ORIGINAL ARTICLE

KNOWLEDGE ON POST-EXPOSURE PROPHYLAXIS OF HEPATITIS B AMONG UNDERGRADUATE NURSING STUDENTS

Reena Mandal[1], Shusma Acharya[1], Aayushma Karki[1],

[1]*Department of Nursing, Manmohan Memorial Institute of Health Sciences, Soalteemode Kathmandu*

Received: October 17, 2025
Accepted: October 30, 2025
Published: December 15, 2025

✉ **Reena Mandal,**
Lecturer, Department of Nursing, Manmohan Memorial Institute of Health Sciences, Soalteemode, Kathmandu
Email: reenamandal901@gmail.com

https://doi.org/10.3126/jmmihs.v10i2.86793

How to Cite

Mandal, R., Acharya, S., & Karki, A. Knowledge on Post-Exposure Prophylaxis of Hepatitis B Among Undergraduate Nursing Students in a College. Journal of Manmohan Memorial Institute of Health Sciences, 2025, 10(2), 12–16. https://doi.org/10.3126/jmmihs.v10i2.86793

ABSTRACT

Introduction: Post exposure prophylaxis (PEP) is a treatment that can be used after possible exposure to the hepatitis B virus through sex, drug injecting equipment or injury such as needle stick injury. Post-exposure prophylaxis can help prevent hepatitis B to many health care workers after being exposed to hepatitis B virus. Due to the frequent contact with patients' blood, bodily fluids, needles, nurses are more susceptible to contact with HBV infection. The overall objective of the research was to assess the knowledge on post exposure prophylaxis of hepatitis B among undergraduate nursing students.

Method: A descriptive cross-sectional study was carried out among 148 nursing students in Manmohan Memorial Institute of Health Sciences using probability proportionate stratified random sampling technique. Ethical approval was taken from the Institutional Review Committee (IRC) of Manmohan Memorial Institute of Health Sciences, MMIHS. Informed consent was taken from the study participants. Data was collected using self-developed structured questionnaire from Jestha 20 to 32, 2081 (2024 June 2 to 2024 June 14). The collected data was analyzed in SPSS version 23.0 using descriptive statistics and inferential statistics chi-square test was done to explore the association between variables and interpretation was done.

Result: Out of 148 respondents, more than half(52.7%) had adequate level of knowledge on meaning of PEP(85.85%), common constituents of Hepatitis B PEP(77.7%),indication of PEP (72.3%), meaning of Hepatitis B Immunoglobulin (HBIG) (68.2%), route of HBIG(71.6%). But there was inadequate level of knowledge on efficacy of PEP(23.0%), types of exposure(12.2%), adequate value of HBsAg titre (10.8%), standard PEP for positive source patient and vaccinated exposed person with inadequate HBsAg titre (9.5%). There was statistically significant association between academic year (p=0.001), vaccination status(p=0.025) with level of knowledge on PEP.

Conclusion: About half of the respondents have inadequate knowledge on PEP of Hepatitis B, there is gap in knowledge on standard protocol of PEP. Therefore, nursing students should be updated on PEP by revising curriculum.

Key words: **Hepatitis B; nursing students; post-exposure; prophylaxis**

INTRODUCTION

Hepatitis B is a liver infection caused by a Hepatitis B virus that can be acute or chronic, with chronic, the risk of cirrhosis and liver cancer is increased. The virus can be transmitted through contact with infected body fluids but it can be prevented with a highly effective vaccine and post exposure prophylaxis. WHO estimates that 296 million people were living with chronic hepatitis B infection in 2019, with 1.5 million new infections each year, hepatitis B resulted in an estimated 8,20,000 deaths, mostly from cirrhosis and hepatocellular carcinoma. Post exposure prophylaxis (PEP) is a preventive measure to hepatitis B after being exposed to the hepatitis B virus through unsafe sex, drug injecting equipment or injury such as needle stick injury[1].

Health care personnel are at more risk to hepatitis B virus infection due to the frequent contact with patients' blood, bodily fluids and needles but can be prevented by using post-exposure prophylaxis. Vaccination is the best course of action for post-exposure prophylaxis in some cases, additional hepatitis B immune globulin is also administered. Nepal has lowest burden of hepatitis B(0.9%) although health care workers are at higher risk[2].

