Title

Physicians' and nurses' perceptions of the factors influencing the implementation of paediatric clinical pharmacy services in Hong Kong: a qualitative study

Abstract

Objectives

To identify barriers and facilitators that influence the implementation of paediatric clinical pharmacy services in Hong Kong public hospitals from physicians' and nurses' perspectives.

Methods

A qualitative study was conducted based on semi-structured interviews of physicians and nurses who worked in the field of paediatrics in four public hospitals in Hong Kong. Interviews were held via telephone conversations using spoken Cantonese which were audio recorded, then translated and transcribed directly into English by the research team. Thematic analysis was used for data analysis and reflexivity was engaged through member checking, making field notes, and reporting using the Consolidated Criteria for Reporting Qualitative Studies checklist.

Results

A total of six barriers and five facilitators were identified from interviewing 17 participants, which included seven physicians and ten nurses. The barriers identified were the public's lack of understanding and recognition of clinical pharmacists, a culture of medical dominance, lack of resources and heavy

workload, the need for a more transparent and defined role of clinical pharmacist at the institutional level, lack of proactive approach and involvement in direct patient care activities. The facilitators identified were the belief in the improvement of patient outcomes and the overall pharmaceutical service efficiency, trust and confidence in clinical pharmacy services, filling the clinical gap as a medicine information provider, and direct and coherent communication as a multidisciplinary team member.

Conclusions

Physicians and nurses reported that the implementation of paediatric clinical pharmacy services was adequate, but several key barriers were identified at both the external and internal levels.

Keywords

Health service administration; Pediatrics; Pharmacy administration; Pharmacy service, hospital; Quality of health care.

What is already known on this topic

Evidence on the benefits of paediatric clinical pharmacy services was shown across the literature but most studies were conducted in controlled settings. How these interventions can be translated into the healthcare system was typically not investigated and thus the research-to-practice gaps were usually not addressed.

What this study adds

Our results have helped to fill in a gap in research by the use of a rigorous qualitative methodology, thus promoting the systematic uptake of research findings into practice.

How this study might affect research, practice or policy

This research has identified evidence-informed implementation factors which enable stakeholders to develop appropriate strategies to enhance the implementation of paediatric clinical pharmacy services in public hospitals in Hong Kong.

Introduction

The implementation of clinical pharmacy services (CPSs) within a healthcare setting is a challenging and complex process influenced by multiple factors including the perceptions of physicians and nurses.[1-3] Al-Arifi and colleagues identified factors such as the belief and expectation of the service, the work environment, and the collaboration between clinical pharmacists and other healthcare professionals influence CPS implementation in different ways.[4]

Although the positive impact of CPSs on clinical, economic, and humanistic outcomes has been demonstrated across the literature, most of these studies were conducted in controlled settings. How these interventions can be translated into the real world were not investigated and therefore the research-to-practice gaps were usually not addressed.[5]

Hong Kong is still in the early stages of clinical pharmacy development, with the public hospitals implementing CPSs for their paediatric patients, which are known to be at higher risk of harm resulting from medication errors.[6,7] While research has highlighted that the development of Hong Kong's CPS programme is hindered by resource limitations and the overwhelming workload of clinical pharmacists, formative evaluations of how well the CPS has been implemented are lacking.[8] Therefore, the exploration of the views of other healthcare professionals could help to assess the extent to which CPSs have been implemented.

Aim

To identify the factors that have influenced the implementation of hospital paediatric CPSs in Hong Kong

from the perspectives of physicians and nurses.

Methods

Study design

A qualitative approach was used for this study as it allows for a rich understanding of complex intervention such as the implementation of a healthcare service. Qualitative research has been performed in pharmacy practice research in order to provide explanations for and understanding of a broad range of phenomena in this area.[9] The methodology of this study was informed by an earlier publication from the same research team with clinical pharmacists.[10] Semi-structured interviews (SSIs) were used for data collection, with the interview guide developed from the themes and subthemes identified in systematic reviews identifying factors in both adult and paediatric CPSs (see Supplemental Material).[11,12] As all researchers agreed that no amendments were required after pilot testing the guide with three participants and therefore, the data were included in the analysis.

