



Emergency nurses' knowledge, attitude, and self-efficacy in managing patient pain: a cross-sectional study

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Background: This study aimed to evaluate emergency nurses' knowledge, attitude, and self-efficacy in managing patient pain.

Methods: This cross-sectional study, conducted in 2022, collected data using four questionnaires: one on demographic characteristics (including age, gender, marital status, education level, shift type, clinical experience, and history of participating in pain management workshops); the Pain Management Practices Assessment Tool for evaluating nurses' knowledge about pain management; the Nurses' Attitude Survey for assessing nurses' attitudes toward pain management; and the Pain Management Self-Efficacy Questionnaire for measuring nurses' self-efficacy in pain management. The data were analyzed using SPSS version 22 software.

Results: 212 emergency department nurses participated in this study, averaging 30.83 years (SD = 4.99). The mean score for nurses' knowledge about pain management was 83.33 (SD = 7.95). The mean score for nurses' attitudes toward pain management was 55.48 (SD = 7.44). Additionally, the average score for nurses' self-efficacy about pain management was 46.17 (SD = 16.69). There was a positive and significant correlation between knowledge and self-efficacy ($r = 0.552$, $P < 0.001$), as well as between attitude and self-efficacy ($r = 0.694$, $P < 0.001$) toward pain management among emergency nurses.

Conclusions: Future research should focus on longitudinal studies, objective measures, and interdisciplinary approaches to further understand and improve pain management in emergency settings. These insights can inform policy development and the creation of standardized protocols to ensure effective and consistent pain management practices across healthcare environments.

Keywords: attitude, emergency department, knowledge, nurse, pain management, self-efficacy

Introduction

Pain is a significant medical issue and the primary reason individuals seek healthcare services^[1]. The American Pain Association has identified pain as the fifth vital sign, underscoring its importance in patient care^[2]. Chronic pain, which persists for 3–6 months or longer, can severely impact an individual's performance, lead to disability, and significantly reduce their

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HIGHLIGHTS

- Nurses had good knowledge but low self-efficacy in pain management.
- Female nurses had significantly higher knowledge scores than males.
- Evening shift nurses showed the highest self-efficacy levels.
- Workshop attendance linked to higher self-efficacy, not knowledge.
- Knowledge and attitude were positively correlated with self-efficacy.

quality of life^[3]. Pain is generally categorized into two types: acute and chronic. Acute pain often requires immediate attention in emergency departments, where studies show that 61%–79% of adult patients report experiencing pain^[4,5]. This figure rises to 90% among patients with traumatic injuries^[6].

As frontline caregivers, nurses play a critical role in identifying and addressing pain. However, evidence-based pain management remains a challenge for many nurses, partly due to insufficient training^[7]. Research has explored nurses' knowledge of pain management, revealing that oncology nurses tend to have a better understanding of pain management compared to general nurses. Interestingly, the knowledge levels of specialist nurses do not necessarily correlate with their years of experience^[8]. Improvements in pain management documentation have been

observed following the implementation of postoperative care programs^[9]. Despite this, many nurses hold misconceptions about pain management, such as believing that patients exaggerate their pain for attention, that opioids quickly lead to addiction, or that vital signs alone are reliable indicators of pain^[10].

Recent discussions have emphasized the importance of self-efficacy in pain management. Self-efficacy, a concept rooted in Bandura's social cognitive theory, refers to an individual's belief in their ability to perform specific tasks or behaviors effectively^[11]. In the context of pain management, self-efficacy reflects a nurse's confidence in their ability to assess, intervene, and manage pain using both pharmacological and non-pharmacological methods. High self-efficacy is associated with better clinical decision-making, improved patient outcomes, and greater adherence to evidence-based practices^[12]. However, pain is often inadequately managed due to factors such as insufficient training, staffing shortages, time constraints, inaccurate assessments, and concerns about side effects^[13]. In emergency departments, untreated pain can lead to prolonged patient stays^[6,14]. Notably, most recent studies on pain self-efficacy have focused on patients rather than nurses^[15].

A study conducted in Saudi Arabia by Issa *et al* found that only 50% of nurses correctly answered 60% of the questions related to pain management knowledge, highlighting a gap in the expertise of nurses in specialized departments^[16]. Another study revealed that 58% of patients reported severe pain, yet nurses often administered less medication than required^[17].

