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# **Assessment of knowledge, attitude and practice towards occupational health hazards and safety measures among health care personnel working in public health facilities of Bhubaneswar Block, India**

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**Abstract**--Background: Healthcare personnel (HCP) are working in an environment that is known to be one of the most hazardous settings to work in. Occupational diseases are often under-reported; there are many reasons for the gross under notification, one of the main reasons being they are usually less obvious than other occupational accidents and injuries. Aims: To assess the knowledge, attitude and practice of HCP regarding different aspects of occupational health hazard and to find out various correlates for their knowledge, attitude and practice regarding occupational hazards and safety measures. Methods and Material: It was a descriptive cross-sectional study which was undertaken in public health facilities of Bhubaneswar Block, Odisha. The study was conducted for a period of one year. One hundred seventy two health care providers (both medical and paramedical with a minimum experience of six months) were included. Statistical analysis used: Descriptive statistics were used and Pearson chi-square test as the test of significance; taking a p value of < 0.05 as statistically significant. Results: Mean age of the respondents is 38.44 years with a standard deviation of 12.8. Majority of the participants had good knowledge (69%), positive attitude (61%) and good level of

practice (67%) towards occupational hazards and safety measures at their workplaces. Education and occupation were significantly associated with both knowledge and practice whereas age and occupation were associated with attitude. Conclusions: The overall level of knowledge, attitude and practice was quite satisfactory. However, still wider gaps exist that can be filled by implementing new policies relating to workplace hazards and safety.

**Keywords**--Occupational hazards, Health care personnel, Public health facilities, Bhubaneswar, Knowledge, attitude and practice.

## **Introduction**

In a report by World Health Organization (WHO), health care facilities employ about 59 million health care workers worldwide and health service providers account for 67% of all health workers globally.<sup>[1]</sup> India has an estimated health care work force of over 4.3 million serving a population of over 1.2 billion.<sup>[2]</sup> These health care workers are working at various levels of health care facilities (HCFs) ranging from primary to tertiary health services and community-based services. Healthcare personnel (HCP) are working in an environment that is known to be one of the most hazardous settings to work in. They are frequently exposed to a great variety of hazards at their workplace. The occupational hazards faced by the health care providers could be broadly divided into the following categories: biological, chemical and physical hazards, ergonomic factors and psychosocial hazards.<sup>[1,3]</sup>

Health care workers play a crucial role in the health care systems of any developing nation therefore; it is of major concern to protect health care providers from occupational accidents or hazards in developing countries. Although Healthcare providers are largely exposed to various risks, yet the protection of HCPs in these countries is largely neglected in national priorities for health care and by the international organizations that fund health care initiatives.<sup>[4]</sup> Occupational health hazards in the workplace are of critical public health concern worldwide. Occupational diseases are often under-reported; there are many reasons for the gross under notification<sup>[5]</sup>, one of the main reasons being they are usually less obvious compared with occupational accidents and injuries. Therefore, a robust system for the notification, compilation, and analysis of data on occupational accidents and diseases should be an important part of a national policy on occupational safety and health. Occupational surveillance and data are useful for identifying exposure risk and developing effective strategies for improved workplace safety.<sup>[6]</sup> Such information is often essential in determining the priority areas for preventing and controlling the risk factors. With this background, this study was undertaken

### **Objective:**

1. To assess the knowledge, attitude and practice of health care providers regarding different aspects of occupational health hazard in the health care setting.

2. To find out various correlates for their knowledge, attitude and practice regarding occupational hazards and safety measures.

### **Material and Methods**

The present study utilized a descriptive cross-sectional study design. The study was undertaken among health care providers working in public health facilities which included all the urban Primary Health Centres (UPHCs) and Community Health Centres (CHCs) of Bhubaneswar Block located in the Khordha district of Odisha State. There are total 282 health institutions present in Khordha district, out of which total 22 urban PHCs and 4 CHCs come under Bhubaneswar Block area, which were included for our study purpose. The study was conducted over a span of 1 year i.e. from January 2017 to January 2018. It comprised the health care providers working in the selected health facilities including medical as well as paramedical staff i.e. doctors, staff nurses/ANM, pharmacists, laboratory technicians and attendants.

### **Inclusion criteria**

- Those who have been working in public health facilities for at least 6 months.
- Those who are willing to give their consent.