Participants and recruitment

All physicians and nurses, with a workforce estimated at more than 300 staff, who worked in the field of paediatrics in four participating public hospitals (i.e. Hong Kong Children's Hospital, Kwong Wah Hospital, Tseung Kwan O Hospital, and United Christian Hospital) situated in the east and central Kowloon in Hong Kong, were invited to take part in this study. The target number of participants was estimated to be between 10 and 15, and this was based on the average sample size required to achieve data saturation reported by other studies.[13] Participants were selected using purposeful maximum

variation sampling. Invitation emails, including an information sheet and consent form (see Supplemental Material), were sent to each subgroup within the group directory via an internal emailing system.

Data collection

The interviews were conducted by the Principal Investigator (PI) in Cantonese to optimise the participants' range of expression. The PI was trained in conducting SSIs from the completion of a certified course in qualitative research organised by Bristol Medical School, University of Bristol.[14] The interviews were audio recorded, then translated and transcribed directly into English by the PI. CH, a member of the research team fluent in Cantonese, subsequently checked three of the translated transcripts for accuracy. QSR NVivo Version 12 (QSR International, Australia) was used to facilitate the analysis process.

Participants had a choice to select either video conferencing (Zoom Video Communications, USA) or telephone for their SSIs, owing to the social distancing restrictions imposed by the local government due to the COVID-19 pandemic. An inductive thematic data saturation approach was employed. This approach focuses on the identification of new themes and is based on the quantity of such themes rather than the completeness of existing theoretical categories.[15] Thematic saturation is said to be achieved when further observations and analysis reveal no new theme can be derived from the dataset.[16]

Data analysis and reporting

Thematic analysis was used for exploring and interpreting patterned meaning across the dataset. As described by Braun & Clarke, it is an iterative process which involves six phases: becoming familiar

115 with the data; generate initial codes or categories for placement of themes; collate codes into potential
116 themes; review themes in relation to the coded extracts and dataset; define the themes; and produce the
117 write-up.[16] CS was responsible for the coding process, with CH coding 20% of the total transcripts.
118 Discrepancies found between the two sets of coding were resolved upon discussion among the two
119 researchers, and a consensus was reached among the whole research team. The researchers have engaged
120 in reflexivity through member checking, making field notes, and reporting the study using the
121 Consolidated Criteria for Reporting Qualitative Studies (COREQ) checklist.

122 **Results**

123 A total of 25 paediatric physicians and nurses across four study sites agreed to participate in the study
124 and 17 were interviewed by telephone which allowed reaching thematic data saturation. This included
125 seven physicians and ten nurses. The interview duration ranged from 11 to 30 minutes (M= 20; SD=
126 5.73). Table 1 shows the demographic details of the physician and nurse participants.

Key	**Study site**	**Gender**	**Years of experience in paediatrics**	**Subspecialty**	**Interview Duration (mins)**
Physician 1	Hospital C	M	>10	Oncology and haematology	18
Physician 2	Hospital C	M	>10	Paediatric intensive care unit	15
Physician 3	Hospital B	M	>10	Oncology and haematology	11
Physician 4	Hospital C	M	5-10	Gastroenterology	20
Physician 5	Hospital A	M	>10	General paediatrics	16
Physician 6	Hospital A	M	5-10	General paediatrics	25
Physician 7	Hospital A	F	5-10	Neonatal intensive care unit	23
Nurse 1	Hospital A	F	5-10	General paediatrics	13
Nurse 2	Hospital C	F	>10	Oncology and haematology	18
Nurse 3	Hospital D	F	<5	General paediatrics	30
Nurse 4	Hospital D	F	5-10	General paediatrics	17

Nurse 5	Hospital B	F	<5	General paediatrics	15
Nurse 6	Hospital A	F	>10	General paediatrics	28
Nurse 7	Hospital D	F	5-10	General paediatrics	13
Nurse 8	Hospital A	F	>10	Paediatric intensive care unit	28
Nurse 9	Hospital A	F	5-10	Neonatal intensive care unit	25
Nurse 10	Hospital A	F	>10	Neonatal intensive care unit	23

127 Table 1. Characteristics of physician and nurse participants in this study.

128 There were six barriers and five facilitators that were identified and categorised as subthemes, and

129 the quotes linked to each category were attributed to the relevant anonymised interview participant. These

130 themes and subthemes are outlined in Table 2.

