

Exploratory Study for Myocardial Infarction Clinical Pathway Compliance and Performance

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Abstract

Objectives: Although Clinical Pathway (CP) standardizes the patient care, poor compliance remains. The consistency of the expert's opinion on the CPs significance to the pattern of Clinical Pathway completeness was explored. **Methods/Statistical Analysis:** Mixed method and data triangulation were used in this study. Two types of data were collected from one hospital for STEMI (St Elevation Myocardial Infarction) patients. Primary (Survey) and secondary (CP filled documents) data were collected. Clinical Pathway content analyses with descriptive statistics were conducted using SPSS version 22. The influence of design on the completeness of the document was investigated. **Findings:** The content analysis revealed four main care processes in STEMI Clinical Pathway (Medical assessment and nursing, Medication therapy and treatment, Education nutrition and rehabilitation and outcome variance). We found differences in the design of the documents. Most of the experts (58%) agreed on the importance of time to treatment, while 35% of the respondents have a strong agreement on the importance of fast action to treatment and nothing should delay the intervention. CP1 was holding the highest ratio of documents completeness despite the fact that CP2 and CP3 are the improved version of CP1. **Application/Improvements:** The variance of the expert opinion from the real Clinical Pathway performance indicated inconsistency between the knowledge and practice. Further explanation for the phenomenon is recommended.

Keywords: Clinical Pathway, Completeness, Experts, Myocardial Infarction

1. Introduction

Cardiovascular Diseases (CVD) is one of the most trending disorders which require more effective strategies to alleviate the global burden of the CVD¹. The way we treat and diagnose the disease is changing rapidly. Clinical Pathway (CP) was adopted initially from the industry in 1980s for the purpose of improving the hospital care. Industries quality management document such as "Standard Operation Procedure" which aims to get good process and quality outcome with less resources and efficient time inspired the CP development. Consequently, CPs have proof its effectiveness on certain aspect of quality².

Apparently, there is a long list of unsatisfactory treatments with the presence of veracity of medications, surgeries techniques, and even facility in the medical practice. Yet, the full benefit that expected from CP is

not shown³. Confounding factors may exist to modulate the process and change the effect⁴ rather than mirrors of nature. Drawing on the insights of cultural cartographers, this paper presents a critical analysis of a specific instance of map-making in health policy, namely the growing use of care pathways in care planning and service delivery. Widely regarded to date as devices for ensuring quality of care, equity of treatment, optimal resource allocation and a rational division of labour between healthcare professionals, they have been seen as helpful--and technically neutral--tools for routing patients through the system. By contrast, we argue that the metaphors are misleading: lived experience and its objectification in pathway maps continually re-create one another, as we explore the slippage between map, map-making and mapping. This paper is based on interviews and observations with a variety of healthcare workers in three areas of south eastern England. We trace the development

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of a series of pathways-in-process, and show how they configure the patient, highlighting some aspects of their experiences, whilst silencing others. We also analyse the role of pathways in the carving up and surveillance of space round the emergence of the 'hybrid professional', particularly new practitioners such as GP specialists, specialist nurses, extended scope therapists and others. In considering the wider implications of care pathways as part of the contemporary discourse on policy, the paper critiques the rationalist, and sometimes evangelical assumptions underpinning their current popularity. In particular, we suggest that a critical and processual understanding of pathways might contribute to a more informed appreciation of their potential (and their limitations). The success of any organization is nowadays depending on the design success. In health service one of the undiscovered points is the design. The design of better care need knowledge and experience on how to design a functional care to improving practice⁵. Clinical pathways are complex plan of care based on best clinical practice for specified groups of patients with particular diagnosis designed to minimize delays and optimum resource utilization and to maximize the quality of care as shown in Figure 1.



Figure 1. Clinical Pathway flow.

The design of Clinical Pathway for certain disease is depending on the treatment process and its proceeding Figure 1, in order to improve health care quality and efficiency. Therefore, the expert opinion is a very important knowledge to be used in designing any management tool such as the Clinical Pathway and determine which indicator or process must be included or recommended to be included or even not required for this disease. As mentioned, there are “two gaps between the evidence and its implementation, either a lack of implementation of proven effective strategies or the use of inappropriate strategies with strong evidence against or insufficient evidence for their effectiveness and safety”.

