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Psychometric Properties of the Arabic Version of the V-Scale Used to Determine Nursing and Midwifery Students' Attitudes towards Vital Signs Monitoring

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ABSTRACT

Background: Improving patient care standards and ensuring safety depend largely on nursing and midwifery students' knowledge and attitudes toward vital sign monitoring. This makes it a vital part of their education. However, there is currently no reliable and standardized Arabic tool to assess their attitudes toward vital sign monitoring. ***Purpose*:** This study aims to evaluate the psychometric properties of the Arabic version of the V-scale used to determine nursing and midwifery students' attitudes towards vital sign monitoring. ***Methods*:** This research adopted a descriptive, methodological, cross-sectional design. A cohort of 185 nursing and midwifery students was recruited *via* convenience sampling to respond to an online survey. The subsequent analysis focused on establishing the psychometric robustness of the instrument, employing both exploratory and confirmatory factor analyses to assess its construct validity and internal consistency. ***Results*:** The psychometric evaluation demonstrated robust properties for the scale. The Exploratory Factor Analysis (EFA) yielded a Kaiser-Meyer-Olkin (KMO) measure of 0.70, and Bartlett's test of sphericity was significant ($\chi^2 = 470.599$, $p < 0.001$), with the derived factor solution accounting for 54.81% of the total variance. Confirmatory Factor Analysis (CFA) further validated the model, indicating a good fit ($\chi^2/df = 1.403$, RMSEA = 0.047, CFI = 0.903, GFI = 0.924, AGFI = 0.883, IFI = 0.911). The finalized 16-item instrument comprised five distinct factors. Reliability analyses revealed strong internal consistency, with sub-scale Cronbach's alpha values ranging from 0.72 to 0.86 and an overall scale alpha of 0.91. ***Conclusion*:** This study confirms the psychometric robustness of the Arabic V-scale, supporting its use as a valid and reliable instrument for assessing student attitudes in this domain. The observed variations in factor loadings from the original version highlight the importance of cultural and linguistic adaptation. The dissemination of this validated Arabic tool is anticipated to enhance research and pedagogical practices within relevant Arabic-speaking contexts. ***Implications for Nursing*:** The evidence generated by this study provides a platform for educators, administrators, and policymakers to devise evidence-based strategies for fostering positive attitudes toward vital sign monitoring among students. Further inquiry is necessary to elucidate the broader range of variables affecting student learning and application of vital sign skills, encompassing knowledge, attitudes, and practical performance roles, can advocate for improved water management policies that prioritize health outcomes.

Keywords: Attitudes, Monitoring, Nursing students, Midwifery students, Vital signs.

What does this paper add?

1. The Arabic adaptation of the V-scale demonstrated strong psychometric properties, with confirmed validity and reliability, thereby solidifying its appropriateness for evaluating attitudes related to vital sign monitoring among nursing and midwifery students.
2. This research offers a foundational framework for systematically assessing student attitudes toward vital sign monitoring, establishing a benchmark for future educational studies.
3. The findings provide important insights for nursing educators, highlighting specific areas within vital sign education that need improved teaching methods, which helps in creating more focused and practical curricula.

Introduction

Vital signs are objective clinical indicators of the condition of the body's fundamental functions (Fortmann et al., 2020). The word "vital" is used because their measurement and assessment are essential preliminary phases of every clinical evaluation (Sapra et al., 2023). Vital signs consist of body temperature, pulse rate, respiration rate, and blood pressure (Sapra et al., 2023). Vital sign monitoring is an essential portion of nursing practice, and a crucial part of patient surveillance (Redfern et al., 2019). Regular vital sign monitoring provides the foundational information needed to identify sudden, severe, dangerous, and life-threatening issues (Cardona-Morrell et al., 2016). Furthermore, it enhances patient safety by reducing the mortality and morbidity rates (Haegdorens et al., 2019). However, the utilization of vital signs serves as a critical mechanism for nurses to detect patients who may be experiencing early-stage deterioration promptly (Kamio et al., 2018).