Barriers	**Facilitators**
• **Related to external bodies including the public and government** o Public understanding and recognition of clinical pharmacists o A culture of medical dominance	• **Related to the patients** o Improvement of patient outcomes o Improvement of the overall pharmaceutical service efficiency
• **Related to the organisation and institutions** o Lack of resources and heavy workload including clinical and dispensing duties o The need for a more transparent and defined role of clinical pharmacists at institutional level	• **Related to the healthcare team** o Trust and confidence in the CPS o Filling the clinical gap as a medicine information provider o Direct and coherent communication as a multidisciplinary team member
• **Related to clinical pharmacists** o The need to have a more proactive approach o Lack of involvement in direct patient care activities	

131 Table 2. Summary of themes and subthemes identified.

132 ***Barriers***

133 *Public understanding and recognition of clinical pharmacists*

Participants commented that the general population in Hong Kong was not clear about the role of clinical pharmacists, as pharmacists are typically portrayed as medicine suppliers. Some identified a causality dilemma between the recognition of clinical pharmacists and professional autonomy. They contended that pharmacists' status as a healthcare professional was negatively affected due to the lack of supportive legislation, such as prescribing rights. However, some participants highlighted that the public has to understand the importance of clinical pharmacists before related legislation can be enacted:

"I think the public or the community needs to be aware of this [CPS] and to accept this. They need to know that the benefits would bring with clinical pharmacists' involvement… and from that, we can perhaps explore the opportunity on the legislation level." (P4)

A culture of medical dominance

Participants remarked that medical dominance is based on traditional values embedded in the culture. However, medical and nursing participants gave different reasons for the resistance to change. Some physicians believed that the barrier was underpinned by cultural aspects that disfavour the empowerment of clinical pharmacists' role in medicines management, largely due to the public viewpoint which was interlinked with the public's understanding of the profession. However, some nurses revealed that physicians might have some resistance toward CPSs as they might be threatened by the increasing power of clinical pharmacists:

"… I feel that as a whole picture doctors would think that patient management is their job, and they should be managing the whole care… why should clinical pharmacist stake parts of their clinical roles

away?" (N2)

Lack of resources and heavy workload including clinical and dispensing duties

The general perception of both professions was that the current manpower of CPSs has already stretched to its limit. Participants identified that the lack of clinical pharmacists was a major factor that limited service implementation, as a high patient-to-pharmacist ratio and coverage of multiple wards were highlighted. Some participants felt that clinical pharmacists were also constrained by their dispensing duties, thus affecting their time in the wards. They reflected that these limitations have a knock-on effect on the quality and extent of service provision.

The need for a more transparent and defined role of clinical pharmacists at institutional level

Generally, members of both disciplines found it difficult to describe the scope of a paediatric CPS. Some participants expressed that were not aware of CPS until their paediatric rotation because it is not uniformly implemented across all specialties and institutions. They expressed that the organisation and its hospitals should take a leading role in informing physicians and nurses on the role of clinical pharmacists in order for the service to be implemented successfully. Some participants also mentioned that healthcare professional bodies can help to achieve this.

The need to have a more proactive approach

Although the implementation was supported by the recognition of clinical pharmacists' activities by physicians and nurses, some felt that the implementation can be more successful if clinical pharmacists are more proactive:

"I do feel that they should have more authority in the medications used… to have more decision making, letting us know how to use drugs properly… rather than a more passive role as currently, they would need to approach us on dosage adjustments…" (P4)

Other areas in which participants wished clinical pharmacists could involve more include the participation of multidisciplinary meetings and the provision of teaching sessions. Additionally, drug counselling was viewed as one of the most important clinical services provided by clinical pharmacists, but clinical pharmacists only counsel patients or their parents upon referral by physicians or nurses. Many participants expressed that the ideal situation would be when the service is initiated by the clinical pharmacists.

