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BARRIERS IN INTERVENTION CHARACTERISTICS OF CLUSTER HOSPITAL (CH) IMPLEMENTATION IN MALAYSIA: AN EXPLORATORY STUDY

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Abstract

To address an imbalance between congested specialist hospitals and underutilised district non-specialist hospitals, Ministry of Health Malaysia introduced Cluster Hospital (CH) in 2014. Following successful implementations from countries with similar healthcare system such as Hong Kong, and Australia, CH merges hospitals to establish an integrated network of specialist and non-specialist hospitals through shared resources, streamlined services and care coordination. A qualitative study was conducted to explore perceived barriers and boosters towards CH implementation and its sustainability among healthcare providers via semi-structured focus group discussions and in-depth interviews with purposefully selected respondents from the first six CHs. An Interview protocol was developed based on Consolidated Framework for Implementation Research (CFIR) covering five domains; intervention characteristics, outer setting, inner setting, characteristics of individuals, and process. This paper will only highlight the perceived barriers in the intervention characteristics domain. A total of 274 participants from varying professions were interviewed. Interviews were audio-recorded, transcribed and thematic analysis was performed. In this domain, barriers to implementation were found within three constructs; complexity, design quality & packaging, and cost. Issues highlighted include intervention was designed with vague guidelines & policies, distance and travel costs within a CH, medical record safety, huge capital and operating cost involved. It was found that adaptation of evidence-based interventions needs to take into account the local context of an organisation for the implementation to be successful and produce desired outcomes. Thus, these perceived barriers raised by ground-level implementers should be considered and acted upon when strategising towards CH sustainability.

Keywords

Implementation Research, CFIR, Hospital Mergers,Perceived Barriers, Cluster Hospitals

1. Introduction

Malaysia's public healthcare system under the custodian of Ministry of Health (MOH) Malaysia oversees a total of 144 hospitals and specialised institutions, housing 42,424 beds to caterpopulation of 32.3 million people (MOH, 2019). These hospitals comprised of specialist hospitals, located in urban areas and non-specialist hospitals covering rural areas. Despite having parallel thriving private hospitals, the majority of healthcare demand is reliant on care provided

by tax-funded government hospitals largely due to the high cost of medical treatment. Public hospitals are seeing double the admission rate than private, and 70% of acute cases in the country is treated by MOH specialists despite making up for only 30% of a total number of specialists nationwide (Ahmad, 2019). This has led to issues of congestion and overburdened staff in public specialist hospitals with particular departments seeing a bed occupancy rate of 100% or more. Contrastingly, non-specialist hospitals faced lower utilisation due to patients' higher expectations on the standard of care perceived to be only available in specialist hospitals, inadequate infrastructure and skilled staff (Medical Development Division, 2016).

A technical committee within MOH discussed the concept of Cluster Hospital (CH) initiative as early as 2010 consequent to this conundrum. Grouping of hospitals in multihospital systems forming regional clusters has been shown to improve health system performance. A study on 343 clusters in the American Hospital Association found that evolving conventional service delivery pattern to form regional service distribution capacities may contribute to improved performance (Sikka et al., 2009). The Hong Kong Hospital Authority provides a comprehensive and complementary public healthcare delivery nationwide via seven hospital clusters (GovHK, 2019). Similarly, in Australia, the local hospital network was shown to provide collaboration opportunities and the sharing of resources between hospitals(Anderson & Catchlove, 2012).

Learning from the successes of CH concept globally, CH initiative in Malaysia was then developed towards Malaysia's Health Visionwhich includes person-centred care, care at/closer to home, effective, efficient and affordable services (Medical Development Division, 2016). A CH consists of a lead hospital, state or specialist hospital, grouped with one or more non-lead hospitals, forming a single entity of shared resources to provide an efficient healthcare delivery through an integrated collaborative network (Medical Development Division, 2018). Three pilots CHs were formed in 2014 followed by nationwide expansion in stages to complete all suitable hospitals to be clustered by 2020.