### **Exclusion criteria**

- Administrative and technical healthcare workers, irrespective of their professions were excluded from the study.
- Those who were absent during all the 3 visits of the respective health facility (including maternity leave).

### **Sample size**

By considering the prevalence rate of overall occupational health hazards among healthcare providers as 70 %, based on the study done by Senthil A et al. in Southern India, [7] with confidence interval at 95 %, the sample size is calculated by using the formula\* [8]

$$N = \frac{Z^2_{1-\alpha/2} \cdot p \cdot (1-p)}{d^2}$$

With assumption of p as 70 % and d as 10 %, where

p= anticipated prevalence

Z  $1-\alpha/2$  = is standard normal variate at confidence interval of 95 % = 1.96

n= sample size required

d= relative precision= 10%

Therefore, 
$$N = \frac{Z^2_{1-\alpha/2} \cdot p \cdot (1-p)}{d^2}$$

$$= \frac{(1.96)^2 \times 70 \times 30}{7 \times 7} = 169.71 \approx 170$$

Hence, the sample size was calculated to be 170. Finally, 172 Healthcare providers agreed to participate in the study.

### **Data Collection and analysis**

All the urban Primary Health Centres (UPHCs) and Community Health Centres (CHCs) under Bhubaneswar Block were visited by the team of researchers and at least three consecutive visits were given in each health facility for data collection. Prior permission was obtained from the medical officer in-charge/ chief medical officer of the respective health facility after informing them about the need and purpose of the study. In the next three subsequent visits, each health care provider was approached and explained about the purpose and methods of the study before the start of the interview. The data was collected by face-to-face interview method after obtaining written informed consent. A pre-designed, semi-structured questionnaire was used to collect data on socio-demographic and personal profile of the respondent and their knowledge, attitude and practice. Filled questionnaire were checked for completeness and coded by the researcher.

The questionnaire respectively had 7, 16 and 9 questions on knowledge, attitude and practice of the respondents. The positive responses were coded as '1' while negative responses were coded '0' for knowledge and practice questions. So the total score for knowledge ranged from zero to seven (0-7), whereas the total practice score ranged from zero to nine (0-9). Attitude was measured as "Agree", "neutral" and "disagree" and 2, 0 and 1 score was given respectively. Total score for attitude ranged from zero to thirty-two (0-32).

The median (inter-quartile range) for attained knowledge score were 6 (5-7). So, a respondent's score below 6 was considered low and categorized into "poor knowledge" and a score equal to or greater than 6 was high and categorized as "good knowledge".<sup>[9]</sup> Similarly, a score of 29 (27-31) and 6 (5-7) were used to stratify the composite scores of attitude and practice into positive and negative, good and poor categories, respectively. Data was entered into Microsoft Excel spreadsheet and analyzed using SPSS 21[trial version]. Descriptive statistics were used and for bivariate analysis, Pearson chi-square test as the test of significance; taking a p value of < 0.05 as statistically significant.

### **Ethical considerations**

The study protocol was presented and approval was obtained from the Institutional Ethics Committee (IEC) of KIIT University, Odisha (Ref. No.: KIMS/KIIT/IEC/65/2016) before commencement of the study. Prior permission was obtained from the Chief District Medical Officer (CDMO), Khordha, Bhubaneswar and appropriate authorities of the health facilities.

### **Results**

Mean age of the respondents is 38.44 years with a standard deviation of 12.8. Majority of the participants (69.2%) belonged to 25-50 years age group and majorities were Hindu (99.4%). Around 69 % of the participants were general category, while rest belonged to other categories. Sixty four percent of the

participants were married and around 33 % were single. Majority were living in a nuclear family (52.3%). Only 1.7% of the respondents were not having any formal education, otherwise rest were literate. Major proportion of the respondents (36%) was formed by doctors, followed by nurses/ANM (23.8%). Around 29% of the participants were not trained on occupational hazards and prevention strategy. Majority of the participants were having monthly income less than 25,000 Rs (45.3%), working experience less than 5 years (40.7%), not working overtime (66.3%) and comfortable with job ( 86%) [Table 1].

