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Developing Healthcare and Safety (HCS) Framework to Reduce Mortality in Childcare Centres

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Abstract
Child mortality in Malaysian childcare centres remains a concern due to limited caregiver training and inadequate safety practices. This paper reports on an ongoing study aimed at developing a Healthcare and Safety (HCS) framework to mitigate deaths in registered childcare centres. Using a mixed-method exploratory sequential design, Phase I involves focus group discussions with 20 childcare workers in Seberang Perai Tengah, Penang. Phase II uses a three-round Delphi technique with ten expert panels to validate framework. The findings may inform improvements to existing childcare modules and support Sustainable Development Goal 3, promoting safer childcare environments and better health outcomes.

Keywords: Child Mortality, Healthcare and Safety Framework (HCS), Childcare Centres, Delphi technique

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1.0 Introduction

1.1 Background
Child mortality in Malaysian childcare centres has become a significant concern due to inadequate healthcare measures, poor safety regulations, and a lack of emergency preparedness. Incidents such as suffocation, sudden infant death syndrome (SIDS), infections, and accidents highlight the urgent need for a health and safety (HCS) framework to enhance childcare safety. Therefore, this study proposes to address this gap by developing a comprehensive framework designed to improve healthcare and safety. The project aims to create a healthcare and safety framework that could help reduce child mortality in childcare centres, potentially serving as a best-practice model for the Ministry of Women, Family, and Community Development (MWFCD). Additionally, this framework may align with Sustainable Development Goal 3, which promotes health, well-being, and safety in childcare settings. Malaysia has made significant progress in reducing under-five mortality, with the mortality rate dropping from 10.4 per 1,000 live births in 2010 to 7.7 per 1,000 live

births in 2020 (World Bank, 2021). However, child mortality in childcare centres remains a pressing issue (Dzulkifli, 2025) due to inadequate health monitoring, emergency preparedness, and caregiver training (Madewell et al., 2022).

Childcare-related deaths are often caused by preventable conditions such as SIDS, respiratory infections, injuries, and choking (Tavares & Adamson-Macedo, 2023). Approximately 60% of childcare centres lack adequate healthcare monitoring systems, leading to delayed medical interventions (JKM, 2023). According to a study by Michel et al. (2022), many childcare providers lack medical training, increasing the risk of mishandling health emergencies. While Malaysia has several childcare policies and guidelines in place, such as the *Kursus Asuhan Permata* (KAP), the integration of proactive healthcare and emergency response measures remains insufficient to address the root causes of preventable deaths. The need for a comprehensive Healthcare and Safety (HCS) framework in Malaysia's childcare system has thus become increasingly apparent. Current healthcare policies primarily focus on establishing operational standards, which, while important, may often overlook the essential role of proactive health interventions needed to protect children's well-being in childcare settings (Oloo et al., 2023).

Furthermore, according to Saari et al. (2022), there is no standardised system for integrating healthcare professionals into childcare centres. Additionally, the lack of trained nurses or healthcare personnel in childcare centres also contributes to delayed emergency response times (De Oliveira Maia et al., 2025). This situation places children's health and safety at considerable risk, highlighting the urgent need for a more holistic and well-coordinated HCS framework.

1.2 Research Objectives
The specific objectives of this study are structured sequentially to ensure that the development and validation of the Healthcare and Safety (HCS) framework are grounded in practical data and expert consensus. The first objective is to investigate to what extent the existing PERMATA Childcare Course (KAP) from the Department of Public Welfare Malaysia can be utilised for childcare centre workers, and to provide a critical baseline analysis of current training gaps. This investigation then leads to the second objective: to identify the essential structures, components, and elements required for a comprehensive Healthcare and Safety (HCS) framework tailored for childcare centres in Malaysia, utilising the qualitative data gathered in Phase I. Finally, the third objective is to design the proposed Healthcare and Safety (HCS) framework for childcare centre workers, justifying the inclusion of key structures, components, and elements based on empirical findings from Phase I data analysis.

