UTILIZATION OF KING'S INTERACTING SYSTEMS FRAMEWORK AND THEORY OF GOAL ATTAINMENT WITH NEW MULTIDISCIPLINARY MODEL: CLINICAL PATHWAY

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ABSTRACT

Background:

The critical role of research in nursing practice is the application of nursing theories to discover new knowledge. This study uses King's interacting systems framework and theory of goal attainment to investigate the effectiveness of implementing clinical pathways for patients undergoing transurethral resection of prostate (TURP) at Aga Khan University Hospital (AKUH), Pakistan.

Objective:

To assess the impact of the implementation of a clinical pathway for the surgical procedure of TURP on clinical quality, cost, and patient and staff satisfaction.

Study Design:

Quasi-experimental, non-equivalent control group study design using clinical pathway intervention.

Setting:

Aga Khan University Hospital (AKUH).

Subjects:

The study population consisted of a convenience sample of patients undergoing surgery for TURP (control and experimental) and health team members (nurses, physicians and others).

Study Findings:

Findings showed a significant difference in variances and outcomes as a result of TURP clinical pathway intervention. The clinical pathway significantly improved all twelve nursing and physician related variances and outcomes, such as: complete documentation; delayed consultation; delayed education; and other variances. Clinical pathway intervention also significantly reduced hospital related variances, and post-operative problems such as electrolyte imbalance, phlebitis, constipation, and urinary tract infection (UTI). The findings also showed significant improvement in patient and staff satisfaction, however no significant difference was observed in patient, hospital and financial related variances.

The current investigation identified that successful implementation of integrated clinical pathways can help health professionals, managers and administrators to meet one of their biggest challenges in making optimal use of limited resources while delivering high quality and timely care.

INTRODUCTION TO KING'S THEORETICAL SYSTEMS

King first published her conceptual framework in 1971 and further developed it into the theory of goal attainment in 1981 (Johson and Webber 2001). King's systems framework is based on the assumption that human beings are the focus of nursing. The goal of nursing is health: its promotion, maintenance, and/or restoration; the care of the sick or injured; and the care of the dying (King 1992). Husting (1997) stated: 'King's theory evolved from the General Systems Theory of Von Bertalanffly. The components of a system theory are: (a) goal; (b) structure; (c) functions; (d) resources; and (e) decision making' (p.15). King (1996) further stated that the 'nursing domain involves human beings, families, and communities as a framework within which nurses make transactions in multiple environments with health as a goal' (Norris and Frey 2001).

HISTORICAL DEVELOPMENT OF KING'S THEORETICAL SYSTEMS

King (1964) spoke of the need to focus on and organise existing knowledge in nursing, as well as expand the knowledge base for nursing practice. She identified concepts of social systems, health, interpersonal

relationships and perceptions as universal to the discipline of nursing (King 1995; 1968).

In 1971, King published a conceptual framework for nursing organised around personal, interpersonal and social systems. The concepts were expanded to include communication, interpersonal relationships, information, energy, social organisations, role and status. A more formalised framework by King was published in 1981.

In 1978, King stated that nursing needed to be promoted as a science, and that the relationship between nursing and research should be seen as a way to build scientific knowledge.

King (1981) introduced a theory of goal attainment, a middle-range theory derived from the conceptual system. Central concepts in the theory of goal attainment are perception, communication, interaction, transaction, self, role, growth and development, stressors/stress, time and space. The concepts of interaction, transaction, and perception form the core of a transactions process model. Transactions are critical antecedents to goal attainment. King is one of the few theorists to generate both a conceptual system and a middle-range theory for nursing.

Although there have been few changes to the conceptual system or theory of goal attainment since 1981, King and others have provided ongoing discussion and clarification of these theoretical and philosophical positions through debates in nursing journals and presentations (King 1988, 1989, 1990, 1991, 1992, 1995, 1997, 1999, 2000; Norris and Frey 2001). Changes to the conceptual system include: the addition of the concept of the personal system; spirituality as a basic aspect of human beings; and the request to use the term conceptual system rather than conceptual framework or paradigm (King 1997). Recently, King further discussed her perspective of the philosophy of human beings and the theory of goal attainment (King 1997).

