

Application of Brim's and Simon's Sequential Decision Theories in Healthcare Administration

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Abstract

As part of the learning process, many episodes in life become routine and habitual with people no longer deliberately paying attention to their behaviors. When individuals come across situations they have encountered before, their response would be the one they have come to know as the best response from previous experience. However, when the situation is new or previous solutions cannot be applied successfully; routine selection of an action will not be possible. In such a case, a decision making process is applied to the identification of the problem and goes through a number of phases eventually ending with the performance of one or more actions based on the available information. Various decision making tools informed by decision theories exist and readily available for the healthcare administrator. This essay will describe the sequential decision theories of Simon (as cited in Hansson, 2005) and Brim et al. (1962) in healthcare decision making and discuss their application in health care settings.

Key Words: Decision making, health care, Simon's Decision theory, Brim's Decision Theory, decision analysis.

1. Introduction

The healthcare environment is a fast changing complex system that requires complex decisions to make it run efficiently and effectively. Healthcare administrators require to understand decision analysis to enable them make choices after carefully examining the available options (Alemi & Gustafson, 2006). The purpose of decision analysis is to assist administrators structure the problems they face, minimize uncertainty about forecasted events, clarify their ideals and preferences, and reduce conflicts that may arise as a result of the chosen options (Alemi & Gustafson). In order to harmonize and streamline decision making in a healthcare organization, Mills and Spencer (2005) recommended the utilization of values based decision making--defined as decision making based on the values of the organization and the goals these values support. A major pitfall for healthcare administrators, especially in not-for-profit healthcare organizations, would be to ignore values and focus on costs only. Values based decision making becomes more pertinent in resource poor countries where most healthcare services are provided as a public other than as a commercial enterprise. This essay first summarizes the functions of the various levels of healthcare administrators and the range of complex decisions they face in running health care organizations (HCOs). Then, it describes the sequential decision theories of Simon (1960) and Brim (1962). Finally, the application of each of these theories to a specific health care administrative decision in a hospital setting will be discussed.

2. Roles and Responsibilities of Health Care Administrators

According to Shi and Singh (2004) there are three tiers of health care administrators that run HCOs: (a) top level administration who take responsibility for the organization's long-term success and work closely with the governing board; (b) middle-level administrators who take responsibility for major areas like surgical services, outpatients, and nursing services or head major departments; and (c) entry level managers who often act as assistants to middle-level managers. The top level managers provide leadership and strategic direction and are responsible for the clinical, financial, and operational outcomes of the whole organization (Shi & Singh). In contrast, the middle level managers have the responsibility of planning and coordinating functions, organizing human and physical resources, making decisions, directing and supervising processes, and controlling finances and operations. Entry level administrators usually supervise small numbers of staff in a department overseeing and assisting with operations considered to be critical for departmental efficiency (Shi & Singh). In order to perform these functions, the various levels of healthcare administrators require to make informed decisions.

The complex nature of HCOs often makes decision making difficult for administrators. An understanding of theoretical frameworks on decision making and proficiency in the use of decision making tools help administrators to make better informed decisions in each of the functional domains of planning, staffing, organizing, directing, and controlling healthcare services (Alemi & Gustafson, 2006). Of special interest would be the translation of endpoints into measures that patients, the general public, providers, and insurers would value. Simon's (as cited in Hansson, 2005) modification of Dewey's theory of decision making and Brim's

(1962) theory of decision making as applied to complex healthcare decisions faced by healthcare managers will be discussed next.

3. Decision Theories and Healthcare

3.1 *Simon's Modification of Dewey's Theory*

Decision theory can simply be defined as theory about making decisions. According to Hansson (2005) the subject of decision theory is not unified and there are many different ways to theorize about decisions as well as many different research traditions. The existence of problems or issues that require decisions and alternative possible solutions to them invite the use of rational models of decision making. Dewey (as cited in Hansson, 2005) is credited for starting the modern discussion with his exposition of the stages of problem-solving. However, Simon (as cited in Hansson) modified Dewey's 5 consecutive stages of problem solving to facilitate decision making in organizations. Before his death in 2001, Simon held various research and faculty positions at the University of California (Berkeley) and other universities, receiving the Alfred Nobel Memorial Prize in Economic Sciences in 1978 and the National Medal of Science in 1986 (Encyclopedia Britannica, n.d). Simon's three principal phases of decision making consist of (a) finding occasions for making a decision--the intelligence phase, (b) finding possible courses of action--the design phase, and (c) choosing among courses of action--the choice phase. Simon's theory can be applied to making complex decisions by healthcare administrators.