Despite evidence of the burden of hepatitis B infection, awareness of the disease and uptake of prevention services such as screening and vaccination remain neglected some what among HCPs. In order to prevent hepatitis B, the World Health Organization (WHO) advises immunizing high-risk populations, such as HCPs, both before and after vaccination. When administered correctly and on time, post- exposure prophylaxis can effectively prevent hepatitis B and the subsequent development of serious consequences. The prevention of prenatal and early childhood hepatitis infection, drug injectors, men who have intercourse with males, sex workers, and healthcare providers are all included in the hepatitis B PEP. One dose of hepatitis B immunoglobulin (HBIG) is given to unvaccinated exposed individuals after 24 hours of exposure as part of the preventive strategy. Three doses of the hepatitis B vaccination are then administered over a six-month period[3]. The most often contracted blood-borne infection is hepatitis B. A nurse has a 100 times higher risk of when exposed to HBV than HIV if she comes into contact with the blood of an HIV/HBV infected patient. Due to needle stick injuries, approximately 66,000 cases of Hepatitis B virus infections are documented annually. Nurses are more vulnerable among health care professionals. From the beginning of the academic careers, nurses are at risk[4].

Only regimens including HBIG and immune globulin (IG) have been investigated for unintentional percutaneous exposure. In this situation, a treatment consisting of two doses of HBIG, administered one month apart and one following exposure, is approximately 75% effective in preventing hepatitis B. If given within two weeks of the last sexual encounter with an individual who has acute hepatitis B, a single dosage of HBIG is 75% effective[5].

A cross-sectional study done in India among 297 nursing students showed that only 57.1% nursing students took post exposure prophylaxis after exposure to hepatitis B which shows that only half of the students were aware about post exposure prophylaxis[6].

A cross sectional study done in Chitwan found that 56% of nurses have poor knowledge of PEP of hepatitis B and more than quarter (38.8%) nurses knew that both HBIG and vaccine series are recommended for un-vaccinated nurses if source is HBsAg positive[7].

A cross sectional study done in Pokhara found that only 20% nursing students know the correct immediate measures

after needle stick injury and correct dose of post exposure prophylaxis[8].

Hence, only less knowledge regarding PEP of hepatitis B among nursing students was found, mainly nurses are less aware than other health personnel about PEP so there must be adequate knowledge about post exposure prophylaxis of hepatitis B among nursing students as they are the future nurses who are high risks groups for getting frequent contact with HBsAg positive patient and educator for public.

METHODS

A descriptive cross-sectional study design was used to assess knowledge of post - exposure prophylaxis of Hepatitis- B among undergraduate nursing students of Manmohan Memorial Institute of Health Sciences, Kathmandu. A total of 148 (BNS and B Sc.) nurses were selected using stratified proportionate random sampling technique. A Self-developed Structured and Self administered Questionnaire was distributed to selected nursing students and collected right after completion. The set of questionnaires consisted of 2 parts:

Part I: Questions related to socio-demographic variables includes age, religion, marital status, permanent address, programme of study, academic level, vaccination status and exposure of Hepatitis B related variables include work experience, in- service education, availability of PPE (Post Exposure Prophylaxis), availability of standard protocol, PEP related content, previous experience with exposure.

Part II: Questions related to knowledge on post exposure prophylaxis of Hepatitis B. A total of 23 questions were used to assess the level of knowledge which included all Multiple Choice Questions (MCQ).Ethical Considerations was maintained before, during and after data collection. Data was collected by the researcher using a self-administered structured questionnaire among undergraduate nursing students from 2081/2/20 to 2081/2/32 i.e.2024 June (2-14). Data was interpreted by using descriptive statistics (frequency, percentage, median and inter-quartile range) and inferential statistics (Chi- square test, Fisher's Exact test)

RESULTS

Table 1: Socio-demographic Variables of the Respondents

Variables	Number	Percent
Age (in completed years)		
<22 years	76	51.4
≥22 years	72	48.6
Median±IQR=22±4Q1=20,Q3=24		
Religion		
Hindu	138	93.2
Buddhist	5	3.4
Christian	2	1.4
Kirat	2	1.4
Muslim	1	0.7
Permanent address		
Urban	89	60.1
Rural	59	39.9
Vaccination status of HepatitisB		
Never vaccinated	59	39.9
Complete doses	52	35.1
Not known	23	15.5
Incomplete doses	14	9.5
Marital status		
Never married	128	86.5
Married/Living together	20	13.5
Programme of study		
BSc. Nursing	88	59.5
BNS	60	40.5
Academic level		
BSc^{1st} year	28	18.9
BSc^{2nd} year	28	18.9
BSc^{4th} year	28	18.9
BNS^{3rd} year	25	14.2
BNS^{2nd} year	21	9.5
BNS^{1st} year	14	6.5
BSc^{3rd} year	4	2.7