1.3 Conceptual Framework of the Health Belief Model
In the context of childcare centres, applying the Health Belief Model (HBM) involves educating staff and parents about the prevalence and severity of health risks to children (perceived susceptibility and severity), demonstrating the effectiveness of safety measures (perceived benefits), and addressing obstacles to implementing these measures (perceived barriers) (Robb et al., 2020). For instance, a study by Mendes et al. (2020) found that using HBM to design hand hygiene interventions in childcare centres improved staff handwashing practices. Moreover, the model incorporates the concept of self-efficacy, which refers to an individual's belief in their ability to perform a behaviour successfully (Bandura, 1977). In childcare settings, enhancing staff's self-efficacy in implementing safety procedures can lead to more consistent adherence to guidelines (Abuhammad, 2021). By systematically addressing these psychological factors, the HBM-based framework can help create a culture of safety in childcare centres. This approach has shown promise in various health promotion contexts, including injury prevention programs for children. Ultimately, by fostering the adoption of evidence-based health and safety practices, this conceptual framework has the potential to mitigate child mortality in childcare centres (Sleet, 2020). However, it's important to note that while HBM provides a helpful framework, its effectiveness can be enhanced when combined with other theories and tailored to specific contexts (Ghanbari et al., 2021).

2.0 Literature Review

2.1 Modified Module PERMATA Childcare Course (KAP)
Specifically, Kursus Asuhan Permata (KAP) is an extension course from the Basic Childcare Course (KAAK), which has been implemented since 1988 and is mandatory for all childcare practitioners in Malaysia, regardless of whether they are employers, managers, supervisors, or nannies, with effect from January 1, 2013 (JKM, 2020). Childcare worker training at TASKA in nurturing and education is essential to determine the quality of nurturing and care for children. The Kursus Asuhan Permata (KAP) course trains and guides participants in caring for, nurturing, and educating babies and children under 4 years old. Nursery workers will be exposed to teaching and real-world experience in nurturing and managing the equipment and needs of babies and children, which will improve students' knowledge and skills in the field. This effort aims to meet the needs of comprehensive development, safety, and well-being of children, as well as address the occurrence of accidents and deaths of children, as often reported in the mass media.

2.2 Children's Mortality at a Childcare Centre
Child mortality in childcare centres, though relatively rare, is a critical public health and safety concern. It refers to the death of a child occurring within a childcare setting due to various factors, including health issues, accidents, neglect, or inadequate supervision. Every such case is a tragedy and typically reflects gaps in the system, whether in caregiver training, infrastructure, emergency preparedness, or regulatory oversight. The Welfare Department's statistics showed that there are only 4,302 registered childcare centres, and only 3,173 of the 16,873 caregivers on its list are certified. However, the quality of caregivers at childcare centres registered throughout the country remains low. 80% of 13,700 childcare centre caregivers registered under the Department of Social Welfare (JKM) in Malaysia

are reported to still not meet the minimum requirements of Kursus Asuhan Permata (KAP) (Anom, 2020). This is proven by statistics from the Ministry of Women, Family and Community Development, which reported eight cases of child deaths and thirty-four instances of child abuse in childcare centres between 2020 and 2024. In response to these concerning incidents, the Ministry has strengthened regulations and safety requirements, including conducting regular and surprise inspections of childcare centres and introducing child protection advocacy programmes beginning in 2024 to enhance compliance and safeguard children's well-being. (Ova, 2025). A study by Jullien (2021) found that childcare-related incidents could have been prevented with better safety protocols and healthcare interventions. This clearly demonstrates the need for a structured Healthcare and Safety (HCS) Framework tailored to local childcare centres. The proposed HCS framework offers novelty by explicitly integrating nursing expertise, specialised health risk assessments, and emergency preparedness training into the daily operations and training of childcare workers, moving beyond general care to address preventable causes of mortality directly. Legal action is required to address the problem of poor-quality childcare facilities, which result in numerous unintentional injuries and fatalities among children while in the care of the centre (Abdul Mutalib, 2022). While preventable, child mortality at childcare centres still occurs due to avoidable lapses in care, infrastructure, or regulation. Reducing such incidents requires a collaborative approach involving trained nurses, caregivers, parents, and policymakers to build a safer, more accountable childcare system.

