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Prevalence, Awareness and Attitude of Tobacco Consumption with Modified Global Health Professions Student Survey among Medical Undergraduates in Bihar, Eastern India

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Abstract

Medical undergraduate students in India are aware of the risks and complications of tobacco consumption. They have a pivotal role to help patients in quitting tobacco. For evaluating this, GHPSS is a validated tool administered for only third year students, but very few studies were done in India using this exhaustive scale, with no separate validation for students of other semesters. So we determined the current level of tobacco consumption, attitude regarding training and curriculum about the cessation of tobacco product use among MBBS students of Bihar, along with validating the Modified GHPSS. 460 students aged 18-24 years were enrolled by Snowball sampling and asked seventeen questions online. This GHPSS was validated using Exploratory Factor Analysis, and internal consistency with Kuder-Richardson 20 Test. Around 8% were currently consuming any tobacco product, and 18.7% admitted to trying tobacco previously once. There is significant increasing trend of tobacco consumption with year of study (Mantel-Haenszel $\chi 2$ = 44.9, df 1, $p<0.001$. There was good attitude albeit low to moderate awareness about cessation of tobacco. Prevalence, Awareness and Attitude factors had good construct and discriminant validity in Modified GHPSS, with high factor loadings and significant Model fit test ($\chi 2$=215, df63, $p<0.001$), and RMSEA value showing good fit (0.072; 0.062-0.083). The internal consistency for questions on Prevalence was 0.853, Awareness 0.718, and Attitude 0.683. Thus an extensive gap has been found between awareness, attitude and practices of tobacco use among MBBS students in Bihar, and its cause needs to be elicited by further qualitative research.

Keywords: Tobacco consumption, MBBS students, Global Health Professions Student Survey, Smoking Cessation, Quitting tobacco, Construct Validity, Eastern India

Introduction

Tobacco use is the single largest preventable cause of death and disability. It kills around half of users worldwide. The majority of deaths from tobacco happen in low and middle-income countries.[1] Global Adult Tobacco Survey-2 (India) in 2016-17 showed that 267 million individuals aged 15 years and above, or 29% of the adult population are tobacco users. The deaths and disability from oral cancer have heavy social and economic costs. In the year 2017-18, the total economic costs attributed to tobacco use in persons aged more than 35 years was INR 1,77,341 crores, over 1% of the country's GDP. The gender distribution is drastically non-uniform, with men responsible for 91%, and women for 9% of the total

burden. Again, 93% burden was borne by age 35-69 years, and the rest 7% was by those aged 70 and above. Finally, even though tobacco products used most in India are Smokeless, they are attributed to 26%, and the Smoking tobacco products to 74% of the total economic costs.[2,3]

Medical undergraduate students in India are more aware than the general population about the risks and complications from tobacco consumption. These future physicians of the society have a pivotal role to help their patients in quitting tobacco, with the help of education and motivation. Smoking rates have shown a decline in physicians before the same in the general population since they are role models for society.[4] Medical students constitute a crucial demographic in society to determine the trend of tobacco consumption which predicts the future trends of smoking in communities.[5]

Rationale of the study

The Global Health Professions Student Survey (GHPSS) is a validated tool by the World Health Organization for the third year students of dentistry, medical, nursing and pharmacy courses all over the world. It is conducted in colleges during regular classes, and it follows an anonymous, self-administered format for data collection on tobacco consumption across six domains, namely prevalence, exposure, attitudes, behavior/cessation, curriculum/training and demographics.[6] India used this tool in February 2005 for surveying tobacco use among the eligible participants in the country for representation among different WHO regions. It revealed inadequate training by health professionals in patient cessation counseling techniques besides finding a high tobacco use prevalence.[7]

However, only small-scale studies were done in Armed Forces Medical College Pune, four randomly selected medical colleges in Chennai, and in healthcare profession students at Mangalore, Karnataka.[8–10] The WHO questionnaire has been modified every time according to local perceptions and language, but it had never been separately validated for students of other semesters. Since India is a multi-cultural place with differing lifestyles, customs and state-wise law enforcement on Tobacco restriction, we modified and shortened the GHPSS questionnaire, and validated the same in the state of Bihar using Exploratory Factor Analysis, while also determining the level of prevalence, awareness and attitude about tobacco consumption among the MBBS students of all the professional years in different medical colleges of Bihar.

