patients will be interviewed at the start of the study and then at yearly intervals for two years.

Several of the patients I plan to approach are on your list. I enclose their names and addresses on the attached list.

The consultants in psychiatry responsible for the patients have given their permission for the patients to be involved in the study. If you wish to discuss this further or have any reservations about me approaching any of your patients, please contact me at Manchester Royal Infirmary on 0161-276-5379.

Thank you,

Yours sincerely,

Dr. Theresa Tattan
Senior Registrar in Psychiatry

Compliance Data Entry Form 1- Data from medical and community casenotes.

Trial ID

Date of randomisation

Date of year 1 interview

Date of end of trial

Date of entry	Type of contact	Place of contact	Did patient attend- yes/no	Medication prescribed	Compliance with medication	Compliance with services	Any change to medication

Any missing data:

Compliance Data Entry Form 2- Blood level monitoring

Trial ID

Date of randomisation

Date of year 1 interview

Date of end of trial

Name of medication

Date of level	Dose of medication	Blood level	Within therapeutic range- yes/no	Any change to medication

Any missing data:

Trial ID

Date of randomisation

Date of year 1 interview

Date of end of trial

Date depot given	Type of depot	Depot interval	Depot given at home- yes/no	Days late receiving depot

Any missing data:

Compliance Data Entry Form 4 - Hospitalisation data

Trial ID

Date of randomisation

Date of year 1 interview

Date of end of trial

Dates of admission and discharge	Number of in-patient days	On section- yes/no	Casenotes checked- yes/no	Hospital database checked- yes/no	Out of area admissions checked- yes/no

Any missing data:

Compliance Data Entry Form 5 -   Mental health professional's rating of medication compliance

Mental health professional: Intensive case manager

Standard case manager

CPN

Consultant

Patient's trial ID:

Date:

During the past twelve months, to the best of your knowledge, has this patient complied with medication:

A. More than 75% of the time

B. Between 25% and 75% of the time

C. Less than 25% of the time

Thank you.

Client's trial ID:

Date:

During the past twelve months have you taken your prescribed medication:

A. More than 75% of the time

B. Between 25% and 75% of the time

C. Less than 25% of the time

Thank you.

Compliance Data Entry Form 7- Main data entry form

Trial ID

Date of randomisation

Date of year 1 interview

Date of end of trial

SECOND year PRIOR to trial entry:	
Number of weeks not in hospital	M2YCMPNH
Number of weeks compliance data is available for (taking account of missing notes, dropout periods etc.)	M2YCMPAV
Number of psychotropic medications prescribed	M2YNOSDR
Number of months depot prescribed	M2YTIMDE
Type of depot prescribed for longest period of time: Flupenthixol decanoate 1 Fluphenazine decanoate 2 Haloperidol decanoate 3 Pipothiazine palmitate 4 Zuclopenthixol decanoate 5	M2YDETYP
Depot interval (weeks)	M2YDEINT
Number of weeks late receiving depot	M2YDELAW
Percentage of prescribed depots received	M2YDEPER
Was depot received at home at any time: No 0 Yes 1	M2YDEHOM
Number of months oral neuroleptic prescribed	M2YTIMON
Type of oral neuroleptic prescribed for longest period of time: Chlorpromazine 1 Clozapine 2 Depixol 3 Droperidol 4 Haloperidol 5 Loxapine 6 Methotrimeprazine 7 Olanzepine 8 Pimozide 9 Risperidone 10 Stelazine 11 Sulpiride 12 Thioridazine 13	M2YONTYP

Trial ID: **SECOND year PRIOR to trial entry:**	
Was an atypical neuroleptic prescribed at any time: No 0 Yes 1	M2YATYPI
Chlorpromazine equivalent (mgs) for neuroleptic prescribed for longest period of time	M2YCPZEQ
Number of months anticholinergic prescribed	M2YTIMPC
Number of months lithium prescribed	M2YTIMLI
Number of lithium levels taken	M2YLILEV
Percentage of lithium levels within the therapeutic range	M2YLIPER
Number of months carbamazepine prescribed	M2YTIMCA
Number of carbamazepine levels taken	M2YCALEV
Percentage of carbamazepine levels within the therapeutic range	M2YCAPER
Number of months antidepressant prescribed	M2YTIMAN
Type of antidepressant prescribed for longest period of time: Amitriptyline 1 Citalopram 2 Clomipramine 3 Fluvoxamine 4 Fluoxetine 5 Imipramine 6 Lofepramine 7 Mianserin 8 Moclobemide 9 Paroxetine 10 Prothiaden 11 Sertraline 12 Trimipramine 13 Venlafaxine 14	M2YANTYP
Was a dosette box administered at any time: No 0 Yes 1	M2YDOSET
Number of weeks patient *not* compliant with oral medication	M2YCMPOR
Number of weeks patient *not* compliant with all medication	M2YCMPP

