

Nurses' Knowledge and Practice on Medication Error in the Pediatric Hospital Setting - Narrative Review

A Ebenezer. E¹, Francis Moses R², Reshmi Siby³

¹PhD Scholar, Mary Hospital, Samugarengapuram, Tamilnadu

²Principal, St. Xavier college of Nursing, Kumbakonam. Tamilnadu

³Research supervisor, MGU University, Bhopal

Corresponding Author: Reshmi Siby

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ABSTRACT

Aim: this study aimed to review the existing scientific articles regarding nurses' knowledge, attitude and to practice on medication errors and to examine known pediatric medication administration errors.

Methods: A narrative review conducted by searching electronic databases: Pubmed, Embase and Scopus. The selection criteria were articles published between 2018-2022, English language, peer reviewed and any type of study design. Search terms were "Medication errors OR drug mistakes AND Pediatric care setting, paediatric wards NAD Nurse. The collected data were extracted and reviewed by 2 researchers independently. Characteristics of the articles were analysed by using frequency and percentage distribution.

Results: We retrieved a total of 10 studies, the majority published in 2018 and spanning eight countries. The majority of the studies were before and after intervention (80%). Three prospective cohort studies, four cross-sectional designs, and three survey studies were included. The intervention program enhanced the knowledge and practice among nurses in the pediatric care setting.

Conclusion: The study results indicate that implementing an appropriate intervention program using advanced technology can enhance nurses' knowledge, attitude, and practice in preventing medication errors in the pediatric care setting. We recommend conducting frequent continuing nursing education to update the protocol and dosage of newer medicines.

Keywords: Medication error; nurses; pediatric hospital; prevention; knowledge; practice

INTRODUCTION

Medication errors are responsible for around 20% of drug-related fatalities, according to the National Health Service (NHS) of England [1]. Also, 61% of errors. that could have killed an individual are linked to drug injections [2-3]. According to research conducted in both the United States and the United Kingdom, nurses committed between 13 and 84 percent of errors in the

preparation and administration of intravenous medications on an annual basis.

According to studies, medication errors that are thought to be preventable account for about one-third of adverse drug events. Registered nurses (RNs) may lack the knowledge and abilities to safely manage medications [3,4]. Others highlight the use of technology, design problems, time limits, poor communication, lack of leadership, and

out-of-date regulations and procedures, as well as the normalization of risk-inducing behavior and unexpected events. Safe medication management depends on many factors while nursing care and management [4]. Medicine errors are commonly utilized as measures of patient safety in hospitals due to their high frequency and possible risks to patients.

Numerous medication errors have been correlated in certain studies to inadequate knowledge about medications and lack skills while prescribing medications [4-5]. In addition, several studies have identified being unable to communicate and adhere to clinical principles and procedures as the primary factors contributing to pharmaceutical errors, alongside a deficiency in knowledge and abilities [5-7]. Nurses with a good attitude are continually looking for ways to improve their nursing profession. However, there was evidence that nurses who viewed their work as "just a job" were more likely to commit medication errors.

Children are at an increased risk of experiencing adverse outcomes as a result of medication errors, as they require weight-based drug dosing that necessitates multiple calculations, the dilution of existing solutions, immature physiological buffering systems (responses), and limited communication skills when experiencing side effects [8-10]. Medication errors are three times more common in children and neonates than in adults and prescribing and administration have higher error rates than dispensing and monitoring. Research has shown that errors in the prescription and administration of medications occur between 3 and 37% and 72% to 78% of the time, respectively [10-11]. Nevertheless, the precise relationship is still uncertain due to the conflicting results that have been reported in these studies.

Prior research has been conducted to investigate strategies that aim to reduce errors across the practice of all healthcare professionals. This is because errors are inherent to the nature of the profession [10-

13]. There have been such types of interventions in take place, but nurses deliver medications the most often. It has been found that these errors are the hardest to spot and can most directly harm patients. Thus, this study aimed to review the existing evidence regarding nurses' knowledge, practice and attitude on medication errors in pediatric setting. In addition, study results report a review of the empirical evidence-based literature on factors that contribute to medication errors in the pediatric care setting.