Objectives

1. To determine the current level of tobacco consumption in MBBS students of Bihar
2. To evaluate their awareness regarding tobacco products, and their attitude regarding training and curriculum about the cessation of tobacco product use
3. To test for validity and reliability the modified Global Health Professions Student Survey (GHPSS) in MBBS students of Bihar

Methodology

Study setting and duration: This cross-sectional study was conducted among the undergraduate students studying MBBS in non-randomly selected medical undergraduate students in various central and state medical Colleges of Bihar. Data was collected from 21.09.2022 till 06.10.2022 (16 days). Data on tobacco consumption was collected using a pre-validated questionnaire (GHPSS) on online Google Form and disseminating it through known contacts and subsequent sharing on online platforms such as WhatsApp and Facebook.

Study population and Sampling frame: All the undergraduate medical students studying from 1st to final year, aged 18 to 24 years, in the medical colleges of Bihar were considered as our study population, while those in the medical colleges of Bihar who received the online Google form questionnaire were included as sampling frame. The age range was set so as to include only the youth population (15-24 years).[11] The individuals who received the form but did not give consent to participation, aged below 18 years or above 24 years, and those in internship were excluded from the study.

Sample size and Sampling technique: In a similar study done in Chennai, it was found that the prevalence of current cigarette smoking among students was 4.8%.[9] Taking p = 4.8%, 5% level of significance and 2% absolute precision, the final sample size was calculated to be 457. The online form was sent on contacts of MBBS students studying in any Bihar medical college, through social

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media channels like WhatsApp. The students participating were requested to share their known contacts of MBBS students to us, who in turn were shared the form online for participation. Thus Snowball Sampling Method was used for our study, and a total of 460 participants were included.

Study Tool: The Global Health Professions Student Survey (GHPSS) is an anonymous, pre-validated self-administered questionnaire for the data collection on tobacco consumption across six domains, namely prevalence, exposure, attitudes, behaviour/cessation, curriculum/training and demographics. The GHPSS was modified for the purpose of easier administration via online Google forms. It was administered anonymously, containing questions on socio-demographic details and Tobacco consumption. There were:

1. 4 questions on prevalence
2. 7 questions on awareness from training on tobacco use
3. 6 questions on attitude towards tobacco sale and consumption.

Case Definitions:

- Tobacco consumption is defined as the consumption of any tobacco products whether it be inhaled, sniffed or chewed or taken via any other means.
- Second-hand tobacco smoke comprises the smoke released from the burning tip of a cigarette between puffs and the smoke exhaled by the smoker.

These definitions were conveyed to the participants in the initial part of the form for clarification.

Data Analysis: The prevalence, awareness and attitude regarding tobacco were shown in frequency and percentage. Mean and Standard Deviation was used to represent continuous data. Chi-square test of association was used to find relationship between two categorical variables. Finally the GHPSS was validated using Exploratory Factor Analysis, and internal consistency using the Kuder-Richardson 20 Test. Data was first entered on Microsoft Excel 2019 and then analysis was done on JAMOVI software version 2.3.18. Significance level was set at $p<0.05$.

Ethical Considerations: There was no risk of the study to the participants, and approval for conduction of the study was taken from the Institutional Ethics Committee. Patient information and consent form was distributed within the online forms at the beginning. Those students who wished to participate in the study were then directed to the main questionnaire. All the data were collected anonymously, only mentioning their college, and stored in a password-protected computer with access only to researchers and research purpose.

Results

Among 460 students who participated in the study, 258 responses were from AIIMS Patna, 50 each from Patna Medical College and Nalanda Medical College, 47 from Indira Gandhi Institute of Medical Sciences, 22 from Darbhanga Medical College, and less than 10 responses from each of twelve other medical colleges in Bihar. The mean age of the participants was 20.3 (1.56) years; 65.4% were males and 33.9% were females. Majority of the responses were from the First (44.9%) and Second (37.3%) year students. Rest 11.3% and 6.5% responses were from the Third and Fourth year respectively. Again, around two-third participants were from urban area, and the rest (33%) from rural area of residence. Majority of the participants i.e. 83% were staying at hostel, 9% as Paying guest and the remaining 8% were day scholars studying in their respective colleges.