RATIONALE OF THE STUDY

The primary focus of this investigation was to assess the impact of clinical pathways on clinical quality, cost, and patient and staff satisfaction. Clinical pathways use a multidisciplinary approach to the delivery of patient care; therefore the researcher saw the value of testing this concept of patient care in her work setting and, in the event of supportive findings, changing the model of nursing practice at Aga Khan University Hospital (AKUH) from the traditional to the multidisciplinary approach.

The most significant gap in the literature was the absence of any Asia-specific research studies conducted by clinical nurses and exploring the role of clinical pathways in improving clinical quality, patient and staff satisfaction. An obvious omission in the literature was any testing of these concepts in other Asian hospitals, or any application of nursing theories as a conceptual framework to test this concept. This study applied and tested King's theory of goal attainment to assess the benefits of TURP clinical pathways.

LITERATURE REVIEW

The literature outlines several benefits of clinical pathways. Chang Gung Memorial Hospital used 18 clinical pathways for urological procedures on 1,784 patients. The length of stay (LOS) reduced significantly by 11% (from 5.5 to 4.9 days); admission charges by 12.9%; and average hospital charges decreased significantly by 12.9% (Chang et al 1999).

John (2003) stated that clinical pathway implementation saved US$5.2 million in costs from medical operations over six years in the Children's Hospital, San Diego, United States of America. Healy (2002) reported that clinical pathway implementation for knee implant standardisation reduced LOS from 6.8 days to 4.2 days and hospital costs by 19%. Calhoun (2000) in her cohort study found a statistically significant difference in LOS with the use of clinical pathways for women having a vaginal delivery, resulting in cost reductions from US$3.2 million to $2.4 million. Healy (2002) found that a clinical pathway and knee standardisation program in reduced average LOS from 6.79 days in 1992 to 4.16 days in 1995.

Balesky and Provenzano (1995) found that implementation of a clinical pathway reduced average LOS for patients from 6.5 to 5.7 days and achieved per patient cost savings of US$3,100. Kevin et al (2000) reported that using clinical pathways for asthma management decreased the beta-agonist medication use for inpatients with asthma.

METHODOLOGY

A quasi-experimental design with non-equivalent groups was used to answer the research questions, objectives and hypotheses. The target population was all patients requiring TURP in Pakistan. The accessible population was those patients admitted to AKUH for TURP, resulting in a convenience sample.

The inclusion criteria were: patients who were considered by the urology surgeon and anaesthetist to be fit for TURP. The exclusion criteria were patients who had undergone emergency TURP and patients having multiple surgical procedures with several co-morbidities.

The current investigation also collected data from 1 August 2000 to 31 December 2002 from the health care team members who were involved in the direct care of patients with TURP. They included nurses, physicians, dietitians, pharmacists, and physiotherapists.

The researcher used a power analysis procedure to estimate a sample size of 200 patients to achieve the research objectives. Statistical power was determined by three factors - (a) alpha: the criterion for significance was

set at 0.05; (b) effect size: the estimate of the mean difference between the populations was set at a 95% confidence level to account for sampling error at 0.05 on a –2 to +2 scale; and (c) sample size: calculated as 100 for each of two groups to give a statistical power of 88% to yield a statistically significant result, which is acceptable to most authorities (Heiman, 1992).

Written approval to conduct study was obtained from the Human Ethics and Research Committee of the University of Ballarat in Australia. In addition approval was also obtained from the Ethical Review Committee of AKUH.