MATERIALS & METHODS

A narrative review was conducted on MEs among nurses regarding the selection, administration and documentation at clinical care setting. Electronic databases were searched: PubMed, Embase, CINAHL and Scopus. The search strategy limited with the articles published within 5 years, English language and all types of study design. The search terms were: 'Nurses, Nursing care, Nursing care' AND 'medication error(s), prescribing error(s), dispensing error(s), administration error(s), documentation error(s), medication mistake(s)' AND 'Knowledge, Attitude, Practice', AND 'clinical setting, pediatric care, intensive care unit, pediatric intensive care unit, neonatal intensive care unit'.

Data Selection and data extraction

Two authors reviewed and retrieved suitable articles. All the eligible articles were exported into the Excel spreadsheet and summarized by author, year, country of publication, number of participants, study design, data analysis and results. All the final articles were cross-checked by the quality assessment to find the risk of bias.

RESULT

Literature search

The electronic database identified a total of 95 articles; 65 articles were retrieved after the duplicates were removed. Twenty-three studies that were retrieved as eligibility requirements had been accepted. The final

synthesis included ten articles. The article selection process is presented in the flowchart (Figure 1).

Figure 1. Flowchart for article selection process

Characteristics of the article

Most of the studies were published in 2018 and eight countries. Two studies of each

were from the Saudi Arabia [14-15]. One in each article published Iran [16], Egypt [17], Paris [13], China [18], UK [19], USA [20], Palestine [21]. All the articles published by country and year are presented in Figure 2.

Figure 2. Review articles published by Country and Year

Table 1. Characteristics of the Medication errors among nurses in selected articles

No	Author /Year/Country	Aims	Design	Setting	N	Measurement tool	Analysis	Outcomes
1	Alandajani et al 2022 Saudi Arabia	Assess KAP	Cross-sectional	Public Hospital	408 nurses	K=30 MCQs A= 23, 5-point Likert scale	Binary logistic regression	Wrong doses (46.9%) Age group had associated with ME
2	Azami et al 2020 Iran	Assess literacy information on ME and EBN	Survey	Hospitals	164 nurses	KAP – 4 components of MEs	Pearson correlation and linear regression	Information literacy and EBN associated with MEs
3	Abdel-Latif et al 2016 Egypt	Assess the knowledge of MEs	Survey	Hospitals	323 healthcare professional	18-item survey	Correlation	Poor knowledge associated with MEs
4	Alsulami et al 2019 Saudi Arabia	Assess KAP	Cross-sectional	Tertiary hospitals	365 nurses	5-point Likert scale KAP	Binary logistic regression	Lack of experience and training associated with MEs
5	Lafuente et al 2019 Paris	Assess the EBM knowledge attitude	Survey	Hospitals Nursing homes Primary care	226 health professionals	Self-administered questionnaires and MCQs	Multivariate logistic regression	EBM training impact the MEs.
6	Lan et al 2015 China	Evaluate pediatric nurses' KP of MEs in pediatric patient	Cross-sectional study	Children hospitals	262 nurses	20 Questionnaires	Logistic regression	Insufficient knowledge of pharmacology
7	Alsulami et al 2014 UK	Evaluate the nurses MEs by double checking policies pediatric care	Prospective observational study	hospitals	2000 MEs	double-checking steps	Logistic regression	Drug dose calculation and lack of training associated with MEs
8	Hebbar et al., 2018 USA	Effectiveness of simulation training program	Prospective cohort	Hospital	1434 Nurses in Children's care	Pre and post intervention questionnaire	Multivariate logistic regression	63% MEs reduced after intervention
9	McSweeney et al., 2019 USA	Evaluate the improvement strategy and	Prospective cohort	Hospital data	Pediatric Specialty	19 MEs found	Multivariate logistic regression	Policy changes, intervention improved

