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**The Post-Discharge Medication Compliance of
Elderly Medical Patients: Incidence and
Influencing Factors**

by

Donna L. Mitchell

**A Thesis Submitted in Partial Fulfilment of the
Requirements for the Award of**

Bachelor of Health Science (Nursing) Honours

**at the School of Nursing, Western Australian
College of Advanced Education**

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Abstract

This study was designed to estimate the extent to which elderly patients complied with their medication regimens post-discharge from three general medical wards of an acute hospital in Perth. Relationships between medication compliance and age, education, cognitive function, medication supervision, number of drugs taken, number of doses per drug per day, regimen recall and drug knowledge were observed. The sample of the study was the general medical patients of three medical wards who were 60 years or older, fluent in the English language, returning to a home in the metropolitan area with no full-time nursing care needs and discharged during the 14-day data collection period. Participants were visited in hospital prior to discharge and at home seven days after being discharged. During the home visit each medication had its residual pills counted. This provided a measure of medication compliance. The Mini-Mental State Examination developed by Folstein, Folstein and McHugh (1975) was used to measure cognitive function. The mean compliance rate for each of the 26 medications observed was 86.4% (SD 19.39, range 21.4-100%). The 11 participants took an average (mean) of 89.1% (SD 9.63, range 67.8-100%) of all their medications. Medication compliance among recently discharge elderly patients was directly related to cognitive function ($r = .570$, $p < .05$), inversely related to the number of drugs taken ($r = -.599$, $p < .025$) and

significantly dependent on the patient's ability to recall the drug regimen ($\chi^2 = 4.49$, $p = < .05$) and drug knowledge ($\chi^2 = 4.21$, $p < .05$). The findings demonstrate that the medication compliance of recently discharged elderly patients is less than optimal, outline means of identifying potential non-compliers and provide objective evidence to support the implementation of education strategies. The study tested a research design that can be replicated.

Declaration

"I certify that this thesis does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any institution of higher education and that, to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text."

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Introduction

The majority of elderly patients discharged home from an acute medical ward at a large, urban, teaching hospital have a medication regimen to follow. The extent to which elderly patients comply with their medication regimens following discharge from general medical wards had not been studied at this hospital and no formal assessment method is used to ascertain whether these patients comply with or are capable of complying with their medication regimens after discharge. Elderly patients were focused upon because they have unique age-related characteristics that affect their medication-taking behaviours. They also take more medications than younger people and this increases the number who are potential non-compliers.

Nurses have the responsibility to assess their patients' ability to care for themselves at home after discharge. This responsibility extends to ensuring that medications are safely and effectively administered. McKenney and Harrison (1976, cited in Stewart & Caranasos, 1989, p. 1552) studied 216 hospital admissions and found 10.5% were due to medication non-compliance. If medication compliance is improved, there is a probability that the number of hospital readmissions will be reduced and elderly people will experience better quality of life. An understanding of post-discharge medication compliance is necessary if compliance-improving strategies are to be

implemented by nurses successfully.

It was the intent of the researcher to estimate the extent to which elderly patients discharged from three general medical wards complied with their discharge medication regimens and to identify some factors that influence compliance. The extent to which medication compliance was related to age, formal school education, cognitive function, medication supervision, total number of drugs taken, number of doses per drug per day, drug regimen recall and drug knowledge was determined. Compliance was assessed by pill counts performed during a home visit. General medical patients of three general medical wards who were 60 years or older, fluent in the English language, and returning to a home in the metropolitan area with no full-time nursing care needs were visited in hospital prior to discharge and at their homes seven days after discharge.

Literature Review

"Medication compliance has been defined in terms of agreement between prescription and behaviour in taking medicines" (Haynes, 1979, cited in Norell, 1984, p. 35). Norell (1984, p. 35) says that an assessment of medication compliance involves the identification of prescriptions, the measurement of patient behaviour in taking medicines and the comparison between prescription and behaviour. An

assessment of a patient's medication compliance leads to a 'more' or 'less' result rather than a 'compliant' or 'non-compliant' classification. Patients' compliance with their medication regimens has been extensively studied. However, there is no universally accepted definition of what it means to comply or not to comply. For example, does the omission of one tablet or ten constitute non-compliance? Researchers vary in the way they discriminate between compliers and non-compliers and furthermore there is no standard method for measuring compliance. Different methods used include a self-report of medication taking by the patient, a residual pill count and drug-tracers. These characteristics of compliance make it difficult to compare the results of different studies.

Sacket and Snow (1979, cited in Evans & Spelman, 1983, p. 68) in a review of 537 studies on medication compliance found that only 40 of the studies satisfied strict methodological requirements, including design, completeness of definition of compliance and the adequacy of measurements of compliance.

Smith and Andrews (1983), Parkin, Henney, Quirk and Crooks (1976) and Brooke and Mukherjee (1988) conducted similar studies to determine medication compliance. Smith and Andrews reported that 92% of their elderly participants achieved 95% compliance (by pill count) with their post-discharge medication regimens. Their sample was drawn from a hospital that admitted patients following

a general practitioner's referral. Smith and Andrews recognised that the high compliance rate obtained may have been due to the observation of a closely supervised group of elderly patients.

Parkin et al. (1976) found 34% of participants (mean age 66.2 years, SD 10.78) made one or more errors when recalling their medication regimens (non-compliance due to noncomprehension). Seventy-seven percent of the 66% of participants recalling their regimens correctly, achieved 85% or greater compliance with their regimens (by pill count). The overall compliance rate reported by Parkin et al. would have been much lower had those patients who did not recall their regimens correctly been included in the pill counts and compliance been defined as taking 95% or more tablets correctly. Parkin et al. report that 50.8% of the participants deviated (either non-comprehension or non-compliance) from the prescribed regimen.

Brooke and Mukherjee (1988) visited 197 elderly patients (mean age 80 years) and found that 25% of these patients correctly administered their drugs (self-report of drug taking behaviour). Of a total of 415 prescribed drugs taken by the sample, 74% were taken correctly (self-report), 10% (42) were taken incorrectly and 16% (68) were not taken at all.

These three studies report very different compliance rates — less than 76.6% compared to 92% and 25%. (The

samples were not from similar age groups and the method of measuring compliance differed.)

Davis (1966, cited in Stewart & Caranasos, 1989, p. 1552) gives an overall estimate of non-compliance among people taking medications to be 30 to 35%, with figures for the studies reviewed ranging from 15 to 93%.

MacDonald, MacDonald and Phoenix (1977, pp. 619-20) report that the compliance (by pill count) of elderly patients discharged from a hospital declined from 33% of patients complying after one week to 23% after 12 weeks. Norell (1984, p. 36) emphasizes that measurements of behaviour one or two weeks after a visit to a health care agency are not representative of long term behaviour.

Each of the variables mentioned in the introduction — age, formal school education, cognitive function, medication supervision, number of drug types taken, number of doses per drug per day, regimen recall and drug knowledge — will be discussed in turn, with respect to evidence of the relationships to medication compliance.

There is no conclusive evidence that suggests that age is associated with a person's medication compliance. Sands and Holman (1985) and Spagnoli et al. (1989) found that age significantly influenced medication compliance in an inverse relationship. Perkin et al. (1976, p. 687), Wong and Norman (1987), and Edwards and Pathy (1984, p.

298) did not find age to be a significant factor in determining medication compliance.

Parkin et al. (1976, p. 687) determined no relationship between education and medication compliance. Sands and Holman (1985, p. 27) state that participants with more education had compliance scores significantly higher than those of participants who had less education. Davis (1968, cited in Evans & Spelman, 1983, p. 69) in a review on studies of medication compliance says that 'noncompliers' are likely to have attained a lower education level than 'compliers'.

"The risk of misguided incorrect drug doses is substantially increased in patients who have poor memories and are not alert" (Shaw & Opit, 1976, p. 506). Moore (1983, cited in Wong & Norman, 1987, p. 21) attributed poor compliance to the cognitive impairments associated with ageing. Brooke and Mukherjee (1988, p. 18), in a study of 197 elderly participants, found that those patients scoring well on a mental function test were not significantly more compliant than those with poor mental function. Wong and Norman (1987) used the Mini-Mental State Examination (MMSE) (Folstein, Folstein & McHugh, 1975) (Appendix A) to assess cognitive function in elderly subjects. They reported no significant relationship between medication compliance and cognitive function determined by the MMSE. They note, however, that this independence may be the result of their small sample size

($n = 17$) and the presence of care-givers for those with cognitive impairments.

Some elderly people have their medication administration supervised by another person. Law and Chalmers (1976) and Spagnoli et al. (1989) found that 15% and 14% of their elderly subjects respectively had their medications supervised by another household member or relative. The relationship between supervision and medication compliance has not been reported in these two studies.