The results of this table shows that majority of the participants (69.8%) had good knowledge of the occupational hazards and safety measures. The results showed statistically significant difference in the level of knowledge among healthcare workers of different age groups ( $p=0.003$ ) with higher proportion of health workers in the lower age groups (<25 years) having good knowledge (81.8%). Education ( $p=0.000$ ), occupation ( $p=0.000$ ) and working experience ( $p=0.001$ ) were significantly associated with the level of knowledge of the participants. On other hand, training on occupational hazard and safety measures ( $p=0.19$ ), working overtime ( $p=0.226$ ) and working in multiple facilities ( $P=0.864$ ) were not statistically significant when compared with the level of knowledge [Table 2]. Majority of the participants in this study (61%) had a positive attitude towards the occupational hazards and safety measures. Age and occupation of the respondents had a significant association with the attitude with  $p=0.017$  and  $p=0.026$  respectively. Education, training on occupational hazard and safety measures, working experience, working overtime and working in multiple facilities had no significant association with the attitude [Table 3].

As high as around 67% of the participants had a good level of practice towards the occupational hazards and safety measures. Health workers having diploma and above qualification were having good practices as compared to workers educated up to higher secondary and this difference was found to be highly statistically significant ( $p=0.000$ ). Similarly, occupation ( $p=0.000$ ) and training on occupational hazard and safety measures ( $p=0.014$ ) were also associated with good practice. Age, working experience, working overtime and working in multiple facilities were not having significant association with level of practice [Table 4].

Table 1: Socio-demographic and personal characteristics of health care personnel (n=172)

Characteristic	Frequency (%)	N (%)
Age in years		
< 25		22 (12.8)
25-50		119 (69.2)
>50		31 (18.0)
Gender		
Male		87 (50.6)
Female		85 (49.4)
Highest educational qualification		
No formal education		3 (1.7)
Up to higher secondary		23 (13.4)

Diploma	49 (28.5)
Bachelor's degree	55 (32.0)
Master's degree	42 (24.4)
Cadre of health care provider	
Doctor	62 (36.0)
Nurse/auxiliary nurse midwife	41 (23.8)
Lab technician	22 (12.8)
Pharmacist	25 (14.5)
Attendant	22 (12.8)
Monthly Income (INR) <sup>a</sup>	
< 25,000	78 (45.3)
25000-50000	44 (25.6)
> 5,0000	50 (29.1)
Working experience (years)	
< 5	70 (40.7)
5-10	36 (20.9)
≥ 5	66 (38.4)
Working overtime	
Yes	58 (33.7)
No	114 (66.3)
Working in multiple facilities	
Yes	62 (36.0)
No	110 (64.0)
Daily hours of sleep	
< 8	98 (57.0)
≥ 8	74 (43.0)
Family conflict	
Yes	30 (17.4)
No	142 (82.6)

<sup>a</sup>1 US Dollar = 74 Indian rupees (2021)

Table 2: Association between level of knowledge and socio-demographic variables of health care personnel (n=172)

Variables	Knowledge		X <sup>2</sup>	df	p value
	Good (n=120) n (%)	Poor (n=52) n (%)			
Age in years					
< 25	18 (81.8)	4 (18.2)	11.400	2	0.003*
25-50	88 (73.9)	31 (26.1)			
>50	14 (45.2)	17 (54.8)			
Education					
Up to higher secondary*	8 (30.8)	18 (69.2)	22.086	1	0.000*
Diploma and above #	112 (76.7)	34 (23.3)			

Occupation					
Doctor	48 (77.4)	14 (22.6)	35.188	4	0.000*
Nurse/ ANM	35 (85.4)	6 (14.6)			
Lab technicians	17 (77.3)	5 (22.7)			
Pharmacists	16 (64.0)	9 (36.0)			
Attendants	4 (18.2)	18 (81.8)			
Training on occupational hazard and safety measures					
Yes	91 (75.2)	30 (24.8)	5.724	1	0.19
No	29 (56.9)	22 (43.1)			
Working experience					
<5 yrs	57 (81.4)	13 (18.6)	14.374	2	0.001*
5-10 yrs	28 (77.8)	8 (22.2)			
>10 yrs	35 (53.0)	31 (47.0)			
Working overtime					
Yes	44 (75.9)	14 (24.1)	1.541	1	0.226
No	76 (66.7)	38 (33.3)			
Working in multiple facilities					
Yes	44 (71.0)	18 (29.0)	0.066	1	0.864
No	76 (69.1)	34 (30.9)			

\* For analysis purpose, "no formal education" category has been merged into it.

