KNOWLEDGE, ATTITUDE, AND PERCEIVED BARRIERS TO MEDICATION ADMINISTRATION ERROR REPORTING AMONG REGISTERED NURSES IN A PRIVATE HOSPITAL IN THE MALDIVES.

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Declaration

I affirm that this thesis is the result of my work and has not been submitted previously as a requirement of any other course or program at The Maldives National University or any other higher educational institution.

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ABSTRACT

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Topic: knowledge, attitude, and perceived barriers to medication administration error reporting (MAER) among registered nurses in a private hospital in the Maldives.

Background: The failure to report medication administration errors (MAE) is a worldwide problem associated with patient safety. The first step towards increasing the reporting rate is recognizing nurses' attitudes toward errors and perceived barriers to reporting. Hence, this study explores the knowledge, attitude, and perceived barriers to medication administration error reporting from the nurses' perspective.

Methods: In this descriptive, correlational study, a structured, self-administered questionnaire was distributed to a sample of 172 randomly selected nurses at ADK hospital, Maldives. IBM® SPSS Statistics (Version 26) was used to analyze the data and level of knowledge and attitude were categorized using Bloom's cut-off point.

Results: Total of 164 nurses participated in this study, with a response rate of 95.93%. 87.8% (n=144) of the participants had a good to excellent level of knowledge. There was a positive attitude towards reporting medication administration errors among 54.9% (n=90) of the participants. A 50.5% (n=83) of the participants agreed or highly agreed that "Nurses could be blamed if something happens to the patient because of the medication error" as a barrier to medication error reporting. The results showed a statistically significant strong negative relationship between MAER attitude and perceived barriers to MAER, r (163) = -.818, p = <. 01. While there was a statistically significant weak negative relationship between MAER attitude and perceived barriers to MAER, r (163) = -.187, p = < .05.

Conclusions: The findings revealed that most of the participants possessed good to excellent levels of knowledge in MAE and had a positive attitude toward medication administration error reporting. Blame due to adverse events to patients were considered the top-ranked barrier to MAER among nurses in the study. Thus, efforts to enhance MAER by creating a safe organizational culture and developing a confidential, anonymous, fast, and simple-to-use reporting system is crucial to eliminating these barriers.

Keywords: Medication Error, Medication Administration Error, Medication Administration Error Reporting, reporting, knowledge, attitude, barriers, Maldives, ADK Hospital

TABLE OF CONTENTS

Table of Figures

Table of Tables

CHAPTER 1: INTRODUCTION

Background

In an era where patient safety is one of the main disciplines of health care, medication safety is considered a core component of it. According to Dyab (2017), in the United States, it was indicated that 7391 patients died due to medication errors from 1993 to 2002, and patients' length of stay at the hospital increased by 4.6 days, which resulted in an increased cost of $4685 per patient, while medication errors in France were estimated to be high and involved 1.9 patients per day, and in Malaysia, about 2572 cases of medication errors were reported in 2009. Similarly, Elliot et al. (2021) estimated that there were 237 million medication errors in England each year, with 38.4% arising in primary care, 72% having little to no potential for harm, and 66 million possibly having clinical significance. Furthermore, medication error prevalence in India was found to be 334.1 per 1000 patient observation days (Batmanabane et al., 2019). Consequentially, healthcare costs and patient suffering increase drastically due to these errors. Even though medication errors are more prevalent in the prescribing and administration phases, errors may occur at any stage in the medication management chain (Alomari et al., 2020). The five primary stages of the process chain of medication management involve prescribing, transcribing, dispensing, administration, monitoring, and reporting. In the USA, approximately 2-14% of hospitalized patients have encountered a medication administration error, while 7000 patients are estimated to be killed and 1.5 million patients per year are injured due to it (Hammoudi et al., 2017). As the medication administration stage is the stage where medication is delivered into the patient’s body, this stage is further divided into components such as checks and rights to ensure the correct medication at the right time is given through the right route with proper documentation.

Numerous mistakes can occur during medication administration practices, including omission (Jessurun et al., 2022), incorrect dosage (Mulac et al., 2021), preparation, and administration (Palmero et al., 2019). The true extent of medication administration error prevalence in the Maldives is not known. However, according to ADK Hospital, Clinical Governance Department statistics (2020-2021), in the years 2020 and 2021, a total of 36 medication administration errors were reported in the ADK hospital, Maldives, of which wrong medication (34.8%) was the most reported error in 2021, while omission (23.1%) and wrong preparation (23.1%) were the most common in 2020. Knowledge of the medication being provided, and its intended therapeutic impact is necessary for the lengthy and often complex process of administering medications.

Medication administration errors are preventable at different stages. Nevertheless, unsafe medication practices, such as hazardous medication routines and medication errors, are considered a major source of preventable harm in health systems throughout the world (World Health Organization [WHO], 2017). Hence, in 2017, WHO launched the "Medication without Harm" campaign to lower avoidable harm from medications by 50% within the next five years. Thus, establishing a safety culture where error reporting mechanisms are in place and lessons are learned from the errors is necessary. While establishing a safety culture is a key aspect of medication safety (Schepel et al., 2019), it is essential that safety motivation, such as a commitment to report medication errors, be promoted to contain these errors (Farag et al., 2019).

Medication errors must be reported instantly as they occur to learn from them and prevent them from happening again (Gleeson et al., 2020; Alsulami et al., 2019). However, some errors go unreported, depending on their severity. Medication near-misses are more prevalent than medication errors; they are mostly underreported, and near-misses must be reported, as they

reveal human and system failure issues (Farag et al., 2020). As near-misses provide the opportunity to learn without any harm or ill-effect to patients, it is of the utmost importance that they are reported and the circumstances that led to them analyzed.

Underreporting of near-misses is a concerning issue that needs to be addressed. According to Alsulami et al. (2019), irrespective of health practitioners possessing adequate knowledge and a positive attitude toward medication error reporting, an underreporting of medication errors was still present when it came to practice. Although reporting mechanisms have improved, underreporting of medication errors persists, and reporting obstacles have been linked to the underreporting of such errors (Samsiah et al., 2016). A collaborative effort must be initiated to understand these obstacles to the underreporting of medication administration errors. Therefore, the participation of key stakeholders such as nurses and patients in the development of interventions to reduce the rate of medication administration errors is pivotal (Alomari et al., 2017). Hence, it is of utmost importance that the barriers to medication administration reporting be explored to improve the reporting.

Relevance & Justification

Medication administration errors (MAEs) are considered one of the most prevalent and serious forms of medication errors (Sulaiman et al., 2017; Dos Santos et al., 2015). Nurses are delegated the complex and time-consuming process of medication administration. Moreover, as nurses work in high-pressure and high-speed environments and due to the high frequency of medication administrations, the occurrence of medication errors is anticipated (Sears et al., 2013). Error detection through effective leadership and an active reporting system reveals medication errors and strengthens safe practices (Alrasheadi, 2019). Therefore, errors must be reported as early as possible to ensure proper measures are taken to avoid repeating the same

error. However, poor compliance with medication error reporting leads to the concealment of errors and serious harm to patients due to incompetence, as well as an increase in healthcare costs and disease burden (Nasiri et al., 2020). Nurses do not report all the medication administration errors, and it was found that most nurses (two-thirds) admitted that less than 20% of medication administration errors were recorded (Brabcová et al., 2023).

The findings of this study can help identify the potential reasons why MAEs are not reported by nurses and the elements that help or hinder reporting. These challenges will therefore aid in providing new information and understanding of the knowledge, attitude, and medication administration error reporting (MAER) practices to support healthcare executives and policymakers in the Maldives in developing a healthcare environment focused on patient safety and voluntary MAE reporting. Additionally, this study will deepen nurse managers' insight into the problem and provide the baseline data required to develop strategies to review and revise policies and protocols to overcome these barriers within the institutions and encourage nurses to report errors.

Research Problem

Providing the best possible quality of care for patients is the principal role of nurses. According to Mirghafourvand et al. (2021), if reporting contributes to beneficial outcomes such as barring future errors, improving practice, and expanding accountability, the likelihood of medication error reporting would increase. However, different healthcare professionals and institutions define medication errors differently. Hence, with the uncertainty surrounding the definition of medication errors, healthcare professionals may argue over the occurrence of errors in any way (Gleeson et al., 2020). Therefore, to improve nurses’ competence in reporting medication

administration errors, nurse managers, policymakers, and nurses must agree on what constitutes medication errors (Afaya et al., 2021).

According to Kerari (2021), system factors are usually focused on in research on medication errors; hence, a gap is created between the researcher's knowledge of the causes of medication administration errors (MAEs) and the frontline nurses' actual practice in the clinical setting. As a result, nurse factors such as knowledge, attitude, or barriers to reporting are not properly addressed. Since nurses manage the medication administration stage, which is the final link in the medication safety process, their involvement in medication safety research is crucial. (Alomari et al., 2020)

Exploring possible obstacles to reporting drug administration errors among Maldivian nurses in the current health culture would aid in describing the present state of patient safety and the nurses' eagerness to disclose these errors. Furthermore, gaining a deeper comprehension of the relationship between nurses' knowledge, attitudes, and perspectives on MAER would aid in promoting awareness across various healthcare institutions and identifying areas that require intervention for enhancement. Therefore, data and information concerning errors are needed to strengthen safety and eliminate or reduce MAEs. As medication administration is one of the main tasks undertaken by nurses locally and globally, it is crucial to analyze these aspects from nurses' perspectives. As the complexity of patient care demands and medication administration pose a high risk for errors, reporting errors as they happen is essential. Therefore, nurses' perceptions of barriers to MAER will enhance a better understanding of factors contributing to underreporting. Also, exploring the topic in a local context will enhance an understanding of the barriers that exist in the Maldives.

Purpose, Objectives, Research Questions and Hypotheses

Purpose

The purpose of this study is to explore the knowledge, attitude, and perceived barriers to medication administration error reporting among registered nurses.

Objectives:

- Determine the level of knowledge and attitude related to medication administration error reporting among registered nurses.
- Analyze the perceived barriers contributing to medication administration error reporting among registered nurses.
- To assess the relationship between level of knowledge and perceived barriers contributing to medication administration error reporting among registered nurses.
- To assess the relationship between the attitude of registered nurses and perceived barriers contributing to medication administration error reporting.

Research Questions:

- What is the level of knowledge among nurses in reporting medication administration errors?
- What are the barriers perceived by nurses in reporting medication administration error reporting?
- What is the association between demographic factors (nursing educational qualification, age and work experience) and the level of knowledge?
- What is the relationship between level of knowledge and perceived barriers in reporting medication administration errors?
- What is the relationship between the attitude of nurses in reporting medication administration errors?

Hypotheses:

- There is an association between demographic factors (nursing educational qualification, age and work experience) and the level of knowledge.
- There is a relationship between the level of knowledge of nurses and perceived barriers to medication error reporting among nurses.
- There is a relationship between the attitude of nurses and perceived barriers to medication error reporting among nurses.

Conceptual and operational definitions

Conceptual definitions

Medication Administration Error Reporting: It is defined as reporting of any discrepancy/incidents that take place between medications received by a patient and the medications intended by the prescriber.

Knowledge: It is defined as the fact or condition of knowing something with awareness grown through experience or association.

Attitude: This concept is defined as a feeling or way of thinking that influences a person's behavior towards something.

Perceived barriers: This term is defined as how something or someone is seen or thought of as an obstacle to something.

Registered Nurse: This term is defined as a graduate trained nurse who has been licensed by a state authority after qualifying for registration.

Operational Definitions

Medication Administration Error Reporting: It is defined as reporting of any discrepancy/incidents that take place between medications received by a patient and the medications intended by the prescriber.

Knowledge: This is the awareness the nurses have on medication administration errors and medication administration error reporting. In this study, it was measured by using a questionnaire adopted from Wakefield, et al. (2005) and Jember et al. (2018). The section dedicated to knowledge consists of 8 questions, in which 4 questions are with five-point Likert's scale, where scales 4-5 is considered as adequate to excellent level of knowledge. The remaining 4 questions are multiple options like questions.

Attitude: This is the way a nurse thinks and behaves toward medication administration errors and medication administration error reporting. In this study, it was measured by using a questionnaire adopted from Wakefield, et al. (2005) and Jember et al. (2018). It was measured by 18 questions with five-point Likert's scale.

Perceived barriers: This is the reason why nurses believe they do not report medication administration. In this study, it was measured by using a questionnaire adopted from Wakefield, et al. (2005) and Jember et al. (2018). The section of perceived barriers consists of 16 questions with five-point Likert's scale.

Registered Nurses: A person who has completed a Diploma or higher qualification in nursing, is registered in the Maldives Nursing and Midwifery council and is licensed to practice nursing in the Maldives.

CHAPTER 2: LITERATURE REVIEW

Introduction

An extensive literature review was conducted to explore the topic in detail by searching databases and finding qualitative and quantitative research articles on the subject. Hence, databases covering the fields of nursing, medicine, and health sciences, were used in obtaining studies relevant to the subject area and they were evaluated to represent the best available sources of knowledge in this subject area. The studies included in this review consist of a wide range of countries and populations to explore the literature available on the topic.