Lack of involvement in direct patient care activities

Participants reflected that direct patient care activities, such as providing drug counselling, are an important aspect of the CPS. Physicians believe that through drug counselling by clinical pharmacists, parents gained a better understanding of medicines for their children. Some participants believed that the implementation was influenced by the observation that clinical pharmacists' input has improved medication compliance. However, many participants expressed the view that clinical pharmacists were not as involved in direct patient care activities as they anticipated:

"I have had some cases where they [clinical pharmacists] would provide drug education to the parents… but it's not often… it's good because they are the expert on drugs and I would think it is better if they can speak with the parents more." (N3)

Participants also expressed that the implementation of direct patient care services is limited to the hospitalisation period currently and it should be extended to post-discharge so that there is a continuity of care.

Facilitators

Improvement of patient outcomes

Participants believe that the involvement of clinical pharmacists performing their duties has improved patient outcomes and that the successful experience in the implementation of current CPS has become a facilitator for further service implementation. Some participants think that the service helps patients and their parents better understand their medications, such as their indications and precautions, which in turn improved medication adherence or concordance. Additionally, participants commented that clinical pharmacists helped to improve the safety of medicine use in children, which was perceived to pose a high risk of error:

"… there's always involvement in calculations when prescribing drugs for children… there is more variation in dosages… and therefore they [clinical pharmacists] are very important." (N5)

Improvement of the overall pharmaceutical service efficiency

Physicians and nurses believe that the CPS has made the overall pharmaceutical service more efficient because they can interact directly with a representative of the pharmacy department. Furthermore, with the clinical pharmacists being based on the wards, they possess a more direct and thorough picture of patients' clinical needs, which supported the prompt implementation of any queries or drug-related

issues. Participants also remarked that one role of clinical pharmacists was to act as a liaison to communicate with the pharmacy, thus facilitating the supply process and saving a lot of time and effort.

Trust and confidence in the CPS

Participants reported that they trust clinical pharmacists, believing them to possess highly specialised skills and knowledge, which helps the participants to provide optimal patient care management:

"I think they use their expert knowledge as pharmacists… I think that the knowledge that clinical pharmacists possess is quite different from that of physicians." (P4)

With healthcare professionals trusting clinical pharmacists, their confidence in the CPS was demonstrated as a result. Some participants were confident that clinical pharmacists in Hong Kong could provide advanced services similar to those of other countries with more developed CPSs.

Filling the clinical gap as a medicine information provider

Generally, both physicians and nurses showed appreciation for clinical pharmacists providing them with medicine information that facilitates their clinical practice. Information provided that was reported frequently by physicians to support CPS implementation include reviewing medicine regimens, performing literature searches, and providing information and the procurement of new pharmaceutical products. Nursing participants believed that the provision of practical information such as drug formulation and administration methods has enhanced the safety of their nursing practice.

Direct and coherent communication as a multidisciplinary team member

Physicians valued the participation of clinical pharmacists in medical rounds, where they have ad hoc

discussions on medicine management with clinical pharmacists. They believe that direct communication forms a rapport between healthcare professionals:

"...now we know which clinical pharmacist is following the cases, and this has increased the level of communication… this is more direct." (P1)

Physicians also believed that direct communication has formed a good working relationship between healthcare professionals in which they can learn and support each other. In contrast, nurses valued having direct communication with clinical pharmacists as some pointed out that this has made the health service more efficient, thus benefiting the patients.

Discussion

The results from this study confirmed that several facilitators enabled the implementation of paediatric CPS in Hong Kong, one of which is the perception that clinical pharmacists could improve patient outcomes. Their view was concordant with evidence across the literature.[17,18] Furthermore, a certain level of trust in clinical pharmacists was shown by both physicians and nurses which was another factor in a successful implementation.[19]

The involvement of clinical pharmacists is believed to improve interprofessional communication, which is a prerequisite for collaborative practice.[20] Their contribution to multidisciplinary teams helps to create a sense of belonging among their members in coordination, cooperation, and decision-making.[21] Members of both disciplines believed that the service helps provide relief for counselling and medicine information, thereby allowing them to focus on other aspects of their work. Participants

248 also believed that clinical pharmacists were in a better position to provide medication counselling due to
249 their expertise in this specialised area, which is thought to improve patient outcomes and also results in
250 better adherence to medications.[22]