Table no 1 represents the socio- demographic variables of the respondents. The median age of the respondents was 22±4 with more than half (51.4%) of the respondents belong to age group of <22 years, almost all (93.2%) of the respondents belong to Hindu religion. Likewise, majority (60.1%) of the respondents belong to urban permanent residence, more than quarter (39.9%) of the respondents have never been vaccinated. Similarly, most (86.5%) of the respondents have never been married. More than half (59.5%) of the respondents are BSc. Nursing students.

Table 2: Respondents' Knowledge on Post- Exposure Prophylaxis of Hepatitis B

n=148

Variables	Number	Percent
Meaning of Post-exposure Prophylaxis (PEP)		
Preventive medical treatment started immediately after exposure to prevent infection#	127	85.8
Refers to increase immunity after the exposure to risk factor	10	6.8
Method of washing the site with antiseptic solution that is Exposed	2	1.4
Condition of using anti-viral medicines after the exposure	9	6.1
Common constituents of Hepatitis B PEP		
Antiviral medications	29	19.6
Immunoglobulin and vaccination #	115	77.7
Antibiotic medications	4	2.7
Corticosteroids	-	-
Indication of PEP in occupational settings for Hepatitis B		
Person exposed to any body fluids of HBsAg positive patient#	107	72.3
Person involved in care of HBsAg positive patient without contact to risk factors	30	20.3
Person came in contact to skin of HBsAg positive patient with gloved hands	7	4.7
Person who had complete HepatitisB vaccination	4	2.7
Efficacy of PEP		
75%#	34	23.0
85%	47	31.8
95%	39	26.4
More than 95%	28	18.9
Initiation time of PEP		
Within 42 hours after exposure	24	16.2
Within 24 hours after exposure #	67	45.3
Any time after exposure	9	6.1

Variables	Number	Percent
Within 72 hours after exposure	48	32.4
Types of exposure for healthcare professionals		
Percutaneous and mucocutaneous#	18	12.2
Occupational and non-occupational exposure	45	30.4
Intact skin and non-intact skin exposure	29	19.6
Invasive and non-invasive exposure	56	37.8

#correct response

Table 2 shows that the most (85.8%) of the respondents correctly answered the meaning of PEP. And the most (77.7%) of the respondents answered common constituents of PEP of hepatitis B. Similarly, majority (72.3%) of the respondents correctly answered indication of PEP in occupational settings for hepatitis B as person exposed to any body fluids of HBsAg positive patient. Less than quarter (23.0%) of the respondents know the efficacy of PEP correctly as 75%. Less than half (45.3%) of the respondents correctly answered the initiation time of PEP as within 24 hours after exposure. Only (12.2%) of the respondents answered correctly types of exposure as percutaneous and mucocutaneous exposure.

Table 3: Respondents' Knowledge on Hepatitis B Immunoglobulin (HBIG) and HBsAg titre

n=148

Variables	Number	Percent
Meaning of HBIG		
Is an immuno globulin that is used to prevent the development	101	68.2
Of hepatitis B after a cute exposure#	32	21.6
Is an immuno globulin to reduce potent of virus after exposure	6	4.1
Isan antibiotic to prevent further ingestion after exposure to	9	6.1
Route of HBIG		
Oral route	5	3.4
Intra muscular route#	106	71.6
Intra venous route	21	14.2
Sub cutaneous route	16	10.8
Adult dose		
0.04ml/kg/5mlforadults	33	22.3
0.06ml/kg/5mlforadults#	76	51.4
0.08ml/kg/5mlforadults	22	14.9
0.10ml/kg/5mlforadults	17	11.5
Common side effects		
Hairloss, weight loss, bleeding, bluish at the injection site	31	20.9
Nausea, tremor, vision problem, erythema, a cheat injection site#	112	75.7
Weight gain, anxiety	1	0.7
Tinnitus, hypotension	4	2.7
Meaning of HBsAg titre		
Test that detect sand measures antibodies of hepatitis B in blood#	82	55.4
Test that detects antigen of any viruses in the blood	51	34.5
Test that determine immunity of an individual	11	7.4
Test that measures the action of virus in the body	4	2.7
Adequate value of HBs Attire		
100mIu/ml	14	9.5
50mIu/ml	55	37.2
≤ 10mIu/ml	63	42.6
≥ 10mIu/ml#	16	10.8
Risk percentage after per cutaneous exposure		
5-10%	16	10.8
6-30%#	65	43.9
7-20%	48	32.4
8-15%	19	12.8

