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Understanding and Improving Workplace Violence Prevention Practices among Nursing Students: A Cross-Sectional Study in a Private College, Malaysia.

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Abstract

Background: Workplace violence (WPV) is a growing concern in healthcare settings, with nursing students at heightened risk due to their frontline roles during clinical placements. Although several studies have explored WPV among healthcare workers, research focusing on prevention practices among nursing students in Malaysia remains limited. This study aimed to assess nursing students' perception and practice of WPV prevention and identify associated factors. **Methods**: A cross-sectional survey was conducted among 245 nursing students enrolled at a private nursing college in Perak, Malaysia. Data were collected using a validated structured questionnaire assessing WPV perception and practice across multiple domains. Descriptive and inferential analyses were performed using chi-square tests and logistic regression to determine predictors of good perception and practice. **Results**: Most participants demonstrated moderate perception and high practice of WPV prevention. Binary logistic regression revealed that bachelor-level students (aOR = 114.5, p = 0.03) and those with ≥ 6 months of clinical experience (aOR = 1.89, p = 0.046) were more likely to exhibit good perception towards WPV prevention. Multinomial regression confirmed these associations, indicating that educational level and clinical experience independently predicted good perception. No significant predictors were found for practice outcomes. **Conclusion**: Academic preparation and clinical exposure play crucial roles in shaping nursing students' perception of WPV prevention. Integrating structured WPV prevention training into the nursing curriculum and strengthening institutional support mechanisms are essential to enhance awareness, preparedness, and safety culture among future nurses.

Keywords: *Clinical training, nursing education, perception and practice, violence prevention, workplace violence.*

Introduction

Workplace violence (WPV) in healthcare settings is increasingly recognised as a critical occupational hazard, posing significant threats to the safety, well-being, and professional development of healthcare workers, particularly nursing students. The World Health Organization and the International Labour Organization define WPV as physical, verbal, or emotional aggression occurring in the workplace, encompassing behaviours that may cause physical harm, psychological distress, or emotional trauma [1,2]. Such incidents disrupt clinical learning environments, compromise patient care, and adversely affect the mental health and job satisfaction of healthcare workers. Globally, the prevalence of WPV among healthcare workers, especially the nurses in clinical training, is alarmingly high, with nearly half reporting experiences of violence at some point in their careers [3,4]. The high incidence is attributed to the nature of healthcare work, which involves direct interaction with patients and their families in high-stress, emotionally charged situations, such as emergency care, mental health units, and long-term care facilities.

Nursing students represent a particularly vulnerable group due to their limited clinical exposure, ongoing skill acquisition, and lower hierarchical status within healthcare teams. While clinical placements are essential for translating theoretical knowledge into practical competence, they often expose students to various forms of WPV, including verbal abuse, physical intimidation, and psychological harassment from patients, visitors, or even colleagues [5,6]. Such encounters may result in immediate physical harm and longer-term psychological consequences, including heightened stress, anxiety, fear, diminished confidence, and erosion of professional identity [7,8]. Repeated exposure to WPV not only undermines nursing students' learning experiences but can also negatively influence career retention, potentially contributing to the ongoing global nursing shortage.

Previous research has established that WPV is a widespread problem across healthcare settings, and several systematic reviews have examined its prevalence, causes, and effects among nurses [3,4,9]. However, the majority of these studies have focused on registered nurses and hospital-based staff, with relatively few addressing WPV prevention among nursing students, particularly within the Southeast Asian context. Existing interventions and policies often prioritise permanent employees, neglecting the unique vulnerabilities of students who rotate through multiple clinical environments [10,11]. Moreover, studies from Malaysia have primarily explored WPV experiences among practising nurses [12,13], leaving a critical gap in understanding how nursing students perceive and practise prevention measures during their training.

