

## Application of clinical pathway within health care: systematic review

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### Abstract:

Background: clinical pathway is a multidisciplinary outline of anticipated care, placed in an appropriate time frame, to help a patient with a specific condition move progressively through a clinical experience to positive outcomes<sup>7</sup>. It designed to streamline patient care delivery, maximize efficiency, minimize cost, improve communication between doctors and nurses, increase patient satisfaction with the service and improve the care outcome. They address variability in practice by having providers agree prospectively on a common regimen of clinical intervention. Method: in this article, we review a state of art of over view about application of clinical pathway in health care. Results: this review confirmed a great impact of clinical pathway application on patient's outcomes as level of pain, anxiety, satisfaction, post-operative complications, length of stay in hospital and quality of care given by the health team. Conclusion: application of clinical pathway enhance the quality of health care services

Key wards: clinical pathway, health care, application.

### Introduction:

The struggle between the cost and quality of health care has led providers to look for new and innovative ways of delivering cost-effective care in an efficient manner. Total quality management philosophy teaches that the most effective way to improve quality is to reduce variation in the process of providing a service. In the field of health care delivery, clinician directed diagnostic and therapeutic plans, called clinical pathways (CPs), provide such an approach in the hospital setting by reducing variation in clinical processes and improving the quality of care while keeping hospital length of stay to an acceptable minimum level (Grimsno et al., 2018).

Clinical pathway is defined as 'a multidisciplinary outline of anticipated care, placed in an appropriate time frame, to help a patient with a specific condition move progressively through a clinical experience to positive outcomes. CPs have been developed in health care as multidisciplinary care plans that outline the sequence and timing of actions or interventions necessary for achieving expected patient outcomes

and organizational goals regarding quality, costs, patient satisfaction and efficiency (Szelągowski, & Berniak-Woźny., 2019; Feuth & Claes., 2008; Whittle., 2009)

Clinical pathways (CPs) are divided into time intervals during which specific goals and expected progress are defined, together with appropriate investigations and treatment. They also reflect the activities of a multidisciplinary team and can incorporate established guidelines of nursing care (Szelągowski, & Berniak-Woźny., 2019).

Clinical pathways (CPs) are designed to streamline patient care delivery, maximize efficiency, minimize cost, improve communication between doctors and nurses, increase patient satisfaction with the service and improve the care outcome. They address variability in practice by having providers agree prospectively on a common regimen of clinical intervention (Jha et al., 2007; De Bleser et al., 2006).

Clinical pathways are developed by a group of doctors, nurses and other health care professionals that are including in the management of patient. Nurses have a key role in all aspects of clinical pathway use. Participating in the development of the pathway is the first step in ensuring the successful use of clinical pathways and can best contribute by gaining a thorough understanding of why and how pathways are used. Because they begin and end the chain of staff involved in delivering care, nurses possess a unique perspective in how health care systems work to enhance or impede the delivery of care. The nurse discusses the pathway with the patient and focuses on achieving specific outcomes (Jabbour et al., 2018).

Four phases to creating a pathway: after selection of a diagnosis or a procedure including: establishing a team or committee, developing, implementing clinical pathway and analyzing of outcomes. The clinical pathway's committee provides support to determine what is needed to initiate the pathway, sees what resources are available and directs all disciplines involved in the clinical pathway. Then a blank template containing each day of the pathway is designed, and the team determines patients' daily goals and how interventions will be sequenced. Although the format varies from institution to institution, CPs have major features in common. All CPs are divided into useful time frames which may be minutes, hours, days, weeks, or phases. During implementation of the path, altering time frames or interventions is categorized as a variance (Platz., 2019).

Variances are considered to be any deviation from the clinical path, as outlined by the patient, caregiver, physician, or hospital that might alter expected outcomes. They represent the discrepancies between planned and actual events. They can also represent outcomes that differ from those anticipated or deviations from the projected timeline (Platz., 2019).