Studies show that elderly patients take an average of 2.08 (MacDonald et al., 1977, p. 620), 2.73 (Gibson & O'Hare, 1968, cited in MacDonald et al., 1977, p. 620) and 3.3 (Brooke & Mukherjee, 1988, p. 18) different medication types each day. There is considerable evidence (Brook & Mukherjee, 1988, Spagnoli et al., 1989, Parkin et al., 1976 and Davis, 1966 cited in Evans & Spelman, 1983, p. 71) to suggest that patients taking many types of drugs will be less compliant than patients taking fewer types of medications. Parkin et al. (1976, p. 687) found that the non-compliance (by pill counts) of 20 participants (all of whom understood their drug regimens) was significantly associated with the number of drugs prescribed ($p < .025$). Edwards and Pathy (1984, p. 298) reported no relationship between the number of drug types being taken and compliance. However, no participant in their sample took more than 5 different drug types and only 11 took more

than 3.

Parkin et al. (1976) and Hazzulo (1972, cited in Evans & Spelman, 1983, p. 71) reported a significant inverse relationship between the number of doses per drug per day and the compliance with that drug.

Law and Chalmers (1976, p. 566) found that 75% of their elderly participants (75 years of age or more) correctly recalled their drug regimens. Parkin et al. (1976, p. 686) report that 64.6% of 130 recently discharged patients (mean age 66.2 years, SD 10.78) recalled their drug regimens correctly. Regimen recall was associated with number of drugs taken ($p < .001$) in their sample. Edwards and Pathy (1984, p. 298) reported that patients who had a perfect recall of their medication regimens invariably demonstrated a compliance rate of 80% or more ($p < 0.002$).

Smith and Andrews (1983, p. 338) visited 35 elderly patients (mean age 78 years), 3 to 12 days after discharge and determined that 29% (9) of the sample understood the purposes of the drugs they took. Brooke and Mukherjee (1988, p. 19) found that of 695 drugs taken by their elderly subjects, 190 (27%) were not understood (use and purpose). Of the 505 drugs that were understood, 52.3% were taken correctly (self-report by subject) with one drug not taken at all, whereas, of those not understood, only 23% were taken as prescribed and 64 not taken at all. They concluded that the understanding of a drug's use and

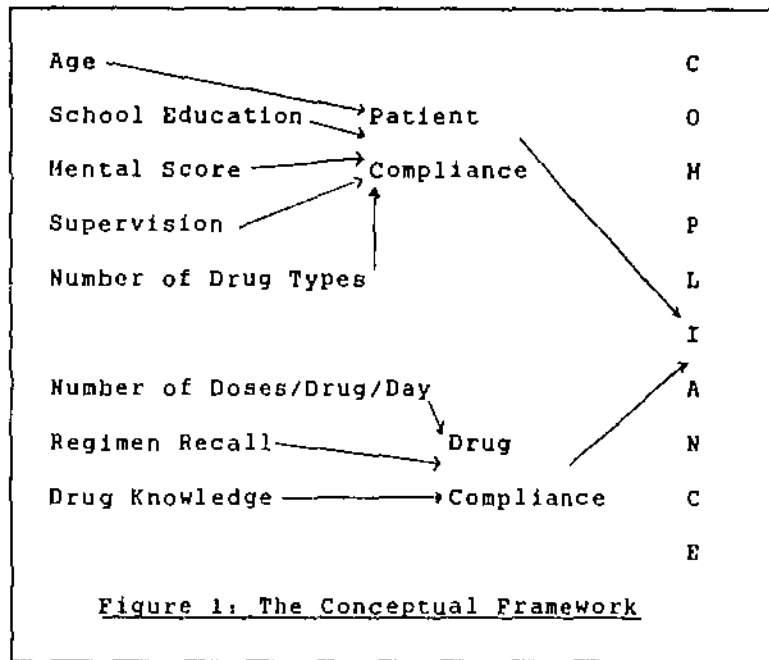
purpose was significantly associated with it's correct administration ($p < .001$).

There are few conclusive and supported research findings regarding the relationships between medication compliance and the study variables age, formal school education, cognitive function, and medication supervision. It would appear from a review of the literature that the total number of drugs taken, number of doses per drug per day, drug regimen recall and drug knowledge are significantly associated with medication compliance.

Frame of Reference

Conceptual Framework

The conceptual framework demonstrates the relationships that were investigated in the present study (see Figure 1). The conceptual framework was devised from information put forward in the literature review. The variables, age, formal school education, cognitive function, supervision and number of different drugs taken were characteristics of each participant. These variables were seen to influence the overall medication compliance of a participant. The variables, number of doses per drug per day, drug regimen recall and drug knowledge were characteristics of each individual drug that the patient took. These variables were seen to influence only the medication compliance of the medication that they were associated with.



The researcher observed the relationships between:

1. Age and patient compliance.
2. Formal school education and patient compliance.
3. Cognitive function and patient compliance.
4. Supervision and patient compliance.
5. Number of different drugs taken by the patient and patient compliance.
6. Number of times a drug is taken each day and drug compliance.
7. Drug regimen recall and drug compliance.
8. Drug knowledge and drug compliance.

The research answered the question: What is the

medication compliance rate among elderly patients discharged home from a general medical setting?

Hypotheses

The study hypotheses were:

1. Age will be inversely related to patient compliance.
2. Patients who have had more formal school education will demonstrate greater patient compliance than those who have had less formal school education.
3. Patients who score higher in the Mini-Mental State Examination will demonstrate greater patient compliance than those who score low.
4. Patients who have supervision with medication administration will be more compliant (patient compliance) than those who administer their medication independently.
5. Number of different drug types prescribed will be inversely related to patient compliance.
6. The number of times that a drug is taken each day will be inversely related to drug compliance.
7. If the regimen of a drug can be recalled, then that drug will be complied with more (drug compliance) than if the drug regimen can not be recalled.
8. If knowledge of the drug's properties can be demonstrated then the drug will be complied with more (drug compliance) than if the patient has no knowledge of the drug's properties.

An alpha of .05 or less was accepted as being significant.

Definitions and Measurement

The concept of compliance was divided into two subconcepts - drug compliance and patient compliance. Drug compliance was the compliance rate for each individual drug type. Patient compliance was the compliance that the patient demonstrated when taking all of the prescribed medication.

Drug compliance rate (DCR) was calculated for each drug type and defined as the number of pills taken of that drug divided by the number of pills prescribed for the time period multiplied by 100 (to give a percentage) (Equation 1). For example, if 4 tablets of frusemide had been taken and 7 had been prescribed, $DCR = (4/7) \times 100 = 57.1\%$.

$$DCR = \frac{\text{number of pills taken}}{\text{number of pills prescribed}} \times 100 \quad (1)$$

Patient compliance rate (PCR) was equal to the mean drug compliance rate for each patient. For example, if 4 tablets of frusemide had been taken with 7 being prescribed and 10 tablets of Slow-K taken with 14 prescribed, $PCR = [(4/7) \times 100 + (10/14) \times 100]/2 = 64.3\%$.

The two definitions of compliance allowed the influence of variables that varied within the individual participant (drug knowledge, regimen recall, and number of doses per drug per day) to be accurately observed. For example, a participant may take frusemide and Slow-K. The

participant takes 95% of the prescribed frusemide and 5% of the Slow-K (DCR equal to 95% and 5% respectively). The PCR for this participant is 50%. The PCR in this case does not accurately represent the two drugs individually which is required if the relationships between drug knowledge, regimen recall and number of doses per drug per day and medication compliance are to be ascertained. If these relationships are to be examined, then the compliance rate must be a property of the individual drug type and independent of other drugs.

Medication compliance was measured by pill counts of medication. A pill count is described by Norell (1984, p. 38) as a "comparison between the medicine left in the pill bottle and that which should be left if the medicine had been taken as prescribed" and is probably the most commonly used measure of medication compliance. Stretcher, Becker, Clark and Prasada-Rao (1989, p. 162) in a review of the validity of measures of medication compliance reported that it is not certain whether self-reports or pill counts are more accurate. Park and Lipman (1964 cited in Evans & Spelman, 1983, p. 67) found that 15% of participants reported taking medications incorrectly. However, 51% were found to be noncompliant following pill counts. Norell (1984, p. 37) says that 25% to 50% of noncompliant patients can be identified by interview (self-report of medication taking behaviour by patient). In a number of studies cited by Stretcher et al. (1989, p. 162) evidence is put forward regarding the

increased compliance rate demonstrated when self-reports were the method of measurement compared to measurements obtained from pill counts and blood and urine assays. Blood and urine assays were not feasible methods of measuring the medication compliance in this study.

A pill count is an objective measurement that does not rely on the patient's willingness to tell the truth and memory and can be used when multiple drugs are being assessed. A disadvantage of pill counts is the possible overestimation of compliance if pills removed from the container are not taken by the patient. This error can be reduced if the examination is careful and unknown to the patient (Norell, 1984, p. 38). The patients were not told that medications would be counted during the home visit. Another disadvantage of pill counts is due to the conduction of the counts at intervals. If a patient misses a pill one day and takes twice the prescribed dose another, the compliance rate determined by a pill count after these errors have occurred will result in the patient being deemed compliant when in fact the patient is not. Wandless and Davie (1977, p. 360) demonstrated this concept by performing pill counts every 48 hours for 14 days. They compared the number of medication errors determined by the second daily counts to the overall number determined by the final 14 day count. They found that the total count errors was an average of 81.3% of the sum of the second daily count errors. This indicates that 19.7% of the 'real' errors were missed by the final 14 day

count. Measurements may also be inaccurate if the patient takes medication from a source not being observed by the researcher. Participants were asked if they had taken medication from a prescription other than the one dispensed by the hospital. Medication types that had been taken from multiple supplies were excluded from the analyses.

