

Hospital Discharge Preparation for Homeward Bound Elderly.
by

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HOSPITAL DISCHARGE PREPARATION FOR HOMEWARD BOUND ELDERLY.

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Hospital discharge planning (DCP) for the elderly is a research priority. Within the cost conscious healthcare environment, there is concern about short hospitalizations and responsibility shifts to patients for continued health care. While Health Maintenance Organizations (HMO) provide care for many elderly, there is no research on DCP outcomes for elderly HMO patients. The purpose of this study was to explore outcomes of DCP for elderly medical patients, satisfaction, service utilization, and relationships among the hospital environment, patients, and discharge outcomes.

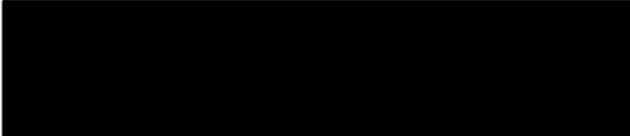
This study utilized a descriptive correlational design within an HMO hospital. A convenience sample of 140 patients age 65 years or older, and returning home were enrolled over one year. Subjects stated satisfaction with instruction and preparation for discharge. Knowledge scores for new regimes ranged from 72% to 95% of the possible score for activities, medications, diet, and treatments. After discharge, 76% stated they were involved in DCP but 86% of their families were not.

Subjects utilized 2121 services or supplies. Prior to hospitalization, 33% used 93 services; 53% required

127 at discharge; and within 30-days of discharge, all subjects used 1901 services. Additional needs were identified by 21%. Within 30 days, 13% were readmitted to the hospital; all had stated they were prepared for discharge.

Patient characteristics significantly explained variance in three outcomes. After multiple regression analyses, the percent of explained variance ranged from 11 to 17 for medication knowledge, arrangements, and services ($p < .01$). Hospital variables were related to individual outcomes but were not significant in multiple regression analyses. Continuity of care was related to satisfaction ($r = .21$, $p < .01$) and the number of advice telephone calls ($r = .17$, $p < .05$). RN Workload was related to the number of emergency room visits ($r = -.23$, $p < .01$), diagnostic tests ($r = -.17$, $p < .05$), and additional referrals ($r = .24$, $p < .01$).

This study reinforced the importance of DCP for elderly patients--the majority were discharged with a regime change and service needs. Medication knowledge scores were low and patient ability to learn instruction was unclear. Patients may have been too ill to learn, their stay too short, or they may not have had the need to learn what health care providers considered essential.



This work is dedicated to my loving husband,

Bruce Ernest Brown.

Without him, this work would not have been possible.

I thank him for believing in my dreams and passions

and for sacrificing while I obtained my goals.

**Hospital Discharge Preparation
for Homeward Bound Elderly.**

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Chapter I: The Study Problem

Inadequate hospital discharge preparation is costly in terms of both human welfare and health care resources. Hospital discharge planning (DCP) is one element crucial for quality health care. Patients that return home without the knowledge, skill, equipment, and resources necessary to continue their care, may not recuperate successfully. For the patient, lack of knowledge about continued medications may lead to drug levels that are too high or too low for therapeutic effect. Inadequate supplies for wound care could lead to costly infections, while misunderstandings about activity levels could lead to injury. Discharge without adequate preparation may appear "uncaring" to the patient and create negative feelings toward the institution. For health care institutions, these issues create an increased burden on already limited resources. Clinic and emergency room visits, or readmission may occur which may have been avoided had the patient been adequately prepared to continue their own care. The elderly have been identified as an "at risk" population for inadequate discharge preparation and health maintenance organization have been identified as having financial incentives to quickly discharge patients. Yet no research has been done on discharge preparation for the elderly population within a health maintenance environment.

Significance

Cost containment for the health care industry became a national health policy issue during the 1980s. The Health Care Financing Administration (HCFA) estimated that health expenditures would exceed \$1.5 trillion and consume 15% of the gross national product by the year 2000 (Wrightson, 1990). Cost containment within the hospital industry was taken seriously after 1983 when the HCFA changed the reimbursement method for treating patients under the Medicare program (Draper et al, 1990). This change was necessary as medical costs rose at a higher rate than background inflation (Kahn et al, 1990). A prospective payment system (PPS) based on diagnostic groups replaced the old system of reimbursement for services provided. The PPS contained an incentive to decrease hospital length of stay (LOS) and substitute lower-cost services in order for hospitals to make a profit. This created concern that the quality of care offered to Medicare patients would decline (LoGerfo, 1990).

Within the health care industry, health maintenance organizations (HMO) have been seen as important change agents to control expenditures for health care services (Wrightson, 1990). Since the passage of the HMO Act of 1973 (which provided developmental funding), the HMO industry has grown rapidly and is currently a significant provider of medical services. One of every 7 employees (and their families) belong to an HMO in the United States. One of

every 20 elderly persons eligible for Medicare receives health care through an HMO.

The HMO industry's rapid growth created increased competition in health markets and contributed to cost containment efforts by demonstrations of managed-care techniques (Gruber et al, 1988; Wrightson, 1990). HMOs are involved both in the delivery and the financing of health services offered to members. Because revenues are fixed (services are provided for a fixed, prepaid fee), cost containment is a high priority in order to provide appropriate services for a defined population (HMO members). Thus, HMOs have an inherent financial incentive to provide preventative services in order to avoid larger future expenditures.

The internal financial incentive for HMOs to control costs can potentially be seen as both a positive and a negative feature. Common cost containment measures include the following (Wrightson, 1990): controlled utilization of services by members; reduced hospital length of stay; substitution of care in a less costly setting; finding new and accepted treatment alternative for high-cost inpatient procedures; and identification of physicians with patterns of unnecessarily high use of inpatient services (utilization review). Physicians are also offered a variety of incentives for prescribing behavior that meets the organizational objects (Feldman, et al, 1989; Hillman,

1990). This creates a direct relationship between clinical decisions and provider income.

Decreased length of HMO hospital stay has been demonstrated in research which compared HMOs to traditional fee-for-service (FFS) practices. Stern et al (1989) compared HMO and FFS after adjusting for severity of illness, and found that LOS was 14% less for the HMO patients. Wagner et al (1990) found that an HMO reduced costs by 30% when compared to FFS practice by reducing hospitalization, but overall patient satisfaction declined too. McCombs et al (1990) looked at two HMO demonstration projects and found that when compared to FFS, only one HMO project reduced hospital utilization significantly.

The elderly consume a large proportion of health care services, especially hospital services. The Sacramento/San Francisco Bay Area in California has the highest HMO market penetration in the country--46% of the population (Group Health Association of America, 1991). Within this region, the largest national HMO, Kaiser Permanente Health Plan, stated that about 8% of their membership was 65 years or older (Feldon, 1991). They predicted that by the year 2000, this number would reach 10% regionally, but with some areas having as many as 18% locally. Members over age 65 are admitted to Kaiser hospitals three times more often than other members, and visit physicians or are admitted to the hospital six times more than other members. In 1980, 31% of

Kaiser's hospital admissions were elders, by 1990 it was projected to have increased to 42%.

One outcome of this cost consciousness, has been concern for adequate hospital discharge planning (DCP) to prepare elders to continue their own health care at home. A national panel of medical and quality assurance experts selected DCP research as a top priority for the population of older persons. DCP was cited as "highly beneficial and definitely improvable, and its quality was considered definitely low" (Fink et al, 1987, p. 1908). Research has shown since the implementation of the PPS, that besides shorter LOS, patients were discharged with greater dependencies in activities of daily living (Coulton, 1988). While LOS for Medicare patients dropped 24% (from 14.4 to 11 days), 75% of these patients continued to return home; and the number of unstable patients discharged home increased from 10% to 15% (Kosecoff et al, 1990).

Multidisciplinary concern for hospital discharge planning quality has been well documented within health care literature. Physicians have demonstrated concern that delayed hospital admission (sicker) and premature discharge (quicker) would impact the quality of hospital care (American Society of Internal Medicine, 1988; Coulton, 1988; Guterman et al, 1988; Keeler, 1991); while hospital administrators have encouraged utilization review to ensure timely patient discharge (Bull, 1988; Micheletti & Shlala, 1985). Nurses must prepare patients for discharge, yet have

sicker patients with multiple needs (Bull; Hartley, 1986; Kramer & Schmalenberg, 1987a, 1987b; Nursing Life, 1984). Social service departments struggle to find placement for patients that can no longer be justified for acute care reimbursement (Marcus, 1987; Coulton, 1988). Ultimately, patients and their families are impacted when patients must recuperate at home rather than in hospitals (Kosecoff et al, 1990; Coulton).

Nurses have observed that early discharge has fostered increased responsibility for health care by the patient and their families (Kramer & Schmalenberg, 1987a, 1987b). Nurses from 16 hospitals observed that LOS was too short for completion of the necessary teaching, and teaching included more family members as patients were too ill. Patients were at times discharged without adequate skill to care for themselves. Gallant and Meisenheimer (1985) also voiced concern that patients were not ready to learn while hospitalized.

Patient needs after hospital discharge have not always been met. Lindenberg and Coulton (1980) found that of 290 adult patients, 63% needed assistance after discharge, yet less than 70% of these patients had adequate services. Wolock (1987) found of 69 adults, 30% stated there were services that they needed but did not receive. Fredrick, Sharp, and Atkins (1988) found that 59% of 115 adult discharged patients lacked knowledge in one or more essential self-care areas.

Readmission to the hospital after early discharge is costly to both patients and providers. Repeat hospital admission has been estimated to account for up to half of all hospital admissions and as much as sixty-percent of hospital charges (Safran & Phillips, 1989). Causes for readmission have been cited as inadequate medical care during the initial hospitalization, inadequate outpatient follow-up, adverse drug reactions, lack of patient compliance with prescribed therapies, and inadequate home support services.

Cost containment within the hospital industry will not vanish. Whether from external agencies, from market competition for health care dollars, or from internal organizational philosophies, cost containment will continue as a national health policy issue. DCP research has been identified as a priority, especially for the elderly, within this environment. Multiple health care disciplines have voiced concern with current practices of short hospitalization and responsibility shifts for continued health care to the patient and family. The literature does not provide evidence of relationships among individual patient characteristics or hospital environment variables that may impact the DCP process and elderly patients who are then not successful at continuing their health care at home. HMOs provide health care for a significant proportion of the elderly, yet no research is available on discharge planning outcomes within an HMO environment. Therefore, this study

is significant as it is the first to explore discharge preparation for elderly patients within an HMO environment.

Purpose of this Study

The purpose of this study was to explore (a) the outcomes of the preparation that elderly medical patients received prior to discharge from an HMO hospital, (b) to examine the types of services and number of services these patients utilized within the first 30-days after discharge, (c) how satisfied the elderly were with the discharge planning process, and finally, and (d) to explore relationships among the hospital environment and patient characteristics variables and discharge outcomes. The anticipated benefits of this study were based on the intent to generate hypotheses for testing in future studies, and the development of knowledge for designing better models of DCP, with the ultimate goal of improved patient care quality and efficient resource utilization.

The specific questions evaluated in this study were as follows:

1. What is the level of discharge preparation in a sample of age 65 or greater medical patients discharged from an HMO hospital to home?
2. What is the level of service utilization within the first 30-days of discharge, in a sample of age 65 or greater medical patients discharged from an HMO hospital to home?
3. Is there a relationship among patient characteristics and discharge preparation?

4. Is there a relationship among patient characteristics and service utilization?

5. Is there a relationship among hospital environmental characteristics and discharge preparation?

6. Is there a relationship among hospital environmental characteristics and service utilization?

7. Is there an individual effect of patient characteristics after controlling the effects of hospital environmental characteristics on discharge preparation?

8. Is there an effect of hospital environmental characteristics after controlling the effects of patient characteristics on discharge preparation?

9. Is there an effect of patient characteristics after controlling the effects of hospital environmental characteristics on service utilization?

10. Is there an effect of the hospital environmental characteristics after controlling the effects of patient characteristics on service utilization?

Chapter II: Literature Review and Conceptual Framework

Overview of Relevant Research

Research efforts to develop scientific knowledge concerning DCP have begun. Descriptive studies have explored theoretical models of DCP (Johnson & Fethke, 1985; Lurie, Robinson, & Barbaccia, 1984); program case studies (Discharge Planning, 1983; Esper, 1988; Fell, 1979; Packard-Helie & Lancaster, 1989); patient discharge needs (Lindenberg & Coulton, 1980; Kromminga & Ostwald, 1987); patient perceptions of DCP (Axen et al, 1988; Halvorson et al, 1988; Victor & Vetter, 1988; Wolock, 1987); caregiver burden (McCann, 1988); patient DCP knowledge recall (Fredrick, Sharp, & Atkins, 1988); blocks to timely discharge (Edwards et al, 1991); and hospital DCP adaptation following prospective payment implementation (Bull, 1988; Dake, 1981; Feather & Nichols, 1985). Experimental research to compare DCP programs has begun (Kennedy, Neidlinger, & Scroggins, 1987; Naylor, 1990; Schragger et al, 1978; Schuman, Ostfeld, & Willard, 1976), perhaps prematurely in light of the current state of knowledge that has yet to establish relationships among DCP variables. There is a need for replication studies to increase the generalizability of these findings beyond initial study institutions.

DCP Patient Needs.

DCP patient needs were described by Lindenberg and Coulton (1980) after interviewing 290 adult patients that

received DCP social work assistance from nine midwestern hospitals. Patients were phone interviewed four weeks after discharge. The instrument, developed by social service experts from the nine hospitals, consisted of 19 types of patient needs and was reported to have interrater reliability at 90%. Forty percent of the patients who needed shelter, personal care, homemaker services, environmental modification, transportation, and meaningful social activity received it from family or friends. Most patients required some form of medical follow-up; almost half required psychosocial assistance, medical equipment, personal care, transportation, health education, or nursing care. Few required shelter, occupational therapy, nutritional services, vocational rehabilitation, environmental modification or legal service. For those needing assistance (63%), adequate service (judged by patient and social worker, $r=.90$) was found for less than 70%. The implication of these findings were that a substantial number of patients did not have their DCP needs met.

Patient needs were also described by Kromminga and Ostwald (1987), after interviewing 30 adult medical and surgical patients discharged from a rural community hospital. Telephone interviews occurred three to 10 days after discharge. The following needs were identified (listed in order of those most often identified to least often): medical supervision, information on illness,

nutritional services, homemaking services, medication instruction, activity instruction, personal care service, public health nursing, counseling, self-care, special therapies, diet instructions, financial assistance, use of appliances, appliance procurement, and home adaptation. Physicians and nurses were perceived to have met patient's information needs.

To determine discharge needs and the sources of available help, Wolock (1987) studied patients from 12 New Jersey hospitals. Interviews, from 69 randomly selected adults returning to a home setting, were conducted six to eleven months after discharge. Most patients (64%) had some activity limitation following hospitalization (of unknown duration), such as getting around outside the house (43%), doing things around the house (42%), bathing (26%), dressing (20%), getting around in the house (17%), and eating (16%). Most patients (84%) had a medication regimen at discharge and some (24%) had difficulty following through with it; 58% had special diets and 43% had difficulty following through; and 23% had medical care such as injections or dressings, of which 25% had difficulty following through. The majority (52%) received from one to five community services, such as nursing care (39%), medical treatment (20%), homemaker service (17%), and nutritional services (17%). Ninety-percent required care from family members at home. All patients met high-risk criteria for social work screening, yet only 64% had contact with social workers. Those who

received social work services were more likely to receive community services (Chi-square, $p < .03$). Almost 30% stated there were services that they needed but did not receive. Social work contact was related to longer lengths of stay and living alone (Chi-square, $p < .03$).

DCP Process.

Research has demonstrated that the process of DCP has been difficult to capture. Process documentation has been poor in patient records (Dake, 1981; Arenth & Mamon, 1985; Knight, 1985; Johnson & Fethke, 1985; Waters, 1987; Kennedy, Neidlinger, & Scroggins, 1987). This has made data collection dependent on interviews or observation.

Patient preparation for discharge was examined by Victor and Vetter in Wales (1988). A random sample of elderly patients ($N = 1930$) completed a postal questionnaire three months after discharge. Older subjects, females, and those living alone, were found to be more likely to be given a longer notice of discharge. Of those living alone and the very old, few described their notice as adequate.

The process of DCP for medical and surgical adult patients at a large teaching hospital was described by Knight (1985). This was based on a convenience sample of 111 patient kardexes, 63 patient charts, and 22 RN interviews. The RNs described DCP responsibility as decentralized between physicians, nurses, and social workers, and verbalized frustration with lack of role clarity. All patients were assessed for placement. The

main factors in this decision included physical limitations, availability of family members, and patient or family preference; other factors were age, finance, mental status, and medical regimen. Those able to return home received DCP with the RN; those unable to return home also received social worker assistance. RNs described most of their DCP time as spent teaching skills for patient care to patients and family members.

Nurse assessment of patient DCP needs was examined by Arentz and Mamon (1985). From an urban oncology center, a convenience sample of 56 adult patients were interviewed three days and three weeks post-discharge to compare patient assessment of need to nurse assessment (as documented in the patient's hospital record). Percent of agreement for eating, personal hygiene, and dressing were good (89-97%); but bed/chair transferring (77%) and bathing (72%) demonstrated significantly higher levels of disagreement (nurses over-assessed patient ability). Non-agreement for mobility capabilities was high. Nurses usually over-assessed patient ability (walking agreement 84%, stair climbing agreement 64%). Nurses under-assessed the need for mobility aids such as canes, crutches, walkers, and wheelchairs (agreement 83%). Patient recall of instruction was difficult to examine. The medical record did not reflect instruction for 11% to 25% of the patients that reported receiving instruction. For those patients with documented instruction, patients did not recall this as

follows: disease process (33%), sites for infection (33%), and exercise (53%).

The DCP process was retrospectively reviewed by Dake (1981) by randomly selecting charts ($n = 100$) from ten nursing units in a community hospital. Patients with shorter hospital stays (less than 14 days) received less assessment of psychosocial and environmental factors. Seventy-five percent of the nursing DCP careplans were not updated to reflect the total medical DCP. Medications, physical condition, and follow-up were mentioned in more than half of the charts, while less than half indicated treatment, diet, and community referrals. This evaluation was limited to that of documentation--one does not know if practice was accurately reflected.

The perception that there were blocks to timely discharge was validated by Edwards et al (1991). This descriptive study noted in a sample of 38 medical patients, that few patient records demonstrated evidence of multidisciplinary collaboration for DCP. Delays were noted in obtaining consultations and diagnostic test results; these delays were thought to delay discharge by one or more days. A pilot was conducted attempting to correct the timeliness of consultations and physician discharge order writing, plus increased RN attendance at morning rounds, and daily medical and nursing notations concerning DCP. A four month pilot (unknown sample size) demonstrated the LOS to increase by 0.8 days for both the pilot and control units.

Qualitative feedback from staff involved with the pilot demonstrated a perception of improved DCP quality.