A consistent body of research has documented significant shortcomings in the practice of vital sign monitoring, including both the infrequency of assessments and the failure to accurately document them (Kamio et al., 2018; Mok et al., 2015; Redfern et al., 2019; Weenk et al., 2019). Hence, scholarly recommendations advocate for ongoing nursing education to facilitate a shift in nurses' perspectives regarding vital sign monitoring (Mok et al., 2015). Adverse incidents can be decreased by organizing systematic training programs and knowing the nurses' attitudes toward vital sign monitoring (Ertuğ, 2018).

The most straightforward, accessible, cost-effective, and pivotal approach to patient assessment within hospital settings involves the monitoring of vital signs (Kellett & Sebat, 2017). The assessment of vital signs represents a core and recurrent responsibility within the nursing students' clinical experience (Alshehry et al., 2021). In nursing programs, students are introduced to vital sign assessment from their first year of study. Owing to their non-invasiveness, vital sign monitoring is typically deemed a low-risk activity, thus enabling student participation under minimal supervision by qualified clinical staff (Alshehry et al., 2021).

Worldwide, more than 400 million individuals communicate in Arabic as their primary language (UNESCO, 2022), constituting a substantial group for which linguistically and culturally proficient healthcare is crucial. The nursing and midwifery profession, with more than 27 million practitioners globally (WHO, 2022), constitutes the foundation of healthcare systems. This is especially apparent in the Eastern Mediterranean Region of the World Health Organization, where nurses and midwives comprise over fifty percent of the health workforce (WHO EMRO, 2022). In response to the increasing need for skilled care, some Arab countries have enhanced their nursing education systems by instituting additional graduate and specialty programs (Sweileh et al., 2019). This development is significant; for instance, in Jordan, 5,318 nursing students are presently enrolled in fourteen universities and 33 public training facilities (Jebreel, 2017).

The nursing curriculum should be more receptive to integrating evidence-based practices, thereby equipping students to implement them in Jordanian healthcare environments (Al-Ali et al., 2025). In addition, ensuring the highest level of safety and quality in nursing care is essential in the global healthcare system today (Cho et al., 2020). The efficacy of nursing education is important, since it directly influences the excellence of patient care and patient safety. An essential nursing and midwifery skill is the precise monitoring and interpretation of vital signs, a duty that demonstrates a nurse's clinical judgment and dedication to patient care. However, measures, such as the V-scale, are available in English and Turkish to evaluate nurses' attitudes towards this essential duty (Ertuğ, 2018; Mok et al., 2015), but

there is no validated Arabic tool to assess attitudes among nursing and midwifery students. The language and cultural divide hinders educators from effectively assessing and fostering the attitudes required for thorough clinical monitoring in Arabic-speaking environments, thereby potentially adversely affecting patient outcomes. Therefore, this study aims to evaluate the psychometric properties of the Arabic version of the V-scale used to determine nursing and midwifery students' attitudes towards vital sign monitoring.

Literature Review

The development of the V-scale marked an important advancement in assessing nurses' perspectives on vital sign monitoring for early detection of clinical deterioration. The V-scale was developed by Mok et al. (2015) as a tool to measure nurses' attitudes toward vital sign monitoring in general wards, specifically for the purpose of early identification of clinical deterioration. The instrument's validation was conducted with a convenient sample of 614 ward nurses from an acute tertiary hospital in Singapore; analyses were performed on 234 complete responses. The authors identified a 16-item solution structured across five factors—key indicators, knowledge, communication, workload, and technology—through principal component analysis, explaining a total of 56.27% of the variance. Psychometric testing confirmed the scale's acceptability, with a Cronbach's alpha of 0.71. Item-sub-scale correlations ranged from 0.56 to 0.89, with strong test-retest reliability (ICC = 0.85).

To evaluate the cross-cultural applicability of the V-scale, Ertuğ (2018) conducted a validation study with Turkish nurses. The research involved 169 ward nurses from a tertiary hospital in Ankara, selected *via* convenience sampling. Psychometric assessment confirmed a stable five-factor, 16-item structure, accounting for 60.823% of the total variance. Furthermore, the Turkish version demonstrated robust internal consistency ($\alpha = 0.764$) and high temporal stability, as indicated by a test-retest ICC of 0.855.