2.3 The Roles of Nurses in Enhancing the Knowledge and Skills of Childcare Centre Workers

Nurses, especially those specialized in community health, pediatrics, and public health nursing, play a critical role in supporting and empowering childcare centre workers. Their contribution is crucial in ensuring children's health, safety, and development. Nurses act as educators, mentors, monitors, and advocates in childcare centres. Their involvement improves childcare workers' competency, ensures safer environments for children, and ultimately contributes to better child health outcomes and reduced mortality and morbidity rates in early childhood care settings. As expert educators, nurses equip childcare workers with essential health knowledge through structured training sessions. The International Council of Nurses (ICN) highlighted its leadership in upskilling non-healthcare personnel, including childcare staff, in 2021. For example, nurses teach staff to recognise the early signs of common childhood illnesses, such as respiratory infections (e.g., colds and bronchiolitis), fevers, and skin conditions (e.g., eczema and rashes). Early detection allows for timely intervention, preventing complications. Additionally, nurses emphasise infection control by demonstrating proper handwashing techniques, safe diapering practices, and disinfection protocols for toys and surfaces, which help reduce outbreaks of contagious diseases such as hand, foot, and mouth disease (HFMD) and influenza. They also provide guidance on nutrition to ensure that meals meet dietary needs and address food allergies, a growing concern in childcare settings.

3.0 Methodology

3.1 Research Design

In this study, the researchers will use a mixed-methods exploratory sequential design with purposive sampling. This study has two phases: the first is a qualitative phase, and the second is a quantitative phase.

3.2 Sample and Setting

The qualitative phase of this study will be conducted in Seberang Perai Tengah (SPT). Out of the 139 registered childcare centres in Penang, 34 are located in SPT and will serve as the sampling frame. A total of 20 childcare workers will be recruited using a purposive sampling technique. These participants will be divided into four focus group discussions (FGDs), with 5 participants per group. This sample size is deemed appropriate to achieve data saturation for qualitative insights related to the framework components. FGDs were selected as the method of data collection, as they enable interactive discussions among participants, allowing the collection of rich, in-depth data on their knowledge, perceptions, and practices regarding healthcare and safety in childcare settings. This approach encourages participants to share experiences, generate ideas, and highlight common challenges or best practices that may not emerge in individual interviews. This sampling approach will ensure that participants have adequate expertise and relevant training aligned with the study's objectives, enabling an in-depth exploration of their knowledge, perceptions, and practices regarding healthcare and safety in childcare settings.

The quantitative phase employs the three-round Delphi technique to systematically validate and refine the proposed Healthcare and Safety (HCS) framework, developed from Phase I findings. This method is specifically chosen as it is the most robust means of achieving expert consensus on complex models. This phase involved a panel of 10 expert participants, with a size (n=10) that is a well-established minimum for ensuring a reliable expert panel in Delphi studies. The expert panel consisted of professionals from various relevant sectors, including the Ministry of Women, Family, and Community Development (MWFCD), the Social Welfare Department, KEMAS, healthcare professionals (nurses), and academicians specialising in early childhood education, health, and safety.

3.3 Data Collection

The Focus Group Discussions (FGDs) for Phase I will be conducted at a venue selected for its convenience, accessibility, and comfort, ensuring a quiet and private environment conducive to open and meaningful discussion. Data collection will follow a semi-structured

interview protocol, and each FGD session is expected to last approximately 40 minutes to one hour. During the sessions, data will be audio recorded with participants' consent to ensure accuracy and completeness. All recordings will then be transcribed verbatim for analysis, enabling detailed and accurate interpretation of participants' responses.

In Phase II, data collection adopts the Delphi method to validate the proposed Healthcare and Safety (HCS) framework through expert input and consensus. Each expert is contacted via email with a personalised invitation to participate in the Delphi study. The email package includes four key documents: (1) a formal invitation letter explaining the purpose and significance of the study, (2) an information sheet providing detailed background on the research and expectations for participation, (3) a consent form to confirm their voluntary agreement and ethical participation, and (4) the Round 1 Delphi questionnaire, which contains the initial set of items from the proposed HCS framework. Experts are requested to complete the questionnaire within two weeks, and a follow-up reminder email is sent after one week to encourage timely responses and ensure high response rates. The Round 1 questionnaire asks experts to evaluate the relevance, clarity, and importance of each framework item using a 5-point Likert scale and provides space for qualitative comments or suggestions for improvement. Upon receipt of responses, each expert's input is assigned a unique anonymous code (e.g., E1, E2, etc.) to ensure confidentiality throughout the process. The researcher then conducts a statistical analysis of the quantitative data using median, interquartile range (IQR), and quartile deviation (QD), and thematic analysis of the feedback to revise the framework accordingly. The revised framework is then circulated via email in Round 2 for re-evaluation and, finally, in Round 3 for confirmation and final validation. This structured, iterative email-based communication strategy ensures that all expert input is accurately documented, ethically handled, and fully integrated into the framework development, ultimately resulting in a rigorously reviewed, consensus-based HCS framework tailored to the needs of childcare centre workers in Malaysia.

