CP 06: Knowledge, attitude and practice towards triple whammy drug interaction and associated socio-demographic and work-related factors among pharmacists and nurses working at Teaching and Base Hospitals in Jaffna District

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Abstract

Background & Objective: The "Triple Whammy (TW), the concurrent use of diuretics, renin–angiotensin–aldosterone system inhibitors, and non-steroidal anti-inflammatory drugs (NSAIDs), increases the risk of acute kidney injury. Evidence on the knowledge, attitude, and practice (KAP) regarding TW among healthcare professionals in Sri Lanka is limited. This study assessed the knowledge, attitude, and practice (KAP) regarding TW drug interactions and examined their association with sociodemographic and work-related factors among registered pharmacists and nurses working at the Teaching Hospital and Base Hospitals in the Jaffna District.

Methods: A descriptive cross-sectional survey was conducted among registered pharmacists and nurses working in cardiology and general wards at the Teaching Hospital and all four Base Hospitals in the Jaffna District. The calculated sample size was 385. The total number of eligible registered pharmacists and nurses was 144. As the accessible population was smaller than the calculated sample size, all eligible and available participants were invited to participate. Data were collected using a validated self-administered questionnaire covering sociodemographic characteristics, work-related factors, and knowledge, attitude, and practice regarding triple whammy drug interactions. Data were analyzed using descriptive statistics to summarize participant characteristics and KAP levels and inferential statistics to examine the associations between sociodemographic and work-related factors and KAP using IBM SPSS Statistics, version 19.0.

Results: A total of 130 pharmacists and nurses participated in the study, giving a response rate of 91.5%. Of the participants, 36.2% were pharmacists and 63.8% were nurses. Overall, knowledge and attitudes towards TW were moderate, while practice was suboptimal. Only 53.8% were aware of TW, and 30.0% and 24.0% correctly identified the ACEI/diuretic/NSAID and ARB/diuretic/NSAID combinations, respectively. Although 65.4% felt capable of identifying TW interactions, 61.5% did not routinely screen for them, 62.3% did not provide counselling on avoiding inappropriate NSAID use and 69.2% did not regularly update their knowledge. Higher knowledge and attitude scores were associated with younger age, pharmacist profession, bachelor's qualification, and participation in continuous professional development ($p<0.05$). Better practice was associated with bachelor's qualification and continuous professional development (CPD) participation ($p\leq0.035$).

Conclusions: Pharmacists and nurses demonstrated moderate knowledge and positive attitudes towards TW but inadequate clinical practices. Strengthening CPD, targeted training, and interprofessional collaboration is essential to improve medication safety and prevent TW-related acute kidney injury.

Keywords: Triple Whammy, drug interactions, Pharmacist, Jaffna

Introduction

The "Triple Whammy" (TW) refers to the concurrent use of a diuretic, a renin–angiotensin–aldosterone system (RAAS) inhibitor [angiotensin-converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB)] and a non-steroidal anti-inflammatory drug (NSAID).[1, 2]

Although these medicines are widely prescribed for conditions such as hypertension, heart failure, diabetes, and pain, their combined use substantially increases the risk of acute kidney injury (AKI), particularly among older adults, dehydrated patients, and individuals with pre-existing renal impairment.[3-5]

In Sri Lanka, approximately one in three adults requires antihypertensive therapy, and combination treatment with RAAS inhibitors and diuretics is common.[6, 7] Polypharmacy is a recognized contributor to adverse drug reactions, and a Sri Lankan study reported that 0.6% of prescriptions involved the TW combination.[8]

As pharmacists and nurses are responsible for dispensing or administering medicines, and counselling patients, they play an important role in identifying and preventing TW-related drug interactions and promoting medication safety.

However, evidence regarding pharmacists' and nurses' knowledge, attitude, and practice (KAP) towards the TW drug interaction in Sri Lanka is limited. Therefore, this study aimed to describe the sociodemographic and work-related characteristics of pharmacists and nurses, assess their knowledge, attitude, and practice regarding the TW drug interaction, and examine the influence of sociodemographic and work-related factors on their KAP among healthcare professionals working in hospitals in the Jaffna District.

Methods

A hospital-based descriptive cross-sectional survey study was conducted among pharmacists and nurses working at the Teaching Hospital and Base Hospitals (Type A and Type B) in the Jaffna District, Sri Lanka, from August 2024 to August 2025. The initial sample size was calculated using Cochran's formula: $n = Z^2p(1 - p) / d^2$. Accordingly, the calculated sample size was 385. The total number of eligible registered pharmacists and nurses working at the teaching hospital and four base hospitals in the Jaffna District was 144. Two individuals were on long-term leave during the study period; therefore, the accessible population was 142. As the accessible population was smaller than the calculated sample size, all eligible and available participants were invited to participate. Thus, a census sampling approach was used.

