Improving Compliance with the Seven Rights of Medication Administration Through a Multifaceted Quality Improvement Intervention: A Clinical Audit in an Emergency and Trauma Department

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ABSTRACT

Introduction:
Medication administration errors remain a major cause of preventable patient harm, particularly in high-acuity settings such as Emergency and Trauma Departments (ETD). Although adherence to the seven rights of medication administration is fundamental to medication safety, maintaining consistent compliance in busy emergency care settings remains challenging. This study aimed to assess baseline compliance with the seven rights of medication administration among healthcare personnel in the ETD and evaluate changes following a multifaceted quality improvement intervention.

Methods:
A prospective clinical audit comprising three sequential audit cycles was conducted in the ETD of Hospital Tawau, Sabah, Malaysia, from March to August 2025. Medication administration events were directly observed using a structured audit checklist adapted from the Malaysian Patient Safety Goals 2.0. Following the baseline audit, a multifaceted intervention comprising structured education, protocol standardisation, clinical pharmacist involvement, and workflow redesign was implemented. Compliance was reassessed through two re-audit cycles.

Results:
During the baseline audit (n=25), full compliance with all seven rights was achieved in 16 events (64.0%). Medication administration timing was the most frequent area of non-compliance (n=4, 44.4%). Following the intervention, full compliance was achieved in all medication administration events during the first re-audit (n=31, 100%) and second re-audit (n=42, 100%). Reported medication errors also decreased during the audit period based on institutional incident reporting and departmental monitoring records.

Conclusion:
This clinical audit suggested that a multifaceted quality improvement intervention was associated with improved adherence to the seven rights of medication administration in an emergency department. Integrating structured education, protocol standardisation, clinical pharmacist involvement, and workflow redesign may strengthen medication safety. Further multicentre studies with longer follow-up are warranted to evaluate the sustainability and the validity of these findings.

Keywords:
Medication safety, seven rights of medication administration, medication errors, quality improvement, emergency and trauma department

INTRODUCTION

Medication errors remain a major cause of preventable patient harm worldwide and are associated with increased morbidity, prolonged hospitalisation, and healthcare costs.[1] Among the stages of the medication-use process, medication administration represents the final opportunity to intercept errors before they reach patients. Consequently, medication administration errors remain a critical target for patient safety initiatives. Recognising the global burden of medication-related harm, the World Health Organization (WHO) launched the Medication Without Harm initiative to promote system-based strategies that improve medication safety across healthcare settings.[1]

Emergency and Trauma Departments (ETD) are particularly vulnerable to medication administration errors due to their dynamic, high-acuity clinical environments. High patient turnover, frequent interruptions, time-critical decision-making, and heavy workloads increase the complexity of medication administration and may compromise adherence to safe medication practices.[2,3] A systematic review and meta-analysis reported a pooled medication error prevalence of 22.6% in emergency department settings, underscoring the substantial burden of medication errors in these high-risk environments.[2]

Reports from Malaysia indicate similar concerns. A cross-sectional study conducted in the Emergency Department of Hospital Universiti Sains Malaysia found that 30.5% of patients experienced at least one medication error, with wrong-time errors accounting for 46.9% of all medication errors identified.[4]

These findings highlight the fact that medication administration errors remain an important patient safety concern within Malaysian emergency care settings and reinforce the need for effective quality improvement strategies to enhance medication safety. The seven rights of medication administration, encompassing the right patient, the right medication, the right dose, the right route, the right time, the right documentation, and the patient's right to refuse treatment, offer a widely accepted framework for promoting safe medication administration.[5] The Malaysian Patient Safety Goals 2.0 include these principles. The guidelines emphasise that adherence to standard medication administration practices is essential for patient safety.[6] Despite the availability of these guidelines, maintaining consistent adherence remains challenging in high-acuity clinical environments due to workload pressures, workflow interruptions, communication barriers, and organisational factors.[2,3,7,8]

Within the ETD of Hospital Tawau, internal medication incident reports documented 12 medication errors between July 2024 and March 2025, raising concerns regarding adherence to safe medication administration practices, particularly among newly appointed and rotating healthcare personnel. Although institutional medication safety guidelines and local reference materials were available, compliance with the seven rights of medication administration had not previously been evaluated through a structured clinical audit. Furthermore, evidence describing the effectiveness of structured, multi-component quality improvement interventions to improve adherence to the seven rights of medication administration in Malaysian emergency departments remains limited.

Therefore, this study aimed to assess baseline compliance with the seven rights of medication administration among healthcare personnel in the ETD of Hospital Tawau, in accordance with the Malaysian Patient Safety Goals 2.0.[5,6] It also identified patterns of non-compliance during the baseline audit and evaluated changes in compliance following the implementation of a structured, multi-component quality improvement intervention across sequential clinical audit cycles.

