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Evaluation of Knowledge, Prevalence, and Factors Associated with Occupational Hazards during Clinical Practices among Nursing Students in Bhutan: A Cross-sectional study

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ABSTRACT

Introduction: Occupational health hazards are risks and unsafe conditions that can harm individuals in the workplace. Nursing students face various occupational hazards during clinical placement, exposing them to risks such as infection, injury and psychological hazards. This study aimed to determine the level of knowledge on occupational hazards and evaluate the prevalence and factors associated with occupational hazards during clinical practices among nursing students. **Methods:** A descriptive cross-sectional study was conducted from March 2023 to June 2024 among nursing students enrolled in the Apollo Bhutan Institute of Nursing, Arura Academic of Health Sciences, Faculty of Nursing and Public Health, and the Royal Thimphu College. Data was collected using a self-administered questionnaire. The questionnaire included items related to physical, mechanical and psychological hazards as well as demographic variables. **Results:** Among 654 students, a high level of knowledge was reported regarding occupational hazards-specifically, needle-prick and sharp injuries (87.5%), falls due to slippery floor (92%) and psychological stress (94.2%). Logistic regression revealed that age was a strong and significant predictor of good knowledge score, whereas gender, institute and category were not associated with knowledge levels. The overall prevalence of exposure to physical, mechanical, and psychological hazards was found to be 81.2%, 70%, and 75.9%, respectively. **Conclusion:** The study demonstrated a high level of knowledge among nursing students regarding occupational hazards. However, the prevalence of exposure to physical, mechanical, and psychological risks remains substantial. These findings underscore the need to strengthen clinical supervision, manage clinical workload, and prioritize Hepatitis B vaccination by the institutions.

Keywords: *Bhutan; Hepatitis B vaccine; Nursing Education; Nursing Student; Occupational exposure*

INTRODUCTION

Occupational hazards are risky and unsafe conditions that can harm individuals in their workplace. In the health sector, they represent a major global concern, affecting physicians, nurses, laboratory staff, radiology staff, cleaners, and waste handlers. Health workers are at risk of biological, chemical, physical, ergonomic, and psychosocial hazards. According to the World Health Organization (WHO), health workers in low and middle income countries face a latent tuberculosis prevalence of 54%, which is 25 times higher than in the general population[1]. Musculoskeletal disorders, particularly chronic low back pain, affect 44–83% of nurses in African clinical settings[1]. Workplace violence is widespread, with 63% of health workers globally reporting incidents. During the COVID-19 pandemic, 23% of health workers suffered from depression and anxiety, while 39% experienced insomnia[1]. These hazards contribute to absenteeism, decreased productivity, and financial losses[1].

Nursing students, although still in training, face many of the same occupational hazards during their clinical placements. They may be exposed to infections, injuries, and psychological stressors that can affect both their well-being and academic performance[2,3]. As future frontline workers, their ability to recognize, prevent, and manage occupational hazards is critical. Curricula that incorporate occupational health and safety components are known to strengthen students' understanding of workplace hazards and promote safe practices during clinical placements.

During clinical placements, nursing students are particularly vulnerable to infectious hazards such as Hepatitis B, Hepatitis C, and HIV through needle stick injuries, improper waste handling, or improper use of Personal Protective Equipment (PPE)[4-6]. They may also experience musculoskeletal problems from lifting patients or equipment, slips or falls, and prolonged standing. Psychological hazards can also be a source of stress, anxiety, and emotional exhaustion[7,8].

Despite these concerns, no published studies have examined occupational hazards among nursing students during their clinical placements in Bhutan. This study aims to assess nursing students' level of knowledge and the prevalence of exposure to different types of occupational hazards in this setting.

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METHODS

Study Design

This is a cross-sectional study conducted from March 2023 to June 2024 in Bhutan.

Study Setting

There are four nursing institutes in Bhutan, under the Khesar Gyalpo University of Medical Sciences of Bhutan. These include Apollo Bhutan Institute of Nursing (ABIN), Faculty of Nursing and Public Health (FNPH), Royal Thimphu College (RTC), and Arura Academic of Health Sciences (AAHS). As part of their curriculum, nursing students from these institutions undergo clinical placements in hospitals after completing their theory classes. These clinical rotations, conducted on a biweekly basis, place students in various departments such as medical, surgical, orthopedics, ENT (ear, nose, and throat), obstetrics and gynecology, and pediatrics. Such clinical exposures are essential for building students' practical competencies and preparing them for professional practice.