Variances are categorized by Simonato et al., (2020) as patient or family, caregiver or clinician and hospital or system or community. Variances are monitored, analyzed, and documented. The variance record is an extremely important part of the pathway and represents the mechanism through which improvements in patient care can be accomplished.

After implementing the clinical pathway, there is the process of outcome evaluation. The best way to determine the efficiency of a clinical pathway is to monitor outcome, which in this case involves patient satisfaction, anxiety level, pain, wound condition, post operative complications, decreased length of stay, readmission rates, morbidity and mortality (Jabbour et al., 2018).

#### **Review of literature:**

The increasing shift in health care systems toward managed care places significant demands on health care providers to streamline resources and provide

quality care in the most cost-effective fashion. One method used to achieve this goal is the development and implementation of clinical pathways (Stout et al., 2020).

Clinical pathways (CPs) are structured, multidisciplinary plan of care designed to support the implementation of clinical management, guidelines and financial management. It is a patient focused concept, a tool to model the care and quality improvement process (Stout et al., 2020). Allen (2010) defined CPs as a tool that sets locally agreed clinical standards based on the best available evidence for managing a specific group of patients with a specific condition. Panella & Vanhaecht., (2010) defined clinical pathway as a multidisciplinary plan of care that outline the main clinical interventions performed in the hospital by a group of professionals responsible for the care of the patient. It is used as a guide to plan, co-ordinate, deliver, monitor, review and document that care. Jabbour et al., 2018 stated that CPs describe the contribution of nursing and ancillary departments to patient care. The goal of the multidisciplinary care plan is to improve the collaborative efforts of health team in the management of patients.

The European Pathway Association (EPA) define clinical pathways (2006) “a methodology for the mutual decision making and organization of care for a well-defined group of patients during a well-defined period” and the defining characteristics of care pathways include: an explicit statement of the goals and key elements of care based on evidence, best practice, and patient expectations, the facilitation of the communication, coordination of roles, and sequencing the activities of the multidisciplinary care team, patients and their relatives, the documentation, monitoring, and evaluation of variances and outcomes, and the identification of the appropriate resources. The aim of a care pathway is to enhance the quality of care by improving patient outcomes, promoting patient safety, increasing patient satisfaction, and optimizing the use of resources (Vanhaecht et al., 2010).

Over the last two decades, the scope of CPs has broadened and being increasingly used throughout the developed world, spanning all aspects of patient cares in a variety of settings. The concept of clinical pathways emerged in the late 1980s as a component of managed care and introduced in the early 1990s in the United Kingdom (UK) and the United States of America (USA) <sup>(31, 32)</sup>. There are many synonyms exist for the term “Clinical Pathways” including “Integrated Care Pathways”, “Multidisciplinary Pathways of Care”, “Pathways of Care”, “Case Management”, “Clinical algorithm”, “Case Profile”, “Care Maps”, and “Collaborative Care Pathways” (Davies & Gray., 2009; Vanhaecht, et al., 2006).

Butow et al (2018) described an integrated care pathways as a “map of the process involved in managing a common clinical condition or situation”. It should detail what to do, when to do it, by whom the action should be undertaken and where the task should be performed”.

Finally, it is apparent from these definitions that the CP is an ongoing evaluation and audit on the patient’s progress and outcomes. It maps out two embodied trajectories: the sequencing and timing of practitioners’ care, and the ‘journey’ that patients will experience. Pathways are a distinctive type of clinical guideline, which specifies each step in the care process and incorporate many of the daily medical and nursing orders required to move the patient toward discharge rather than stating broad principles that practitioners should follow (De Luc et al., 2018).

### **Advantages and benefits of Clinical Pathways**

There are many potential benefits of using care pathways. These potential benefits become reality dependent not only on the design and content of the care pathway, but also on the way that it is applied and implemented within the local

setting. The potential benefits of using care pathways can be divided into three main categories including; benefits to the patient; benefits to the healthcare professional and benefits to the healthcare system (De Luc et al., 2018).