251 There are several barriers identified from this study. First, the public in Hong Kong was perceived
252 not to understand the role of clinical pharmacists and this negatively impacted the implementation of
253 CPS, since patients' attitudes and expectations of CPSs could influence policymakers' decisions on
254 healthcare legislation that determines the functionality of professional services.[23] Additionally, the
255 clarification of clinical pharmacists' roles within multidisciplinary teams could help to enhance the
256 effectiveness of CPS in patient care, thus facilitating its implementation.[24]

257 Another associated barrier that was identified is the culture of medical dominance, and this is
258 consistent with the literature reporting healthcare services in Hong Kong.[25] Participants from both
259 healthcare professions confirmed this issue, as they explained that the traditional and cultural values
260 place physicians at the top of the professional hierarchy. Studies have confirmed a striking dominance of
261 hierarchical culture in Hong Kong's public hospitals.[26]

262 One of Hong Kong's prevailing problems is its shortage of healthcare professionals, and the
263 challenges for clinical pharmacists were found to be due to limited resources and their engagement in
264 medication supply duties. Hospital pharmacists in Hong Kong have always been heavily involved in
265 medical supply, and a survey conducted in 2008 found that drug distribution constituted about 55.5% of
266 pharmacist activities.[8] Although that survey was conducted some years ago, the lack of separation

between the clinical and supply roles was still present in our data.

As suggested by the participants, one way to improve the service implementation is for clinical pharmacists to proactively engage in more direct patient care activities, which is a concept advocated by the American College of Clinical Pharmacy.[27] Studies found that healthcare professionals considered clinical pharmacists' proactive communication with patients as an essential factor to enhance patient care.[24] The implementation of a successful direct patient care service not only helps achieve better patient-related outcomes but could also improve the public's and other healthcare professionals' recognition of clinical pharmacists as healthcare providers, thus establishing their unique role within the healthcare system in Hong Kong.

The results of this study needed to be interpreted with caution in light of some limitations. Although thematic data saturation was reached, the selection of participants was not as widely diversified as desired due to low participation rate in some study sites. This could affect the richness of the dataset and consequently the number of themes identified. In order to achieve this, strategies to increase the participation rate from those sites and recruitment of additional participants across more study sites would be ideal. Furthermore, the use of theoretical rather than thematic data saturation approach would mean more participants to be interviewed, as it focuses on the depth of research data which could yield more constructs about the emerging grounded theory. However, we were unable to use this approach due to the limitation in resources such as time, number of interviewers, and PI's experience in qualitative research. Another limitation to note was that the second coder was only able to code a portion of the

transcripts due to other work commitment. This might affect the consistency of interpretations or the range of concepts that could be developed from the dataset. Lastly, the interview method might have affected the results in several ways. The inability to read non-verbal language with telephone interviews may have an impact on the interpretation of the data. In addition, in-person interviews may provide visual access to the interviewee's environment allowing the researcher to collect key contextual data which video or telephone interviews may not be able to capture. Another perceived disadvantage with telephone or video interviews is the lack of a 'natural encounter' for the interviewer to build rapport with interviewees, thus making it more difficult in stimulating interviewees to speak openly and freely on selected topics.

Conclusion

The physicians and nurses interviewed in this study reported that the successful implementation of paediatric CPSs in public hospitals in Hong Kong is an area for continued development with several key barriers. The major implementation barriers identified include the understanding of clinical pharmacists' roles both externally and internally, the culture of medical dominance, the dearth of resources, and the lack of direct patient care activities. Nevertheless, healthcare professionals in general appear to have positive attitudes toward the service, as trust in clinical pharmacists was established with their roles as medicine information providers and as part of multidisciplinary teams helping to facilitate the implementation of the CPS, and the result was thought to be an overall improvement in patient outcomes.

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Competing interests

The authors declare that they have no conflicts of interest to disclose.

Ethics approval statement

Ethical approval for this study was obtained from the research ethics committees of the relevant institutions (HKCH-REC-2021-031 [September 2021], KC/KE-21-0089 [June 2021], and 1741 Aston University [March 2021]).

Contributorship statement

CS was the principal investigator for this research and was responsible for the study design, data collection including the translation of data and preliminary coding, data analysis and wrote the manuscript. CH was responsible for the study design, reviewed the transcriptions, coding process and provided comments for the manuscript. IM supervised the project and contributed to the final version of the manuscript.

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