Trial ID: SECOND year PRIOR to trial entry:	
Percentage of time patient *not* compliant with medication (not including time in hospital)	M2YCMPPE
Patient *not* compliant with medication for: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	M2YCMPM
Number of out-patient appointments made	M2YOPDNO
Number of out-patient appointments attended	M2YOPDAT
Percentage of out-patient appointments attended	M2YOPPER
Patient compliant with out-patient appointments for: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	M2YCMPO
Did intensive case manager or standard keyworker attend any out-patient appointments: No 0 Yes 1	M2YOPDCM
Did patient dropout at any time: No 0 Yes 1	M2YDROPO
Reason for dropout: Refused to attend out-patient appointments 1 Refused to attend out-patient appointments and community services 2 Refused to attend out-patient appointments, community services and day hospital 3 Refused contact with intensive case manager or standard keyworker 4 Moved away 5 Dropped out from day hospital 6 Died 7 Discharged back to GP care as well 8 Administrative error by hospital 9 In prison 10 Permanently in hospital 11 Reason not clear 12	M2YDROPRE
Number of weeks of dropout	M2YDROPP
Percentage of time patient dropped out	M2YDROPE

Trial ID:		
FIRST year PRIOR to trial entry:		
Number of weeks not in hospital		M1YCMPNH
Number of weeks compliance data is available for (taking account of missing notes, dropout periods etc.)		M1YCMPAV
Number of psychotropic medications prescribed		M1YNOSDR
Number of months depot prescribed		M1YTIMDE
Type of depot prescribed for longest period of time: Flupenthixol decanoate 1 Fluphenazine decanoate 2 Haloperidol decanoate 3 Pipothiazine palmitate 4 Zuclopenthixol decanoate 5		M1YDETYP
Depot interval (weeks)		M1YDEINT
Number of weeks late receiving depot		M1YDELAW
Percentage of prescribed depots received		M1YDEPER
Was depot received at home at any time: No 0 Yes 1		M1YDEHOM
Number of months oral neuroleptic prescribed		M1YTIMON
Type of oral neuroleptic prescribed for longest period of time: Chlorpromazine 1 Clozapine 2 Depixol 3 Droperidol 4 Haloperidol 5 Loxapine 6 Methotrimeprazine 7 Olanzepine 8 Pimozide 9 Risperidone 10 Stelazine 11 Sulpiride 12 Thioridazine 13		M1YONTYP
Was an atypical neuroleptic prescribed at any time: No 0 Yes 1		M1YATYPI
Chlorpromazine equivalent (mgs) for neuroleptic prescribed for longest period of time		M1YCPZEQ

Trial ID:	
FIRST year PRIOR to trial entry:	
Number of months anticholinergic prescribed	M1YTIMPC
Number of months lithium prescribed	M1YTIMLI
Number of lithium levels taken	M1YLILEV
Percentage of lithium levels within the therapeutic range	M1YLIPER
Number of months carbamazepine prescribed	M1YTIMCA
Number of carbamazepine levels taken	M1YCALEV
Percentage of carbamazepine levels within the therapeutic range	M1YCAPER
Number of months antidepressant prescribed	M1YTIMAN
Type of antidepressant prescribed for longest period of time: Amitriptyline 1 Citalopram 2 Clomipramine 3 Fluvoxamine 4 Fluoxetine 5 Imipramine 6 Lofepramine 7 Mianserin 8 Moclobemide 9 Paroxetine 10 Prothiaden 11 Sertraline 12 Trimipramine 13 Venlafaxine 14	M1YANTYP
Was a dosette box administered at any time: No 0 Yes 1	M1YDOSET
Number of weeks patient *not* compliant with oral medication	M1YCMPOR
Number of weeks patient *not* compliant with all medication	M1YCMPP
Percentage of time patient *not* compliant with medication (not including time in hospital)	M1YCMPPE