### Benefits to patients

Clinical pathway has benefits for patients because it promotes evidence-and guideline-based practice, promoting patient focused care because patients can participate in what is planned and can give feedback on whether outcomes have been achieved. CP provides detailed guidance for each stage in the management of a patient with a particular diagnosis or procedure (Kwan., 2007). It provides patient and family education through provision of information regarding care provided and guides the patient and family through expected treatment and progress thus it improves patient satisfaction with the health service (Bower., 2009).

### Benefits to the health care professional

Clinical pathways are designed to improve communication between doctors and nurses and eliminate the duplication of documents. Development of the clinical pathway involves a coordinated effort of clinical nurses, nurse managers, nurse administrators, nurse educators, clinical nurse specialists, physicians and other health professionals. Through this approach, nurses and physicians work together for a common goal and thus develop a heightened awareness of collaborative practice and its impact on patient outcomes. It also reflects the activities of a multidisciplinary team and can incorporate established guidelines of nursing care. It addresses variability in practice by having providers agree prospectively on a common regimen of clinical intervention. CP Serves as a map or guide to clinicians while those introducing care for patients. It enhances the accountability for each task or intervention. It can be a tool for educating health care providers to identify time frames for major interventions that include the most efficient and clinically appropriate use of resources (Naqib et al., 2018).

### Benefits to the health care system

Clinical pathway is designed to provide continuity of care, streamline patient care delivery, maximize efficiency and eliminate the duplication of documents. It Supports evaluation of care practices through variance management. CP Supports the implementation of evidence based practice, standardized important aspects of care thus reducing the unnecessary delays in care, promotes quality care, improves the clinical outcome, decrease fragmentation of services and reduces length of hospital stay (LOS) and facilitates audit and research (Naqib et al., 2018).

### **Role of the nurse in clinical pathway**

Nurses have a key role in all aspects of clinical pathway use. The professional nurse combines education and experience to formulate a particular practice pattern. Participating in the development of the pathway is the first step in ensuring the successful use of clinical pathways and can best contribute by gaining a thorough understanding of why and how pathways are used. Because they begin and end the chain of staff involved in delivering care, nurses possess a unique perspective in how health care systems work to enhance or impede the delivery of care. The nurse discusses the pathway with the patient and focuses on achieving specific outcomes and reviews the daily activities of the patient (Jabbour et al., 2018).

### **Development of clinical Pathway**

The process of clinical pathway development has many components including selection of a diagnosis or a procedure, establishing a team or committee, pathway

development, implementation and utilization and analysis of outcomes and practice review (Croucher., 2005).

## **1. Planning phase:**

### **1.a: Selecting topic and patient population**

The first step in pathway development is the selection of a patient population. CP is designed for specific cohorts of patients who share key characteristics such as particular symptoms or disease or being subjected to similar interventions or treatments. Homogeneity of the patient is key component for selecting patient groups. Targeting one diagnosis is usually easier to start with a surgical diagnosis than a medical one. There is less variability in the patient population and in the interventions or treatments required for a surgical patient as opposed to a medical patient. Topic selection, in general, should concentrate on high volume, high cost diagnoses and procedures. In addition, marked variation in care has been observed in these conditions, which makes the goal of decreased variation and reduction in resource utilization possible. Furthermore, there has been evidence of noncompliance with guideline recommendations. In this case, the pathways might improve guideline compliance and potentially improve quality of care. Clinical pathways are now used in a variety of settings and cover different diagnoses and conditions. Although this concept can be developed for any diagnostic or therapeutic clinical scenario, it has been most widely applied to surgical procedures (Vanhaecht et al., 2009; Panella, & Vanhaecht., 2010).