Data collection was carried out between June and July 2025, using a validated, self-administered questionnaire comprising five sections: sociodemographic characteristics, work-related factors, knowledge, attitude, and practice regarding the TW drug interaction. The questionnaire was developed through a literature review, reviewed for content and face validity by an expert panel, pre-tested among pharmacists and nurses outside the study setting. The questionnaire was prepared in English and translated into Tamil and Sinhala by a bilingual expert to facilitate administration according to participants' language preference.

Data were analyzed using IBM SPSS Statistics, version 19.0 . Descriptive statistics were used to summarize participant characteristics and KAP scores. Knowledge, attitude, and practice levels were categorized according to Bloom's cut-off criteria.[9] Since the data were not normally distributed (Shapiro–Wilk test), Mann–Whitney U and Kruskal–Wallis tests were used to examine the influence of sociodemographic and work-related factors.

Ethical approval was obtained from the Ethical Review Committee, Faculty of Medicine, University of Jaffna, and written informed consent was obtained from all participants.

Result

The study included 130 pharmacists and nurses working in cardiology or general wards in Jaffna District, with a response rate of 91.5%. Of the 130 participants, 47 (36.2%) were pharmacists and 83 (63.8%) were nurses. The participants were mainly aged 25–36 years (55.4%), female (77.7%), and nurses (63.8%). Most had diploma qualifications (85.4%), worked in teaching hospitals (54.6%), were assigned to general wards (56.2%), and had 20 years or less of experience (84.6%). In addition, 64.6% reported using resources to check possible drug interactions, while only 33.8% participated in continuing professional development (CPD). The main barriers to detecting potential drug interactions were lack of time (40.9%) and inadequate therapeutic knowledge (28.3%).

Overall knowledge of TW was moderate. More than half of participants (53.8%) were aware of the TW interaction, and 53.8% correctly identified acute kidney injury as the main risk. However, only 30.0% and 24.0% correctly recognized the drug combinations involved. Based on total knowledge scores, 18.5% had high knowledge, 41.5% moderate knowledge, and 40.0% low knowledge, with a mean score of 4.8 ± 1.677.

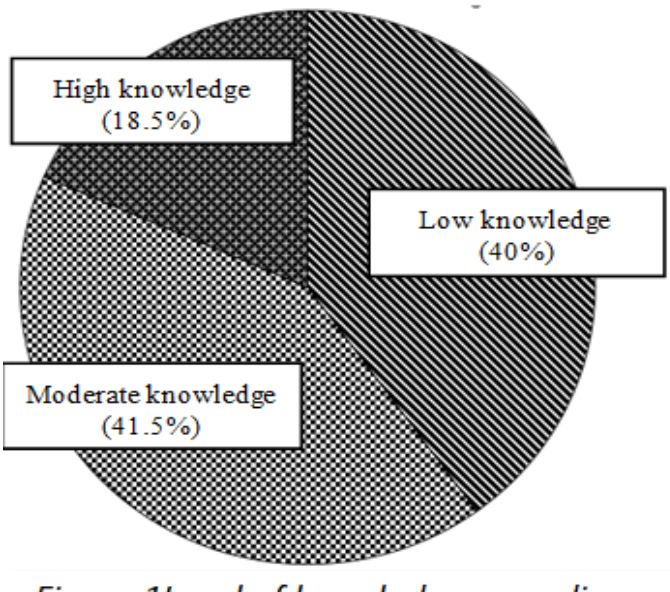


Figure 1Level of knowledge regarding participants

Attitude was generally positive but not strong. Most participants felt confident in recognizing triple whammy interactions (65.4%) and agreed that checking prescriptions for interactions is an important responsibility (55.4%). However, only 36.2% supported the need for CPD programs, and 53.1% agreed on the importance of collaboration in preventing drug interactions. Overall, 25.4% had high attitude, 36.2% moderate attitude, and 38.5% low attitude.