Given the limited research on emergency department nurses' knowledge, attitudes, and self-efficacy in pain management, this study aims to evaluate their self-efficacy levels. The findings are expected to provide valuable insights into nurses' confidence in managing pain and inform policymakers in developing strategies to improve clinical practices.

Aims

1. What is the level of knowledge of emergency department nurses in managing patients' pain?
2. What is the level of attitude of emergency department nurses in managing patients' pain?
3. What is the level of self-efficacy of emergency department nurses in managing patients' pain?
4. What is the relationship between knowledge, attitude, and self-efficacy in emergency department nurses regarding pain management?

Methods

Study design and subjects

This cross-sectional study, conducted in 2022, aimed to evaluate the knowledge, attitudes, and self-efficacy of emergency department nurses regarding pain management. The study adhered to the STROCSS criteria for reporting^[18]. Participants were included in the study if they met the following criteria: (1) holding a bachelor's degree or higher in nursing, (2) having at least 6 months of clinical experience in an emergency department, and (3) actively working in the emergency department at the time of data collection. Participants were excluded from the study if they (1) had attended a pain management workshop within the past three months (to avoid recent training bias) and

(2) declined to participate or were unwilling to complete the questionnaire.

Setting and timeframe of research

The research was conducted in the emergency departments of hospitals affiliated with a medical university in Iran. These hospitals were tertiary care facilities, providing comprehensive emergency medical services. Data collection took place from January 2022 to December 2022. A convenience sampling method was used to recruit participants. Nurses who met the inclusion criteria were invited to participate in the study.

Sample size

The sample size was determined based on the anticipated correlation between knowledge, attitude, and self-efficacy. Using an estimated moderate correlation coefficient ($r = 0.30$) with a significance level (α) of 0.05 and a power of 80%, a minimum sample of 138 participants was calculated using G*Power software. To account for potential non-response and incomplete questionnaires, we increased the target sample size by approximately 30%, resulting in an estimated required sample of around 180 participants.

From the participating hospitals affiliated with Karaj University of medical sciences, a total of 230 emergency department nurses met the eligibility criteria (i.e., holding a bachelor's degree or higher and having at least 6 months of emergency department experience). All eligible nurses were invited to participate in the study through convenience sampling. Of these, 230 nurses were approached, and 212 completed the survey in its entirety, yielding a response rate of approximately 92.2%.

Data collection

Data were collected using four questionnaires: (1) a demographic questionnaire capturing details such as age, gender, marital status, education level, shift type, clinical experience, and prior participation in pain management workshops, (2) the Pain Management Practices Assessment Tool (PMPAT) to assess nurses' knowledge of pain management, (3) the Nurses' Attitude Survey (NAS) to evaluate nurses' attitudes toward pain management, and (4) the Pain Management Self-Efficacy Questionnaire (PMSEQ) to measure nurses' self-efficacy in managing pain.

Questionnaires

PMPAT and NAS

The knowledge and attitude questionnaires, originally developed by McMillan in 2000, were used to assess nurses' knowledge and attitudes toward pain management. The PMPAT consists of 31 multiple-choice questions with four or five options each, covering topics such as pain concepts, pain assessment, pain relief methods, and analgesics. Respondents selected the answer they believed to be correct, with one point awarded for each correct response. A higher score indicates greater knowledge, with optimal knowledge defined as correctly answering 70% or more of the questions^[19].

The NAS includes 25 questions where participants rated their agreement on a four-point Likert scale (1 = completely disagree, 2 = disagree, 3 = agree, 4 = completely agree). Higher scores

reflect a more positive attitude, with scores of 70% or above considered highly positive, scores between 50% and 70% indicating an average attitude, and scores below 50% representing a negative attitude^[19].

The validity of these instruments was confirmed by a panel of 10 faculty members from the same university of medical sciences through formal and criterion-based methods. The reliability, as reported by Aflatoonian *et al* in 2017, was demonstrated by an internal consistency coefficient (Cronbach’s alpha) of 0.86^[20].

Pain Management Self-Efficacy Questionnaire

The PMSEQ was used to evaluate nurses’ self-efficacy in managing pain. It consists of 17 items, each rated on a 6-point Likert scale (0–5). The total score ranges from 0 to 85, with scores of 59 or higher (70% of the total score) representing an optimal level of self-efficacy in pain management^[15].