METHODS

Study design and setting

A prospective series of clinical audits, employing repeated audit cycles, was conducted in the ETD of Hospital Tawau, Sabah, Malaysia, over six months from March to August 2025. The ETD is a tertiary emergency care facility providing medical, surgical, and trauma services, comprising the Resuscitation (Red) Zone, the High Acuity (Yellow) Zone, and the Observation Bay. This audit was initiated as part of a departmental quality improvement initiative to evaluate and enhance adherence to the seven rights of medication administration.

The audit was conducted in five sequential phases: (i) baseline audit (3-11 March 2025), (ii) structured medication safety workshop and course (12 March-15 May 2025), (iii) first re-audit (30 June-8 July 2025), (iv) implementation of other workflow improvement strategies (10 July-15 August 2025), and (v) second re-audit (18-26 August 2025) (Table 1).

Audit standard and audit instrument

The audit standard was defined as 100% compliance with all seven components of the seven rights of medication administration, in accordance with the Malaysian Patient Safety Goals 2.0 and the Ministry of Health Malaysia medication safety recommendations.[5,6] A structured audit checklist was developed by the investigators based on the Malaysian Patient Safety Goals 2.0 and the Ministry of Health Malaysia Medication Error Reporting System (MERS) reporting framework.

The checklist evaluated compliance with the seven rights of medication administration, namely the right patient, the right medication, the right dose, the right route, the right time, the right documentation, and the patient's right to refuse treatment. Before use, senior clinical pharmacists verified the audit checklist, ensuring that the items were clear, relevant, and complete. A medication administration event was considered fully compliant (100%) only when all seven domains were fulfilled. Failure to comply with any one domain was classified as a non-compliant event.

Audit sample and data collection

The unit of analysis was the medication administration event rather than the individual patient. Medication administration events were selected using consecutive sampling and observed on routine working days (Monday to Friday) between 08:00 and 17:00 during periods when trained clinical pharmacist auditors were available. Eligible medication administration events included medications administered via oral, intravenous, intramuscular, subcutaneous, inhalational, rectal, vaginal, topical, and ophthalmic routes. Administration of high-alert medications was also included. Medication administration involving STAT medication orders, self-administered medications, pre-hospital treatments, discharge medications, or incomplete medication orders were excluded.

Data were collected through direct observations, which were conducted independently by three trained clinical pharmacists, comprising one emergency clinical pharmacist and two ward-based clinical pharmacists. Before the commencement of the audit, all auditors participated in a standardisation session to familiarise themselves with the audit checklist and establish a common interpretation of each audit criterion to promote consistency during data collection. Healthcare personnel were informed of the audit before observations commenced.

To ensure patient safety, auditors intervened immediately whenever an imminent medication administration error was identified. Such events were corrected before medication administration but remained recorded as non-compliant events in

the audit data set. Data collected included patient demographics, medication characteristics, route of administration, compliance with each of the seven rights of medication administration, and the type of non-compliance identified.

Outcome measure

The primary outcome was the percentage of medication administration events demonstrating complete adherence to all seven rights of medication administration. Secondary outcomes included the incidence and categories of non-compliance detected during each audit cycle, including a documented temporal trend of medication errors via the institutional incident reporting system and departmental medication error monitoring records.

Statistical analysis

Categorical variables were summarised using frequency and percentage. Descriptive statistical analysis was performed using Microsoft Excel 365 (Microsoft Corporation, Redmond, WA, USA). Inferential statistical analyses were not performed because the project was designed as a clinical audit and quality improvement initiative.

Table 1. Timeline of the prospective series of clinical audits on the compliance with the seven rights of medication administration

Timeline	Task	Activity
3-11 March 2025	Baseline audit	*Initial assessment:* Number of medication administration events observed (n=25); compliance 64.0%, non-compliance 36.0%
12-20 March 2025	Educational workshop	*Structured medication safety workshop:* Participants (n=74); pre-test 51.4%, post-test 91.9%, remedial 100%
14-15 May 2025	Short course	*Medication safety course for newly appointed healthcare personnel:* Participants (n=42); pre-test 33.3%, post-test 95.2%, remedial 100%
30 June-8 July 2025	First re-audit	*Assessment following education and protocol standardisation:* Number of medication administration events observed (n=31); compliance 100%
10 July-15 August 2025	Medication station	*Dedicated medication preparation station with a buddy verification system implemented*
18-26 August 2025	Second re-audit	*Second assessment following the implementation of the dedicated medication station (EMAC):* Number of medication administration events observed (n=42); compliance 100%

RESULTS

Baseline Audit Findings

A total of ninety-eight medication administration events were observed across the three audit cycles, accounting for 25 events during the baseline audit, 31 during the first re-audit, and 42 during the second re-audit. During the baseline audit, 16 of 25 medication administration events (64.0%) demonstrated full compliance with all seven rights of medication administration, whereas 9 events (36.0%) were classified as non-compliant (Table 2).