Study population

Student nurses of the four nursing institutes in Bhutan were potential study participants.

Inclusion Criteria

All nursing students in their second, third, and fourth years from the four nursing institutes were eligible to participate.

Exclusion Criteria

First-year students from the nursing program were excluded as they are engaged only in theoretical coursework and not sent for clinical placement. In addition, in-service nurses were also excluded from the study as they have prior clinical experience and are already working in health care setting, which exposes them to occupational hazards at levels that differ from nursing students.

Data collection

Data was collected using a self-administered questionnaire developed specifically for the study. The questionnaire was pilot tested among a group of nursing students to assess clarity, relevance and feasibility. Necessary revisions were made accordingly. Reliability and internal consistency were evaluated using Cronbach's alpha, which yielded a coefficient of 0.82 indicating acceptable reliability. Thereafter, nursing students fulfilling inclusion criteria were approached to participate. After obtaining informed consent, the questionnaire was shared to gather data for the study.

Study tools

The research questionnaire consisted of three parts. Part 1 captured demographic information including age, sex, year of study, and institution. Part 2 consisted of 9 questions assessing students' knowledge of occupational hazards and safety. Each question was scored as correct (score = 1) and incorrect/don't know (score = 0), yielding a total score ranging from 0-9. Knowledge levels were classified as poor (0-3), fair (4-6) and good (7-9). Part 3 assessed the students' exposure to three categories of occupational hazards: physical hazards (6 questions), mechanical hazards (5 questions), and psychological hazards (5 questions). Responses were scored as yes (score = 1) and no/don't know (score =0).

Sample Size

All 657 nursing students enrolled across the four institutions were included to ensure full representation of the entire population of interest, and avoid selection bias. A total of 654 students completed the questionnaire- 232 from ABIN, 115 from FNPH, 165 from RTC and 142 from AAHS. A post hoc analysis using G power indicated an estimated power above 0.95, exceeding the conventional threshold of 0.80. As this was a cross-sectional study, the possibility of recall bias remains.

Statistical analysis

Data was double entered into Microsoft Excel for accuracy, then cleaned and coded prior to analysis. Statistical analysis was performed using SPSS version 23 (IBM Corp., Armonk, NY, USA). Descriptive statistics are reported as frequencies and proportions. Associations between categorical variables were analyzed using the chi-square test with a significance level of $p<0.05$. Factors associated with good knowledge of occupational hazards were analyzed using univariate and multivariate logistic regression analysis.

Ethical consideration

Administrative approval was obtained from the Ministry of Health, and ethical clearance was secured from the Institutional Review Board of the Khesar Gyalpo University of Medical Sciences of Bhutan (Ref. No: IRB/Approval/PN/2023/564 dated:12/02/2024).

RESULTS

Characteristics of study participants

A total of 657 nursing students were eligible for the study, of whom 654 completed the questionnaire, yielding a response rate of 99.5%. Of the respondents, 35.5% (n=232) were from ABIN, followed by 25.2% (n=165) from RTC, 21.7% (n=142) from AAHS and 17.6% (115) from FNPH.

As shown in Table 1, 78.0% of the respondents were female, and 94% of them were between 20-30 years of age. The largest academic groups represented were second year General Nursing and Midwifery (GNM) students (38.8%) followed by third year GNM students (24.5%). The remaining respondents were enrolled in the BSc Nursing and Midwifery program. More than half of the students (56.4%) had received Hepatitis B vaccination (Table 2).