An empirical approach to defining the RN role in DCP was taken by Halvorson et al (1988) and Axen et al (1988). This study used importance/performance scaling to compare RN and patient perceptions of DCP activity importance and RN task performance. Twenty-two RN DCP activities were identified based on hospital policy, job descriptions, and expert opinion. Thirty-three head nurses, 405 staff nurses, and 50 randomly selected medical/surgical patients were surveyed. RNs ranked all 22 activities as highly important, but scored their own performance high only on concrete, specific tasks (instruction of medications and activity restrictions, teaching treatments or procedures and use of homegoing equipment, answering questions about the patient's illness, listening, and providing emotional support). Patient perceptions were different. They identified only six activities as important--instruction of medications, activity restrictions, treatments or procedures, and use of homegoing equipment; having nurses observe return demonstrations; and answering family questions about the illness. Patients ranked RN task performance higher than the RNs had.

One of the first quasi-experimental studies in DCP was done by Schuman, Ostfeld, and Willard (1976). These physicians collected data on 60 adult medical patients before implementing change in the nursing delivery of DCP,

and collected data on 61 patients after this change. DCP was evaluated as adequate or not adequate based on criteria for patient knowledge of diagnosis, medical regimen, diet, and follow-up care; and on criteria for disease treatment, medical treatment follow-up, and assessment of patients' environment. An inservice was provided to nurses about DCP and delivery was changed to a team model (an RN and a practical nurse caring for six to eight patients). An increase in adequacy of DCP was found (66% to 87%; Chi-square, $p < .05$) and patient satisfaction improved ($Z = 1.65$, $p < .05$) but there were no differences in patient knowledge levels. The results of this study are difficult to interpret. One does not know if the physicians collecting data were also involved in these patients' care. The intervention applied was a nursing intervention; nursing was to support the medical plan of care and was responsible to assess the patient's environment for DCP. Yet most of the criteria for evaluation of DCP were based on medical care.

The effectiveness of a comprehensive DCP protocol (completed by a gerontological clinical nurse specialist [CNS]) was examined using an experimental design and 80 randomly assigned elderly patients (Kennedy, Neidlinger, & Scroggins, 1987; Neidlinger, Scroggins, & Kennedy, 1987). DCP effectiveness was defined as decreased length of stay (LOS), non-readmission to the acute care facility within eight weeks, and appropriate placement (no change in original placement or change to a less dependent level of

care). Patients were phone interviewed at two and four weeks post-discharge. Assessment of DCP needs by the CNS in the experimental group included health status, orientation level, knowledge/perception of health status, resource use pattern, functional status, skill level, motivation level, and sociodemographic data. After this protocol, staff nurses were assisted in coordination of DCP by the CNS, a second bedside visit was made, and communication with the patient and family about DCP was emphasized. The control group had the existing hospital practice for DCP. The records of the control group contained limited DCP information. The control group was found to be more costly (\$60/day). The experimental group had shorter LOS (1.9 days) and readmissions were delayed by an average of 10 days beyond those in the control group. Delays due to lack of travel arrangements, teaching, or necessary take-home supplies were not noted in the experimental group. There was no difference between groups in placement disposition. The direct cost of the CNS time was two percent of the additional gross excess revenues obtained from the experimental group--the net savings were \$34,707 for the experimental group.

The comprehensive DCP protocol implemented by a CNS for elderly patients was also examined by Naylor (1990a; 1990b). Patients were randomly assigned to experimental and control groups (20 subjects each) and a study intervention similar to that reported by Neidlinger, Scroggins, and Kennedy

(1987) was given to the experimental group. But the results of the two studies differed, perhaps because Naylor's sample did not include patients discharged to nursing homes.

Naylor did not find a difference between the groups for length of stay or cost of hospitalization, and did find that the control group statistically had more rehospitalizations.

DCP Patient Outcomes.

DCP health outcomes were studied by Johnson and Fethke (1985), who interviewed 101 elderly patients at discharge and after two weeks, two months, six months, and 12 months. Physical health, activities of daily living, mental status, compliance with DCP, and well-being were measured by the perceptions of the patient and a geriatric nursing specialist. Other outcomes examined were unplanned readmission, death, or moves to more dependent living situations. Documentation was found to be poor. DCP was not mentioned in either medical or nursing notes prior to the day of discharge in 24 of the records; anticipation of discharge was documented only one day in advance in 30 records. Most instruction that was given was not documented. Fewer patients reported instruction when interviewed in the hospital than those interviewed at home, which indicated that instruction occurred immediately prior to discharge. At one year, only 35 patients had regained their pre-hospital level of health. The nurse perceived 40 patients as noncompliant with discharge instruction yet only 18 patients reported difficulty in carrying out

instructions. Reasons for noncompliance included personal decision, confusion on orders, inability to read labels, or foul weather that inhibited exercise.

An evaluation of services patients received after DCP was conducted by Lurie, Robinson and Barbaccia (1984). They interviewed 170 elderly patients with arteriosclerotic heart disease or hip arthroplasty at discharge and two months later, reviewed their medical records, and interviewed staff involved in their care. Not all patients were considered for DCP, especially those with "good families" or repeated admissions. Patients who expressed anticipated needs were more likely to receive discharge planning (Chi-square, $p < .05$). In all three hospitals, patients with hip fractures, or who were older, or non-married were more likely to receive DCP ($p < .01$). Of the formal services planned through DCP, most were justified and reimbursed in terms of patient medical condition. Of the services patients received, the majority were provided by family rather than paid providers. At two months, most patients (64%) named their main helper as spouses.

Patient knowledge in key health care areas and perception of preparation for discharge were described by Fredrick, Sharp, and Atkins (1988). Adult medical and surgical patients ($n = 115$) were interviewed at discharge and 7 to 10 days post-discharge by telephone. Knowledge recall of medications, medical and nursing treatments, diet and activity, were evaluated by the ability to verbalize

information predetermined to be essential. At discharge, 59% lacked knowledge in one or more area while 96% felt prepared for discharge. For example, 95% recalled the names of their medications, but only 52% could list one side effect. On second interview, 90% continued to perceive adequate preparation for discharge. Of those patients discharged with some type of treatment, 15% had not been observed performing the treatment at the hospital. Those with the most difficulty following discharge plans were experiencing their first illness in a high-risk medical category. The authors concluded that if these patients were inexperienced in medical matters, they may also be unable to identify information needed for discharge.

The following key points from this literature review were utilized in the design of this study.

1. Adequate notice of discharge may not be given to patients (Victor & Vetter, 1988).
2. Shorter LOS was related to less assessment of psychosocial and environmental factors (Dake, 1981).
3. Discharged patients often have new activity limitations and require assistance with activities of daily living; and have new diets, treatments, and medication regimes which many have difficulty following through with (Johnson & Fethke, 1985; Wolock, 1987).
4. Nurses over-assess patient's functional status ability which might lead to inadequate assessment of DCP needs (Arenth & Mamon, 1985).

5. The needs of discharge patients are not always met (Kromminga & Ostwald, 1987; Lindenberg & Coulton, 1980; Wolock, 1987).

6. Patients may have difficulty following discharge plans (Johnson & Fethke, 1985).

7. DCP instruction recall is poor (Arenth & Mamon, 1985).

8. Most patients perceived themselves to be prepared for discharge despite the provider's perception of inadequate knowledge in the following key areas: diet, medications, treatments, and activities (Fredrick, Sharp, & Atkins, 1988).

9. The patients experiencing the most difficulty following discharge plans were hospitalized for a new illness (Fredrick, Sharp, & Atkins, 1988).

10. Patients identified the following nursing activities as important in the DCP process: instruction of medications, activity restrictions, treatments or procedures, and use of homegoing equipment; observation of return demonstrations; and answering family questions about illness (Axen et al, 1988; Halvorson et al, 1988).

Conceptual Framework

Continuity of care has been defined as the coordinated delivery of health services within and between communities and institutions (McKeehan, 1981; Hartigan & Brown, 1985). The American Nurses' Association (ANA) (1975) described continuity of care as an ideal with DCP as one part of the

process. The ANA defined DCP as assistance with arrangements and preparation of patients for the next phase of care, whether this was self-care, or care by family members or an organized health care provider. DCP is also the transfer of health care responsibility to the patient, their significant others, or other professionals (Clausen, 1984; Slevin & Roberts, 1987). Hartigan and Brown (1985) described the goal of DCP as "to ensure continuity of care, help sick and well persons and their families find the best solutions to their health problems, at the right time, from the appropriate source, at the best price, and on a continuous basis for the required period of time" (p. 9).

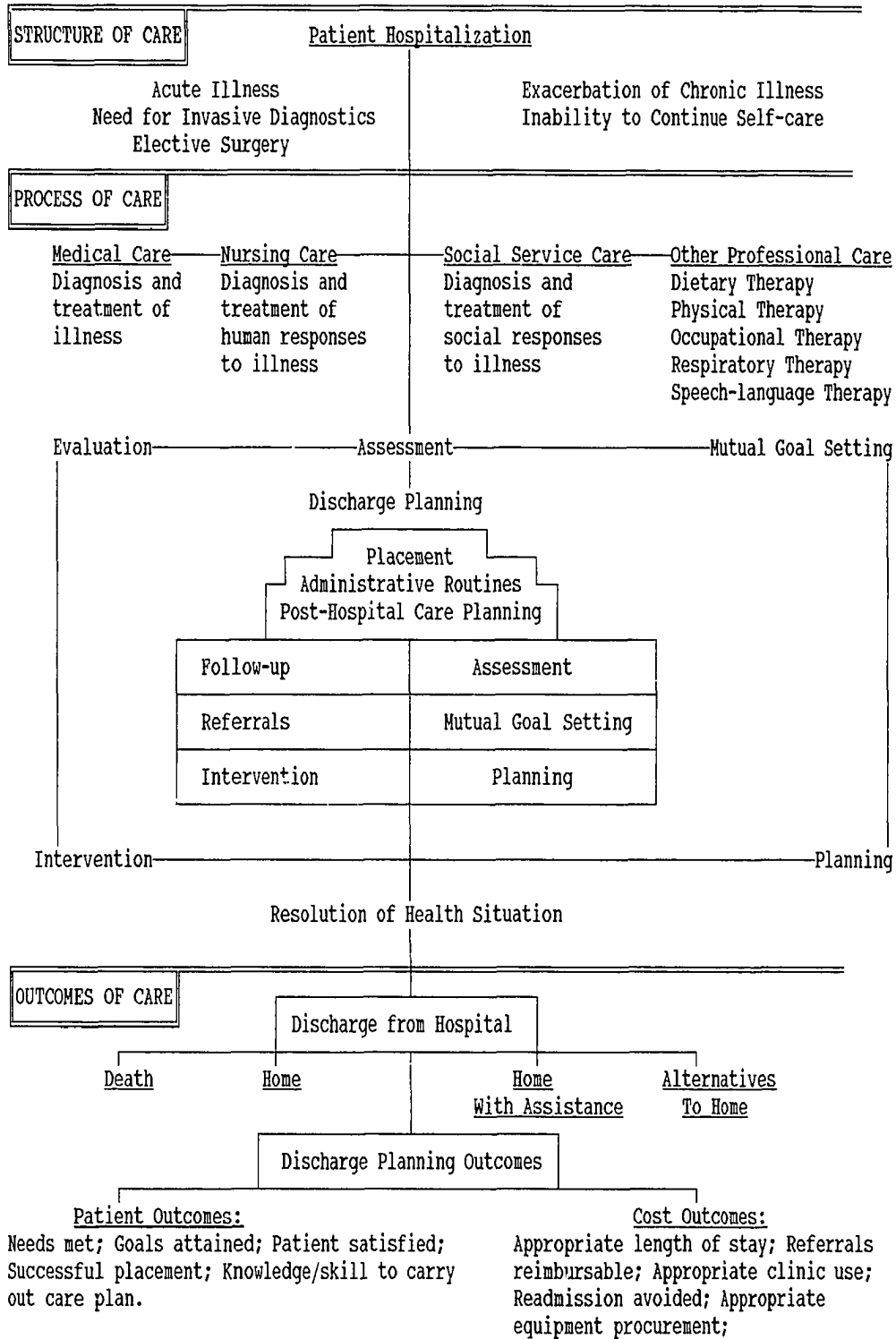
Hospital DCP includes three components--placement, administrative routines, and post-discharge care planning (Johnson & Fethke, 1985). The transition of the patient from one environment to another has been coined "placement". The placement decision is made for every patient, although placement has traditionally been used in reference to patients who were unable to return to the home setting. Placement decisions drive the DCP process. The decision not to return home may be very difficult for many patients and their families--feelings of guilt or grief and financial difficulties may plague them (McCann, 1988). The hospital may struggle to locate community resources available to facilitate discharge (Shrager et al, 1978).

DCP administrative routines are form completion, transportation arrangements, prescription assembly, and

arranging follow-up appointments (Johnson & Fethke, 1985). Post-discharge patient care planning are patient-specific activities that require an assessment of both patient needs and resources. This requires a cooperative effort to visualize how to best extend the needed health care (which may be unfamiliar to the patient) into the home setting (which is unfamiliar to the provider). Preparation may require simple instruction or intensive preparation with the patient and family in order to maximize skill, opportunity, and motivation to follow regimens (James, 1987).

Once hospitalized, every patient receives some form of nursing care. As the only discipline routinely and immediately available to every patient and family on a 24-hour basis, hospital nurses form a unique coordinating link between the patient and other disciplines (Feild, 1981). Nurses, concerned with the diagnosis and treatment of human responses to health problems (ANA, 1980), have a different perspective than other professions for DCP. Nursing assumes that every patient has some particular need after discharge, therefore, all patients receive DCP (Clausen, 1984). In DCP, patients' (and families') abilities to cope with the physical, psychological, and social changes that result from illness are considered by nurses (Feild). DCP interventions include referrals, location of community resources, patient and family education for self-care, or a written nursing care plan when transfer to another facility is planned (Dake, 1981).

Figure 1 Hospital Discharge Planning



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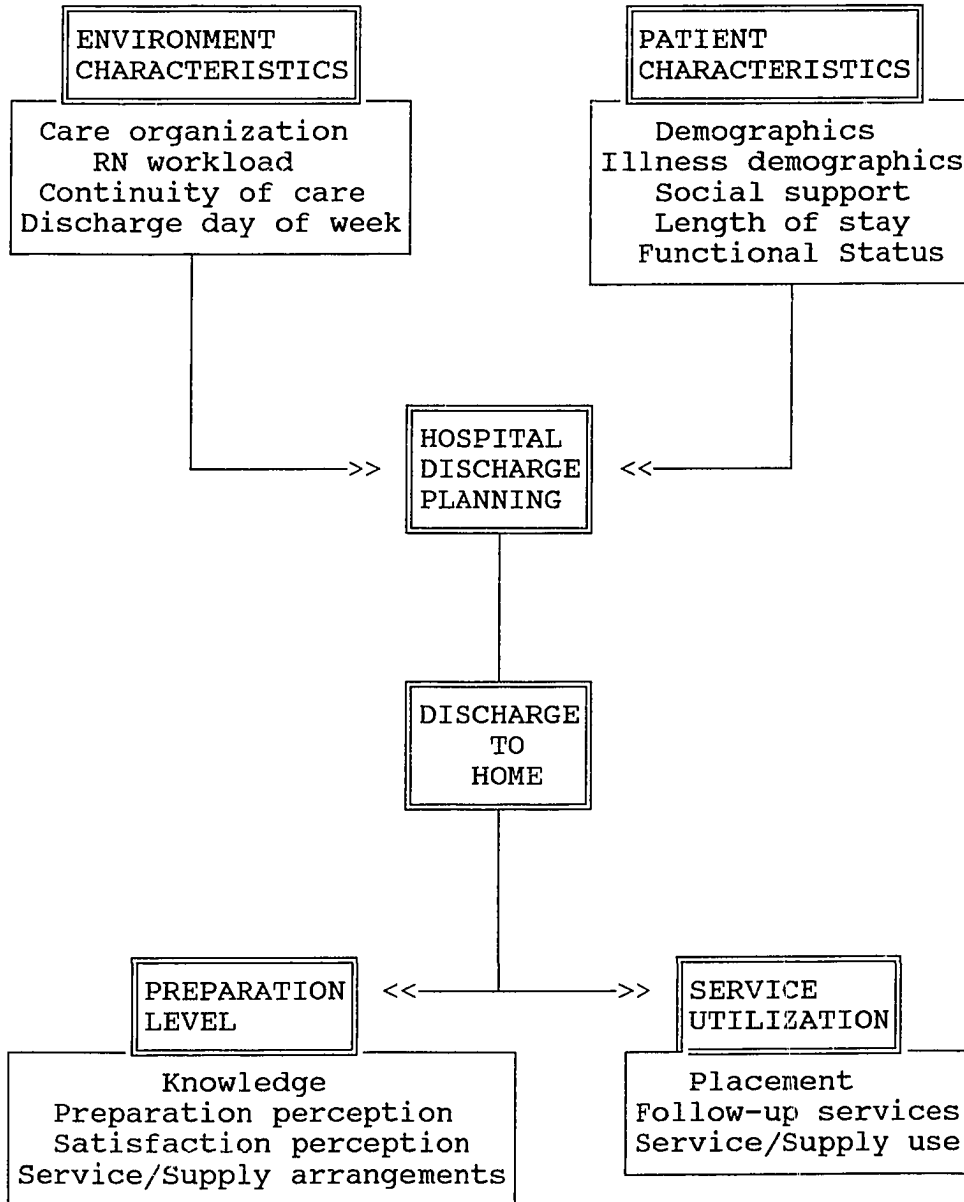
Figure 1 diagrams a multidisciplinary model of hospital discharge planning. DCP is part of the multidisciplinary processes, therefore it was assumed that variables which impact these processes would also impact DCP. Johnson and Fethke's (1985) DCP components were added as part of the overall process of patient care. DCP outcomes were identified as both patient outcomes and cost outcomes for either the patient or the provider.

Based on the key literature points and the model of hospital DCP (Figure 1), four main constructs were developed and used in this study. Figure 2 diagrams the proposed relationships among these constructs, and the constructs are defined below.

Discharge preparation is one outcome of hospital discharge planning. It was defined as patient knowledge levels about illness, medications, diet, activity, and treatments that are to be continued after discharge; patient perception of preparation; patient perception of satisfaction; and the number of supplies and services arranged through discharge planning compared to the patient's perception of those needed.

Service utilization is an outcome related to hospital discharge planning. It was defined as placement--the need to be transferred from home to a higher level of care within 30 days after discharge; follow-up services--the number of contacts made by the patient in 30 days to obtain further information about their continued care, to the clinic,

Figure 2 Proposed Relationships of Study Constructs



emergency room, or advice line; the number of diagnostic tests performed; and the number of services or supplies that were arranged for the patient.

Patient characteristics were defined as the patient's age, sex, education, ethnicity, marital status, living arrangement, social support, functional status, diagnosis, number of months with the diagnosis, number of hospitalizations in 12 months, number of secondary diagnoses, mean GRASP score (Nursing Workload Management Tool) for 24-hours prior to discharge, and length of stay.