This study is guided by Social Cognitive Theory, which posits that individuals learn behaviours through observation, imitation, and reinforcement within a social environment [14]. In the context of WPV prevention, students' perceptions and practices are shaped not only by their formal education but also by modelling from clinical supervisors and peers. Understanding these cognitive and environmental factors is therefore essential to strengthen preventive behaviour and self-efficacy.

Against this backdrop, the present study aims to examine the perception and practice of WPV prevention among nursing students in Malaysia, with a specific focus on identifying associated sociodemographic and educational factors. Conducted at a private nursing college in Perak, this study provides context-specific insights that contribute to the regional and global understanding of WPV prevention in nursing education. By exploring the determinants of perception and practice, the findings can inform the design of targeted training, institutional support mechanisms, and evidence-based policies that promote safer clinical learning environments.

Materials and methods

Study design

A quantitative, cross-sectional descriptive research design was employed to assess nursing students' perceptions and practices regarding workplace violence (WPV) prevention, as well as to identify associated sociodemographic factors. The cross-sectional design enabled the collection of data at a single point in time, providing a representative snapshot of students' attitudes, preparedness, and preventive behaviours. This design was chosen due to its efficiency in exploring prevalence patterns and associations within a defined population.

Study setting and population

The study was conducted at Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP), a private higher education institution offering diploma and bachelor's degree programmes in nursing. The target population consisted of nursing students who had completed at least one clinical placement, ensuring participants had direct exposure to clinical environments where WPV might occur. Students from both diploma and bachelor's programmes were eligible to participate.

Sampling method and sample size

A convenience sampling technique was utilised to recruit participants. This approach was chosen due to accessibility and logistical feasibility within the study's timeframe. From an estimated 680 eligible nursing students, a sample size of 246 was calculated using OpenEpi software with a 95% confidence interval and a prevalence estimate of 51.6% from prior literature [9]. A total of 245 students completed the questionnaire, representing a high response rate that enhanced the reliability of the findings, although generalisability remains limited due to the non-probability sampling approach.

Research instrument

Data were collected using a structured, self-administered questionnaire adapted from the validated tool by Mohamad Yazid et al, [11], with modifications to suit the nursing student context (for example replacing "healthcare worker" with "student nurse") and removing items not applicable to students' roles (e.g., managerial responsibilities). To ensure the adapted instrument's reliability and validity, a pilot test was conducted with 30 nursing students from a comparable institution. Internal consistency was verified using Cronbach's alpha, yielding $\alpha = 0.91$ for the overall scale, indicating excellent reliability. Construct validity was confirmed through expert review by three nursing education and occupational safety specialists. The instrument comprised 53 items divided into two main domains:

1. Perception Domain (33 items): Covered subdomains such as forms of WPV, causes, impacts, benefits of prevention, barriers to prevention, high-strain job characteristics, reaction to WPV, protective measures, and encouragement for prevention.
2. Practice Domain (20 items): Addressed workplace safety measures, WPV prevention implementation, and incident reporting practices.

All items were rated on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Domain scores were calculated as percentages and categorised according to Bloom's cut-off: low (<60%), moderate (60–79%), and high (≥80%).

Data collection procedure

The questionnaire was distributed online between 1 December and 25 December 2024 via official class WhatsApp groups. Prior to participation, students received an explanation of the study purpose and were provided with the consent form embedded in the survey link. Only those who consented were able to proceed to the questionnaire.

Statistical analysis

Data were analysed using IBM SPSS Statistics version 25. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarise respondents' characteristics and domain scores. Inferential analyses included:

a.) Chi-square tests, to examine associations between sociodemographic variables (e.g., gender, age, education level, clinical experience) and perception or practice levels;
b.) Binary logistic regression, performed to identify independent predictors of good perception and good practice (dependent variables dichotomised as good = 1, poor/moderate = 0);
c.) Multinomial logistic regression, used as a supplementary analysis to confirm the robustness of results using all three perception categories (poor, moderate, good).

Statistical significance was set at $p < 0.05$, and all results were reported as adjusted odds ratios (aOR) or relative risk ratios (RRR) with 95% confidence intervals.