Trial ID: **FIRST year PRIOR to trial entry:**	
Patient *not* compliant with medication for: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	M1YCMPM
Number of out-patient appointments made	M1YOPDNO
Number of out-patient appointments attended	M1YOPDAT
Percentage of out-patient appointments attended	M1YOPPER
Patient compliant with out-patient appointments for: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	M1YCMPO
Did intensive case manager or standard keyworker attend any out-patient appointments: No 0 Yes 1	M1YOPDCM
Did patient dropout at any time: No 0 Yes 1	M1YDROPO
Reason for dropout: Refused to attend out-patient appointments 1 Refused to attend out-patient appointments and community services 2 Refused to attend out-patient appointments, community services and day hospital 3 Refused contact with intensive case manager or standard keyworker 4 Moved away 5 Dropped out from day hospital 6 Died 7 Discharged back to GP care as well 8 Administrative error by hospital 9 In prison 10 Permanently in hospital 11 Reason not clear 12	M1YDROPRE
Number of weeks of dropout	M1YDROPP
Percentage of time patient dropped out	M1YDROPE

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Trial ID: FIRST AND SECOND year PRIOR to trial entry:	
Number of weeks not in hospital	MYSCMPNH
Number of weeks compliance data is available for (taking account of missing notes, dropout periods etc.)	MYSCMPAV
Number of psychotropic medications prescribed	MYSNOSDR
Number of months depot prescribed	MYSTIMDE
Type of depot prescribed for longest period of time: Flupenthixol decanoate 1 Fluphenazine decanoate 2 Haloperidol decanoate 3 Pipothiazine palmitate 4 Zuclopenthixol decanoate 5	MYSDETYP
Depot interval (weeks)	MYSDEINT
Number of weeks late receiving depot	MYSDELAW
Percentage of prescribed depots received	MYSDEPER
Was depot received at home at any time: No 0 Yes 1	MYSDEHOM
Number of months oral neuroleptic prescribed	MYSTIMON
Type of oral neuroleptic prescribed for longest period of time: Chlorpromazine 1 Clozapine 2 Depixol 3 Droperidol 4 Haloperidol 5 Loxapine 6 Methotrimeprazine 7 Olanzepine 8 Pimozide 9 Risperidone 10 Stelazine 11 Sulpiride 12 Thioridazine 13	MYSONTYP
Was an atypical neuroleptic prescribed at any time: No 0 Yes 1	MYSATYPI
Chlorpromazine equivalent (mgs) for neuroleptic prescribed for longest period of time	MYSCPZEQ

Trial ID: FIRST AND SECOND year PRIOR to trial entry:	
Number of months anticholinergic prescribed	MYSTIMPC
Number of months lithium prescribed	MYSTIMLI
Number of lithium levels taken	MYSLILEV
Percentage of lithium levels within the therapeutic range	MYSLIPER
Number of months carbamazepine prescribed	MYSTIMCA
Number of carbamazepine levels taken	MYSCALEV
Percentage of carbamazepine levels within the therapeutic range	MYSCAPER
Number of months antidepressant prescribed	MYSTIMAN
Type of antidepressant prescribed for longest period of time: Amitriptyline 1 Citalopram 2 Clomipramine 3 Fluvoxamine 4 Fluoxetine 5 Imipramine 6 Lofepramine 7 Mianserin 8 Moclobemide 9 Paroxetine 10 Prothiaden 11 Sertraline 12 Trimipramine 13 Venlafaxine 14	MYSANTYP
Was a dosette box administered at any time: No 0 Yes 1	MYSDOSET
Number of weeks patient *not* compliant with oral medication	MYSCMPOR
Number of weeks patient *not* compliant with all medication	MYSCMPP
Percentage of time patient *not* compliant with medication (not including time in hospital)	MYSCMPPE

| Trial ID: | |
FIRST AND SECOND year PRIOR to trial entry:	
Patient *not* compliant with medication for: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	MYSCMPM
Number of out-patient appointments made	MYSOPDNO
Number of out-patient appointments attended	MYSOPDAT
Percentage of out-patient appointments attended	MYSOPPER
Patient compliant with out-patient appointments for: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	MYSCMPO
Did intensive case manager or standard keyworker attend any out-patient appointments: No 0 Yes 1	MYSOPDCM
Did patient dropout at any time: No 0 Yes 1	MYSDROPO
Reason for dropout: Refused to attend out-patient appointments 1 Refused to attend out-patient appointments and community services 2 Refused to attend out-patient appointments, community services and day hospital 3 Refused contact with intensive case manager or standard keyworker 4 Moved away 5 Dropped out from day hospital 6 Died 7 Discharged back to GP care as well 8 Administrative error by hospital 9 In prison 10 Permanently in hospital 11 Reason not clear 12	MYSDROPRE
Number of weeks of dropout	MYSDROPP
Percentage of time patient dropped out	MYSDROPE