Environment characteristics were defined as nursing care organization--primary or team assignment; RN workload measured in GRASP patient care hours; continuity of care--number of RNs assigned to the patient; and the day of week for discharge.

Definition of Terms

Patient Characteristics:

1. Age in years.
2. Sex as male or female.
3. Education as completion of grade school, high school, some college, college, or post graduate work.
4. Ethnic background: Self identification of cultural background as Asian, Black, Hispanic, Native American Indian, White, or Other.
5. Marital status: Single; partnered, not married; married; widow; separated or divorced.

6. Living arrangement as the number of people living in the household.

7. Social support as the presence of supportive and conflicting relationships with family friends, and neighbors, using Tilden's Inventory (Tilden, Nelson, & May, 1990).

8. The patient's functional status as scored by the Katz ADL index (activities of daily living) (Katz & Akpom, 1976): independence abilities in bathing, dressing, toileting, transferring, continence, and feeding just prior to hospital discharge. A second instrument will also score functional status, the Quality Audit Marker (QAM), which measures functional status using three subscales (Self Care, Ambulation, and Psychological Distress).

9. The patient's medical diagnosis that required hospitalization.

10. The number of months since the patient was first diagnosed with the admitting diagnosis.

11. The number of hospitalizations during the past 12 months.

12. The number of other medical diagnoses at the time of discharge, as listed by the discharging physician.

13. The patient's average GRASP score (GRASP Nursing Workload Management tool) for the three shifts prior to discharge, in patient care hours (PCH).

14. The patient's length of stay for this hospitalization, calculated in days.

15. Patient contribution--the patients' perception of how much they participated in the planning and decisions for their discharge (not involved, involved, very involved).

Hospital Environment Variables.

1. Organization of care was defined as primary care assignment or team assignment. Primary care assignment being when one RN is assigned to a number of patients for total patient care. Team assignment being when an RN is assigned a number of patients with a nurses aide who assists. A ratio was used to describe the number of primary care day and evening shifts during hospitalization. The total number of primary care shifts the patient received during the day and evening were divided by the total number of day and evening shifts during the patient's hospitalization.

2. RN workload is the mean hours of patient care (PCH) assigned to the patient's RN as determined by the GRASP system (GRASP Nursing Workload Management tool), during the hospitalization, for the day and evening shifts.

3. Continuity of care was defined as the number of different RNs assigned to the patient during their hospitalization. A ratio was calculated by dividing the actual number of RNs assigned to the patient during all shifts (one RN per shift) by the maximum possible number of RNs that could have been assigned.

4. The day of the week for discharge was recorded as Sunday through Saturday.

Outcome Variables.

1. Health knowledge was defined as recall of teaching for medical diagnosis, medications, diet, activity level, and treatments, measured for those areas appropriate to the patient. Two to seven questions were asked about each subject area, for a total of 16 questions. Responses were judged to be correct (3 points), partially correct (2 points), or incorrect (1 point). This measurement was based on outcome measurement done by Haussmann, Hegyvary, and Newman (1976).

2. The number of services and supplies arranged for the patient during discharge planning was recorded. Services and supplies were arranged into twelve categories for a forced-choice selection--home health nursing care, physical therapy, homemaker services, meal services, ambulating devices, oxygen, hospital beds, self-care equipment, medications, and treatment supplies.

3. The number of the above services and supplies needed as perceived by the patient.

4. The patient's perception of preparation for continuing their medications, activity orders, diet, and treatments will be evaluated using Likert items scored 1 to 3 (not prepared, prepared, very prepared) for each of the four questions.

5. Patient satisfaction with discharge planning preparation in the areas of medications, activity orders, diet, and treatments will be evaluated using Likert items

scored 1 to 3 (not satisfied, satisfied, very satisfied) for each of the four questions.

6. Follow-up services were defined as the number of times the patient sought professional assistance from the health care system, by totaling the number of advice telephone calls, clinic visits, and emergency room visits, additional referrals, and diagnostic tests for the first 30-days after discharge.

7. The placement decision was evaluated based on whether patients were successful at staying home to continue their care at one month post discharge, or if the patients required placement in a facility that provided a higher level of care (hospital, rehabilitation hospital, board-and-care facility, nursing home, or the home of a caretaker). If an alternative placement was required, the date of placement will be recorded and the number of days since hospital discharge will be calculated for descriptive purposes.

Assumptions

The following assumptions were made in this study.

1. DCP is beneficial to patients.
2. All patients have some particular need after discharge and therefore all patients need DCP.
3. Nursing care does affect the outcome of the patient's health status.

4. The structure of nursing care impacts the process and outcomes of nursing care, and the process of nursing care impacts the outcomes of nursing care.

Chapter III: Methodology

Research Design

A descriptive correlational survey design was used to explore the relationships among individual patient and hospital environmental characteristics and discharge preparation outcome variables (Brink & Wood, 1983). This design was selected based on the current level of knowledge concerning DCP. The literature has described DCP and relevant variables, and a conceptual framework could be developed to explain possible associations between variables, but definitive relationships and patterns of relationships have not been established. It would therefore be premature to propose hypotheses for testing.

Correlational designs do not control the independent variables, rather all variables were measured as they existed with no manipulation (Brink & Wood, 1989). The variables selected for this study were based on the literature and conceptual framework, and were described as independent and dependent based on their spacial order. To relate multiple variables to one another, a large sample representing a cross-section of the population was studied, and variables were observed each at the same point in time for each subject as they occurred naturally. The study was designed so that subjects were enrolled in the study during hospitalization, but questions pertaining to DCP were not asked until after discharge so that the DCP process was not altered by participation. Telephone interviews occurred

within a week after discharge while events of the hospitalization and instructions were most likely to be remembered.

Relationships between two variables are measured with correlation coefficients (Brink & Wood, 1989). Correlation coefficients measure the degree of linear association between variables, measuring only association between variables, not cause-and-effect relationships. Increases in one variable that create like increases in the other are positive relationships, while decreases in one that create increases in another are negative relationships. Correlation coefficients (r) range from -1 (a perfect negative correlation) to $+1$ (a perfect positive relationship), with 0 indicating no relationship. Correlation coefficients were examined in this study between the hospital environmental characteristics and both the preparation level of subjects and their service utilization; and between patient characteristics and both preparation level and service utilization.

Relationships between several independent variables and one dependent variable were measured with multiple regression (Brink & Wood, 1989). Multiple regression provides a means of measuring the effects of several independent variables concurrently and measures the relative effect of each variable on the dependent variable. Multiple regression assumes a linear relationship between variables, and coefficients (R) range from 0 (no relationship) to $+1$ (a

perfect relationship). Multiple regression coefficients were examined in this study for relationships between all the hospital environmental characteristics and both the preparation level of subjects and their service utilization; and between all the patient characteristics and both preparation level and service utilization.

Correlational study designs are theory generating research designs (Woods, 1988; Woods & Mitchell, 1988). After observing the variables as they naturally occurred and examining the relationships among the variables, hypotheses will be generated for testing in subsequent studies.

Research Setting

The setting for this study was a 201 bed northern California urban community HMO medical center. Two medical nursing units were utilized, one unit with 37 beds, the other with 16 beds.

DCP is an integrated multidisciplinary process at this HMO, with RN Discharge Planners (Planner), physicians, staff nurses, social workers, and other allied health professionals all participating. Discharge teaching is the responsibility of all members of the health care team. Medical care is provided to patients by the same group of physicians during their hospitalization. Physicians write discharge orders for treatments, medications, diet, activities, equipments, and services. Nurses provide patients with a written form describing these orders.

Each patient admitted over the age of 65 years is reviewed by a Planner for both DCP needs and utilization review. Patients, nurses and physicians are interviewed by Planners to clarify questions about needs and resources. Only those patients initially determined to have needs are followed by the Planner throughout their hospitalization. For those not followed, a Planner referral can be made by any member of the health care team or by patient request, at which point the Planner will follow the patient until discharge. Planners are available Monday through Friday during day shift. Social Service consultations are placed by members of the health care team or by patient request, once social needs or placement needs are identified. Planners facilitate equipment procurement and service arrangements while social workers facilitate transfers to other health care settings.

Once discharged, patients have access to Advice Nurses, clinic services, urgent care services, emergency room services, and numerous outpatient services through the HMO. Advice Nurses, a 24-hour a day service, answer patient questions and health concerns, direct patients to appropriate services, and facilitate moving the patient through the HMO system. Urgent care services are same-day clinic appointments during the day and evening shift. The emergency room is available to patients 24-hours each day.

Sample

Nature and Size of Sample

The target population was age 65 years or older medical patients discharged from the an HMO hospital to their homes. The elderly were selected because they are major consumers of health care services and are at high risk for hospital readmission. Sample size was estimated using Cohen and Cohen's (1983) guidelines for behavioral and social sciences for hypothetical effect sizes, with a medium effect size (f-squared) of .15. Using this value in power analysis for multiple regression with sets and Model II error, alpha of .05, power of .80, and 19 independent variables, the sample size estimate or goal was 157 ($n^* = L/f\text{-squared} + K + 1 = 20.55/.15 + 19 + 1 = 157$).

Data collection was discontinued after 140 subjects were enrolled in the study, 135 subjects completed all phases of the study, and 11 months of data collection. After preliminary data analyses, it was known that 9 independent variables were the most variables used in any regression analysis. Using the same hypothetical medium effect size (f-squared) of .15, and the formula to estimate power for a known sample size (135) ($L^* = f\text{-squared} [n - K - 1]$) with power analyses tables (Cohen & Cohen, 1983), the power of the study was re-estimated. Those analyses that would use all 9 independent variables, would have an estimated power of .88 at an alpha of .05 or .72 at an alpha of .01. Based on this analysis with the hypothetical medium

effect size, the decision was made to discontinue data collection.

Criteria for Sample Selection

Subjects selected for this study were limited to those with medical diagnoses in an effort to create a more homogenous sample. Patients previously enrolled, in Hospice programs, or with surgical diagnoses or myocardial infarction were excluded. These diagnoses were excluded because there were organized teaching programs and support systems in place that were not available to other patients. Subjects also met the following requirements: able to speak, read, and write English; oriented to person, place, and time; admitted to the hospital from home with plans for discharge home; and reachable by telephone after discharge.

Human Subjects Assurance

The purpose, nature, risks, and benefits of study participation were discussed with each subject and written consent to participate was obtained by the investigator. Subjects were given a copy of the consent and the Experimental Subjects Bill of Rights. Participation was voluntary and in no way affected the quality or quantity of medical or nursing care provided to the subjects who did or did not participate.

There were no anticipated physical risks to the patient. Any psychological risks associated with the study were likely to be restricted to the degree that the interview process may focus the patient's attention to the

disease process and any limitations they have in caring for themselves. There were no costs for participation or reimbursement. Each subject was provided with a phone number for the investigator and the Regional Research Institute of the HMO in case questions would arise concerning participation.

The proposal for this study was reviewed by the Committee On Human Research at the University of California. Approval was granted for human subject research (Approval Number H642-06699-01). The Local Research Committee and the Regional Institutional Review Board for the HMO also reviewed and approved this proposal for human subject research.

Data Collection Methods

Techniques

Data was collected using the following procedure. Medical patients admitted to two medical nursing units were recruited for study participation if they met study criteria. Subjects were approached in person by the investigator and invited to participate after informed consent. Subjects were briefly interviewed in their hospital room to obtain demographic and social support information. Medical records were reviewed during the hospitalization and data recorded about illness and functional status. Environmental characteristic data was obtained from existing records on each nursing unit during the hospitalization. The subjects' RN were asked to

complete the Katz ADL Index near the time of discharge. A subject tracking form was utilized to link patient code numbers with names, home telephone numbers, diagnoses, and discharge orders. Several days after discharge, structured telephone interviews were conducted. Computer searches and medical record review were completed 30-days after discharge to record service utilization data.

Instruments

A pilot study of 10 subjects was conducted to standardize measurement techniques; to assess the response to instruments; to eliminate unnecessary data collection; and to determine if the necessary data was collected. Following the pilot analyses, instructions for instrument administration were finalized.

The following variables relied on self report for data: age, sex, education, ethnicity, marital status, living arrangement, and the services/supplies needed and used. To assess the reliability of the subject's responses, responses were compared to information previously recorded in the medical record.

The medical record was the data source for the following variables: diagnosis, length of diagnosis, number of hospitalizations in the past 12 months, number of other diagnoses, length of stay, day of the week for discharge, services/supplies arranged, placement, and follow-up services. Services/supplies arranged data were recorded from the medical record and validated with the subject

during telephone interview. Placement and follow-up services data were obtained initially from the medical record, but computer searches of existing data sources from the HMO data bank were also used to ensure accuracy.

Data for the environmental characteristic variables were obtained from existing data sources on each nursing unit. Multiple data sources were used for both care organization and continuity of care; both assignment sheets and patient records were reviewed to assure reliability. Data for RN workload was dependent on GRASP scores, a nursing acuity, which are calculated each shift by an RN. The reliability of this data is assessed monthly by a hospital GRASP committee and by the Unit Supervisor for each nursing unit, using interrater reliability analyses. Interrater reliabilities were maintained above 90% during the data collection period.

The Tilden Interpersonal Relationship Inventory (IPRI) was used to measure social support (Tilden, Nelson, & May, 1990). This instrument has been under development since 1983 and has been submitted to rigorous reliability and validity assessment with samples of students ($n = 351$), cancer patients ($n = 94$), weight-control patients ($n = 92$), HMO subscribers ($n = 46$), middlescent spouses of MS patients ($n = 310$), adults in the community ($n = 703$), pregnant women ($n = 30$), battered women ($n = 30$), and bereaved elderly ($n = 100$) (Tilden, personal communication, March 1991). Reliability of the three subscales has been demonstrated

with test-retest correlations of .81 to .91, and average inter-item correlations of .28 to .47 (Tilden, Nelson, & May, 1990). Concurrent validity was suggested by moderate correlation with the Personal Resources Questionnaire subscales ($r=.64$, $r=.56$, $r=-.35$). Using a contrasted groups approach, groups differed as expected for each of the three concepts. Battered women ($n = 30$) were significantly lower in support and reciprocity and significantly higher in conflict than members of a medical auxiliary ($n = 42$). Normative subscale scores have been established for adult HMO subscribers ($n = 531$) in a northwest metropolitan area.

The Katz Index of Activities of Daily Living (ADL) was developed empirically during the 1950s based on observations of adult hip fracture patients (Katz & Akpom, 1976). The instrument was later extended to other chronically ill adults and children. Theoretically, it represents an ordered regression as part of the natural process of aging. Predictive and discriminate validity have been reported in the literature. The rater judges the amount of human assistance the patient requires; the categories are well defined, behavioral in nature, and require little inference. Formal reliability analyses have not been reported but differences between observers seem to be infrequent (Moinpour, McCorkle, & Saunders, 1988). High scores reflect more dependence.

The Quality Audit Marker (QAM) measured three functional status concepts--Self Care, Ambulation, and

Psychological Distress. This instrument was developed by Dr. William L. Holzemer at the University of California, San Francisco, while studying AIDS patients. It was designed to be completed by the data collector after chart review and patient observation. The Self Care subscale has 6 items with a possible score from 5 to 24; Ambulation has 2 items with a possible score from 2 to 8; and Psychological Distress has 2 items with a possible score from 2 to 8. High scores reflect more independence.

The instrument "Telephone Interview: Discharge Preparation" was developed for this study based on literature review, expert opinion, and the work of Haussman, Hegyvary, and Newman (1976). It is thought to have face validity and content validity. Based on theoretical literature concerning hospital DCP, the following five subject areas were addressed for patient knowledge: health status, medications, activity, diet, and treatments. Thirteen of the 16 questions that assess patient recall of teaching, were developed by Haussman and Hegyvary as outcome measures (Haussman & Hegyvary, 1976; Haussman, Hegyvary, & Newman, 1976), who reported that pilot studies were completed followed by extensive instrument revision, but reliability and validity testing were not reported. There was support for content validity as expert panels and literature review were used in development. This instrument is found in Appendix 1.

The 30-item instrument "Telephone Interview: Discharge Preparation" was organized into five subject areas with patient preparation and patient satisfaction items interspersed among knowledge items. The subject areas of medications, diet, activity, and treatments were thought to be within the nursing domain of DCP teaching based on literature review and expert opinion. Therefore, each of these areas had one descriptive question to identify who gave the patient instructions, one satisfaction question, and one preparation question. Subjects were asked how satisfied they were with the instructions given--not satisfied, satisfied, or very satisfied; and how prepared they felt to continue this care at home--not prepared, prepared, or very prepared. A single item question explored subject contribution to the DCP process. DCP theoretical literature advocates that the patient must be involved in DCP. Brody et al (1989) explored patient perception of involvement in medical care with an HMO population using a single item question. No other instruments were found that measured patient involvement in care. For this study, subjects were requested to describe their involvement with the health care team in making discharge plans, as not involved, involved, or very involved.

Data Analysis

Descriptive statistics, single order correlation coefficients, principle components analysis, multiple regression, and contextual multiple regression were used in

this study to explore relationships between variables. Descriptive statistics--frequencies, means, medians, modes, standard deviations, and ranges, were used to describe the variables in study Questions One and Two. Questions Three, Four, Five, and Six were analyzed using both single order correlations and regression analyses for each outcome variable. Contextual regression analyses were used for Questions Seven, Eight, Nine, and Ten. Data analyses were conducted using the CRUNCH statistical computer program (Bostrom, 1991).

Principle components analysis was conducted as a data reduction technique for both patient characteristics and environmental characteristics, and as a method of dealing with multicollinearity (Dunteman, 1989). This technique was used to decrease the number of independent variables used in the regression analyses by developing composite scores of correlated independent variables. Five components or factors were used for patient characteristics (made from 14 variables) and the original variables were retained for the environmental characteristics. A complete discussion of the method used to conduct these analyses is found in Chapter IV under Question Three (patient characteristics) and Question Five (environmental characteristics).

Contextual regression analysis was used to determine whether the group level variables contributed to the explanation of the variance in an outcome measure after the effects (explained variance) of individual characteristics

had been taken into account (Holzemer & Chambers, 1988; Holzemer, Jennings, Chambers, & Paul, 1989). A contextual effect is present if environmental level variables (hospital environmental characteristics) account for a significant proportion of variation in dependent measures after controlling for the effects due to individual patient characteristics. An individual effect is present if additional variance in the dependent measure is attributable to individual level variables (patient characteristics) after controlling for the group effects (hospital environmental characteristics). Independent variables were entered into the equations as sets in predetermined (hierarchical) order. The variables within the sets are entered in a stepwise fashion according to the amount of variance each accounts for in the dependent variable. For example, to control for individual characteristic effects, the set of patient characteristics would be entered first, followed by the set of environmental variables.