The psychometric evaluation of this questionnaire was conducted by Rezaei *et al* in Iran in 2018. Exploratory factor analysis identified two main factors: comprehensive pain assessment and pain management, which together accounted for 56.64% of the total variance in nurses’ self-efficacy regarding pain management. Confirmatory factor analysis showed a moderate model fit. The internal consistency for the entire questionnaire (Cronbach’s alpha) was 0.891, with coefficients of 0.876 and 0.803 for the two factors, respectively^[21].

Ethical consideration

Ethical approval was obtained from the ethics committee and the research department, along with a letter of introduction for the participating centers. Written informed consent was secured from all participants before data collection. The questionnaire was distributed online through virtual networks, with coordination from department supervisors. The purpose of the study was explained in writing at the beginning of the questionnaire and verbally to the matron and supervisors of each department. Confidentiality was strictly maintained, and the questionnaires were completed anonymously without any identifying information.

Statistical analysis

Quantitative variables were expressed as mean (standard deviation), while qualitative variables were presented as frequency (percentage). The Kolmogorov–Smirnov and Levene tests were used to assess the assumptions of normality and homogeneity of variances. For univariate analysis, independent *t*-tests, one-way ANOVA, and Pearson’s correlation coefficients were employed to explore the relationships between knowledge, attitude, self-efficacy, and individual-occupational variables. Pearson’s correlation coefficient (*r*) ranges from –1 to +1, where –1 indicates a perfect negative linear relationship, +1 indicates a perfect positive linear relationship, and 0 indicates no linear relationship, with values interpreted as follows: 0.00–0.19 (very weak), 0.20–0.39 (weak), 0.40–0.59 (moderate), 0.60–0.79 (strong), and 0.80–1.00 (very strong)^[22]. If the data were not normal, equivalent nonparametric tests such as Mann–Whitney *U* test, Kruskal–Wallis *H* test, and Spearman’s rank correlation coefficient were used. Data analysis was performed using SPSS version 22, with a significance level set at 0.05 and 95% confidence intervals.

Results

Participants’ characteristics

As outlined in Table 1, a total of 212 emergency department nurses participated in this study. The average age of the participants was 30.83 years (SD = 4.99). Most participants were female (80.7%), and 51% were single. Regarding educational background, 86.8% held a Bachelor of Science in Nursing (BSN), while 13.2% had a Master of Science in Nursing (MSN). The majority of participants (92.0%) were staff nurses, with 5.7% serving as supervisors and 2.4% as head nurses. Most nurses (71.7%) worked rotating shifts, and 71.2% had 2–5 years of general nursing experience. Specifically, 56.1% had 2–5 years of experience in the emergency department. Notably, 64.2% of participants had not attended any pain management workshops, while 35.8% had participated in such training in various settings (in-hospital, out-of-hospital, or departmental).

Knowledge, attitude, and self-efficacy of emergency nurses toward patient pain management

The average scores for knowledge (%), attitude (%), and self-efficacy (%) in pain management were 83.33% (SD = 7.95), 55.48% (SD = 7.44), and 46.17% (SD = 16.69), respectively. These findings suggest that nurses generally had good

Table 1 Demographic and clinical characteristics (N = 212)	
	Frequency (%) or mean (SD)
Gender	
Male	41 (19.3)
Female	171 (80.7)
Marital status	
Single	108 (51.0)
Married	104 (49.0)
Level of education	
BSN	184 (86.8)
MSN	28 (13.2)
Nursing position	
Nurse	195 (92.0)
Head nurse	5 (2.4)
Supervisor of emergency department	12 (5.7)
Work shift	
Morning	17 (8.0)
Evening	23 (10.8)
Night	20 (9.4)
Circulating	152 (71.7)
Work history	
6 months to 2 years	13 (6.1)
2 to 5 years	151 (71.2)
Above 5 years	48 (22.6)
Work history in the emergency department	
2 to 5 years	119 (56.1)
Above 5 years	93 (43.9)
Experience participating in a pain management workshop	
Participation in out-of-hospital training	18 (8.5)
Participation in in-hospital training	54 (25.5)
Participating in training within the department	42 (19.8)
No	98 (46.2)

Values are given as frequency (%) for categorical variables.

knowledge and moderately positive attitudes toward pain management, but their self-efficacy levels were suboptimal (Table 2).