Among the non-compliant events, the most frequently identified domain was the right time (n=4, 44.4%), followed by the right dose (n=2, 22.2%), the right documentation (n=2, 22.2%), and the right patient (n=1, 11.1%). (Figure 1) Following implementation of the structured quality improvement intervention, full compliance was observed in all medication administration events during both the first re-audit (n=31, 100%) and the second re-audit (n=42, 100%). No instances of non-compliance with the seven rights of medication administration were identified during re-audit.

Table 2. Compliance to the seven rights of medication administration across sequential audit cycles (n=98)

Date	Audit cycle	Medication administration events observed (n)	Fully compliant events observed, n (%)	Non-compliant events observed, n (%)
3-11 March 2025	Baseline audit	25	16 (64.0)	9 (36.0)
30 June–8 July 2025	First re-audit	31	31 (100.0)	0 (0.0)
18–26 August 2025	Second re-audit	42	42 (100.0)	0 (0.0)
	Total	**98**	**89 (90.8)**	**9 (9.2)**

Quality improvement intervention

Following the completion of the baseline audit, a structured, multifaceted quality improvement intervention comprising educational, organisational, and workflow-based strategies was implemented. Structured medication safety workshops were conducted from 12 to 20 March 2025, involving 74 healthcare personnel. Participants completed pre- and post-training competency assessments. Thirty-eight participants (51.4%) achieved a passing score on the pre-test, increasing to sixty-eight (91.9%) following the workshop. The remaining six participants then underwent remedial training and subsequently achieved competency. As a result, all 74 participants (100%) successfully met the required competency standard by the completion of the training programme.

Additional short courses were conducted on 14 and 15 May 2025 for 42 newly appointed healthcare personnel, consisting of assistant medical officers and nurses, to further reinforce safe medication

administration practices and address staff turnover within the department. Fourteen (33.3%) passed the pre-test, which increased to 40 (95.2%) post-course. The remaining two participants completed remedial training, resulting in a 100% competency pass rate.

Medication safety resources were standardised and made readily accessible in the department. These included the *Garis Panduan Waktu Administrasi Ubat di Wad/Unit Hospital Queen Elizabeth II* (Guideline on Medication Administration Timing in Hospital Wards/Units), the Hospital Tawau Injectable Drugs Dilution Protocol 2024, and the Quick Dosing and Dilution Guide for Common Drugs Used in the Emergency Department, Hospital Tawau 2025. These reference materials were reinforced during educational sessions and routine clinical practice.

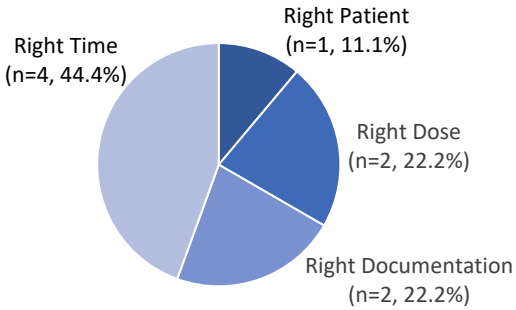

Figure 1. The proportion of non-compliance events during the baseline audit, in accordance with the seven rights of medication administration (n=9)

Emergency clinical pharmacists and senior nursing personnel also provided continuous clinical support through real-time supervision and reinforcement of safe medication administration practices. An independent double-check (buddy verification) system was incorporated into routine medication preparation and administration processes. To further optimise medication preparation, a dedicated medication preparation station (EMAC) was established on 10 July 2025 to minimise environmental distractions, improve workflow, and support safer medication preparation practices.

Re-audit Findings

The first re-audit was conducted from 30 June to 8 July 2025, following the implementation of initial interventions, which included structured medication safety education, standardisation of medication administration protocols and references, and support from pharmacists and senior nursing staff. The re-audit demonstrated 100% compliance (n=31). The second re-audit, conducted from 18 to 26 August 2025 (n=42), also demonstrated 100% compliance, indicating that the improvement achieved following the initial interventions was maintained after the implementation of the additional workflow improvement (EMAC).