A rate of 100% was deemed necessary for a patient to be classified as compliant. The duration of time over which compliance was being observed was minimal and, thus, a high rate was required. Pill counts were performed for medications in the form of tablets, capsules and transdermal patches.

Medications are defined as tablets, capsules or transdermal patches prescribed by a doctor at the hospital for a patient to administer regularly at home. Tablets or capsules prescribed to be taken 'as necessary' (p.r.n.) were excluded from this definition and not included in the pill counts because the prescribed amount of the drug for a particular time period was determined by the patient and not predetermined.

Age was calculated from the patient's date of birth as it appeared on the hospital addressograph label and was restricted to years. Elderly was defined as being 60 years of age or more.

A statement by the patient as to how many years of school education had been completed was taken as the value for the variable formal school education.

Cognitive function was measured using the Mini-Mental State Examination (MMSE) (Folstein, et al., 1975) (Appendix A). The purpose of the MMSE is to grade the cognitive state of a person. Concepts that are incorporated in the MMSE are orientation, registration, attentiveness, calculation and language ability, and recall. The MMSE was developed through the administration to psychiatric patients and patrons of a senior citizens centre. The MMSE consists of 11 questions. The maximum score is 30 which represents adequate cognitive function. Anthony, Le Resche, Niaz, Von Korff, and Folstein (1982, p. 400) say that in most publications of the MMSE, it has been recommended that a score of 0 to 23 represents a disturbance in cognitive function. "A score of 12 or less usually signifies dementia to the point of inability to care for oneself" (Wong & Norman, 1987, p. 24)

The MMSE has demonstrated test-retest reliability for both time and examiner variations ($r = .887$ and $r = .827$ respectively) (Folstein et al., 1975, p. 194). Anthony, et al. (1982, pp. 400-1) determined similar coefficients. Foreman (1987, p. 218) found internal consistency to be .957. The MMSE has construct validity when compared to other measures of cognitive performance (Folstein, et al., 1975, p. 194, Folstein & McHugh, 1979 cited in Anthony et

al., 1982, p. 398 and Foreman, 1987, p. 218).

The HHSE took approximately 15 minutes to administer. As no copyright restrictions were published with the instrument, a letter of intent to use the HHSE was sent to Professor Folstein. During the course of data collection it was discovered that the HHSE was used by medical staff of the hospital as a measure of cognitive performance.

The participant was asked if he/she had assistance with medication administration. Responses were grouped into three categories - 'no assistance', 'reminders only' and 'assistance'. These three categories provided a measure for the variable, supervision.

The number of different drugs prescribed was determined from the number of drugs prescribed on the discharge prescription and from the number of drugs that the patient took from his or her own supply at home that were not prescribed by a doctor at the hospital. For example, some patients continued to take laxatives and oral hypoglycaemics at home even though these had not been prescribed by their doctor at the hospital. Beclomethasone inhalers and other inhalers taken regularly, transdermal glycerol trinitrate patches and tablets or capsules prescribed to be taken 'as necessary' were included in the calculation of number of drugs taken because the taking of these drugs exerted an influence on the patient's ability to remember to take medications

being counted.

The frequency of administration of a drug as prescribed by the doctor on the discharge medication prescription provided the basis for measuring the variable, number of times the drug was taken per day. For example, 'tds' represented three times per day and 'mane' once per day, specifically in the morning.

A patient was said to have regimen recall if he/she could remember, without prompts, how many times a day the drug was taken and how many tablets were taken at each administration time. The patient was either given the drug name or the bottle/package was held up for the patient to see in order to elicit the response for a particular drug type. For example, "Could you please tell me how often you take your Lasix and how many tablets you take each time you take it?" The patient had to recall both properties to qualify for the regimen recall classification.

Drug knowledge was deemed to be present if the patient could recall what the drug's purpose or action was. The participant did not have to demonstrate knowledge of both action and purpose to be classified as having drug knowledge. For example, if the participant could recall that Lasix was the 'water tablet' but did not know that it inhibited salt reabsorption by the kidney tissues, the patient was classified as having drug knowledge.

Method

Design

A descriptive and correlational design was used to observe the phenomenon of medication compliance and its relationship to the study's independent variables. The descriptive design permitted the observation of medication compliance and enabled an estimation of its presence among the study sample. The correlational design permitted investigation of the relationships between medication compliance and the independent variables.

Population and Sample

The population for this study was drawn from patients from the hospital aged 60 years or more who were (a) under the care of a general medical physician, (b) discharged with at least one medication prescribed and dispensed to administer at home, (c) fluent in the English language, (d) capable of giving a valid consent, and (e) returning to a home in the metropolitan area where there is no full-time nursing care. All patients who met the population criteria could not be identified at the commencement of data collection because patients were continually transferred between and admitted to the hospital's wards and it was uncertain which patients would be discharged with medications to take home.

It was decided the most effective way of obtaining a representative sample of the changing population was to

cluster sample the five medical wards of the hospital. One ward planned to conduct a self-medication trial during the time of data collection and was excluded from the population to prevent a nonrepresentative sample being drawn. Of the remaining four wards, three were randomly selected to participate in the study. Cluster-sampling was a time-efficient and cost-effective method of sampling this unknown population.

The sample was drawn from the population over a period of 14 days. Patients who met the population criteria and were discharged during a 14-day period were included in the sample. A sample of 11 was obtained.

Setting

The setting for this study was three general medical wards at a large, urban, teaching hospital. The wards that were sampled varied in size from 21 to 34 beds. Two of the wards had beds allocated to patients under the care of speciality physicians. Patient allocation nursing is performed on all three wards. Patients being discharged from the hospital are given a 10 day supply of any drugs that they may require and do not possess at the time of discharge.

An information letter (Appendix B) describing the research was distributed to the nursing and medical staff of the three selected wards. Personal contact was made with a Clinical Nurse on each of the wards. Permission to

interview and visit the participants was sought from the participants' consulting physicians through a letter sent to the Professor of Medicine at the hospital. A copy of the research proposal was subsequently sent to the Professor.

Ethical Considerations

An informed consent was sought from each potential participant prior to discharge. Potential participants were approached and asked to complete the MMSE (Appendix A). It was assumed that patients who score below 13 were unable to give a valid consent. Those patients who scored 13 or more had the research explained to them and were asked to read the patient information leaflet/consent form (Appendix C). Patients' questions regarding the research were answered without mentioning the observation of medication. Patients were told, if they asked, that the purpose of the visit was to see "how they were doing at home". Disclosure of the specific reason for the home visit, that is, medication observation, may have improved compliance and inaccurate measurements of the dependent variable would have resulted. After reading the information leaflet/consent form, potential participants were asked to sign two consent forms permitting the researcher to include them in the study. One copy was given to the participant with a copy of the information leaflet included as a reference and the other kept by the researcher as proof of consent. Potential participants were assured both on the consent form and by the

researcher that non-participation brought no penalties.

Each potential participant was given an identification number. The name, identification number and address of each potential participant was recorded on the master identification sheet (Appendix D). Participants also had their home phone numbers and the date and time of home visit recorded on the master identification sheet. The master identification sheet was stored separately from all coded information. Patients were identified only by an identification number. Confidentiality of information was assured by this method.

Prior to data collection, the study was approved by the School of Nursing Ethics Committee at the Western Australian College of Advanced Education, and both the Nursing Research Advisory Group and the Ethics Committee of the participating hospital.

Data Collection Procedure

Over a period of 16 days (2 days of population identification and 14 days of participant discharge) patients of the three selected wards who satisfied the population criteria (or were likely to) were identified by the researcher from the ward census and from discussions with the nursing and medical staff. As these patients recuperated from their illnesses their suitability for inclusion in the study was assessed with the assistance of the ward staff. Patients of the three wards who (a) were

aged 60 years or more, (b) were under the care of a general physician, (c) were taking at least one medication in hospital and likely to have at least one medication prescribed and dispensed to administer at home following discharge, (d) were fluent in the English language, and (e) were likely to return to a home in the metropolitan area with no fulltime nursing care were asked by the researcher to complete the MMSE (Appendix A).

Patients were told that some research was being done in the hospital and that the MMSE was part of the research. Patients scoring less than 13 were thanked for completing the MMSE and their responses stored using their identification numbers. Patients scoring 13 or more had the research further explained to them and were given the patient information leaflet/consent form (Appendix C) to read and sign if they wished. If the patient agreed to participate in the study, the address that they would be returning to after discharge was recorded on the master identification sheet (Appendix D). A contact phone number was also recorded for use should the participant be discharged prior to a home visit being arranged. One participant was discharged before a home visit could be arranged and a time was successfully agreed upon over the telephone.