Despite prior validations, there is currently no Arabic version available for use with nursing and midwifery students in the Arab world. This gap limits educators' ability to reliably measure and develop important attitudes toward patient deterioration within this group. Translating and validating the V-scale for Arabic-speaking undergraduate nursing and midwifery students holds significant scientific and practical importance. Although the original English version (Mok et al., 2015) proved effective in assessing nurses' attitudes, and translations, such as the Turkish version, have confirmed its reliability among practicing nurses, a notable gap remains. The attitudes of student nurses in the early stages of their careers not only reflect those of experienced practitioners, but also serve as key indicators of their future clinical performance. Therefore, it is crucial to validate the V-scale, specifically for this student population, in Arabic. The Arabic version provides a culturally and linguistically appropriate tool for evaluating attitudes in Jordanian and broader Arab educational settings, enabling direct assessment of how these attitudes evolve during training. This allows educators to identify misconceptions, measure the impact of educational interventions, and tailor curricula to foster the attitudes necessary for early recognition of patient deterioration—fulfilling an essential goal of nursing and midwifery education and improving patient safety outcomes in the region.

Methods

Design and Setting

This study employed a descriptive, methodological, cross-sectional design and utilized an online survey to evaluate the psychometric properties of the Arabic version of the V-scale, which is used to determine nursing and midwifery students' attitudes toward vital sign monitoring. The chosen design was suitable for the study goals, because it allows the exploration of relationships among variables and supports evidence of their connections (Etoom et al., 2024; Spector, 2019). In this study, the scale validation process included two phases: (1) translating the V-scale from English into Arabic, and (2) examining the internal structure and reliability of the Arabic version using exploratory factor analysis and confirmatory factor analysis, as well as Cronbach's alpha.

Participants

Participant recruitment was conducted using an online questionnaire distributed through convenience sampling. This approach was chosen for its practical advantages in flexibility, cost-effectiveness, and rapid data collection (Golzar et al., 2022). Prospective participants were required to meet specific inclusion

criteria: they had to be willing and able to provide online consent, be currently enrolled as nursing or midwifery students, be at least 18 years of age, possess reliable internet access, have received prior education on vital signs, and demonstrate proficiency in Arabic.

The sample size was calculated according to established methodological guidelines for factor analysis, which recommend from 5 to 10 participants per item (Wu, 2010). Consequently, for the 16-item scale utilized, a target sample size between 80 and 160 respondents was established.

Measures

This research utilized a two-part questionnaire. The first part captured key demographic variables, including participant age, gender, academic program, current level of study, and GPA. The second part incorporated the validated V-scale (Mok et al., 2015). This 16-item instrument evaluates attitudes towards vital sign monitoring through five sub-scales: technology (4 items), communication (2 items), workload (4 items), key indicators (3 items), and knowledge (3 items). All items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total score, which can range from 16 to 80, is interpreted such that elevated scores signify more favorable attitudes (Ertuğ, 2018; Mok et al., 2015). The original scale is psychometrically sound ($\alpha = 0.71$, ICC = 0.85). For this investigation, the tool was modified following the adaptation by Alshehry et al. (2021), which exhibited excellent content validity (CVI = 1) and high reliability ($\alpha = 0.88$) among nursing students.

Translation of the V-Scale

The scale underwent forward and backward translation procedures in accordance with established methodology (Brislin, 1970) to ensure semantic and content validity. The translation of the original 16-item Vital Sign Attitude Scale underwent a meticulous, multi-phase procedure to guarantee linguistic precision and conceptual equivalence. The preliminary forward translation from English into Arabic was performed separately by two certified professional translators, both native Arabic speakers with specialized knowledge in medical terms. A committee consisting of the translators and the research team harmonized the two versions to produce a unified, consensus-driven Arabic text.

This provisional version was later back translated into English by two additional qualified translators, who were native English speakers, fluent in Arabic, and intentionally blinded to the original instrument; notably, they lacked clinical backgrounds to ensure that the items were conceptually straightforward and did not depend on professional jargon. The study team and a bilingual clinical expert subsequently conducted a thorough review, comparing the back-translated version with the original scale and identifying and correcting minor conceptual inconsistencies to ensure consistency between the versions. This finished Arabic version was evaluated and officially sanctioned by a panel of multilingual experts and experienced medical professionals for its semantic clarity and cultural relevance, culminating in the final instrument used in the study.