Search Strategy

A total of three electronic databases (Hinari, EBSCOhost, pubmed) were searched for articles using the keywords and Bhoolean operators: "Nurs*" or "Nurs* manage*" or "Nurs* administrat*" and (medic* administrat* error* report*) or (medication error*) and "knowledge" and "attitude" and "barrier* and report*". Additionally, Google scholar and academia were also used to search for articles. Reference lists from relevant journal articles were also used to obtain additional studies. The search results were limited to the articles published within the past five years, then extended to the past seven years.

Findings

From the available literature, it was apparent the topic was explored in various countries and in different populations. Various research designs were also employed to examine the topic in-depth. Among these studies, there were some major, common themes which were presented as attitude towards medication administration error reporting, knowledge on medication administration error reporting and perceived barriers to medication error reporting or contributing factors to underreporting of medication administration errors.

Knowledge

In an institution-based quantitative cross-sectional study of 397 nurses conducted by Jember et al. (2018), it was determined that sociodemographic factors such as level of education played a role in the knowledge regarding medication administration error reporting among nurses, and having more experience in nursing practice was also a vital element in gaining more knowledge on the process of error reporting and the consequences of medication error reporting. This finding was supported by Asefa et al. (2021) in an institutional-based cross-sectional study; it was found that nurses who worked for more than 15 years were nearly four times more likely to report medication administration errors than nurses whose work experience was four years or less. On the contrary, Yoon & Sohng (2020) found that nursing professionals with 1–9 years of clinical experience reported a comparatively low likelihood of prescription mistakes. Similarly, Farag et al. (2017) found that there was a negative association between nurses' years of experience and their willingness to report medication errors, which meant that when there was an increase in nurses' years of experience, there was a decrease in their intention to report errors. Furthermore, Sears et al. (2016) found that the number of pediatric medication administration errors reported was higher in units with more nurses with a higher degree of recent experience.

According to Cetin & Cebeci (2021), the rates of reporting medication errors were higher among nurses with a bachelor's or higher degree (18.7%) than the reporting rates of nurses with a high school diploma (14.5%) outnumbered those with an associate degree (8.9%), and it was also found that there was a significant correlation between the nurses' level of education and their rates of witnessing MAEs. Similarly, Prihartono & Wibowo (2020) found that the group with a higher percentage of medication administration error reporting exhibited characteristics

including good knowledge and good organizational learning. Likewise, Asefa et al. (2021) found that educational status was an essential predictor of medication administration error reporting and that the incidence of medication error reporting among nurses with a higher level of education was higher. In the same study, it was found that nurses with a bachelor's degree and a master's degree were three and six times more likely to report medication errors than those with diplomas. However, this finding was inconsistent with the findings by Rahsepar et al. (2021), where it was found that nurses with a bachelor's degree had a higher mean score on managerial and attitudinal criteria for not reporting errors than nurses with a master's degree or higher qualification. The same study also reported that nurses with varying levels of work experience or education scored differently in terms of the reasons for not reporting errors (Rahsepar et al., 2021). Nevertheless, Rahsepar et al. (2021) found that there was no statistically significant association between education and medication error reporting.

In a cross-sectional descriptive-analytical study of 131 nurses, Nasiri et al. (2020) found that there was a lack of clarity on the definition of medication errors for nurses, which received the lowest weightage among the factors related to the error reporting process.

However, Haw et al. (2014) found that nurses lacked knowledge of the process of error reporting and, they were uncertain about the definition of errors and near misses. Contrastingly, in a qualitative study conducted by Dyab et al. (2018), it was found that nurses were familiar with medication error reporting, yet their hesitancy to report minor errors suggested the necessity for an educational program to emphasize the advantages of reporting near-misses. According to Stewart et al. (2018), participants' responses were highly positive, especially about awareness of the medication error definition (97.1%) and on differentiating medication errors and adverse

reactions to medication awareness (96.2%); however, the least agreed to have the required experience to medication errors reporting (78.2%).

It was found that nursing staff lacked education on medication errors and were unfamiliar with the method or form for reporting errors (Dirik et al., 2019). Contrastingly, in a descriptive cross-sectional hospital-based study by Abdalla et al. (2020), it was found that in the whole sample of 196 nurses, 96.9% of the nurses knew what constituted a medication error, and 95.8% knew when an incident report had to be used to report medication errors. In a qualitative study by Ali et al. (2021), it was found that most participants emphasized the significance of reporting medication error incidents to deal with the system flaws or the faults of individuals to enable learning from present-day errors and to prevent recurrence in the future. However, it also identified that irrespective of knowing the importance of medication error reporting, the participants had a negative impression of doing the reporting (Ali et al., 2021). Furthermore, in an observational cross-sectional study of 980 healthcare professionals (348 physicians, 144 pharmacists, and 488 nurses), Alshammari et al. (2021) found that most of the participants, including 438 nurses (89.8%), had adequate knowledge of medication error reporting forms and medication errors, while 89.75% of the nurses possessed knowledge on the medication errors reporting system.

Attitude

Experts determined that the number of actual errors is greater than the number of errors reported by healthcare personnel (Kim & Kim, 2019). It was found that 43.6% of MAEs by nurses were never reported (Alblowi et al., 2021). Likewise, Shahzadi et al. (2017) found that 62% of the study participants failed to recognize medication errors and did not consider them significant enough that they required reporting. However, Alshammari et al. (2021) and Alsulami et al.

(2019) found that 44.3 percent of the study participants would prefer to educate colleagues who committed medication errors instead of reporting them. Similarly, according to the findings of a cross-sectional, descriptive study of 306 nurses by Yung et al. (2016), nurses' attitudes regarding MAER were mostly positive (67.8% agreed; 32.2% disagreed), with the most negative attitude being that the decision to report (or not) should depend on the situation and that when the patient is unharmed, it is not necessary to report. According to a mixed-methods study by Stewart et al. (2018), nearly two-thirds of participants (67.5%) agreed that medication error reporting was of significant importance in comparison to other professional obligations, and nearly one-third (34.7%) denied forgetting to report medication errors.

In a cross-sectional study of 467 nurses conducted by Lee (2017) in South Korean tertiary and general hospitals, it was found that there were no appreciable variations in what was regarded as medication administration errors among nurses employed in various types of hospitals. In the same study by Lee (2017), it was also found that instead of filing an incident report, Korean nurses were more likely to disclose an error to a doctor. Similarly, 88.9% of the participants reported medication administration errors verbally, with the majority reporting it to the charge nurse (67.6%) and coworkers (55.6%); far fewer reported the error to supervisors (20.6%) or directors (9.2%); and 44.4% reported medication errors to physicians, but the reporting rates to pharmacists (10.5%) or patients and families (11.8%) were found to be low (Yung et al., 2016). It was also found that only 19.0% of MAEs were reported anonymously via the hospital internet system, and even fewer (10.8%) were documented on the patient's chart (Yung et al., 2016). This finding was supported by Dirik et al. (2019), an exploratory cross-sectional study of 135 nurses, who found that the mean reporting percentage for not reporting was 46.7%, while notifying the physician was 49.4%, and reporting via the incident reporting system accounted

for 29%.

According to a methodological, descriptive, multicenter, and cross-sectional study by Cetin & Cebeci (2021), 68.8% of the nurses did not report an error made by them, while 72.6% did not report an error witnessed by them; hence, the rate of medication errors made by nurses was lower than the rate of medication errors witnessed by them. However, his finding was contradicted by a cross-sectional survey-based study conducted by Yousef et al. (2021) at Jordan University Hospital with a sample of 150 nurses, which found that nurses exhibited a positive attitude towards reporting MAEs. Whereas, in a similar study design with a sample of 548 nurses, Hung et al. (2016) found that even though nurses' attitudes towards MAER positively affected their intention to report MAEs, there was no connection between nurses' intentions and their actual MAER behavior and that irrespective of the nursing administration's or coworkers' attitudes, nurses were likely to report MAEs if they noticed them.

According to Dirik et al. (2019), most of the participants responded that they would report incidents of administering medications that should have been delayed to a physician (68.9%), while most participants responded that they would engage them via the reporting system for medications administered through an incorrect route (68.1%). It was also found that insufficient observation and monitoring of patients while they take medication was not considered by most of the participants (87.3%) as an error that required reporting as an error (Dirik et al., 2019). Similarly, in a cross-sectional descriptive correlational study with a sample of 71 emergency nurses, Farag et al. (2017) found that 25.4% of responding nurses were very likely to report near misses, 54.9% were very likely to report errors that reached patients but had no harm, and 71.8% were very likely to report errors with a high potential for patient harm.

In a qualitative study of 50 nurses by Haw et al. (2014), it was found that 26 of those interviewed

claimed they would not use the Medi-Error system to report a coworker's missing signature error, while seven claimed they would inform other senior personnel about the incident but would not submit a report. Also, six stated the omission was a one-time error and would not repeat, while the majority emphasized that if it was a recurring issue, they would disclose it. and another six agreed that there might be a good reason why the nurse made the mistake, and a small fraction (n = 4) stated that this sort of error was rather common and thus not worthy of reporting (Haw et al., 2014).

The results from a study by Kiguba et al. (2015) revealed that 85% of the study participants agreed that medication errors reported must be used to find the root causes of medication errors, while 82% agreed that organizational support and leadership were required in medication error reporting.

Barriers

The results of an integrative review conducted by Afaya et al. (2021) found that the core themes and subthemes recognized as barriers to reporting medication administration errors were: organizational factors such as insufficient reporting systems, management behavior, and indistinct medication error definition; professional and individual factors such as fear of legal charges, management, or coworkers. This result was consistent with the results of a cross-sectional analytical study by Zarea et al. (2018), which found that most of the study participants (40%) agreed that the most important factor in nurses' hesitancy to report medication errors was fear of legal consequences. Similarly, according to the findings of some studies, the primary reason for nurses' unwillingness to report medical errors was fear of the consequences of reporting (Ali et al., 2021; Mahdaviazad et al., 2020; Prihartono & Wibowo, 2020; Kim & Kim,

2019; Morrison et al., 2018; Rutledge et al., 2018; Stewart et al., 2018; Samaei et al., 2017; Soydemir et al., 2016; Yung et al., 2016; Tabatabaee et al., 2014).

Nurses were concerned that reporting medication errors would result in verbal and written warnings and notices, salary reductions, or even termination (Ali et al., 2021; Mayhob & Hashim, 2017; Tabatabaee et al., 2014), legal consequences (Alshammari et al., 2021; Mahdaviazad et al., 2020; Tabatabaee et al., 2014), and negative responses and reactions from managers and colleagues (Prihartono & Wibowo, 2020; Dirik et al., 2019; Geravandi et al., 2019; Mobarakabadi et al., 2017; MohammadNejad et al., 2013). Additionally, lack of clear reporting procedures (Ali et al., 2021); concern about conflict with other members of the team (Alshammari et al., 2021); lack of time due to busy schedules (Alshammari et al., 2021; Kim & Kim, 2018); the process of error reporting being time-consuming (Rutledge et al., 2018); and failing to remember to report (Samaei et al., 2017) impact on professional reputation (Alqubaisi et al., 2016). Furthermore, Yung et al. (2016) found that nurses perceived more barriers to reporting medication administration errors if their attitude towards reporting medication administration errors was negative. However, Aljabari & Kadhim (2021) reported that the barriers to reporting were highly fluctuating among different facilities.

The main barriers identified by Peyrovi et al. (2016) included protecting professional reputation and avoiding stigma; fear of repercussions (penalties, legal issues, and organizational misbehavior); emotions of insecurity (blaming nurses and lacking managerial support); and failure to investigate the underlying source of error.

There was no statistically significant difference in the causes of error non-reporting based on age or gender. Furthermore, there was no difference across educational levels in terms of educational, process, or structural aspects. There was, however, a significant difference in the

non-reporting of medical errors depending on education between attitudinal (P-value = 0.022) and managerial (P-value = 0.06) components. Nurses with a bachelor's degree had a higher average score on attitudinal and managerial criteria for not reporting errors than those with an MSc or a Ph.D.

In addition, a lack of knowledge and awareness of reporting (Prihartono & Wibowo, 2020; Yung et al., 2016), a lack of understanding of the significance of reporting (Hammoudi et al., 2018; MohammadNejad et al., 2013), lack of awareness of what constitutes medication administration errors (Dirik et al., 2019), and poor compliance with error feedback (Prihartono & Wibowo, 2020; Morrison et al., 2018; Fathi et al., 2017) were also found to be perceived barriers to reporting errors by nurses. Likewise, according to Mahdaviazad et al. (2020), deprivation of anonymity was found to be one of the most important aspects of underreporting among nurses. It was also identified that the absence of a proper reporting system and a heavy workload were some of the key factors in the underreporting of medication errors by nurses (Fathi et al., 2017). Similarly, according to Amrollahi et al. (2017), the main reasons for the lack of medication error reporting among nurses included fear over the negative impact error reporting can have on salaries, biased managerial responses that were inconsistent with the gravity of the incident, and forgetfulness to report medication errors.