Reported medication error trends

A temporal reduction in reported medication errors was observed during the audit period, based on data obtained from the institutional incident reporting system and departmental medication error monitoring records. Nine medication errors were recorded between July 2024 and February 2025, followed by three errors in March 2025, and one error each in April and May 2025. No medication errors were reported from June 2025 onwards. This reduction coincided with the implementation of the medication safety interventions, including structured education, protocol standardisation, and subsequent workflow improvements involving the dedicated medication preparation station (EMAC). (Figure 2)

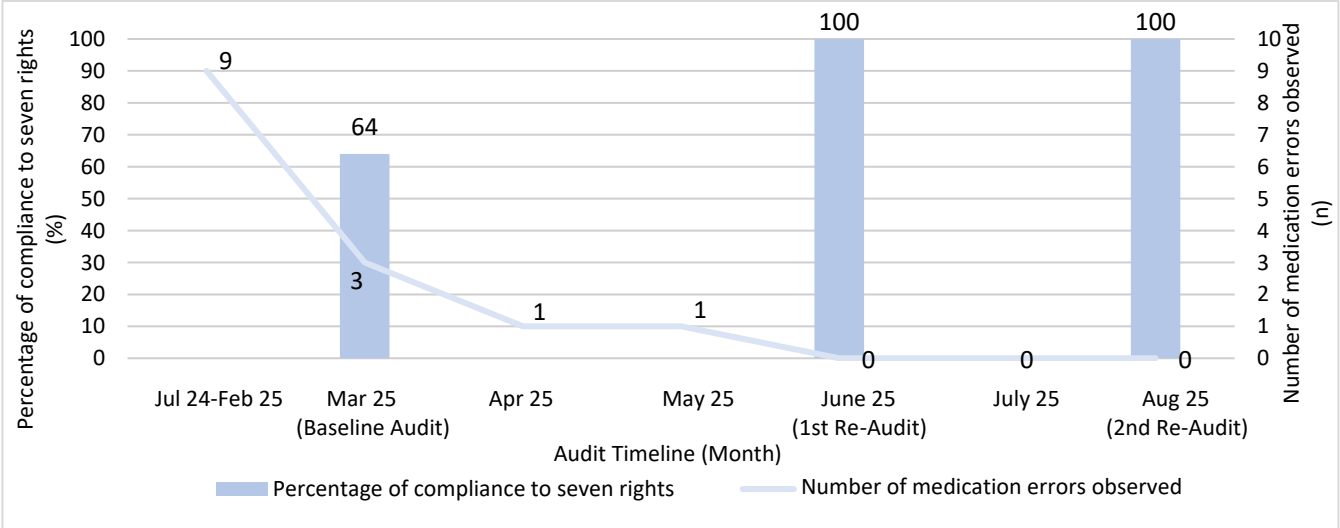

Figure 2. Reported medication error trends during the clinical audit period

DISCUSSION

This clinical audit demonstrated substantial improvements in compliance with the seven rights of medication administration following the implementation of a structured, multifaceted quality improvement intervention in the ETD. Full compliance increased from 64.0% in the baseline audit to 100% in both subsequent re-audits. Concurrently, a reduction in reported medication errors was noted during the audit period. These findings suggest that a comprehensive quality improvement strategy encompassing structured education, protocol standardisation, pharmacist-led clinical support, and workflow redesign was associated with improved adherence to safe medication administration practices in a high-acuity emergency care environment.[1,2]

The timing of medication administration emerged as the most prevalent reason for non-compliance identified during the baseline audit, with errors in dosage and documentation following closely behind. International reports indicate that deviations in medication timing and omissions in documentation are consistently among the most common errors in hospital practice.[2–4] The emergency care setting is significantly impacted by frequent interruptions, high patient turnover, and competing clinical priorities, all of which can heighten the risk of straying from recommended medication administration procedures. These observations align with the World Health Organisation's systems approach to medication safety, which recognises that medication errors often stem from complex interactions among human, organisational, and environmental factors, rather than being attributable solely to individual performance.[1]

The present findings also aligned with previous evidence from other Malaysian emergency departments. For instance, Shitu et al. (2020) reported that wrong-time errors were the most frequently documented medication errors among patients attending a teaching hospital emergency department.[4] Similarly, the baseline audit in this study identified medication administration timing as the most prevalent area of non-compliance. Although the two studies varied in design and outcome measures, both additionally underscore the ongoing challenge of ensuring timely medication administration in emergency care settings. The improvements observed across the audit cycles indicated that a single intervention is unlikely to account for the progress made. Instead, it appears that a combination of structured education, protocol standardisation, pharmacist-led clinical support, independent double-verification practices, and workflow redesign may have collectively contributed to these enhancements. This dynamic quality improvement strategy addressed several pivotal dimensions of medication safety, including the consolidation of staff competency, the promotion of consistent adherence to standardised medication administration practices, the facilitation of real-time reinforcement through clinical pharmacist involvement, and the reduction of system-related vulnerabilities within the medication preparation process. Similarly, the previous quality improvement literature also suggested that sustainable improvements in medication safety are more likely to be achieved through coordinated, system-level interventions rather than through isolated educational activities alone.[2, 3]