Implementing an organisational-level intervention such as CH is often complex and multi-faceted. Evidence-based and cost-effective interventions may fail to produce the desired outcome when implemented into particular organisations or healthcare systems (Grimshaw et al., 2012). In recent years, there has been an increasing emphasis on research examining this failure in knowledge translation to close the gap between knowledge and practice. Consequentially, the

importance of implementation science has been further recognised as providing aconceptual and methodological approach in translating evidence into routine practice (Hull et al., 2019). *From its inception in 2014, the experiences of healthcare providers (HCPs) as ground-level implementers of CH have yet to be explored.* Their perspectives aresignificant considering the nationwide expansion and the likely permanence of the CH initiative for the Malaysian public healthcare system. *Findings from this study are hoped to fill this gap of knowledge in the long-term pursuit of a sustainable public healthcare system.*

1.1 The Consolidated Framework for Implementation Research (CFIR)

The terms 'implementation' and 'context'are used repeatedly in this article. Implementation is defined as a collection of processes required to put an intervention into practice. It is theoretically described as the gateway between an organisation's decision to adopt an intervention and the effective assimilation of the intervention into practice (Damschroder et al., 2009). Contextis the set of circumstances that surround a particular implementation effort. In implementation research, it is imperative to grasp that this definition stretches beyond a mere background of which an intervention is to be inserted into but more of an active assemblage of interacting variables within the setting(Daivadanam et al., 2019).

Damschroder et al in 2009 introduced the CFIR as a pragmatic approach to evaluating factors influencing implementation of complex multi-level interventions in context by consolidating key features of current literature of implementation science (Damschroder et al., 2009). This framework contains five major domains; a) Intervention characteristics,b) Outer setting, c) Inner setting, d) Characteristics of individuals, and e) Process of implementation. All five domains interact heavily with each other and influence the outcome of the intervention. A pictorial representation of this framework is illustrated in **Figure 1** below

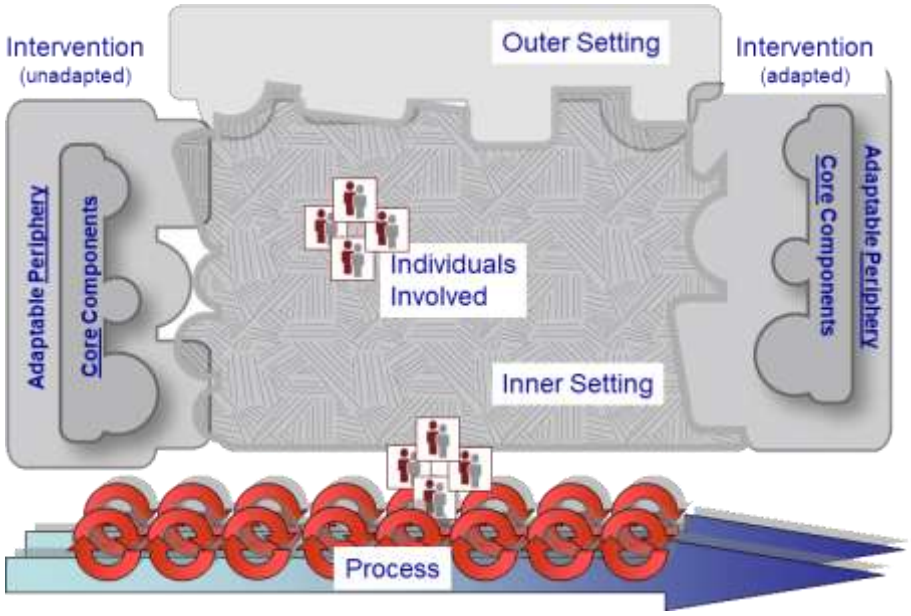

Figure 1: *The Consolidated Framework for Implementation Research (CFIR Research Team-Center for Clinical Management Research, 2021)*