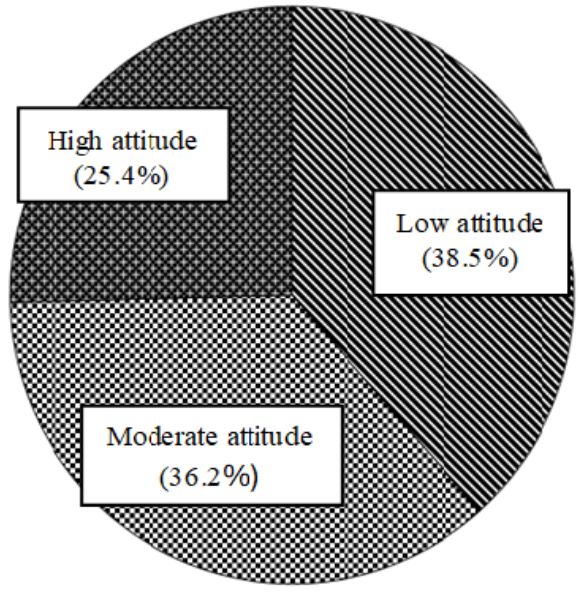


Figure 2: Level of attitude regarding triple whammy

Practice was poor. Although 61.5% never checked for triple whammy interactions when dispensing or administering NSAIDs to high-risk patients, 62.3% never counseled patients to avoid self-medication with NSAIDs, and 75.4% never reported identified interactions to prescribers. Only 6.9% had high practice, 5.4% moderate practice, and 87.7% low practice.

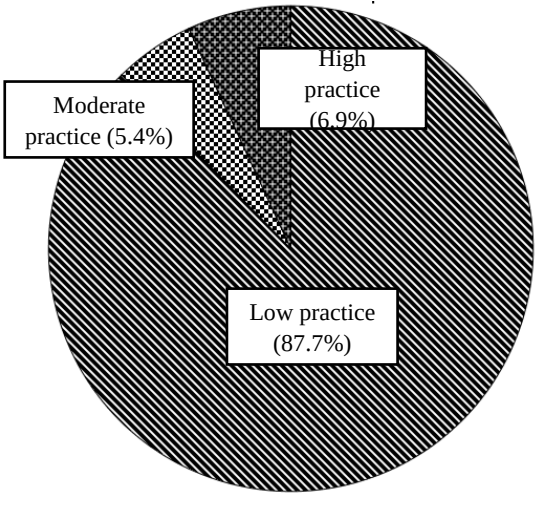


Figure 3 Level of practice regarding triple whammy

Sociodemographic and work-related factors significantly influenced knowledge, attitude, and practice. Pharmacists, bachelor's degree holders, and CPD participants had significantly better knowledge and more positive attitudes. Practice was significantly associated with higher educational level and CPD participation.

Discussion

This study assessed the knowledge, attitude, and practice regarding the TW drug interaction among pharmacists and nurses in hospitals in Jaffna District. Overall, participants demonstrated moderate knowledge and attitudes but poor practice, indicating important gaps in the prevention and management of this potentially harmful drug interaction.

Most participants were young, female nurses with diploma-level qualifications working in teaching hospital general wards. Participation in CPD was low, with lack of time identified as the main barrier. Similar barriers, including time constraints and poor communication, have been reported among healthcare professionals in New Zealand.[1]

Knowledge regarding the TW was moderate, with just over half of participants aware of the interaction. Comparable findings have been reported in Saudi Arabia, where awareness was low among pharmacists and another study found that most healthcare professionals were unaware of the interaction.[10, 11] Although many participants correctly identified acute kidney injury as the main adverse outcome and recognized high-risk patients, only 18.5% achieved high knowledge scores, indicating incomplete understanding. Uncertainty regarding the prescription-only status of NSAIDs in Sri Lanka further highlights knowledge gaps that may contribute to inappropriate medicine use.

Attitudes were generally positive, with most participants recognizing their responsibility in identifying drug interactions and collaborating with other healthcare professionals. However, only about one-third strongly supported CPD activities, while nearly one-quarter considered their undergraduate training inadequate, suggesting a need for improved professional education.

Practice showed the greatest deficiency. Most participants did not routinely screen high-risk patients for TW interactions, infrequently reported identified interactions to prescribers, and provided limited counselling on avoiding self-medication with NSAIDs. Similar deficiencies have been reported in Saudi Arabia and New Zealand, where inadequate reporting systems and inconsistent patient education limited effective management of TW interactions.[1, 10] These findings indicate a clear gap between knowledge and everyday clinical practice.

Age, profession, educational level, work unit, and CPD participation significantly influenced knowledge, attitudes, and practice. Pharmacists, younger participants, those with higher educational qualifications, and those participating in CPD demonstrated better outcomes, highlighting the importance of continuous professional education. Evidence from Japan further supports this, where a targeted awareness campaign substantially improved pharmacists' recognition of TW risks and patient counselling practices.[12] Similar educational initiatives could strengthen medication safety and reduce TW-related adverse events in Sri Lanka.

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Conflict of interest

The authors declare no conflicts of interest.

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