According to Asefa et al. (2021), 54.0% of the sampled nurses did not feel the error was significant enough to report, and 63.8% of the members concluded that the belief that medications must be given precisely as instructed is impractical; another factor for not reporting medication administration errors is that approximately 58.9% of nurses dreaded the adverse consequences of reporting medication errors, and 64.7% of participants believed that nursing management focused on the individual instead of considering potential system causes

contributing to errors. However, in an institutional-based, cross-sectional study design with 422 nurses, Tsegaye et al. (2020) found that although 19.6% of participants knew the procedure for medication administration error reporting, 10.43% of them had not reported it within the last 12 months owing to a fear of being blamed for reporting (14.60%), workload (73.20%), and others (12.20%).

Contrastingly, Mobarakabadi et al. (2017) found that nurses neither overlooked medication error reporting by considering it lightly nor failed to report it for fear of disciplinary action or loss of job. However, according to Prihartono & Wibowo (2020), in the groups with good administrative support, positive outcomes of reporting, and good incident characteristics, the percentage of medication error reporting was found to be higher. Similarly, in a cross-sectional descriptive correlational study of 71 emergency department nurses, Farag et al. (2017) found that when nurses received more feedback about errors, their willingness to report errors increased. Similarly, an anonymous medication error reporting system and a sense of security regarding the working environment were found to be facilitators of medication error reporting (Mirghafourvand et al., 2021). In the same study, Mirghafourvand et al. (2021) also found that if reporting could prevent potential errors, improve practice, and increase accountability, then the probability of reporting would increase. Farag et al. (2020) discovered that for participant nurses to report medication near-misses, a high level of trust in nurse managers was required.

According to Yung et al. (2016), the most common reasons for nurses not reporting medication administration errors were the fact that the error did not result in harm to the patient (83.3%) and, subsequently, the fact that everyone except the responsible nurse was unaware of the error. (45.1%). The same study also found that nurses experienced complex and negative feelings, including self-recrimination, heavy moods, restlessness, regret, fear, and guilt, among others,

irrespective of their reporting practices. 83.0% of nurses were affected by self-blame after reporting, and 63.4% felt restless after not reporting, while 1% of nurses felt relieved after they reported an error; 8.5% were relieved when they decided not to report an error (Yung et al., 2016).

According to Mostafaei et al. (2014), the most crucial factors in the failure to report medication errors among the nurses in the study were the dearth of a proper medication error reporting system, the absence of proper feedback, and an unclear definition of medication errors; fear of the consequences of error reporting was found to be one of the least important factors. Likewise, Mohammad et al. (2016) and Richter et al. (2014) found that the administrative response was considered the topmost barrier to medication administration error reporting as perceived by the participants, where medication administration errors were emphasized as an indicator of the quality of nursing care delivered, and the systems were considered a potential cause of error instead of concentrating on the individual. According to Mansouri et al. (2019), the three main factors contributing to the underreporting of errors were barriers related to fear of the outcomes of reporting an error, management barriers, and procedural barriers. Furthermore, according to Mayhob & Hashim (2017) and Aboshaiqah (2013), blaming, administrative response, and concentrating on the individual instead of considering systems as potential causes of error are the top reasons for the under-reporting of medication errors.

CHAPTER 3: METHODOLOGY

Research design

A descriptive and correlational design was employed to study the issue. As the study focuses on identifying the perceived barriers to MAER and determining the level of knowledge and

attitude related to medication administration error reporting among registered nurses, a descriptive approach would serve this purpose. Furthermore, this design was used because the study aims to describe the relationships among variables without deducing causal relationships (Polit & Beck, 2018).

Due to the necessity for uniform data that can allow for more objective analysis and statistical testing, a questionnaire was regarded as a good choice for data collection. “To achieve primary data, different sources can be used such as experiments, surveys, interviews, and questionnaires” (Kabir, 2016, as cited in Taherdoost, 2021, p. 12). Questionnaires also enable the study to contact a diversity of people, boosting the generalization of the findings. Since participants are assumed to be highly educated professionals, a self-administered questionnaire that each respondent could go through and respond to independently was chosen.

Setting

This study was conducted in ADK Hospital, Republic of Maldives. ADK Hospital is a 245-bedded, leading tertiary hospital in the Maldives with state of art facilities. A wide range of services are offered at ADK Hospital. The inpatient services available include intensive and critical care units, operation theater services, general, cardiac, neurological, neurovascular, surgical, medical, and paediatric wards. Patient care practicing nurses with a minimum of Diploma in nursing as the educational qualification were included in the study.

Sampling

All the registered nurses working in ADK Hospital, Male’, Republic of Maldives were used as the population for the study. A list of registered nurses meeting the inclusion/exclusion criteria was obtained from the Nursing Department of ADK Hospital and it was used as the sampling

frame. This list was compiled in Microsoft Excel and running numbers (numbers from 1-262) were allocated for the whole sample.

Among the total of 308 nurses, 262 nurses were found to fit the inclusion criteria, after filtering out the nurses fitting the exclusion criteria. Sample size was calculated using "Raosoft sample size calculator" (http://www.raosoft.com/samplesize.html) with the assumption of 95% confidence interval with margin of error of 5%. The sample size was calculated from this value (using "Raosoft sample size calculator") and the effective sample size was found to be 157. A 10% non-response rate was added to the calculated sample size. The non-response rate was calculated using a simplified formula derived from Wayne (1975).

Formula: Final sample size = Effective sample size/ (1- non-response rate anticipated)

The final sample size was 172. Random numbers representing the sample size were generated using Microsoft Excel. Nurses representing each random number were personally contacted and information sheets were provided. And consent for participation in the research was obtained to proceed further.

Inclusion and exclusion criteria

- Inclusion Criteria
  - Nurses who are involved in direct patient care have a minimum diploma qualification in nursing.
  - Nurses who have had at least three months of clinical work experience (as the first 3 months are commonly a job-related orientation/probation period).
  - Nurses work full-time basis.
- Exclusion criteria

- Nurses undertaking administrative responsibilities only.
- Nurses working in non-patient departments such as Central Sterile Services Department (CSSD).
- Nurses who are on maternal leave, extended annual leave, no pay leave and attending external training courses off-site at the time of the data collection.
- Nurses whose scheduled leave coincides with the data collection period.

Participant recruitment

After ethical clearance from the National Health Research Committee and the MNU Ethical Committee, permission was obtained from ADK Hospital for data collection. After receiving this permission, a meeting was held with the head of the nursing department to debrief on the research. An information sheet on the research was prepared and shared with the nursing department heads, which was then shared with the nurses by them. A list of registered nurses who fit the inclusion criteria (after removing those who fit the exclusion criteria) and their contact numbers were obtained from the Nursing Department of ADK Hospital. Ten nurses were randomly selected, and a pilot study was conducted. After excluding the pilot study participants, those nurses corresponding to the randomly generated numbers were contacted, and a link to fill out the consent form was provided to them. Subsequently, they were provided information face-to-face and a closed package containing the information sheet, self-enumerated questionnaire, withdrawal form, and a return envelope with the researcher's name. Instructions were provided to retain the withdrawal form and the number on the upper right-hand corner of the questionnaire with the participant (as the researcher did not retain any information that would match participants to the questionnaires submitted by them) and to

return the filled questionnaire as a closed package (using the return envelope). Participants were requested to fill out the questionnaire as honestly as possible within three days. After three days, they were contacted, and progress was checked. Initially, the return questionnaires were collected personally by the researcher, but this technique was found to be inconvenient for the participants. Hence, participants were instructed to put the closed package into the ballot box kept in the ER cash counter near the biometric fingerprint attendance system.

Data collection

Data collection was started on December 7, 2022, and was planned to finish on December 21, 2022. However, due to a lack of responses, data collection was continued until December 31, 2022. Data collection was done using a structured, self-administered questionnaire that took about 10–15 minutes to complete. The questionnaire was printed, and hard copies were handed over to the participants with the information sheet in a sealed envelope.

Participants were instructed to put the filled-out questionnaires, in a sealed envelope, into the ballot box. The ballot box was checked and emptied daily in the morning and evening by the researcher. The data was then entered into a Microsoft Excel spreadsheet and saved.

Further instructions were provided on the withdrawal process, should the participant wish to do so. Furthermore, the subjects were provided with the contact number of the chief researcher and requested to contact her if questions arise at any time during the data collection.

The instrument used in this study is a questionnaire adopted from Wakefield et al. (2005), used by Kim & Kim (2019) and Prihartono & Wibowo (2020), and Jember et al. (2018), used by Prihartono & Wibowo (2020) and Asefa et al. (2021). The questionnaire consisted of 50 structured questions, which were categorized into four sections. Section 1 was to collect the

demographic information of the participants. Section 2 adopted from Jember et al. (2018), was on medication error reporting knowledge; it was measured by using 8 questions, of which 4 questions (Part-1) were on a five-point Likert scale, where scales 4-5 were considered adequate to excellent levels of knowledge. The remaining four questions (Part 2) were multiple-response questions. Section 3 adopted from Wakefield et al. (2005), was on attitude toward error reporting, and it was measured by 18 questions on a five-point Likert scale. Section 4, adopted from Wakefield et al. (2005), contained 16 questions with a five-point Likert scale that were used to measure the barriers to error reporting. These 16 questions have been divided into three categories:

Personal factors (8 items):

1. Nurses do not agree with the hospital's definition of a medication error.
2. Nurses do not recognize an error occurred.
3. Nurses may not think the error is important enough to be reported.
4. Nurses believe that other nurses will think they are incompetent if they make medication errors.
5. The patient or family might develop a negative attitude toward the nurse or may sue the nurse if a medication error is reported.
6. The expectation that medications be given exactly as ordered is unrealistic.
7. Nurses are afraid the physician will reprimand them for the medication error.
8. Nurses fear adverse consequences from reporting medication errors.

Reporting process factors (3 items):

1. Filling out an incident report for a medication error takes too much time.
2. Contacting the physician about a medication error takes too much time.

3. Medication error is not clearly defined.

Administrative factors (5 items):

1. The response by nursing administration does not match the severity of the error.
2. Nurses could be blamed if something happens to the patient because of the medication error.
3. No positive feedback is given for passing medications correctly.
4. Too much emphasis is placed on MAEs as a measure of the quality of nursing care provided.
5. When MAEs occur, nursing administration focuses on the individual rather than looking at the systems as a potential cause of the error.

Pilot study

The initial validity of the instrument was established by three expert nurse advisors working in the field. Further validity of the tool was tested through a pilot study after obtaining approval from MNUREC and NHRC. The pilot study was conducted on 10 participants from the same target population, identified using simple random sampling. However, these 10 participants were excluded from the main study. Data collection for the pilot study was conducted the same way it would be for the main study. Participants were initially briefed on the purpose and significance of the study, and consent was obtained for participation in the pilot study. Then, closed packages containing the information sheet, self-enumerated questionnaire, withdrawal form, and a return envelope with the researcher's name were handed over to them personally by the researcher.

Instructions were provided to retain the withdrawal form and the number on the upper right-hand corner of the questionnaire with the participant and to return the filled questionnaire as a

closed package (using the return envelope). Participants were requested to fill out the questionnaire as honestly as possible within three days. After three days, they were contacted, and progress was checked. Completed forms were personally collected from each nurse. Nurses were asked if the questionnaire was easy to understand and if the contents were relevant to their practice. Their comments suggested that the questions were straightforward and understandable, and they agreed that the issue was essential to the nursing profession.

A total of 10 questionnaires were distributed, and ten responses were received (response rate: 100%). The data was then entered into a Microsoft Excel® spreadsheet, and the data set was prepared for analysis using IBM® SPSS Statistics (Version 26). Then, the reliability of the instrument was checked using Cronbach's alpha (Table 1). An alpha value of 0.6 and above was considered reliable.

Table 1

Reliability statistics

Dimensions	**Cronbach's Alpha**	**Number of Items**
Section 2: Medication administration error reporting knowledge	.637	25*
Section 3: Medication administration error reporting attitude	.802	18
Section 4: Perceived barriers to medication administration error reporting	.915	16
Overall	**.867**	**59**

* Each answer choice for the multiple response question was converted to a yes/no question during analysis.

The Cronbach's alpha value for the questions on medication administration error reporting knowledge was 0.637, which is within the 'acceptable' range (Ursachi et al., 2015). Hence, questions were used without alterations or omissions. The low value for Section 1 could be because the section was adopted from a 50-question instrument on assessing nurses' knowledge of MAER. All 50 questions were not used in this study as it would make the questionnaire too long for a self-enumerated questionnaire (101 questions) and the time required to fill it would take more than 20 minutes, which could result in a poor response rate. Cronbach's alpha value for the questions on medication administration error reporting attitude was 0.802. An alpha value of 0.8 or greater is a very good level (Ursachi et al., 2015). Hence, questions were used without alterations or omissions. The Cronbach's alpha value for the questions on medication administration error reporting attitude was 0.915. An alpha value of 0.8 or greater is a very good level (Ursachi et al., 2015). Hence, questions were used without alterations or omissions. Questions consisting of multiple responses were split for analysis. The overall Cronbach's alpha value for the questionnaire was 0.867 (an alpha value of 0.8 or greater is a very good level (Ursachi et al., 2015)), which confirms the reliability of the questionnaire. Hence, the questionnaire was used for the main study without any deletions or rephrasing.