#correct response

Table 3 states that majority (68.2%) of the respondents correctly answered meaning of HBIG. Majority (71.6%) of the respondents correctly answered the route of HBIG as intramuscular route. Similarly, more than half (51.4%) of the respondents correctly answered the adult dose as 0.06%ml/kg/5ml for adults. Likewise, most (75.7%) of the respondents correctly answered the common side effects of HBIG as nausea, tremor, vision problem, erythema, ache at injection site. More than half (55.4%) of the respondents answered correctly the meaning of HBsAg titre as test that detects and measures antibodies of hepatitis B in the blood. Similarly, only (10.8%) of the respondents answered correctly adequate value of HBsAg titre as>/equal to 10mIu/ml. Likewise, less than half (43.9%) of the respondents answered correctly risk percentage after percutaneous exposure as 6-30%.

Table 4: Level of Knowledge on PEP of Hepatitis B among the Respondents

Level of knowledge	Number	Percent
Inadequate(<12)	70	47.3
Adequate(≥12)	78	52.7
Median±IQR=12±4Q1=10,Q3=14		
Total	148	100.0

Table 4 shows respondents knowledge on PEP of Hepatitis B. The respondents level of knowledge was categorized on the basis of median score (12±4). Among 148 respondents, more than half (52.7%) of the respondents have adequate knowledge on PEP of Hepatitis B while less than half(47.3%) of the respondents have adequate knowledge on PEP of Hepatitis B.

Table 5: Association between Level of Knowledge with Socio-demographic Variables of the Respondents

Variables	Level of Knowledge		χ^2	p-value
	Inadquate (%)	Adequate(%)		
Age (In completed years)				
<22years	41(53.9)	35(46.1)	2.772	0.096
≥22 years	29(40.3)	43(59.7)		
Religion				
Hindu	63(45.7)	75(54.3)	1.498	0.306#
Others***	6(66.7)	3(33.3)		
Address				
Rural	32(54.2)	27(45.8)	1.896	0.169
Urban	38(42.7)	51(57.3)		
Programme of study				
Bachelor of nursing in science(BNS)	24(40.0)	36(60.0)	2.156	0.097
Bachelor in scienceof Nursing(BSc.)	46(52.3)	42(47.7)		

Variables	Level of Knowledge		χ^2	p-value
	Inadquate (%)	Adequate(%)		
BNS First Year	7(50.0)	7(50.0)		
BNS Second Year	10(47.6)	11(52.4)		
BNS Third Year	7(28.0)	18(72.0)		
BSc. Nursing First Year	24(85.7)	4(14.3)		
BSc. Nursing Second Year	10(35.7)	18(64.3)	23.38	0.001*
BSc. Nursing Third Year	2(50.0)	2(50.0)		
BSc. Nursing Fourth Year	10(35.7)	18(64.3)		
Vaccination status				
Never vaccinated	34(57.6)	25(42.4)		
Complete doses	22(42.3)	30(57.7)		
Incomplete doses	2(14.3)	12(85.7)	9.385	0.025*
Not known	12(52.2)	11(47.8)		

**Significant Note: P value is obtained from t-test and Anova analysis; denotes P significant at ≤0.05*

Table 5 shows that the association between academic level with level of knowledge was (p=0.001). Likewise, the association between vaccinated status with level of knowledge was (p= 0.025).