Each day, patients being discharged were visited in the ward by the researcher. A home visit was arranged with the participant for seven days post-discharge.

Information about the participant's drugs was obtained from the medication chart and hospital notes. Information collected included (a) all drugs prescribed by the doctor on the discharge letter, (b) all drugs prescribed on the discharge medication prescription and dispensed by the pharmacy, (c) the number of tablets, capsules and patches dispensed by the pharmacy for each medication, (d) the prescribed dose and frequency for each medication, and (e) the number of times the medication had been given by nursing staff on the day of discharge.

The patient's age was obtained from the date of birth on the hospital addressograph label.

Prior to the home visit, a reminder letter (Appendix E) was sent to the participant. The aim of sending this was to reduce participant withdrawal by reassuring the participant of the friendly intent of the visit and providing a written reminder of the time and date of the home visit. One participant asked that she be telephoned on the morning of the home visit to remind her of the visit and to ensure that no other plans had been made.

During the home visit, each participant was asked how he/she was coping following discharge from hospital. This discussion invariably led to a discussion of the medications that the participant was taking at home. Participants were asked what drugs they were taking, how often they took each drug and how many tablets, capsules

or patches they used each time they administered or applied the medication. Once an assessment of the participant's regimen recall had been made, the researcher asked to see the medications. All 11 participants freely showed the researcher the medications that were being taken.

The participant's knowledge of each medication's properties was sought through prompts such as "What is this tablet for?" and "Do you know how Lasix works?" Answers were provided if the patient did not know.

Agreement between the instructions on the medication label and those copied from the discharge medication prescription was established.

The remaining tablets, capsules and patches of each medication were counted and the number recorded. Permission to count the residual medication was not sought from the participants. Participants were agreeable to the researcher counting the medications. To ensure that no tablets had been transferred between containers and that no tablets had been added to those provided by the hospital, any variation in a medication's appearance and the presence of multiple prescriptions of a drug were noted. Such medications were excluded from the analyses. One participant had a large supply of drugs which she had transferred between bottles making pill counts of the majority of her medications impossible. Medication

supplies that she had rearranged were excluded from the study.

Each participant was asked (a) how many years they had attended school, (b) whether they had any assistance with their medication administration, (c) if they had been taking their medications as prescribed, and (d) whether they had been taking drugs from sources other than those supplied by the hospital.

The number of tablets, capsules and patches taken/applied was calculated for each medication by subtracting the number remaining from the number dispensed. The number of pills prescribed was calculated using (a) the number of times the medication had been given by nursing staff on the day of discharge, (b) the administration frequency prescribed, (c) the number of days since discharge, and (d) the time of the day that the pill count was performed.

All data collected by the researcher were recorded on the data collection tool (Appendix F).

Limitations

The main limitations identified were:

1. The period of time between discharge and the observation of compliance was short (seven days). It was assumed that compliance was greatest during the immediate post-discharge period because (a) patients have a supply

of drugs given to them, (b) patients have the memory of their illness acting to reinforce medication-taking behaviour, (c) knowledge of the regimen and the drug is fresh in the patient's memory.

2. Medication may have been taken from past prescriptions rather than the hospital dispensed supply. Patients were asked during the home visit if they had taken drugs from a supply other than the one dispensed by the hospital.

3. The single setting restricted the generalizability of the study's findings.

4. The exclusion of non-English speaking patients and patients who were unable to give a valid consent restricted the generalizability of the study's findings.

5. Difficulty in ensuring that all patients who satisfied the population criteria were invited to participate in the study due to lack of time and the inability to identify patients who returned to a hostel where there was no qualified personnel to supervise medications.

6. The small sample size obtained limited the statistical conclusions and restricted the generalizability of the findings.

Results

During the study period, a total of 123 patients were discharged from the three wards. Twenty-six of these patients were considered for inclusion in the study

population. Two of these patients, although returning home, failed to score above 12 on the MMSE and were excluded because a valid and informed consent could not be obtained. Two of the remaining potential participants refused to answer any questions of the MMSE, one because she could not be bothered and the other overheard another patient completing the MMSE and subsequently refused to answer any questions because she "was not stupid". Four patients successfully completed the MMSE and did not wish to participate in the study. The main reason for the non-consent was the wish to forget the hospital stay and not be bothered at home. One patient withdrew after giving a valid consent. The reason for his voluntary withdrawal was not determined. Two patients were discharged from the hospital before they could be invited to participate. Fifteen home visits were arranged with 15 participants during the study period. One participant moved to a country area to live with a family member within seven days of being discharged, and another was readmitted to the hospital within seven days of being discharged. One participant sought hospice care and was subsequently readmitted within seven days of discharge. During a home visit it was discovered that the participant lived in a hostel in which he had his medications dispensed by a 'supervisor.' The participant's details were excluded from data analyses.

A total of 11 participants were successfully interviewed at home seven days after discharge.

Altogether, six were men and five women. Twenty-six medications had their residual pills counted (mean of 2.4 medications counted per patient, SD 1.37, range 1-4).

Values for number of pills taken and number of pills prescribed were used to calculate the drug compliance rate (DCR) according to Equation 1. Drug compliance rate was calculated for 26 medications. The mean DCR was 86.4% (SD 19.39, range 21.4-100) (see Figure 2). Twelve medications (46.2%) demonstrated a DCR of 100% and were described as having been complied with. Fourteen (53.9%) medications were taken with a DCR of 95% or more and 19 (73.1%) at a rate of 85% or greater (see Figure 3).

Patient compliance rate was to be calculated for each participant using Equation 2 (Method 1).

$$PCR = \frac{\text{total number of pills taken}}{\text{total number of pills prescribed}} \times 100 \quad (2)$$

During data analyses it was decided that the patient compliance rate (PCR) would be more accurately represented by determining the mean DCR for the participant (Equation 3), where N equals number of pill counts performed.

$$PCR = \text{mean DCR} = \left(\frac{\text{number drug A taken}}{\text{number drug A prescribed}} \times 100 + \frac{\text{number drug B taken}}{\text{number drug B prescribed}} \times 100 + \dots \text{etc.} \right) / N \quad (3)$$