Ethical considerations

Ethical approval for this study was obtained from the Universiti Kuala Lumpur (UniKL) Research Ethics Committee (Approval No.: UNIKL REC/2024/PG/APV/01). All procedures adhered to the principles outlined in the Declaration of Helsinki. Participation was entirely voluntary, and informed consent was obtained from all respondents prior to data collection. The consent form clearly stated the study's objectives, the voluntary nature of participation, and the right to withdraw at any time without penalty. Data were anonymised and stored securely to ensure confidentiality.

Results

Demographic characteristics of respondents

The study included 245 nursing students from a private nursing college in Perak, Malaysia. The majority were female (n = 203; 82.9%), while males comprised 17.1% (n = 42), consistent with the global gender distribution in the nursing profession. Previous studies suggest that female nursing students may be more susceptible to verbal and psychological WPV compared to males [12]. The age distribution indicated that most students were between 18–20 years (n = 153; 62.4%), followed by 21–23 years (n = 81; 33.1%), and only 4.5% (n = 11) were above 24 years. This suggests that the majority were early in their clinical training, potentially affecting their WPV-related coping strategies.

Ethnically, the cohort was predominantly Malay (n = 240; 98.0%), with small proportions identifying as Indian (n = 3; 1.2%), Chinese (n = 1; 0.4%), and other ethnicities (n = 1; 0.4%). In terms of educational level, 58.4% (n = 143) were diploma students, and 41.6% (n = 102) were pursuing bachelor's degrees. Semester distribution showed the largest proportion in semester three (n = 96; 39.2%), followed by semester one (n = 69; 28.2%) and semester five (n = 35; 14.3%). Only 0.8% (n = 2) were in semester six, and 8.6% (n = 21) in semester seven. Regarding clinical placement, the vast majority (n = 233; 95.1%) had hospital-based postings, which are often high-risk environments for WPV [13, 14]. Only 4.9% (n = 12) had community-based placements. Most students (n = 179; 73.1%) had less than six months of clinical experience, while 26.9% (n = 66) had more than six months. A notable finding was that only 21.6% (n = 53) had received WPV prevention training, leaving 78.4% (n = 192) without formal preparation — indicating a major training gap in nursing education.

Perception towards WPV prevention

Perception was assessed using 33 Likert-scale items. The overall mean perception score was 68.4%, categorised as moderate based on Bloom's cut-off, suggesting general awareness of WPV but limited depth of understanding of prevention strategies. Within the perception subdomains, the highest score was for the Impacts

of WPV (mean = 89.1%), indicating strong awareness of the consequences, including physical harm, psychological trauma, and professional repercussions [15, 16]. The second-highest was the Benefits of WPV Prevention (mean = 83.1%), reflecting recognition of its role in creating safer workplaces and reducing organisational costs.

Workplace Violence Protection also scored relatively high (79.3%), while High-strain job characteristics (71.1%) and WPV Prevention Encouragement (69.7%) indicated moderate awareness. The lowest score was in Reactions to WPV (45.8%), highlighting limited knowledge on appropriate response mechanisms, reporting procedures, and post-incident support utilisation [9, 17].

Practice towards WPV prevention

The overall mean practice score was 81.5%, placing it in the high category. This suggests that students generally engage in WPV prevention behaviours, potentially influenced by observation and modelling from senior staff (Social Cognitive Theory) rather than formal training. The highest practice domain was Workplace Safety (82.5%), followed by WPV Prevention Implementation (82.2%), which included communication strategies, safety protocols, and environmental awareness [19, 20]. The lowest score was for Workplace Violence Reporting (75.0%), reflecting a common trend of underreporting in healthcare due to fear of repercussions, lack of clarity on procedures, or perceived ineffectiveness of reporting systems [18, 21].