Table 6: Association between Level of Knowledge with Exposure of Hepatitis B related Variables of the Respondents

Variables	Level of Knowledge		χ^2	p-value
	Inadquate (%)	Adequate(%)		
Work experience(n=60)				
Yes	22(39.3)	34(60.7)	0.179	1.000
No	2(50.0)	2(50.0)		
In-service education of PEP(n=60)				
Yes	2(50.0)	2(50.0)	0.179	1.000
No	22(39.3)	34(60.7)		
Standard protocol regarding PEP in your clinical exposure				
Yes	21(46.7)	24(53.3)		
No	26(42.6)	35(57.4)	1.896	0.169
Do not remember	23(54.8)	19(45.2)		
Content of PEP in curriculum				
Yes	17(41.5)	24(58.5)		
No	31(46.3)	36(53.7)	1.481	0.477
Do not remember	22(55.0)	18(45.0)		
Vaccination status				
Never vaccinated	34(57.6)	25(42.4)		
Complete doses	22(42.3)	30(57.7)		
Incomplete doses	2(14.3)	12(85.7)	1.540	0.463
Not known	12(52.2)	11(47.8)		
Content of PEP in curriculum				
Yes	17(41.5)	24(58.5)	1.540	0.463
No	31(46.3)	36(53.7)		
Do not remember	22(55.0)	18(45.0)		
Exposed with HBsAg positive patient				
Yes	19(39.6)	29(60.4)	1.696	0.193
No	51(51.0)	49(49.0)		
Frequency of standard precaution to follow in your clinical institution				
Always	57(47.5)	63(52.5)	0.010	0.919
Sometimes	13(46.4)	15(53.6)		
Frequency of institution providing personal protective barrier				
Always	33(44.0)	42(56)	0.663	0.415
Sometimes	37(50.7)	36(49.3)		

**Significant Note: P value is obtained from t-test and Anova analysis; denotes P significant at ≤0.05*

Table 6 illustrates that there was no association found between exposure related variables and level of knowledge

DISCUSSION

In this study respondents studying in BNS third year had significantly higher knowledge levels (72.0%) compared to nursing students studying in other years with lowest knowledge level in 1st year (26.2%). This difference was statistically significant (p=<0.001). In the current study, finding shows that respondents who have incomplete doses have significantly higher knowledge levels (85.7%) compared to students who have never been vaccinated (42.4%). This difference was statistically significant (p=<0.025). In the current study the finding revealed that among 148 respondents ,more than half (52.7%) of the respondents have adequate knowledge on PEP while less than half(47.3%) of the respondents have inadequate knowledge on PEP whereas a study done among undergraduate dental students in India found majority (60.2%) of the respondents have adequate knowledge on PEP[8].

In regard of general information on PEP of Hepatitis B in this study the majority (85.8%) of the respondents correctly answered the meaning of PEP. A study done among nurses in Chitwan Medical College found that 33.6% of the respondents answered correctly regarding meaning of PEP[2].

In this study the majority (77.7%) of the respondents answered common constituents of PEP of hepatitis B. A study done among nurses in Chitwan Medical College where nearly one third (28.9%) nurses knew HBIG and Hepatitis B vaccine as the constituents of PEP for HBV[2].

In this study less than quartile (23.0%) of the respondents knew the efficacy of PEP correctly. One third of the respondents (30.4%) answered correctly about it in a study done among dental and nursing students in N.K.P. Salve Institute of Medical Sciences (NKPSIMS) and dental & nursing colleges, Hingna Road, Nagpur[9].

In this study less than half (45.3%) of the respondents correctly answered the initiation time of PEP. A study done in Chitwan Medical College where half of the respondents (50%) answered correctly2.A study done in N.K.P. Salve Institute of Medical Sciences (NKPSIMS) and dental & nursing colleges, Nagpur found that 49.3% students answered this question correctly[9].

Only (10.8%) of the nursing students answered correctly adequate value of HBsAg titre. A study done among nurses in Chitwan Medical College revealed that correct answer was given by less than half (43.1%) of the respondents[2].

In this study less than half (43.9%) of the respondents answered correctly risk percentage. A study done among nurses in Chitwan Medical College found that correct answer to percentage of getting HBV infection after needle stick injuries with known HBV infected person was 30%2. In this study less than half (42.6%) of the respondents correctly answered first contact person after exposure for risk assessment. A study done among nurses in Chitwan Medical College which revealed that only one third (33.6%) of the nurses knew about first contact person for risk assessment[2].

Similarly, the current study shows that more than half (56.8%) of the respondents answered baseline investigation after exposure. A study done among nurses in Chitwan Medical College where more than two third (68.1%) nurses had knowledge about it[2].

Likewise, more than half (59.5%) of the respondents answered correctly first-aid management after needle prick. A study conducted among respondents at a high education institution in the Western Cape Province, Africa has a finding where more than half(63.5%) of the respondents answered correctly about it[10].