Prototypes on decision analysis are available to simplify decisions on healthcare matters by using known tools and methods. A commonly used prototype in healthcare includes decisions on unclear values in a situation where options and future outcomes are already defined with little uncertainty ((Alemi & Gustafson, 2006). The value of the options, defined as the decision maker's judgment of the relative worth of these options and outcomes might still be unclear prompting the need for a decision analysis (Alemi & Gustafson; Hansson, 2005). An example is the allocation of resources in developing countries where many health care needs compete for limited resources. Evidently, healthcare administrators irrespective of their geographical location, have to utilize health care funds in the most cost effective way. Nevertheless, healthcare decisions are bound to be influenced by the value based objectives of the HCO depending on their not-for-profit or for-profit missions. The finding of an occasion to make a decision is informed by the intelligence or first phase of Simon's decision theory.

Finding possible courses of action--the design phase of Simon's theory, guides the second stage of the decision making process. For example, a healthcare administrator of a government funded healthcare agency in an area prone to infectious disease X may be faced with two options to control the disease. He or she needs to decide on either building a new ward to treat more infected patients or utilize the available funds on preventive and community healthcare projects. The possible outcomes from a decision will be positive and negative with one option being acceptable on one dimension but unacceptable on another. In order to arrive at the best possible course of action, the health care administrator will proceed to utilize one of the available analytic tools used for evaluating decisions.

Cost-effectiveness analysis is a powerful analytic tool that can be used to evaluate healthcare administrative decisions. It has the ability to measure both direct and indirect costs as well as their tangible and intangible values (Gupta, 2001). The existence of problems or issues that require decisions and alternative possible solutions to solve them invite the use of this rational model of decision making by healthcare administrators. Although they use the same rational criteria, there is a need to differentiate between social and private cost-benefit analysis. Political concerns and considerations would obviously play a role in the decision options considered by a healthcare administrator running a publicly funded facility.

The 'choice' phase of Simon's theory --choosing among courses of action--will inform the third and last stage of the decision making process, The healthcare administrator must trade off gains from one dimension with the losses from another and make a decision after considering all options. For example, a cost-benefit analysis may indicate that introducing measures to prevent infection X in the surrounding villages is more cost-effective than building a new ward to treat more patients with the infection. In the cost benefit analysis the healthcare administrator will consider both the tangible and intangible costs. However, in a non-profit or a government healthcare agency as commonly encountered in African countries more weight may be placed on the benefits to the community than on the actual costs of the project. Community or population targeted health policies to provide clean drinking water, control infections, and avail vaccines to vulnerable children, would be of more value than building costly structures that would benefit a few only.

3.2 Brim's Decision Theory

Another common decision making theory that could be applied to complex healthcare decisions is Brim's decision theory. Dr. Brim is a former president of the Russell Sage Foundation and the Foundation for Child Development. He also directed the John D. and Catherine T. MacArthur Foundation Research Network on Successful Midlife Development authoring and editing over a dozen books on human development (MIDMAC, n.d). Brim et al (1962) proposed an influential subdivision of the decision process by dividing it into 6 steps: "(a) identification of the problem, (b) obtaining necessary information, (c) production of possible solutions, (d) evaluation of such solutions, (e) selection of a strategy for performance, and (f) performance of the selected action or actions" (p.9). Applying Brim's theory in health care administration decision making entails following a longer process than Simon's theory. For example, using the same hypothetical African health care agency used to illustrate the application of Simon's theory in decision making, the health care administrator would first identify the problem of the increased number of patients with infection X over the last year. The second stage, equivalent to Brim's step 2, is to obtain the necessary information by doing epidemiological studies in the surrounding villages. Thirdly, possible solutions maybe conceived and probably narrowed down to either building new wards to treat the patients or introduce preventive measures to control the infection. Fourthly, both of these strategies will be evaluated to ascertain which one comes with the most benefit by using a cost-benefit analysis. Fifthly, a strategy for performance is selected—5th stage of Brim's theory, and finally, one or more actions will be carried performed

Decision analysis, based on a theoretical framework helps answer questions like which objectives are paramount and how a relative value could be obtained. The rest of the essay will focus on discussing the application by health care administrators of Simon's and Brim's decision theories to specific health care decision examples. Simon's theory will first be applied to how a health administrator in a developing country can make decisions on the introduction of new technology. Brim's theory will then be used to illustrate how decisions on improving hospital processes can contribute to continuous quality improvement in a hospital.