Medical record usage as a data source for any quality review is widely known as an important data collection method. The role of the observer on giving an accurate measurement for the quality of care is the most important point that could affect the validity of the results. As the chart or medical record are usually considered a trustable and valid data source. The review of charts could be explicit or implicit, with more validity to the explicit with higher interpreter reliability while it's difficult to be achieved in implicit review. The medical record data can be classified into two types soft data that collected from interview, physical examination, interpretation and hard data obtained from the hospital laboratory results. The soft data have shown in some studies unreliable especially among different experts interpretations⁶. Health care epidemiological studies examine the determinant and the outcome of health service. While quality assessment studies do examine the process of care to determine if it follows the established standard of practice. The limitation on completeness of documentation with the agreement or disagreement based on expert clinical judgment may give a sensitive base for further measurement. The Clinical Pathway design from the expert based and how the role of the expert in designing the CP is affecting its use and might be a factor that might lower the functionality of Clinical Pathway, therefore, it become with a limited role for the quality improvement as it supposed to be. Performance could be improved and should be monitored for the implemented Clinical Pathway.

In this study we described the Clinical Pathway design completeness as an indicator to success. The variance of the expert opinion from the performance will be used as an indicator of disagreement of expert role on the CP design. We technically aim to identify the factor contributing to Clinical Pathway incompleteness through identifying the variability in the expert opinion with the record review.

2. Method

2.1 Study Design and Sampling

This is an exploratory study using the opinion of the experts and documents analysis. In this study the population of interest was the ST-Elevation Myocardial Infarction (STEMI) patient's Clinical Pathway records from PCI for patients received by referring hospitals and the cardiology experts. The frame of our sample included

the hospitals that have the Clinical Pathway trials for STEMI patients and have the trained staff of the Clinical Pathway committee in the local context.

2.1 Primary Data

Five scale survey were distributed to the Clinical Pathway committee from the volunteered hospital (in which is an expert who experiences the Clinical Pathway in their practice with at least one trial for Clinical Pathway) to explore the variation between opinion, performance and the opinion on the design of CP. Purposive sampling were adopted. The received data from different experts of myocardial infarction Clinical Pathway were screened prior to analysis and tested the agreement and consistency with the Clinical Pathway design.

2.3 Secondary Data

STEMI medical Clinical Pathway records for 297 patients for 18 and above years old were collected; Purposive sampling technique was adopted for selection of the cardiologist who are experts and users of Clinical Pathway.

2.4 Analysis Technique

The qualitative descriptive technique using SPSS version 22 (IBM corporation, USA) is used in this study to analyze the categorical data. The nature of the analysis is qualitative as it based on seeking expert opinion in this field. Inferential statistics were used to describe the significance of the finding by easier way.

3. Results and Discussion

3.1 Interviews

As a result of preliminary investigation by interviewing 15 experts we found that there is a defect in the measurement of effectiveness of Clinical Pathway in hospitals. The experts also highlighted that there is also a defect on analyzing the outcome of Clinical Pathway. They think that certain quality indicators are the focus of analysis such as length of stay and cost while there was no standard procedure that could be used in the development and evaluation of CP. In the stage of Clinical Pathway development, they mostly use expert direct input. Furthermore; there was no interest found in using or obtaining results from their implemented CP regarding the improvement of health care quality. Current situation leads to fall short away

from the goal of quality improvement and delivery of high quality for patient care that's happen most likely due to the absence of standard method to facilitate their work.

3.2 Clinical Pathway Content Analysis

We reviewed different designs of STEMI Clinical Pathway that have been trialed from the period 2012 to 2014. We extracted important and unique aspect STEMI Clinical Pathway consists basically of 63 elements distributed among four major sections (medical assessment and nursing, medication therapy and treatment, education nutrition and rehabilitation and outcome variance) as shown in Figure 2.

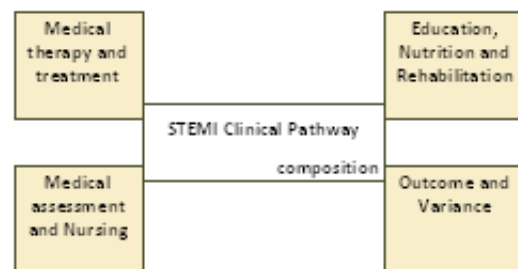


Figure 2. STEMI Clinical Pathway extracted composite.

3.3 Survey Study Analysis

For the sake of solid baseline data source, a real successful process for implementation of Clinical Pathway was identified. From the volunteered hospital, retrospective analysis for the (real situation) Clinical Pathway documents that filled from 2012 to 2014 has been conducted. Then, the content of the Clinical Pathway was screened in order to extract the common theme and components using some real empty documents for different design from the same hospitals. As a result of that, we came out with the common properties of Clinical Pathway for the STEMI patients. From the aforementioned content has been used in designing the survey. In this study 63 main items have been identified based on the content of Clinical Pathway and questionnaire was prepared to be rated by an expert panel. The survey has been distributed among Clinical Pathway experts and acquired 15 respondents with different experience and background. The questionnaire consisted of two sections. The first section covered the respondent background and experience while the second section was about the importance of the Clinical Pathway elements for high quality care. The statistics of the section A are shown in the Table 1.