Knowledge of Study Participants

The majority of students demonstrated a strong knowledge

Table 1: Demographic characteristics of the nursing students in the four nursing institutes of Bhutan, 2023 - 2024 (n = 654)

Characteristics	Total n (%)	ABIN n (%)	FNPH n (%)	RTC n (%)	AAHS n (%)
Gender					
Male	141 (21.6)	30 (4.6)	37 (5.7)	33 (5.0)	41 (6.3)
Female	510 (77.9)	201 (30.7)	77 (11.8)	132 (20.2)	100 (15.2)
Others	3 (0.5)	1 (0.2)	1 (0.2)	1 (0.2)	0
Age (years)					
<20	35 (5.4)	23 (3.5)	3 (0.5)	9 (1.4)	0
20 - 30	616 (94.2)	207 (31.7)	112 (17.1)	157 (24.0)	140 (21.4)
>30	3 (0.5)	2 (0.3)	0	0	1 (0.2)
Academic cohorts					
GNM 2nd year	254 (38.8)	143 (21.9)	20 (3.1)	0	91 (13.9)
GNM 3rd year	160 (24.5)	89 (13.6)	21 93.2)	0	50 (7.6)
BscNM 2nd year	83 (12.7)	0	17 (2.6)	66 (10.1)	0
BscNM 3rd Year	89 (13.6)	0	23 (3.5)	66 (10.1)	0
BscNM 4th Year	68 (10.4)	0	34 (5.2)	34 (5.2)	0

Table 2: Hepatitis B vaccination status among the nursing students in the four nursing institutes in Bhutan, 2023-2024 (n=654)

Vaccination status	Total n (%)	ABIN n (%)	FNPH n (%)	RTC n (%)	AAHS n (%)
Vaccinated	369 (56.4)	69 (10.6)	83 (12.7)	129 (19.7)	88 (13.5)
Not vaccinated	285 (43.6)	163 (24.9)	32 (4.9)	37 (5.7)	53 (8.1)

of occupational hazards encountered during their clinical placement. High awareness was observed for needle stick and sharp injuries (87.5%), falls due to slippery floors (92.0%), and stress or fear (94.2%). Additionally, over 90% were aware of the appropriate actions to be taken after exposure to blood or body fluids. Overall, 93% of participants achieved a good knowledge score as shown in Table 3.

Factors associated with good knowledge

A logistic regression analysis was performed where good knowledge was the dependent variable while gender, age, student category and institutes were considered independent variables. Multivariate logistic regression demonstrated that students older than 30 years were likely to have poor knowledge on occupational hazard (aOR 0.10, 95% CI 0.01-0.95; $p < 0.001$). Second and third year GNM students were 2.2 times more likely to have good knowledge compared to other groups, although this association was not statistically significant ($p>0.05$) as shown in Table 4.

Occupational hazards experienced by nursing students

The study assessed exposure to physical, mechanical and psychological hazards experienced by the nursing students. In terms of physical hazards, 18% of the students reported issues related to slippery floors, while 30.7% reported loud noise and 39% reported poor lighting conditions. A notable 490 students (74.9%) reported backache. The majority (71%) attributed the backache to prolonged standing, 14.1% to too much workload, and 2.8% to wound dressing. (Table 5).

Students reported sustaining pricks or cuts from broken ampoules, injection needles, infusion set needles, or scalpel blades during their clinical placement. Injuries commonly occurred while preparing injections (47.7%) followed by recapping needles (10.4%), blood sample collection (1.2%), and IV cannulation (1.7%). Additionally, 2.9% of students stated that they experienced needle stick injury often, while 61.3% encountered them sometimes. Reporting practices were concerning as only 33.8% of students consistently reported the incident to their staff/ supervisor. A large proportion of students (43.9%) reported them only sometimes, indicating under reporting in many instances as shown in Table 5.

More than half of the participants (55.4%) reported facing harassment or violence, including scolding, discrimination from the staff, supervisors, colleagues, or patients. As shown in Table 5, 20.9% reported that they intended to leave their studies

Table 3: Knowledge score on occupational hazards among the nursing students in the four nursing institutes in Bhutan, 2023-2024 (n=654)