The first domain of CFIR focuses on the characteristics of the intervention implemented. An intervention can be conceptualised as consisting of two core components;the 'essential elements' (the essential elements of the intervention) and 'adaptable periphery' (adaptable elements and structures related to the intervention and the organisation into which it is implemented). Interventions should allow for adaptations befitting the context of the organisationwithout affecting its integrity(Damschroder et al., 2009)(Kirsh et al., 2008). This domain contains eight constructs within it, examining an intervention's multiple facets; a) Intervention source, b) Evidence strength and quality, c) Relative advantage, d) Adaptability, e) Trialability, f) Complexity, g) Design quality & packaging, and h) Cost.

1.2 Study Objectives

This study was conducted to explore the experiences of the HCPs involved in the CH implementation to gain anin-depth understanding of the perceived barriers and facilitators for CH sustainability.It was hoped that the findings from this study could be shared between stakeholders and hospital managers nationwide and help to improve the implementation process for the newer Cluster Hospitals in other parts of Malaysia. *In this article, we describe only the perceived barriers to implementation that emerged from the intervention characteristics domain of CFIR from the perspectives of the HCPs involved in CH.*

2. Methodology

This was a *qualitative study* conducted between March-May 2018. Perceived barriers in intervention characteristics were explored through semi-structured focus group discussions (FGD) and in-depth interviews (IDI) by trained interviewers. Study sites were the first six cluster hospitals formed by MOH. The clusters were formed based on their regional locations and the healthcare demand. At the time of the study, these hospitals have had at least two years' experience in CH implementation. The study sites are shown in **Figure 2** below.

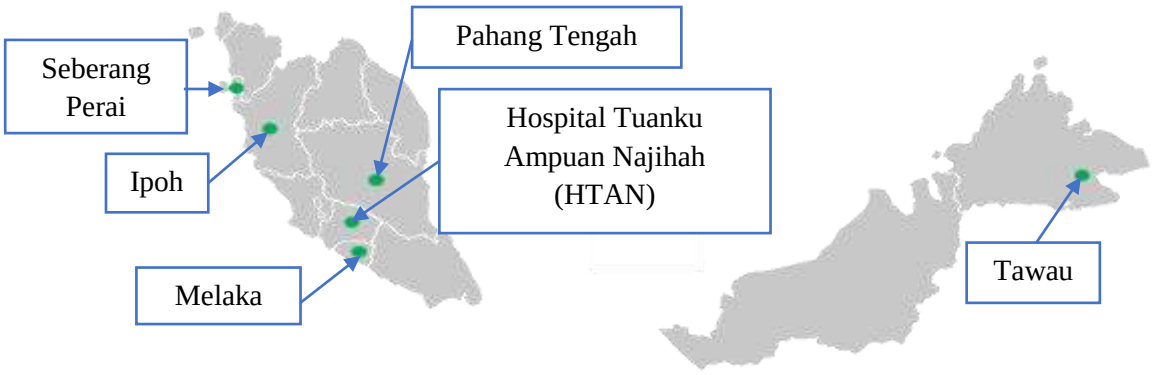

Figure 2: *Cluster Hospitals chosen as study sites*

Purposive sampling technique is commonly used in qualitative work to identify and select information-rich individuals as study respondents for the most effective use of limited resources (Palinkas et al., 2015). The maximum variation sampling strategy was applied in the final selectionof respondents from each study site to ensure a breadth of experiences and perspectives. Individual participants were selected to represent varying categories of HCPs by the appointed CH liaison officer as the site coordinator from each CH for the study. Inclusion criteria were I) HCPs from disciplines which had implemented CH, and ii) had been directly involved in CH implementation for at least three months. Those who did not consent to participate in the study were excluded.