Trial ID:	
FIRST year in trial:	
Number of weeks not in hospital	Y1CMPNH
Number of weeks compliance data is available for (taking account of missing notes, dropout periods etc.)	Y1CMPAV
Number of psychotropic medications prescribed	Y1NOSDR
Number of months depot prescribed	Y1TIMDE
Type of depot prescribed for longest period of time: Flupenthixol decanoate 1 Fluphenazine decanoate 2 Haloperidol decanoate 3 Pipothiazine palmitate 4 Zuclopenthixol decanoate 5	Y1DETYP
Depot interval (weeks)	Y1DEINT
Number of weeks late receiving depot	Y1DELAW
Percentage of prescribed depots received	Y1DEPER
Was depot received at home at any time: No 0 Yes 1	Y1DEHOM
Number of months oral neuroleptic prescribed	Y1TIMON
Type of oral neuroleptic prescribed for longest period of time: Chlorpromazine 1 Clozapine 2 Depixol 3 Droperidol 4 Haloperidol 5 Loxapine 6 Methotrimeprazine 7 Olanzepine 8 Pimozide 9 Risperidone 10 Stelazine 11 Sulpiride 12 Thioridazine 13	Y1ONTYP
Was an atypical neuroleptic prescribed at any time: No 0 Yes 1	Y1ATYPI
Chlorpromazine equivalent (mgs) for neuroleptic prescribed for longest period of time	Y1CPZEQ

Trial ID: FIRST year in trial:	
Number of months anticholinergic prescribed	Y1TIMPC
Number of months lithium prescribed	Y1TIMLI
Number of lithium levels taken	Y1LILEV
Percentage of lithium levels within the therapeutic range	Y1LIPER
Number of months carbamazepine prescribed	Y1TIMCA
Number of carbamazepine levels taken	Y1CALEV
Percentage of carbamazepine levels within the therapeutic range	Y1CAPER
Number of months antidepressant prescribed	Y1TIMAN
Type of antidepressant prescribed for longest period of time: Amitriptyline 1 Citalopram 2 Clomipramine 3 Fluvoxamine 4 Fluoxetine 5 Imipramine 6 Lofepramine 7 Mianserin 8 Moclobemide 9 Paroxetine 10 Prothiaden 11 Sertraline 12 Trimipramine 13 Venlafaxine 14	Y1ANTYP
Was a dosette box administered at any time: No 0 Yes 1	Y1DOSET
Number of weeks patient *not* compliant with oral medication	Y1CMPOR
Number of weeks patient *not* compliant with all medication	Y1CMPP
Percentage of time patient *not* compliant with medication (not including time in hospital)	Y1CMPPE

Trial ID: FIRST year in trial:	
Patient *not* compliant with medication for: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	Y1CMPM
Number of out-patient appointments made	Y1OPDNO
Number of out-patient appointments attended	Y1OPDAT
Percentage of out-patient appointments attended	Y1OPPER
Patient compliant with out-patient appointments for: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	Y1CMPO
Did intensive case manager or standard keyworker attend any out-patient appointments: No 0 Yes 1	Y1OPDCM
Did patient dropout at any time: No 0 Yes 1	Y1DROPO
Reason for dropout: Refused to attend out-patient appointments 1 Refused to attend out-patient appointments and community services 2 Refused to attend out-patient appointments, community services and day hospital 3 Refused contact with intensive case manager or standard keyworker 4 Moved away 5 Dropped out from day hospital 6 Died 7 Discharged back to GP care as well 8 Administrative error by hospital 9 In prison 10 Permanently in hospital 11 Reason not clear 12	Y1DROPRE
Number of weeks of dropout	Y1DROPP
Percentage of time patient dropped out	Y1DROPE