Knowledge on occupational hazards	Response	Total	ABIN	FNPH	RTC	AAHS
		n (%)	n (%)	n (%)	n (%)	n (%)
Do you know what occupational health hazards and safety are?	Yes	608 (93)	216 (33)	105 (16.1)	154 (23.5)	133 (20.3)
	No	46 (7)	16 (2.4)	10 (1.5)	12 (1.8)	8 (1.2)
Do you know that a skin cut can cause an occupational hazard?	Yes	622(95.1)	214 (32.7)	108 (16.5)	162 (24.8)	138 (21.1)
	No	32 (4.9)	18 (2.8)	7 (1.1)	4 (0.6)	3 (0.5)
Are needle stick and sharp injuries in clinical practice a mechanical hazard?	Yes	572 (87.5)	196 (30)	98 (15)	153 (23.4)	125 (19.1)
	No	82 (12.5)	36 (5.5)	17 (2.6)	13 (2.0)	16 (2.4)
Are stress, fear, and anger examples of psychological hazards?	Yes	616 (94.2)	222 (33.9)	108 (16.5)	152 (23.2)	134 (20.5)
	No	38 (5.8)	10 (1.5)	7 (1.1)	14 (2.1)	7 (1.1)
Are back pain and injuries from fall due to slippery floor a physical hazard?	Yes	602 (92)	209 (32)	106 (16.2)	153 (23.4)	134(20.5)
	No	52 (8)	23 (3.5)	9 (1.4)	13 (2)	7 (1.1)
Do you know what measures you have to take if you accidentally sustain a needle stick injury?	Yes	613(93.7)	225 (34.4)	97 (14.8)	162 (24.8)	129 (19.7)
	No	41 (6.3)	7 (1.1)	18 (2.8)	4 (0.6)	12 (1.8)
Risk assessment assesses the significance of the injury status of both the patient and the health workers.	Yes	580 (88.7)	216 (33)	104 (15.9)	140 (21.4)	120 (18.3)
	No	74 (11.3)	16 (2.4)	11 (1.7)	26 (4)	21 (3.2)
Immediate care of exposure to blood or body fluids is washing well with soap and water	Yes	620 (94.8)	215 (32.9)	108 (16.5)	161 (24.6)	136 (20.8)
	No	34 (5.2)	17 (2.6)	7(1.1)	5 (0.8)	5 (0.8)
Manual lifting techniques for lifting an immobile patient are not sufficient to protect you from injury.	Yes	459 (70.2)	148 (22.6)	91 (13.9)	112 (17.1)	108 (16.5)
	No	195 (29.8)	84 (12.8)	24 (3.7)	54 (8.3)	33 (5)
Knowledge score	**Overall**		**ABIN**	**FNPH**	**RTC**	**AAHS**
Poor (0-3)	2 (0.3)		0	0	1 (0.15)	1 (0.15)
Fair (4-6)	50 (7.6)		21 (3.2)	10 (1.5)	10 (1.5)	9 (1.4)
Good (7-9)	602 (92)		211 (32.3)	105 (16.1)	154 (23.5)	132 (20.2)

Table 4: Factors associated with good knowledge on occupational hazards among the nursing students of Bhutan, 2023 – 2024 (n = 654)

Gender	n (%)	cOR (95%CI)	p-value	aOR (95%CI)	p-value
Female (Ref)	510 (78.0)				
Male	141 (21.5)	0.98 (0.83-1.16)	0.790	0.79 (0.55-2.23)	0.636
Age (years)					
<20 (Ref)	35 (5.3)				
20 - 30	616 (94.2)	1.28 (0.41-4.03)	0.790	0.80 (0.23-2.71)	0.796
>30	3 (0.5)	1.01 (0.10-9.01)	<0.001	0.10 (0.01-0.95)	<0.001
Category					
GNM 2nd year	254 (38.8)	1.20 (0.86-1.66)	0.329	2.29 (0.95-5.48)	0.065
GNM 3rd year	160 (24.5)	0.51 (0.24-1.01)	0.044	2.28 (0.95-5.48)	0.065
BscNM 2nd year	83 (12.7)	0.53 (0.21-1.39)	0.144	2.04 (0.72-5.82)	0.182
BscNM 3rd Year	89 (13.6)	0.62 (0.24-0.1.62)	0.287	1.71 (0.60-4.89)	0.319
BscNM 4th Year (Ref)	68 (10.4)				
Institute					
ABIN (Ref)	232 (35.5)				
FNPH	115 (17.6)	1.26 (0.71-2.24)	0.425	1.33 (0.64-2.77)	0.444
RTC	166 (25.4)	1.03 (0.62-1.71)	0.862	1.04 (0.53-2.06)	0.909
AAHS	141 (21.5)	0.80 (0.42-1.52)	0.579	0.75 (0.34-1.65)	0.477

due to the work hours and 35.6% reported that they were affected by the death of a patient.