An interview protocol was developed based on the domains of CFIR(Damschroder et al., 2009), as a guide to ensure consistency in all sessions. Before interviews, respondents were briefed on the study, interview process, anonymity and confidentiality guarantee before informed consent was taken. All interviews were conducted in the dual language of Malay and English, audio-recorded and transcribed verbatim. Data were analysed using thematic analysis in

NVIVO12.Multiple stages of independent analysis were conducted based on the CFIR framework while also including new categories found inductively to be included. Findings from the interviews were triangulated with researchers observations and feedback data from CH managers of each study site. This was followed by consensus meetings to ensure the trustworthiness of findings. This study was approved by the Medical Review & Ethics Committee, Malaysia (NMRR-18-8-39583) and funded by MOH, Malaysia.

3. Results

There were 274 respondents, with almost equal representation from both lead (n=148, 54%) and non-lead hospitals (n=126, 46%). **Table 1** summarises respondents' profiles. Six constructs under intervention characteristics domain were used. Two constructs; trialability and intervention source were pre-emptively dropped as were deemed irrelevant to the context of CH. Additional categories under existing constructs that better present the findings were included

Table 1: *Respondents' Profiles (N=274)*

Participants' profile	n (%)
Type of Hospitals	
Lead hospitals	148 (54%)
Non-Lead hospitals	126 (46%)
Workplace (Cluster Hospital)	
Pahang Tengah	46 (17%)
Melaka	45 (16%)
Tawau	45 (16%)
HTAN	43 (16%)
Seberang Perai	49 (18%)
Ipoh	46 (17%)
Professions	
Hospital director & assistant director	14 (5%)
Head of the department	9 (3%)
Specialist	29 (11%)
Medical officer (MO)	76 (28%)
Matron	8 (3%)
Nurse	56 (20%)
Assistant medical officer	28 (10%)
Health care assistant	13 (5%)
Driver	18 (7%)
Administrative officer	9 (3%)
Medical record officer	11 (4%)
Others (pharmacist, occupational therapist, neurophysiologist)	3 (1%)
Years of service in MOH	

0 - 10 11 - 20 21 - 30 > 30	113 (41%) 88 (33%) 64 (23%) 9 (3%)
Years of involvementin CH < 1 1 - 2 > 2	 12 (4%) 159 (58%) 103 (38%)

The six constructs used in coding transcripts were; Evidence strength & quality, Relative advantage, Adaptability, Complexity, Design quality & packaging, and Cost. *However, when looking explicitly at the perceived barriers of implementation, only three constructs fitting to CH were raised*, as detailed below. Each finding is followed by the corresponding respondent quotes.

3.1 Complexity

This construct refers to the perceived difficulty in implementing an intervention. Respondents often reflect on this through radicalness,disruptiveness, duration, scope and intricacy required to implement (Damschroder et al., 2009).

- **Existing Relationship**

The first was the pre-CH relationship that existed between hospitals. It was common for hospitals to have had a pre-existing arrangement for certain services which may not be coherent with new relationships formed with collaborating partner hospitals in CH. This led to confusion among HCPs.

> "This year we are taking over Hospital A because when the Cluster started, Hospital A was not under us (Hospital B) but Hospital C that is not in our cluster instead. That is the barrier that we are facing because it was never under our specialists."

- **Geography**

Geographical factors contributing to poor connectivity was another perceived barrier. CH involved daily liaising and communicating between staff from different hospitals, which heavily relies on internet connection and phone coverage. Having poor internet connection and phone signal coverage has made the communication difficult failing to sustain virtual ward rounds and teleconsultation with specialists in the lead hospital.

> "The skype round, it started for a short while in Medical unit in Hospital K, but we have issues with an internet connection"

Another perceived barrier was the rural location of particular non-lead hospitals leading to a high staff turnover, complicating CH sustainability.

> "Because we are so rurally located, doctors transferred here tend not to stay here for long"

- **Travelling between Hospitals**

CH involves frequent movement of patients, staff and equipment. Thus, poorly maintained roads were perceived as a barrier as it raised some serious safety concerns and expensive equipment risked being damaged from frequent travelling.

