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RESEARCH ARTICLE

The development of a medication safety module for healthcare professionals: Results of a Delphi technique

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Abstract

Background: Healthcare professionals need to learn jointly to foster role understanding in medication pathways to ensure medication safety. **Objectives**: This research aims to validate a module on medication safety using Delphi techniques involving the collaboration of medication safety experts. **Methods**: The experts reviewed the structure and content of the medication safety module using the Delphi technique process. Structural and content validity was obtained when more than 79% of the expert panels rated the statements more than 3. Agreements were reported as content validity index (CVI). **Results**: The expert panels consisted of four physicians, three pharmacists, and three nurses. Although CVIs for prescribing, administration, and monitoring were 86%, the CVI for the role and responsibility of professionals in dispensing was rated 71%, indicating the need for a revision.

Introduction

Medication safety is an essential element of patient safety in the context of healthcare services. There are different definitions of medication safety in the literature (Pintor-Mármol *et al.,* 2012; Falconer *et al.,* 2019), including medication errors, the main focus of this manuscript. According to the World Health Organization (WHO), medication errors are preventable events that occur while the medication is in the control of the health care professional, patient, or consumer. It can be reduced or avoided by improving medication systems and practices, including ordering, prescription, preparation, dispensing, administration, and monitoring (WHO, 2017). The errors were estimated to cost USD 42 billion per year in the United States (US). National Prescribing Service (NPS) Medicinewise learning describes the processes in the medication delivery pathway or medication use pathway as prescribing, dispensing, dispensing and monitoring (NPS Medicinewise Professionals, 2021). The professionals involved in the pathway are physicians, pharmacists, and nurses. Prescribing is the responsibility of the physician. It covers patient evaluation, establishing the needed medications, selecting medications, individualising medications, and prescribing medications. Dispensing is the responsibility of the pharmacist. It includes prescription review, preparation, and delivering medications. The administration phase involves the nurse. It consists of reviewing the prescription, preparing and administering the medication to patients, and documenting the process. The monitoring stage allows all healthcare professionals to participate and be responsible for monitoring the success of the treatment.

The WHO concept of medication without harm has shown that medication errors are highly influenced by the system and delivery of the medication safety pathway. Healthcare professionals who understand their contribution to medication errors are expected to deliver care more cautiously. Currently, most modules found in the literature were specific for certain healthcare professionals, e.g., nurses or pharmacists (Emanuel *et al.,* 2011), but little is known about modules involving all healthcare professionals. Furthermore, medication safety activities initiated by health professionals or health institutions are limited. Thus, promoting knowledge among healthcare

professionals, particularly regarding medication safety and how it will contribute to errors, can improve their awareness to make medication safety their culture in the delivery of care.

A module should be self-instructed, self-contained, stand-alone, adaptive, user friendly, consistent, and organised (Suastika & Rahmawati, 2019). Thus, the developed module should meet these requirements. A careful literature review was conducted on module development and the topics to be covered in the area of medication errors. The researcher created a medication safety module with the following structure:

General description of the module
Objectives of the module
Training Timeline
Steps of training a. Group dynamics b. Pre-assessment questionnaire to evaluate baseline knowledge c. Contents of the module o Role and responsibility of healthcare professionals in prescribing o Role and responsibility of healthcare professionals in dispensing o Role and responsibility of healthcare professionals in administration o Role and responsibility of healthcare professionals in monitoring d. Group discussion and case studies e. Post-assessment questionnaire to evaluate knowledge after attending to the workshop f. Training facilitator's guide g. Annexes h. References

The topic of the medication safety modules were inspired by the NPS Medicinewise Learning based on the medication use pathway (NPS Medicinewise Professionals, 2021) and reports from the WHO (Routledge, 2019; World Health Organization, 2019a, World Health Organization, 2019b). Since medication errors are preventable and due to some factors, the module emphasised how to improve healthcare professional awareness in contributing to errors. Priority areas for ensuring the safe use of medication included high-risk conditions, high-alert medications, polypharmacy, patient transfer within the hospital, and from and to the community.

Objective

This study objective was to assess the content validity index (CVI) of the structure and content of the medication safety module.

Methods

The Delphi technique is an adequate tool for facilitating creative content development and suggestions from subject matter experts. (Saxena *et al.,* 2012; Habibi, Sarafrazi & Izadyar, 2014). The Delphi technique was divided into two phases. The first phase was to obtain agreement on the structure and content of the module developed by the investigator. Suggestions and feedback from the expert panels were then incorporated into the module's second version, which was then resubmitted to the panels for re-agreement.

The first phase took place from June to August 2021; the investigator invited expert panels from Indonesia and outside of Indonesia of medical, pharmacy, and nursing backgrounds with knowledge and experience on medication safety. These experts were purposely selected because the three professions were involved in the medication delivery pathway. Professionals from outside Indonesia were invited for their expertise in medication safety, while Indonesian experts were selected to ensure the applicability of the content and cases to Indonesian settings. In this study, only the first phase of the findings was reported.