Gender-based analysis

Female nurses demonstrated significantly higher knowledge scores compared to their male counterparts (83.86 ± 7.75 vs. 81.10 ± 8.49 , $P = 0.046$). However, no significant differences were observed in attitude ($P = 0.544$) or self-efficacy ($P = 0.162$) scores between genders (Table 2).

Marital status and education level

No significant differences in knowledge, attitude, or self-efficacy were found between single and married nurses ($P > 0.05$ for all). Similarly, education level (BSN vs. MSN) did not significantly influence any of the three variables ($P > 0.05$) (Table 2).

Nursing position

Significant differences in knowledge scores were observed across nursing positions ($P = 0.033$). Head nurses scored the highest (89.00 ± 11.06), followed by staff nurses (83.41 ± 7.89) and supervisors (79.58 ± 6.31). However, differences in attitude ($P = 0.187$) and self-efficacy ($P = 0.472$) across positions were not statistically significant (Table 2).

Work shift

Self-efficacy scores varied significantly across work shifts ($P = 0.031$). Nurses working evening shifts had the highest self-efficacy scores (52.13 ± 16.22), followed by those on morning shifts (51.41 ± 13.11), rotating shifts (45.76 ± 17.00), and night shifts (39.15 ± 15.52). Knowledge and attitude scores did not differ significantly by shift ($P > 0.05$) (Table 2).

Table 2
Knowledge, attitude, and self-efficacy of emergency nurses ($N = 212$)

	Knowledge	Attitude	Self-efficacy
Gender			
Male	81.10 (SD = 8.49)	56.12 (SD = 9.71)	42.46 (SD = 19.23)
Female	83.86 (SD = 7.75)	55.33 (SD = 6.82)	47.06 (SD = 15.96)
<i>P</i> -value	0.046*	0.544*	0.162*
Marital status			
Single	83.83 (SD = 7.12)	55.51 (SD = 6.78)	46.32 (SD = 16.02)
Married	82.80 (SD = 8.74)	55.45 (SD = 8.11)	46.01 (SD = 17.44)
<i>P</i> -value	0.947*	0.948*	0.895*
Level of education			
BSN	83.33 (SD = 7.73)	55.61 (SD = 7.70)	46.30 (SD = 16.54)
MSN	83.29 (SD = 9.48)	54.60 (SD = 5.47)	45.28 (SD = 17.97)
<i>P</i> -value	0.977*	0.504*	0.763*
Nursing position			
Nurse	83.41 (SD = 7.89)	55.67 (SD = 7.52)	46.51 (SD = 16.82)
Head nurse	89.00 (SD = 11.06)	57.00 (SD = 3.82)	46.60 (SD = 17.89)
Supervisor of emergency department	79.58 (SD = 6.31)	51.75 (SD = 6.75)	40.41 (SD = 14.28)
<i>P</i> -value	0.033 ^a	0.187 ^a	0.472 ^a
Work shift			
Morning	82.71 (SD = 5.88)	55.52 (SD = 5.14)	51.41 (SD = 13.11)
Evening	85.65 (SD = 8.28)	55.73 (SD = 4.55)	52.13 (SD = 16.22)
Night	82.80 (SD = 9.16)	53.85 (SD = 7.34)	39.15 (SD = 15.52)
Circulating	83.11 (SD = 7.95)	55.65 (SD = 8.03)	45.76 (SD = 17.00)
<i>P</i> -value	0.522 ^a	0.786 ^a	0.031 ^a
Work history			
6 months to 2 years	83.38 (SD = 8.56)	55.15 (SD = 4.12)	43.54 (SD = 17.33)
2–5 years	83.11 (SD = 8.13)	55.42 (SD = 8.23)	47.20 (SD = 16.70)
Above 5 years	83.98 (SD = 7.31)	55.77 (SD = 5.30)	43.92 (SD = 13.79)
<i>P</i> -value	0.807 ^a	0.949 ^a	0.369
Work history in the emergency department			
2–5 years	82.72 (SD = 7.74)	55.11 (SD = 7.89)	44.77 (SD = 15.69)
Above 5 years	84.10 (SD = 8.20)	55.95 (SD = 6.85)	47.96 (SD = 17.83)
<i>P</i> -value	0.033*	0.417*	0.027*
Experience participating in a pain management workshop			
Participation in out-of-hospital training	83.50 (SD = 6.10)	52.72 (SD = 11.19)	46.72 (SD = 18.47)
Participation in in-hospital training	84.28 (SD = 6.72)	55.03 (SD = 4.48)	44.55 (SD = 16.11)
Participating in training within the department	81.74 (SD = 9.74)	55.66 (SD = 3.44)	55.78 (SD = 13.21)
No	83.45 (SD = 8.46)	56.16 (SD = 8.97)	42.48 (SD = 16.68)
<i>P</i> -value	0.482 ^a	0.321 ^a	<0.001 ^a

Values are given as mean (SD) for continuous variables.