Trial ID: SECOND year in trial:		
Number of weeks not in hospital		Y2CMPNH
Number of weeks compliance data is available for (taking account of missing notes, dropout periods etc.)		Y2CMPAV
Number of psychotropic medications prescribed		Y2NOSDR
Number of months depot prescribed		Y2TIMDE
Type of depot prescribed for longest period of time: Flupenthixol decanoate 1 Fluphenazine decanoate 2 Haloperidol decanoate 3 Pipothiazine palmitate 4 Zuclopenthixol decanoate 5		Y2DETYP
Depot interval (weeks)		Y2DEINT
Number of weeks late receiving depot		Y2DELAW
Percentage of prescribed depots received		Y2DEPER
Was depot received at home at any time: No 0 Yes 1		Y2DEHOM
Number of months oral neuroleptic prescribed		Y2TIMON
Type of oral neuroleptic prescribed for longest period of time: Chlorpromazine 1 Clozapine 2 Depixol 3 Droperidol 4 Haloperidol 5 Loxapine 6 Methotrimeprazine 7 Olanzepine 8 Pimozide 9 Risperidone 10 Stelazine 11 Sulpiride 12 Thioridazine 13		Y2ONTYP
Was an atypical neuroleptic prescribed at any time: No 0 Yes 1		Y2ATYPI
Chlorpromazine equivalent (mgs) for neuroleptic prescribed for longest period of time		Y2CPZEQ

Trial ID: SECOND year in trial:	
Number of months anticholinergic prescribed	Y2TIMPC
Number of months lithium prescribed	Y2TIMLI
Number of lithium levels taken	Y2LILEV
Percentage of lithium levels within the therapeutic range	Y2LIPER
Number of months carbamazepine prescribed	Y2TIMCA
Number of carbamazepine levels taken	Y2CALEV
Percentage of carbamazepine levels within the therapeutic range	Y2CAPER
Number of months antidepressant prescribed	Y2TIMAN
Type of antidepressant prescribed for longest period of time: Amitriptyline 1 Citalopram 2 Clomipramine 3 Fluvoxamine 4 Fluoxetine 5 Imipramine 6 Lofepramine 7 Mianserin 8 Moclobemide 9 Paroxetine 10 Prothiaden 11 Sertraline 12 Trimipramine 13 Venlafaxine 14	Y2ANTYP
Was a dosette box administered at any time: No 0 Yes 1	Y2DOSET
Number of weeks patient *not* compliant with oral medication	Y2CMPOR
Number of weeks patient *not* compliant with all medication	Y2CMPP
Percentage of time patient *not* compliant with medication (not including time in hospital)	Y2CMPPE

Trial ID: **SECOND year in trial:**	

Patient *not* compliant with medication for:
                                >75% of the time 1
                            25%-75% of the time 2
                               <25% of the time 3
	Y2CMPM

Number of out-patient appointments made	Y2OPDNO
Number of out-patient appointments attended	Y2OPDAT
Percentage of out-patient appointments attended	Y2OPPER

Patient compliant with out-patient appointments for:
                                >75% of the time 1
                            25%-75% of the time 2
                               <25% of the time 3
	Y2CMPO

Did intensive case manager or standard keyworker attend any out-patient appointments:
                                No 0
                                Yes 1
	Y2OPDCM

Did patient dropout at any time:
                                No 0
                                Yes 1
	Y2DROPO

Reason for dropout:
            Refused to attend out-patient appointments 1
    Refused to attend out-patient appointments and community services 2
  Refused to attend out-patient appointments, community services and day hospital 3
    Refused contact with intensive case manager or standard keyworker 4
                                Moved away 5
                    Dropped out from day hospital 6
                                  Died 7
              Discharged back to GP care as well 8
                 Administrative error by hospital 9
                           In prison 10
                    Permanently in hospital 11
                        Reason not clear 12
	Y2DROPRE

Number of weeks of dropout	Y2DROPP
Percentage of time patient dropped out	Y2DROPE

Trial ID: FIRST AND SECOND year in trial:		
Number of weeks not in hospital		YSCMPNH
Number of weeks compliance data is available for (taking account of missing notes, dropout periods etc.)		YSCMPAV
Number of psychotropic medications prescribed		YSNOSDR
Number of months depot prescribed		YSTIMDE
Type of depot prescribed for longest period of time: Flupenthixol decanoate 1 Fluphenazine decanoate 2 Haloperidol decanoate 3 Pipothiazine palmitate 4 Zuclopenthixol decanoate 5		YSDETYP
Depot interval (weeks)		YSDEINT
Number of weeks late receiving depot		YSDELAW
Percentage of prescribed depots received		YSDEPER
Was depot received at home at any time: No 0 Yes 1		YSDEHOM
Number of months oral neuroleptic prescribed		YSTIMON
Type of oral neuroleptic prescribed for longest period of time: Chlorpromazine 1 Clozapine 2 Depixol 3 Droperidol 4 Haloperidol 5 Loxapine 6 Methotrimeprazine 7 Olanzepine 8 Pimozide 9 Risperidone 10 Stelazine 11 Sulpiride 12 Thioridazine 13		YSONTYP
Was an atypical neuroleptic prescribed at any time: No 0 Yes 1		YSATYPI
Chlorpromazine equivalent (mgs) for neuroleptic prescribed for longest period of time		YSCPZEQ