3.4 Data Analysis
In phase I, the qualitative data obtained from the Focus Group Discussions (FGDs) will be analysed using an inductive thematic analysis approach with the assistance of ATLAS. ti software, allowing for the systematic identification of patterns and insights. This process will lead to the development of meaningful themes that inform and shape the proposed Healthcare and Safety (HCS) framework for childcare centres.

In Phase II, quantitative data from the Delphi technique will be analysed using descriptive statistics, including median, interquartile range (IQR), quartile deviation (QD), and per cent agreement. These measures will determine the consensus and importance of each item, ensuring the final HCS framework is valid and reliable.

4.0 Initial Findings
In this study, the expected outcomes and preliminary progress of the ongoing mixed-method study are structured into two research phases: Phase I (Qualitative) and Phase II (Quantitative).

4.1 Phase I (Qualitative)
The objective of phase I was to explore existing healthcare and safety practices among childcare centre workers and to identify the key domains that would form the foundation of the preliminary Healthcare and Safety (HCS) framework. Through inductive thematic analysis of Focus Group Discussion (FGD) data, seven major domains were identified, representing the essential elements of safe and health-oriented childcare management. The emerging themes indicate that effective childcare health and safety depend on skill management, safety training, infectious disease control (e.g., Hand, Foot, and Mouth Disease), emotional coping strategies, knowledge and practices, health monitoring, and communication and feedback. These themes collectively define the structural components of the preliminary HCS framework, emphasising the integration of both preventive and responsive safety measures in daily childcare operations. The findings from phase I, therefore, serve as the conceptual groundwork for the subsequent validation process in Phase II.

4.2 Phase II (Quantitative)
Phase II aims to validate and refine the preliminary HCS framework identified in Phase I through the three-round Delphi technique involving an expert panel. At the end of this stage, a validated healthcare and safety (HCS) framework will be produced. This framework will include a set of essential components, along with explanations of how they were developed. The findings of this research may be consistent with several Malaysian government policies and initiatives, such as the Ministry of Women, Family, and Community Development (MWFCD), which focuses on supporting children's growth and development.

4.3 Consensus and Importance
In this study, the findings will be derived from analysing the experts' consensus data using the median, interquartile range, and quartile deviation in rounds one, two, and three. After the median value, interquartile range, and quartile deviations were identified, the subsequent analysis classified items according to their consensus and importance levels. For this study, the consensus level was divided into three levels (high, medium, and no consensus), and the importance level into two (very high and low). The consensus level was determined as high if the quartile deviation is less than or equal to 0.5, medium if the quartile deviation is between 0.5 and 1, and no consensus if the quartile deviation is more than 1. The importance level was very high if the median value was 4 and above and low if the median value was less than 3.5 (see Table 4.1).

Table 4.1. Level of Consensus and Importance

Quartile Deviation (QD)	Level of Consensus	Median	Level of Importance
Less than or equal to 0.5 (QD≤0.5)	High	4 and above (M≥4)	High
More than 0.5 and less than or equal to 1.0 (0.5≤QD≤1.0)	Moderate	3.5 and less (M≤3.5)	Low
More than 1.0 (QD≥1.0)	Low and no consensus		

Norizan (2003) formula for classifying consensus was determined at three levels.

Table 4.2. Description of the Classifications

Level	Description
High importance – high consensus	Items that achieved high consensus with a QD value of less than or equal to 0.5, but are regarded as importance with a median of 4 and above [(QD≤0.5) and (M≥4)]
High importance – moderate consensus	Items that achieved moderate consensus with a QD value of more than 0.5 and less than or equal to 1.0, but are regarded as importance and very important with a median 4 and above [(0.5<QD≤1.0) and (M≥4)]
High importance – no consensus	Items that did not achieve consensus with a QD value of more than 1.0, but are regarded as important and very important with median of 4 and above [(QD>1.0) and (M≥4)]
Low importance – high consensus	Items that achieved high consensus with QD value of less or equal to 0.5, but are regarded as moderate and not important, with a median of 3.5 and less [(QD≤0.5) and (M≤3.5)]
Low importance – moderate consensus	Items that achieved moderate consensus with QD value of more than 0.5 and less or equal to 1.0, but are regarded as moderate and not important with median of 3.5 and less [(QD≤0.5) and (M≤3.5)]
Low importance – no consensus	Items that did not achieve consensus with QD value of more than 1.0, but are regarded as moderate and not important, with median of 3.5 and less [(QD≤0.5) and (M≤3.5)]