Chapter IV: Results

The purpose of this study was to gain an understanding of relationships among patient and hospital environmental characteristics that impact patients, DCP, and DCP outcomes. This chapter first describes the study constructs--patient characteristics, hospital environmental characteristics, and the discharge planning outcomes, preparation level and service utilization. Each variable within the constructs are described. The relationships among the constructs are then explored by an analysis of each of the ten research questions.

Descriptive Analyses

Patient Characteristics

One hundred eighty-one patients were approached to participate in this study over a ten month period between August 4, 1991 and June 2, 1992, and 140 agreed to participate. Follow-up telephone interviews were obtained with 135 subjects and 30-day audits of records were completed on all 140 subjects, between August, 1991 and July, 1992.

Random patient selection based on admission dates proved to be an unrealistic methodology and a convenience sample resulted. Subject admission dates were distributed equally over the time period, with 82% ($n = 116$) being admitted on different dates, 16% ($n = 22$) shared an admission date with one other, and 2% ($n = 3$) shared an admission date with two others.

Twenty-nine percent ($n = 41$) of the patients approached refused to participate in this study--20 males and 21 females age 66 to 85 years. The reasons for nonparticipation were as follows: the patient was too tired or preoccupied (29%); the patient was too happy with the HMO and felt they could not contribute to the study (27%); and one patient each with no telephone, disliked interviews, angry at health care in general, and angry with the impact of their diagnosis. The diagnoses of participants and nonparticipants were similar.

Demographics. The subjects in this study were 99% Caucasian (2 Blacks), with 46% ($n = 64$) male and 54% ($n = 76$) female. Ages ranged from 65 to 94 years, with a mean age of 73 years (SD 6.9). All were discharge to a home setting from the hospital where 24% ($n = 34$) lived alone and 65% ($n = 91$) lived with one other person. Fifty-seven percent ($n = 80$) were married. Education level for this age-group was high; only 14% ($n = 19$) had less than a high school education and 81% ($n = 95$) had completed some college. Eleven percent ($n = 15$) remained employed.

Illness Characteristics. Admission diagnoses for the majority of the subjects were related to the pulmonary (32%), gastrointestinal (16%), vascular (14%) and cardiac (11%) systems. As shown in Table 1, most were admitted with a diagnosis new to them in the past year ($M = 10.4$ months since diagnosis); 69% ($n = 96$) had this diagnosis less than one month and 19% ($n = 27$) had this diagnosis for one year

or less. Upon discharge, 92% ($n = 129$) had at least one additional diagnosis.

Table 1

Patient Illness Characteristics

Illness Characteristic	<u>M</u>	<u>SD</u>	<u>Range</u>
Months with admit diagnosis	10.4	31.6	0 to 228
# Other diagnoses at discharge	2.9	1.9	0 to 10
Length of stay in days	8.7	6.8	1 to 40
GRASP score prior 24-hours	5.1	0.9	3.6 to 9.4
# Hospitalizations/12 months@	2.0	1.6	1 to 7
# Days hospitalized/12 months@@	12.7	12.1	2 to 58
Days in critical care*	3.1	1.7	1 to 9
Katz ADL**	0.7	1.3	0 to 5
QAM ADL***			
Selfcare	21.6	2.9	9 to 24
Ambulation	7.3	1.1	2 to 8
Psychological	5.7	1.7	2 to 8

Note: @52 subjects had hospitalizations in past 12 months;
 @@ # Days Hospitalized in 12 months based on sample of 52.
 *30 subjects with critical care admissions during this hospitalization. **The lower the score, the fewer the dependencies. ***The higher the score, the fewer the dependencies.

Hospitalization history varied among subjects (see Table 1). Most subjects, 63%, were not hospitalized in the past 12 months. Of the 37% who were, the mean number of days hospitalized was 12.7 during a range of 1 to 7 hospitalizations. Most patients, 79%, were not placed in critical care during this hospitalization; of the 31% who were, the mean length of stay there was 3.1 days. Mean length of stay for the current hospitalization was 8.7 days (ranging from 1 to 40 days). While hospitalized, the GRASP Nursing Workload Management tool was completed each shift, based on the amount of assistance each subject required and

the number of tasks required for each subject. The mean GRASP score for the three shifts prior to discharge was 5.1 hours of nursing care required within the 24-hour day.

Functional Status. Functional status, the ability to perform activities of daily living (ADL), was measured using two instruments. Both measures, as listed in Table 1, demonstrated patients to be fairly independent. The Katz ADL scored one point for each of six dependencies; 68% ($n = 95$) did not have any dependencies at discharge while the remaining patients had from 1 to 5. The Quality Audit Marker (QAM) measured three concepts--Self Care, Ambulation, and Psychological Distress, with higher scores reflecting more independence and less distress. Self Care had 6 items with a possible score from 5 to 24; the mean score was 21.6. Ambulation had 2 items with a possible score from 2 to 8; the mean score was 7.3. Psychological Distress had 2 items with a possible score from 2 to 8; the mean score was 5.7.

Perception of Discharge Planning Involvement. Follow-up telephone interviews were completed with 135 subjects. Subjects were asked how involved they were with planning for and the decision of when they would be discharged from the hospital. Most perceived themselves to be involved with this process: 39% ($n = 53$) were very involved, 37% ($n = 50$) were somewhat involved, and 24% ($n = 32$) were not involved. This contrasted with 86% ($n = 116$) who described family members as having no planning involvement.

Social Support. Social support was measured using Tilden's Interpersonal Relationship Inventory scores (IPRI). Table 2 lists these scores. Eighty-two percent ($n = 115$) of the subjects had at least one relative living within a 50-mile radius of their home, leaving only 18% ($n = 25$) with no relatives nearby. The mean number of family or friends currently important in their lives was 15.4 (SD 14.7), with no one listing this number as zero.

The IPRI has 13 questions each for the support and conflict scores. Total scores ranged from 13 to 65 with high scores reflecting more support or more conflict. For this sample, there was more support than conflict. Mean support scores were 81% of the possible score, while mean conflict scores were only 50% of the possible score.

Table 2

IPRI Social Support Scores

IPRI SCORES	<u>M</u>	<u>SD</u>	Range
# Relatives within 50 miles	3.9	4.0	0 to 22
# Of important people in life	15.4	14.7	1 to 100
Support Score	52.8	6.9	28 to 65
Conflict Score	32.6	8.5	16 to 58

Hospital Environment Characteristics

The distribution of subjects between two nursing units was proportional to the unit bed size. Third floor had 69% of the subjects ($n = 97$) and North Wing had 28% of the subjects ($n = 39$); the remainder were discharged from the pediatric and surgical floors. Day shift accounted for 88%

($n = 123$) of the discharges with the remainder on evening shift.

Table 3

Nursing Environment Characteristics.

Characteristic	<u>M</u>	<u>SD</u>	Range
% Primary Care Assignments			
Day Shift	.26	.29	0 to 1
Evening Shift	.58	.35	0 to 1
Combined Shifts	.42	.21	0 to 1
RN Workload in PCHs*			
Day Shift	21.5	1.7	16.4 to 25.2
Evening Shift	26.2	2.9	14.1 to 35.6
Combined Shifts	23.9	2.0	17.6 to 29.3
% Continuity of RN Care			
Day Shift	.36	.22	0 to .73
Evening Shift	.32	.20	0 to .73
Night Shift	.36	.20	0 to .78
Combined Shifts	.34	.17	0 to .73

*Patient Care Hours (PCH) as measured by the GRASP Nursing Workload Management System.

Nursing Care Organization. On day shift, 26% of the patient assignments were primary nursing care (each RN does total patient care rather than team assignment with an aide). On evening shift, 58% of the assignments were primary care. Table 3 lists these percentages.

RN Workload. RN workload for an 8-hour shift, defined in patient care hours (PCH) as measured by the GRASP Nursing Workload Management System, averaged 21.5 hours on the day shift. Day shift was budgeted for 40% of each patient's PCHs (based on a 24-hour time period). Day shift nursing care hours (NCH) therefore averaged 8.6 hours for direct patient care ($21.5 \times .40$). Evening shift workload averaged

26.2 PCHs. Budgeted for 32% of the PCHs, this averaged 8.4 NCHs. Table 3 lists these hours.

Continuity of Care. Continuity of care, or the number of RNs who cared for the subject, was indexed with a range of 0 (no continuity--a different RN every shift) to 1 (complete continuity--the same nurse every shift). On day shift, the mean index was .36, or 36% of the time on this shift the same RN cared for the subject. On evenings the mean was .32, and on night shift .36. Table 3 lists these percentages.

Consultations. Most subjects' (99%) hospitalization and history were reviewed by a Hospital Discharge Planner, and 56% ($n = 79$) were followed by the Planner until discharge. Social Worker Consultation was obtained for 11% of the subjects ($n = 15$) with 87% of these followed until discharge.

Discharge Day of the Week. The most frequent discharge day of the week was Friday, followed by Tuesday and Thursday respectively. Table 4 lists these frequencies.

Table 4

Discharge Day

Day	<u>N</u>	%
Monday	14	10
Tuesday	27	19
Wednesday	16	11
Thursday	25	18
Friday	34	24
Saturday	15	11
Sunday	9	6

Discharge Planning Outcomes

Of the 140 subjects, 135 were available for follow-up telephone interview. Interviews took place within one week of discharge for 95% of the subjects (mean, median, and mode were all 4 days). The remaining interviews ($n = 7$) were equally distributed between days 8 to 15; these subjects were unavailable sooner for a variety of unrelated reasons. Those subjects ($n = 5$) who refused follow-up telephone interviews gave one of the following reasons; either too busy, too ill, or they changed their mind about participation.

Table 5

Knowledge Scores For Regime Changes.

Knowledge Scores	<u>N</u>	<u>M</u>	<u>SD</u>	Possible	% of Possible
Activity	135	5.7	0.6	2 to 6	95%
Medications	119	13.0	3.5	3 to 18	72%
Diet	51	7.4	1.6	3 to 9	82%
Treatments	54	8.3	1.3	3 to 9	92%

Note: Low scores reflect low knowledge.

Patient Knowledge. Knowledge was assessed regarding activity, medications, diet, and treatments, for those areas only where subjects were sent home with a changed regime. Therefore sample size varies for each knowledge area. Table 5 lists the number of subjects with regime changes in each area, mean knowledge score, possible score, and the percentage of the possible score which the mean represents. Activity was best understood followed by treatments and

diet. Medications were least understood, with the mean score of 13 representing only 72% of the possible score.

Table 6

Regime Change: Percentages of Instruction Satisfaction, Perception of Preparation, and Provider Recollection.

Regime Change	Satisfied		Prepared		Provider	
Activity (N = 135)	Not	05	Not	06	No One	53
	Average	91	Average	90	MD	33
	Very	04	Very	04	RN	16
					PT	07
Medications (N = 119)	Not	15	Not	14	No One	31
	Average	70	Average	70	MD	39
	Very	15	Very	16	RN	41
					Leaflet	26
Diet (N = 51)	Not	22	Not	22	No One	47
	Average	63	Average	63	MD	30
	Very	16	Very	16	RN	09
					RD	32
Treatments (N = 54)	Not	07	Not	09	No One	13
	Average	65	Average	69	MD	50
	Very	27	Very	22	RN	52
					Other RN	20

Note: Decimal points not printed.

Perception of Satisfaction and Preparation. Of the subjects discharged with new regimes, their perception of satisfaction with the instruction received and their perception of being prepared to continue this regime were also measured. The Table 6 lists these perceptions with the recollection of who provided instruction in each area. More than one provider gave instruction in several areas.

Overall, subjects were satisfied with the instruction that they received and perceived themselves to be prepared to continue new regimens at home. The grand mean for satisfaction with teaching was 2.01 (SD .35) and the grand mean for preparation was 2.00 (SD .35).

Service and Supply Arrangements. Figure 3 and Figure 4 diagram the discussion of service and supply arrangements for those arrangements made prior to the current hospitalization (Prior), arrangements made with discharge (Discharge), and those arrangements needed or desired by subjects after discharge (Needed). Figure 3 diagrams the number of items arranged for each subject and Figure 4 diagrams the most common items arranged. Prior to hospitalization, 33% (n = 46) of the subjects had from one to five services and/or supplies arranged for their home use. These 93 arrangements continued after discharge.

One hundred twenty-seven services and supplies were arranged through discharge planning for 53% of the subjects (n = 74). Most (55%) required only one arrangement. The most frequent arrangement was for Home Health Nursing (HHRN) follow-up after discharge; 68% (n = 47) received this service. Of the arranged services, 93% were available when required and 92% were actually utilized by the subject. Those items available but not used were most often "stand-by" equipment for ambulation or treatments. Only one ambulation device did not arrive on time. Home health and

Figure 3
Number of Services Arranged Per Patient

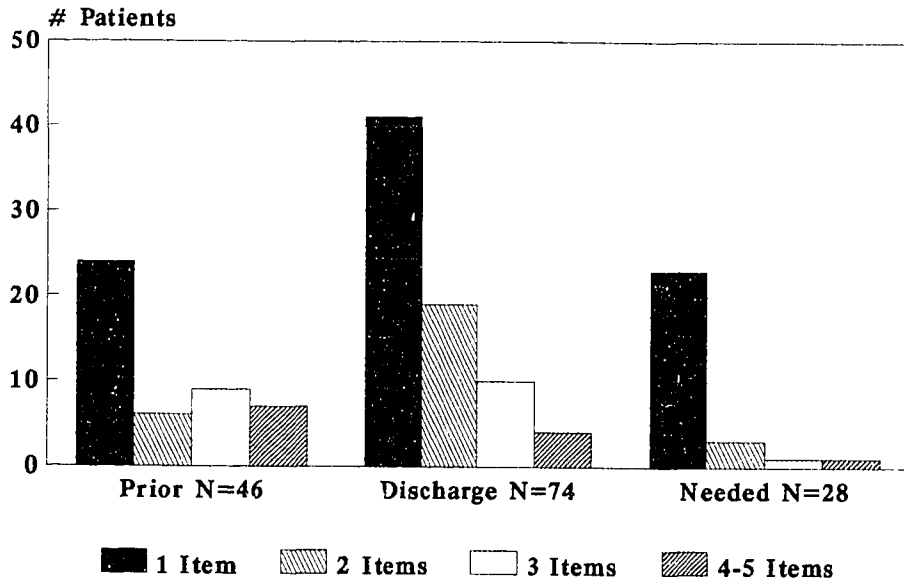
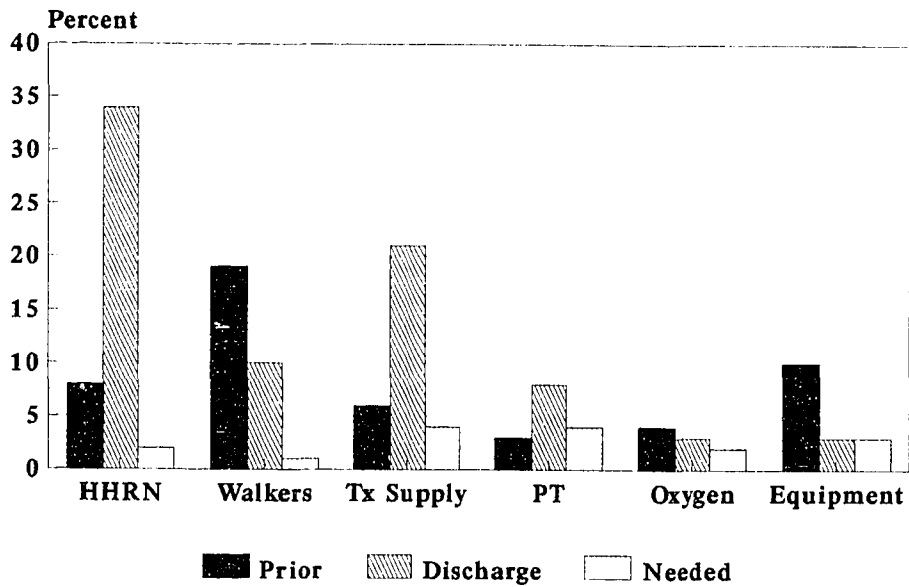


Figure 4
Most Common Supply Arrangements



physical therapy services each were not available, and therefore not used, for 2 subjects.

After hospital discharge, 21% of the subjects ($n = 28$) identified needs or desires that were not arranged through discharge planning. Figure 3 demonstrates that 82% only identified one service or supply, and one subject each had 3 and 4 needs. Figure 4 demonstrates the identity of the needed items; equipment and treatment supplies were identified by 54% ($n = 15$) and homemaker services and meal services each were identified by 18% ($n = 5$). It should be noted that homemaker services were not arranged through discharge planning but lists of referral names were given to each of these subjects prior to discharge.

Follow-up Service Utilization. Clinic charts for all 140 subjects were reviewed from hospital discharge through 30-days after discharge. Service utilization was evaluated by the number of clinic visits, advice-nurse telephone calls, emergency room (ER) visits, the number of diagnostic tests performed such as laboratory tests and x-rays, and the number of additional referrals made. Table 7 lists these services.

Post-hospitalization clinic visits were scheduled an average of 13 days (SD 8.8) after hospital discharge, ranging from 1 to 30 days. Eight subjects were not seen within the 30-day time period. Seven days was the modal time ($n = 11$).

Table 7

30-Days Post Discharge Follow-up Service Utilization.

30-Day Service Usage	<u>M</u>	<u>SD</u>	Range	Mode
Clinic Visits	2.3	1.6	0 to 8	1 (<u>n</u> =42)
Advice Calls	1.6	1.9	0 to 12	0 (<u>n</u> =47)
ER Visits	0.4	0.6	0 to 3	0 (<u>n</u> =99)
Tests	4.7	6.0	0 to 37	0 (<u>n</u> =41)
Referrals	0.3	0.5	0 to 2	0 (<u>n</u> =106)

Advice telephone calls were placed by 93 subjects.

Most (62%) placed only one or two calls. The purpose of the advice call was as follows: 32% for the same problem as the admission diagnosis; 45% for a problem related to the admission diagnosis; and 23% for a problem other than the admission diagnosis.

As shown in Table 7, 71% of the subjects were not seen in the emergency room (ER) during the 30-day period after discharge. Of the 41 that were seen, 76% were seen only once. The purpose of the ER visit was as follows: 49% for the same problem as the admission diagnosis; 27% for a problem related to the admission diagnosis; and 24% for a problem other than the admission diagnosis.

The number of diagnostic tests performed on subjects during this time period ranged from 0 to 44. Tests were counted in the following manner. Laboratory tests were counted individually; for example, a Complete Blood Count (CBC) was totaled as 4 tests (red blood cells, hemoglobin, hematocrit, and platelets) and a CBC with Differential was counted as 5 tests. This method was used to distinguish

between those subjects who simply had a hemoglobin and hematocrit completed. Each x-ray view counted as one test, and each procedure such as a biopsy, endoscopy, or culture also counted as one test.

Additional referrals during the first 30-days after discharge were placed for 24% ($n = 34$) of the subjects. Thirty subjects needed 1, and 4 subjects needed 2. One referral was made for physical therapy and one for Meals on Wheels. The remaining referrals were unrelated to the hospitalization, as for example, a podiatry consult and a new surgical consult.