### **1.b: Selecting a Team**

It is important to develop a multidisciplinary team for clinical pathway development. Historically, clinical pathway development has been a nursing initiative. Although this has been a successful model in some institutions, one fault of this process is the lack of physician commitment to the pathway. Active physician participation and leadership is crucial to the development and implementation of the clinical pathway. In addition, it is important to include representatives from all groups that would be affected by the pathway, for example, physical therapists and dietary personnel. The lack of involvement of physicians has been cited as a reason for failure of a clinical pathway (Gray., 2008; Cook, & Scott., 2005).

The committee of health team provides support to determine what is needed to initiate the pathway, sees what resources are available and directs all disciplines involved in the path and the team determines patients' daily goals, and how interventions will be sequenced (Gray., 2008).

## **2- Evaluating the Current practice of Care phase:**

This phase involves identifying and understanding current practice among the care team members by performing record review of patients with the diagnosis or procedure. A careful review of medical records is necessary to identify the critical intermediate outcomes, determine what is and is not important is a challenge and high-cost areas on which to focus. Thus the outcome of this process will allow the team to identify best practice by care provider (Hall et al., 2005; McAloon et al., 2005).

## **3- Evaluating Medical Evidence and External Practices phase:**

After key rate-limiting steps have been identified, the clinical pathway team must evaluate the literature to identify evidence of best practices. For most rate-limiting steps, there are few data available to define optimal processes of care. The clinical pathway development team will often lack answers to specific questions such as appropriate observation period or length of stay. In the absence of evidence,

comparison with other institutions, or “benchmarking,” is the most reasonable method to use (Brown & Xhaja., 2018).

#### **4- Determining the clinical Pathway Format (Designing) phase:**

Once the team has reached a consensus on the desired outcomes and the process for the clinical pathway, the information is mapped onto a blank template or flow sheet. The blank template containing each day of the clinical pathway and the design is based on goals, interventions and outcomes in a day-to-day or visit-by-visit sequence. The format of the clinical pathway may vary widely. Although the format varies from institution to institution, clinical pathways have major features in common including: (Hussein et al., 2018)

##### Time Frames

All pathways are divided into useful time frames. The identified time frame may be minutes, hours, days, weeks, or phases. Conditions requiring emergency treatment (myocardial infarction, head injury, stroke) might be divided into 15-minute intervals, whereas conditions requiring chronic care (chronic pain, spinal cord injury rehabilitation) may be divided into weekly or monthly intervals. Interventions are bound by time, for example, day 1, day 2, week 1, week 2, visit 1 or visit 2. Important features include a task-time matrix in which specific tasks are specified along a timeline (Hunter, & Segrott., 2008; Rosique., 2009).

##### Interventional Categories

Interventional categories consist of the groups of activities for each stage that make up a comprehensive treatment plan and are shown in the left-hand column of the pathway. Although the order in which they are listed varies, these categories typically include: diagnostic tests, treatments and nursing interventions, consultations, medications, diet a fluids, activity, patient and family education and discharge planning. Clinical pathway teams begin working with a blank grid and fill in the appropriate interventions. Patient education material is one way to address the patient's role in the CP and education is an important part, since the goal is to assist the patient in becoming independent in a shorter period of time. Discharge planning is included from the entry point of the pathway and continues until discharge. Furthermore other data will be included in the pathway such as patient name, sex and age, date of entry pathway and date of discharge from pathway (Sjoerdsma et al., 2020).

##### Outcomes

Defined outcomes provide the focus for patient care activities and unify the various disciplines. All well-written pathways include outcomes identified for each time interval. They should be realistic, reflect incremental progress, and be achievable by 90% of the population. Pathway outcomes are similar in content and language to the goals or expected outcomes written into nursing care plans; physiologic, psychological, social, and educational outcomes are included to capture all elements of complete recovery (Hui et al., 2019).

##### Variance Record

Variance is defined as any deviation from the pathway. The reasons for any deviation must be clearly documented in a record which called variance record. The variance record is an extremely important part of the pathway and represents the mechanism through which improvements in patient care can be accomplished (Rotter et al., 2019).