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board of Al-Balqa Applied University (Ref: 100/8/2023/2024). Before participating, all individuals gave informed consent through a digital form that explained the study's purpose and procedures. The researchers assured participant anonymity and highlighted that participation was voluntary, clearly stating that participants could withdraw at any time without penalty. All data collected was securely stored on a password-protected computer to maintain confidentiality.

Data Collection

Participants were recruited through convenience sampling. Data was collected using a self-administered questionnaire that captured demographic details and information on the study's primary variables. The survey was created in Google Forms, and the link was distributed to eligible participants via their Microsoft Teams classes. Data collection was conducted between November 1 and December 3, 2023. The online survey ensured respondent anonymity by not collecting any personally identifiable information. To enhance anonymity, the obtained data was encoded, and access was limited to the study team. The data was later saved to an Excel file and safely kept on a password-protected computer.

Statistical Analysis

Data analysis was performed using the Statistical

Package for Social Sciences (SPSS, version 27) for Windows. Confirmatory factor analysis (CFA) was conducted using structural equation modeling in IBM AMOS, version 24.0. Descriptive statistics were applied to summarize and evaluate the study variables according to their respective levels of measurement.

To evaluate construct validity, exploratory factor analysis was performed. This analysis looked at factor loadings, factor correlations, and individual item performance. The principal component method with Equamax rotation was used, and eigenvalues greater than 1.0 were retained. Before running the factor analysis, data suitability was checked with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity.

Results

Participant Demographic Characteristics

A total of 185 students participated in the study. The mean age of the participants was 20.29 years (SD = 1), and the mean grade point average (GPA) was 70.70 (SD = 8.04). Most participants were female (n = 156, 84.3%), enrolled in the nursing program (n = 126, 68.1%), and in their second year of study (n = 154, 83.2%). The demographic characteristics of the study sample are summarized in Table 1.

Table 1. Participants' demographic characteristics (N= 185)

Variable	N (%)	M	SD
Age		20.29	1
Gender			
Male	29 (15.7)		
Female	156 (84.3)		
Academic Program			
Nursing	126 (68.1)		
Midwifery	59 (31.9)		
Academic Level			
First year	10 (5.4)		
Second year	154 (83.2)		
Third year	21 (11.4)		
GPA		70.70	8.04
Notes: N = 185; M = Mean; SD = Standard deviation; GPA: Grade point average			

Exploratory Factor Analysis (EFA)

Initially, sample adequacy was assessed using Bartlett's test of sphericity ($p < .001$, $\chi^2 = 470.599$) and the Kaiser-Meyer-Olkin (KMO) measure (.70). An exploratory factor analysis (EFA) was then performed with the principal component method and an Equamax rotation to select the best model. The determination of the final EFA model adhered to standard methodological conventions, prioritizing a combination of statistical and interpretability criteria. Key decision metrics encompassed the magnitude of factor loadings, adequate simple structure defined by a minimum loading difference of 0.20, sufficient communalities, factors defined by no fewer than two items, and an overall acceptable proportion of explained variance. (Etoom et al., 2024; Warner, 2013). This analysis yielded a five-factor model that explained 54.81% of the variance. The model comprised 16 Likert-scale items rated from 1 to 5. The variance explained by each factor was: Factor 1 (13.44%), Factor 2 (12.13%), Factor 3 (10.21%), Factor 4 (10.06%), and Factor 5 (5.01%) (Table 2).

Table 2. Exploratory factor analysis of the V-scale (N= 185)

Item	Item description					
		F1	F2	F3	F4	F5
Workload						
10	I feel overwhelmed trying to complete the different frequency of vital signs collection (i.e. hourly, 2 hourly and 4 hourly) of my patients	0.781				
8	Vital sign monitoring is a boring task	0.768				
9	Complete and accurate vital sign monitoring is neglected due to time constraints	0.718				
7	It is time-consuming to perform vital signs monitoring	0.507				