4. Application of Decision Theories in Healthcare

4.1 Simon' Decision Theory

Simon's decision theory has three principal phases which consist of (a) finding occasions for making a decision, (b) finding possible courses of action, and (c) choosing among courses of action. Simon's theory could be applied to how a health care administrator can make decisions on the introduction of new technology in a developing healthcare environment with limited healthcare resources. The theory will inform the decision making process on whether to purchase key-hole surgical equipment for Hospital X in a hypothetical African country.

4.1.1 Finding the occasions to make a decision—intelligence.

The procedure of key-hole or laparoscopic surgery (LS) has been used increasingly in the east Africa region in recent years in response to public demand and perhaps the desire to keep up with surgical trends in developed countries. Studies in developed countries indicate the savings from the slightly shorter hospital stay after LS for certain operations justifies the higher cost of the laparoscopic equipment and consumables (Kurz & Heimann, 2001; Moore, Grogan, Speroff, & Poulouse, 2005). However, no similar studies have been done to assess effectiveness and efficiency of LS in comparison to open surgery (OS) in the east Africa region. A healthcare administrator may want to evaluate information on the cost effectiveness of the new surgical technology before committing scarce healthcare resources to purchasing it. The first phase or intelligence phase of Simon's decision theory informs this stage of decision making for a healthcare administrator vested with the responsibility of running a public hospital in a developing country. The next step is to identify the possible courses of action to evaluate the use of LS and OS.

4.1.2. Possible courses of action—design. Simon's second phase of decision making—possible courses of action-- can be used to guide evaluation of the options of LS and OS. The use of a decision analysis will be suitable for deciding possible courses of action as such an approach synthesizes information about effectiveness to determine the value of one approach versus another for policy analysis (Aday, Begley, Lairson, & Balkrishnan, 2004). A decision analysis requires information on the actual treatment of patients with specific surgical diseases and the value of those outcomes to the patients. Information from the hospital records, databases, and operating room over a period of time could be analyzed. The hospital historical data including equipment charge, duration of the surgery, hospital stay, and total hospital charge can be analyzed and used for a process and outcomes evaluation (as in figure 1).