Although institutional medication safety guidelines and local reference materials were available prior to the commencement of the audit, baseline compliance remained suboptimal. This suggests that written guidance alone was insufficient to ensure consistent medication administration practices in a busy emergency department. The improvements observed following the implementation of structured education, protocol standardisation, clinical pharmacist involvement, and workflow redesign emphasise the necessity of translating medication safety principles into routine clinical practice through active organisational support rather than merely disseminating guidelines passively.[2,3,7] Within this intervention, real-time pharmacist reinforcement, the Emergency Medication Administration Centre (EMAC), and buddy verification worked in tandem to strengthen standardisation, reduce vulnerabilities related to workflow, and promote shared accountability among healthcare personnel. These findings indicate that medication safety initiatives in emergency departments should extend beyond written policies and periodic education to include coordinated system-level strategies that actively support safe medication administration.[1–3,7]

The key strength of this study was the repeated audit cycles and direct observation to assess changes in medication administration practices following the implementation of the intervention. This approach provided a more comprehensive evaluation compared to relying solely on incident reporting. However, several limitations must be acknowledged when interpreting the findings. Firstly, this was a single-centre quality improvement project with a relatively small sample size, and observations were restricted to weekdays and office hours because auditors were available. Furthermore, healthcare personnel were aware of the observation, which raises the possibility of the Hawthorne effect.[8] Additionally, as multiple interventions were implemented simultaneously, it was not possible to determine the individual contribution of each intervention component. Therefore, causal relationships between specific interventions and improved compliance cannot be definitively established.

Future studies should evaluate the long-term sustainability of these interventions through extended follow-up and include observations during after-hours clinical practice to better reflect routine emergency department practice. Multicentre studies across various emergency care settings would corroborate the evidence and justify these findings. Continuous audit and feedback, as recommended in quality improvement frameworks, may also help sustain improvements in medication administration practices over time.[1,2]

CONCLUSION

This study indicated that a multifaceted intervention which included structured education, protocol standardisation, clinical pharmacist involvement, and workflow redesign improved adherence to the seven rights of medication administration among healthcare personnel in the ETD of Hospital Tawau. This was supported by the sustained full compliance across two sequential re-audit cycles, alongside a reduction in reported medication errors observed. Despite methodological limitations, the findings support a coordinated, system-based approach to improve medication safety in emergency care settings. However, further multicentre studies with larger sample sizes and extended follow-up are needed to confirm the sustainability and generalisability of these findings.

ACKNOWLEDGMENTS

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CONFLICT OF INTEREST

The authors declared no conflict of interest.

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ETHICAL APPROVAL

This project was conducted as a clinical quality improvement initiative. It was exempt from Medical Research and Ethics Committee (MREC) review in accordance with institutional requirements for quality improvement activities. The project also received approval from the Hospital Tawau Quality Improvement Committee and was registered with the National Medical Research Register (NMRR ID: 25-02145-ZTZ).

Patient confidentiality was maintained throughout the study. Patient identifiers recorded during the audit were used solely for contemporaneous verification during observations and were removed before data analysis. All audit data were anonymized before reporting.

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Appendix 1

SAMPLE DATA COLLECTION FORM

SECTION A: GENERAL INFORMATION			
DATE & TIME			
NAME (INITIAL)			
PATIENT RN/IC			
AGE			
SEX			
DIAGNOSIS			
SECTION B: MEDICATION ADMINISTRATION DETAILS			
ROUTE OF ADMINISTRATION			
DRUG NAME			
DOSE PRESCRIBED			
FREQUENCY			
DATE PRESCRIBED			
SECTION C: 7R CRITERIA			
RIGHT PATIENT	YES / NO	RIGHT ROUTE	YES / NO
RIGHT DRUG	YES / NO	RIGHT DOCUMENTATION	YES / NO
RIGHT DOSE	YES / NO	REFUSAL	YES / NO
RIGHT TIME	YES / NO		
SECTION D: ADDITIONAL INFORMATION			
ERRORS OBSERVED	YES / NO		
TYPE OF ADMINISTRATION ERROR OBSERVED	☐ WRONG DRUG FORMULATION ☐ WRONG DOSE ☐ WRONG FREQUENCY ☐ WRONG ADMINISTRATION TIME ☐ WRONG ADMINISTRATION TECHNIQUE ☐ DOSE OMISSION ☐ WRONG ROUTE OF ADMINISTRATION ☐ WRONG PATIENT		
CONSEQUENCES	☐ DEATH ☐ ADDITIONAL MONITORING REQUIRED (BP / DXT / HR) ☐ PROLONGED HOSPITALISATION ☐ TREATMENT / INTERVENTION REQUIRED ☐ NO HARM		
DESCRIBE INTERVENTION (IF ANY)			
REMARKS / NOTES			