Trial ID:	
FIRST AND SECOND year in trial:	
Number of months anticholinergic prescribed	YSTIMPC
Number of months lithium prescribed	YSTIMLI
Number of lithium levels taken	YSLILEV
Percentage of lithium levels within the therapeutic range	YSLIPER
Number of months carbamazepine prescribed	YSTIMCA
Number of carbamazepine levels taken	YSCALEV
Percentage of carbamazepine levels within the therapeutic range	YSCAPER
Number of months antidepressant prescribed	YSTIMAN
Type of antidepressant prescribed for longest period of time: Amitriptyline 1 Citalopram 2 Clomipramine 3 Fluvoxamine 4 Fluoxetine 5 Imipramine 6 Lofepramine 7 Mianserin 8 Moclobemide 9 Paroxetine 10 Prothiaden 11 Sertraline 12 Trimipramine 13 Venlafaxine 14	YSANTYP
Was a dosette box administered at any time: No 0 Yes 1	YSDOSET
Number of weeks patient *not* compliant with oral medication	YSCMPOR
Number of weeks patient *not* compliant with all medication	YSCMPP
Percentage of time patient *not* compliant with medication (not including time in hospital)	YSCMPPE

Trial ID: FIRST AND SECOND year in trial:	
Patient *not* compliant with medication for: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	YSCMPM
Number of out-patient appointments made	YSOPDNO
Number of out-patient appointments attended	YSOPDAT
Percentage of out-patient appointments attended	YSOPPER
Patient compliant with out-patient appointments for: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	YSCMPO
Did intensive case manager or standard keyworker attend any out-patient appointments: No 0 Yes 1	YSOPDCM
Did patient dropout at any time: No 0 Yes 1	YSDROPO
Reason for dropout: Refused to attend out-patient appointments 1 Refused to attend out-patient appointments and community services 2 Refused to attend out-patient appointments, community services and day hospital 3 Refused contact with intensive case manager or standard keyworker 4 Moved away 5 Dropped out from day hospital 6 Died 7 Discharged back to GP care as well 8 Administrative error by hospital 9 In prison 10 Permanently in hospital 11 Reason not clear 12	YSDROPRE
Number of weeks of dropout	YSDROPP
Percentage of time patient dropped out	YSDROPE

Trial ID:	
ALL four years in the trial:	
Sources of information for compliance data: No information available 0 Medical notes only 1 Medical notes + blood levels 2 Medical notes + depot cards 3 Medical notes + blood levels + depot cards 4 Medical notes + community notes 5 Medical notes + community notes + blood levels 6 Medical notes + community notes + depot cards 7 Medical notes + community notes + blood levels + depot cards 8 Prison medical notes 9	SOURCES
Sources of missing data: Depot cards 1 Medical notes 2 Depot cards and medical notes 3 Prison medical notes 4	MISSING
Number of weeks of missing compliance data	DURMISS
Percentage of time compliance data was missing	PERMISS
Was patient on a section of the Mental Health Act at any time: No 0 Yes 1	SECTION

Trial ID: **SECOND year in trial – subjective ratings of medication compliance:**	
Mental health professional who rated compliance: Intensive case manager 1 Standard case manager 2 CPN 3 Consultant 4	CMOPINWH
Mental health professional's rating of medication compliance: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	CMOPMED
Patient's self rating of medication compliance: >75% of the time 1 25%-75% of the time 2 <25% of the time 3	PTOPMED

Equivalent doses of neuroleptic medication (mgs)

Neuroleptic medication	Dose (mgs)	Interval
Chlorpromazine	300	daily
Clozapine	150	daily
Depixol	9	daily
Droperidol	12	daily
Haloperidol	9 or 15[*]	daily
Loxapine	60	daily
Methotrimeprazine	150	daily
Olanzepine	10	daily
Pimozide	6	daily
Risperidone	3	daily
Sulpiride	600	daily
Thioridazine	300	daily
Trifluoperazine	15	daily
Flupenthixol decanoate	40	two weekly
Fluphenazine decanoate	25	two weekly
Haloperidol decanoate	50	two weekly
Pipothiazine palmitate	25	two weekly
Zuclopenthixol decanoate	200	two weekly

[*] 9 mgs of haloperidol for doses less than or equal to 20mgs daily; 15mgs of haloperidol for doses more than 20mgs daily.