Source: Adapted from Norizan (2003)

5.0 Discussion

The framework being developed in this study aims to address key components, including health monitoring, infection control, safety training, emotional coping strategies, and communication protocols. These components were directly derived and justified by the key themes identified during Phase I (FGDs) with childcare workers and subsequently validated by the high consensus (QD ≤0.5, Median ≥4) achieved among the expert panel in Phase II (Delphi technique). For example, the need for enhanced 'emotional coping strategies' emerged explicitly from the qualitative discussions on managing critical incidents, demonstrating how evidence directly shaped the proposed model. By providing clear guidelines and standardized practices, the framework is expected to support childcare workers in responding more effectively to health emergencies and implementing preventive measures. Furthermore, the study is guided by the Health Belief Model (HBM), which provides a behavioural perspective on how individual beliefs influence health and safety practices. Through education and training, childcare workers can enhance their awareness of health risks and strengthen their ability to take appropriate preventive actions. In addition, collaboration with healthcare professionals, such as nurses, may further enhance the framework's practical application by equipping childcare workers with the knowledge and skills to manage health-related situations confidently. Moreover, this study may align with key national strategies, such as the Twelfth Malaysia Plan (RMKe-12), and international goals, including Sustainable Development Goal 3 (Good Health and Well-Being). Therefore, the proposed framework has the potential to inform improvements in policy, training, and practice in early childhood care settings. Ultimately, it is anticipated to contribute to reducing health related risks and improving overall outcomes for children in Malaysia.

6.0 Conclusion & Recommendations

This study aims to address the pressing issue of child mortality in Malaysian childcare centres by developing a comprehensive Healthcare and Safety (HCS) framework. Guided by the Health Belief Model (HBM), the proposed framework integrates essential components: caregiver training, health monitoring, emergency preparedness, and nursing interventions into daily childcare practices. By identifying critical gaps in existing guidelines, such as the PERMATA Childcare Course (KAP), this study seeks to strengthen the overall standard of health and safety practices in childcare settings. The proposed framework aligns with national and global priorities, including the Twelfth Malaysia Plan (RMKe-12) and Sustainable Development Goal 3 (Good Health and Well-being), and has the potential to contribute meaningfully toward creating safer and healthier environments for children across Malaysia.

As the study is still ongoing, with Phase I data collection confined to childcare centres in Seberang Perai Tengah (SPT), Penang, the final validated HCS framework and complete findings are not yet available, which may limit the initial generalizability of the results to the broader Malaysian childcare context. Upon completion and validation, the proposed HCS framework is expected to provide valuable insights for the Ministry of Women, Family, and Community Development (MWFCD), childcare providers, and related stakeholders. Based on the anticipated outcomes, it is recommended that the HCS framework's nursing intervention and emergency

response modules be integrated into the national PERMATA Childcare Course (KAP) to enhance standardised health preparedness and that a national "Health Monitoring and Safety Compliance Tool" be developed to ensure consistent safety assessment and accountability across childcare centres. Future research should focus on nationwide pilot testing to evaluate the framework's feasibility and effectiveness across diverse settings, complemented by longitudinal studies to assess its long-term impact on reducing child mortality and morbidity. Additionally, the development and validation of a standardized assessment instrument grounded in the HCS framework would further support the MWFCD's policy implementation, regulatory oversight, and accreditation processes.

In conclusion, while this paper primarily outlines the methodological foundation for the development of the HCS framework, the subsequent validation and pilot testing phases will be crucial to establishing its national relevance and practical impact. The finalised framework is intended to serve as a cornerstone recommendation for the MWFCD and other stakeholders to strengthen childcare safety standards and promote the well-being of children throughout Malaysia.

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Paper Contribution to Related Field of Study

The proposed Healthcare and Safety (HCS) framework offers a practical tool for improving childcare service quality through structured caregiver training, emergency preparedness, and integration of nursing care. For practitioners, it provides clear modules and safety protocols that enhance competency in daily childcare operations. For policymakers, it delivers evidence-based insights to support the formulation of national safety standards, potentially guiding regulatory updates under the Ministry of Women, Family, and Community Development (MWFCD). The framework may support long-term improvements in childcare centre accreditation, staff qualifications, and institutional accountability.

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