Patient Placement. Three subjects died within the first 30-days after hospital discharge. Two died on day 7, and one died on day 15. All had a poor prognosis upon discharge and were expected to be terminal.

Thirteen percent of the subjects ($N = 18$) were readmitted to the hospital within 30 days of discharge. Nine were readmitted within the first week, 4 in the second, 3 in the third, and 2 in the fourth. The purpose of the readmission was as follows: 61% for the same problem as the original admission diagnosis; 6% for a related problem; and 33% for a different problem. Length of stay for readmission ranged from 0 (one subject died) to 46 days ($M = 10.3$, $SD = 13.4$, median 7). All of these subjects stated that during the original hospitalization they were ready for discharge-- they were not discharged too soon. Three mentioned the physician had allowed them to stay several days longer than

planned, until they were ready to go home. Most returned home after readmission ($n = 13$), but 2 were discharged to a skilled nursing facility, 1 to a relative's home, and 2 died.

Those subjects readmitted were examined as a group compared to those that were not. Patient characteristics and DCP outcomes were examined through t-tests to see if the groups differed. The groups differed only on three variables--total number of clinic visits ($\bar{x} = 2.2, p < .05$), number of emergency room visits ($\bar{x} = 6.4, p < .00$), and number of diagnostic tests ($\bar{x} = 2.0, p < .05$). For all variables, the readmission group consumed more services.

One subject was admitted to a rehabilitation hospital after returning home for two weeks. This was a planned admission. The rehabilitation hospital accepted her as soon as a bed became available.

Research Question Analyses

Question One

What is the level of discharge preparation in a sample of age 65 or greater medical patients discharged from an HMO hospital to home?

These subjects perceived that they were satisfied and prepared for hospital discharge based on the instruction received for their continued health regime (see Table 6). Subjects stated they were prepared or very prepared in the following areas: 91% for treatments, 94% for activities, 86% for medications, and 79% for diet. They also stated they

were satisfied or very satisfied with the instruction received for discharge as follows: 92% for treatments, 95% for activities, 85% for medications, and 79% for diet. Scores were obtained for each subject only in those areas with new or changed regimes (diets $n = 51$, medications $n = 119$, treatments $n = 54$, or activity levels $n = 135$), therefore, sample size varied.

Subjects were most knowledgeable about continuing their activity once discharged. Of 135 subjects who completed the interviews, the mean knowledge score was 95% of the possible score. Of interest, is that 53% ($n = 71$) did not recall receiving instruction about activity yet 95% were satisfied with the amount of instruction received. Treatment knowledge was 92% of the possible score for 54 subjects. Again, 13% did not recall receiving instruction, yet 92% were satisfied with the instruction received.

Knowledge scores for diet regime changes were 82% of the possible score ($n = 51$). Of these subjects, 47% ($n = 25$) did not recall diet instruction yet only 22% stated they were not prepared to continue this at home, and only 22% were not satisfied with the instruction received.

Knowledge scores for medication regime changes were 72% of the possible score ($n = 119$). Of these subjects, 31% ($n = 36$) did not recall receiving instruction, yet 85% were satisfied with the instruction received. Only 14% did not feel prepared to continue their regime.

The need for supplies and services were met for most subjects. One hundred twenty-seven services and supplies were arranged through discharge planning for 53% of the subjects ($n = 74$) (see Figures 3 and 4). Of these services, 93% were available when required by the patient. After hospital discharge, 21% of the patients ($n = 28$) identified additional needs that were not arranged through discharge planning. Most (82%) identified only one service or supply that was needed. Most frequently (54%), equipment and treatment supplies were identified as the needed item.

Question Two

What is the level of service utilization in a sample of age 65 or greater medical patients discharged from an HMO hospital to home?

Prior to hospitalization, 33% of the subjects ($n = 46$) had 93 services arranged for their home use. With hospital discharge planning, 74 (53%) subjects had 127 services arranged for home use. During the 30-days after hospital discharge, these subjects used 1901 services (tests, procedures, clinic visits, advice calls, ER visits, and hospital readmissions) through the hospital and clinics. Therefore, with a total of 220 services and supplies continued after hospital discharge and the 1901 services utilized after discharge through the clinic and hospital, a grand total of 2121 services were utilized by this sample ($M = 15.1$, $SD = 11.6$, median 10). Table 8 demonstrates this utilization.

Table 8

Service Utilization.

Services	<u>n</u>	<u>M</u>	<u>SD</u>	Range	Median	Mode
Prior to Discharge	46	2.0	1.3	1 to 5	1	1
Discharge Planning	74	1.7	1.0	1 to 5	1	1
30-Day Utilization	140	13.6	11.2	1 to 53	10	6

Question Three

Is there a relationship among patient characteristics and discharge preparation?

Certain patient characteristics were related to discharge preparation outcomes. Table 9 displays the single order correlations (Pearson Product Moment) calculated with pairwise deletion methods. Patient demographics were represented by the variables age, gender, and the number of people living in the subject's home (House). Illness demographics were represented by length of stay (LOS), number of months with admission diagnosis (Months), the average GRASP score for each subject in the 24-hours prior to discharge (GRASP), the number of days hospitalized in the past 12-months (DaysHosp), and the number of secondary diagnoses at discharge (OtherDx). Social support was represented with the number of important persons currently in the subject's life (List), the IPRI support subscale score (Support), and the IPRI conflict subscale score (Conflict). Functional status was represented by the Katz ADL score and the QAM subscales of Ambulation (Ambu), Psychological distress (Psych), and Selfcare.

Discharge preparation was defined as the following subject outcomes: knowledge scores in activity, medications, diet, and treatment; preparation scores; satisfaction scores; number of arrangements made through discharge planning; the number of arrangements needed after discharge; overall satisfaction with the instruction received; and the perception of preparation for discharge.

Overall satisfaction with the instruction received and the perception of preparation for discharge were not statistically distinct concepts. Of 135 subjects, the mean (2.0), median (2.0), mode (2.0) and standard deviation (.35) were identical for the two concepts. The single order correlation was .92 ($p < .0000$). Therefore, the decision was made to utilize satisfaction as a single outcome to represent perceived satisfaction with their preparation to return home.

Patient characteristics were related to discharge preparation outcomes (Table 9). Functional status and social support variables were related to the number of arrangements made. The variable Arrangements was positively related to LOS and ADL dependencies (both the QAM and Katz measures). The Katz instrument scored high for more dependence while the QAM subscales of Ambu, Selfcare, and Psych scored high for more independence, therefore the correlations are negative and positive respectively. Subjects with more dependencies and longer LOS needed more arrangements (and vice versa). Arrangements was negatively

related to the number of persons listed as important in the subject's life (List); those with fewer persons listed needed more arrangements. Arrangements was positively related to Needs (number of items subjects needed after discharge). The number of months since diagnosis (Months) was also positively related to subjects requiring additional arrangements (Needs) and vice versa.

Knowledge scores were also related to patient characteristics. Diet scores were positively related to the ambulation subscale of the QAM; high scorers were more mobile and vice versa. Subjects that were older (Age), male (Gender), and had additional diagnoses at discharge (Other diagnoses) had lower medication knowledge scores (and vice versa). Education level was not a significant variable between high and low medication knowledge scorers.

By examining Table 9, it is easily noted that patient characteristic variables were interrelated (multicollinearity). Therefore, principle components analysis was conducted (Appendix 2) both as a data reduction technique for the numerical patient characteristics and as a method of dealing with multicollinearity (Dunteman, 1989). Five components or factors emerged using Kaiser's Rule of retaining components with eigen values greater than 1.0, each with several variables loading greater than .40 after Varimax rotation (McLaughlin & Marasauilo, 1990).

Table 9

Single Order Correlations: Patient Characteristics & Discharge Preparation Outcomes.

Variable	1.Gen	2.Age	3.Hou	4.LOS	5.Mon	6.GRA
1. Gender	1.0					
2. Age	-.04	1.0				
3. House	-.15	-.17*	1.0			
4. LOS	-.01	-.03	.03	1.0		
5. Months	.01	-.02	-.11	.02	1.0	
6. GRASP	.07	.00	-.03	.12	.00	1.0
7. DaysHosp	.10	-.15	.15	-.05	.10	.26**
8. OtherDx	-.16*	.09	.08	.16*	.03	.22**
9. List	-.01	-.08	.09	-.12	.01	-.05
10. Conflict	-.03	-.24**	.08	-.05	.12	-.19*
11. Support	.00	-.03	-.10	.01	-.17*	.00
12. Katz	.15	.09	.07	.26**	.05	.44**
13. Ambu	-.09	-.03	-.08	-.33**	.01	-.39**
14. Selfcare	-.08	-.01	-.12	-.27**	-.02	-.50**
15. Psych	-.10	.17*	-.01	-.12	-.25**	-.24**
16. Activity	-.03	-.07	.07	-.11	-.03	-.09
17. Medication	.17*	-.34**	.13	.02	.08	-.08
18. Diet	.18	-.11	-.03	-.10	-.04	-.18
19. Treatment	-.01	.07	-.02	.10	.09	-.11
20. Satisfaction	-.13	-.02	-.05	.23**	.07	.03
21. Arrangements	-.03	.05	-.06	.21**	.12	.15
22. Needs	.08	-.14	-.05	-.02	.18*	.09

Note: Point biserial correlation used for dichotomous Gender. Decimal points for correlation coefficients not printed. *p<.05, two-tailed; **p<.01, two-tailed.

Table 9 (continued)

Patient Characteristics & Discharge Preparation Outcomes.

Variable	7.Days	8.Oth	9.List	10.Con	11.Sup	12.Katz
7. DaysHosp	1.0					
8. OtherDx	10	1.0				
9. List	03	-09	1.0			
10. Conflict	-19*	-14	03	1.0		
11. Support	05	-01	31**	-29**	1.0	
12. Katz	15	06	-23**	-16*	-06	1.0
13. Ambu	-07	-09	22**	14	02	-84**
14. Selfcare	-20**	-15	22**	15	06	-90**
15. Psych	-19*	-10	04	-05	32**	-26**
16. Activity	-08	-04	05	09	02	-12
17. Medication	00	-23**	15	00	06	-13
18. Diet	-20	-09	11	14	-17	-19
19. Treatment	-01	15	17	-05	00	-17
20. Satisfaction	15	-04	00	-06	05	-02
21. Arrangements	09	02	-26**	-11	-05	35**
22. Needs	00	08	-05	-03	10	01

Note: Decimal points for correlation coefficients not printed. *p<.05, two-tailed; **p<.01, two-tailed.

Table 9 (continued)

Patient Characteristics & Discharge Preparation Outcomes.

Variable	13.Ambu	14.Self	15.Psy	16.Act	17.Med	18.Tre
13. Ambu	1.0					
14. Selfcare	82**	1.0				
15. Psych	23**	35**	1.0			
16. Activity	08	01	02	1.0		
17. Medication	17	14	-06	27**	1.0	
18. Diet	29*	26	-17	46**	17	1.0
19. Treatment	15	09	-08	33**	11	-01
20. Satisfaction	-01	-02	-05	24**	23**	00
21. Arrangements	-32**	-30**	-26**	-23**	-15	-19
22. Needs	-08	00	-09	-12	15	-05

Note: Decimal points for correlation coefficients not printed. *p<.05, two-tailed; **p<.01, two-tailed.

Table 9 (continued)

Patient Characteristics & Discharge Preparation Outcomes.

Variable	19.Trea	20.Sat	21.Arr	22.Need
19. Treatment	1.0			
20. Satisfaction	.20	1.0		
21. Arrangements	-.12	.13	1.0	
22. Needs	-.02	-.02	.22**	1.0

Note: Decimal points for correlation coefficients not printed. * $p < .05$, two-tailed; ** $p < .01$, two-tailed.

Component or factor scores were created using the CRUNCH Statistical package (Bostrom, 1991) for each subject for use in further analyses. Table 10 displays the correlation matrix of these factors with patient outcomes. Factor 1, describing ADLs, explained 40% of the variance and contained the QAM subscale variables Selfcare and Ambulation, the Katz score, the average GRASP score, and LOS. Factor 2, labeled distress, explained 19% of the variance with the variables Months (since diagnosis) and the QAM psychological Distress score. Factor 3, social support, explained 16% of the variance with two IPRI variables List and Support. Factor 4, labeled age, explained 13% of the variance with the variables age and House (number of persons living in the subjects home). Factor 5, labeled stressors, explained 12% of the variance with the variables DaysHosp (days hospitalized in the past 12 months), OtherDx (number of diagnoses at discharge), and the IPRI Conflict score.

Table 10

Correlation Matrix for Patient Characteristic Factors and Patient Outcomes.

Variable	1	2	3	4	5
1. Factor 1 ADL	1.0				
2. Factor 2 Distress	00	1.0			
3. Factor 3 Social Support	00	00	1.0		
4. Factor 4 Age	00	00	00	1.0	
5. Factor 5 Stressors	00	00	00	00	1.0
6. Activity Knowledge	09	04	01	10	-08
7. Medication Knowledge	12	-07	18*	22**	-15
8. Diet Knowledge	28*	-08	-12	10	-19
9. Treatment Knowledge	16	-06	-03	-05	15
10. Satisfaction	-04	-07	06	-02	04
11. Arrangements Made	-35**	-15	-11	-10	04
12. Needed Arrangements	-03	-14	07	-01	03

*p< .05, two-tailed; **p< .01, two-tailed.

Multiple regression analyses were run using the factors independent variables to represent the numerical patient characteristics, with each of the discharge preparation dependent variables. Table 11 displays the regression analyses results with the ANOVA F-test to examine for statistical significance.

Patient characteristics did significantly explain variance in two outcome variables--medication knowledge and number of arrangements. R-square, or the percent of explained variance (Cohen & Cohen, 1983), was 13% for Medication Knowledge and 17% for Arrangements. Squared-semi-partial values (sr-squared) describe the percent of explained variance individual variables contribute to the dependent variable (Cohen & Cohen).

Table 11

Multiple Regression Analyses: Patient Characteristics & Discharge Preparation Outcomes.

Outcome Variable	R	R-square	F	p-value	DF
Activity Knowledge	.16	.03	0.67	0.64	5,129
Medication Knowledge	.37	.13	3.50	0.00	5,113
Diet Knowledge	.31	.10	0.98	0.44	5,45
Treatment Knowledge	.23	.05	0.53	0.75	5,48
Overall Satisfaction	.11	.01	0.34	0.89	5,129
Number of Arrangements Needed	.41	.17	5.18	0.00	5,134
Arrangements Needed	.16	.03	0.27	0.60	5,129

Note: Patient Characteristics represented by 5 Principle Components Factors.

For Medication Knowledge, Factor 1 (ADL) explained most of this variance with a squared semi-partial value of .13, and Factor 2 (distress) explained some of this variance with a squared semi-partial value of .03. For Arrangements, Factor 3 (social support) explained part of this variance with a squared semi-partial value of .04, and Factor 4 (age) explained some of this variance with a squared semi-partial value of .05.

Question Four

Is there a relationship among patient characteristics and service utilization?

Functional status, illness severity, and social support were all related to service utilization. Table 12 displays single order correlations (Pearson Product Moment) calculated using pairwise deletion. The number of clinic visits, advice telephone calls, emergency room visits,

diagnostic tests, additional referrals, and hospital readmissions during the 30-days after discharge are listed.

Table 12

Single Order Correlations: Patient Characteristics & Service Utilization.

Variable	21	22	23	24	25	26
1. Gender	00	14	-07	08	18*	-04
2. Age	-11	00	-02	02	00	04
3. House	09	02	24**	11	-01	-07
4. LOS	-13	16*	02	13	01	04
5. Months	05	07	-02	02	24**	-04
6. GRASP	04	22**	02	12	16*	01
7. DaysHosp	10	08	13	20**	08	-09
8. OtherDx	07	09	05	14	03	-06
9. List	08	00	07	18*	00	-04
10. Conflict	05	-05	-02	-17*	00	-08
11. Support	00	04	03	11	-13	08
12. Katz	-07	19*	-05	12	22**	05
13. Ambu	10	-19*	11	-08	-15	-09
14. Selfcare	02	-26**	08	-11	-11	-08
15. Psych	-10	-29**	-03	-15	-04	02
16. Factor 1	08	-24**	08	-11	-14	-09
17. Factor 2	-12	-15	03	-05	-20**	07
18. Factor 3	07	03	05	18*	-02	02
19. Factor 4	15	02	18*	06	-03	-10
20. Factor 5	08	10	16	22	02	-07
21. # Clinic	1.0					
22. # Advice	16*	1.0				
23. # ER	32**	10	1.0			
24. # Tests	40**	24**	38**	1.0		
25. # Referrals	16*	14	-03	08	1.0	
26. # Readmits	-16	-07	43**	15	-04	1.0

Note: Decimal points for correlation coefficients not printed. * $p < .05$, two-tailed; ** $p < .01$, two-tailed.

Patient characteristics were related to service utilization outcomes. Six functional status characteristics were related to the number of advice telephone calls placed by subjects. The more dependence, the more calls and vice versa. (The Katz instrument scores high for more dependence while the QAM subscales of Ambu, Selfcare, and Psych score

low). Emergency room visits were positively related to the number of people living in the subjects home. The number of diagnostic tests performed was positively related to the number of days hospitalized in the past 12-months. Tests also were related to social support--lower conflict scores and more important people in their lives were associated with more tests (and vice versa). The number of additional referrals made was also related to functional status; subjects with more time with their diagnoses (Months), higher GRASP scores, and more dependencies (Katz) were related to more referrals (and vice versa). Female gender was also positively related to more referrals.

A multiple regression analysis was conducted with the five patient characteristic factors and Total Services utilized as the dependent variable. Total Services was calculated as a total score for the number of clinic visits, advice telephone calls, emergency room visits, diagnostic tests, additional referrals, and hospital readmissions during the 30-days after hospital discharge. Patient characteristics did significantly explain 11% of the variance in the number of total services utilized by patients during this 30-day period. Factor 5 (stressors) explained most of this variance, with a squared semi-partial value of .05, and Factor 3 (social support) explained some of this variance with a squared semi-partial value of .03.

Table 13

Multiple Regression Analysis: Patient Characteristics & Service Utilization.

Outcome Variable	R	R-square	F	p-value	DF
Total Services	.33	.11	3.37	0.01	5,134

Question Five

Is there a relationship among hospital environmental characteristics and discharge preparation?

Data on environmental characteristics were collected for day and evening shifts for RN Workload and Organization of Care; and day, evening, and night shifts for Continuity of Care. Factor analyses were conducted with these variables and their respective grand means. Using the same criteria as in Question Three, four components or factors emerged. One factor each emerged for the Continuity of Care and Workload variables, each loading only the shift data and grand mean, with loadings from .78 to .99. Therefore, it was decided that the grand mean for each of these variables would represent the concepts.