Regarding standard protocol of PEP of Hepatitis B the findings revealed that more than half (51.4%) of the respondents answered correctly when source patient is positive and exposed person is unvaccinated. A study done in Chitwan Medical College found that more than quarter (38.8%) nurses knew that both HBIG and vaccine series are recommended for un-vaccinated nurses if source is HBsAg positive. In regards to follow up timing after taking PEP majority of the respondents (82.4%) answered correctly. Only 19.4% of the respondents correctly answered about it in a study done among dental and nursing students in N.K.P. Salve Institute of Medical Sciences (NKPSIMS) and dental & nursing colleges, Nagpur[9].

CONCLUSION

Based on the findings of the study, more than half of the nursing respondents have adequate level of knowledge on PEP of Hepatitis B. Although the findings show inadequate level of knowledge regarding the efficacy of PEP, types of exposure, adequate value of HBsAg titre, standard protocol of PEP for Hepatitis B. This study shows statistically significant association between level of knowledge with academic level and vaccination status.

RECOMMENDATIONS

IThe findings of this study can be used as a basis for informing the concerned authorities that curriculum need to be revised and PEP related content can be highlighted. The related content can be more focused to first year students.

REFERENCES

1. [WHO] World Health Organization.(2023).Hepatitis B Vaccine. Author. Retrieved March 18 ,2024 from https:www.who.int>Newsroom>Fact- Sheets/Detail/HepatitisB
2. Sharma, K., & Adhikari, S. (2019). Nurses Knowledge on Post Exposure Prophylaxis for Hepatitis B Virus Infection in Tertiary Care Hospital. Journal of Chitwan Medical College, 9(2), 72–78. https://doi.org/10.3126/jcmc.v9i2.24559
3. Queensland Government. (2017). Health and Wellbeing. Author. Retrieved March4,2024 from https://hdl.handle.net/20765/2653
4. [CDC]CentersforDiseaseControl andPrevention.(2022). HepatitisB Vaccine. Author. Retrieved March 18,2024 fromhttps://www.cdc.gov.hepatitisB
5. Potdar,P.A.,Potdar,A.B.,&Raikar,V.R.(2019). HepatitisBInfectionamong Nursing Staff of Tertiary Care Hospital in South India. Indian Journal of Public Health Research &Development , 10(10), 32-36
6. Anand, K., Jain, S., Garg, S.K., Kumar,A., & Mittal, C. (2020). India Assessment of Knowledge, Attitude and Practices regarding Hepatitis-B among nursing students. Journal of Dental and Medical Sciences 19(4) 30- 35.www.iosrjournals.orgDOI:10.9790/0853-1904013
7. Thapa, A., &Kaphle, H. P. (2021). Knowledge and Factors Associated with Compliance of Standard Precautions in Clinical Exposure among Proficiency Certificate Level Nursing Students of Pokhara, Nepal. Journal of Health and Allied Sciences, 11(1), 51–58. https://doi.org/10.37107/jhas.228
8. Fatima, A., Alam, S., Iftekhar, H., Tewari, R., Nisar Andrabi, S.-U., & Faraz, A (2021). Knowledge, practice, and awareness of dental undergraduate and postgraduate students toward post exposure prophylaxis and needle stick injuries:Adescriptivecross-sectionalinstitutionaldentalhospitalstudy. Journal of Oral Research and Review, 13(2), 106. https://doi.org/10.4103/jorr.jorr_4_20
9. Pande D. Effect Of Training On Awareness About Pep Against Hiv, Hbv & Hcv, Among Dental And Nursing Students. Journal Of Medical Science And Clinical Research. 2020;8(1).
10. Amer RK. Nursing students' knowledge and practices related to sharp object injury and management at a university in the Western Cape Province. Cape Peninsula University of Technology; 2019

ACKNOWLEDGEMENT

The Author would like to acknowledge Professor Dr. Dharma Prasad Khanal and Prof. Mandira Onta. Thanks to the MMIHS faculties, Statistician Sudip Khanal, and library, computer lab, and administrative staff. Appreciation to administration of Manmohan Memorial Institute of Health Sciences, and heartfelt thanks to the participants.

AUTHOR CONTRIBUTIONS

Reena Mandal took the overall responsibility for the study, including conceptualization, methodology development, analysis, and finalization of the manuscript. Sushma Acharya contributed to methodology design and tool preparation, while Aayusma Karki led the preparation of the theoretical framework, methodology, data collection and analysis, and report preparation.

CONFLICT OF INTEREST

All the authors declare no competing