The overall prevalence of physical hazards among the students was 81.2%, while mechanical hazards were reported by 70% and psychological hazards by 75.9% of the participants.

DISCUSSION

This study revealed a high level of knowledge regarding occupational health hazards, with 94.2% acknowledging stress or fear as psychological hazard, 92% identifying falls due to slippery floors, and 87.5% recognizing needle stick and sharp injuries as common hazards encountered in the clinical setting. These findings are comparable to studies in other regions, where nursing and medical students also reported high levels of knowledge on common occupational hazards and post-exposure prophylaxis[9,10].

Compared with findings from other countries, Bhutanese nursing students appear to have relatively higher levels of knowledge. For instance, a study conducted in Turkey reported a lower level of knowledge on occupational safety while a study in the Philippines noted that although 69% of students were aware of needle stick injuries, fewer were aware of the risks related to psychological stress and ergonomic risks[11,12]. Similarly, a study conducted in Riyadh found lower knowledge level than those observed among Bhutanese students[13]. This knowledge difference could be due to smaller class size, more focused safety training or curriculum integration of occupational health content in Bhutanese nursing institutions.

Despite a high level of knowledge of occupational hazards among the Bhutanese nursing students, the prevalence of occupational hazards remained high, with 81.2% of students reporting physical hazards, 70.0% reporting mechanical hazards, and 76.0% reporting psychological hazards. When compared with findings from neighboring countries where many Bhutanese nurses train, the results are similar, yet reveal some contextual distinctions. For instance, a study conducted among Indian nursing students reported needle-stick injury rates ranging from 63% to 75% and high rates (66.3%) of unsafe practices such as recapping needles[14,15]. Similarly, research conducted among doctors and nurses in Bangladesh reported widespread exposure to occupational hazards, particularly psychological hazards (56.1%) followed by physical hazards (13.8%)[16]. In Nepal, although 82% of nurses had adequate knowledge of biological hazards, nearly 70% have reported exposure to occupational hazards during clinical practice[17]. Nursing students identified stress related symptoms during clinical placement, with fears of making errors and lack of support as major contributing factors[17].

While knowledge levels varied across institutions in our study, logistic regression analysis showed no statistically significant association between knowledge scores and the nursing institute attended. This pattern is similar to those reported from studies in India and Nepal, where knowledge levels were

Table 5: Occupational hazards experienced by the nursing students during their training period in Bhutan, 2023 - 2024 (n=654)