Day shift and evening shift organization of nursing care (primary assignment versus team assignment) was not represented by one principle components factor. Two factors emerged, each with the grand organization mean and one shift's organization mean. This demonstrated that the grand mean would not represent organization both on day and evening shifts, therefore the individual shift variables

were used in regression analyses. Table 14 displays the single order correlations (Pearson Product Moment) produced with pairwise deletion methods, for hospital environmental variables and discharge preparation outcomes.

Only one hospital environmental characteristic was related to a discharge preparation outcome. Continuity of care was moderately related to overall patient satisfaction. Patients that had higher RN continuity tended to be more satisfied and vice versa.

Table 14

Single Order Correlations: Hospital Environmental Characteristics & Discharge Preparation Outcomes.

Variables	1	2	3	4
1. Organization Days	1.0			
2. Organization PMS	-.12	1.0		
3. Continuity of Care	-.19*	.09	1.0	
4. Work Load	-.17*	.01	.01	1.0
5. Activity Knowledge	-.05	.03	-.05	-.08
6. Medication Knowledge	.00	-.04	.06	.00
7. Diet Knowledge	.09	-.22	-.19	.05
8. Treatment Knowledge	-.08	-.09	-.02	-.02
9. Satisfaction	-.12	.02	.21**	.01
10. Arrangements Made	-.19	.01	.09	.17
11. Needed Arrangements	.24	-.16	.01	.27

Note: Decimal points for correlation coefficients not printed. * $p < .05$, two-tailed; ** $p < .01$, two-tailed.

Two hospital environmental variables had data that were not numerical. Discharge Day of the Week was categorical. Contingency tables were developed by equally dividing all of the outcome variables into low, average, and high scores. Chi-Square statistics were then used to explore these relationships (Cohen & Cohen, 1983). None of these

relationships reached statistical significance. A Discharge Planner following the patient until discharge was a dichotomous variable, which allowed the use of a point biserial correlation coefficient to explore relationships (Cohen & Cohen). Table 15 presents these findings.

Table 15

Relationships of Categorical Hospital Environmental Characteristics & Discharge Preparation Outcomes.

Outcome Variable	DC Planner Follow#	Day of Discharge@
Activity Knowledge	-24**	10.8 (df 12)
Medication Knowledge	-26**	7.8 (df 12)
Diet Knowledge	-11	10.4 (df 12)
Treatment Knowledge	-06	14.9 (df 12)
Satisfaction	02	15.8 (df 12)
Number of Arrangements Needed Arrangements	23*	20.4 (df 24)
	12	11.2 (df 18)

Note: Decimal points for correlation coefficients not printed. *p<.05, two-tailed; **p<.01, two-tailed.
Point biserial r; @ Chi-square statistics.

Significant relationships were found among outcome variables and the discharge planner following the patient until discharge. Those subjects followed had lower knowledge scores for activity and medications and had more arrangements made for discharge (and vice versa). Chi-square was performed with Follow and Arrangements, which was not statistically significant (Chi-square 2.2, df 3, p<.52). Of interest, is that only 39% of the 28 subjects who identified additional needs after discharge were not followed until discharge. Two subjects had multiple needs (3 and 4 items), both of which were followed by a planner.

Of the 26 subjects with 1 or 2 needs, 58% were also followed by a planner.

Multiple regression analyses were conducted utilizing the numerical hospital environmental characteristics as independent variables (RN Workload, Organization of Care, and Continuity of Care) with the discharge preparation variables as dependent variables. Table 16 displays these results with the ANOVA F-test to examine for statistical significance.

Table 16

Multiple Regression Analyses: Hospital Environmental Characteristics & Discharge Preparation Outcomes.

Outcome Variable	R	R-square	F	p-value	DF
Activity Knowledge	.13	.02	0.54	0.71	4,130
Medication Knowledge	.07	.00	0.16	0.95	4,114
Diet Knowledge	.26	.07	0.85	0.50	4,46
Treatment Knowledge	.14	.02	0.24	0.91	4,49
Overall Satisfaction	.22	.05	1.70	0.15	4,130
Number of Arrangements	.25	.06	2.48	0.06	4,135
Needed Arrangements	.22	.05	1.80	0.13	4,135

Hospital environmental characteristics did not significantly explain the variance in discharge preparation outcomes at an alpha level of .05. Although Arrangements was not statistically significant ($p < .06$), it was interesting to note that continuity of care was the variable contributing to the explained variance with a squared semi-partial of .03.

Question Six

Is there a relationship among hospital environmental characteristics and service utilization?

Hospital environmental characteristics were related to service utilization. Table 17 displays these single order correlations (Pearson Product Moment) calculated using pairwise deletion. The number of tests performed within 30-days of discharge were related to day-shift organization; those subjects that required more tests after discharge tended to have more primary RN assignments on the day shift and vice versa. The number of advice calls was related to continuity of care; those subjects who placed more advice telephone calls tended to have more continuous RN assignments while hospitalized and vice versa. Three variables, number of emergency room visits, the number of tests performed, and the number of additional referrals made, were related to RN workload. Those patients that utilized more ER visits and tests tended to have RNs with lighter workloads while hospitalized and vice versa. Those patients that required additional referrals tended to have RNs with heavier workloads while hospitalized and vice versa.

Table 17

Single Order Correlations: Hospital Environmental Characteristics & Discharge Preparation Outcomes.

Variables	1	2	3	4
1. Organization Days	1.0	----	----	----
2. Organization PMS	-12	1.0	----	----
3. Continuity of Care	-19*	09	1.0	----
4. Work Load	-17*	01	01	1.0
5. # Clinic Visits	06	-02	-03	02
6. # Advice Calls	-06	-13	17*	02
7. # ER Visits	11	00	02	-23**
8. # Tests	19*	-05	15	-17*
9. # Referrals	-16	03	09	24**
10.# Readmissions	-02	-06	-02	04

Note: Decimal points for correlation coefficients not printed. *p<.05, two-tailed; **p<.01, two-tailed.

A multiple regression analysis was conducted using the four environmental variables with Total Services utilized as the dependent variable. This analysis (Table 18) was significant statistically at an alpha of .05. The variables that explained this variance were Organization on Days (squared semi-partial .03) and Continuity of Care (squared semi-partial .04).

Table 18

Multiple Regression Analyses: Hospital Environmental Characteristics & Service Utilization.

Outcome Variable	R	R-square	F	p-value	DF
Total Services	.27	.07	2.75	0.03	4,135

These relationships demonstrated in Question Six appeared to be spurious. Although these relationships were

looked for theoretically, they were expected to be in the opposite directions or no relationship at all. Based on the literature, one would expect that those subjects who while hospitalized had less continuity of care, fewer primary-care assignments, and higher workload, would require more services after discharge as their needs for knowledge or service and supplies were not assessed prior to discharge. For additional referrals, the relationship to RN workload was as expected (positive). But for the remaining variables, the opposite relationships were found.

Continuity of nursing care was positively related to the number of advice telephone calls subjects made after discharge. Both Factor 1 (ADL) and Factor 2 (distress) from the patient characteristics were also related to continuity of care. Factor 1 was related to continuity with an $r = -.32$, $p < .01$, and Factor 2 was related to continuity with an $r = +.18$, $p < .05$. Subjects with more dependencies, longer LOS, more Psychological distress, and more months with their diagnoses had more continuity (and vice versa). Those subjects who placed advice calls were statistically different from those who did not place calls in ADL scores, social support scores, and service utilization. Appendix 3 lists the t-tests for the means of these two groups. Nurses may have made assignments in such a manner that patients who had more dependencies, distress, and longer LOS, (i.e. required more assistance) had the same nurse assigned to them more often; or a longer LOS may have allowed more

continuity with part-time nursing schedules. Factor 1 was also related to advice calls such that patients with more dependencies made more advice calls ($r = -.24$, $p < .01$).

If the relationship between continuity and advice calls was spurious based on multicollinearity with Factor 1 (ADL), then one would predict that in the contextual regression analysis with both Factor 1 and Continuity, Factor 1 would suppress the variance that Continuity explained in Total Services (one of which was Advice). This was not the case. In the regression of environmental characteristics on service utilization, Continuity had a squared semi-partial of .0369 (Question Six); with the contextual regression analysis where Factor 1 was controlled in step 1, Continuity had a squared semi-partial of .0419 (Question Ten).

RN workload and the nursing assignment organization (primary care assignments) on day-shift also demonstrated spurious relationships with service utilization (Table 17). Day-shift primary care assignment organization was positively related to the number of tests performed within 30-days of discharge. RN workload was negatively related to both the number of ER visits and the number of tests performed. This relationship suggested that with assignment decisions, those assignments that were primary may have had a different patient population. Perhaps this population would include more complicated patients, in which case more RN duties and less aide duties were required. Primary assignments had fewer patients per assignment than team

assignments, so perhaps overall, the hours of care were less. More complicated patients would be expected to have more diagnostic tests and perhaps more ER visits after discharge.

Analysis of these relationships suggested that some variable used in the assignment making decision (team or primary, continuity, and workload) was not captured in this study. To explore this further a different outcome variable was calculated. The number of diagnostic tests performed was related to the number of days hospitalized in 12-months. Lack of knowledge and inadequate service or supplies would theoretically impact the other service utilization variables more, so Tests was removed from Total Services and the regression analyses were repeated (Table 19).

Table 19

Multiple Regression Analyses: Patient and Hospital Environmental Characteristics with Service Utilization (With and Without Diagnostic Tests).

Outcome Variable	R	R-square	F	p-value	DF
Patient Characteristics					
5 Services	.31	.10	2.85	0.02	5,134
6 Services	.33	.11	3.37	0.01	5,134
Hospital Characteristics					
5 Services	.10	.01	0.34	0.85	4,135
6 Services	.27	.07	2.75	0.03	4,135

As expected, environmental characteristics no longer explained the variance in service utilization while patient characteristics continued to explain the variance with both service totals. But by removing Tests, the patient

characteristic variables which explained this variance changed from Factor 3 (social support) and Factor 5 (stressors) to Factor 2 (distress; sr-squared .04) and Factor 4 (age; sr-squared .02).

Question Seven

Is there an individual effect of patient characteristics after controlling the effects of hospital environmental characteristics on discharge preparation?

Hospital environmental characteristics were controlled by statistically accounting for these variables first in the regression equation (step 1), then adding the patient characteristic variables (step 2) for each of the dependent outcome variables. Table 20 displays the results of these contextual regression analyses.

Step 1 of these analyses were discussed already with the multiple regression analyses in Question Five. The environmental variables were regressed on the outcome variables and only Arrangements reached statistical significance. With the addition regression of patient characteristics after environmental characteristics were accounted for, both Arrangements and Medication Knowledge were statistically significant.

Table 20

Contextual Multiple Regression Analyses: Patient
Characteristic Effects on Discharge Preparation Outcomes
After Controlling Hospital Environmental Characteristics.

Outcome Variable	R-square	R-square Change	F	p-value
Activity Knowledge				
Step 1	.02	.02	0.53	0.71
Step 2	.04	.02	0.66	0.65
Medication Knowledge				
Step 1	.01	.01	0.18	0.95
Step 2	.17	.16	4.32	0.00
Diet Knowledge				
Step 1	.07	.07	0.91	0.47
Step 2	.22	.15	1.57	0.19
Treatment Knowledge				
Step 1	.02	.02	0.23	0.92
Step 2	.07	.05	0.52	0.76
Overall Satisfaction				
Step 1	.05	.05	3.68	0.16
Step 2	.08	.03	0.84	0.52
Number of Arrangements				
Step 1	.06	.06	2.59	0.03
Step 2	.19	.13	4.22	0.00
Needed Arrangements				
Step 1	.05	.05	1.79	0.13
Step 2	.08	.03	0.79	0.56

Note: Step 1 = hospital environmental characteristics entered; Step 2 = patient characteristic factors entered.

There was an individual effect of patient characteristics with the outcome Arrangements. The outcome of Arrangements was statistically significant after both steps 1 and 2. The set of variables for environmental characteristics in step 1 only explained 6% of the variance. With the second set of variables added at step 2--patient characteristics, an additional 13% of the variance was accounted for (R-square change). Factor 1 (ADL) uniquely contributed 13% to this explained variance (squared semi-

partial) and Factor 2 (distress) uniquely explained 3%. The explained variance for the equation (R-square) increased from .17 to .19, an additional 2% from the regression with just the set of patient characteristic variables.

There was also an individual effect of patient characteristics with the outcome Medication Knowledge. This outcome was statistically significant only after step 2. With the second set of variables added to the equation, 17% of the variance was accounted for (R-square). The explained variance for the equation increased from .13 to .16, an additional 3% from the regression with just patient characteristics. While Factor 3 (social support; sr-squared .06) and Factor 4 (age; sr-squared .06) continue to explain this variance, Factor 1 (ADL) also contributed 03%.

Question Eight

Is there a contextual effect of hospital environmental characteristics after controlling the effects of patient characteristics on discharge preparation?

Patient characteristic variables were controlled by statistically accounting for these variables first in the regression equation (step 1), then adding the hospital environmental characteristics (step 2) with each of the dependent outcome variables. Table 21 displays the results of these contextual regression analyses.

Step 1 of these analyses were discussed already with the multiple regression analyses in Question Three. When the patient characteristic variables were regressed on the

outcome variables, Arrangements and Medication Knowledge reached statistical significance. With the additional regression of environmental characteristics after patient characteristics were accounted for (step 2), none of the outcome variables were statistically significant. This means that the environmental characteristics did not explain additional variance after the patient characteristics were accounted for.

Table 21

Contextual Multiple Regression Analyses: Hospital Environmental Characteristic Effects on Discharge Preparation Outcomes After Controlling Patient Characteristics.

Outcome Variable	R-square	R-square Change	F	p-value
Activity Knowledge				
Step 1	.02	.02	0.66	0.65
Step 2	.04	.02	0.53	0.71
Medication Knowledge				
Step 1	.13	.13	3.53	0.00
Step 2	.17	.04	1.17	0.33
Diet Knowledge				
Step 1	.10	.10	1.03	0.41
Step 2	.22	.12	1.57	0.20
Treatment Knowledge				
Step 1	.05	.05	0.49	0.78
Step 2	.07	.02	0.26	0.90
Overall Satisfaction				
Step 1	.01	.01	0.35	0.88
Step 2	.08	.07	2.29	0.06
Number of Arrangements				
Step 1	.17	.17	5.41	0.00
Step 2	.19	.02	1.09	0.36
Needed Arrangements				
Step 1	.03	.03	0.75	0.59
Step 2	.08	.05	1.84	0.12

Note: Step 1 = patient characteristic factors entered; Step 2 = hospital environmental characteristics entered.

Question Nine

Is there an individual effect of patient characteristics after controlling the effects of hospital environmental characteristics on service utilization?

Hospital environmental characteristics were controlled by statistically accounting for these variables first in the regression equation (step 1), then adding the patient characteristic variables (step 2) for the dependent variable Total Services. Due to the spurious relationships noted in Question Six, the analysis was again run with the outcome of Services without Tests. Table 22 displays the results of this contextual regression analyses.

Table 22

Contextual Multiple Regression Analyses: Patient Characteristic Effects on 30-Day Service Utilization After Controlling Hospital Environmental Characteristics.

Outcome Variable	R-square	R-square Change	F	p-value
Total Services				
Step 1	.08	.08	3.06	0.02
Step 2	.20	.12	3.99	0.00
Services without Tests				
Step 1	.01	.01	0.37	0.83
Step 2	.11	.11	3.04	0.01

Note: Step 1 = hospital environmental characteristics entered; Step 2 = patient characteristic factors entered.

Step 1 of these analyses were discussed already in Question Six--the environmental characteristics variables were statistically significant when regressed on Total Services but not on Services without Tests. With the

additional regression of patient characteristics after the environmental characteristics were accounted for (step 2), both analyses became statistically significant. Therefore, there was an individual effect.

The variances in both service utilization variables were explained by the same variables as demonstrated in earlier analyses. After removing tests, the variables which explained the variance changed from Factor 3 (social support; sr-squared .04) and Factor 5 (stressors; sr-squared .04) with Total Services to Factor 2 (distress; sr-squared .05) and Factor 4 (age; sr-squared .03) in Services without Tests. The amount of explained variance for the equations (R-squared) was 20% Total Services and only 12% for Services without Tests.

Question Ten

Is there a contextual effect of the hospital environmental characteristics after controlling the effects of patient characteristics on service utilization?

Patient characteristics were controlled by statistically accounting for these variables first in the regression equation (step 1), then adding the hospital environmental characteristic variables (step 2) for the dependent variable Total Services. Again, due to the spurious relationships noted in Question Six, the analysis was also run with the outcome of Services without Tests included. Table 23 displays the results of these contextual regression analyses.

Table 23

Contextual Multiple Regression Analyses: Hospital
Environmental Characteristic Effects on 30-Day Service
Utilization After Controlling Patient Characteristics.

Outcome Variable	R-square	R-square Change	F	p-value
Total Services				
Step 1	.11	.11	3.62	0.00
Step 2	.20	.09	3.52	0.00
Services without Tests				
Step 1	.10	.10	2.82	0.02
Step 2	.12	.02	2.71	0.62

Note: Step 1 = patient characteristic factors entered; Step 2 = hospital environmental characteristics entered.

Step 1 of this analysis was discussed already in Question Four--the patient characteristics variables were statistically significant when regressed on Total Services and Services without Tests. With the additional regression of hospital environmental characteristics after the patient characteristics were accounted for (step 2), only the analysis of Total Services remained statistically significant with the additional 9% of variance explained (R-square change). One variable contributed to this additional to this explained variance--continuity of care, which uniquely contributed 4% (squared semi-partial). The amount of explained variance for the total equation increased from 11% to 20% by controlling patient characteristics. But when Tests were removed from Total Services, the analysis was not statistically significant.

Other Findings

Medication knowledge was identified as an important issue both in this study and in the literature. The means score in this study was only 72% of the possible score; while 31% of the subjects did not recall instruction, 85% were satisfied with the instruction that they received. Only 14% of the subjects were not prepared to continue their regime at home. Several variables in this study demonstrated significant correlations with medication knowledge scores, and there were significant multiple regression and contextual regression analyses too. Therefore, three aspects of medication knowledge scores were explored further: Were subjects that scored high and low different? Did scores vary with the instruction provider? Which questions contributed to low knowledge scores?

To examine if subjects that scored high on medication knowledge were different from those that scored low, they were divided into two groups based on their scores. Possible scores ranged from 6 to 18; these scores were divided at 12, with a low score group from 6 to 12 ($n = 50$), and high score group from 13 to 18 ($n = 69$). Mean scores were calculated for each group and t-tests were calculated to determine if there were significant differences between groups for the following variables: age; gender; Katz ADL score; number of people living in their house; number of important people in their life; IPRI Support and Conflict scores; QAM Selfcare, Ambulation and Psychological Distress

scores; months with admission diagnoses; number of other diagnoses, days hospitalized in the past 12-months; average GRASP score; LOS; organization of day and evening shifts; RN workload; continuity of care; activity knowledge; diet knowledge; medication satisfaction; overall satisfaction; total services used in 30-days; and the number of arrangements mad, needed, and previously made. Table 24 demonstrates those variables where there were significant group differences.