The model in Figure 1, which presents conceptual framework of WPV illustrates the interrelationship between key determinants, the observed perception–practice gap, and the resulting consequences for nursing students' readiness to manage WPV. Educational level and clinical experience emerged as significant determinants of perception (p = 0.04 for both; Table 6), with Bachelor students and those having more than six months of clinical exposure achieving higher perception scores. Despite these positive influences, overall perception remained moderate (mean = 68.4%; Table 1), with the lowest subdomain score observed in reaction to WPV (mean = 45.8%), indicating limited confidence in managing incidents independently.

Conversely, preventive practice was high overall (mean = 81.5%; Table 2), with workplace safety (mean = 82.5%) and prevention implementation (mean = 82.2%) scoring highest. However, WPV reporting remained the weakest practice area (mean = 75.0%), reflecting possible cultural and institutional barriers to incident disclosure. Notably, no sociodemographic variable significantly influenced practice scores (Table 7), suggesting that once students are placed in clinical environments, standardised safety protocols promote uniform preventive behaviours across groups.

The framework underscores that the high practice–moderate perception disparity may stem from procedural adherence shaped by structured clinical environments rather than informed conviction. Without targeted interventions—such as WPV-specific training (currently received by only 21.6% of participants), mentorship, and robust reporting systems—students remain vulnerable to under preparedness, underreporting, and psychological distress. By addressing these determinants through curriculum integration, pre-placement orientation, and supportive institutional culture, both perception and practice can be enhanced, thereby reducing WPV-related harm and improving the resilience of the future nursing workforce.

Associations between sociodemographic variables and WPV perception and practice

Chi-square analysis revealed two statistically significant associations: (1) Education level was significantly associated with perception scores (p = 0.04), with bachelor's students demonstrating higher understanding than diploma students; (2) Clinical experience was significantly associated

with perception scores ($p = 0.045$), with those having more than six months of experience showing greater awareness and insight. No significant associations were found between sociodemographic variables and practice scores, suggesting that preventive behaviours may be influenced more by environmental and institutional factors than individual characteristics.

Furthermore, a binary logistic regression was performed to identify independent predictors of good perception and good practice towards WPV prevention (Table 6). Among the variables entered into the model, education level was the only statistically significant predictor of good perception. Bachelor-level students were significantly more likely to demonstrate good perception compared to diploma students (aOR = 114.5, $p = 0.030$). Although this high odds ratio may reflect small group differences or sparse data, the association direction remained consistent with prior evidence showing that higher academic training improves awareness and readiness towards WPV prevention. Other predictors, including gender, age, WPV training, semester, clinical experience, and clinical placement, were not statistically significant.

However, students with ≥6 months of clinical experience (aOR = 1.63, $p = 0.48$) and those with hospital placements (aOR = 9.93, $p = 0.13$) showed positive, though non-significant, trends toward better perception. For practice outcomes, none of the predictors were significant, suggesting that preventive actions may be more strongly influenced by institutional guidelines and standard operating procedures rather than individual characteristics. The overall model fit was acceptable, with Hosmer–Lemeshow $\chi^2(7) = 5.209$, $p = 0.634$, indicating good calibration. The model, however, did not achieve overall statistical significance (Omnibus $\chi^2(16) = 11.944$, $p = 0.748$) and explained approximately 9.4% of the variance (Nagelkerke $R^2 = 0.094$).

Additionally, to confirm the robustness of the binary model, a multinomial logistic regression was conducted using three perception categories (poor, moderate, good) (Table 7). Compared with poor perception, both bachelor-level education (RRR = 2.40, 95% CI: 1.20–4.82, $p = 0.013$) and ≥6 months of clinical experience (RRR = 1.95, 95% CI: 1.01–3.74, $p = 0.046$) were independently associated with good perception. No significant predictors were identified for moderate perception, suggesting that the strongest determinants of improvement occur between the lowest and highest perception groups. These findings corroborate the binary model, reinforcing that educational advancement and clinical exposure are central to developing students' understanding and awareness of WPV prevention.