Structure _____ Process _____ Outcome

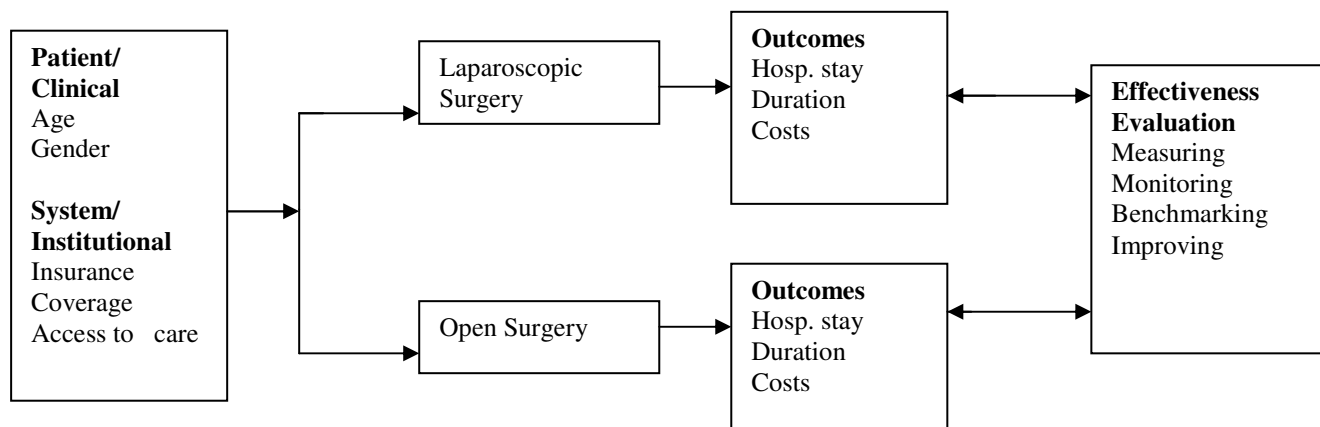


Figure 1. Framework for Analysis of Effectiveness of LS and OS

The healthcare administrator would be interested in the cost of the equipment and perishables used during surgery and the manpower requirements in terms of nurses, physicians, and technicians. The duration of the procedure and operating room timed charges and complications of the procedures as well as days spent in hospital need to be evaluated using industry benchmarks for similar level healthcare organizations. There would also be an interest in the demand for the procedure and customer satisfaction after experiencing the different types of surgical procedures in the effectiveness analysis. The advantage of a decision analysis is that it synthesizes a larger amount of information relevant to effectiveness. The disadvantage is that the necessary data on patient values or preferences may not be readily available. The next stage in the decision making process will be informed by the third and final stage of Simon's theory.

4.1.3. Choosing among courses of action—choice.

Based on the analysis of LS and OS, the healthcare administrator could do an effectiveness evaluation to choose the surgical procedure best suited for the hospital. The benefits of LS over OS for certain procedures like appendectomy remain a subject for debate more than two decades from the introduction of key-hole surgery (Guller et al., 2004). The priorities of a healthcare administrator in a developed country will differ from those of a counterpart in a developing country considering the variation in disease patterns and availability of financial and human resources. Obviously, the choice among different options arrived at in the decision making process will depend on the goals and values of the healthcare organization. The evaluation model should look at the financial impact from both the institutional and societal cost perspectives. The institutional perspective may consider only the direct costs of the procedure borne by the hospital. The societal perspective evaluates both the direct costs of the procedure to the hospital and the indirect costs borne by the patients or society. However, the structure, process, and outcome of the options for effectiveness, efficiency, and equity can be standardized for evaluation (see table 1). As the information provided is for illustrative purposes only, the different possible evaluation criteria and categories have not been weighted.

Table 1. Evaluation of the use of Laparoscopic Surgery and Open Surgery

Evaluation Criterion	Laparoscopic Surgery	Open Surgery
Effectiveness Structure Process Outcome	Expensive equipment Operating time Satisfaction Complications Discharge home	Traditional instruments Operating time Satisfaction Complications Discharge home
Efficiency Outcome	Cost	Cost
Equity Structure Process Outcome	Equipment availability Expertise availability Cosmetic Satisfaction More out of pocket payments. Insurance coverage limited or denied if available. Unavailable to the poor	Equipment availability Expertise availability Cosmetic Satisfaction No or minimal out of pocket payments. Unencumbered insurance coverage; procedure available in all hospitals.

A decision tree using the same or similar criteria that would reflect the actual costs could also be constructed to help in the decision process (see figure 2). Such an approach would be essential when individual surgical procedures need to be evaluated separately. For example, open appendectomy can be evaluated against laparoscopic appendectomy using a cost benefit analysis. Such an approach would allow the healthcare administrator to decide whether LS could be used to conduct certain operations and OS for others as a hospital policy based on the evidence gleaned from the decision analysis.