Figure 1 presents the responses to the first part of the GHPSS questionnaire. There were four questions on prevalence of consumption of tobacco among the participants. Only 37 students (8%) were currently consuming any tobacco product, and 86 (18.7%) admitted to trying tobacco once in the past. Coming to history of tobacco consumption in college, 55 (12%) students have used tobacco products in the previous one year. However, more than half of the participants (259, 56.3%) reported being exposed to second-hand or passive smoke at either residence or a public place.

We considered the result from the first question on prevalence and tried to find any association with the demographic characteristics of the participants. In Table 1 showing the demographic characteristics, we found that current smoking status was statistically significantly associated with the year of study of MBBS ($\chi2 = 55.2$, df 3, $p<0.001$). Here we can see

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the increasing trend of tobacco consumption with year of study (2.4% in First year, 5.2% in Second year, 26.9% in Third year and 30.0% in the Fourth year), and we used the Mantel-Haenszel Test for Trend which showed that it was also statistically significant ($\chi2 = 44.9$, df 1, $p<0.001$). The difference between the median age of smokers and non-smokers was statistically significant, as shown by Mann-Whitney U test (test value 4199, $p<0.001$). When we tried to find the reason behind it, we found significant difference in the median age of only First year students (difference=2, p=0.006). But in the rest, the median age differences are not significant. In both Second and Third years the age difference is 1, p values 0.148 and 0.435 respectively, whereas in Fourth year there is no mean difference and p=0.639. So the current MBBS year is acting as a confounder in the association between age and current smoking status.

In Table 2, the awareness and attitude of the MBBS students regarding training and curriculum on cessation of tobacco products have been determined. Around 74% participants reported that they were taught about the dangers of smoking and the importance of recording history of tobacco use in patients in their curriculum. But only half of the participants knew the reason behind smoking. Only 16.7% had received formal training in smoking cessation approaches to use with patients, but 58.5% had learnt through training that it was important to provide educational materials to support cessation to patients who want to quit smoking.

Even though there is low to moderate knowledge on how to deal with tobacco use in patients, more than 80% students felt that tobacco sale should be banned for adolescents, along with the advertising of tobacco. More than 90% said that health professionals should routinely advise their patients regarding tobacco products and get specific training on cessation techniques, and around 95% participants reported that smoking should be banned at public places. But 62% agreed that health professionals who indulge in smoking were less likely to advise patients to stop smoking. Overall there was a good attitude of the medical students towards restriction of tobacco use in patients and young population.

Table 3 shows the validity analysis of the modified GHPSS scale where the scale is first checked for meeting assumptions of Factor analysis. We chose to do Exploratory Factor Analysis (EFA) to test for the constructs of "Awareness" and "Attitude" by the scale. The Bartlett's Test of Sphericity $\chi2$ test value was 1981, df 136 and $p<0.001$, showing significant inter-item correlation. The Kaiser–Meyer–Olkin (KMO) measure of Sampling adequacy was 0.767, above the acceptable minimum of 0.50, and indicated good convergent validity of the items. We conducted principal axis extraction with oblimin rotation and applied parallel analysis of factors. The factor loadings of the Questions "Have you experienced second hand smoking at residence/public places?" (prevalence) and "Do you feel that health professionals who smoke are less likely to advise patients to stop smoking?" (Attitude) were less than 0.3. Upon removal of these two items, three factors were retained by EFA. High factor loadings were shown by first three questions on prevalence, all seven questions on Awareness about tobacco, and the first five questions on Attitude regarding tobacco use. The Model fit test was found to be statistically significant ($\chi2=215$, df 63, $p<0.001$), and the RMSEA value also showed good fit (0.072; 95% CI 0.062-0.083) of the model. The eigenvalues of the factors account for a cumulative 38.69% of the variance. Inter-factor correlation was highest among Prevalence and Attitude (-0.495), followed by Prevalence and Awareness (0.257), and least among Awareness and Attitude (-0.096). Considering that only one correlation was moderately high (>0.3), we concluded that the modified GHPSS had good discriminant validity among the three constructs. Figure 2 demonstrates the Scree plot showing the observed Eigenvalues of the factors compared to simulated Eigenvalues in Parallel analysis.

The three discrete factors obtained in Exploratory analysis were tested separately for reliability analyses first. Kuder-Richardson 20 test was used, which is equivalent to Cronbach's Alpha for binary outcomes. In Table 4, The internal consistency for questions on Prevalence was **0.853 (Good)**, Awareness was **0.718 (Acceptable)**, and Attitude was **0.683 (Questionable).** When reliability was tested for the overall scale, it was found that Attitude component was completely removed to get a final internal consistency of **0.739 (Acceptable)**.