Discussion and conclusion

This study contributes meaningfully to the workplace violence (WPV) literature by focusing on nursing students in a private institution in Perak, Malaysia (an under-represented yet highly vulnerable population in WPV research) [22,23]. We observed a clear disparity between domains: preventive practice was high (mean 81.5%), whereas perception was only moderate (mean 68.4%). Within perception, the highest means were recorded for the impacts of WPV (89.1%) and benefits of prevention (83.1%), while the lowest was reaction to WPV (45.8%). This pattern suggests students recognise the seriousness of WPV and the value of preventive measures but feel less confident about responding effectively during incidents. Similar gaps have been reported in Jordan and Turkey, where students frequently comply with safety procedures but feel underprepared in unstructured or high-pressure situations [22,24]. In our cohort, workplace safety (82.5%) and prevention implementation (82.2%) were the strongest practice subdomains, whereas reporting remained weakest (75.0%), mirroring international under-reporting linked to fear of retaliation, perceived

futility, and the normalisation of violence in clinical settings [17,25–28]. These findings align with Social Cognitive Theory, in which modelling and supervision can instil behaviours but deeper cognitive engagement and self-efficacy are required to translate observation into adaptive action [29–31].

Multivariate analyses were performed to identify independent determinants of perception. The binary logistic regression indicated that education level was the only statistically significant predictor of good perception (aOR = 114.5, p = 0.03). Although the overall model explained a modest proportion of variance (Nagelkerke R^2 = 0.094), the direction and magnitude reinforce the role of academic progression in shaping cognitive readiness for WPV prevention. Complementing this, the multinomial regression confirmed that both bachelor-level education (RRR = 2.40, 95% CI: 1.20–4.82, p = 0.013) and ≥6 months of clinical experience (RRR = 1.95, 95% CI: 1.01–3.74, p = 0.046) predicted good versus poor perception. Although the omnibus test for the binary model was not significant ($\chi^2(16) = 11.944$, p = 0.748), the convergence of binary and multinomial results strengthens confidence that educational exposure and prolonged clinical engagement driven the students' understanding of WPV (not demographic factors). The modest explanatory power points to unmeasured institutional and psychosocial influences (e.g., mentoring quality, safety culture, perceived organisational justice) that likely account for additional variance.

No sociodemographic predictors were associated with practice levels, consistent with reports from South Africa and Canada showing that clinical policies and supervision standardise preventive behaviours across student groups [34,35]. In other words, practice appears institutionally driven, whereas perception is education- and experience-sensitive. Notably, only 21.6% of respondents reported formal WPV prevention training. Given the documented risks (from verbal abuse to physical assault) during clinical placement this gap is concerning [10,36]. Prior studies show that structured, simulation-based WPV programmes improve both knowledge and confidence to de-escalate aggression [28,32,33,37,38]. Repeated or poorly managed exposure has been linked to stress, anxiety, and emotional exhaustion, with longer-term risks of burnout and attrition from the profession [39–42]. In Malaysia, where workforce shortages persist, failing to equip students with robust WPV competencies may exacerbate retention challenges and compromise patient care.

The persistently low reporting score underscores a "culture of silence." International evidence attributes under-reporting to retaliation fears, weak feedback loops, and scepticism that reports lead to change [25,27,43]. Ward culture strongly shapes students' safety behaviours; without explicit reinforcement from clinical instructors, students may absorb avoidance norms modelled by staff [43,44, 45]. Breaking this cycle requires confidential, easy-to-use reporting systems, zero-tolerance policies jointly upheld by nursing schools and hospitals, and mandated feedback to reporters. Jurisdictions that combined policy enforcement with routine training documented measurable reductions in WPV incidents, whereas settings without such structures continue to report persistent or rising rates [46,47, 48]. Although our study is local, its implications are global. For instance, the cross-cultural consistency of WPV from Europe to Asia and the Middle East which suggests that effective prevention rests on the same pillars of education, reporting, and institutional accountability [22,49,50].