**P*-values are given as an independent *t*-test.

^a*P*-values are given as an ANOVA.

Work experience

Nurses with over 5 years of emergency department experience demonstrated significantly higher knowledge scores (84.10 ± 8.20) compared to those with 2–5 years of experience (82.72 ± 7.74 , $P = 0.033$). Similarly, self-efficacy scores were significantly higher among nurses with more than 5 years of emergency experience (47.96 ± 17.83) compared to those with 2–5 years of experience (44.77 ± 15.69 , $P = 0.027$). No significant differences in attitude scores were observed based on work experience ($P = 0.417$) (Table 2).

Pain management workshop participation

Participation in pain management workshops was strongly associated with higher self-efficacy scores ($P < 0.001$). Nurses who participated in departmental training had the highest self-efficacy scores (55.78 ± 13.21), followed by those who attended out-of-hospital training (46.72 ± 18.47) and in-hospital training (44.55 ± 16.11). Nurses who had not attended any workshops had significantly lower self-efficacy scores (42.48 ± 16.68). Knowledge and attitude scores did not differ significantly based on workshop participation ($P = 0.482$ and $P = 0.321$, respectively) (Table 2).

Correlation analysis

Pearson’s correlation analysis revealed significant positive relationships between knowledge, attitude, and self-efficacy scores. Knowledge was moderately correlated with self-efficacy ($r = 0.552$, $P < 0.001$), indicating that higher knowledge levels were associated with greater confidence in managing pain. Similarly, attitude was strongly correlated with self-efficacy ($r = 0.694$, $P < 0.001$), suggesting that nurses with more positive attitudes toward pain management were more likely to feel confident in their abilities. The correlation between knowledge and attitude, however, was weak and not statistically significant ($r = 0.113$, $P > 0.05$) (Table 3).

Discussion

This study aimed to assess the knowledge, attitudes, and self-efficacy of emergency nurses regarding pain management by analyzing data collected from 212 nurses working in emergency departments. The findings revealed that emergency nurses’ knowledge of pain management had a statistically significant relationship with gender, job position, and work experience. Specifically, female nurses and those with more experience demonstrated higher levels of knowledge. A study in the United States found no significant relationship between knowledge levels and variables such as gender or work experience

among emergency nurses^[23]. One possible explanation for this discrepancy is the variation in patient populations and nursing roles across different settings. Emergency nurses often encounter acute and traumatic pain cases, requiring rapid decision-making and confidence in pain management, which may strengthen the relationship between knowledge, attitude, and self-efficacy. In contrast, pediatric nurses may face unique challenges, such as non-verbal patients or parental involvement, which could dilute the direct impact of knowledge and attitude on self-efficacy.

The study also found significant differences in the self-efficacy of emergency nurses based on work shifts, with evening shift nurses demonstrating higher self-efficacy compared to those on other shifts. In contrast, a U.S. study found no correlation between variables like hospital type or work shift and nurses’ self-efficacy in pain management^[24]. This discrepancy may arise from differences in healthcare systems, staffing structures, and cultural attitudes toward pain management. For example, in the United States, emergency departments may have more standardized protocols and resources available across all shifts, minimizing the variability in nurses’ experiences and confidence levels. Furthermore, differences in the instruments used to measure self-efficacy could also account for the variation in findings. While this study utilized a validated questionnaire specifically designed to assess pain management self-efficacy, other studies may have employed tools that are less sensitive to the nuances of shift-based differences.