Data analysis

The questionnaires were checked for completeness. The data in the completed forms was compiled and saved in a Microsoft Excel® spreadsheet; the data was cleaned, and the data set

was prepared for analysis. Questionnaires with more than 10% of unanswered questions were considered incomplete and excluded from the study. The data was checked for missing values after it was entered into the Microsoft Excel® spreadsheet. Missing values were handled by the imputation method, where the mean response for the specific questionnaire item was used. The questions assessing knowledge were divided into two sections. The questions in Section 1 (general knowledge on medication administration error reporting) were scored on a scale of 1–5, where one is the lowest (highly disagree) and five is the highest (highly agree). However, a two-point scale (0 = incorrect, 1 = correct) was used to score questions in Section 2 (multiple response/choice questions). These questions focused on knowledge of the institutional policies and procedures for medication administration error reporting. The total score for both sections was calculated, and results were converted to percentages and categorized (1 = good, 2 = moderate, 3 = poor) using Bloom's cut-off point (Ashebir et al., n.d.).

The questions assessing medication administration error reporting attitude were scored on a scale of 1–5, where one is the lowest (highly agree) and five is the highest (highly disagree). To accommodate this formula, form responses were inversed (form responses of 1 (strongly disagree) were scored as 5, and 2 (disagree) as 4, and so on during the analysis). The total score per participant was converted to a percentage and categorized using Bloom's cut-off point (Ashebir et al., n.d.). Positive attitude if the score was between 80 and 100%, intermediate if the score was between 60 and 79%, and negative if the score was less than 60%.

Statistical Analysis of the data

The data was coded (Table 2**),** then the data set was analyzed using IBM® SPSS Statistics (version 26 and above) for Windows. Descriptive and bivariate descriptive statistical tests and correlational analysis tests were used to analyze the data. As part of the sample representation

using demographics, frequency tables were generated. The results are presented as pie charts in Chapter 4, Section 1. The mean response of participants for each question in the questionnaire was also calculated.

The Chi-square test was used to determine the association between demographic factors and level of knowledge. Spearman correlation, or Spearman's rank correlation coefficient, was used to test the relationship between knowledge and attitude with the perceived barriers since the data fulfilled the assumptions of this statistical test. All statistical tests were considered significant at the 95% confidence interval with a p-value less than 0.05. The results generated are included in the discussion section of the report and presented as percentages, frequency tables, graphs, and figures.

Table 2

Coding

ITEM	Category	Label
Sex	Female	1
	Male	2
Age group (in years)	≤25	1
	25-34	2
	35-44	3

	45-54	4
	≥ 55	5
Nationality	Maldivian	1
	Non-Maldivian	2
Marital status	Married	1
	Single	2
	Divorced	3
	Widowed	4
Level of education in nursing	Diploma	1
	Advance Diploma	2
	BSc	3
	MSc	4
	PhD	5
Working area	Ward/Private Ward	1
	Cathlab/CCU	2
	ICU/NICU/HDU	3
	ER/Observation Room	4

	Labour Room	5
	OPD (Dialysis Unit, Chemotherapy Unit, OPD, TR, Endoscopy)	6
	OT (OTC, OBG OT, Day OT, Minor OT)	7
How long have you been in the nursing profession? (in years)	≤5	1
	6–10	2
	11–15	3
	16–20	4
	≥21	5

Item	Category	Scale	Code
Knowledge (Part 1)	Highly Disagree	1	1
	Disagree	2	2
	Neutral	3	3
	Agree	4	4
	Highly Agree	5	5
Knowledge (Part 2)	Multiple responses	Incorrect	0
		Correct	1

	Highly Disagree	1	5
	Disagree	2	4
Attitude	Neutral	3	3
	Agree	4	2
	Highly Agree	5	1
	Highly Disagree	1	1
	Disagree	2	2
Barriers	Neutral	3	3
	Agree	4	4
	Highly Agree	5	5

Rigor and interpretation

Rigor

To ensure that the problem studied is represented as accurately as possible, certain measures were taken.

- Sampling Bias

Simple random sampling was chosen to avoid bias in sampling, as the probability sampling method ensures an equal chance for every subject in the population to be chosen as a study participant, and the sample size is representative of the population. Even though participants

might give consent to the study, the chances of not returning a filled-out or incomplete questionnaire are there. Hence, a non-response rate was considered, and it was addressed by calculating a 10% non-response rate from the calculated sample and adding it to the study sample.

- Data collection bias and measurement bias

  To minimize bias in data collection and measurement, an instrument that has been assessed for its validity or reliability was adopted and used in this study. Furthermore, the instrument was used in several other studies to determine the knowledge, attitude, and perceived barriers to medication administration error reporting among nurses. Therefore, this instrument is a tool that is suitable for the specific population group. Additionally, this adopted instrument was validated by experts working in the field (three expert nurses working in the field), and a pilot study was conducted to ensure that the instrument measures what it is intended to.

- Recall bias

  Some memories may be more vivid than others, therefore, some behaviors or events might not be mentioned by the participants. This was overcome by careful reviewing of questions to ensure they were understood by the participant and providing sufficient time to recall long-term memories.

- Data analysis bias

  The researcher assures that the collected data was used in the data analysis and result interpretation without any alterations, even if the results were not what the researcher anticipated.

Interpretation

The data collected through the study was interpreted using the mean, median, mode, standard deviation, and frequency tables. Furthermore, correlational tests were used to test the relationship between dependent and independent variables, the strength, and the statistical significance of the relationship.

Trustworthiness of the data

The validity and reliability of the research instrument were assured using three main approaches. Hence, the initial validity was checked by three nurse experts working in the field. It was further validated by conducting a pilot study, and the internal consistency of the research instrument was measured using Cronbach's alpha.

As the study is limited to registered nurses working in a private hospital that is of tertiary level, the result cannot be applied to all the registered nurses working in the Maldives or to health facilities of any level. However, the results can be generalized to a healthcare facility with similar settings.

Ethical consideration

A letter of permission to conduct research at ADK Hospital was obtained for ethical clearance from the National Health Research Council (NHRC) of the Maldives and the Maldives National University Research Ethics Committee (MNUREC). Approval from MNUREC was obtained (ethics approval number: RE/2022/B-41). Then, approval from NHRC was obtained to conduct the study (the research registration number is NHRC/2022/24).

After that, participants were provided with the information sheet, and complete anonymity (names, addresses, or any means of participant identification are excluded in the questionnaire),

the confidentiality of the data collected, and voluntary participation or withdrawal were assured. Further emphasis was placed on participation in this study not being compulsory and on the right to decline or withdraw from the research at any time without being penalized. Participants were also informed that participation is voluntary and that there is no monetary gain or reward for their involvement. Consent was obtained just before initiating the data collection.

Also, identity-revealing data was only accessible to the chief investigator. Moreover, this identity-revealing data was stored separately in a secure location, in a locked drawer or cupboard accessible only to the chief investigator. All identity-revealing data was discarded personally by the researcher once the research project was completed. Furthermore, the raw data collected in this project will not be used for any purpose other than that specified.

All questionnaires contained a unique identification number (which must be retained by the participants), but the researcher did not keep records that could match this number to the identity of the participants. If any participant wishes to withdraw the questionnaire after it has been completed and submitted, the participant must fill out the "Withdrawal Form" and hand it over to the researcher. The participant must submit the completed form to initiate withdrawal from the research process.

As the study subjects were drawn from a population of local and expatriate nurses, the possibility of subjects from different cultural backgrounds is high. There could be a fear of loss of job and repatriation among expatriate nurses; therefore, they were assured of complete anonymity and confidentiality. Furthermore, staff discrimination between the study participants and non-participants could arise; therefore, the study group was kept confidential, and details of the participants were not disclosed.

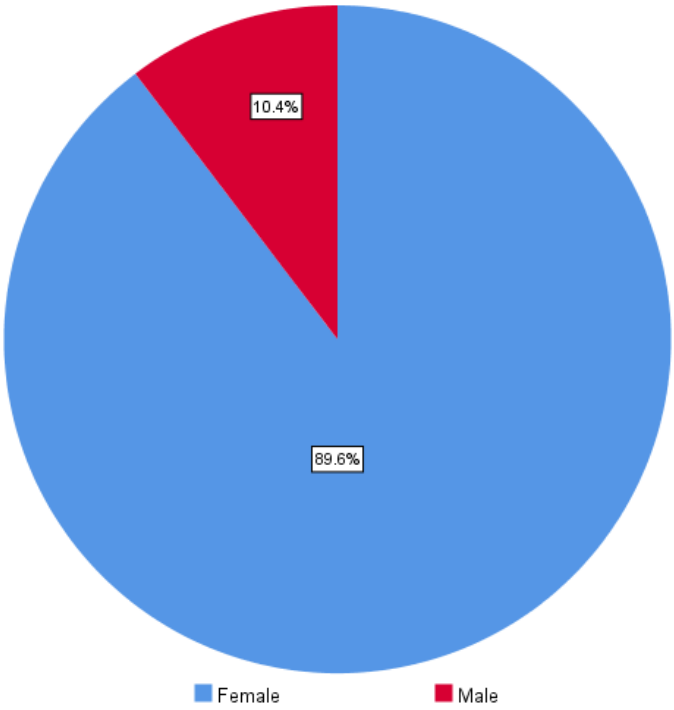
CHAPTER 4: FINDINGS

This chapter comprises five sections. The first section is on the descriptive analysis and demographic characteristics of the participants, and the second section is on the medication error reporting knowledge of the participants. The third section is on the participants' attitudes toward medication error reporting, and the fourth section is on the barriers to medication error reporting perceived by the participants. The fifth section is on hypothesis testing.

A total of 172 questionnaires were distributed, and 165 responses were received (response rate: 95.93%). One questionnaire was incomplete (75% unanswered questions); hence it was omitted. However, questionnaires that had 1-4 unanswered questions were included in the study. The values for these were adjusted by finding the mean response and using that value. A total of 164 nurses across ADK Hospital participated in the study.

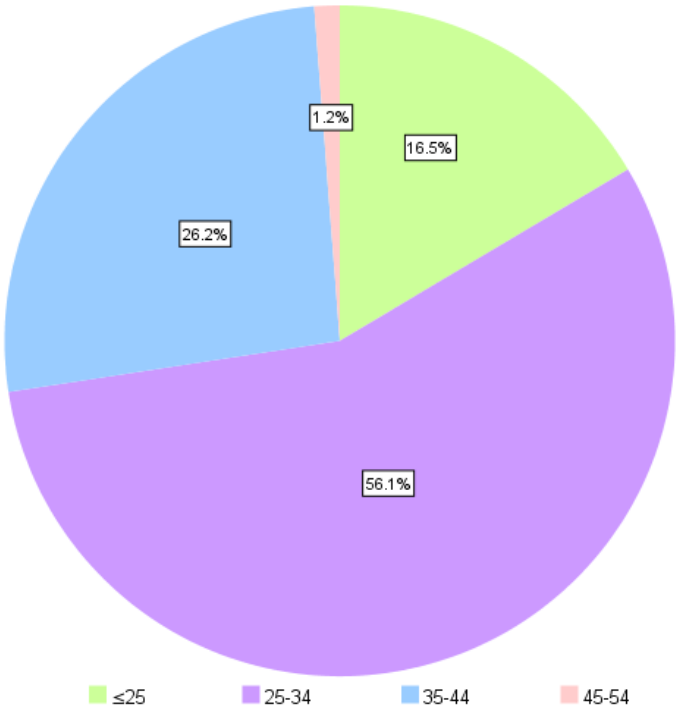
Sociodemographic Characteristics of the participants

Figure 1: *Percentage of participants by gender*



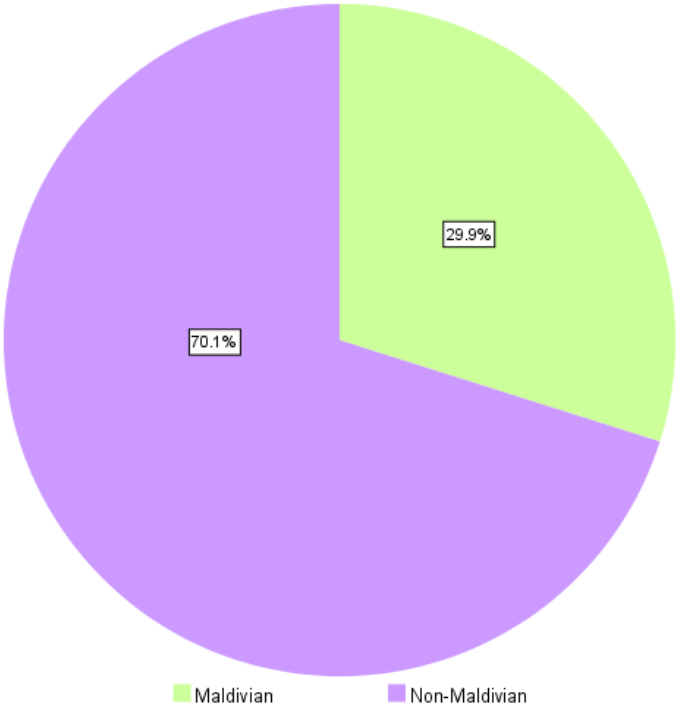
It was revealed that 89.6% (n = 147) of the study participants were females, while 10.4% (n = 17) were males, which indicates a high number of females in the profession. The mean score was 1.10, inclining towards the female gender.