Measuring validity and reliability of outcome related instruments

Construct validity was used for instruments of process and outcome measurement, which were variance-tracking instruments and the clinical pathway. For variance tracking instruments, content validity was also used as it contained all the important aspects of patient care. This instrument consisted of 57 items out of which 35 items were related to variances in patient care, 11 items related to monitoring clinical indicators, and 11 items related to monitoring financial variances.

Face and content validity was used for satisfaction surveys as formal validation of measuring instruments. Both survey questionnaires had content validity as they contained all-important components of patient and staff satisfaction such as: medical care, information and caring, promptness of service, courtesy of service providers, and comfort amenities provided.

Reliability of research instruments was achieved through modification of instruments on several occasions to make them more understandable, and the pilot phase of the study dealt adequately with the ambiguities in the variance monitoring instruments. Instruments were considered reliable as they showed stability by producing the same results with repeated testing and homogeneous as they measured the same concepts and characteristics.

Statistical analysis

Statistical Package of Social Sciences (SPSS) Version 10.0 was used to assist statistical analysis with an Alpha of 0.05 considered statistically significant. Various statistical tests such as: descriptive analysis for age and demographic data, inferential analysis, chi-square, t test and multivariate analysis were used to formulate conclusions. Standard deviation was used for age, measurement of waiting time, and length of stay. 'P'-values were calculated to determine the statistical significance of observed differences in variances and outcomes, such as: clinical indicators, cost of the treatment, patient satisfaction, and staff satisfaction. Chi-square test was used for categorical variables such as pre-admission, patient, nursing, physician, hospital, and discharge related variances, post-operative problems, and post-operative complications.

An independent t test was used for continuous variables. Multivariate statistical analysis was used for the analysis of financial variances. Finally, a detailed analysis was conducted on the comments and suggestions outlined by the study subjects in the patient and staff satisfaction surveys.

Data Collection

Considering the size of the project and the number of variables required to be measured, the data collection plan was thoroughly outlined, and all suggestions outlined during pilot phase of study were rigorously followed to ensure proper collection, recording and storing of data. The researcher also had ongoing dialogue with AKUH unit staff to explore any ambiguities in design and content of the clinical pathway and to ensure the successful implementation of the pathway.

RESULTS

There was no statistically significant difference found between the mean ages of the two groups. The age of subjects in the control group ranged from the lowest at 50 years to the highest at 95 years, with a mean age of 67.15 years, SD 8.85. The age of subjects in the experimental group ranged from the lowest at 50 years to the highest at 80 years, with a mean age of 65.78 years, SD 6.88.

Physician related variances such as: delayed consultation by physician; delayed evaluation; appropriate and complete written physician order; discussion of plan of care to the patients by physicians; delayed investigation orders written by physicians; delayed follow-up and delayed education by physicians to the patients; showed significant difference between both groups.

Nursing related variances such as: complete documentation by nurses in every aspect of patient care; discussion of plan of care with patients and families; appropriate assessment of patient; notification to physician by nurses about patient's condition when required; carrying out physician orders; and delayed patient education by nurses; indicated significant difference between both groups. For example, chi-square results of complete documentation X^2 (2, N=200) = 105.344, p=0.001; discussion of plan of care X^2 (2, N=200) = 76.133, p=0.001; and appropriate assessment X^2 (2, N=200) = 119.548, p=0.001. The pathway interventions introduced in the experimental group significantly enhanced the quality of care delivered by nurses.

Discharge related variances such as: discharge delay due to delivery of medications; timely documentation of discharge notes by nurses; time of discharge orders written by physicians; time of discharge procedure; time patient left hospital; and discharge delays due to family reasons after completion of discharge procedure. There was no significant difference between both groups in discharge delays due to non-availability of discharge medication X^2 (2, N=200) = 1.005, p=0.317. However there was a significant difference found in discharge notes written by

nurses X^2 (2, N=200) = 60.126, p=0.001. The experimental group showed comprehensive writing of discharge notes by nurses as a result of pathway intervention.