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Figure 1: Prevalence of exposure to tobacco (n=460)

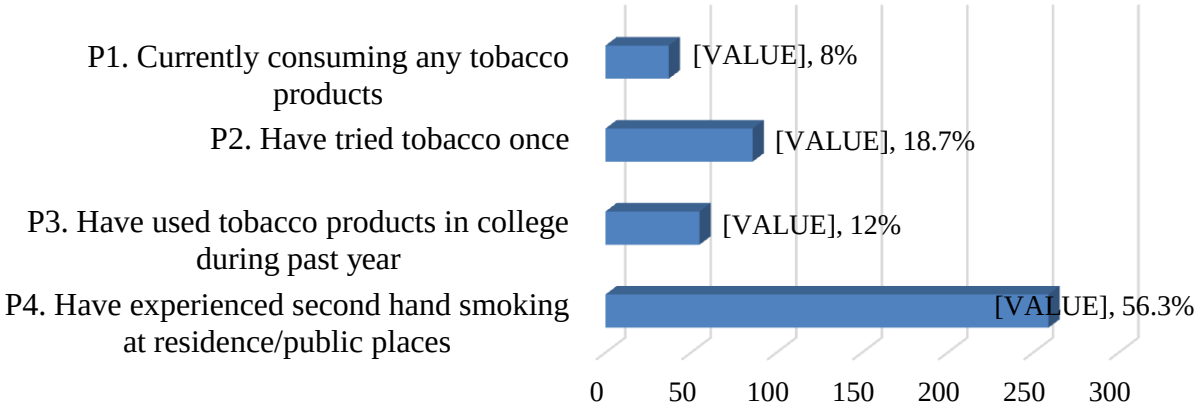

Table 1: Demographic characteristics of the study participants and association with current smoking status (n=460)

Characteristics	Categories	n (%) Current smokers (n=37)	n (%) Non-smokers (n=423)	$\chi 2$ (df), p value
Gender	Female	10 (6.4%)	146 (93.6%)	3.3 (2) 0.168*
	Male	26 (8.6%)	275 (91.4%)	
	Rather not say	1 (33.3%)	2 (66.7%)	
Current MBBS Year	1st professional	5 (2.4%)	201 (97.6%)	**55.2 (3) <0.001****
	2nd professional	9 (5.2%)	163 (94.8%)	
	3rd professional	14(26.9%)	38 (73.1%)	
	4th professional	9 (30.0%)	21 (70.0%)	
Area of permanent residence	Rural	10 (6.7 %)	140 (93.3%)	0.570 (1) 0.450**
	Urban	27 (8.7 %)	283 (91.3%)	
Type of residence	Day scholar	5 (13.9%)	31 (86.1%)	1.81 (2) 0.373*
	Hostel	29 (7.6%)	354 (92.4%)	
	Paying guest	3 (7.3%)	38 (92.7%)	
	Mean ± SD	**Current smokers (Median & IQR)**	**Non-smokers (Median & IQR)**	**Mann-Whitney U test (p value)**
Age (in years)	20.3 ± 1.56	22.0 (21.0-23.0)	20.0 (19.0-21.0)	**4199 (<0.001)†**

*Fisher's Exact Test ** Chi-square Test of Association

†The age distribution across current smokers and non-smokers groups is not normal on visual

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inspection of Q-Q plot. Age is left-skewed in Current smokers (-0.55) and right-skewed in Non-smokers (0.57), with no outliers.

Table 2: Level of awareness and attitude among the MBBS students regarding training and curriculum on cessation of tobacco products (n=460)