Figure 2: *Percentage of participants by age group*



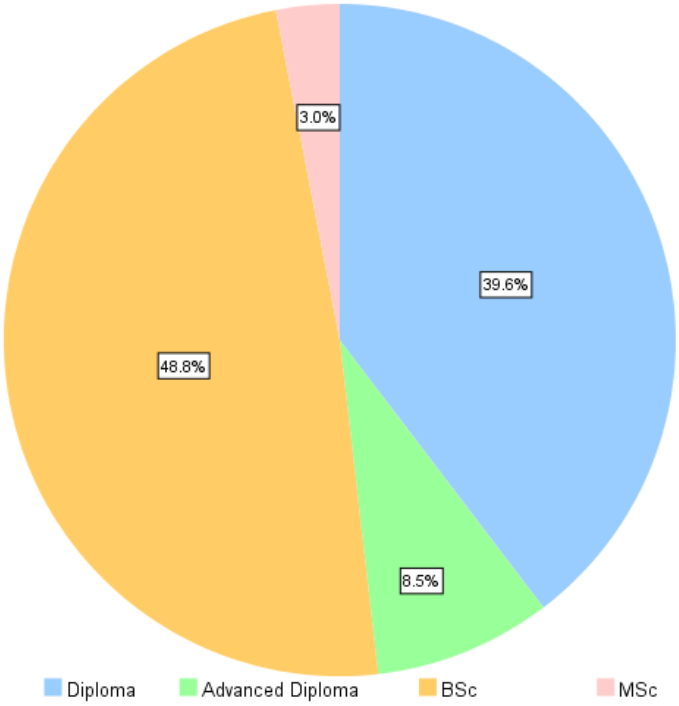
According to the results, 72.6% (n = 119) of the nurses were 34 years of age or younger, while 27.4% (n = 45) were above 35 years of age, with a mean score of 2.12, indicating the 25–34 years age group. This data reveals a young workforce of nurses at the institution.

Figure 3: *Percentage of participants by nationality*



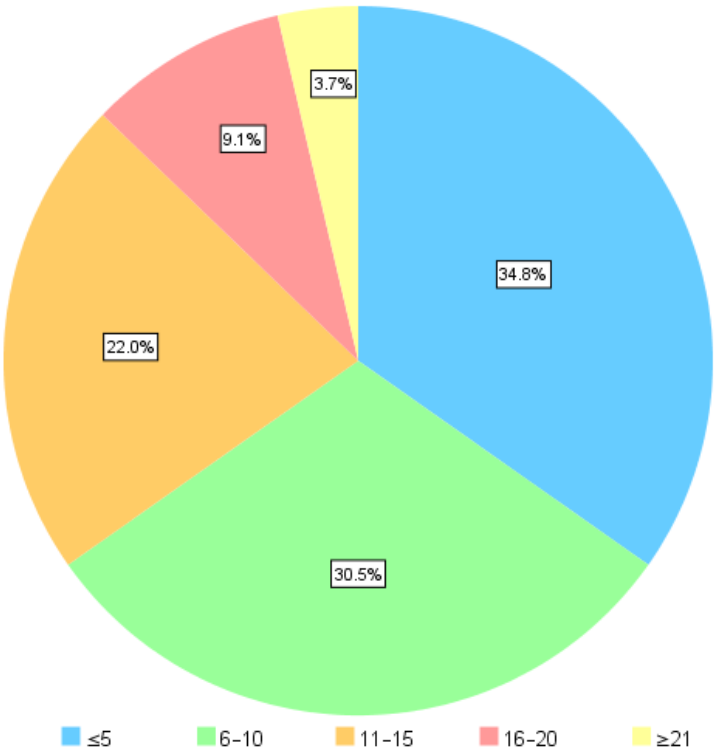
The results revealed that non-Maldivian nurses comprised 70.1% (n = 115) of the study population, while 29.9% (n = 49) were Maldivians, indicating a high number of expatriate nurses working at the institution.

Figure 4: *Percentage of participants by nursing educational qualification*



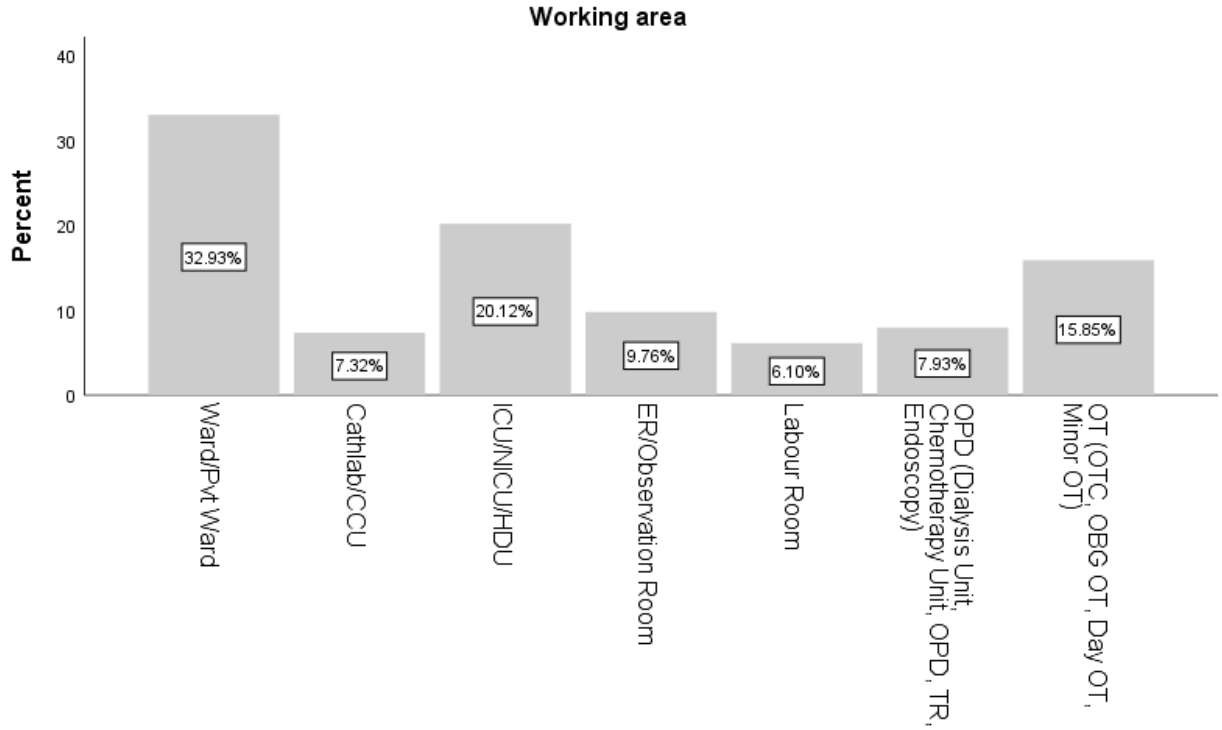
The data reveals 51.3% (n = 85) having attained their Bachelor of Nursing and beyond, which indicates a large proportion of the nurses working at ADK were qualified professional nurses.

Figure 5: *Percentage of participants by work experience*



Nearly 2/3rds (n = 107) of the workforce has less than ten years of experience. This indicates a young workforce within the institution, probably new to the field.

Figure 6: *Participants' area of working*



Most of the study participants were working in the wards or in private wards, while the fewest were in labor rooms. This could be due to the high number of beds in wards and private wards. Hence, a high number of nurses are needed to cater to the needs of patients in these areas.

Descriptive analysis of medication error reporting knowledge

The study examined nurses' knowledge of medication administration error reporting and the following results were obtained (Table 3). The overall ratings of participants' understanding in areas of medication administration error reporting ranged from one to five points on a scale of "strongly disagree" = 1 to "strongly agree" = 5.

Table 3

Participants' responses to Medication Error Reporting Knowledge

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Mean**	**Std. Deviation**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**		
Should medication administration errors (MAEs) be reported?	1.2% (n=2)	0% (n=0)	1.2% (n=2)	6.7% (n=11)	149% (n=149)	4.86	0.541
Do you know how your institution defines medication MAEs?	1.2% (n=2)	0.6% (n=1)	1.2% (n=2)	23.8% (n=39)	73.2% (n=120)	4.67	0.656
Is there a medication administration error reporting (MAER)	0.6% (n=1)	0% (n=0)	0% (n=0)	12.8% (n=21)	86.6% (n=142)	4.85	0.451

protocol in your hospital?						
Are MAEs preventable?	0% (n=0)	0% (n=0)	2.4% (n=4)	15.9% (n=26)	81.7% (n=134)	4.79	0.463
	Yes (1)		**No (2)**				
Omission should be reported as an MAE	61% (n=100)		39% (n=64)			0.61	0.489
Prescribing should be reported as an MAE	73.8% (n=121)		26.2% (n=43)			0.95	0.216
Dispensing should be reported as an MAE	67.1% (n=110)		32.9% (n=54)			0.88	0.328
Wrong dose should be reported as an MAE	95.1% (n=156)		49% (n=8)			0.93	0.251
Wrong frequency should be reported as an MAE	93.3% (n=153)		6.7% (n=11)			0.26	0.441
Wrong patient should be reported as an MAE	98.2% (n=161)		1.8% (n=3)			0.98	0.134
Wrong site should be reported as an MAE	95.1% (n=156)		4.9% (n=8)			0.95	0.216

Wrong time should be reported as an MAE	87.8% (n=144)	12.2% (n=20)	0.33	0.471
Near miss should be reported as an MAE	82.9% (n=136)	17.1% (n=28)	0.83	0.377
MAERs should be done by completing the MAER form	76.2% (n=125)	23.8% (n=39)	0.59	0.493
MAERs should be done by notifying the patient safety in-charge	42.7% (n=70)	57.3% (n=94)	0.62	0.486
MAERs should be done via a telephone call to the duty doctor	11.6% (n=19)	88.4% (n=145)	0.63	0.483
MAERs should be done via a text message to supervisor	11.0% (n=18)	89.0% (n=146)	0.90	0.306
MAEs be immediately reported to intern doctor	10.4% (n=17)	89.6% (n=147)	0.93	0.261

MAEs be immediately reported to medical director	3.0% (n=5)	97.0% (n=159)	0.90	0.306
MAEs be immediately reported to nursing director	7.3% (n=12)	92.7% (n=152)	0.97	0.172
MAEs be immediately reported to team leader nurse	89.6% (n=147)	10.4% (n=17)	0.80	0.402
MAEs be immediately reported to the concerned specialist	20.1% (n=33)	79.9% (n=131)	0.11	0.314
MAEs should be reported by anyone who notices it	63.4% (n=104)	36.6% (n=60)	0.76	0.427
MAEs should be reported by the one from whom it occurred	59.1% (n=97)	40.9% (n=67)	0.88	0.321
MAEs should be reported by the shift coordinator	62.2% (n=102)	37.8% (n=62)	0.57	0.496

For the 97.6% of the participants agreed/strongly agreed that MAEs should be reported while 2.4% strongly disagreed/neutral. This indicated that nearly all the participants were aware that MAEs should be reported. Hence it can be concluded that 97.6% of the participants had adequate knowledge of reporting MAEs while 2.4% had inadequate knowledge of it. Similarly, 97% of the participants had agreed or strongly agreed that they knew how the institution defined MAEs while 1.2% were neutral and 1.8% disagreed/strongly disagreed to it. 99.4% of the participants agreed/strongly agreed that there was a medication administration error reporting protocol in the hospital while 0.6% of the participants strongly disagreed to it.

The mean score for Part 1 of this section ranged from 4.67 to 4.86 indicating an average of good to excellent knowledge. The SD ranges from 0.134 to 0.656 indicating a high level of agreement among the participants. To the question “Are MAEs preventable”, 97.6% of the respondents agreed/strongly agreed while 2.4% gave a neutral response. According to the data, 40.1% of the participants responses did not include “the one from whom it occurred” as their choices for “Who should report MAEs”, this could indicate poor compliance to self-reporting/voluntary reporting of MAEs. Overall, nurses possessed adequate level of general knowledge on medication administration error reporting.