Two nurse's respondents were an outlier in the group and excluded from the analysis. Only 70% of them responded to the survey sections completely. The respondent demographic statistics as shown in Table 1 were 5 (33.33%) specialists, 3 (20%) nurses, 5 (33.33%) doctors and 2 (13.33%) quality managers. Majority of the respondents were males and within 30-40 years old. The experience of the respondents in cardiovascular department was also observed. Majority of the respondent (38.1%) were has experience of 1-5 years in cardiovascular department while the minority which involved only two person (9.5%) have less than one year experience in the cardiovascular department. Besides that, there were three respondent (14.3%) have experience in cardiovascular department from 5 to 15 years

The survey contained the information from of the CP four sections with a total of 63 elements. Survey distributed to be answered by the experts and users for the clinical pathway. We asked them to fill a survey to give their opinion on the Clinical Pathway elements and it's important in the Clinical Pathway design analysis and performance. A total of 15 responses have been collected with details as shown in Table 2.

Table 2. Reliability statistic for expert opinion on treatment time

	Cronbach's Alpha	Cronbach's Alpha based on Standardized Items	No. of Items
Medical as- essment and nursing	.607	.661	26
Medication and treat- ment	.616	.871	27
Education, nutrition and rehabilitation	.685	.759	8
Outcomes and vari- ances	0.626	.882	2

The reliability of the variable was analyzed using the Cronach's Alpha reliability test. The Cronach's Alpha for the medical assessment and nursing, medication and treatment and education, nutrition and rehabilitation were $\alpha = 0.607$, $\alpha = 0.616$ and $\alpha = 0.685$ respectively as shown in Table 2. Thus, the measured items found reliable and

Table 1. Study respondent age and gender

Respondent Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(M)	10	66.7	66.7	66.7
	(F)	5	33.3	33.3	100.0
	Total	15	100.0	100.0	
Respondent Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30 y	3	20.0	20.0	20.0
	31-40	5	33.0	33.0	53.0
	41-50	3	20.0	20.0	73.0
	>51y	4	27.0	27.0	100.0
	Total	15	100.0	100.0	
Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nurse	3	20.0	20.0	20.0
	Quality Manager	2	13.33	33.33	53.0
	Doctor	5	33.33	33.33	66.66
	Specialist	5	33.34	33.34	100
	Total	15	100.0	100.0	

internally consistence. Most of the experts agreed on the importance of time to treatment with strong agreement on the importance of fast action to treatment and nothing should delay the intervention as shown in Figure 3.

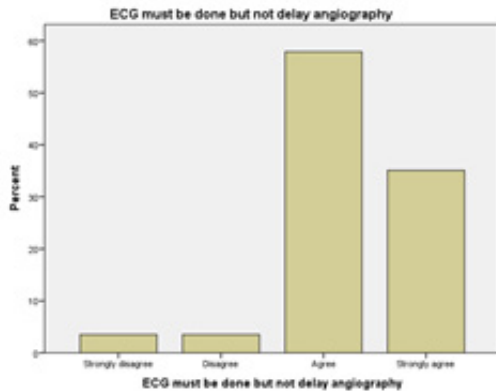


Figure 3. Time to perfusion opinion.

In this study we found out that 48.6% of the respondent believed that the person who should be responsible to fill the clinical pathways is the nurse while 25.7% of the cases put doctor as responsible person to fill the Clinical Pathway of patient completely while therapist and nutritionist was 11.4% and 14.3% respectively. More agreement to the content of the survey with more than 58% of respondents agree on the items significance on Clinical Pathway.

3.4 Clinical Pathway Document Analysis

There were 297 documents collected related to Clinical Pathway for STEMI patients. Only 294 documents were valid for the three different Clinical Pathway designs. The frequency statistics for the use of the three CPs (CP1, CP2 and CP3) show that the CP1 has the most usage among others. The percentage of physician and nurses whom used the CP was 33.3%, 52.4% respectively Table 3. The descriptive analysis for the compliance with time in the collected document shown in the table below, where there was 89.29% response to that point in the CP. We calculated the standard error; it was 0.441 at confidence interval is 95% for the population parameter Table 4.

The only difference of the three CPs designs was the arrangement and the structure of the document CP1 had the most complete documents percentage while CP2 comes second and CP3 with the lowest percentage as shown in Table 5 and Figure 4.