There is a spectrum of pathways that range from a form that takes the place of the medical record to a simple checklist. CPs can be managed by either electronic-

based methods using electronic medical records, or by traditional paper-based methods that make use of printouts. A reduction in charting that may occur with more complicated pathways is a benefit. However, if the pathway format is too difficult to follow, it will not be used (Wakamiya, & Yamauchi., 2006; Gray., 2009)

### **5- Testing phase:**

The involved nurses, physicians and other health care team members must embrace the entire process, including the trial testing phase, which is imperative for success. The component of the clinical pathway must be adjusted as needed. During this phase, the team starts small with a few patients and selected team members. Constant surveillance is a must and only those patients who meet the definition will be admitted into the clinical pathway thus the successful implementation of clinical pathway depends on staff education and understanding of the purpose and need for the pathway (Gray., 2009).

### **6-Documenting, Analyzing and Action Plan of Variances**

All events on the clinical pathway are critical to obtain; therefore any deviations can have a negative impact on outcomes or alter the patient's progress. Patient variance occurs when the patient has a complication. If the patient is to ambulate 3 times a day and he ambulates only once, a variance has occurred. Certain variances are in our control, whereas others are not (Gray., 2009).

Variances are categorized by McLachlan, et al., (2019) as patient or family, caregiver or clinician, hospital or system, or community. Physician and nursing related variances arise when the nurse or caregiver cannot deliver the patient care according to the set regimen, resulting in delays in the delivery of care. Hospital or system variances may be related to operational insufficiencies such as an inability to schedule a test in timely manner. Variances can be positive or negative. Because the clinical pathway is a series of time-associated actions, a negative variance is an undesired outcome such as omission of an action or the performance of an action at an inappropriate (often, a late) time. On the other hand, a positive variance is an outcome that is achieved before it is expected such as early discharge or meeting the patient's goal in the specified time frame and at a cost equal to or less than anticipated.

Analysis of variance is essential process for effective utilization of CP and requires regular monitoring of variance. Computer-assisted pathway analysis can help with this issue. Identification of factors that contribute to variance and interventions to improve those factors are the key features in process improvement (31-35). Analysis of variance can inform clinicians of patients' immediate needs and also assist organizations in making service improvements and benchmarking. A variance management system should be in place for the collection and reporting of variance data and its analysis. These data can then be used to review, update and improve clinical and organizational practices by incorporating any new changes within the overall pathway template, thus completing the audit cycle. By monitoring and reviewing the variances, the information is incorporated into the pathway documentation so that the pathway becomes a dynamic tool continually being refined. Although pathway was developed meticulously with a strong evidence base, it is not possible to take a pathway as it stands and implement it into another area. To work to their optimum care pathways need to be adapted for local use, taking into account best local practice and local resources (Zhang et al., 2020).

### **7- Evaluation phase:**

After implementing the CP, there is the process of outcome evaluation and the best way to determine the efficiency of a pathway is to monitor outcome, which involves improved patient satisfaction, decreased LOS, readmission rates, morbidity

and mortality. Thus, clinical pathway must be continuously refined to incorporate new knowledge and information regarding the disease status. In addition pathway development is a dynamic process and regular monitoring and updating of the pathway is necessary as advances are made and variances are identified. The success of clinical pathway development and implementation depends on input and support from all disciplines, including physicians, involved in using the pathway and caring for the patient (Langdorf et al., 2007).

### **Discussion:**

It is clear that clinicians and health-care managers are still looking for methods to improve safety, quality and efficiency of their work. As in other service industries, the focus in health care shifts from the structure to the process to the outcome. Care processes and the organization of care processes are receiving increasing attention from both clinicians and managers. Both the care process structure and the multidisciplinary process or mechanisms are important in understanding the impact on outcomes when care processes are changed. One structured care methodology is clinical pathways, which are used worldwide in a wide range of settings to manage well-organized care processes (Plishka et al., 2019; Vanhaecht et al., 2007; Zuckermann et al., 2008).