Table 4

Total level of knowledge

Level of knowledge	Frequency	Percent	Valid Percent	Cumulative Percent
Good	144	87.8	87.8	87.8
Moderate	20	12.2	12.2	100.0
Total	164	100.0	100.0	

According to the data on total level of knowledge (Table 4), 87.8% (n=144) of the respondents had a good level of knowledge while 12.2% (n=20) had intermediate level of knowledge and 0% of the respondents had poor level of knowledge. This indicates that most of the participants of the study (87.8%) were aware of the medication administration error reporting and related protocols in place at ADK Hospital.

Medication administration error reporting attitude

For this section of the questionnaire, participants were asked to circle the number that best reflects the extent to which they agreed with the questions(statements) as their thoughts on medication administration error reporting. The responses are summarized as a frequency table (Table 5).

Table 5

Participants' responses to Medication Error Reporting attitude

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Mean**	**Std. Deviation**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**		
Even if I don't give my details, I'm sure that they'll track me down	40.2% (n=66)	17.1% (n=28)	16.5% (n=27)	18.9% (n=31)	7.3% (n=12)	2.36	1.365
The incident was too trivial	35.4% (n=58)	22.0% (n=36)	23.8% (n=39)	14.0% (n=23)	4.9% (n=8)	2.31	1.226
I am worried about disciplinary action	39.0% (n=64)	21.3% (n=35)	16.5% (n=27)	16.5% (n=27)	6.7% (n=11)	2.3	1.317
I wonder about who else is privy to the	31.7% (n=52)	26.8% (n=44)	26.2% (n=43)	11.6% (n=19)	3.7% (n=6)	2.29	1.139

information that I disclose							
I am worried about litigation	36.0% (n=600	25.0% (n=41)	18.3% (n=30)	14.0% (n=23)	6.1% (n=10)	2.28	1.261
Junior staff are often blamed unfairly for MAEs	43.9% (n=72)	21.3% (n=35)	13.4% (n=22)	12.2% (n=20)	9.1% (n=150	2.21	1.36
MAER is unlikely to lead to system changes	40.2% (n=66)	19.5% (n=32)	24.4% (n=40)	12.2% (n=20)	3.7% (n=6)	2.2	1.198
I never get any feedback on what action is taken	47% (n=77)	15.2% (n=25)	15.2% (n=25)	17.1% (n=28)	5.5% (n=9)	2.19	1.332
I don't feel confident the form is kept anonymous	36.6% (n=60)	32.9% (n=54)	12.8% (n=21)	12.2% (n=20)	5.5% (n=9)	2.17	1.206

My co-workers may be unsupportive	38.4% (n=63)	29.9% (n=49)	15.9% (n=26)	11.0% (n=18)	4.9% (n=8)	2.14	1.187
I don't want the case discussed in meetings	40.9% (n=67)	29.9% (n=49)	11.0% (n=18)	13.4% (n=22)	4.9% (n=8)	2.12	1.22
I don't want to get into trouble	49.4% (n=81)	20.7% (n=34)	14.0% (n=23)	9.8% (n=16)	6.1% (n=10)	2.02	1.258
The medication error reporting form is too complicated and requires too much detail	48.8% (n=80)	31.7% (n=52)	7.9% (n=13)	7.9% (n=13)	3.7% (n=6)	1.86	1.096
When the ward is busy, I forget to make a report	57.9% (n=95)	22.0% (n=36)	67% (n=11)	10.4% (n=17)	3.0% (n=5)	1.79	1.139

If I discuss the case with the person involved nothing else needs to be done	51.2% (n=84)	34.1% (n=56)	9.1% (n=15)	2.4% (n=4)	3.0% (n=5)	1.72	0.95
It's not my responsibility to report somebody else's mistakes	56.7% (n=93)	26.8% (n=44)	8.5% (n=14)	3.7% (n=6)	4.3% (n=7)	1.72	1.054
When it is a near miss, I don't see any point in reporting it	59.1% (n=97)	24.4% (n=40)	7.9% (n=13)	4.3% (n=7)	4.3% (n=7)	1.7	1.069
I don't know whose responsibility it is to make a report	70.7% (n=116)	17.1% (n=28)	4.9% (n=8)	2.4% (n=4)	4.9% (n=8)	1.54	1.041

The responses to the questions assessing nurses' attitude (Table 5) towards MAER ranged from Strongly disagree to strongly agree. The mean for the response's ranges from 1.54-2.36 (strongly disagree - disagree) indicating a positive attitude among the nurses regarding medication administration error reporting. However, the relatively high SD (ranging from 0.95 to 1.365), representing a high degree of dispersion of data, is suggestive of disagreement among participants. For the question "I never get any feedback on what action is taken", 61.9% disagreed/strongly disagreed to while 15.3% were neutral 22.7% strongly agreed/agreed. This indicates that feedback on the action taken the error is not provided for all the nurses and irrespective of that, nurses were willing to report medication errors. 57.4% strongly disagreed/disagreed to "The incident was too trivial", 23.8% were neutral and 18.9% agreed/strongly agreed to it. This indicates that most of the nurses take MAE incidents seriously, and do not consider it as insignificant.

77.9% disagreed/strongly disagreed to "When the ward is busy, I forget to make a report" while 6.7% were neutral and 13.4% agreed/strongly agreed to it. This indicates that even though the ward is busy, nurses remember to make an error report if an error took place. 87.8% of the nurses disagreed/strongly disagreed to "I don't know whose responsibility it is to make a report" while 4.9% were neutral and 7.3% agreed/strongly agreed to it. This indicates that most of the nurses believe that they know who must make a report when there is a medication administration error incident. Most of the nurses (83.5%) disagreed to "when it is a near miss, I don't see any point in reporting it". This indicates that nurses are aware of near miss being a medication administration error and they would report near misses, if/ when they occur. 80.5% of the nurses have disagreed/strongly disagreed to "The medication error reporting form is too long and complicated and requires too much detail. This indicates that most of the nurses are comfortable with the current format of the MAER form.

Table 6

Total attitude to medication administration error reporting

Attitude	Frequency	Percent	Valid Percent	Cumulative Percent
Intermediate	55	33.5	33.5	88.4
Negative	19	11.6	11.6	100.0
Total	164	100.0	100.0	

According to participants' total attitude to MAER (Table 6), 54.9% (n=90) of the participants had a positive attitude towards MAER while 33.5% (n=55) had intermediate and 11.6% (n=19) had a negative attitude to MAE reporting. Therefore, this indicates that on average, most of the participants had a positive attitude towards medication administration error reporting.

Perceived barriers to medication administration error reporting

Participants were asked to circle the number that best reflects the extent to which they agreed with the questions/statements as their thoughts on medication administration error reporting. The responses are displayed in the frequency table below.

Table 7

Participants responses to perceived barriers to medication administration error reporting

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Mean**	**Std. Deviation**	**Rank**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**			
Nurses could be blamed if something happens to the patient because of the medication error.	26.8% (n=44)	10.4% (n=17)	12.2% (n=20)	34.1% (n=56)	16.5% (n=27)	3.03	1.48	1
Too much emphasis is placed on MAEs as a measure of the quality of nursing care provided.	22.6% (n=37)	19.5% (n=32)	17.7% (n=29)	31.3% (n=51)	9.1% (n=15)	2.85	1.327	2

No positive feedback is given for passing medications correctly.	27.4% (n=45)	14.6% (n=24)	23.2% (n=38)	22.0% (n=36)	12.8% (n=21)	2.78	1.393	3
The patient or family might develop a negative attitude toward the nurse or may sue the nurse if a medication error is reported.	29.9% (n=49)	14.6% (n=24)	24.4% (n=40)	24.4% (n=40)	6.7% (n=11)	2.63	1.315	4
When MAEs occur, nursing administration focuses on the individual	27.4% (n=45)	25.6% (n=42)	15.2% (n=25)	19.5% (n=32)	12.2% (n=20)	2.63	1.384	4

rather than looking at the systems as a potential cause of the error.								
Nurses fear adverse consequences from reporting medication errors.	37.8% (n=62)	14.6% (n=24)	14.6% (n=24)	24.4% (n=40)	8.5% (n=14)	2.51	1.421	5
Nurses are afraid the physician will reprimand them for the medication error.	39.0% (n=64)	20.7% (n=34)	15.2% (n=25)	18.9% (n=31)	6.1% (n=10)	2.32	1.324	6
Nurses believe that other nurses	45.7% (n=75)	20.1% (n=33)	8.5% (n=14)	20.1% (n=33)	5.5% (n=9)	2.2	1.347	7

will think they are incompetent if they make medication errors.								
The response by nursing administration does not match the severity of the error.	39.0% (n=64)	28.7% (n=47)	17.1% (n=28)	9.8% (n=16)	5.5% (n=9)	2.14	1.198	8
The expectation that medications be given exactly as ordered is unrealistic.	49.4% (n=81)	20.1% (n=33)	18.9% (n=31)	9.1% (n=15)	2.4% (n=4)	1.95	1.129	9
Filling out an incident	48.8% (n=80)	31.1% (n=51)	11.0% (n=18)	6.1% (n=10)	3.0% (n=5)	1.84	1.047	10

report for a medication error takes too much time.								
Nurses may not think the error is important enough to be reported.	57.9% (n=95)	21.3% (n=35)	8.5% (n=14)	7.9% (n=13)	4.3% (n=7)	1.79	1.154	11
Nurses do not agree with hospital's definition of a medication error.	58.5% (n=)96	19.5% (n=32)	12.2% (n=20)	6.1% (n=10)	3.7% (n=6)	1.77	1.111	12
Contacting the physician about a medication error takes too much time.	51.8% (n=85)	30.5% (n=50)	11.0% (n=18)	4.9% (n=8)	1.8% (n=3)	1.74	0.963	13

Nurses do not recognize an error occurred.	59.1% (n=97)	23.2% (n=38)	7.9% (n=13)	7.3% (n=12)	2.4% (n=4)	1.71	1.051	14
Medication error is not clearly defined.	56.1% (n=92)	31.1% (n=51)	6.7% (n=11)	4.3% (n=7)	1.8% (n=3)	1.65	0.918	15

According to the data (Table 7), nurses had agreed or strongly agreed to two factors as the potential barriers to MAE reporting.

"Nurses could be blamed if something happens to the patient because of the medication error."

"Too much emphasis is placed on MAEs as a measure of the quality of nursing care provided."

50.6% of the nurses strongly agreed or agreed to "nurses could be blamed if something happens to the patient because of the medication error" while 37.2% disagreed/strongly disagreed and 12.2% were neutral. This indicates that nurses perceived fear of blame as a barrier to MAER. The mean was 3.03 with SD of 1.480. Even though the mean represents a value within the neutral range, the relatively high value of SD suggests a varying response between the participants.

31.3% (n=51) of the participants agreed with "Too much emphasis is placed on MAEs as a measure of the quality of nursing care provided" while 17.7% (n=29) were neutral and 22.6% (n=37) strongly disagreed. This indicates that most of the nurses feel that the quality of nursing care they provide is rated based on the errors they commit. However, a combined (those who disagreed or strongly disagreed) 42.1% of the nurses did not feel so.

To the questionnaire item, “No positive feedback is given for passing medications correctly,” 27.4% (n=49) strongly disagreed while 14.6% (N=24) disagreed, 23.2% (N=38) were neutral, 22.0% (N=36) agreed and 12.8% (N=21) strongly agreed. The mean score for the item was 2.63 indicating an inclination towards neutral but the SD of 1.315 suggests disagreement between the participants on the responses. This could also indicate that even though majority of the nurses did not agree with “No positive feedback is given for passing medications correctly,” as a potential barrier to MAE reporting, to 34.8% (n=57) of the participants, positive feedback on their correct practices mattered.

Majority (52.4%) of participants disagreed or strongly disagreed to “Nurses fear adverse consequences from reporting medication errors.” Indicating that the potential of facing adverse outcomes from reporting an MAE is not perceived as a barrier to MAER by nurses. The mean value represents disagree range 2.51 while the SD is 1.421 which represents a varying response between the participants.

Inferential Statistics

Association between Level of knowledge and work experience

Table 8

Level of Knowledge and Work experience (in years) Crosstabulation

			Work experience (in years)					Total
			≤5	6–10	11–15	16–20	≥21	
Knowledge category	Good	Count	52	38	34	15	5	144
		Expected Count	50.0	43.9	31.6	13.2	5.3	144.0
	Moderate	Count	5	12	2	0	1	20
		Expected Count	7.0	6.1	4.4	1.8	.7	20.0
Total		Count	57	50	36	15	6	164
		Expected Count	57.0	50.0	36.0	15.0	6.0	164.0

Table 9

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.81	4	.029
Likelihood Ratio	11.77	4	.019
Linear-by-Linear Association	.50	1	.481
N of Valid Cases	164		

A chi-square test of independence was performed (Table 9) to compare the level of knowledge of MAER and work experience. The relationship between these variables was significant, χ^2 (4), (*N = 164*) = 10.81, *p* = .029. Nurses with ≤5 years of work experience were more likely to have a good level of knowledge of MAE while nurses with 6-10 years of work experience were more likely to have a moderate level of knowledge. Based on these results the null hypothesis as well as the study hypothesis are rejected.