In conclusion, nursing students demonstrate strong adherence to preventive procedures but only moderate cognitive readiness to anticipate and manage WPV. Education level and clinical experience which verified through binary and multinomial models have shape the perception, while practice remains largely a function of institutional protocols. The limited variance explained by sociodemographic and exposure variables indicates that organisational and psychosocial determinants deserve greater

attention. We recommend integrating comprehensive, simulation-based WPV modules early in the curriculum (particularly for diploma tracks), establishing transparent, non-punitive reporting systems, and embedding WPV prevention within hospital accreditation and supervision standards. Longitudinal and mixed-methods research should examine how perception evolves with repeated placements, how ward culture and mentoring influence reporting, and which educational designs best translate knowledge into confident, adaptive responses. By aligning education, policy, and culture, institutions can safeguard students and strengthen the resilience of the nursing workforce.

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Conflict of interest
None.

Authors' contributions
MNS was responsible for developing the concept and study design, conducting data collection, performing the analysis, and drafting the manuscript. DS contributed to data analysis and interpretation and participated in the critical review of the manuscript. HS contributed to drafting and reviewing the manuscript. All authors read and approved the final version of the manuscript.

Table 1. Demographic Characteristics of Participants (n = 245)

Variable	n	%
Gender		
Male	42	17.1
Female	203	82.9
Age Group (years)		
18–20	153	62.4
21–23	81	33.1
>24	11	4.5
Ethnicity		
Malay	240	98.0
Chinese	1	0.4
Indian	3	1.2
Others	1	0.4
Education Level		
Diploma	143	58.4
Bachelor	102	41.6
Semester of Study		
1	69	28.2
2	16	6.5
3	96	39.2
4	6	2.4
5	35	14.3
6	2	0.8
7	21	8.6
Clinical Placement Setting		
Hospital	233	95.1
Others	12	4.9
Clinical Experience		
<6 months	179	73.1
≥6 months	66	26.9
Previous WPV Prevention Training		
Yes	53	21.6
No	192	78.4

Note: WPV = Workplace Violence.

Table 2. Mean percentage scores for perception towards workplace violence (WPV) prevention domains in PPWVP (n = 245)

Domain	Min	Max	Mean	SD	Mean (%)
Impacts of workplace violence	2	10	8.9	1.5	89.1
Benefits of workplace violence prevention	5	25	20.8	4.0	83.1
Workplace violence protection	2	10	7.9	1.7	79.3
High-strain job characteristics	3	15	10.7	2.8	71.1
Workplace violence prevention encouragement	2	10	7.0	1.8	69.7
Barriers to workplace violence prevention	5	25	16.2	4.1	64.7
Form of workplace violence	8	40	25.3	7.6	63.2
Causes of workplace violence	3	15	9.4	2.5	62.3
Reaction to workplace violence	3	15	6.9	3.1	45.8
Overall score	33	165	112.9	17.7	68.4

Note: WPV = Workplace Violence; PPWVP = Perception and Practice of Workplace Violence Prevention questionnaire

Table 3. Mean percentage scores for practice towards workplace violence (WPV) prevention domains in PPWVP (n = 245)

Domain	Min	Max	Mean	SD	Mean (%)
Workplace safety	3	15	12.4	2.2	82.5
Workplace violence prevention implementation	15	75	61.6	10.3	82.2
Workplace violence reporting	2	10	7.5	1.6	75.0
Overall score	20	100	81.5	12.9	81.5

Note: WPV = Workplace Violence; PPWVP = Perception and Practice of Workplace Violence Prevention questionnaire.