Types of occupational hazards	Response	Total n (%)	ABIN n (%)	FNPH n (%)	RTC n (%)	AAHS n (%)
Physical hazards						
Did you face any fall/problem in your clinical practice due to a slippery floor?	Yes	118 (18.0)	30 (4.6)	17 (2.6)	39 (6.0)	32 (4.9)
	No	536 (82.0)	202 (30.9)	98 (15.0)	127 (19.4)	109 (16.7)
If your answer to Q1 is "YES":	Always	4 (3.4)	3 (0.5)	0	0	1 (0.2)
How often you have faced fall/ problem due to slippery floor?	Often	15 (12.7)	3 (0.5)	2 (0.3)	4 (0.6)	6 (0.9)
	Sometimes	99 (83.9)	24 (3.7)	17 (2.6)	39 (6.0)	31 (4.7)
Were you involved in transferring an immobile patient while providing patient care during your clinical practice?	Yes	463 (70.8)	132 (20.2)	103(15.7)	131 (20)	97 (14.8)
	No	127 (19.4)	68 (10.4)	2 (0.3)	24 (3.7)	33 (5.0)
	Sometimes	64 (9.8)	32 (4.9)	10 (1.5)	11 (1.7)	11 (1.7)
Have you faced any problem due to loud noise in clinical practice?	Yes	201 (30.7)	59 (9)	57 (8.7)	44 (6.7)	41 (6.3)
	No	453 (69.3)	173 (26.5)	58 (8.9)	122 (18.7)	100 (15.3)
Did you come across poor lightening while providing patient care during your clinical practice?	Yes	255 (39.0)	74 (11.3)	77(11.8)	56 (8.6)	48 (7.3)
	No	399 (61.0)	158 (24.2)	38(5.8)	110 (16.8)	93 (14.2)
Have you got back pain during your clinical practice?	Yes	490 (74.9)	188 (28.7)	105 (16.1)	97 (14.8)	100 (15.3)
	No	164 (25.1)	44 (6.7)	10 (1.5)	69 (10.6)	41(6.3)
If your answer to Q5 is YES:	Lifting patient	16 (2.4)	2 (0.3)	5 (0.8)	5 (0.8)	4 (0.6)
	Prolonged standing	349 (71.2)	143 (21.9)	65 (9.9)	71 (10.9)	70 (10.7)
	Wound dressing	18 (2.8)	5 (0.8)	6 (0.9)	2 (0.3)	5 (0.8)
What was the cause of your back pain?	Too much work	69 (14.1)	15 (0.8)	26 (4)	11 (1.7)	17 (2.6)
	Observing patients	16 (2.4)	11 (1.7)	1 (0.2)	2 (0.3)	2 (0.3)
	Fall injury	2 (0.3)	0	0	2 (0.3)	0
	Others	18 (2.8)	11 (1.7)	2 (0.3)	3 (0.5)	2 (0.3)
Total prevalence of physical hazard		Overall	ABIN	FNPH	RTC	AAHS
531 (81.2)		155 (66.8)	104 (90.4)	137 (83.0)	135 (95.1)	
Mechanical Hazard						
Did you have cut from broken ampoules/ injection needles/ infusion set needles/ scalpel blade during clinical practice?	Yes	408 (64.4)	137 (20.9)	94 (14.4)	89 (13.6)	88 (13.5)
	No	246 (37.6)	95 (14.5)	21 (3.2)	77 (11.8)	53 (8.1)

If your answer to Q1 is "YES": Which procedure you were involved during incident you have experienced?	Preparation for injection	312 (47.7)	122 (18.7)	79 (12.1)	56 (8.6)	55 (8.4)
	Recapping needle	68 (10.4)	9 (1.4)	6 (0.9)	28 (4.3)	25 (3.8)
	Taking laboratory sample	8 (1.2)	0	2 (0.3)	2 (0.3)	4 (0.6)
	IV canula insertion	11 (1.7)	2 (0.3)	5 (0.8)	2 (0.3)	2 (0.3)
	Assisting in minor surgical procedures	3 (0.5)	2 (0.3)	0	0	1 (0.2)
	Others	6 (0.9)	2 (0.3)	2 (0.3)	1 (0.2)	1 (0.2)
How often you have needle prick/cut injury during your clinical practice?	Always	3 (0.5)	1 (0.2)	1 (0.2)	0	1 (0.2)
	Often	19 (2.9)	8 (1.2)	3 (0.5)	2 (0.3)	6 (0.9)
	Sometimes	401 (61.3)	128 (19.6)	93 (14.2)	91 (13.9)	89 (13.6)
	Never	231 (35.2)	95 (14.5)	18 (2.8)	73 (11.2)	45 (6.9)
Have you informed the staff or your supervisor about your incident of needle prick/ cut injury during your clinical practice?	Yes	221 (33.8)	88 (13.5)	48 (7.3)	43 (6.6)	42 (6.4)
	No	146 (22.3)	32 (4.9)	36 (5.5)	43 (6.6)	35 (5.4)
	Sometimes	287 (43.9)	112 (17.1)	31 (4.7)	80 (12.2)	64 (9.8)
Did you use personal protective equipment while performing procedure?	Yes	490 (74.9)	193 (29.5)	78 (11.9)	131 (20)	88 (13.5)
	No	81 (12.4)	10 (1.5)	17 (2.6)	28 (4.3)	26 (4)
	Sometimes	83 (12.7)	29 (4.4)	20 (3.1)	7 (1.1)	27 (4.1)
Total prevalence of mechanical hazard		Overall	ABIN	FNPH	RTC	AAHS
458 (70.0)		168 (72.4)	71 (61.7)	136 (82.4)	83 (58.5)	
Psychological Hazard						
Did you face any problem during your clinical practice due to harassment (e.g: scolding, discrimination) from the staff/ supervisors/colleague and/or patients?	Yes	362 (55.4)	127 (19.4)	93 (14.2)	60 (9.2)	82 (12.5)
	No	292 (44.6)	105 (16.1)	22 (3.4)	106 (16.2)	59 (9.0)