Relationship between Knowledge and perceived barriers

A Spearman's rho, or Spearman's rank correlation coefficient, was performed to evaluate the relationship between MAER knowledge and perceived barriers to MAER. The results of the Spearman correlation (Table 10) indicated that there was a statistically significant weak negative relationship between MAER attitude and perceived barriers to MAER, r (163) = -.187, p = < .05. This indicates a negative relationship where one variable increase and the other decreases. Therefore, the null hypothesis is rejected, and the study hypothesis is accepted.

Table 10

Relationship between MAE knowledge and perceived barriers

		Total Knowledge
Mean Barriers	Correlation Coefficient	-.187*
	Sig. (2-tailed)	0.017
	N	164

The relationship between attitude and perceived barriers:

A Spearman's rho, or Spearman's rank correlation coefficient, was performed to evaluate the relationship between MAER attitude and perceived barriers to MAER. The results of the Spearman correlation (Table 11) showed a statistically significant, strong negative relationship between MAER attitude and perceived barriers to MAER, r (163) = -.801, p = <. 01. This indicates a strong negative relationship where one variable increase and the other decreases. Therefore, the null hypothesis is rejected, and the study hypothesis is accepted.

Table 11

Relationship between MAE attitude and perceived barriers

		Total Knowledge
Mean Barriers	Correlation Coefficient	-.801**
	Sig. (2-tailed)	0.000
	N	164

CHAPTER 5: DISCUSSION AND RECOMMENDATION

Introduction

This chapter consists of four sections. The first section is on discussion, the second section focuses on the limitations of this study, and the third section is on recommendations. The fourth and final section is the conclusion of the study.

Discussion

This section is guided by the study questions and objectives. It will incorporate and discuss the findings of the study. This study was carried out to gain a deeper understanding of the knowledge, attitude, and perceived barriers to medication administration error reporting among registered nurses working in a private hospital in the Maldives.

Knowledge on medication administration error reporting

Among the study participants, 97.6% agreed that medication administration errors must be reported, while 2.4% disagreed, indicating a high proportion of nurses possessing sufficient knowledge on the topic. This result is higher than that of Asefa et al. (2021), which revealed that 37.9% of the participants believed that medication administration errors should be reported. Similarly, 97% of the participants agreed that they knew how the institution defined MAEs, while 1.2% were neutral and 1.8% disagreed or strongly disagreed. Additionally, 81.7% of the nurses believed that MAEs were preventable. According to Lee (2017), without a shared understanding of MAEs, nurses will continue to make disparate judgments on the decision to submit an incident report. Therefore, ensuring that the nurses understand how the institution defines MAEs is essential. Furthermore, most of the nurses believed that MAEs were preventable. Therefore, to prevent these errors, believing in their prevention is crucial.

The data reveals that most of the nurses (76.2%) were aware of the MAER procedure, which is completing the MAER form. 42.7% believed that notifying the patient safety in-charge was the procedure for MAE reporting. Additionally, 11.6% agreed that MAER is done via a telephone call to the duty doctor, and 11.0% agreed to report MAEs by sending a text message to the supervisor. These results contradict the findings by Yung et al. (2016), in which over 90% (88.9%) of MAEs were reported unofficially and verbally, primarily to head nurses. It was also found that nurses were more at ease and eager to disclose MAEs orally rather than in writing (Yung et al., 2016). Similarly, Dyab et al. (2018) found that some nurses report MAEs only when the nurse in charge urges them to fill out the error reporting form. According to this study, nurses reported MAEs mainly to the team leader nurse (89.6%), 20.1% to the concerned specialist, 10.4% to the intern doctor, 7.3% to the nursing director, and 3.0% to the medical director. However, these results vary compared to the findings of a study by Yung et al. (2016), who discovered that the majority (67.6%) had reported to the head nurse, to supervisors (20.6%), or directors (9.2%), and to physicians (44.4%).

The study also revealed that nurses with less than or equal to 5 years of experience were more likely to have a good level of knowledge, while nurses with 6–10 years of work experience were more likely to have a moderate level of knowledge. These results contradict the findings of Asefa et al. (2021) and Rahsepar et al. (2021), where it was found that the higher the work experience, the greater their knowledge of MAE and MAER. The current study findings could have been affected by the induction program and the in-service programs for nurses conducted by the ADK Hospital.

Overall, the study reveals that most of the participants (87.8%) had good to excellent knowledge of medication administration error reporting, how these errors are defined by the institution, and

to whom and how to report them. This result is consistent with a study by Hammoudi et al. (2018), which revealed that nurses understood how their institution defined medication errors, detected when an error occurred, and recognized the need to report them.

Attitude on medication administration error reporting

For the question "I never get any feedback on what action is taken," 61.9% disagreed or strongly disagreed, while 15.3% were neutral. 22.7% strongly agreed or agreed. These indicate that feedback was not provided for all nurses on the action taken to correct the error, yet nurses have a positive attitude towards MAE reporting. A study done in the United States (Richter et al., 2014) revealed that the most impact on error reporting was from error feedback. Most nurses (57.4%) strongly disagreed or disagreed with "the incident was too trivial," while 23.8% were neutral, and 18.9% agreed or strongly agreed. It indicates that most nurses take MAE incidents seriously, irrespective of the degree of harm, and do not consider them insignificant. 77.9% disagreed or strongly disagreed with "When the ward is busy, I forget to make a report," while 6.7% were neutral, and 13.4% agreed or strongly agreed. It reveals that nurses have a positive attitude towards MAE reporting, and even when the wards are busy, they would still make a report in the case of an MAE.

87.8% of the nurses disagreed or strongly disagreed with "I don’t know whose responsibility it is to make a report," while 4.9% were neutral and 7.3% agreed or strongly agreed. This indicates that the nurses’ attitude toward the responsibility of making a report is positive. 80.5% of the nurses disagreed or strongly disagreed with "The medication error reporting form is too long and complicated and requires too much detail." This indicates that most of the nurses are comfortable with the current format of the MAER form and do not consider it too much paperwork. This

finding is consistent with the findings of Dyab et al. (2018), which show that nurses do not find the MAER form too detailed or complicated to fill out.

Most nurses (83.5%) disagreed with "When it is a near miss, I do not see any point in reporting it." These findings contradict those of Haw et al. (2014), who found that 42% of participants would not disclose a near-miss occurrence involving themselves, while another 18% were unsure. Therefore, the results of this study indicate that the participants are aware that near misses are medication administration errors, and they would report near misses if and when they occur.

The mean values for the attitude ranged from 2.36 to 1.54, indicating an inclination towards a positive standard deviation ranging from 0.95 to 1.365. It reveals a relatively high SD, suggesting varying responses among the participants. Similarly, the total attitude of the participants toward medication administration error reporting was tilted towards positive (54.9%), while 33.5% were intermediate and 11.6% were negative. These findings are supported by a study done in Taiwan (Yung et al., 2016).

Barriers to medication administration error reporting perceived by nurses.

The mean values for the barriers to medication administration error reporting ranged from 3.03 to 1.65. According to the participants, the top five barriers ranked based on the mean values, to medication error reporting were: "nurses could be blamed if something happens to the patient because of the medication error," "too much emphasis is placed on MAEs as a measure of the quality of nursing care provided," "no positive feedback is given for passing medications correctly," "the patient or family might develop a negative attitude toward the nurse or may sue the nurse if a medication error is reported," "when MAEs occur, nursing administration focuses on the individual rather than looking at the systems as a potential cause of the error" and "nurses fear

adverse consequences from reporting medication errors". Items measuring administrative factors are the most common, followed by personal factors. Reporting process factors are ranked third. The reason for the likelihood of nurses being blamed if anything happens to the patient due to the error being ranked at the top could be that nurses are worried about being blamed for adverse effects on the patient when an MAE report is filed. These results are consistent with studies done in the Tabuk region of Saudi Arabia (Alblowi et al., 2021), Ethiopia (Tsegaye et al., 2020), Riyadh, Saudi Arabia (Hammoudi et al., 2018), and Iran (Zarea et al., 2018).

The lowest five ranked barriers were "nurses may not think the error is important enough to be reported," "nurses do not agree with the hospital's definition of a medication error," "contacting the physician about a medication error takes too much time," "nurses do not recognize an error occurred," and "medication error is not clearly defined." These are items measuring personal factors and reporting process factors; hence, it indicates administrative factors and personal factors measuring fear were ranked higher as barriers to medication administration error reporting compared to personal and system factors. These findings are supported by a study in Riyadh, Saudi Arabia (Hammoudi et al., 2018) and Ethiopia (Tsegaye et al., 2020).

This study found that there was a statistically significant ($p = < .05$) and weakly negative ($r (163) = -.187$) relationship between MAER knowledge and the perceived barriers to MAE reporting. This result indicates that when there is an increase in one variable, the other decreases. Similarly, it was found that there was a statistically significant ($p = < .01$) and strong negative ($r (163) = -.818$) relationship between MAER attitude and the perceived barriers to MAE reporting. This result indicates that attitude and perceived barriers are inversely proportional; therefore, when there is an increase in one variable, the other decreases, suggesting that when the positive attitude of nurses increases toward MAE reporting, the barriers they perceive toward MAER will decrease.

Similarly, when the positive attitude decreases (increasing the negative attitude), the barriers perceived towards MAER will increase. This result is supported by a study conducted in Taiwan (Yung et al., 2016). However, it is contradicted by Aljabari & Kadhim (2021), as it was found that barriers to reporting were highly fluctuating among different facilities..

Limitations

Females were overrepresented (89.6%) in the study due to the large number of female participants. Thus, a more equal representation of males and females could be attained in the study by stratified sampling. Many researchers believe that using a self-reporting questionnaire limits a study due to recall bias (Althubaiti, 2016). Furthermore, the possibility of study participants discussing the answers among themselves was likely due to the nature of the data collection method used. This could be minimized by switching the self-administered questionnaire to a researcher-administered questionnaire.

This study focused on studying MAER from registered nurses' perspectives and understanding their perceived barriers to MAER. Hence, this study will not provide solutions but act as a guide that could lead to solutions surrounding MAER among registered nurses. The topic of the perceived incidence of medication administration errors, reporting, and safety culture can be invasive and intimidating. Nurses might have been hesitant to share information about themselves, their colleagues, or hospital systems for fear of punishment from managers or peers. Participants might have been unwilling to be honest despite assurances of anonymity. Since the study relied on nurses' self-rated assessments of their attitude, knowledge, and practice, it might not reveal the true picture of their reporting practices. Additionally, as it was a correlational study, it would merely provide a snapshot of the situation at the point in time when the data collection took place. Therefore, causal inferences from exposure and outcome determination could be difficult.

Furthermore, the study was limited to registered nurses working in a single institution (ADK Hospital, Male', Republic of Maldives), which is of tertiary level. Therefore, the findings are not representative of the nurses working in other health facilities within the Maldives, and they cannot be applied to all the registered nurses working in the Maldives or to health facilities of all levels. However, the study findings can be generalized if its limitations, such as the fact that it was limited to a single hospital in the Maldives, are considered. Subsequently, additional elements that have not been explored as an aspect of MAEs, such as in-service education programs in ADK Hospital and the employment of multi-cultural nursing staff with different first languages, could have an impact on the outcomes.

Additionally, the findings of this study can be used for future research on the topic. As the study subjects were drawn from a population of local and expatriate nurses, the possibility of subjects from different cultural backgrounds is high. Therefore, what is accepted in one culture might not be accepted in another, so this could influence the data collected.

The Cronbach's alpha value for the knowledge section was 0.637, which is within the acceptable range. However, this value is low as the questions in the section were part of a questionnaire of 52 questions. All 52 questions were not included in the tool adopted for this study, as it would result in a poor response rate due to the high number of questions in it. For further confirmation of the tool's reliability, a pilot study of the same tool can be conducted in a different setting. If the results obtained from it are like these study findings, it can be concluded that the tool is reliable. Furthermore, some of the main study participants said that all the questions seemed to be the same, and it was quite confusing as they were placed under different sections. It could be because English is the second language of most research participants, and the questionnaire was written in English.

Hence, some of the participants' comprehension may have suffered as a result. The questions could be rephrased to make it very straight-forward to address this limitation..

Recommendations

The top-ranked barriers included blame, fear, and administrative factors such as placing too much emphasis on MAEs as a measure of the quality of nursing care provided. The findings of this study emphasize the importance of shifting from a culture of blame to a blame-free culture in the workplace since this was recognized as a barrier to reporting MAEs. Personal factors such as fear of patient families acquiring a negative attitude toward nurses and filing lawsuits against them were perceived as a barrier to reporting MAEs, indicating the need for assurance and trust in the reporting process. This data offers nursing policymakers and leaders a chance to gain a better understanding of what may be preventing nurses from reporting MAE, allowing them to change the current work environment to enhance patient safety.

This section is divided into recommendations for practice, recommendations for education, and recommendations for future research.