Event record (Patient contact forms)

SCORING:

Name of patient..

Completed by..

Date of event... ......

Time spent excluding travel in minutes............................

Time spent travelling to visit only in minutes.................

PLACE:

1- Service setting (team base, OP, etc.)

2- Client's home or neighbourhood

3- Other

EVENT TYPE:

1- Direct contact with client

2- Indirect contact with client

3- Direct or indirect contact with carer

PLACE

EVENT TYPE

OUT OF HOURS

CARE PLAN OR CRISIS

DEPOT ADMINISTERED

4- Contact with other agencies

5- Contact not made

OUT OF HOURS:

1- yes

0- no

CARE PLAN OR CRISIS:

1- Event is a scheduled care plan

intervention

2- Event is an unscheduled crisis

  intervention

FOCUS OF EVENT:

 (Primary = 1, secondary = 2)

Housing

Occupation and leisure

Finance

Daily living skills

Criminal justice system

Carers and significant others

Engagement

Physical health

Specific mental health intervention/assessment

Medication

Case conference

DEPOT ADMINISTERED:

1- Yes

0- No

FOCUS OF EVENT:

1- Primary focus i.e. the major concern

2- Secondary focus i.e. up to one

substantial secondary concern

Event recording (Patient contact) guidelines

General Points

1. Must be completed for clients in the standard and intensive care groups- by any worker dealing with the client.

2. Must be completed for every face-to-face contact with client of whatever duration.

3. Must be completed for all contacts not made- i.e. if contact is not made because the client does not attend an appointment, is not in or does not answer on a home visit. If contact is not made, then focus will not need completion.

4. Other types of contact (i.e. indirect contact/carer contacts/agency contacts) should only be recorded if the contact lasted for longer than 15 minutes.

5. If a joint visit is made, then each worker should complete a form.

The forms

1. **Name of patient.**

2. **Completed by-** worker's name.

3. **Time spent excluding travel (in minutes)-** time spent on direct or telephone contact with client/carer/agency. The actual time spent face to face with the client/carer, the duration of the telephone call or the time spent actually discussing the client should be recorded. Time spent in preparation for visits, calls etc. should not be included.

4. **Date of event.**

5. **Time spent travelling to the visit only (in minutes)-** record only time spent travelling to the visit etc.

6. **Place**

> 1. Service setting- any statutory or voluntary health or social service e.g. ward, out-patients, depot clinic, G.P. surgery, community group, day centre, drop in facility. Does not include police stations, prisons, DSS offices etc.

> 2. Client's home or neighbourhood- inside clients accommodation (including hostels/sheltered and supported housing) and within client's block (if flats) and on street/estate outside.

> 3. Other- anywhere not covered above i.e. cafes, leisure centres, prisons, police stations etc.

7. Event type

1. Direct contact with client- face to face contact. Does not include a case conference attended by the client.

2. Indirect contact with client- telephone only. Does not include time spent writing letters.

3. Direct/indirect contact with carer- face to face or telephone contact.

4. Contact with other agencies/care co-ordination- face to face or telephone contact, meetings/reviews/ward rounds/liaison. Includes case conferences even when attended by the client.

5. Contact not made- client does not attend, is not in, or does not answer on a home visit.

NB: 1 & 5 above are always recorded.

2, 3, & 4 are only recorded if they exceed 15 minutes.

8. Out of hours

Score 1 if most of time spent was outside normal office hours (9.00- 5.00, Monday to Friday).

Score 0 if most of time spent inside normal office hours.

9. Care plan or crisis

Score 1 if the event was a planned or routine intervention.

Score 0 if the event was unscheduled AND in response to a crisis.

10. Depot administered

Score 1 if a depot was given.

Score 0 otherwise.

11. Focus of event (primary = 1, secondary = 2)

Enter 1 in box which describes the primary focus of event. If there is an important secondary focus this may be entered as 2. Aim to enter primary focus whenever possible.

No more than two focus of event boxes should be completed, although it is recognised that many client contacts are multi-faceted.