> "In terms of safety, since we travel every day, we have to be careful. Mainly because of the road condition, that's the factor here."
>
> "For example, as Sister mentioned, when they come here from Lead hospital, sometimes they bring specialised equipment with them. And the roads between our hospitals are bumpy. We worry because these types of equipment are sensitive and bumps during travel can damage them."

- **Distance**

The distance between hospitals within CH was mentioned quite frequently as a perceived barrier. Short distance helped staff to mobilise, but there is a higher tendency for patients to bypass non-lead hospitals to seek treatment in lead hospitals even though they stay closer to non-lead hospitals.

> "I think the uniqueness is our geographical location is very near. So, I think that's why the public would have a choice not to go to Hospital Y or Z. They can come to Hospital X in half-hour..."

On the contrary, when the distance is long, it was taxing for staff to travel daily, especially when shuttle transportation and accommodation were not provided.

> "We feel that going there daily can be very stressful especially we have to travel 100km every day. Most of us are not staying here. For us to travel from (our) respective homes to CH every day is very taxing."

- **Coverage Area**

Another barrier was the need to cater for population outside their CH's coverage area, leading to increased workload, and interfered with their capacity to perform CH activities.

"Because we are covering the whole state. Only about 10 of us, specialists and MOs, so we are the one to go to Hospital D, Hospital C, Hospital E and (at the same time) covering Town A."

- **Medical Record Management**

Increasedpatients' movement following CHled toconcerns about medical record management. The first concernwas about the safety of medical records during transfer.

"Losing track of patients' medical records is a huge problem. Because patients and their records get transferred around frequently, sometimes it takes a while to track because we still use manual medical records system"

Second is the unavailability of medical records in time for service provision, for example, the patient was discharged from lead hospital and given clinic follow-up in non-lead hospital, but the records were not yet available during the appointment.

"…tomorrow I have a case here (non-lead) decided by a specialist in the lead hospital. But until now we don't have the case note. So, we don't know what case, when we call the lead hospital to ask for the case note, they said they will find and let me know, until now no reply…"

3.2 Design Quality & Packaging

This construct refers to the perception of how well an intervention is bundled, assembled and presented to the implementers(CFIR Research Team-Center for Clinical Management Research, 2021).

The lack of specific guidelines or work process policies in running CH activities was perceived as a barrier, which led to alack of continuity when a change in leadership happened.

"One of the issues is with the lack of policy on the details of the implementation of CH. This can lead to a lack of continuity as the implementation becomes heavily dependent on the leadership in the CH itself. This bottom-up approach of Cluster is good, MOH doesn't dictate exactly how to cluster but then this can also be a negative when leadership in the cluster change, the implementation and work processes change because the direction changes"

Some respondents perceived there was a mismatched delineation in CH which acted as a barrier. They suggested relooking into the suitability of hospitals within the existing CH, considering the geographical location and patients' utilisation trend.

> "Most of the time we try to tell them to go back to Hospital K because Hospital K is very near to you. But most of them still refuse. Maybe we should put Hospital K in our Cluster."

3.3 Cost

This construct refers to the perception of the cost that is incurred when implementing an intervention. Costs here include perceptions of investment, supply and opportunity costs(Damschroder et al., 2009). This construct is separate to the topic of available resources that is explored under a separate domain of CFIR.

- **Financing Mechanism**

Some respondents mentioned that rigid financing mechanism is a barrier as they cannot freely utilise budget allocation according to their needs.

> "If MOH wants to provide funding, make it more flexible for us."

- **Capital Cost**

Another perceived barrier was the huge capital cost involved, especially in building, renovating infrastructure or purchasing equipment.

> "For ICU care, when Medical specialists come here from lead hospital, they complain that our equipment and facility is not up to par. So they ask to apply for more budget from the MOH… even if approved it's often after a long wait."

