

Delivering Quality Healthcare Services using Clinical Pathways

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ABSTRACT

The aim of this paper is to investigate clinical pathways as a tool to improve the healthcare quality, is a need for a method to improve patient safety, healthcare quality, and efficiency of medical activities, in healthcare there is a change in the method of looking to the services, the services in healthcare shifting from structure to process to outcomes. Result from investigating literature review reveal characteristics of clinical pathways and the method of presentation will improve healthcare quality. A set of characteristics of clinical pathways and the benefits will give researcher a clear idea to implement it. Ontology and knowledge management are the suitable methods to develop and implement clinical pathways.

Keywords: healthcare, quality, characteristics, benefits, knowledge management, ontology.

1. INTRODUCTION

Clinical pathways is an integrated medical treatment protocols, nursing care plan, and other healthcare activities [1], Clinical pathways support implementing evidence-based care, clinical pathways standardized healthcare treatments [2], the main objective for clinical pathways is to improve the quality of care and reduce the cost .

One of method to improve the quality is to redesign the healthcare process, the aim of this redesign healthcare process will adopt in clinical pathways to utilize resources [3].

Clinical pathways have another synonym like critical pathways, integrated care pathway, care map [4], clinical pathways is a set of medical processes that connect together to represent the flow of information for the patient treatment journey [5]

Medical errors are the most issue in the medical sector, these errors are divided into four types, diagnostics, treatment, preventive, and others, some of these errors related to the procedures of treatment, monitoring the diagnosis, most errors seems that there is a weakness in the treatment process[6].

There is a need for a method to improve patient safety, healthcare quality, and efficiency of medical activities, in healthcare there is a change in the method of looking to the services, the services in healthcare shifting from structure to process to outcomes, healthcare process is changed due to effect on outcomes, implementing clinical pathways to improve the clinical outcomes [7].

Clinical pathways are a management plan which introduces in the united states in the eighteenth of this century, the initial goal for clinical pathways has been to reduce the length of stay in hospitals and improve the quality of care [8], there are 84 definition for clinical pathways, in [8] there is a historically a definition of clinical pathways.

In his paper [9], there is the tenth definition for clinical pathways since 1994 until 2010, at the beginning of implementing clinical pathways it was used as schedule of medical and to manage the nursing procedures, after that it became as a multidisciplinary practice, clinical pathways concepts developed to be a plan to describe the diagnosis that will improve the quality care, outcome, and reduce the care cost, clinical pathways based on evidence-based-medicine (EBM).

Clinical pathways used as methodology to share knowledge to improve the patients safety and outcomes[9], beside clinical pathways called process management, because it consist with many medical processes for diseases and care procedures [10], clinical pathways used as a multidisciplinary tool to manage the care quality and medical procedures [11],[12].

2. REVIEW ON CLINICAL PATHWAYS

Clinical pathways as defined by the European Pathway Association (E-P-A) is “a complex intervention for the mutual decision making and organization of care processes for a well-defined a group of patients during a well-defined period” [7].

In the late of 1980s in United States Zander the first person who introduce the concepts of clinical pathways, the aim was to decrease the healthcare cost and to improve the quality. In the early 1990s in the United Kingdom the concept of clinical pathways applied, then the concept applied in Europe [8].

There are sixteen characteristics for clinical pathways, also every character has sub characteristics which mentioned in [4]:

1. A group of patients homogeneous: this characteristic related to the diagnosis and diseases, procedures, also is related to a good group of patients.
2. Multidisciplinary team: here it relates to the team of professional.
3. Timeline: define time frame or the patient from admission to discharge.
4. Actions: define the treatment procedures.
5. Patient care structure: these structures related to care structure and identify a comprehensive care.
6. Care efficiency: to utilize the medical resources.
7. Care standardization: to standardize the medical procedures.
8. Order in clinical pathways: the structures for the step in clinical pathways are ordered.
9. Variances: to monitor the patient, we have to identify the variances to reduce the errors.
10. Evidence-based-medicine: emphasis on Evidence-based-medicine interventions.
11. Care quality: improve the quality of care and improve the indicators.
12. Documentation: document all actions on the patient record.
13. Guidelines: to use these guidelines and accept it.

- 14. Education and training: clinical pathways can educate the medical staff and patients also his family about the treatment journey.
- 15. Communications: clinical pathways play role as a communication tool between departments.
- 16. Data: clinical care can document staff activities.

There are 17 standard functions with 6 categories, these functions has implemented in Health Information System (HIS), these functions play role as a baseline in developing and implementing clinical pathways and embedded it in HIS. [13]

3. METHODS AND IMPLEMENTATION

No general methods to represent clinical pathways [14], also to Identify or discovering clinical pathways models or the structure of the contents need a method, many methods used to discover these models, the following methods used in clinical pathways :

- 1. Knowledge management: by using this method there is increasing in the performance of clinical pathways [15].
- 2. Process mining: is a technique to extract knowledge from the event log, also to discover the behavior and the patterns on clinical pathways and become as a backbone, But these techniques cannot provide information about critical medical behaviors within clinical pathway stages [16].
- 3. Data mining: it is a technique to extract from the event log, this method can automate standard process to reduce documentations, the proposed method, can guide the physicians about what is the next steps, by using recommendation will optimized the quality clinical pathways[16].
- 4. Also there are many methods used in clinical pathways, like interview, case study, literature review.