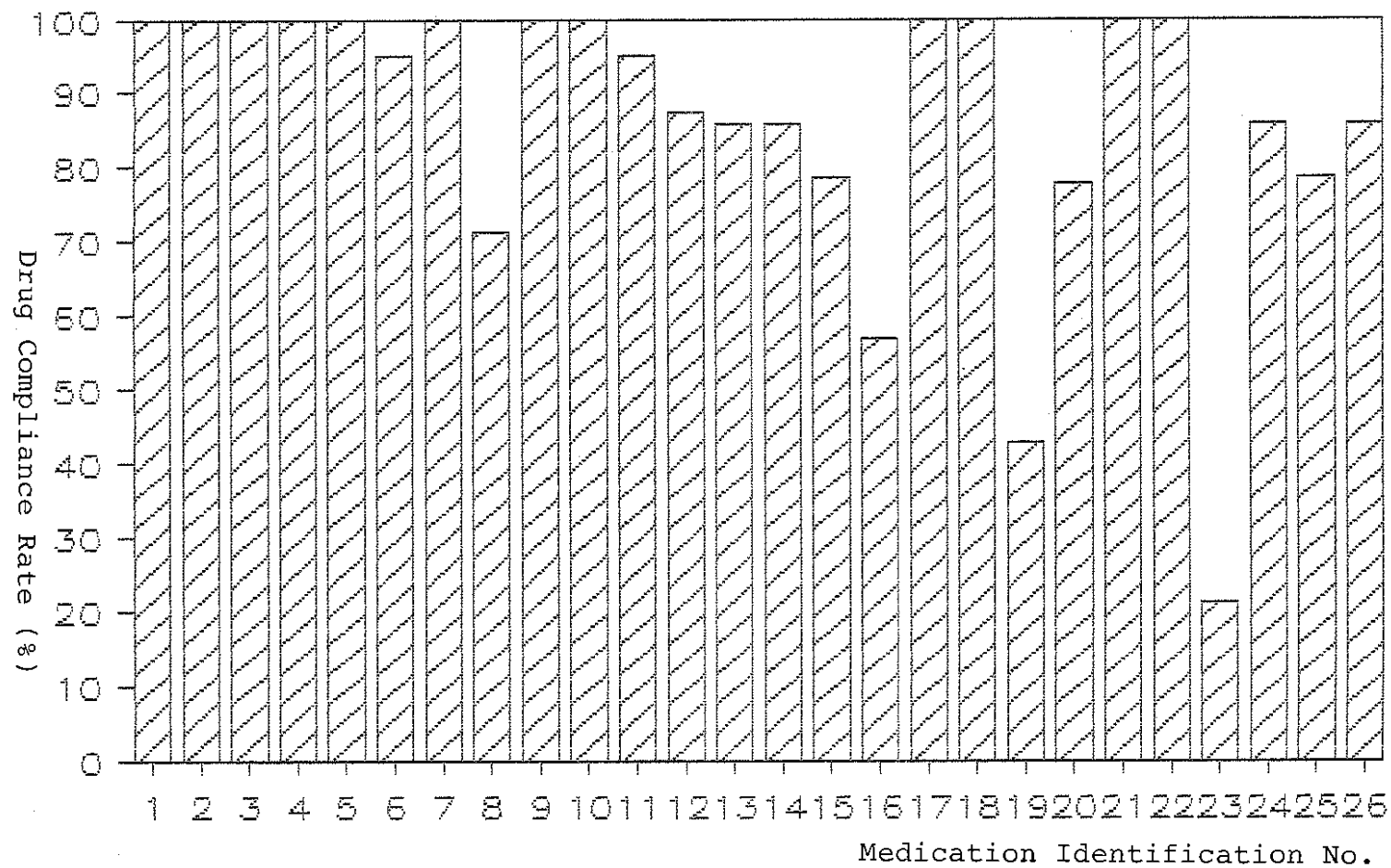


Figure 2: Drug Compliance Rate of Each Medication

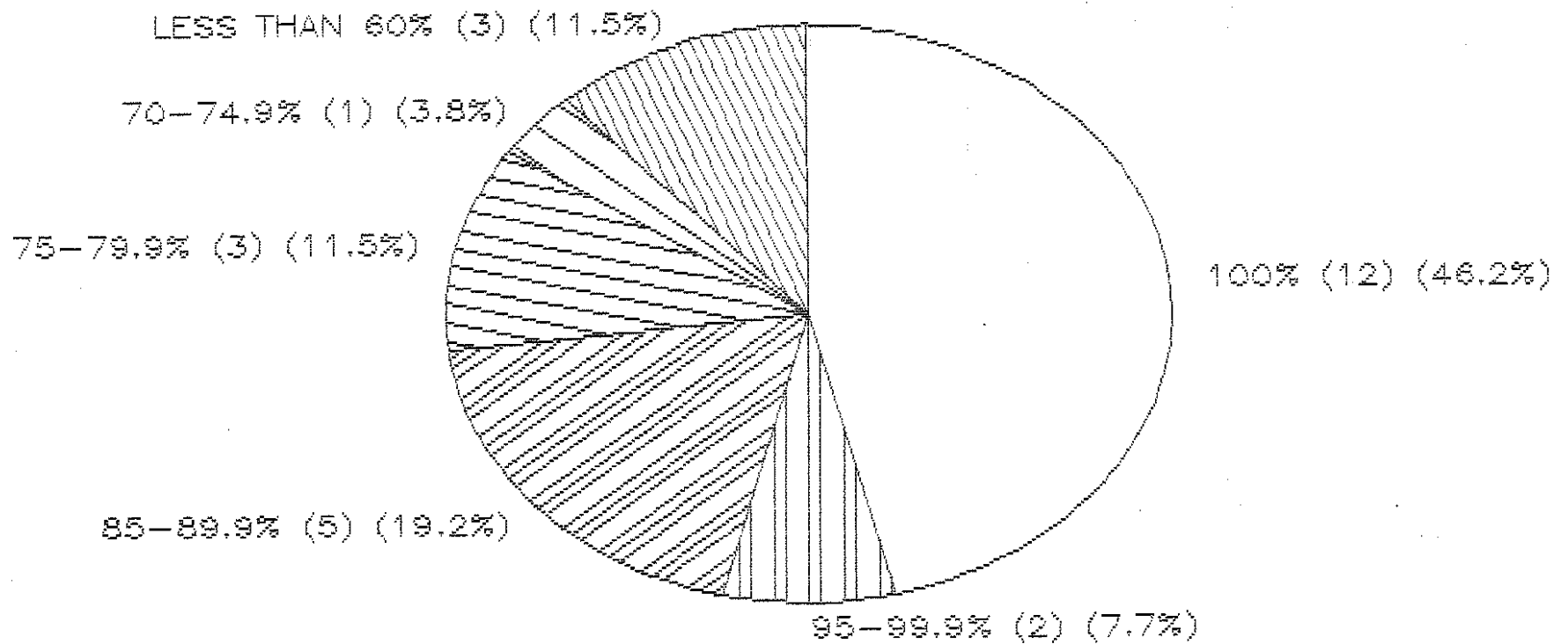


Figure 3: Number of Medications Achieving Different Drug Compliance Rates

For example, if a participant took 1 1/2 tablets of aspirin with 3 1/2 having been prescribed (DCR = 42.8%) and 20 tablets of isosorbide dinitrate with 21 prescribed (DCR = 95.2%), the PCR using Equation 2 would equal 87.8%. The PCR using Equation 3 equals 69.0%. The value obtained using Equation 2 underrepresents the medication that requires one or two pills to be taken each day. The poor compliance rate of an infrequently taken medication is negated if the participant also administers a medication that is taken frequently and in large quantities. Disregarding medication type, the omission of one tablet of a medication that is taken once a day has greater consequences than the omission of one tablet of a medication that is taken three times a day, that is, a whole day's dose versus a third of a day's dose. Equation 2 disregards the omission of the more 'important' drug. To ensure that each medication and its properties were equally represented in the PCR value, Equation 3 (the mean DCR) was used in the analyses of data.

Patient compliance rate was calculated for the 11 participants. The mean PCR was 89.1% (SD 9.63, range 67.8-100%). Three participants (27.3%) took all their medications as prescribed and achieved a PCR of 100%. A PCR of 95% or more was achieved by 4 participants (36.4%) and 5 (45.4%) achieved a PCR of 90% or more. Eight participants (72.7%) demonstrated a PCR of 85% or more and ten participants (90.9%) a rate of 80% or more (see Figure 4).

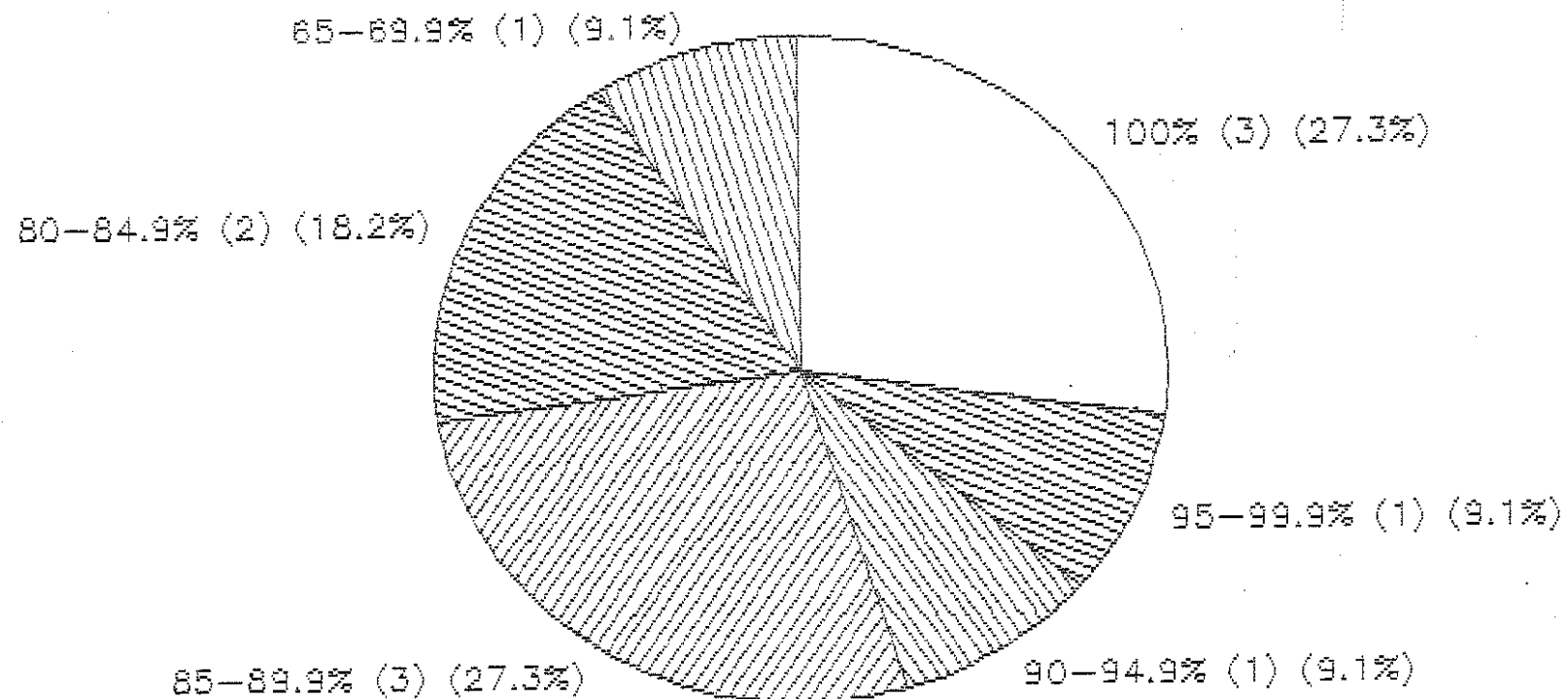


Figure 4: Number of Participants Achieving Different Patient Compliance Rates

Of the 26 medications, only 3 were overcomplied with, that is, too many tablets were removed from the container. Whether these pills were taken by the participants is unknown.