HOUSING:

a. Finding and arranging suitable accommodation

Includes: attendance at case review (e.g. at hostel) to gain a place

                      assistance with the mechanics of home moving (and furnishing)

b. Maintaining existing home

Includes: obtaining essential furniture

c. Negotiations to protect accommodation/prevent eviction

Includes: attendance at case review (e.g. at hostel) to protect the place

FINANCE:

a. Arranging benefits

Includes: new applications, reviewing and attending benefits review meetings

                      applications to charities

b. Emergency financial provision

c. Budgeting help

Includes: managing savings

                      avoiding disconnection, financial appointeeship etc.

                      assessing financial position

MEDICATION

a. Administer depot

b. Arrange adjustment or review of medication

Includes: getting the client to the review

c. Monitor compliance with medication

d. Education/negotiation aimed at enhancing compliance

e. Formal assessment of side effects

f. Supplying medication

OCCUPATION AND LEISURE:

a. **Organising/planning/encouraging daytime structure and leisure activities**

Includes: needs assessment and social services review of day-care

b. **Accompany client to (mainstream) leisure activity**

Includes: purely going along with the client

                    joint participation

c. **Accompany client to day centre**

Includes: groups

d. **Vocational planning and assistance**

e. **Assisting client to build relationships**

                    focuses on social network issues

                    relationships with other professionals are not included

DAILY LIVING SKILLS:

a. **Daily living skill assessment**

                    i.e. all daily living skills assessment

b. **Household tasks**

                    i.e. active encouragement, instruction and teaching re: household tasks

                    assist with or supervise the performance of household tasks

                    arranging/enabling others to assist with household tasks

Includes: own laundry at home

c. **Personal hygiene**

                    i.e. active encouragement, instruction and teaching re: personal hygiene

                    assist with or supervise the performance of personal hygiene

                    arranging/enabling others to assist with personal hygiene

d. **Transport**

                    i.e. active encouragement, instruction and teaching re: transport skills

                    assist with or supervise transport skills

                    arranging/enabling others to assist with transport skills

Includes: using buses

                    finding one's way around

e. **Shopping**

                    i.e. active encouragement, instruction and teaching re: shopping

                    assist with or supervise shopping

                    arranging/enabling others to assist with shopping

f. Community facilities

          i.e. active encouragement, instruction and teaching re: community facilities

          assist with or supervise the use of community facilities

          arranging/enabling others to assist the client to use community facilities

'community facilities' relate to mainstream non-leisure, non-occupation facilities e.g. library, bank, launderette.

ENGAGEMENT: where the overriding intention of the contact is to build and foster a positive client attitude to treatment. (This main category is unusual in that it focuses on intention rather than activities).

a. Befriending

Includes: enhancing communication and establishing a rapport

            conversation aimed at establishing a positive relationship

            visiting on the ward (where the overriding purpose is engagement)

b. Engaging in recreational activity

Includes: cafe, cinema where the overriding purpose is engagement

            social activity where the overriding purpose is engagement

c. General problem solving

          i.e. practical problem solving where the overriding purpose is engagement

CARERS AND SIGNIFICANT OTHERS: where the event is wholly or mainly focused on the carer but does not include family therapy.

a. Coping advice/education about illness

b. Support and problem solving to reduce stress on the carer or significant other to enhance the carers ability to care.

Includes: dealing with neighbour's complaints

c. Information gathering from significant others

          e.g. information gathering from friends, neighbours etc.

SPECIFIC MENTAL HEALTH INTERVENTION/ASSESSMENT:

a. Structured mental state assessment

> e.g. BPRS

b. Focused but unstructured mental state assessment

> i.e. the main emphasis of the visit is to perform a mental state examination

c. Specific psychological/cognitive therapy or social skills programme

> e.g. phobic desensitisation

d. Expressed emotion family therapy

e. Counselling/coping strategy focused on enabling the client to live with his/her illness

f. Mental Health Act activity

Includes: being present at Section assessments

accompanying client to a tribunal

facilitating Mental Health Act assessment

attending Section 117 meetings

CRIMINAL JUSTICE SYSTEM:

a. Contact with police, probation or solicitor

b. Responsible adult role

> i.e. under Police and Criminal Evidence Act- attendance at a police station or a
>
> formal police interview

c. Attend court

Includes: support whether client is the alleged offender or witness/victim

PHYSICAL HEALTH:

a. Focused assessment of physical health

b. Organising/accompanying to G.P./hospital etc.

Includes: dentist, opticians etc.

c. Specific programme

Includes: e.g. diabetic diet

CASE CONFERENCE

a. Case conference

An extra category which is likely to be used only very rarely.

In most cases where even a formal multi-disciplinary case conference is held it will be possible to

identify one or even two main foci. Where this is impossible and all the categories were discussed to

equal degree then this category may be used.