Post-operative problems indicated significant difference in electrolyte imbalance; constipation; and phlebitis between the groups. Post-operative problems were reduced in the experimental group compared to the control group as a result of clinical pathway intervention.

The incidence of post-operative complication of UTI was less in the experimental group X^2 (2, N=200) = 5.944, p=0.015, indicating significant difference due to clinical pathway intervention; whereas no statistically significant difference was found in the occurrence of haematuria X^2 (2, N=200) = 1.087, p=0.298.

Financial variances such as: bed charges; attendant fee; surgical fees; anaesthesia charges; pharmacy charges; and medical/surgical supplies charges; were the same in both study groups and there was only a difference of PKR 800 (AUD$20) in the average of total charges for both groups.

Patient satisfaction: t-test results showed significant difference between the patient satisfaction results of both groups t (200) = -5.695, p=0.001 (two-tailed). Subjects of the experimental group were more satisfied compared to the control group as a result of clinical pathway intervention.

Staff satisfaction was significantly different in the two groups, t (200) = -2.830, p=0.006 (two-tailed), indicating that clinical pathway intervention significantly improved staff satisfaction.

APPLICATION OF KING'S CONCEPTUAL FRAME WORK TO CURRENT STUDY

In the current study King's conceptual frame work and theory of goal attainment was applied to investigate the phenomena of interest. Communication is the main key for facilitating mutability and trust between patient and health care team. King (1997) stated that communication is the interchange of thoughts and opinions among individuals. Clinical pathways serve that purpose, where members of health care team communicate patient care goals with each other.

APPLICATION OF THEORY OF GOAL ATTAINMENT TO CURRENT STUDY

King's theory of goal attainment is based on her philosophy of human beings interacting with their environment. King has demonstrated linkages between her theory of goal attainment and the traditional nursing process. King (1993) views the traditional nursing process as a system of interrelated actions, the method by which nursing is practiced. In traditional practice utilisation of the nursing process enables nurse to conduct comprehensive assessments on patients, make diagnoses, set realistic goals, and evaluate outcomes. The nursing process in clinical practice creates a distance between nursing practice and the practice of other health professionals because physicians, physiotherapists, dietitians, social workers and occupational therapists do not review nursing records and remain ignorant of nursing actions and interventions.

This raises many questions for nurses such as: Who reads the care plans? Who benefits from them? And what if such plans are not made? In spite of such questions, nursing practice in Pakistan continues to use the same traditional ways of delivering and documenting patient care and experiences the breakdown of communications, interactions and transactions within the existing frameworks. Recently, clinical pathways have provided opportunities of interaction and transaction among the health team. Herring (1999) stated that clinical pathways provide a change in the traditional approach to nursing care, and are viewed as a new approach for planning, implementing and documenting nursing care.

King (1996) put particular emphasis on the nurse's ability for critical thinking, observation of behavior, and the collection of specific information essential for decision-making based to meet the needs of individuals at a particular point in time (Norris and Frey 2001). Clinical pathways serve this purpose. The delivery of nursing care to patients therefore becomes a process of thinking as well as doing, as nurses continuously monitor variances in the use of clinical pathways and work to prevent such variances recurring by monitoring patient outcomes. In contrast to the traditional approach to the nursing process as a system of interrelated actions, King's (1996) perspective of the process of nursing reflects the science of nursing, which enables critical thinking to discover the rationale for actions taken. Clinical pathways provide such qualities.