OBSERVED BY:

SIGN & STAMP

Appendix 2

Report on the Safe Medication Administration Workshop of the Emergency and Trauma Department, Hospital Tawau

1. Continuing Education Workshop Series: Safe Medication Administration
   a. Date: 12 to 20 March 2025 (5 sessions).
   b. Time: 2:30 pm - 3:30 pm
   c. Venue: ETD Meeting Room
   d. Invited speakers:
      I. Nur Nazifah binti Mohd Yusof - Pegawai Farmasi UF9
      II. Farah Amaliena binti Zulkiflee - Pegawai Farmasi UF10
      III. Wan Muhamad Saufi bin Wan Mohamed Esa Azwin - Pegawai Farmasi UF10
      IV. Mazliyana Syahirah binti Arman - Pegawai Farmasi UF9
      V. *Syamimi Aqilah binti Abdull Kahar- Pegawai Farmasi UF9*
   e. Participants:
      I. Nurses (18 participants)
      II. Medical assistant officers (PPP) (56 participants)
   f. Tentative:

Time	Topic	Committee in charge
2:30pm - 2:35pm	Registration	*KJ Sarifah*
2:35pm - 2:40pm	Pre- test	*Cik Nazifah*
2:40pm - 3:20pm	Slot: Safe Medication Administration	*Cik Nazifah*
3:20pm - 3:25pm	Post-test	*Cik Nazifah*
3:25pm - 3:30pm	Course evaluation form & dismissal	*KJ Sarifah*

Table 3. Test results of the safe medication administration workshop (n=74)

Workshop Results		Number of participants (n)			Total
		Nurse	PPP	Trained Nurse (ETD)	
Pre-test	Fail	5	29	2	36
	Pass	9	27	2	38
Total		14	56	4	74
Post-test	Fail	0	6	0	6
	Pass	14	50	4	68
Total		14	56	4	74