No	Author /Year/Country	Aims	Design	Setting	N	Measurement tool	Analysis	Outcomes
		intervention programme						MEs Prevention knowledge
10	Qedan et al 2022 Palestine.	Assess the knowledge about resuscitation medications	Cross-sectional study	Hospitals	200 nurses	20 true/false questionnaire of knowledge of resuscitation medications	Multivariate logistic regression	Lack of training, insufficient knowledge associated with MEs

Methodology quality assessment

All studies included in this paper provided a clear statement of the study objectives, study population, and interventions. Every study was carried out both prior to and following the intervention. Four cross-sectional designs, three survey studies, and three studies were conducted. The reviews were all rated as having a low risk of bias. Randomization and blinding of assessors were not feasible due to the nature of the studies.

DISCUSSION

Most of the articles were focused on cross-section study design. It was consistent with prior studies. A cross-sectional study by Alshammari et al. [7] on healthcare workers revealed that few medication errors were reported, and that most participants knew little about the stages of medication errors and had never received any kind of training on the subject. On the other hand, a cross-sectional study revealed that few medication errors were reported by healthcare professionals [12, 17,22], and the majority of participants had never received any kind of training on the subject or a solid understanding of the stages of medication errors.

Studies have been reported, nurses exhibited basic adequate knowledge, attitude and practice. However, some studies have reported lack of experience and practices impact the MEs in the clinical setting. Furthermore, most nurses who report medication errors believe that patients and family members should be informed, regardless of whether the patient may have negative side effects [8]. According to

various research, the most common causes of ME were incorrect dosing and a lack of pharmaceutical understanding [9, 23]. In contrast, gender, job context, medical specialization, and years of employment after graduation are considered, there is no difference in the level of knowledge and usage of EBM [12].

All the reviewed articles were analysed the logistic regression analysis to find out the associated factors between nurses' knowledge, practice and attitude on MEs. A study found that appropriate predictor variables are correlated with the MEs and can significantly predict the changes in attitudes toward medication errors [16]. Furthermore, a variety of studies and literature reviews have found that poor physical or mental health [24] and a heavy workload [25] are important risk factors for MEs. Frequently, the relocation of highly experienced personnel from their standard responsibilities is the result of a shortage of personnel or an increased workload. Our results indicated that the age group was a significant factor in the development of numerous MEs. On the other hand, compared to nurses over 35, younger nurses had a lower risk of medication errors. [26]. The increased exposure to patient management and handling that senior nurse experience as a result of their extended service in hospitals renders them more susceptible to medication errors [13].

Most studies found that lack of continuing education or training programme were the important influencing factors on MEs among nurses. According to an earlier survey, almost 50% of Saudi Arabian

healthcare personnel who were involved in pharmaceutical errors reported not having had any training on the topic in the previous two years [7]. Due to a lack of educational programs about medication safety and assistance from their respective hospitals, it is possible that nurses who participated in the current study will not have the opportunity to attend such formal training [17,27-28].

Consequently, nurses working in pediatric hospitals should participate in MEs education and training programs tailored to local needs in order to raise awareness and reduce the prevalence of medication errors. These tactics will help to guarantee the safety and well-being of patients.

CONCLUSION

This study set out to assess the body of recent scientific research about nurses' understanding, attitudes, and use of MEs. The findings showed that the evaluation of nurses' KAP in clinical settings typically made use of survey and cross-sectional study designs. Most of the studies that examined nurses who worked in general hospitals used logistic regression to find the factors that were important for KAP and MEs. MEs have been associated with factors such as inadequate continuing education programs, stress, age groups, and a lack of experience. All of the research was conducted by nurses in the hospital's general wards. However, little study has been done on nurses who work in pediatric hospitals providing pediatric care. Consequently, the investigators are interested in continuing the study in the future, with a special focus on the Knowledge, Attitude, and Practices (KAP) of nurses in pediatric care settings in regard to MEs.

Declaration by Authors

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