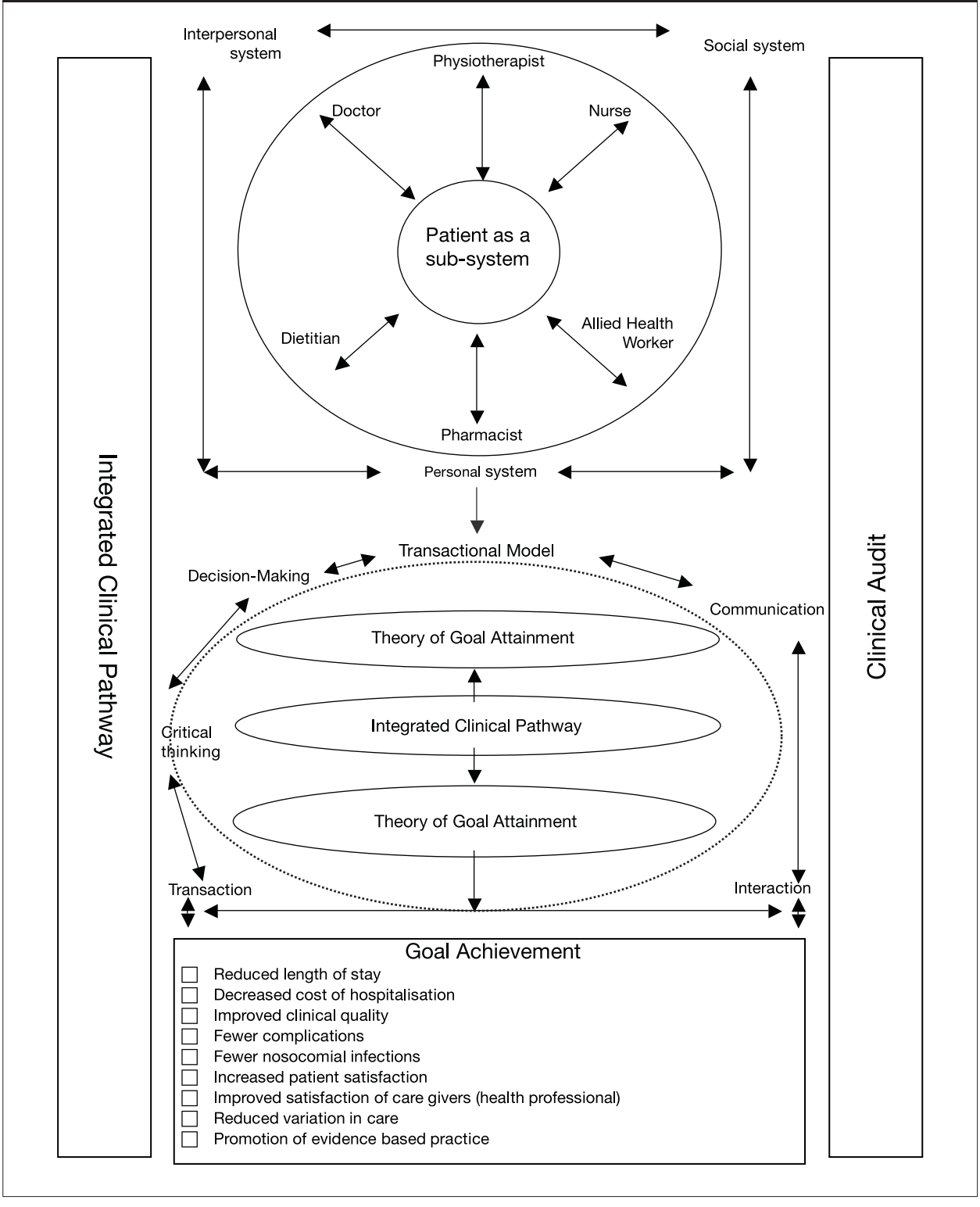
Goal attainment needs ongoing evaluation. According to King (1996), goal attainment can improve or maintain health, control illness, or lead to a peaceful death. If goals are not attained, the nurse needs to re-examine the process of nursing, critical thinking and transaction (Alligood and Tomey 2002). Similarly, the variance analysis process in clinical pathways is a goal evaluation tool. Cheah (2000) stated that analysis of variance is a powerful audit tool because all aspects of patient care are continuously reviewed and revised. Improvements in the quality of care are achieved through continuously redefining the pathways to reflect current best practices.