Clinical Pathway is a systemic approach to managing health care that involves a high degree of collaboration between patients, nurses and various health care team professionals. It serves as reminders of interventions that clinical physicians, nurses and health care staff believe are most likely to be needed by the patient (El-Ghorr et al., 2010; Hensen et al., 2005)

In the past decades, the effectiveness of clinical pathways has been established through myriads of publications and researches all over the world, but in most hospitals of developed countries, a clinical pathway is considered a new approach of the integral part of the patient management (**Kinsman** et al., 2010). Nevertheless, there is a lack of experimental evidence to verify the benefits of implementing clinical pathway in various disease conditions. Therefore, the current review was conducted to overview the effect of application of a clinical pathway on enhancing the quality of health care (**El Baz** et al., 2007).

Van Zuuren et al (2006) and Kutluturkan et al (2010) reported that nurses can decrease the anxiety level of the patients before endoscopy by providing written materials such as brochures/booklets that included detailed information for the patients together with oral explanations which is considered as a vital part in application of any clinical pathway.

In addition, one of the assumed benefits and goals of clinical pathway is that patients who have been made aware of the day by day changes in their clinical pathway have a decreased level of anxiety (Morse et al., 2019). Berg et al., (2019) mentioned that pathways to be effective, a team approach must be used and patient education emphasized at each step of the pre- and post-operative courses.

**Patient satisfaction** is an important indicator of health care system performance. High patient satisfaction is associated with greater trust in caregivers which improves compliance with treatment recommendations. It is regarded as one of the desired outcomes of care and a measure of the quality of care in health care settings. Poor care quality can certainly lead to dissatisfaction and lost business. Thus measures of patient satisfaction should be closely linked with defined measures of quality in patient care (Ramachandran & Cram., 2005; Herrera-Espiñeira., 2009). In addition, Debono et al (2019) stressed that combining clinical indicators with a



satisfaction survey could have given a more accurate measure of the real level of quality achieved through clinical pathways.

In addition, Freeman and Denbam (2008) recommended that, the presence of a nurse has been found to be valuable to patient recovery. Improved communication during the preoperative care phase provides an important opportunity for a therapeutic interpersonal relationship between the nurse and the patient, which in turn improves patients' satisfaction which is consistent with the present study methodology and findings.

According to Kennedy et al., 2007, the results showed that the clinical pathway intervention overcame the problem of coordination among health team members compared to the control group in which the investigator initiated a mutual coordination with the other hospital departments including collaboration with the laboratory technician to perform the required preadmission laboratory investigations and also the required diagnostic procedures were done after collaboration with the radiologist and responsible physician. Postoperatively collaboration was done with x ray department to perform x-ray and coordinated with the dietary department to offer soft followed by regular or therapeutic diet for patients with associated diseases (Zhang et al., 2020).

### **Conclusion:**

Clinical pathway has been developed in health care as multidisciplinary care plans that outline the sequence and timing of actions or interventions necessary for achieving expected patient outcomes and organizational goals regarding quality, costs, patient satisfaction and efficiency. Clinical pathways are developed by a group of doctors, nurses and other health care professionals that are included in the management of patient. Nurses have a key role in all aspects of clinical pathway use. Participating in the development of the pathway is the first step in ensuring the successful use of clinical pathways and can best contribute by gaining a thorough understanding of why and how pathways are used. Because they begin and end the chain of staff involved in delivering care, nurses possess a unique perspective in how health care systems work to enhance or impede the delivery of care. The nurse discusses the pathway with the patient and focuses on achieving specific outcomes.

### **Recommendations:**

- Apply the clinical pathway model in nursing practice rather than the traditional delivery of care for patients undergoing PCNL.
- Assess level of patient's satisfaction about caring process after application of clinical pathway.
- Study the effect of using computerized clinical pathway on patients' health outcome.
- Study the effectiveness of interactive individualized online patient pathway.

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