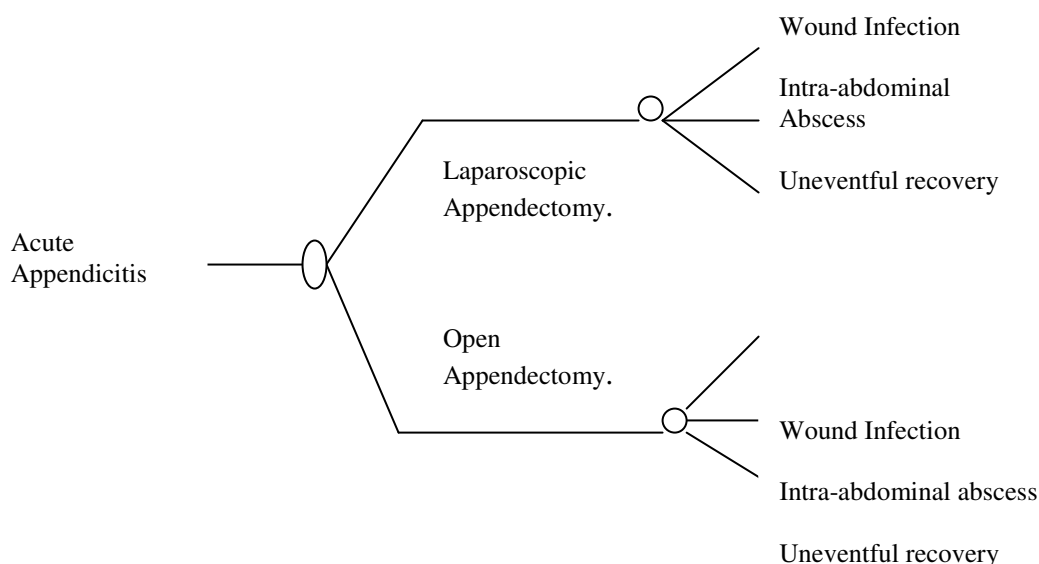


Figure 2. Decision tree of procedure for treating acute appendicitis

Assuming LS costs twice as much as OS on average in Hospital X and the hospital stay is 1-2 days on average for both procedures, the healthcare administrator can make a number of assumptions. For example, the cost difference could be due to the longer time it takes to perform LS and the use of more costly consumables for this procedure. These outcomes indicate that LS is more expensive and does not reduce length of hospital stay nor change the time to return to work. Considering the limited resources in developing countries, healthcare

managers need to consider achieving production efficiency. The fact that OS achieves the same outcome as LS negates the need for using the more expensive LS in public hospitals where resources are limited. This would avoid diverting financial resources from other critical health care needs like treatment of diseases like HIV/AIDs, tuberculosis, and malaria. Therefore, depending on the values attached to the outcome, a healthcare administrator in a developing country may opt for OS. Another theory that can be applied to healthcare decisions in a developing country is Brim's decision theory. Brim's (1962) theory will next be applied to the decision making process in Hospital X.

4.2. Brim's Decision Theory

Application of Brim's theory in healthcare decision making can be illustrated by how healthcare administrators resolve issues in hospital processes. When the administrative role is viewed as a process, all the tools used to improve processes may be applied to assist managers improve their effectiveness (Kelly, 2003). If a desired outcome is patient satisfaction, the administrative decision-making will have to include techniques of collecting, analyzing, reporting, communicating, and evaluating patient satisfaction data regularly (Kelly). For example, the administrator of Hospital X might discover a problem exists in the quality of healthcare delivery in a hospital department based on data obtained from the evaluation of patient satisfaction during admission in the hospital. The information derived from the patient discharge questionnaires can highlight patient and family frustrations with the hospital discharge process. Brim's theory can be applied to identify the problem in the discharge process, obtain the necessary information to study the problem, produce possible solutions, evaluate such solutions, select a strategy for performance, and finally actually perform the action or actions (Brim et al.1962). The six steps of Brim's theory will be applied to resolving problems in the discharge process from the surgical service of Hospital X.

4.2.1. Identification of the problem. Patients and their families may persistently complain about the discharge process from a hospital. The identification of the problem is informed by the first step of Brim's theory. The discharge process starts when the discharge summary is completed by the physician and concludes when the patient physically leaves the hospital. Any one of the many steps in the discharge process could lead to long delays that lead to customer dissatisfaction. A healthcare administrator should monitor hospital processes using various direct and indirect methods to ensure the services are running efficiently.

The informal ways to pinpoint patients' needs and expectations are asking and observing. More commonly, a healthcare administrator could get to know something is wrong with the discharge process through quality improvement monitoring processes routinely practiced in modern health care organizations (Kelly, 2003). The data is compiled from patient satisfaction questionnaires on discharge from the hospital which commonly use Likert type scales to assess the patient's and family's satisfaction with the hospital stay. In the additional comments area the patients may indicate the source of the dissatisfaction as the length of the discharge process. The healthcare administrator would then need to obtain data to pinpoint the sources of the delays—obtaining necessary information—the second stage of Brim's theory.