Recommendations for practice

According to the study findings, the administration should emphasize its efforts to enhance MAER and create a safety culture within the organization. The administration should devise a strategy to change nurses' perceptions of the potential risk of reporting MAEs. As a result, additional measures are taken to build a no-blame learning environment within the organization. Additionally, developing a confidential, anonymous, fast, and simple-to-use reporting system will encourage nurses to report MAEs.

Furthermore, performing root cause analysis on the reported errors and providing error feedback will assure nurses that the administration does not consider errors as individual-focused

occurrences. Instead, the whole process and all the possible factors contributing to errors are analyzed and addressed. Subsequently, providing feedback will enable nurses to know why the error occurred and what can be done to prevent it in the future. It will also pave the way for a no-blame culture wherein nurses can trust the systems in place for medication error reporting.

The administration can promote error reporting by welcoming it and considering it a positive gesture. The anonymity of the filed reports can be assured to ensure that nurses do not feel ashamed of making a report or be considered incompetent by coworkers. Furthermore, the administration can adopt behavior-shaping methods such as Skinner's model of operant conditioning (Skinner, 1958) to encourage error-reporting behavior. Rewards can be introduced and given to the nurses making error reports as they occur, as rewards are a proven way to encourage a required behavior.

Recommendations for education

This study found that the main perceived barrier to medication error reporting by nurses was blaming. To understand the significance of reporting, nurses must first comprehend the principles of patient safety and incident reporting. They should understand that reporting is not intended to discover personal flaws but rather to enhance the healthcare system. As a result, training in areas such as collaboration, successful communication, and patient and staff safety culture can help raise awareness of the need to report errors.

Therefore, in-service training can be organized and conducted for nurses on teamwork, effective communication, and the importance of a safety culture within the workplace. Additionally, guidance and support can be provided to the nurses on error reporting and the process of reporting. Likewise, focused classes and re-induction programs can be introduced for nurses with work experience of 10 years and above.

Furthermore, the implementation of error reporting and patient safety training centered on different teaching and learning approaches as part of nursing students' curricula is essential. These training programs must be designed so that, after finishing the university course and transitioning to clinical practice, nursing students can actively participate in transforming the lifestyles of individuals and social systems to establish a sustainable culture of error reporting.

Recommendations for future research

Even though extensive information is available on the topic, the lack of study on the barriers to reporting MAEs among Maldivian nurses indicates the necessity for additional research and development of a safety culture and management strategies to address these barriers. Further research is also needed to investigate MAER policies within the hospitals in the Maldives. Additional research is also needed to identify non-punitive reporting systems that exist in other countries and those that can be adapted to the Maldivian context. The questionnaire items used in this study were factors identified through studies conducted in contexts different from the study setting, and a high percentage of study participants did not agree to them as barriers they perceive in reporting MAEs. Therefore, qualitative research can be conducted to identify the barriers perceived by nurses working in the Maldives for further understanding of these barriers. Furthermore, research can be conducted to explore additional elements, such as in-service education programs in ADK Hospital and the employment of multi-cultural nursing staff with different first languages, as an aspect of MAEs.

Conclusion

MAER is an essential nursing practice. Nurses, as the frontline workforce, can identify and report MAEs. MAER is an effective approach for recognizing possible system issues that may increase

the chance of future errors. Therefore, MAER can be useful in identifying and addressing possible and actual safety incidents, which can subsequently aid in the prevention of future errors.

This study identified the nurses' knowledge, attitude, and perceived barriers to medication administration error reporting and their relationship. The findings revealed that all the participants possessed good to excellent levels of knowledge and that they had a positive attitude toward medication administration error reporting. It also identified the barriers to medication administration error reporting perceived by the nurses in a private hospital in the Maldives. These barriers were categorized as personal, administrative, and reporting system/process factors.

Administration factors directed towards nursing administration and blame were considered the top-ranked barriers to MAER among nurses in the Maldives.

As a result, the researcher suggests that healthcare executives and policymakers reassess their MAER regulations and try to change the culture of reporting MAEs. Instead of punitive actions, introduce interventions to build a non-punitive, non-fearful, and non-blaming culture that encourages nurses to report MAEs and to modify and enhance the organization's safety culture. Furthermore, this study emphasized the significance of developing MAER methods that are discreet, anonymous, straightforward, and effective.

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Appendices

Appendix A: Research Instrument

1. Socio-demographic information Please circle the answer that best describes you.		
S.No	**Query categories**	**Response categories**
101	Sex	1. Male 2. Female
102	Age group (in years)	1. ≤25 2. 25-34 3. 35-44 4. 45-54 5. ≥ 55
103	Nationality	1. Maldivian 2. Non-Maldivian
104	Marital status	1. Married 2. Single 3. Divorced 4. Widowed
105	Level of education in nursing	1. Diploma 2. Advance Diploma 3. BSc

		4. MSc 5. PhD
106	Organization/Sector	1. Public 2. Private
107	Working area	1. Medical ward 2. Surgical ward 3. Paediatric ward 4. Intensive care unit 5. Emergency room 6. Labour & Delivery 7. Others (specify)
108	How long have you been in the nursing profession? (in years)	1. ≤5 2. 6–10 3. 11–15 4. 16–20 5. ≥21
2. Questions related to Medication error reporting knowledge (Part 1) Please circle the number that best reflects the extent to which you agree with the following (Strongly Disagree-1, Disagree-2, Neutral-3, Agree-4, Strongly agree-5)		
201	Should medication administration errors (MAEs) be reported?	1 2 3 4 5

202	Do you know how your institution defines medication MAEs?	1 2 3 4 5
203	Is there a medication administration error reporting (MAER) protocol in your hospital?	1 2 3 4 5
204	Are MAEs preventable?	1 2 3 4 5
	Questions related to Medication error reporting knowledge (Part 2) Please circle the number that best reflects the extent to which you agree with the following	
205	Which types of MAEs should be reported? (circle all that apply)	1. Omission 2. Wrong dosage 3. Wrong time 4. Wrong frequency 5. Prescribing 6. Wrong patient 7. Wrong site 8. Dispensing 9. Near miss
206	Who should report MAEs? (circle all that apply)	1. The one from whom it occurred 2. Shift coordinator 3. Anyone who notices it
207	To whom should MAEs be immediately reported to?	1. Team leader nurse 2. Nursing director

		3. Intern doctor 4. Medical director 5. Concerned specialist				
208	How should MAERs be done?	1. Via a text message to supervisor 2. By completing the MAER form 3. Via a telephone call to the duty doctor 4. By notifying the patient safety in-charge				
3. Questions related to attitudes on Medication error reporting Please circle the number that best reflects the extent to which you agree with the following as <u>your thoughts on medication administration error reporting</u>. (Strongly Disagree-1, Disagree-2, Neutral-3, Agree-4, Strongly agree-5)						
301	I never get any feedback on what action is taken	1	2	3	4	5
302	The incident was too trivial	1	2	3	4	5
303	When the ward is busy, I forget to make a report	1	2	3	4	5
304	I don't know whose responsibility it is to make a report	1	2	3	4	5
305	When it is a near miss, I don't see any point in reporting it	1	2	3	4	5

306	The medication error reporting form is too complicated and requires too much detail	1	2	3	4	5
307	Junior staff are often blamed unfairly for MAEs	1	2	3	4	5
308	MAER is unlikely to lead to system changes	1	2	3	4	5
309	I wonder about who else is privy to the information that I disclose	1	2	3	4	5
310	If I discuss the case with the person involved nothing else needs to be done	1	2	3	4	5
311	I don't feel confident the form is kept anonymous	1	2	3	4	5
312	I am worried about litigation	1	2	3	4	5
313	It's not my responsibility to report somebody else's mistakes	1	2	3	4	5
314	My co-workers may be unsupportive	1	2	3	4	5
315	I don't want to get into trouble	1	2	3	4	5
316	Even if I don't give my details, I'm sure that they'll track me down	1	2	3	4	5
317	I am worried about disciplinary action	1	2	3	4	5
318	I don't want the case discussed in meetings	1	2	3	4	5
4. Questions related to barriers to medication error reporting						

	Please circle the number that best reflects the extent to which you agree that the following reasons contribute to why errors are not reported. (Strongly Disagree-1, Disagree-2, Neutral-3, Agree-4, Strongly agree-5)					
401	Nurses do not agree with hospital's definition of a medication error.	1	2	3	4	5
402	Nurses do not recognize an error occurred.	1	2	3	4	5
403	Filling out an incident report for a medication error takes too much time.	1	2	3	4	5
404	Contacting the physician about a medication error takes too much time.	1	2	3	4	5
405	Medication error is not clearly defined.	1	2	3	4	5
406	Nurses may not think the error is important enough to be reported.	1	2	3	4	5
407	Nurses believe that other nurses will think they are incompetent if they make medication errors.	1	2	3	4	5
408	The patient or family might develop a negative attitude toward the nurse or may sue the nurse if a medication error is reported.	1	2	3	4	5
409	The expectation that medications be given exactly as ordered is unrealistic.	1	2	3	4	5
410	Nurses are afraid the physician will reprimand them for the medication error.	1	2	3	4	5

411	Nurses fear adverse consequences from reporting medication errors.	1	2	3	4	5
412	The response by nursing administration does not match the severity of the error.	1	2	3	4	5
413	Nurses could be blamed if something happens to the patient because of the medication error.	1	2	3	4	5
414	No positive feedback is given for passing medications correctly.	1	2	3	4	5
415	Too much emphasis is placed on MAEs as a measure of the quality of nursing care provided.	1	2	3	4	5
416	When MAEs occur, nursing administration focuses on the individual rather than looking at the systems as a potential cause of the error.	1	2	3	4	5

Appendix B: Permission to conduct research at ADK Hospital

ADK Hospital

5th September 2022

Dear Ms. Mariyam Azeemath

Permission to Conduct Research at ADK Hospital

This is to give consent to conduct the following research at ADK Hospital.

Research Topic: "Knowledge, attitude, and perceived barriers to medication administration error reporting among registered nurses in a private hospital in the Maldives"

Institute: Maldives National University

Details of Student: Mariyam Azeemath

Purpose: Conduct a survey among nurses for Master of Nursing Administration

Please ensure that you use the data gathered only for the purpose of this research and hold confidentiality and anonymity.

I would also like to request you to share your findings and recommendation with us.

Thank you

Sharafiyya Mohamed

Training and Development Executive

ADK Hospital

Appendix C: NHRC Approval document

بسم الله الرحمن الرحيم

National Health Research Council
Ministry of Health
Male'
Republic Of Maldives

22nd November 2022

Mariyam Azeemath
Male'
Republic of Maldives

Approval of Research Proposal

Title of Study Proposal: Knowledge, attitude, and perceived barriers to medication administration error reporting among registered nurses in a private hospital in the Maldives.

Researcher: Mariyam Azeemath

Dear Mariyam Azeemath,

The members of the National Health Research Council have reviewed your research proposal "Knowledge, attitude, and perceived barriers to medication administration error reporting among registered nurses in a private hospital in the Maldives". Following the review, the proposed study has been approved by the council.

The research registration number is NHRC/2022/24.

It is requested that the final report of the research and research abstract to be forwarded to the Ministry of Health for future reference and use. Please also note that researchers are required to submit a "Yearly Monitoring Form" to NHRC for review by NHRC on progress of researches conducted in Maldives.

Dr. Ahmed Ashraf
Chair of National Health Research Council (NHRC)

Tel: (960) 3328887, Fax: (960) 3330699, Email: ppd@health.gov.mv

Appendix D: Information Sheet

Information Sheet

Information for Participants

You are invited to participate as a subject in the research project '**knowledge, attitude, and perceived barriers to medication administration error reporting among registered nurses in a private hospital in the Maldives'.**

The aim of this project is **to explore the knowledge, attitude, and perceived barriers to medication administration error reporting among registered nurses.**

Your involvement in this project will be **self-enumeration of the questionnaire which will take about 10-15 minutes**, and the right to withdraw from the project at any time, including withdrawal of any information provided without any penalty. Additionally, there is no monetary gain or reward for your involvement in the project.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: the identity of participants will not be made public without their consent. To ensure anonymity and confidentiality, **all means of identification including names/addresses or any means of participant identification are excluded in the questionnaire**.

The project being carried out **as a requirement for Master of Nursing Administration** by **Mariyam Azeemath** under the supervision of **Ms. Asiya Ibrahim**, who can be contacted at **+9603346557**. She will be pleased to discuss any concerns you may have about participation in the project.

The project has been reviewed and approved by the Maldives National University Ethics Committee.

Appendix E: Consent Form

Mariyam Azeemath

H. Hickory

11.09.2022

CONSENT FORM

Knowledge, attitude, and perceived barriers to medication administration error reporting among registered nurses in a private hospital in the Maldives.

I have read and understood the description of the above-named project. On this basis I agree to participate as a subject in the project, and I consent to publication of the results of the project with the understanding that anonymity will be preserved.

I understand also that I may at any time withdraw from the project, including withdrawal of any information I have provided.

I note that the project has been reviewed and approved by The Maldives National University Ethics Committee.

Name:

Signature:

Date:

Sincerely,