Communication						
5	I am confident to report deteriorating vital signs in a way that will get the team RN in-charge or my clinical instructor to review the patient		0.772			
6	I will repeatedly inform the team RN in charge or my clinical instructor of vital sign changes if no prompt actions are acted on		0.743			
12	Blood pressure is often the first parameter that reflects abnormality when a patient deteriorates		0.552			
Technology						
1	Respiratory rate value is usually estimated for stable patients during routine vital signs monitoring			0.778		
14	I can relate vital signs readings to physiology and pathophysiology of presenting diseases			0.528		
11	SpO2 is a more reliable indicator in reflecting early signs of respiratory dysfunction than respiratory rate			0.492		
4	I usually record respiratory rate as standard rate between 12 and 20/min if SpO2 is within normal range			0.412		
Knowledge						
16	Changes in vital signs were not interpreted accurately by student nurses				0.750	
15	My knowledge in interpreting vital signs to identify clinical deterioration is limited				0.707	
2	Electronic vitals monitoring results in casual monitoring (i.e. counting) of respiratory rate				0.452	
Key Indicators						
3	The use of pulse oximetry to monitor SpO2 will reduce the need to count respiratory					0.669
13	Respiratory rate value is the least important sign of deterioration					0.602
Eigenvalues		2.75	2.37	1.25	1.20	1.17
Percentage of variance (total: 54.81)		13.44	12.13	10.21	10.06	8.95

Notes: The extraction method was exploratory factor analysis, principal component method and equamax rotation with Kaiser Normalization. F1, F2, F3, F4, and F5 are factor loadings for the rotated solution. Eigenvalues ≥ 1.0, KMO =0.7.

The workload factor comprised four items: Items 10, 8, 9, and 7. The communication factor included three items: Items 5, 6, and 12. The technology factor consisted of four items: Items 1, 14, 11, and 4. The knowledge factor encompassed three items: Items 1, 4, and 5. Lastly, the key indicator factor comprised two items: Items 3 and 13. Items with factor loadings below 0.40 were considered unreliable and excluded from the study.

Conformity Factor Analysis (CFA)

Confirmatory factor analysis (CFA) was conducted to evaluate the construct validity of the proposed five-factor model. The results of the 16-item instrument supported the earlier exploratory factor analysis (EFA)-derived factor structure. The fit indices demonstrated a good model fit (χ^2/df = 1.403, RMSEA = 0.047, CFI = 0.903, GFI = 0.924, AGFI = 0.883, IFI = 0.911), with all values within acceptable thresholds. The model fit indices support the validity of the proposed five-factor, 16-item structure, demonstrating its close alignment with the empirical data (Table 3). The corresponding standardized parameter estimates are illustrated in Figure 1.

Table 3. Fit index values of the CFA of the tool (N= 185)

Index	Acceptable value	The Scale
Chi-square/degree of freedom (χ^2/df)	<5	1.403
Goodness-of-fit index (GFI)	>0.85	0.924
Adjusted goodness-of-fit index (AGFI)	>0.85	0.883
Comparative fit index (CFI)	>0.90	0.903
Incremental Fit Index (IFI)	>0.90	0.911
Root mean square error of approximation (RMSEA)	<0.08	0.047