- **Operating Cost**

It was also mentioned that increased operating cost was a barrier mainly for the purchase of consumables especially when non-lead hospitals started to perform more procedures and other miscellaneous expenses associated with increased staff and patients' mobilisation.

> "Emergency Department uses a lot of consumables. If we have to share, some consumables we do share with our non-lead hospitals, so cost increases for us. But our yearly budget remains the same. So, there will be cases that should be treated in Hospitals J or K but have to be transferred to us here due to lack of consumables there."

4. Discussion and Conclusion

The perceived barrier of pre-CH relationships confusing new partnerships formed could be tackled if staff were informed of the change and involved in the designing of the change process. Good leadership with employee participation in the change process is among the key factorsfacilitating mergers (Gustafsson & Östberg, 2017). This isessential for sustainability as it both builds understanding as well as trust and commitment. If managers had succeeded in communicating their vision for change and strategies, employees' motivation and engagement would be stronger as work processes would be clearer (Engström et al., 2002).

The issue of geographical distance between hospitals was raised as a barrier frequently in our findings. Though there is little than can be done on this, a study onstaffs' perception of hospital mergers in Norway, found that positive relationship with merger top management, measured by cognitive distance, was of greater significance despite the long geographical distance between hospitals that can be challenging, This study also highlighted the mitigating role of adequate information systems and means of communication in overcoming the negative effects of geographical distance(Solstad et al., 2020). It may be advisable for policymakers to consider distance as a possible barrier when planning new mergers and find ways toreduce the burden on HCPs

The lack of an integrated medical record system between hospitals has been shown to pose serious challenges in the continuity of care during inter-facility transfer. (Jay Biem et al., 2003). As most hospitals in Malaysia still uses manual medical record system, our findings were expected. Structural reform should never risk patient safety and continuity of care. Therefore, it is highly encouraged that an electronic medical record system with lab results, discharge summaries and care plans accessible to all hospitals involvedis provided (Jay Biem et al., 2003).

Respondents also raised concerns on the lack of specific guidelines on CH implementation.Guidelines and policies are significant in standardising processes for communication, coordination and consistency of integrated health care.(Jay Biem et al., 2003). Having an applicable guideline that adapts to the local context would boost CH implementation. This finding was echoed in a study on nine NHS Trusts' mergers in England that faced difficulties in implementation when policies were based on simplistic assumptions on processes of organisational change without accounting forthe dynamic relationship between the organisation, its context, and individuals involved(Fulop et al., 2005).

In cost construct, issues of huge capital cost to upgrade facilities and equipment besides the increased operating cost for purchasing consumables and logistics were raised. There is conflicting literature on the effects of merging hospital services on cost. An evaluation of a large number of hospital mergers between 2000 and 2010 in the United States has shown that acquired hospitals saw an average cost reduction of 4-7% following the merger (Schmitt, 2017). However, a study from Denmark hospital mergers found some merged hospitals became too large and experienced diseconomies of scale. They found that hospitals in a merger would benefit the most from learning best practices and practising economies of scope (Kristensen et al., 2010).

In conclusion, CH requires a change in organisational culture, norms and work processes to ensure its unhampered implementation. Though the concept of combining hospitals to form a larger cluster for efficient healthcare delivery is common practice in other countries, this is still relatively new to the Malaysian healthcare system. Thus, CH success and sustainability depends greatly on strategies to adapt the intervention and surmounting perceived barriers explored in the study, to attain the Malaysian healthcare system transformation.

5. Limitations and Recommendations

The findings of this study are limited to the study participants' own experiences of the CH initiative within the time frame of the research. Also, as the only qualitative methodology was conducted in this study, quantitative measures of the severity of the issues raised were not performed. Further quantitative evaluations of magnitude and severity of implementation issues are recommended to depict a holistic picture of the CH initiative implementation in Malaysia.

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