The mean age of the sample was 70.7 years (SD 5.61, range 60-79). The relationship between age and patient compliance was moderate (Burns & Grove, 1987, p. 510) ($r = .342$), and not significant ($p > .10$). The first hypothesis, age will be inversely related to patient compliance, was not supported. Unexpectedly, the results demonstrated a moderate, insignificant direct relationship between age and compliance rather than an inverse relationship as expected.

The participants reported a mean of 8.2 years of formal school education (SD 1.70, range 4-10). The correlation between formal school education and patient compliance was moderate (Burns & Grove, 1987, p. 510) ($r = .314$), and not significant ($p > .10$). The second hypothesis, patients who have had more formal school education will demonstrate greater patient compliance than those who have had less formal school education, was not supported.

Participants attained a mean score of 25.3 on the Mini-Mental State Examination (SD 3.39, range 20-30). Four participants scored 23 or below and thus demonstrated some degree of cognitive impairment. A one-tailed correlation between cognitive function (MMSE) and patient compliance

revealed a moderately strong ($r = .570$) (Munro, Visintainer & Page, 1986, p. 70) direct relationship that was significant at $p < .05$. χ^2 analysis could not be performed between cognitive function and patient compliance because the sample was too small. However, none of the four participants who demonstrated cognitive impairment ($MMSE < 24$) achieved a PCR value of 95% or more. Hypothesis 3, patients who score higher in the MMSE will demonstrate greater patient compliance than those who score low, was supported.

Only one participant reported having his medication administration supervised by another person. This patient demonstrated a PCR of 97.1%. No participant admitted having their medications administered by another person. The relationship between supervision and patient compliance could not be determined because only one participant had supervision. Hypothesis 4, patients who have supervision with medication administration will be more compliant (patient compliance) than those who administer their medications independently, was not tested adequately.

The eleven participants took a total of 48 drugs (mean of 4.4 drugs per participant, SD 2.53, range 1-10) (see Figure 5). A significant ($p < .025$) inverse relationship of moderate strength ($r = -.599$) (Munro et al., 1986, p. 70) was found between total number of drugs taken and patient compliance. The fifth hypothesis, number of

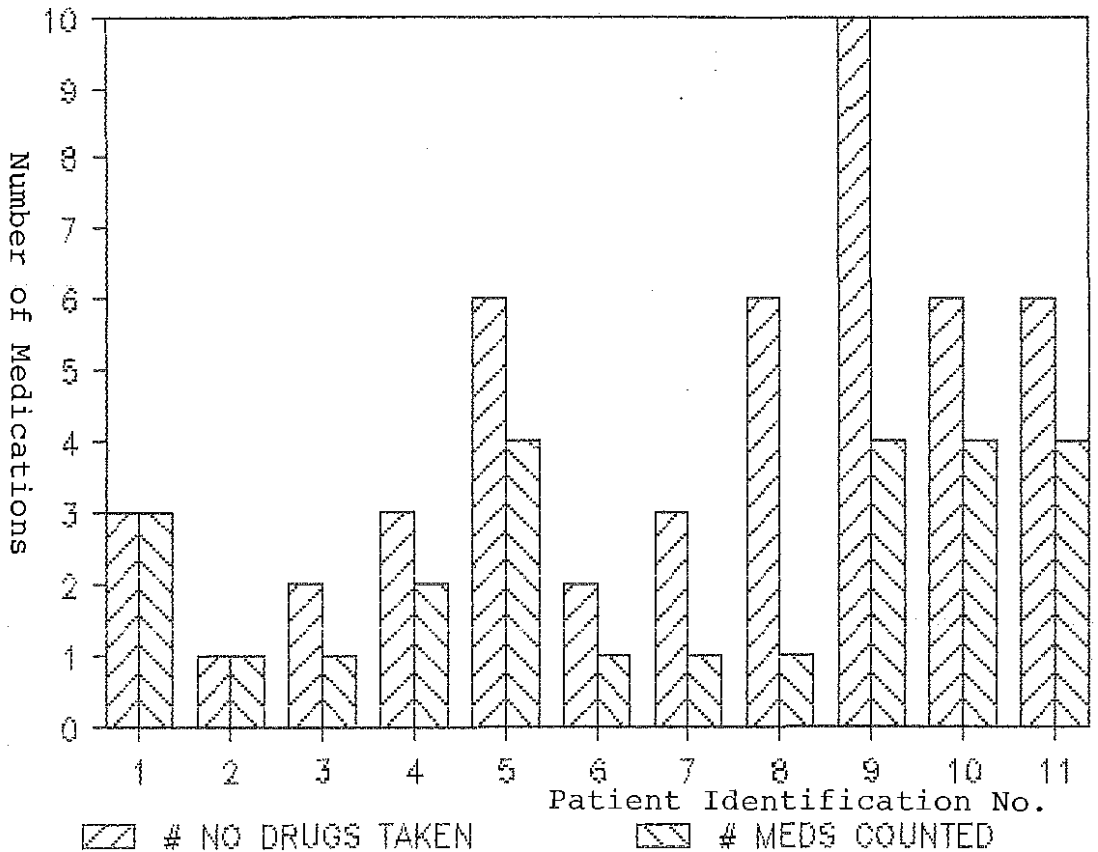


Figure 5: Number of Drugs Taken and Number of Medications Counted For Each Participant.

different drug types prescribed will be inversely related to patient compliance, was supported.

Medications were taken a mean of 1.46 times per day (SD 0.746, range 1-3) (see Figure 6). There was no relationship between the number of doses per drug per day and drug compliance ($r = -.006$). However, the majority of the drugs were taken only once per day. The sixth hypothesis, the number of times that a drug is taken each day will be inversely related to drug compliance, was not adequately tested because the range of the scores was small

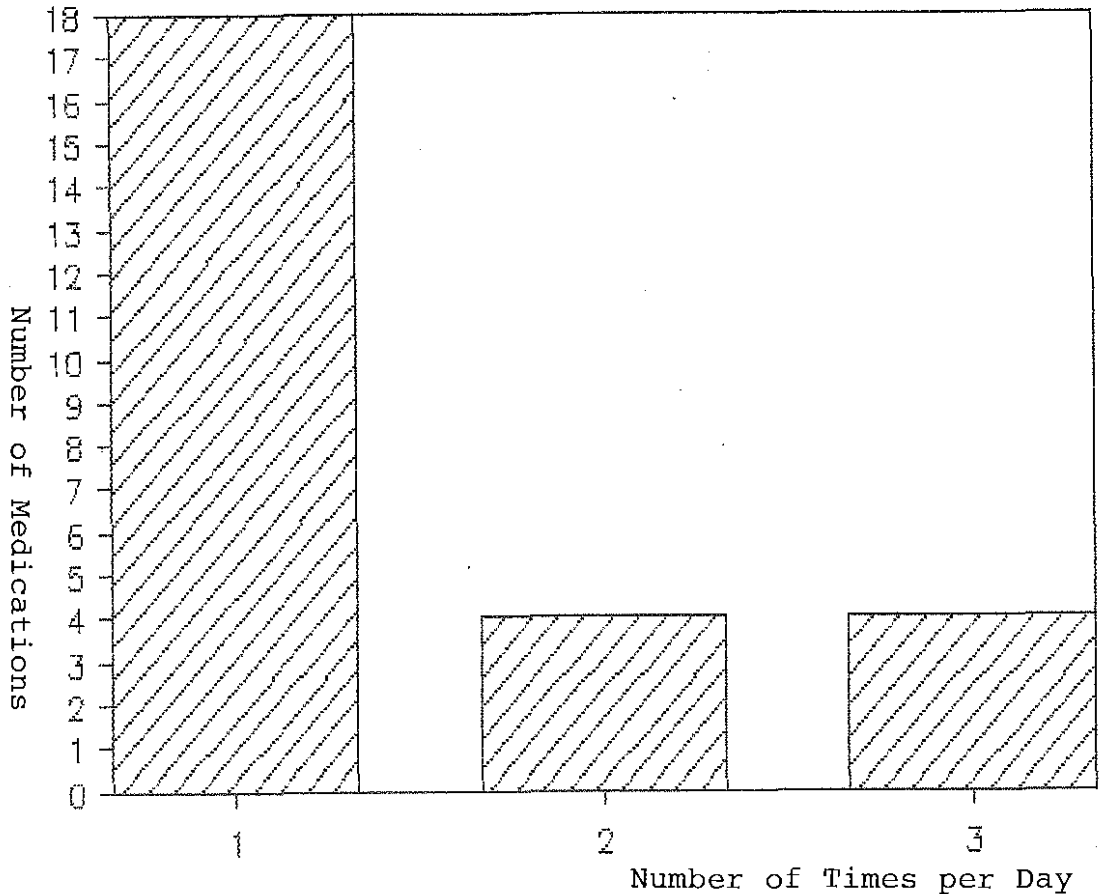


Figure 6: Distribution of Number of Doses per Drug per Day

and unevenly distributed.