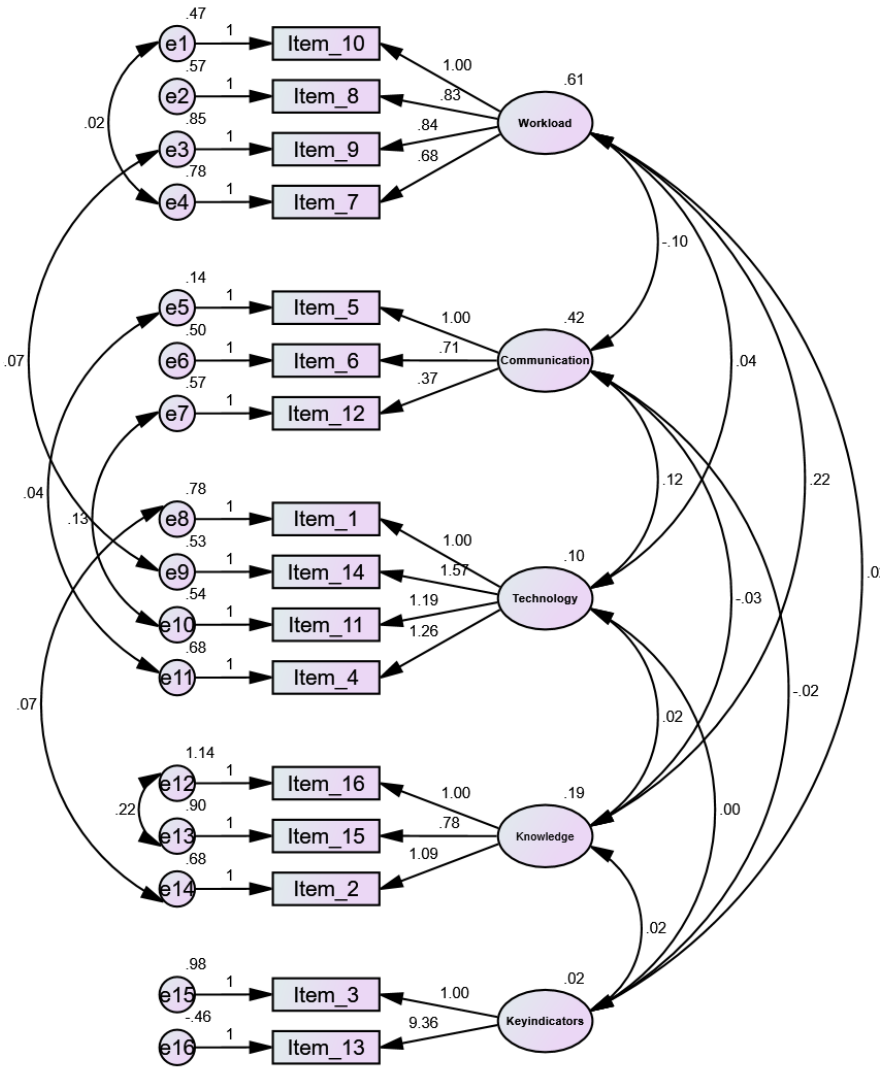

Figure 1. Standardized confirmatory factor analysis for the five-factor 16-item structure model

Reliability

The translated instrument demonstrated strong psychometric properties based on reliability analyses. All items exhibited satisfactory correlations with the total scale, as indicated by corrected item-total correlation (CITC) values ranging between 0.517 and 0.696 (Table 4). The sub-scales showed good internal consistency (α = 0.72–0.86), while the scale in its entirety achieved an excellent reliability coefficient (α = 0.91).

Table 4. Cronbach's alpha values for the Arabic version of the V-scale (N= 185)

Item	Item description	CITC	C. α
Workload			0.85
10	I feel overwhelmed trying to complete the different frequency of vital signs collection (i.e. hourly, 2 hourly and 4 hourly) of my patients	0.601	
8	Vital sign monitoring is a boring task	0.568	
9	Complete and accurate vital sign monitoring is neglected due to time constraints	0.577	
7	It is time-consuming to perform vital signs monitoring	0.626	
Communication			0.86
5	I am confident to report deteriorating vital signs in a way that will get the team RN in-charge or my clinical instructor to review the patient	0.587	

6	I will repeatedly inform the team RN in charge or my clinical instructor of vital sign changes if no prompt actions are acted on	0.604	
12	Blood pressure is often the first parameter that reflects abnormality when a patient deteriorates	00.675	
Technology			.84
1	Respiratory rate value is usually estimated for stable patients during routine vital signs monitoring	0.618	
14	I can relate vital signs readings to physiology and pathophysiology of presenting diseases	0.655	
11	SpO2 is a more reliable indicator in reflecting early signs of respiratory dysfunction than respiratory rate	0.696	
4	I usually record respiratory rate as standard rate between 12 and 20/min if SpO2 is within normal range	0.585	
Knowledge			0.74
16	Changes in vital signs were not interpreted accurately by student nurses	0.551	
15	My knowledge in interpreting vital signs to identify clinical deterioration is limited	0.549	
2	Electronic vitals monitoring results in casual monitoring (i.e. counting) of respiratory rate	0.663	
Key Indicators			0.72
3	The use of pulse oximetry to monitor SpO2 will reduce the need to count respiratory	0.586	
13	Respiratory rate value is the least important sign of deterioration	0.517	
Overall			**0.91**

Notes: CITC: Corrected item-total correlation; C.α: Cronbach's alpha.