Table 24

Group Mean Differences for High Medication Knowledge and Low Medication Knowledge Groups.

Characteristic	M	SD	t-test	p-value
Age				
Low	76.0	8.2	3.1	.001
High	71.9	5.3		
QAM Ambulation				
Low	7.0	1.3	-2.4	.02
High	7.5	0.9		
# Other Diagnoses				
Low	3.3	1.6	2.5	.01
High	2.5	1.8		
Activity Knowledge				
Low	5.5	0.9	-2.3	.02
High	5.8	0.5		
Medication Satisfaction				
Low	1.9	0.5	-2.4	.02
High	2.1	0.6		
Overall Satisfaction				
Low	1.9	0.3	-2.6	.01
High	2.1	0.4		

The groups differed statistically significantly on 6 variables. Low scorers tended to be older, less ambulatory, and had more secondary diagnoses. Low scorers also had

lower activity scores; the means differed by 0.3 points which clinically would not be significant. Low scorers also were less satisfied overall and with medication instruction; again, the means differed by 0.2 on a scale of 3, which would not have clinical significance.

The relationships among the instruction provider and knowledge scores and satisfaction scores were examined using Chi-square statistics. All the knowledge scores were distributed equally into thirds to represent low, average, and high scores. Satisfaction scores were already categorical, as not satisfied, satisfied, and very satisfied. Table 25 displays these statistics. Cramer's V statistics were also calculated as a measure of association between the categorical variables, with V-squared demonstrating the percent of explained variance (Bostrom, 1991; Cohen & Cohen, 1983).

Table 25

Chi-Square Statistics: Provider by Knowledge and Satisfaction Scores.

Scores	<u>Chi-square</u>	<u>df</u>	V	V-square
Activity Knowledge	11.2	6	---	---
Activity Satisfaction	13.7*	6	.21	.05
Medication Knowledge	13.3*	6	.20	.04
Medication Satisfaction	45.5**	6	.38	.14
Diet Knowledge	2.1	6	---	---
Diet Satisfaction	17.5**	6	.38	.14
Treatment Knowledge	8.2	8	---	---
Treatment Satisfaction	23.1**	8	.39	.15

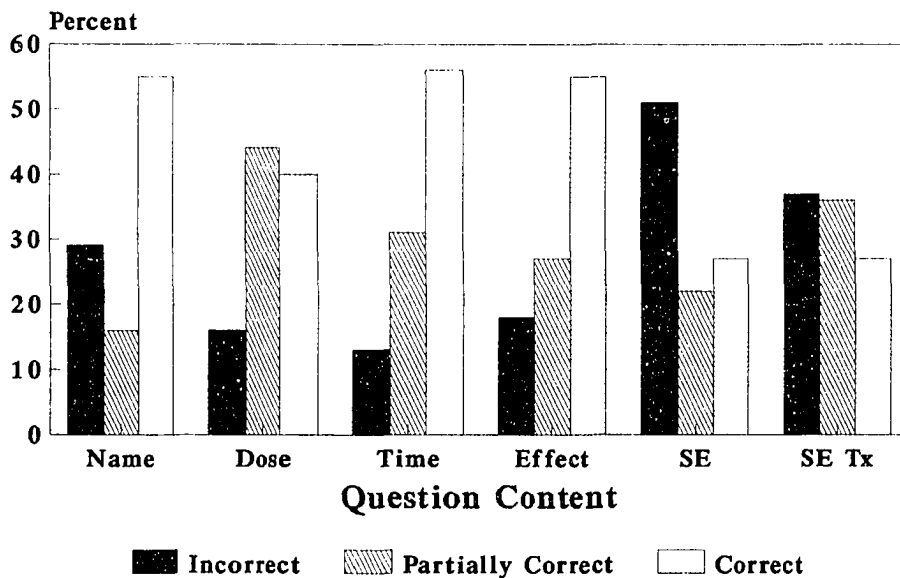
*p<.05, **p<.01

Of the knowledge scores, only medication scores were significant by provider. Those subjects who did not recall anyone providing instruction (31%) were more likely to have low scores and least likely to have high scores. Of the 119 subjects discharged with a new medication regime, 39% recalled a doctor providing instruction (Table 6); 59% of these patients had high scores, 30% average scores, and 11% low scores. Forty-one percent recalled an RN providing instruction, of which 48% had high scores, 31% average scores, and 20% low scores.

All satisfaction scores were significant by provider at an alpha of 0.05. For activities, 91% ($n = 123$) of the subjects were satisfied with their instruction. Of the 5% that were not satisfied, 60% did not recall receiving instruction; and of the 4% that were very satisfied, 33% were instructed by physical therapists. For medications, 70% ($n = 82$) of the subjects were satisfied with their instruction. Of the 15% that were not satisfied, 57% did not recall receiving instruction. None of the subjects who did not recall medication instruction were found in the very satisfied group. Of those who recalled either a doctor or an RN providing instruction, 30% were very satisfied and 4% were not satisfied. For diet instruction satisfaction, 63% ($n = 32$) were satisfied with their instruction; of the 22% that were not satisfied, 58% did not recall receiving instruction. None of the subjects who did not recall diet instruction were found in the very satisfied group. Of the

16% that were very satisfied, 57% recalled a registered dietician (RD) as the provider. For treatment instruction, 65% ($n = 35$) were satisfied with their instruction; of the 7% that were not satisfied, 60% did not recall receiving instruction. Of the 27% that were very satisfied, 52% recalled an RN providing instruction.

Figure 5
Medication Knowledge Responses



N = 119

Figure 5 displays frequencies for responses to the medication questions. Responses were scored as correct, partially correct, and incorrect. Two questions had more incorrect responses--the side effects of the medication (51%) and how to treat those side effects (37%). Chi-square statistics were used to examine if the provider of instruction was related to side effect responses (Table 26).

Table 26

Chi-Square Statistics: Provider by Medication Question Response.

Scores	<u>Chi-square</u>	<u>df</u>	V	V-square
Side Effect				
No One	10.2**	2	.29	.09
Doctor	12.6**	2	.33	.11
Nurse	4.4	2	---	---
Leaflet	1.6	2	---	---
Side Effect Treatment				
No One	11.9**	2	.32	.11
Doctor	19.5**	2	.41	.16
Nurse	4.0	2	---	---
Leaflet	1.4	2	---	---

*p<.05, **p<.01

For both side effect questions, two providers were significant, no one and the doctor. Those subjects that could not recall instruction being provided gave incorrect responses when asked to identify the medication side effect 56% of the time; they gave incorrect responses to side effect treatment 72% of the time. In contrast, those

patients that recalled a physician providing instruction gave correct responses when asked to identify the medication side effect 39% of the time; they gave correct responses to side effect treatment 48% of the time.

Chapter V: Discussion

Meaning of Findings

Since the PPS implementation, health care literature has documented that HMO hospital LOS for Medicare recipients (the elderly) has decreased (Stern et al, 1990). With shortened LOS, HMO patient satisfaction was also noted to decrease (Wagner et al, 1990). The average LOS for medical and surgical Medicare patients has been report as 11 days for a combined sample of HMO and fee-for-service patients (Kosencoff, 1990). In this study, LOS for HMO medical subjects was 8.7 days, lower than 11 days, but perhaps not a fair comparison as one would expect elderly surgical patients to have higher LOS. Although LOS was short, these HMO subjects were still very satisfied with their care. Most subjects (76%) felt they were involved in the decision of when discharge should occur. Only 2 subjects verbalized that they felt they could have stayed longer, but both admitted that they did well once home. Over all aspects of care, 88% of these subjects were either satisfied or very satisfied. For this sample of HMO elderly, LOS did not appear to decrease satisfaction.

Whether LOS impacted hospital readmission rates is unknown. The readmission rate of 13% (within 30 days of discharge) found in this study was much lower than published rates which have ranged from 22% to 37% (Naylor, 1990). Of the readmitted subjects, all had verbalized that they were

not discharged too soon and 3 stated that they were allowed to stay longer until they were ready for discharge.

Health care literature suggests that HMOs have a financial incentive to shift services from in-patient to out-patient (Wrightson, 1990). Service utilization was high in this sample during the first 30-days after discharge (mean 15.1 services). But without a matched sample of non-HMO subjects, one can not infer if there was a service shift to less costly out-patient services.

Concerns found in the literature (Gallant & Meisenheimer, 1985; Kramer & Schalenberg, 1987a, 1987b) as to whether patients were too ill to learn discharge instructions may have been valid regarding medication instruction. Low knowledge scores (by healthcare professional standards) did not relate to subjects perceiving themselves as unprepared to continue their regimes. This finding agrees with the work of Fredrick, Sharp, and Atkins (1988) who also found that adult patients lacked essential knowledge by professional standards yet perceived themselves as prepared. These authors stated that 59% of their sample lacked knowledge in essential areas. When essential information was described, they reported that 95% knew the name of their medication and 52% could list 1 side effect. In this sample, 55% knew the correct name of their medication and 49% could list a side effect.

Few of the subjects in this study had a perfect knowledge score for diet, activities, treatments, or

medications. With the exception of medications, mean scores were above 80%, which in most testing situations, would be considered a "passing" score. Those subjects with low medication scores were older, less ambulatory, and had more secondary diagnoses. These subjects may very well have been too ill to learn while hospitalized. On a positive note, these same subjects were followed by an RN discharge planner throughout their hospitalization and had more arrangements for their discharge. The most common arrangement was for home health nurses to follow the subjects at home.

If patients were too ill to learn, they may also not recall instruction given. Arenth and Mammon (1985) reported that 33% to 53% of the subjects who did receive instruction did not recall it. In this study, 13% to 53% did not recall instruction in the four content areas, but it was not confirmed if instruction was given. Instruction may have been given to family members. Kramer and Schalenberg (1987a, 1987b) documented that teaching included more family members when LOS was short. In this study, 86% of the subjects did not think their family was involved with DCP. Yet the social support factor was positively related to higher medication scores. Perhaps the subjects were not aware of the family member interactions with members of the health care team.

Knight (1985) suggested a lack of role clarity for discharge planning and teaching. This may partially explain the low medication knowledge scores in this study. Subjects

recalled both doctors and nurses as providing instruction. Again, some subjects did not recall receiving instruction and these subjects were more likely to have low scores. Of those that did recall a physician providing instruction, 59% had high scores. One wonders if subjects paid more attention if a physician took the time to discuss a medication. If instruction occurred and it was not recalled, perhaps the format was too informal.

Most of the patients had at least one new regime to continue after discharge. New medications were the most common item (88%), followed by treatments (40%) and diet changes (38%). These figures are somewhat comparable to Wolock's (1987) study of adults in multiple hospitals; here 84% had medication regimes, 58% had special diets, and 23% had treatments. Wolock also reported those who had difficulty with their new regime: 24% with medications, 43% with diet, and 25% with treatments. This study asked a different question, but the idea was similar. Subjects were asked, after they were home and had opportunity to know, if they were adequately prepared for their new regime. This self reporting was lower than Wolock's findings; 14% with medications, 21% with diet, 9% with treatments, and 6% with activities stated they were not prepared.

Patient needs have not always been met through DCP (Lindenberg & Coulton, 1980; Wolock, 1987). In this sample, 127 services were arranged for 53% of the sample. This is comparable to Wolock's (1987) report of 52%, and lower than

Lindenberg and Coulton's report of 63%. Of these services, 93% were available when the subject needed them and 9 % were actually utilized by subjects. This suggests fairly accurate patient assessment--neither over nor under ordering of services and supplies.

A need for mobility devices has been a concern expressed in the literature. Arenth and Mamon (1985) reported that nurses over assessed patient functional status abilities and under assessed their need for mobility devices. Only 1 subject in this study expressed the desire for a walker after discharge; this subject desired this equipment to be "on stand-by" in case needed and did not require it for daily use. This suggests that subject mobility needs were accurately assessed.

After discharge, 21% of the subjects identified a desired or needed item. This number is lower than Wolock's (1987) report of 30%. Treatment supplies were the most common supply needed and physical therapy was the most common service desired (4 subjects each).

Fredrick, Sharp, and Atkins (1988) suggested that patients experiencing the most difficulty with discharge plans were hospitalized for a new illness. This study demonstrated support for this relationship. The number of months since diagnosis was related to subjects having more needs after discharge. This was also related to a perception of less social support and more psychological distress. Although difficulty after discharge was not

directly measured, these relationships support that prediction.

Social support also proved to be related to the amount of discharge planning required. Those subjects with fewer people listed as important in their lives required more arrangements to be made for discharge. Those subjects with more psychological distress also required more arrangements.

Functional status, as expected, also was an important variable for the amount of planning required and the number of services utilized. Those subjects with more dependences required more arrangements, additional referrals after discharge, and placed more advice telephone calls. Those subjects with longer LOS and higher GRASP numbers also made more advice calls. Those that had been hospitalized more days in the past year also required more tests.

Hospital environmental variables did not demonstrate many relationships with DCP outcomes. Continuity of care was related to overall satisfaction; and instruction provider was related to overall satisfaction and individual satisfaction scores. Generally, those subjects that received instruction from a health professional were more likely to be satisfied. Physicians providing medication instruction was also related to higher knowledge scores.

Significance and Implications for Nursing

These findings reinforce the importance of hospital DCP for elderly patients. The majority of the subjects were discharged with a regime change in diet, medications, treatments, or activities. New medications were sent home with 85% of the subjects. Fifty-three percent required service arrangements at discharge. Yet with all these "new" regimes and needs, only 14% of the subjects perceived their family members to be involved in planning for discharge.

Patients likely to need additional assistance after discharge can be identified through screening procedures. Patient demographics, illness characteristics, and social support were related to discharge planning outcomes. Current measures of patient characteristics, such as the GRASP Nursing Workload Management Tool, demonstrated relationships with functional status measures. These existing measures could be incorporated into needs assessment tools.

The ability of elderly patients to learn instruction for their continued health care is not yet clear. Patients may be too ill to learn while hospitalized, or LOS may be too short to allow time to learn, or patients may not have the need to learn what health care providers consider to be essential. Those patients prone to lower knowledge scores (men, older, and with more secondary diagnoses in this study) could be identified and additional education efforts applied.

Nurses and other health professionals might explore the standards we have set for patient knowledge compared to patient standards for needed knowledge. Perhaps we have not adequately educated patients as to the need for the knowledge about medications, diet, treatments, and activities. Or perhaps our expectations of elders are too high. While exploring what we want patients to know, clarification needs to occur or responsibility determined for who will prepare patients for discharge on topics that cross disciplines.

Medication knowledge was identified in this study as an area that needed improvement. Within the HMO industry, this may also be an issue. Feldon (1991) reported that at one Kaiser hospital, 17% of older members' hospital admissions were due to adverse drug reactions. In this study, medication side effect recognition and treatment were the content areas that patients most often did not know.

Limitations

The major limitation of this study concerns sampling. Subjects were from one HMO hospital. The logistics of obtaining a randomized sample of eligible patients proved to be unfeasible and the sample became a convenience sample of all eligible medical patients over an 11-month time span. External validity, or generalizability, is limited to an HMO population; this could be increased by the use of multiple sites and randomized sampling procedures.

Knowledge score interrater reliability was enhanced by the use of descriptors for each question response. Only one rater, the investigator, was used for all subjects but investigator bias could be a threat. Knowledge scores were not normally distributed for diet, activity, and treatments (medication scores were normally distributed). Activity scores were skewed toward high scores with 79% obtaining the maximum score; spread of the data was minimal with the SD of .66. Diet scores were somewhat skewed toward high scores, with 35% obtaining the maximum; data spread was better with a SD of 1.6. Treatment scores also were skewed toward high scores with 67% obtaining the maximum score; data spread was over the entire range, with a SD of 1.3.

These scores demonstrated a measurement problem. A ceiling effect was noted as most patients obtained the maximum score. This created less score variance. With only small amounts of score variance, it was difficult to significantly explain this variance. Large sample sizes would be required to statistically explain small effect sizes (Cohen & Cohen, 1983). Sample sizes varied based on the number of subjects that had regime changes. Statistical power is the probability that statistical significance will be attained given that there really is an effect (Lipsey, 1990). Based on the study sample sizes, the power for these analyses were calculated using a hypothetical effect size of .15 and an alpha level of .05. Table 27 displays these analyses. Smaller sample sizes clearly decreased power.

Table 27

Power Analyses for Knowledge Scores.

Scores	N	#IV*	Power**
Patient Characteristics			
Diet	51	5	.48
Treatments	54	5	.50
Activities	135	5	.94
Environmental Characteristics			
Diet	51	4	.49
Treatments	54	4	.51
Activities	135	4	.94
Contextual Regression			
Diet	51	9	.44
Treatments	54	9	.47
Activities	135	9	.96

* independent variables; ** alpha .05.

Methodology

In correlational designs, measurement reliability and validity are critical (Brink & Wood, 1989). Chapter III discussed the known reliability and validity of the instruments used. Chronbach's alpha reliabilities for this sample were as follows: Katz .85; QAM .88; IPRI Support .87; IPRI Conflict .85; Medication Scores .91; Diet Score .88; Treatment Score .82; and Activity Score .85.

Functional status, a measure of one patient characteristics, thought to be critical in this study, was measured by two instruments. Support for concurrent validity was found for these measures (Carmines & Zeller, 1979). Correlations between the Katz score and the QAM subscales were strong: Ambulation $-.84$, $p < .01$; Selfcare $-.90$, $p < .01$; and Psych $-.26$, $p < .05$. The negative

correlations were noted as the instruments scored dependence in opposite directions.

Functional status was a significant variable with many DCP outcomes. Factor 1 represented functional status with the Katz score, QAM subscales of Ambulation and Psych, LOS, and GRASP scores. The GRASP scores were thought to be both valid and reliable. Used to predict RN workload, this measure was thought to have predictive validity (Brink & Woods, 1983). Workload items were based on time-motion studies to perform patient centered tasks on each specific nursing unit. GRASP scores demonstrated moderate relationships with the number of days patients were hospitalized in the past year, number of secondary diagnoses, IPRI social conflict scores, and both functional status measures. Interrater reliabilities were measured monthly by Nurse Managers and were reported to have been above 90%. GRASP scores were also used to measure RN workload in this study.

Internal validity of the outcome measures of Needs, Satisfaction, and Knowledge may have been influenced by history (Brink & Woods, 1989). Needs and Satisfaction were patient perceptions of such. Telephone interviews were placed soon after discharge while the experience was still recent. This also allowed subjects an opportunity to discover if they were satisfied with their preparation and if there were additional needs identified. But during this time ($\bar{M} = 4$ days) external events may have altered the

relationships. Discussions with family, friends, neighbors, or health care providers may have influenced subjects' perceptions as other people shared their experience and opinions of what the subject should expect. Knowledge scores also were subject to influence from interactions with other people. Media sources also threatened internal validity. Several patients stated that they had medication reference books at home.