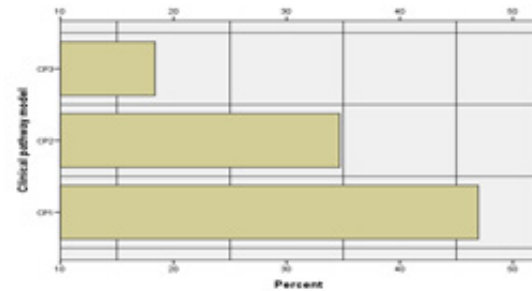


Figure 4. Clinical Pathway completeness percentage.

3.5 Time to Treatment Important

Regarding the opinion on the important of the fast reperfusion there was no significant deviation from the respondent opinion in the population from the compliance to fill that part in the CP documents. The descriptive contingent is mention earlier in Table 3.

Table 3. Statistics for the Clinical Pathway completeness

		Frequen- cy	Percent	Valid Percent	Cumulative Percent
Valid	CP1	138	46.9	46.9	46.9
	CP2	102	34.7	34.7	81.6
	CP3	54	18.4	18.4	100.0
	Total	294	100.0	100.0	

The descriptive statistics for the differences in compliance and expert opinion in the important of time patient care have mean = 1 with Standard Deviation SD = 2.3 from the survey responses and means of 2.9 and SD = 1.5 that indicted differences between the opinion of experts and the real practice Table 4 and Table 5.

Table 4. Clinical Pathway completeness statistics

	N	Mean	Std. Deviation	Std. Error Mean
Clinical Path- way model	294	3.7143	.55722	.03216

There was a difference between the means of the expert's opinion on the important in Clinical Pathway and their actual use in the document Table 5. In other words, some difference between what they think and what they use exist, however, a larger sample size would be beneficial.

The pattern of missing value in CP document and missing value in our survey presented in Figure 5 and

Figure 6 as we consider the non-significant responses (1-2 in the scale) as the missing value to run the analysis of the missing pattern for the survey.

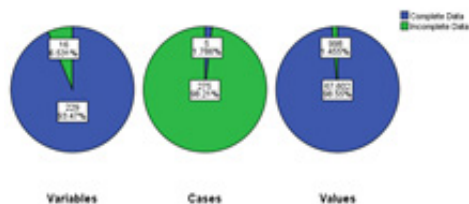


Figure 5. Clinical Pathway items completeness in Clinical Pathway document.

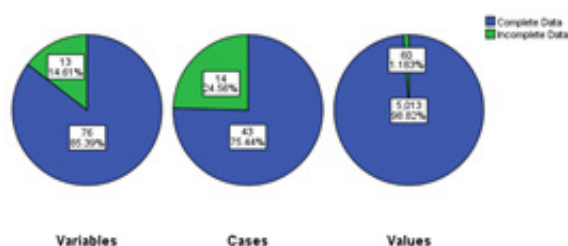


Figure 6. Clinical Pathway items completeness in survey.

Table 5. Expert vs. real practice opinion on time

	Mean	Std. Deviation
mean of time target expert	1.0035	2.39353
mean of time target CP	2.9694	1.53046

By comparing the mean of the agreement on the items of the Clinical Pathway to the mean of adherence to the Clinical Pathway document we found some discrepancy as shown in Table 6.

4. Conclusions

Clinical Pathway evaluation after trial and implementation is an important step for assessing the performance of such management tool on the patient and hospital care. The pattern of completing the CP document was not identical

to the pattern of agreeing or not with the component of Clinical Pathway as revealed in survey despite that we could not reject the null hypothesis. Sample size of the expert has to be increased in order to be able to conclude the actual difference.

Most of the expert respondents have strongly agreed on the importance of time to treatment with the importance of fast action to treatment and nothing should delay the intervention. Furthermore; regardless of the fact that CP2 and CP3 supposed to be improve versions of CP1 the completeness percentage of Clinical Pathway was higher in CP1 than these versions and responsibility to fill the Clinical Pathway is relying on the specialist.

As a conclusion, in order to improve the current situation and make it optimum, evaluation for the Clinical Pathway as a construct is crucial with consideration to design and content. Clinical Pathway could be promising if we could understand the process and its organization. The limitation on completeness of documentation with the agreement or disagreement based on expert clinical judgment may give a sensitive base for further measurement. Further analysis still needed to study the Clinical Pathway performance and its consistency with the expert's opinion. This study was a small scale of analysis focusing on one hospital. Wider study will be advantageous to add to the field and assist on development of better compliant Clinical Pathway.

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Table 6. Descriptive statistics for the comparison between the experts and document analysis for the significants of time to reperfusion

Means of Time	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
					25th	50th (Median)	75th
mean_expe	2.2386	.53508	1.65	2.85	1.7281	2.2281	2.7596
mean_doc	.2420	.15012	.05	.41	.0920	.2572	.3768

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