APPLICATION OF THE TRANSACTION PROCESS MODEL TO THE CURRENT STUDY

The final step in King's interaction process is transaction, which involves bargaining, negotiating, and social exchange. Goal attainment is the salient factor of King's theory, and it is only through nurse-patient interaction and transaction that mutual goals can be set. Once the goals are set, the nurse and patient collaborate to formulate the means by which the goals can be attained. Similarly, with clinical pathways the emphasis is on achievement of personal,

interpersonal, and social goals, which are based on the best evidence from the literature and are agreed on by all who are part of the conceptual system. Such a goal in TURP clinical pathway includes enhancing quality by reducing occurrence of complications, reducing length of stay, improving co-ordination among health care providers, reducing costs, and improving patient and staff satisfaction.

Figure 1: Conceptual framework



Adapted from King's conceptual framework and theory of goal attainment (Husting 1997, p.16-17).

DISCUSSION OF CONCEPTUAL FRAMEWORK

The conceptual framework for the current investigation, as illustrated in figure 1, was derived from the concepts underpinning King' conceptual framework and theory of goal attainment. The first part of the model shows that in the current investigation, the patient is the central focus of the system. Therefore the personal, interpersonal, and social systems should operate as a whole to achieve maximum benefit for the patient. When all members of the conceptual system communicate, interact, transact, and use critical thinking for decision-making, they design an integrated clinical pathway.

The researcher perceived that if the integrated clinical pathways are developed as suggested by the literature where all multidisciplinary team members play an active role in designing, implementing and evaluating the clinical pathway, and furthermore, the focus of the clinical pathway is on improvement of clinical quality, then the perceived benefits outlined in the last part of the model will be the outcome.

Nish (2000) stated that the benefits achieved from the use of clinical pathways include: enhanced multidisciplinary collaboration; increased consistency in practice; increased coordination in care activities; cost reductions; efficient and effective resource use; effective patient education and management of patient's expectations; continuous quality improvement; and ongoing review of practice and outcomes through variance tracking and variance analysis.

LIMITATIONS

Scope of study: The first and most obvious limitation of the study was its restricted scope. Clinical pathways can be applied to all specialty areas however constraints such as time, budget, and the size of the project, as well as the researcher's involvement, led the researcher to narrow the scope of the study to one disease and one discipline.

Research related literature: The literature review showed more emphasis on reduction in length of stay and cost of hospitalisation (Bankhead 1996; Browne et. al 2001; Calhoun 2000; Chang et. al 1999; Healy 2002; and John 2003), and the research could have included these other benefits of clinical pathways. It was also demonstrated in the literature that clinical pathways have been developed for surgical procedures, and in areas where length of stay can be predicted easily so as to evaluate outcomes faster, and included the clinical disciplines of medicine, psychiatry, and pediatrics.

Survey Sample: There is some doubt that the limitation in obtaining a convenience sample according to the selection criteria would have the potential to threaten the internal and external validity of the investigation.

Formulating actions for identified variances: The final limitation of the study was its inability to communicate the analysis of variances and feedback to the multidisciplinary team, which is a vital component of the entire clinical pathway program. The study did not include this component in the design where the results of variances could be shared with all stakeholders, particularly physicians and nurses, and practices modified to further improve them. This approach was omitted to prevent the occurrences of biases by the researcher.

CONCLUSION

King's conceptual framework and theory of goal attainment provides a useful structure for the current investigation by using a clinical pathway for the care of patients undergoing TURP. Study findings are supportive that clinical pathways would be an effective replacement for traditional nursing practice at AKUH, Karachi. King's theory provides direction for nursing practice by emphasising the processes of multidisciplinary collaboration, communication, interaction, transaction and use of critical thinking. Nurses who interact with other systems will influence the health outcomes of the patients/families during their hospital stay and beyond discharge, with the result that the patient becomes their own health manager.

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