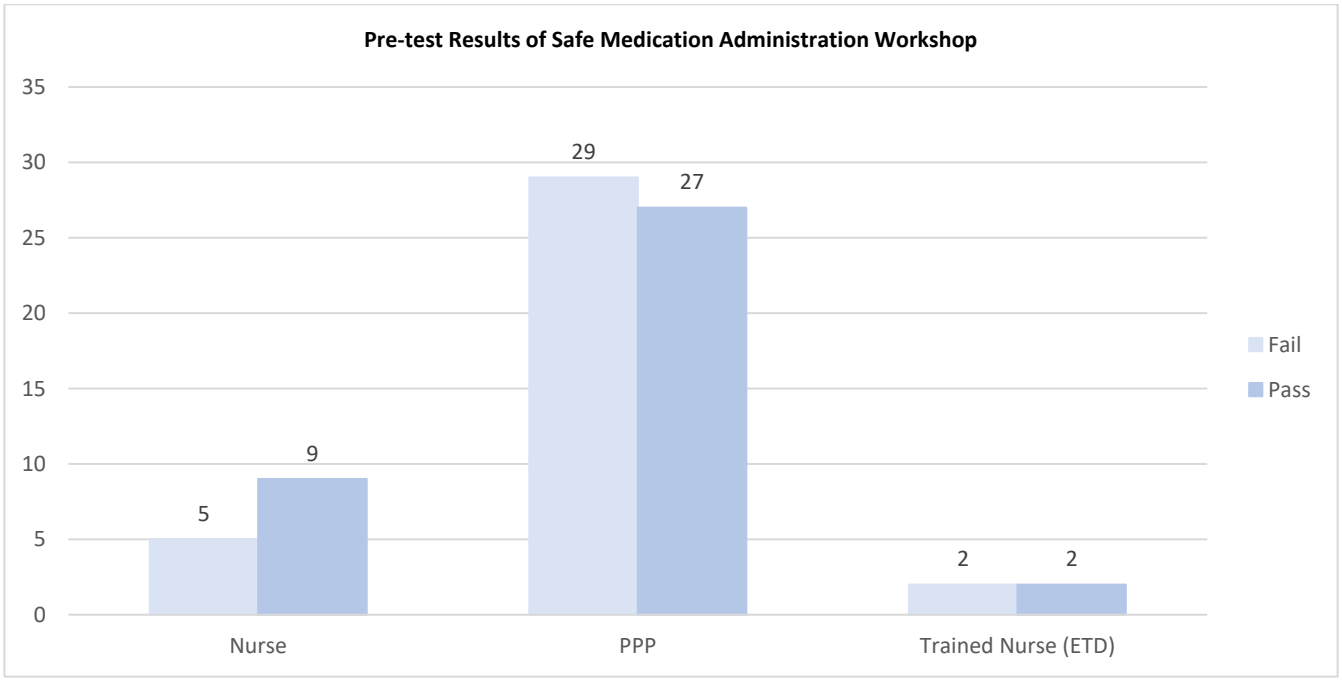

Figure 3. Pre-test results of the Safe Medication Administration Workshop

Appendix 2

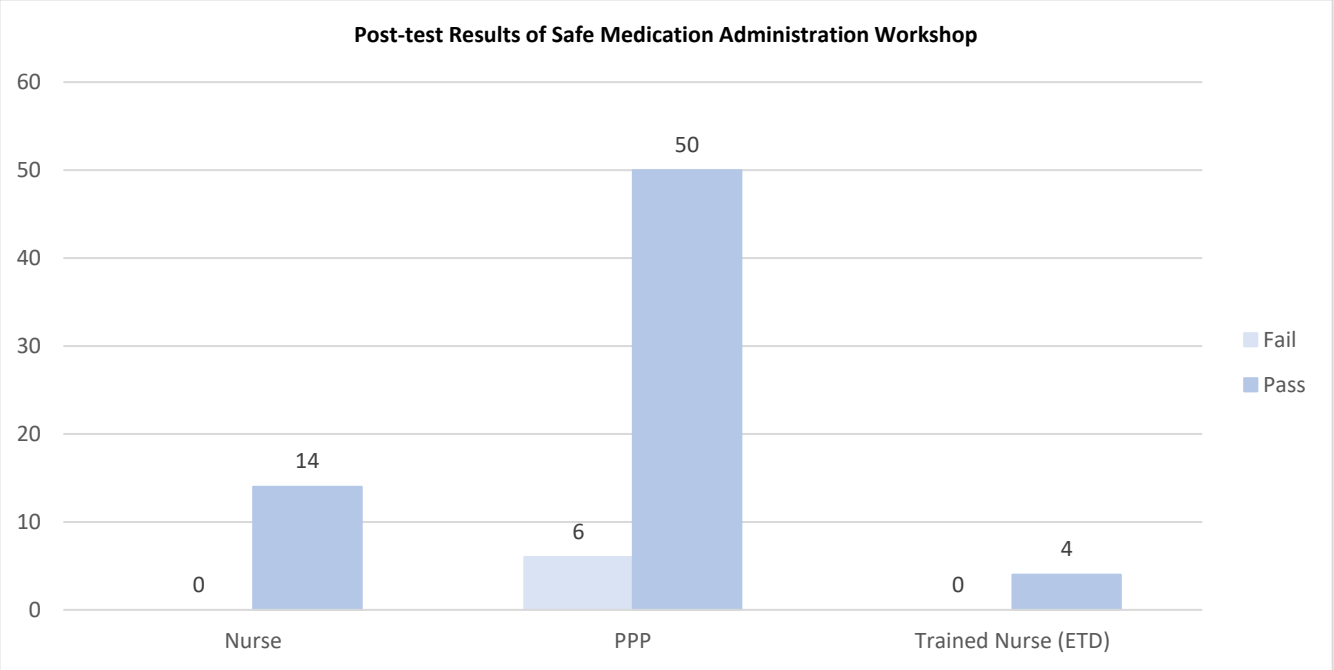

Figure 4. Post-test results of the Safe Medication Administration Workshop

Table 4. Workshop Question Analysis (for participants who failed, n=6)

Question	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10.1	Q10.2	Q10.3	Q10.4
	Dose		Maintenance Dose Administration Time	Paediatric Dose	Dilution	Dose	Maintenance Dose Administration Time	Dose Calculation for IVI		Medication Administration Time			
Correct	6	6	4	3	5	1	2	5	2	6	6	5	6
Wrong	0	0	2	3	1	5	4	1	4	0	0	1	0

2. Remedial Workshop: Safe Medication Administration
   a. Date: 29 April 2025 (1 session).
   b. Time: 3:00 - 3:30 pm
   c. Venue: ETD Meeting Room
   d. Invited speaker:
      I. Nur Nazifah binti Mohd Yusof - Pegawai Farmasi UF9
   e. Participants:
      I. Medical Assistant Officers (PPP) (6 participants)
   f. Tentative:

Time	Topic	Committee in charge
3:00pm - 3:05pm	Registration	*KJ Sarifah*
3:05pm - 3:20pm	Discussion of safe medication administration test questions	*Cik Nazifah*
3:20pm - 3:25pm	Remedial test	*Cik Nazifah*
3:25pm - 3:30pm	Course evaluation form & dismissal	*KJ Sarifah*

   g. All six participants who did not pass the initial assessment subsequently achieved a pass during the Remedial Workshop, thereby attaining full competency.