AWARENESS	n	%
AW1. During college, were you taught, in any of your classes, about the dangers of smoking?	341	74.1 %
AW2. During college, did you discuss, in any of your classes, the reasons why people smoke?	230	50.0 %
AW3. During college, did you learn that it is important to record tobacco use history as part of a patient's general medical history?	341	74.1 %
AW4. During college, did you ever receive any formal training in smoking cessation approaches to use with patients?	77	16.7 %
AW5. During college, did you learn that it is important to provide educational materials to support smoking cessation to patients who want to quit smoking?	269	58.5 %
AW6. Have you ever heard of using nicotine replacement therapies in tobacco cessation programmes such as nicotine patch or gum?	322	70.0 %
AW7. Have you ever heard of using antidepressants in tobacco cessation programs such as BUPROPION?	140	30.4 %
ATTITUDE		
AT1. Should tobacco sales to adolescents be banned?	390	84.8 %
AT2. Should there be a complete ban of the advertising of tobacco products?	390	84.8 %
AT3. Should smoking be banned at public places?	436	94.8 %
AT4. Should health professionals get specific training on cessation techniques?	439	95.4 %
AT5. Should health professionals routinely advise their patients regarding tobacco products?	422	91.7 %
AT6. Do you feel that health professionals who smoke are less likely to advise patients to stop smoking?	285	62.0 %

Table 3: Results of Exploratory Factor Analysis of the modified GHPSS scale items

Item	Factor Loadings			Communalities
	Factor 1	Factor 2	Factor 3	
P1	0.799			0.575
P2	0.709			0.631

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P3	0.945			0.905
AW1		0.519		0.289
AW2		0.535		0.285
AW3		0.507		0.265
AW4		0.507		0.313
AW5		0.685		0.453
AW6		0.423		0.186
AW7		0.422		0.220
AT1			0.540	0.371
AT2			0.621	0.365
AT3			0.674	0.502
AT4			0.550	0.277
AT5			0.414	0.166
Eigenvalues	3.22	1.74	0.84	**Total % of variance**
% of variance	21.48	11.58	5.63	38.69%

Principal axis extraction, oblimin rotation. Loadings <0.3 omitted. Parallel analysis of factors done for determining the number of factors in the scale. RMSEA value 0.072; 95% CI 0.062-0.083.

Figure 2: Scree plot showing the Observed Eigenvalues of factors compared to simulated Eigenvalues in Parallel analysis

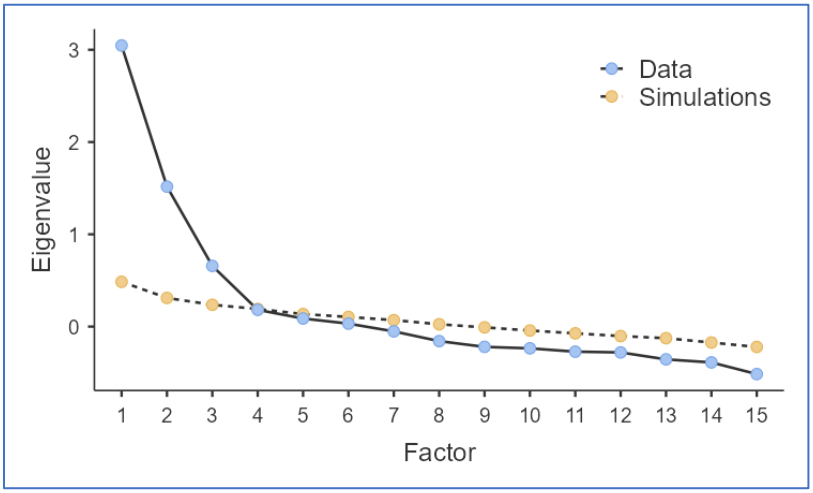

Table 4: Reliability analysis of Prevalence, Awareness and Attitude questions in Modified GHPSS

Factors	Item-total correlation	Kuder-Richardson 20 score
	Prevalence	
P1, P2, P3, P4	0.56, 0.64, 0.69, 0.21	0.689

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P1, P2, P3	0.69, 0.71, 0.82	**0.853**
	Awareness	
AW1, AW2, AW3, AW4, AW5, AW6, AW7	0.42, 0.43, 0.43, 0.44, 0.54, 0.36, 0.38	**0.718**
	Attitude	
AT1, AT2, AT3, AT4, AT5, AT6	0.46, 0.41, 0.51, 0.42, 0.33, 0.19	0.614
AT1, AT2, AT3, AT4, AT5	0.49, 0.47, 0.56, 0.43, 0.31	**0.683**
	Overall GHPSS	
P1, P2, P3 AW1, AW2, AW3, AW4, AW5, AW6, AW7	P1-P3: 0.31-0.44 AW1-AW7: 0.33-0.48	**0.739**