The χ^2 analyses of regimen recall and drug compliance and drug knowledge and drug compliance were 2 x 2 contingency tables (see Appendices G & H). It is recommended (Dixon & Masser, 1983, p. 278, Lumsden, 1974, p. 135, and Woodward & Francis, 1988, pp. 242-3) that Yates correction for continuity be used for χ^2 analyses where the data to be analysed has one degree of freedom. Woodward and Francis (1988, p. 243) and Dixon and Massey (1983, p. 278) note the conservativeness of the χ^2 value with Yates correction.

Nine of the 11 participants (81.8%) correctly recalled all their drug regimens. Medication regimen was recalled correctly for 20 of the 26 medications. All 12 medications that demonstrated DCR values of 100% had their regimens recalled correctly (Appendix G). The χ^2 analysis with Yates correction for continuity resulted in the conclusion that drug compliance was significantly dependent on drug regimen recall with χ^2 (1, $N = 26$) = 4.49, $p < .05$. The seventh hypothesis, if the regimen of a drug can be recalled, then that drug will be complied with more (drug compliance) than if the drug regimen can not be recalled, was supported.

Knowledge of a medication's properties was demonstrated by the participants for 15 (57.7%) of the 26 medications. χ^2 analysis with Yates correction for continuity demonstrated that drug compliance was significantly associated with drug knowledge with χ^2 (1, $N = 26$) = 4.21, $p < .05$ (Appendix H). Hypothesis 8, if knowledge of the drug's properties can be demonstrated then the drug will be complied with more (drug compliance) than if the patient has no knowledge of the drug's properties, was supported.

All 11 participants reported taking their drugs correctly when asked by the researcher during the home visit.

During the 11 home visits it was found that 8 participants had either seen their General Practitioner or made an appointment to see him/her.

It was noted during a home visit that due to a lack of knowledge, a participant had failed to contact her General Practitioner and advise him that her hospital doctors had commenced her on the authority drug ranitidine. Subsequently, there was insufficient time between telling the General Practitioner of the need for the prescription and the completion of her hospital dispensed supply. It takes approximately one week to obtain a prescription authority so this lady was required to go without her drug for approximately two to three days. Perhaps if this patient had been informed of the drug's prescription requirements the problem could have been avoided.

Discussion

Major Findings

The mean drug compliance rate was found to be 86.4%, that is, an average of 86.4% of the prescribed dose of each of the 26 medications was taken correctly. Edwards and Pathy (1984, p. 297) reported that the 44 drugs that should have been taken regularly by their elderly sample achieved a mean compliance level of 76% (equivalent to the DCR).

Fourteen (53.9%) of the medications were taken more

than 95% correctly. No medications attained a DCR of 90% -94.9%, thus 53.9% of the medications were taken more than 90% correctly. Edwards and Pathy (1984, p. 297) reported that 43% (19) of drugs were taken greater than or equal to 90% correctly. Additionally, 88.5% of the medications prescribed for the sample achieved a rate of greater than or equal to 70% compared to 68% of the medications reported by Edwards and Pathy. The sample in the present study demonstrated better compliance with their medications than the sample studied by Edwards and Pathy.

The mean patient compliance rate was 89.1%. That is, each participant took an average of 89.1% of the tablets, capsules and patches prescribed. Over the seven day period, 36.4% of the participants achieved a PCR of 95% or more. Smith and Andrews (1983, p. 338) state that 92% (28) of their elderly sample achieved a compliance rate (equivalent to PCR) of 95% or more. Their sample however, was of a select group who were admitted to the hospital at the request of a general practitioner and only 2 participants took less than 95% of their prescribed medications. Parkin et al. (1976, p. 688) report that 76.6% of their sample achieved 85% or more compliance with their medication regimens (equivalent to PCR). Comparatively, this study found 72.8% achieved a similar compliance level.

This study failed to identify a significant relationship between age and compliance as did Parkin et

al. (1976, p. 687), Wong and Norman (1987), and Edwards and Pathy (1984, p. 298).

No evidence was found to suggest that education is associated with compliance. Parkin et al. (1976, p. 687) also failed to find a relationship.

Shaw and Opit (1976, p. 506) stated that incorrect drug dosage was increased in patients who have poor memories. The results support this statement in finding that cognitive function is moderately associated with compliance. Unlike Wong and Norman (1987), a significant ($p < .05$) direct relationship between MMSE score and compliance was determined.

The sample studied averaged more drug types per participant than the samples reported by MacDonald et al. (1977, p. 620), Gibson and O'Hare (1968, cited in MacDonald et al., 1977, p. 620) and Brooke and Mukherjee (1988, p. 18). An explanation for the increased prescription rate can not be given. It was found that participants who took a greater number of drugs were significantly ($p < .025$) less compliant than those taking fewer. Brooke and Mukherjee (1988), Spagnoli et al. (1989), Parkin et al. (1977) and Davis (1966, cited in Evans & Spelman, 1983, p. 71) also found that patients taking many types of drugs were less compliant than those taking fewer medication types.

A Type II Error is common when the sample size is small because relationships that exist in the population do not show up as clearly in the sample. Therefore, small Pearson co-efficients must not be ignored when they are calculated for a small number of co-ordinates. Such is the case with the correlations between age and patient compliance and education and patient compliance. The co-efficients were of moderate strength (.342 and .314) and not significant ($p > .10$) however, the sample was small. Similarly, the co-efficients calculated for cognitive function and patient compliance and number of drugs and patient compliance (.570 and -.599) may have deviated from zero more had the sample been of adequate size. Some results suggest relationships and the small sample size may have restricted the determination of relationships present in the population.

The sample demonstrated better regimen recall than the participants observed by Law and Chalmers (1976, p. 566) and Parkin et al. (1976, p. 686). The participants sampled by Law and Chalmers were 75 years of age or more and were patients of the one general practice. The different ages and health situations (general practice survey versus post-discharge survey) may explain the difference in the regimen recalling ability demonstrated by the samples. However, although the Parkin et al. sample had a wider age distribution and was a post-discharge sample, they still demonstrated lower regimen recall than the sample in the present study. Drug

compliance was found to be significantly dependent on regimen recall — if a person could recall a regimen, that regimen was more likely to be complied with. This finding supports the research of Edwards and Pathy (1984, p. 298).

Drug knowledge was demonstrated for 57.7% of the medications. The samples studied by Smith and Andrews (1983, p. 338) and Brooke and Mukherjee (1988, p. 19) demonstrated a great range, 29% and 73% of the participants respectively, of ability to recall drug knowledge. This study's findings fall within this range. The understanding of a drug's properties was significantly associated with its correct administration (Brooke & Mukherjee, 1988, p. 19).

Relationships between supervision and number of doses per drug per day and compliance were not adequately tested due to deficiencies in the data collected.

Those patients who declined to participate in the study had their details coded and their reasons for declining recorded. No specific characteristics were observed in the group who refused to participate.

One limitation of this research is its limited generalizability to the population from which the sample was drawn. This is because the sample size is too small.

Conclusions

The study determined the extent to which elderly, general medical patients who were fluent in the English language, returning to a home in the metropolitan area with no full-time nursing care needs and discharged from one of three general medical wards during a 14 day period, complied with their discharge medication regimens.

Medication compliance was reported by two measures - drug compliance rate and patient compliance rate. The mean DCR found in the present study was 86.4%. A patient who is prescribed one tablet of drug x daily demonstrates a DCR of 85.7% if one tablet over a seven day period is omitted (that is, 6/7 taken correctly). Therefore, we can say that on average, each of the 26 medications prescribed for the sample to administer, had approximately one days dose omitted during the seven day period. Depending on the drug type, this may or may not be clinically significant. A patient who is to take drug x three times per day, demonstrates a DCR of 95% if one dose over a seven day period is omitted (that is, 20/21 taken correctly). Approximately 46% of the medications taken by the participants fell below this level of compliance.

Participants took an average of 89.1% of their prescribed medications. Clinically this mean PCR converts to the omission of two-thirds of one day's medication over a seven day period. Over the seven day period, 27.3% of patients omitted equivalent to one days medication (6 days

correct, one day omitted completely). The clinical significance of this was not determined.

The findings offered support for the view that medication compliance is directly related to cognitive function, inversely related to number of drugs taken by the patient, and significantly dependent on the patient's ability to recall the drug regimen and knowledge of the drug. Medication compliance was found to be insignificantly related to age and education, however the sample size was small and this deficiency may have restricted the display of population characteristics in the sample.

The value for age was obtained from the hospital addressograph label. No attempt was made to verify date of birth with the patient. Subsequently, if the date of birth was incorrect on the addressograph label it was an invalid measure of the patient's age. No major differences between the age on the label and the age a patient appeared were observed.