Agreements on the structure and content of the module were scored from 1 (strongly disagree) to 4 (strongly agree). They were reported as content validity index (CVI). The structure and content were considered valid when more than 79% of the panel had an agreement of more than three or four. The panel reviewed the module via the *Google form* platform. Inclusion criteria were physicians, nurses, and pharmacists with knowledge and experience in medication safety and willing to participate in the study. Exclusion criteria were experts who did not respond to the invitation after two reminders and those with incomplete responses. This research was approved by the Research Ethics Committee of the Faculty of Medicine at Udayana University (1622/UN14.2.2.VII.14/LT/2021).

Results

The expert panels in this study consisted of four physicians, three pharmacists and three nurses, with an equal balance of genders. Two were Australians, and the remaining eight were Indonesians. The authors had

contacted 15 potential experts initially, but despite the follow-up, only ten responded. Most of those who declined mentioned being unable to participate because of the high workload, family matters, or the pandemic. After two months of follow up with the panel, the authors compiled all the information gathered. All of the panels had a good understanding of medication safety (100%). Table I shows that CVIs on the module structure and the role and responsibility of healthcare professionals in the prescribing, administering, and monitoring phases were 86%. However, the role and responsibility of healthcare professionals in dispensing had a CVI of 71%, indicating the need for further clarifications on the dispensing level and other related topics.

Table I: Content Validity Index (CVI) on Medication safety module

Statements	CVI (%)	Notes from panels
Agreement on the structure of the module	86	Objectives of study needs revision; definition of medication safety needs further clarifications; systems factors and professionals involved in transcribing phase needs to be addressed.
Agreement on the content of role and responsibility of healthcare professionals in prescribing	86	Valid
Agreement on the content of role and responsibility of healthcare professionals in dispensing	71	Needs further clarifications from panels
Agreement on the content of role and responsibility of healthcare professionals in administration	86	Valid
Agreement on the content of role and responsibility of healthcare professionals in monitoring	86	Valid

Discussion

To the best knowledge of the authors, this study was the first to develop a medication safety module using a Delphi technique in Indonesia. The response rate from the expert panels was 75%, despite the follow-up by sending reminders every two weeks to potential experts. This result was similar to other findings showing that response rates may range from around 40–80% (Habibi, Sarafrazi & Izadyar, 2014).

The first stage results indicated the validity of the module structure obtained from the content validity index (CVI), higher than 79% (Zamanzadeh *et al.,* 2015). In this study, most expert panels agreed with the structure. One of them suggested improving it by amending the objective of the module to be more specific. The definition of drug safety will be added to the introduction of the module to address the panel comments asking to clarify this matter. The topics will cover the medication use process, medication errors, safety culture, and no blaming culture.

Another expert recommended adding a topic on the role and responsibility of healthcare professionals in the transcribing process. Errors may also occur when transcribing from and to medication charts, as reported by previous studies (D.K. Ernawati, Lee & Hughes, 2014; Salmasi *et al.,* 2015). Thus, transcribing errors will also be covered in this module.

Interestingly, it was suggested in some comments to change the terms role and responsibility into role and understanding for all health professions involved in the medication pathway. The panel also recommended having a role-play on exchanging roles from one profession to another to allow a deeper understanding of each other work. This role-play model has been used from early learning education through professional development (Church & Bateman, 2019; Kvaal *et al.,* 2021). These studies have highlighted that role-playing can develop a deeper understanding of themselves and others and reduce the gap between theory and practice. Thus, the case scenario in the training module will also be designed to exchange roles between professions. This finding also indicates that the Delphi technique provides an opportunity for experts to suggest creative content to improve the module development and build a consensus from a series of questions posed by selected participants (Saxena *et al.,* 2012; Habibi, Sarafrazi & Izadyar, 2014).

In this study, experts disagreed on the role and responsibility of professionals involved in the dispensing phase. Further clarification was required on how to improve this sub-topic. Dispensing should be performed by pharmacists. However, in practice, this role may be played by other healthcare professionals due to the limited number of pharmacists in some healthcare services (Ernawati, 2015), leading to the lack of understanding of the pharmacist role when considered from a technical aspect only, such as preparing medications. The pharmacist plays a pivotal role in the dispensing process, e.g., reviewing the

prescription, ensuring medicine availability (i.e., stock management), analysing medication efficacy and safety before dispensing (Agency for Healthcare Research and Quality, 2019). For some medicines, such as opioids, pharmacist skills are needed to adjust the dose when switching from injection to oral administration or reformulate a drug dosage form.

The expert panels also provided case scenarios as potential topics on medication safety. The cases ranged from drug interactions, polypharmacy, opioid regimentation for cancer patients, medication reconciliation upon transfer care, and complex drug regimentation for stroke patients. These case scenarios will be added to the module.

Conclusion

This study demonstrated that the medication safety module was valid, with some revisions needed for the next phase of the Delphi method, particularly related to the clarification on the role and understanding of healthcare professionals at the dispensing level.

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