4.2.2. Obtaining necessary information. The discharge process can be documented using a modified Lead-Time Analysis. According to Kelly (2003) the benefits of documenting a process include to:

1. Provide a visual picture of the process
2. Distinguish the distinct steps of the process
3. Identify unnecessary steps in the process
4. Understand vulnerabilities—where breakdowns, mistakes, or delays are likely to occur—in a process
5. Detect rework loops that contribute to inefficiency and quality waste (P. 34)

Studying the discharge process will need to be done discreetly to avoid the Hawthorne effect on research participants. The Hawthorne effect is the improvement in a process performance as the individual realizes they are under observation and become motivated to work harder. This effect could seriously confound the research findings as they will not reflect the true situation.

The researcher walks through the paths followed in the discharge process of a sample of discharged patients and notes the time various actions take to complete. The average time spent on each discharge step for the selected sample of patients is then calculated. A visual rendition of the steps could be provided by constructing a pie-chart that shows the proportion of time spent on each step in the discharge process (see figure 3). The provided values cited in the figure are hypothetical to reflect what would be obtained from a lead-time analysis chart of

the discharge process from a surgical ward in Hospital X. Possible solutions are then considered using the obtained information—as suggested by step 3 of Brim’s theory.

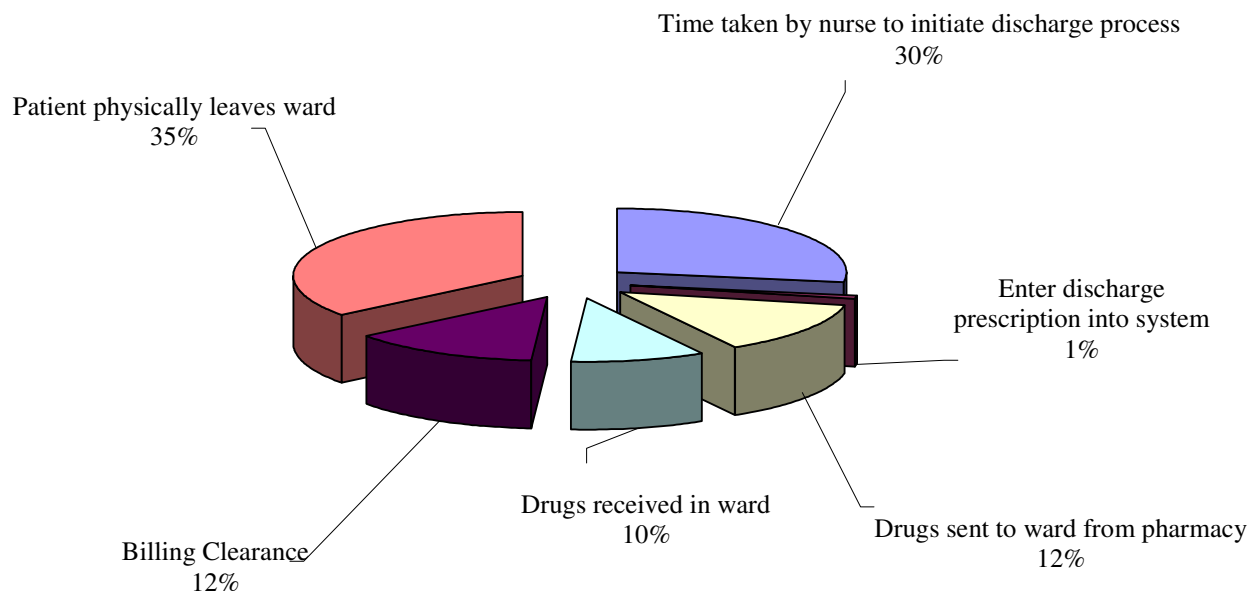


Figure 3. Activities Contributing to Delay in the Discharge Process at Hospital X

4.2.3. *Produce possible solutions.* The pie-chart (see Figure 3) may indicate the major constraints to the discharge process in Hospital X. For example, the proportion of time spent on the various steps indicates that the time taken by the nurse to initiate the discharge process (30%) and the time taken by the patient to actually leave the ward after completing the discharge process (35%) account for 65% of the total discharge time (see figure 3). Improving these two steps of the discharge process could cut down on the total discharge time leading to customer satisfaction and more efficient processes. Although health administrators have other options to improve hospital processes, a popular strategy is to apply the Shewhart cycle, a tool used in continuous quality improvement