If your answer to Q1 is "YES":						
How often have you faced the problem?	Always	11 (1.7)	3 (0.5)	3 (0.5)	2 (0.3)	3 (0.5)
	Often	77 (11.8)	24 (3.7)	29 (4.4)	13 (2)	11 (1.7)
	Sometimes	274 (41.9)	100 (15.3)	62 (9.5)	60 (9.2)	81 (12.4)
Are you fearful or experience extreme nervousness in giving care to any patient due to occupational hazard?	Yes	244 (37.3)	102 (15.6)	52 (8.0)	41 (6.3)	49 (7.5)
	No	363 (55.5)	108 (16.5)	53 (8.1)	112 (17.1)	90 (13.8)
	No Response	47 (7.2)	22 (3.4)	10 (1.5)	13 (2)	2 (0.3)
Have you ever intended to leave the institute due to heavy shift duty?	Yes	137 (20.9)	37 (5.7)	45 (6.9)	33 (5.0)	22 (3.4)
	No	517 (79.1)	195 (29.8)	70 (10.7)	133 (20.3)	119 (18.2)
Did a death of the patient worry you or are you affected by a death of the patient in the past?	Yes	233 (35.6)	85 (13.0)	66 (10.1)	40 (6.1)	42 (6.4)
	No	370 (56.6)	116 (17.7)	41 (6.3)	122 (18.7)	91 (13.9)
	No Response	51 (7.8)	31 (4.7)	8 (1.2)	4 (0.6)	8 (1.2)
Total prevalence of psychological hazard		**Overall**	**ABIN**	**FNPH**	**RTC**	**AAHS**
497 (75.9)		159 (68.5)	100 (87.0)	134 (81.2)	104 (73.2)	

more strongly influenced by age and year of study rather than institutional affiliation[18]. This may be attributed to several factors such as inadequate supervision during clinical placements, heavy workload, time constraints, and variable access to personal protective equipment, all of which may influence students' experiences regardless of their training institution.

A particularly concerning finding was that only 56.4% of participants reported receiving the Hepatitis B vaccine. This underscores a significant shortfall in essential preventive practices and highlights an urgent need for nursing institutions to strengthen vaccination programs to protect future health care workers from blood-borne infections.

The study findings underscore the importance of strengthening clinical supervision, managing clinical workload effectively, ensuring reliable and consistent access to PPE, reinforcing safety protocols, and fostering a supportive reporting culture. Additionally, preventive strategies such as ergonomic training, safe sharps handling practices, and securing vaccinations against blood borne infections for nursing students should be strengthened.

While the study provides important insights, its generalisability is limited to nursing students from the four institutions in Bhutan. Students from other disciplines such as allied health and community health programs were not included although they are also exposed to occupational hazards during their clinical placements.

CONCLUSIONS

This study highlights a concerning mismatch between nursing students' strong theoretical knowledge of occupational hazards and their high exposure to risks during clinical placement, underscoring the need for better translation of knowledge into safe clinical practices. Strengthening supervision, improving access to protective equipment, and increasing Hepatitis B vaccination coverage are essential steps to safeguard nursing students and promote a safer clinical learning environment.

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AUTHOR CONTRIBUTIONS

SZ: Concept, design, literature review, data collection, analysis, manuscript writing, editing, review
SZ: Literature review, data collection, analysis, manuscript writing, editing, review
KY: Literature review, data collection, analysis, manuscript writing, editing, review
Authors agree to be accountable for all respects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

None

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