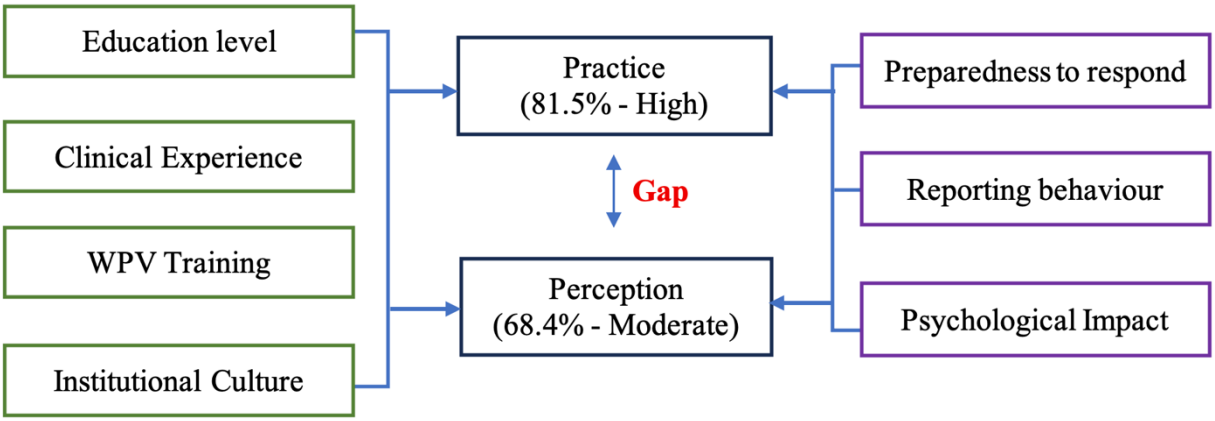

Figure 1. Conceptual framework illustrating the determinants, perception–practice gap, and consequences of workplace violence (WPV) prevention among nursing students in Malaysia.

Table 4. Perception Towards WPV Prevention by Sociodemographic Variables (n = 245)

Variable	n	Poor, n (%)	Moderate, n (%)	Good, n (%)	*p*-value
Gender					0.49
Male	42	6 (14.3)	29 (69.0)	7 (16.7)	
Female	203	34 (16.7)	148 (72.9)	21 (10.3)	
Age Group					0.84
18–20	153	26 (17.0)	112 (73.2)	15 (9.8)	
21–23	81	12 (14.8)	58 (71.6)	11 (13.6)	
>24	11	2 (18.2)	7 (63.6)	2 (18.2)	
Race					0.92
Malay	240	40 (16.7)	172 (71.7)	28 (11.7)	
Chinese	1	0 (0.0)	1 (100.0)	0 (0.0)	
Indian	3	0 (0.0)	3 (100.0)	0 (0.0)	
Others	1	0 (0.0)	1 (100.0)	0 (0.0)	
Education Level					**0.04**
Diploma	143	28 (19.6)	104 (72.7)	11 (7.7)	
Bachelor	102	12 (11.8)	73 (71.6)	17 (16.7)	
Semester					0.19
1	69	12 (17.4)	49 (71.0)	8 (11.6)	
2	16	6 (37.5)	9 (56.3)	1 (6.3)	
3	96	18 (18.8)	68 (70.8)	10 (10.4)	
4	6	1 (16.7)	4 (66.7)	1 (16.7)	
5	35	0 (0.0)	29 (82.9)	6 (17.1)	
6	2	1 (50.0)	1 (50.0)	0 (0.0)	
7	21	2 (9.5)	17 (81.0)	2 (9.5)	
Clinical Placement					0.05
Hospital	233	36 (15.5)	172 (73.8)	25 (10.7)	
Others	12	4 (33.3)	5 (41.7)	3 (25.0)	
Clinical Experience					**0.04**
<6 months	179	35 (19.6)	122 (68.2)	22 (12.3)	
>6 months	66	5 (7.6)	55 (83.3)	6 (9.1)	
WPV Prevention Training					0.73
Yes	53	10 (18.9)	36 (67.9)	7 (13.2)	
No	192	30 (15.6)	141 (73.4)	21 (10.9)	

Table 5. Practice Towards WPV Prevention by Sociodemographic Variables (n = 245)