Only one measurement of the dependent variable 'medication compliance' was used in this study. The only other method of measuring medication compliance available to the researcher was to ask each patient if each of the prescribed drugs had been taken as directed. The results using this method could have been falsely increased due to the participant wishing to be seen in a favourable light

in the eyes of the Registered Nurse who was making a home visit. As reported in the results, all 11 participants said that they were taking their drugs as directed. The 100% compliance found by self-report contrasts to the compliance determined by pill counts. Although validity could have been improved if two methods of measurement of the dependent variable had been used, the accuracy of the subjective self-report method is questionable.

Implications

The findings of this research suggest that the medication compliance of the sample was less than ideal. Variables that may be associated with medication compliance were identified. For example, a person taking 10 medications has a greater non-compliance potential than a person taking one. Also, a patient with poor cognitive function is less likely to comply than a person who has adequate cognition. The study provides a means of identifying potential non-compliers. The finding that regimen recall and drug knowledge were associated with improved compliance, offers a scientific rationale for the implementation of drug education strategies.

It was found that patients made mistakes with their discharge medication regimens. It is not clear what level of non-compliance with medications is clinically significant. The clinical significance of medication non-compliance is determined in part by the type of medication that is not complied with and the state of health of the

patient who does not comply. No attempt was made to categorise the drugs prescribed by their importance to the patient or to estimate the effect on patient health of medication non-compliance.

The study's findings were significant in that they added to the knowledge that the hospital possesses about the post-discharge medication compliance of its patients. No objective data on the post-discharge medication compliance of the hospital's patients were available before this study was conducted. Even if this study is not replicated with a larger sample, its findings (a) demonstrate that the medication compliance of discharged elderly patients is less than optimal, (b) outline means of identifying potential non-compliers and, (c) provide objective evidence to support the implementation of sessions to educate patients about their discharge medications. It demonstrates that the discharge planning/education that the sample of 11 received was inadequate and did not prevent them from making medication errors. The study is significant in that it tested a research design and determined that the use of this design to observe a larger sample would be cost-effective.

Recommendations For Further Research

The findings of this study clearly indicate that further research into the medication compliance of the hospital's discharged patients is required. Initially, this study should be replicated with a larger patient

sample being observed so that conclusions may be generalized to the population. All medical wards at the hospital should be included in the setting. The disruption to recruitment of participants caused by movement of patients between wards would be reduced if all medical wards were sampled. If a larger sample was observed the statistical conclusion validity of the results would be maintained.

The measurement of the variable age should be altered to include verification from the patient as to the correctness of the patient's age as written on the hospital addressograph label. Validity of the variable age will be improved following this alteration.

To facilitate identification of potential participants and data collection, a letter should be placed in the front of the potential participant's medical notes. The letter should explain that the patient has consented to being in the research, briefly explain the research and inform the patient's doctors that they will be asked periodically about the patient's impending discharge. This ensures that all doctors know of their patient's research involvement.

To further facilitate data collection and ensure that all potential participants are invited to participate, the population should be identified from an up-to-date record of ward in-patients. The researcher used the ward census

census to identify potential participants, but this is a maximum of 24 hours behind and subsequently two potential participants were discharged before they were identified as having satisfied the population criteria. Liason with Bed Allocation Personnel may overcome this limitation.

To ensure that all patients within the wards who satisfy the population criterion of 'returning to a home with no full-time nursing care' and to reduce the number of unnecessary and non-productive home-visits, a list of hostels that have 'supervisors' or part-time nurses available to administer medications should be compiled. Patients who were 'returning to a home with no full-time nursing care' were excluded because it was patient medication taking behaviour that was being observed, and not a 'qualified' person's ability to administer medications. It was difficult to identify which hostels did and did not provide staff to administer medications to residents. Subsequently it could not be certain that all the potential participants were invited to participate.

If the ward information letter is used again, it is recommended that the word subjects be changed to participants or patients. Some nurses objected to the word, likening the participant's involvement to a "guinea pig". To ensure that staff do not feel that their patients are being exploited the word should be substituted.

Further research should be carried out after a replication study. This research could include a study that includes non-English speaking patients in the sample and uses an interpreter to gain meaningful data. A larger replication study could also include patients who are unable to give a valid consent. It has been reported previously that a score of 12 or less on the MMSE is incompatible with independent living. Consent to visit the patient and carer at home could be sought from the patient's home-carer. The medication compliance of cognitively impaired patients could be investigated further by such a study. Education strategies could be implemented and using this research design the 'post-treatment' compliance rate compared to the 'pre-treatment' compliance rate.

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Appendix A

Mini-Mental State Examination

(Add points for each correct response.)

Orientation

	Score	Points
1. What is the Year?	—	1
Season?	—	1
Date?	—	1
Day?	—	1
Month?	—	1
2. Where are we? State?	—	1
County?	—	1
Town or city?	—	1
Hospital?	—	1
Floor?	—	1

Registration

3. Name three objects, taking one second to say each. Then ask the patient all three after you have said them.
Give one point for each correct answer.
Repeat the answers until patient learns all three.

Attention and calculation

4. Serial sevens. Give one point for each correct answer.
Stop after five answers.
Alternate: Spell WORLD backwards.

Recall

5. Ask for names of three objects learned in Q.3. Give one point for each correct answer.

Language

6. Point to a pencil and a watch. Have the patient name them as you point. — 2
7. Have the patient repeat 'No ifs, ands or buts.' — 1
8. Have the patient follow a three-stage command: 'Take a paper in your right hand. Fold the paper in half. Put the paper on the floor.' — 3
9. Have the patient read and obey the following: 'CLOSE YOUR EYES.' (Write it in large letters.) — 1
10. Have the patient write a sentence of his or her choice. (The sentence should contain a subject and an object, and should make sense. Ignore spelling errors when scoring.) — 1
11. Enlarge the design printed below to 4-5 cm per side, and have the patient copy it. (Give one point if all sides and angles are preserved and if the intersecting sides form a quadrangle.) — 1



= Total 30

(Anthony et al., 1982, p. 407)

Appendix B

Ward Information Letter

_____,
Commencing on the 5th August, 1990 for 14 days, consenting elderly patients who are discharged from wards _____, _____, and _____ will be included in a research study aimed at assessing medication compliance after discharge.

Subjects will be visited in hospital and once at home seven days after discharge. Subjects are unaware of the exact reason for the home visits. If the subjects know that they will be asked about their medications during the home visit, this knowledge may influence the accuracy of the answers they give.

I may ask you at some time during the study about the likelihood of one (or more) of your patients going home on a particular day. I need to know (before the patients leave the hospital) when they are going home so that I can arrange a convenient time for a home visit.

Any queries about the research can be answered by contacting me on Ward _____ (Ext. _____). Thank you for your assistance and time.

Donna Mitchell

Appendix C

Patient Information Leaflet/Consent Form

Dear _____,

A study is being done at _____ to find out about any problems that patients have in following their instructions when they return home. If we know about the problems that patients experience when they return home we may be able to prevent them from occurring. You have been selected to participate in the study. If you consent to participate, you will be visited by myself in hospital and at home. Before you are discharged, I will arrange a time to visit you around the seventh day after your discharge.

I wish to discuss your hospital stay with you and will need to look at your hospital records to obtain some information about your stay. All information that is collected from you or your hospital records will remain confidential. You will only be identified by a number. If the research is published, your name will not be used. Non-participation brings no penalties and if you wish to withdraw from the study please contact me.

Thank you, yours sincerely,

Sister Donna Mitchell (Registered Nurse)

Phone Number: _____ (Home) _____ (Work)

 I _____ have read and understood the above research and wish to participate in the study.

(Participant)_____
(Researcher)_____
(Date)

Appendix D

Master Identification Sheet-----
Number: _____Home address: _____

Phone: _____

Date: _____ Time: _____

Number: _____

Home address: _____

Phone: _____

Date: _____ Time: _____

Number: _____

Home address: _____

Phone: _____

Date: _____ Time: _____

Number: _____

Home address: _____

Phone: _____

Date: _____ Time: _____

Number: _____

Home address: _____

Phone: _____

Date: _____ Time: _____

Appendix E

Patient Reminder Letter

Dear _____

Thank you for completing the first part of the research
being done at _____

I will be visiting you

on _____

at _____

to complete the research interview.

Please contact me if you have any worries or questions.

Thank you

Donna Mitchell

(Phone: _____)

Appendix G

		Drug Compliance Rate			
		0 - 99%	100%		
R e g i m e n	R e c a l l	Yes	8	12	20
		No	6	0	6
			14	12	26

Contingency Table: Regimen Recall Versus
Drug Compliance Rate

Appendix H

		Drug Compliance Rate			
		0 - 99%	100%		
D r u g	K n o w l e d g e	Yes	5	10	15
	No	9	2	11	
		14	12	26	

Contingency Table: Drug Knowledge Versus
Drug Compliance Rate