Discussion

The present study sought to evaluate the psychometric properties of the Arabic version of the V-scale used to determine nursing and midwifery students' attitudes towards vital sign monitoring. The appropriateness of the data for EFA was confirmed through two preliminary tests. The Kaiser-Meyer-Olkin (KMO) measure yielded a value of 0.70, surpassing the acceptable threshold of 0.60 and indicating adequate sampling. Furthermore, Bartlett's test of sphericity was statistically significant ($\chi^2 = 470.599$, $p < 0.001$), rejecting the null hypothesis that the correlation matrix is an identity matrix and thereby establishing the suitability of the data for factor extraction (Jassim & Alansari, 2020).

The scale was evaluated using principal component analysis with Equamax rotation, setting cut-offs of 0.40 for factor loadings and 1.0 for eigenvalues. A five-factor structure was extracted based on the eigenvalue-greater-than-one criterion. These factors explained a cumulative 54.81% of the total variance, which indicates a robust capacity of the instrument to capture the underlying attitudes of nursing and midwifery students regarding vital sign monitoring. Robust structural validity is confirmed when at least 50% of the variance is explained by factors from an exploratory factor analysis (EFA), and each item loads above 0.4 on a shared factor (Weziak-Bialowolska et al., 2021). This finding aligns with Mok et al. (2015), who found that five variables explained 56.27% of the variance.

While the Arabic V-scale validation confirmed the original instrument's five-factor structure, notable differences appeared in the composition of specific sub-scales. The Arabic version features workload (4 items), communication (3 items), technology (4 items), knowledge (3 items), and key indicators (2 items). In contrast, the original scale includes technology (4 items), communication (2 items), workload (4 items), key indicators (3 items), and knowledge (3 items). These discrepancies may stem from differences in the study population's educational backgrounds, language skills, and curricular focus.

Several items were loaded onto different factors in the Arabic version of the V-scale compared to the original, and contextual and cultural factors can explain these differences. Item 12 was noticeably shifted from Key Indicators in the original scale to Communication in the Arabic translation. This shift likely illustrates the clinical hierarchies prevalent in numerous Arabic-speaking healthcare environments, where fluctuations in blood pressure are not primarily regarded as early-warning clinical indicators, but rather as data that must be swiftly sent to a senior nurse or physician. Items about pulse oximetry and respiratory evaluation, specifically Item 11 and Item 3, deviated from Key Indicators and Technology and were categorized differently in the Arabic model. This conclusion suggests that students view pulse oximetry more as a clinical signal of deterioration than as a technological instrument, indicating a significant dependence on device-based monitoring in numerous clinical training settings. Furthermore, Item 14 transitioned from Knowledge in the original scale to Technology in the Arabic version, suggesting that students may associate the comprehension of vital signs with the operation of technological devices rather than with a profound

theoretical understanding. Similarly, Item 2 transitioned from Technology to Knowledge, aligning with the notion that misreading electronic texts is perceived as a deficiency in knowledge rather than a limitation of technology. Collectively, these changes indicate that Arabic-speaking nursing students may perceive vital-sign assessment through a more technology-oriented, hierarchical lens, thereby affecting the clustering of specific items within the factor structure.

Discrepancies in the factorial structure and item loadings between the original scale and its Arabic translation are common in cross-cultural validation, typically arising from a combination of methodological, linguistic, and cultural influences. The validation sample's unique characteristics, such as age, educational level, or clinical experience, can affect item perception and responses, thereby modifying the underlying factor structure. Achieving perfect semantic equivalence is challenging due to subtle differences in word connotation and clarity, which can affect comprehension and statistical performance, leading to loading onto different factors despite rigorous translation procedures. Cultural influences significantly influence outcomes. This encompasses conceptual non-equivalence, in which the fundamental construct being assessed is intrinsically perceived or expressed differently within the Arab cultural context, and differential item salience, in which specific behaviors or attitudes possess variable degrees of significance across cultures. Moreover, culturally affected response styles, such as an increased tendency towards social desirability or acquiescence bias, can systematically modify response patterns, resulting in a factor structure that deviates from the original. Consequently, these discrepancies do not inherently indicate a defective adaptation, but instead represent an essential adjustment of the instrument to encompass the concept within its revised cultural environment accurately.