Discussion

Our study was conducted to highlight the prevalence of tobacco usage among medical students in Bihar regarding, and their awareness and attitude regarding cessation norms administered to patients who need to quit. Quitting tobacco is necessary to reduce morbidity, as it has been consistently linked to lung and oral cancer, cardiovascular diseases and premature mortality.[12] In GATS survey 2016-17, besides the prevalence of 11.9%, the odds were significantly higher in respondents 20-24 years age (OR: 2, 1.76-2.77) and who were primarily residing in rural areas.[13] Peto et al. has projected that the mortality from tobacco will cause 10 million deaths annually by 2030, and will keep on rising further in later decades.[14] This period from late adolescence to early adulthood is the most susceptible phase of life for initiation of tobacco use in India.[15] Varun Kumar et al. conducted a study in Delhi where they found that late adolescents using tobacco ever and currently were 16.4% and 13.1%.[12] Our study in medical students found prevalence of 8% and 18.7% respectively. We estimate the habit of tobacco use has been picked up during from adolescence itself, due to different factors which should be explored in depth. There is increasing trend of tobacco use with study year, that may indicate increasing pressure from peers as well as studies. The notable finding is that >50% are exposed to second-hand smoke, showing that the social acceptability of tobacco is quite high in that environment.

The strategies for cessation involve 5As and 5Rs, pharmacotherapy and telephonic follow-ups. The 5As ask about smoking status, advice patients to quit, assess willingness to quit at every level, assist with quitting with pharmacotherapy and counselling, and arrange follow-up visits after quitting.[16] If a physician gives advice, then it has profound impact, ranking it as a high-priority prevention, and considered as an effective public health intervention from the adolescence stage. Physicians are known to have better knowledge of health risks and less belief in the social value of smoking. Their involvement ensures more intentions and attempts to quit among the smokers.[8,17] This is why in Chennai, 75.6% thought health professionals served as a role model for patients, and 70.6% medical students agreed the health professionals who smoke are less likely to advise patients to stop smoking.[9] In our study, the latter result are almost similar i.e. 62%. Majority have been taught about the perils and importance of smoking history of patients, and were aware of the cessation approaches, but very few (16.7%) had any formal training in implementing them. This may be because more than 80% participants were from 1st and 2nd years, who were not exposed to clinical approaches yet. With even moderate knowledge, the participants had very good attitude towards cessation and ban of tobacco for adolescents, in public places and media.

The unmodified GHPSS questionnaire by WHO was used in previous studies, which had an exhaustive list

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of questions on prevalence(8), attitude(12), cessation statement(5) and curriculum training(7). Many questions were repeated with only different places, so we combined such questions into one, while we addressed the overlap of attitude and cessation statement questions by combining them into one segment. Here, we can see that question on second-hand smoking prevalence have been dropped due to low factor loading and in reliability, since there might be underlying relation between prevalence of active and passive smoking. Nevertheless it can be kept in the tool as it has high evidential importance. Even the question on if physicians who are smokers were less likely to advise patients, was removed from the modified tool, and had questionable reliability because of its redundancy due to similar previous questions under Attitude. All three sections of the questionnaire have good discriminant validity and are equally important in determining how medical students perceive the risk of tobacco and importance of smoking cessation. The questions on awareness shows more pragmatic results because of the gap in age and study years. As a medical student learns about the importance of quitting tobacco and how to achieve it, they will surely implement their awareness unto the patients and make the society healthier. This will lead to more changes in prevalence among the students themselves. Since these factors only account for only 38.7% of the determinants, we should focus on qualitative enumeration of unexplored factors behind these results and can further modify GHPSS to an even better scale with meaningful predictors.

There are a few limitations of the study. Non-probability sampling led to uneven distribution of students among medical colleges. Even the number of students are non-uniform years due to snowball sampling. The questionnaire was self-administered, so there could be some information bias despite it being response anonymous. However, administering among 460 participants have made it possible to validate GHPSS in Bihar, which further strengthens the findings of the study.

Conclusion

The GHPSS questionnaire has been modified and validated for East Indian scenario, while prevalence, awareness and attitude are representing three separate constructs in the MBBS population of Bihar. The items have shown good construct validity and internal consistency. On administering GHPSS, an extensive gap has been found between awareness, attitude and practices of tobacco use among MBBS students in Bihar, and its cause needs to be elicited by further qualitative research.

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