Follow-up service measurement was dependent on clinic chart accuracy. Results of tests and reports of procedures were used to tally services. Several subjects used more than one clinic, in which case, charts from all clinics were reviewed. To increase reliability, progress records were reviewed to validate additional services whose results were not found in the chart. Rehospitalization data was taken from both clinic charts and computer searches from the HMO data bank.

Power analyses were also calculated for the multiple regression and contextual regressions analyses in this study that obtained statistical significance. Table 28 displays these findings. The hypothetical effect size used in sample size determinations and in Table 27 appears to have been a fair estimation based on the true effect sizes found in Table 28. Alpha levels of both .05 and .01 were used in the power calculations; these are the probabilities of an erroneous statistical conclusion if there is truly no effect

(Type I error or alpha error) (Lipsev, 1990). All but one analysis had power greater than .80 at an alpha of .05.

Table 28

Power Analyses for Regression Analyses that Reached Statistical Significance.

Regression	N	#IV*	ES**	Alpha .05	Alpha .01
Patient Characteristics & Preparation Level					
Medication Score	119	5	.15	.81	.76
Arrangements	140	5	.20	.99	.98
Patient Characteristics & Service Utilization					
Total Services	140	5	.12	.88	.73
Services - Tests	140	5	.11	.87	.68
Environmental Characteristics & Service Utilization					
Total Services	140	4	.07	.68	.46
Patient Characteristics & Preparation Level (Environmental Characteristics controlled)					
Medication Score	119	9	.20	.88	.79
Arrangements	140	9	.23	.94	.94
Patient Characteristics & Service Utilization (Environmental Characteristics controlled)					
Total Services	140	9	.25	.99	.83
Services - Tests	140	9	.12	.80	.59

* independent variables;

** Effect size = (R-squared/1 - R-squared)

Future Research

Future research efforts are needed to replicate these findings in other HMO settings to increase generalizability, and in non-HMO settings to increase generalizability to other populations. This research is currently underway in two other HMO facilities. Research with a variety of samples is needed. This sample was well educated and somewhat affluent. Knowledge levels may differ with patient

demographics. Replication is also needed to examine if the relationships found in this study are reproduced in other studies, both within and outside of an HMO environment.

The relationships found in this study are diagramed in Figure 6. This diagram differs from Figure 2 which proposed relationships among the study constructs. The relationships proposed in Figure 6 are directional and allow hypotheses to be generated for future research. The following hypotheses are examples.

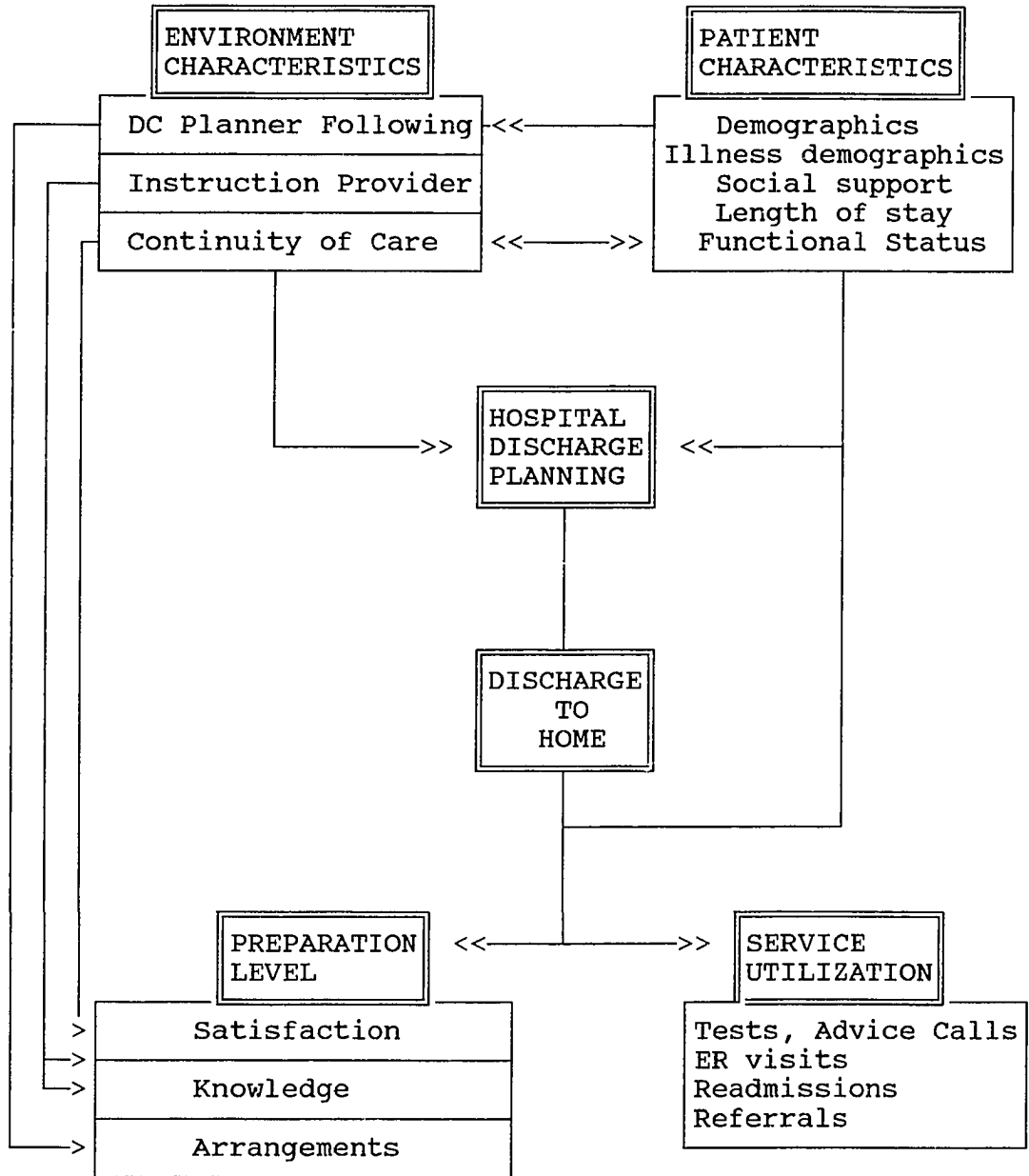
1. Increased continuity of RN caregivers increases patient satisfaction with DCP.
2. Formal discharge instruction provided by a health professional increases patient knowledge as measured by health professional standards for necessary knowledge.
3. Formal discharge instruction provided by a health professional increases patient satisfaction with DCP.
4. Patients that are followed by an RN Discharge Planner throughout their hospitalization are more likely to be satisfied with DCP.
5. Patients that are followed by an RN Discharge Planner throughout their hospitalization have more arrangements made for their discharge.
6. Patients with longer LOS and more dependencies are more likely to have an RN Discharge Planner follow them until discharge.
7. Patient demographics, illness demographics, social support, LOS, and functional status influence decisions

regarding RN assignments such that more complicated patients have more continuity.

8. Patient demographics, illness demographics, social support, LOS, and functional status are predictors of patient preparation level for discharge.

9. Patient demographics, illness demographics, social support, LOS, and functional status are predictors of patient service utilization after discharge.

Figure 6 Relationships of Study Constructs



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Appendix 1 Instruments for Discharge Outcomes

TELEPHONE INTERVIEW: DISCHARGE PREPARATION

1. Code Number:_____
2. Date of Interview:_____3. Time of Interview:_____

4. What was your medical diagnosis that required this hospitalization?
____Correct (3)
____Partially correct (2)
____Incorrect or does not know (1)

5. When would you seek medical attention again?
(All signs and symptoms which require a doctor's attention, such as bleeding, pain, fever, G.I. distress, continued weight loss.)
____Correct (3)
____Partially correct (2)
____Incorrect or does not know (1)

6. Where you sent home with any new medications?
____Yes; (2) Continue with 5-13
____No; (1) Move to question 14

7. What are the names of the medications you are taking at home?
____Correct (3)
____Partially correct (2)
____Incorrect or does not know (1)

8. How much medication do you take of each type?
(Dose is correct if given in mg., partially correct if in tablets only. Observer must ask for correct dosage if answer given in tablets initially.)
____Correct (3)
____Partially correct (2)
____Incorrect or does not know (1)

9. When will you be taking each medication?
(Includes both frequency and time of day.)
____Correct (3)
____Partially correct (2)
____Incorrect or does not know (1)

10. What do these drugs do for you, how do they help you?
(Medically intended effects of medication.)
____Correct (3)
____Partially correct (2)
____Incorrect or does not know (1)

11. What side effects should you be watching for?
(Potentially harmful and unintended effects.)
 Correct (3)
 Partially correct (2)
 Incorrect or does not know (1)
12. If you should have any side effects after taking the medication, what should you do for yourself?
(Complete, accurate statement of self-care activities for medication side effects.)
 Correct (3)
 Partially correct (2)
 Incorrect or does not know (1)
13. Who gave you instructions on your medications at the hospital?
Yes (1) No (2) Leaflet with medications
 No one Pharmacist
 Doctor Family/Friends
 Nurse Other
 Discharge planner Social Worker
14. How satisfied were you with the medication instructions that were given?
 Not Applicable (0) Not satisfied (1)
 Satisfied (2) Very Satisfied (3)
15. How well prepared do feel you are to continue your medications at home?
 Not Applicable (0) Not Prepared (1)
 Prepared (2) Very Prepared (3)
16. What are your activity limits (or requirements)?
(Describes plan for resumption of self-care, vocation, etc.)
 Correct (3)
 Partially correct (2)
 Incorrect or does not know (1)
17. How will you know if you have done too much?
 Correct (3)
 Partially correct (2)
 Incorrect or does not know (1)
18. Who gave you instructions about your activity level at the hospital? Yes (1) No (2)
 No one Physical therapist
 Doctor Family/Friends
 Nurse Other
 Discharge planner Social Worker

19. How satisfied were you with the activity instructions given?
 Not Applicable (0) Not satisfied (1)
 Satisfied (2) Very Satisfied (3)
20. How well prepared do feel you are to continue your activities at home?
 Not Applicable (0) Not Prepared (1)
 Prepared (2) Very Prepared (3)
21. Were you sent home on a **special diet** or a changed diet?
 No; go to question 28
 Yes: continue with questions 22-27
22. What type of diet are you on? (Specific statement: 500 mg sodium restriction, 1500 calorie, diabetic, etc.)
 Correct (3)
 Partially correct (2)
 Incorrect or does not know (1)
23. What types of foods should you avoid on this diet?
 Correct (3)
 Partially correct (2)
 Incorrect or does not know (1)
24. How much fluid are you supposed to drink in a day? (Amounts in quarts, pints, cc's, etc.)
 Correct (3)
 Partially correct (2)
 Incorrect or does not know (1)
25. Who gave you instructions about your diet at the hospital?
Yes (1) No (2)
 No one Dietician
 Doctor Family/Friends
 Nurse Other
 Discharge planner Social Worker
26. How satisfied were you with the diet instructions given?
 Not Applicable (0) Not satisfied (1)
 Satisfied (2) Very Satisfied (3)
27. How well prepared do feel you are to continue your diet at home?
 Not Applicable (0) Not Prepared (1)
 Prepared (2) Very Prepared (3)

28. Were any **treatments** continued after you returned home?
(Able to list procedures and treatments continued such
as dressing changes, ROM, traction, slings, braces,
etc.)

- Correct (3)
 Partially correct (2)
 Incorrect or does not know (1)

If no treatments, go to question 34

29. Why is this treatment important for your care?

- Correct (3)
 Partially correct (2)
 Incorrect or does not know (1)

30. Describe to me the treatment procedure as you learned
it.

- Correct (3)
 Partially correct (2)
 Incorrect or does not know (1)

31. Who gave you instructions about your treatments at the
hospital?

Yes (1) No (2)

- | | |
|--|--|
| <input type="checkbox"/> No one | <input type="checkbox"/> Clinic nurse |
| <input type="checkbox"/> Doctor | <input type="checkbox"/> Family/Friends |
| <input type="checkbox"/> Hospital nurse | <input type="checkbox"/> Respiratory therapist |
| <input type="checkbox"/> Discharge planner | <input type="checkbox"/> Physical therapist |

32. How satisfied were you with the treatment instructions
given?

- | | |
|---|---|
| <input type="checkbox"/> Not Applicable (0) | <input type="checkbox"/> Not satisfied (1) |
| <input type="checkbox"/> Satisfied (2) | <input type="checkbox"/> Very Satisfied (3) |

33. How well prepared do feel you are to continue your
treatments at home?

- | | |
|---|--|
| <input type="checkbox"/> Not Applicable (0) | <input type="checkbox"/> Not Prepared (1) |
| <input type="checkbox"/> Prepared (2) | <input type="checkbox"/> Very Prepared (3) |

34. Take a moment to think about **your involvement** with
the health care team in making your discharge plans.
Describe how involved you were using a scale of 1 to
10, where 1 represents no involvement, and 10
represents complete involvement in plans and decisions.

35. _____ Take a moment to think about your family's involvement with the health care team in making your discharge plans. Describe how involved you were using a scale of 1 to 10, where 1 represents no involvement, and 10 represents complete involvement in plans and decisions.

SCORING GUIDELINES:

Knowledge: Items 4, 5, 7, 8, 9, 10, 11, 12, 16, 17,
22, 23, 24, 28, 29, 30

Preparation: Items 15, 20, 27, 33

Satisfaction: Items 14, 19, 26, 32

Patient Participation: Item 34

Family Participation: Item 35

Descriptive Information: Items 6, 13, 18, 21,
25, 31

TELEPHONE INTERVIEW: SERVICES and SUPPLIES

1. Patient Code #: _____

I'm going to read you a list of services and supplies that might have been arranged for you through discharge planning. After each item, I will ask you these questions:

- A) Was this item arranged for you before you left the hospital?
- B) If it was arranged, was it available by the time you returned home and needed the item?
- C) Did you not use any of the items arranged for you?
- D) Did you find you needed items that were not arranged for you?
- E) Were you already receiving items before your hospitalization and now continue their use?

Home Health Care (Nursing care)

- 2. Yes No Was this arranged for you?
- 3. NA Yes No Was this available for you?
- 4. NA Yes No Did you use this?
- 5. Yes No Did you need this?
- 6. Yes No Were you already receiving this?

Physical therapy

- 7. Yes No Was this arranged for you?
- 8. NA Yes No Was this available for you?
- 9. NA Yes No Did you use this?
- 10. Yes No Did you need this?
- 11. Yes No Were you already receiving this?

Homemaker services

- 12. Yes No Was this arranged for you?
- 13. NA Yes No Was this available for you?
- 14. NA Yes No Did you use this?
- 15. Yes No Did you need this?
- 16. Yes No Were you already receiving this?

Meal service or assistance

- 17. Yes No Was this arranged for you?
- 18. NA Yes No Was this available for you?
- 19. NA Yes No Did you use this?
- 20. Yes No Did you need this?
- 21. Yes No Were you already receiving this?

Wheel chairs or ambulating devices such as a walker

22. Yes No Was this arranged for you?
23. NA Yes No Was this available for you?
24. NA Yes No Did you use this?
25. Yes No Did you need this?
26. Yes No Were you already receiving this?

Oxygen

27. Yes No Was this arranged for you?
28. NA Yes No Was this available for you?
29. NA Yes No Did you use this?
30. Yes No Did you need this?
31. Yes No Were you already receiving this?

Hospital bed

32. Yes No Was this arranged for you?
33. NA Yes No Was this available for you?
34. NA Yes No Did you use this?
35. Yes No Did you need this?
36. Yes No Were you already receiving this?

Other equipment such as ramps, toilet seat elevators, commodes, etc.

37. Yes No Was this arranged for you?
38. NA Yes No Was this available for you?
39. NA Yes No Did you use this?
40. Yes No Did you need this?
41. Yes No Were you already receiving this?

Treatment supplies such as syringes, dressing change supplies, pumps, suction equipment, incontinent supplies (chux or diapers), etc.

42. Yes No Was this arranged for you?
43. NA Yes No Was this available for you?
44. NA Yes No Did you use this?
45. Yes No Did you need this?
46. Yes No Were you already receiving this?

Other: _____

47. Yes No Was this arranged for you?
48. NA Yes No Was this available for you?
49. NA Yes No Did you use this?
50. Yes No Did you need this?
51. Yes No Were you already receiving this?

Appendix 2
Factor Analysis

Patient Characteristics

Eigenvalues of correlation matrix

<u>Factor</u>	<u>Eigen Value</u>	<u>Percent of Variance</u>
1	3.479	38.9
2	1.690	18.9
3	1.442	16.1
4	1.238	13.8
5	1.099	12.3

Sorted Varimax Rotated Factor Loadings

<u>Variable</u>	<u>Factor1</u>	<u>Factor2</u>	<u>Factor3</u>	<u>Factor4</u>	<u>Factor5</u>
Katz	-0.936	-0.084	-0.052	-0.038	-0.002
SelfCare	0.931	0.120	0.041	-0.068	-0.098
Ambulation	0.921	-0.013	0.077	-0.006	0.026
GRASP	-0.533	-0.232	0.187	-0.045	0.363
LOS	-0.386	0.152	-0.259	-0.003	0.128
Psych	0.282	0.683	0.128	-0.184	-0.099
List	0.229	-0.010	0.629	0.184	-0.101
Conflict	0.202	-0.172	-0.367	0.426	-0.480
DaysHosp	-0.130	-0.360	0.396	0.266	0.466
House	-0.075	0.264	-0.096	0.761	0.229
Months	0.065	-0.725	-0.068	-0.143	-0.045
OtherDx	-0.031	0.005	-0.221	0.001	0.798
Support	-0.329	0.384	0.728	-0.168	0.014
Age	-0.026	0.210	-0.217	-0.666	0.195
Variance	3.228	1.512	1.455	1.399	1.355

Appendix 3

Advice Telephone Calls: Group Differences Between Those Subjects that Placed Calls and Those Who Did Not.

Characteristic	<u>M</u>	<u>SD</u>	t-test	p-value
Katz ADL Score				
No Calls	0.4	0.9	-2.8	0.00
Placed Calls	1.1	1.5		
QAM SelfCare				
No Calls	22.5	2.1	2.9	0.00
Placed Calls	20.7	3.6		
QAM Ambulation				
No Calls	7.6	0.8	2.4	0.02
Placed Calls	7.0	1.5		
QAM Psych				
No Calls	6.3	1.5	2.9	0.00
Placed Calls	5.3	1.8		
GRASP Score				
No Calls	4.8	0.6	-2.4	0.04
Placed Calls	5.2	1.0		
Medication Knowledge				
No Calls	14.2	3.5	2.5	0.01
Placed Calls	12.3	3.2		
# Arrangements Made				
No Calls	0.6	1.0	-2.3	0.02
Placed Calls	1.1	1.1		
Total Services Used				
No Calls	7.4	9.9	-4.6	0.00
Placed Calls	17.4	11.6		