3. A Short Course on Safe Medication Administration for Paramedics
   a. Date: 14 and 15 May 2025 (2 sessions).
   b. Time: 2:30 - 4:30 pm
   c. Venue: ETD Meeting Room
   d. Invited speaker:
      I. Nur Nazifah binti Mohd Yusof - Pegawai Farmasi UF9
   e. Participants:
      I. Medical Assistant Officers (PPP) (42 participants)
   f. Tentative:

Appendix 2

Time	Topic	Committee in charge
2.15pm - 2.30pm	Registration	*PPP Fred*
2.30pm - 2.45pm	Pre-test	*PPP Fred*
2.45pm - 3.15pm	Slot: Safe Medication Administration	*Cik Nazifah*
3.15pm - 3.30pm	Post-test	*PPP Fred*
3.30pm - 4.00pm	Discussion of safe medication administration test questions	*Cik Nazifah*
4.00pm - 4.10pm	Remedial test	*PPP Fred*
4.10 - 4.25 pm	Discussion of safe medication administration remedial test questions	*Cik Nazifah*
4.25 - 4.30 pm	Course evaluation form & dismissal	*PPP Fred*

g. Two participants successfully passed the subsequent remedial examination after failing the initial assessment of the short course, thereby attaining full competency.

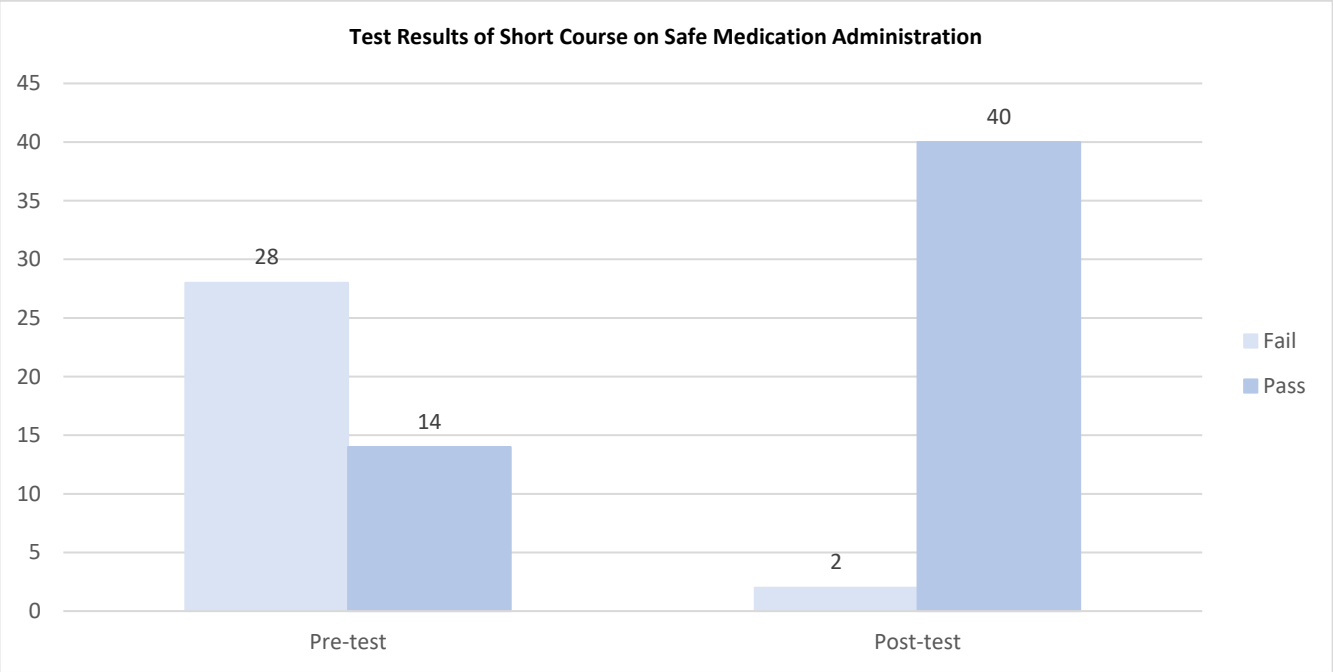

Figure 5. Test results of the short course on Safe Medication Administration.

Table 5. Workshop Question Analysis (for participants who failed, n=2)

Question	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9.1	Q9.2	Q9.3	Q9.4
	Dose	Maintenance Dose Administration Time	Paediatric Dose	Dilution	Dose	Dose Calculation for IVI		Drug Allergy	Medication Administration Time			
Correct	1	1	2	2	2	2	2	0	2	2	2	0
Wrong	1	1	0	0	0	0	0	2	0	0	0	2