Variable	n	Poor, n (%)	Moderate, n (%)	Good, n (%)	*p*-value
Gender					0.22
Male	42	1 (2.4)	22 (52.4)	19 (45.2)	
Female	203	2 (1.0)	81 (39.9)	120 (59.1)	
Age Group					0.29
18–20	153	3 (2.0)	70 (45.8)	80 (52.3)	
21–23	81	0 (0.0)	28 (34.6)	53 (65.4)	
>24	11	0 (0.0)	5 (45.5)	6 (54.5)	
Race					0.89
Malay	240	3 (1.3)	101 (42.1)	136 (56.7)	
Chinese	1	0 (0.0)	0 (0.0)	1 (100.0)	
Indian	3	0 (0.0)	2 (66.7)	1 (33.3)	
Others	1	0 (0.0)	0 (0.0)	1 (100.0)	
Education Level					0.95
Diploma	143	2 (1.4)	60 (42.0)	81 (56.6)	
Bachelor	102	1 (1.0)	43 (42.2)	58 (56.9)	
Semester					0.24
1	69	3 (4.3)	25 (36.2)	41 (59.4)	
2	16	0 (0.0)	3 (18.8)	13 (81.3)	
3	96	0 (0.0)	46 (47.9)	50 (52.1)	
4	6	0 (0.0)	4 (66.7)	2 (33.3)	
5	35	0 (0.0)	14 (40.0)	21 (60.0)	
6	2	0 (0.0)	1 (50.0)	1 (50.0)	
7	21	0 (0.0)	10 (47.6)	11 (52.4)	
Clinical Placement					0.92
Hospital	233	3 (1.3)	98 (42.1)	132 (56.7)	
Others	12	0 (0.0)	5 (41.7)	7 (58.3)	
Clinical Experience					0.89
<6 months	179	2 (1.1)	74 (41.3)	103 (57.5)	
>6 months	66	1 (1.5)	29 (43.9)	36 (54.5)	
WPV Prevention Training					0.14
Yes	53	2 (3.8)	20 (37.7)	31 (58.5)	
No	192	1 (0.5)	83 (43.2)	108 (56.3)	

Table 6. Multivariate binary logistic regression of factors associated with good perception towards WPV prevention (n = 245)

Predictor	B	Wald	*p*-value	Adjusted OR (Exp(B))
Gender (Male vs Female)	1.37	1.37	0.24	3.95
Age (≥ 21 vs < 21 years)	ns	–	> 0.45	–
WPV training (Yes vs No)	0.21	0.21	0.65	1.23
Education (Bachelor vs Diploma)	**4.74**	**4.74**	**0.030**	**114.5**
Semester (all levels)	ns	–	> 0.25	–
Clinical experience (≥ 6 months vs < 6 months)	0.49	0.49	0.48	1.63
Clinical placement (Hospital vs Other)	2.30	2.30	0.13	9.93

(Dependent variable: Perception (0 = Poor/Moderate, 1 = Good); ns = non-significant; model $\chi^2(16) = 11.944$, p = 0.748; Nagelkerke $R^2 = 0.094$; Hosmer–Lemeshow $\chi^2(7) = 5.209$, p = 0.634)

Table 7. Multinomial logistic regression for predictors of perception towards WPV prevention (n = 245)

Predictor	Moderate vs Poor (RRR = Exp(B))	95% CI	*p*-value	Good vs Poor (RRR = Exp(B))	95% CI	*p*-value
Gender (Male vs Female)	1.71	0.58–5.07	0.33	–	–	–
WPV training (Yes vs No)	0.74	0.31–1.78	0.50	–	–	–
Education (Bachelor vs Diploma)	ns	–	> 0.20	**2.40**	**1.20–4.82**	**0.013**
Clinical experience (≥ 6 months vs < 6 months)	0.37	0.13–1.05	0.06	**1.95**	**1.01–3.74**	**0.046**
Clinical placement (Hospital vs Other)	5.59	0.96–32.6	0.055	–	–	–

(ns = non-significant; RRR = Relative Risk Ratio)

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