The whole discharge process with an emphasis on the identified main constraints could be continuously improved by applying the steps of the Shewhart Cycle—Plan, Do, Check, Act, or PDCA through process improvement teams (Griffith & White, 2006). The Shewhart cycle systematically identifies the specific actions in the stages of the discharge process which cause delays by (a) identifying the problem (PLAN), (b) Best improvement process selection (Do), (c) evaluation of result and further improvements considered (ACT), and (d) the cycle is repeated by going back to PLAN. The Shewhart Cycle and any other possible solutions selected by the healthcare administrator can then be evaluated in search of the most suitable among them—Stage 4 of Brim’s theory.

4.2.4. *Evaluation of solutions.* The steps of the Shewhart Cycle are continuously repeated until the discharge time meets the expectations of the hospital administration, physicians, and the patients. In essence, the Shewhart Cycle steps closely resemble the stages of Brim’s theory of decision making. Benchmarking with other similar level hospitals from the professional literature and historical data on discharge times from the hospital could guide the quality improvement team. The time taken by the nurse from the time the physician completes the discharge to initiating the process appears too long as it takes up almost 30% of the discharge time. Delays in the physical discharge (36%) of the patient from the ward maybe related to process management issues which might include delays in the billing clearance and obtaining discharge medications among others. Similarly, the family might arrive late to pick up the discharged patient because they were not informed of the expected time of discharge. After evaluation of the possible solutions, a strategy for performance is elected—Step 5 of Brim’s

theory. The strategy may be one of the solutions or a combination depending on the areas that need attention to improve the discharge process time.

4.2.5. Selection of performance strategy. The application of the quality improvement tools including lead-time analysis, process analysis charts, and the Shewhart Cycle have been applied successfully to identify and evaluate possible solutions to the discharge process delays. Two main constraints have been identified and possible solutions evaluated. The time taken from discharge to actual departure from the hospital by the patient has a direct relation to activities in other departments involved in the discharge process. For example, posting of charges from pharmacy or physical therapy, extension letters, communication issues with physicians, and sometimes unrealistic expectations by the patient and family of the discharge process are all possible constraints to the discharge process. Quality improvement tools could be used to improve these steps.

4.2.6. Perform the action. The best improvement process selection would be to ensure the nurse enters the discharge prescription as soon as the physician completes the discharge documents and alerts other departments concerned which may not be hooked up to the system. Any factors that may be hindering the nurse to initiate the discharge process in a timely manner should be addressed by the nursing administration. However, the successful implementation of improvements in the discharge process may require an overall focus on a number of factors like (a) establishing better communication channels between the bed management team and other departments involved in the discharge process as well as the patient's family members, (b) early indication by physicians for discharge the following day, and (c) monitoring of the process for early detection of delays and continuous quality improvement. Discharge times could be recorded regularly and the trends monitored using control charts.

Summary

This essay described the roles of healthcare administrators in directing and managing healthcare facilities and programs in the complex system and rapidly changing healthcare environment. Healthcare administrators are faced daily by the need to make complex decisions that require an understanding of decision analysis to enable them make choices after careful examination of the available options. The purpose of decision analysis is to assist administrators structure the problems they face, minimize uncertainty about forecasted events, clarify their ideals and preferences, and reduce conflicts that may arise as a result of the chosen options. The applicability of the decision theories of Simon et al. (1960) and Brim (1962) to the complex decisions healthcare managers face was discussed and each of the theories applied to a specific administrative decision example in Hospital X in a developing country.

Simon's three principal phases of decision making consist of (a) finding occasions for making a decision--the intelligence phase, (b) finding possible courses of action—the design phase, and (c) choosing among courses of action—the choice phase (as cited in Hansson, 2005). These phases were applied by a healthcare administrator in order to make a decision on whether to introduce new surgical technology or not in an environment of competing healthcare needs. The five steps of Brim's (1962) theory were applied to resolving problems in the discharge process from the surgical service of Hospital X. The steps of Brim's theory included identification of the problem in the discharge process, obtaining the necessary information to study the problem, producing possible solutions, evaluating such solutions, selecting a strategy for performance, and finally implementation of one or more choices..

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