Table 1 Method of Clinical Pathways implementation

Ontology Method [14, 17, 18]	Knowledge management method [17] [15]	Process mining method [16, 19]	Data mining method [11, 16]
<ul style="list-style-type: none"> • It is a method to : <ol style="list-style-type: none"> 1. Analyze. 2. Design. 3. Implement. 4. Model. • It is a knowledge method. • Improve patients' safety. • Ontology method is the only approach that can describe the structure and functions. • There are three types of ontologies used in healthcare: <ol style="list-style-type: none"> 1. Generic ontologies: such as process, structure to represent medical concept such as diseases, drugs, and so on. 2. Domain oriented ontologies: this type concentrate on specific domain in healthcare. 3. Task oriented ontologies: this type contains vocabulary and descriptions, for example diagnosis. 	<ul style="list-style-type: none"> • It is a method to: <ol style="list-style-type: none"> 1. Represent. 2. Conceptualize. • Knowledge base support and optimizes clinical practice. • Knowledge base monitors medical behaviors. • Knowledge base improves the treatment quality. • Knowledge base improves performance of clinical pathways. 	<ul style="list-style-type: none"> • Process mining is a technique to extract knowledge from the event log. • But these techniques cannot provide information about critical medical behaviors within clinical pathway stages. • Deal with unstructured clinical pathway data. 	<ul style="list-style-type: none"> • Discover the behavior and the patterns. • optimized the quality clinical pathways
<ul style="list-style-type: none"> • From this table it seems that one approach could not achieve the goals of developing clinical pathways. • Integration between more than approach will provide a robust methodology to develop clinical pathways. • Ontology and knowledge base should be one of these approaches, because knowledge base is one the components of CDSS. • There is a need for a method to extract medical behaviors. 			

4. BENEFITS OF CLINICAL PATHWAYS

According to [20],[21],[22],[1, 2], clinical pathways have many benefits, the main goal of these benefits to improve the care quality, also these benefits as listed below:

- Enhance the quality of care by improving patient outcomes.
- Length of hospital stay is less when using clinical pathways.
- Decrease the healthcare cost.
- Decreasing the rate of complications, readmission, and mortality.
- Pain relief, Improvement in clinical outcomes
- Care pathways can also be used effectively to improve internal hospital efficiency and effectiveness,
- provide the key ingredients for effective hospital planning
- Patient outcomes include inpatient mortality, mortality at longest follow-up, hospital, readmissions,
- In-hospital, complications, adverse, events, ICU, admissions, and Discharge destination.

5. RESULTS

According to the benefits of clinical pathways in improving healthcare quality, table 1 expresses these benefits and effectiveness of clinical pathways on healthcare service quality

Table 2 Effectiveness of Clinical Pathways on healthcare service quality

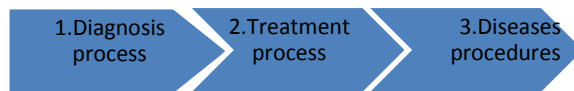
Author	Mortality	Morbidity	Length of stay	Readmission	Complications	cost
[20]			√			√
[21]	√		√	√	√	√
[22]			√			√
[1]			√			√
[23]	√	√	√	√	√	√
[24]	√		√	√	√	√
[25]			√			√
[26]	√	√	√	√	√	√
[27]	√	√	√	√	√	√
[28]	√		√	√	√	√

The result from this findings reveal that clinical pathways has a positive impact on healthcare quality, all studies focus on length of stay with cost, and readmission, because readmission has reflect on cost, furthermore readmission means that the treatment process is poor[14], based on these improvement in healthcare quality, a lot of research needed to improve and implement clinical pathways.

Table 2 illustrated clinical pathways methods of implementation, different methods suggested because no generalized method from develop and implement clinical pathways as a treatment process[14]. Furthermore implement clinical pathways need to study from information system perspective to be a adopt as a sub-systems of Health Information System to support physicians decision making process in order to improve the healthcare quality[24].

6. DISCUSSIONS

Clinical pathways is a well-accepted instrument for quality improvement and assurance [29], clinical pathways also used to organized patients care [8], clinical pathways concentrate on three dimensions [30],[31],[32],[3],[15]:



1. Diagnosis: it is the cognitive process, physicians use several data sources and put the puzzles together to do the diagnosis, diagnosis describe the patients diseases [33].
2. Treatment: the manner of patients' treating medically of surgically [34]
3. Prevention: prevention means to a void an injury, or disease. [33]

7. CONCLUSION

Before developing any system or any product, there is a need to define it exactly and what is the main factor that related to this. Developing and implementing clinical [8]pathways need first to define the healthcare quality, clinical pathways as knowledge based system will optimize control medical behavior, Clinical pathways as clinical decision support system play role in improving healthcare quality. Firstly we have to define the healthcare quality to apply clinical pathways as healthcare quality tool.

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