Additionally, the results indicated a direct correlation between knowledge and attitude variables with self-efficacy. Specifically, as nurses’ knowledge about pain management increased, so did their self-efficacy. However, a similar study focusing on pediatric ward nurses found no relationship between knowledge, attitude, and self-efficacy in pain management^[24]. This inconsistency may be attributed to several factors, including differences in the populations studied, the clinical settings, and the specific challenges faced by nurses in these environments. Emergency nurses often work in high-pressure situations where rapid decision-making is critical, and their confidence in managing pain may be more directly influenced by their knowledge and attitudes. In contrast, pediatric nurses may face unique barriers, such as the difficulty of assessing pain in non-verbal children or the involvement of family members in care decisions, which could dilute the impact of knowledge and attitudes on self-efficacy.

The findings provide a foundation for future research and emphasize the importance of considering demographic and job-related factors when evaluating and improving pain management skills among emergency nurses.

Limitation

This study has several limitations that should be acknowledged to provide context for the findings and guide future research. First, as a cross-sectional study, it only provides a snapshot of the relationships between knowledge, attitude, and self-efficacy in pain management among emergency nurses. This design limits the ability to establish causal relationships between the variables and may not capture changes over time. Second, the sample size, while adequate for the statistical analyses conducted, was relatively small and limited to emergency nurses working in hospitals affiliated with a single medical university in Iran. This regional focus may restrict the generalizability of the findings to other healthcare settings, regions, or countries with different

Table 3
Correlation of knowledge, attitude, and self-efficacy of nurses toward pain management (N = 212)

	Knowledge	Attitude	Self-efficacy
Knowledge	1		
Attitude	0.113	1	
Self-efficacy	0.552*	0.694*	1

*P-value was obtained with Pearson’s correlation coefficient ($P < 0.001$)

cultural, organizational, or systemic factors influencing pain management practices. Third, the reliance on self-reported questionnaires introduces the potential for response bias. Participants may have overestimated their knowledge, attitudes, or self-efficacy due to social desirability or a desire to present themselves in a favorable light. This could affect the accuracy of the findings. Finally, differences in cultural attitudes toward pain and variations in organizational policies and resources for pain management across hospitals may have influenced the results. These contextual factors could limit the applicability of the findings to healthcare systems with different cultural or institutional practices. Finally, most of the statistically significant results are close to the level of non-significance, and given the lack of correction for multiple testing, they could not be considered conclusive.

Recommendations for future research

Future research should adopt mixed-methods approaches that integrate both quantitative and qualitative data to gain a deeper understanding of the factors influencing nurses' pain management practices. It is also important to investigate how technology and e-learning platforms can enhance emergency nurses' knowledge, attitudes, and self-efficacy in pain management. Furthermore, interdisciplinary studies involving other healthcare professionals are recommended to provide a comprehensive view of pain management practices and promote collaborative strategies for improving patient care.

Conclusions

In summary, this study highlights significant relationships between emergency nurses' knowledge, attitudes, and self-efficacy in pain management and various demographic and professional factors, including gender, job role, work experience, and shift patterns. The findings underscore the importance of implementing targeted educational interventions and training programs to strengthen pain management skills among emergency nurses. To further advance this field, future research should focus on longitudinal studies, objective assessments, and interdisciplinary approaches to deepen the understanding of pain management in emergency settings. These insights can inform the development of policies and standardized protocols, ensuring consistent and effective pain management practices across healthcare environments.

Ethical approval

After obtaining approval from both the ethics committee (IR. ABZUMS.REC.1401.086) and the research department at Alborz University of Medical Sciences, as well as presenting a letter of introduction to the relevant center, permission from the authorities to conduct the study in the research environment was obtained.

Consent

Written informed consent was collected from the participants before sampling emergency nurses from the educational centers affiliated with Alborz University of Medical Sciences. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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There was no funding.

Author contributions

S.S.: Conceptualized the study and conducted primary research; led the writing of the manuscript and contributed to data analysis. R.N.A.: Provided expertise and oversight in the research design, data interpretation, and critical revision of the manuscript for important intellectual content. F.R.: Assisted in data collection, literature review, and drafting of initial sections of the manuscript; contributed to data analysis and manuscript editing. R.H.: Supported data collection, interpretation of results, and assisted in the final manuscript preparation. T.B. B.: Supervised the research project as the corresponding author, coordinated the research process, and approved the final manuscript for submission.

Conflicts of interest disclosure

None.

Research registration unique identifying number (UIN)

Not applicable.

Guarantor

The corresponding author serves as the guarantor for the integrity of the work as a whole.

Provenance and peer review

None.

Data availability statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Presentation

None.

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