Confirmatory factor analysis (CFA) was performed to evaluate the validity of the proposed factor structure. Model fit was assessed using various indices, such as the normed chi-square (χ^2/df), GFI, AGFI, CFI, IFI, and RMSEA. All indices met their predefined thresholds, indicating that the Arabic version of the scale has an acceptable model fit.

Reliability was assessed using Cronbach's α, an internal-consistency statistic that reflects item homogeneity within the scale (Anselmi et al., 2019). The overall Cronbach's α for the translated scale was 0.91, compared to 0.71 for the original scale. Dimension-specific coefficients ranged from 0.72 to 0.86, exceeding the original scale's range of 0.56 to 0.89 (Mok et al., 2015). These results confirm the reliability of the Arabic V-scale, as all Cronbach's α values surpass the acceptable threshold of 0.70, with values between 0.71 and 0.91 considered good (Chang et al., 2018; Taber, 2018). Consequently, the linguistic adaptation did not compromise the effectiveness of the scale's items.

Corrected Item-Total Correlation analysis, which evaluates the relationship between an individual item and the aggregate of the remaining items (Chang et al., 2018), was employed to confirm internal consistency. Consistent with established criteria (Chang et al., 2018), all items were retained as their CITC coefficients exceeded the 0.30 benchmark, with observed values falling within a moderate to strong range (0.517–0.696). These results provide evidence for the items' internal homogeneity and indicate a clear and unambiguous interpretation by the respondent cohort.

The findings demonstrate that the V-scales possess suitable psychometric properties for use among Arabic-speaking populations. The V-scale may serve as an effective method for monitoring vital signs among Arabic-speaking students and healthcare workers, as indicated by a key result of this study.

Implications for Nursing

The findings highlight that assessing student attitudes regarding vital signs is an essential component of professional education, directly contributing to the development of the expertise necessary for ensuring competent practice and positive patient outcomes. Using this scale can help detect gaps in students' attitudes towards vital signs, enabling targeted interventions to fill these gaps. Additionally, applying the scale may enhance nursing educators' understanding of effective strategies to promote positive attitudes among students and identify particular aspects of vital signs that should be emphasized more in educational curricula.

Limitations and Recommendations

This study has certain limitations. It was conducted exclusively among Jordanian nursing and midwifery students and relied on self-administered online questionnaires. Since participants might unconsciously

choose correct answers rather than honestly express their opinions, bias is unavoidable. To strengthen the external validity of these results and enable the creation of robust, standardized norms for the Arabic adaptation, future investigations should seek to recruit a more extensive and demographically heterogeneous sample from multiple regions. Additionally, employing a mixed-method exploratory approach in future studies could provide a deeper understanding of students' attitudes toward monitoring of vital signs.

For example, performing a quantitative survey of a larger, more diverse group of students from different universities and academic years, complemented by qualitative focus groups or interviews, can help explore the motivations behind the attitudes observed in this study. This approach could uncover the cultural, educational, or clinical experiences that shape students' perspectives on vital sign monitoring.

Conclusion

This study establishes the Arabic V-scale as a valid and reliable measure for assessing attitudes regarding vital sign monitoring among the target student population. Subsequent scale development could focus on refining specific items to enhance its structural validity. Once optimized, this tool can be leveraged in both research and practice to inform evaluations of student proficiency and preparedness for holistic clinical responsibilities.

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Conflict of Interests

The authors declare that there is no conflict of interests.

Author Contributions

Study Design: **ME, RA, NAA**. Data Collection: **ME, RA, EA**. Data Analysis: **ME, EA, RA**. Study Supervision: **ME**. Manuscript Writing: **ME, EA, AA**. Critical Revisions for Important Intellectual Content: **ME, EA, RA, NAA, SA, AA, MD**.

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Supplementary Materials

Arabic version of V-scale: Arabic-Version of V-Scale.pdf.

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