# diploma, bachelor's and master's degree has been clubbed into a single category.

Table 3: Association between Attitude and socio-demographic and personal variables of health care personnel (n=172)

Variables	Attitude		X <sup>2</sup>	df	p value
	Positive (n=105) n (%)	Negative (n=67) n (%)			
Age in years					
< 25	8 (36.4)	14 (63.6)	8.050	2	0.017*
25-50	80 (67.2)	39 (32.8)			
>50	17 (54.8)	14 (45.2)			
Education					
Up to higher secondary	12 (46.2)	14 (53.8)	2.857	1	0.126
Diploma and above	93 (63.7)	53 (36.3)			
Occupation					
Doctor	47 (75.8)	15 (24.2)	11.006	4	0.026*
Nurse/ ANM	20 (48.8)	21 (51.2)			
Lab technicians	10 (45.5)	12 (54.5)			
Pharmacists	16 (64.0)	9 (36.0)			
Attendants	12 (54.5)	10 (45.5)			
Training on occupational hazard and safety measures					
Yes	74 (61.2)	47 (38.8)	0.002	1	1.000

No	31 (60.8)	20 (39.2)			
Working experience					
<5 yrs	37 (52.9)	33 (47.1)	3.329	2	0.197
5-10 yrs	24 (66.7)	12 (33.3)			
>10 yrs	44 (66.7)	22 (33.3)			
Working overtime					
Yes	32 (55.2)	26 (44.8)	1.270	1	0.321
No	73 (64.0)	41 (36.0)			
Working in multiple facilities					
Yes	43 (69.4)	19 (30.6)	2.814	1	0.105
No	62 (56.4)	48 (43.6)			

Table 4: Association between level of practice and socio-demographic variables of health care personnel (n=172)

Variables	Practice		X <sup>2</sup>	df	p value
	Good (n=115) n (%)	Poor (n=57) n (%)			
Age in years					
< 25	15 (68.2)	07 (31.8)	2.487	2	0.309
25-50	83 (69.7)	36 (30.3)			
>50	17 (54.8)	14 (45.2)			
Education					
Up to higher secondary	6 (23.1)	20 (76.9)	26.501	1	0.000*
Diploma and above	109 (74.7)	37 (25.3)			
Occupation					
Doctor	50 (80.6)	12 (19.4)	46.063	4	0.000*
Nurse/ ANM	34 (82.9)	7 (17.1)			
Lab technicians	16 (72.7)	6 (27.3)			
Pharmacists	13 (52.0)	12 (48.0)			
Attendants	2 (9.1)	20 (90.9)			
Training on occupational hazard and safety measures					
Yes	88 (72.7)	33 (27.3)	6.339	1	0.014*
No	27 (52.9)	24 (47.1)			
Working experience					
<5 yrs	47 (67.1)	23 (32.9)	0.779	2	0.694
5-10 yrs	26 (72.2)	10 (27.8)			
>10 yrs	42 (63.6)	24 (36.4)			
Working overtime					
Yes	37 (63.8)	21 (36.2)	0.372	1	0.608
No	78 (68.4)	36 (31.6)			
Working in multiple facilities					
Yes	47 (75.8)	15 (24.2)	3.502	1	0.066
No	68 (61.8)	42 (38.2)			

## Discussion

In our study, most of the respondents were males and doctors, whereas Ngwa CH et al. showed in a similar study that most of the respondents were females and nurses.<sup>[10]</sup> The mean age of the respondents was 38 years, which was slightly higher than the findings reported by Aluko OO et al. as 33 years.<sup>[11]</sup> The reason for presence of large number of younger population in our study is that they constitute the active working age group in the country. Majority of the respondents in our study had a working experience of less than 5 years, which was almost consistent with the findings of Dhahir DM et al.<sup>[12]</sup>, whereas Gupta HV et al. concluded in their study that majority of the participants had working experience of 5-10 years.<sup>[13]</sup>

Our study demonstrated that majority of the participants (69.8%) had good level of knowledge about the occupational hazards and safety measures, which is consistent with the findings of Awan A et al. in Pakistan<sup>[14]</sup> and Sabita K et al. in Nepal.<sup>[15]</sup> This is in contrast with the findings of some similar studies, where proportion of health workers having high knowledge was around 57%.<sup>[11,16]</sup> This difference could be possibly because of the fact that a high proportion of healthcare workers had been trained on occupational hazard and safety measures in our study.

Age had a statistically significant association with the level of knowledge ( $p=0.003$ ) with majority of the respondents having good knowledge belonged to the lower age group i.e. less than 25 years (81.8%). This is comparable with the findings of Abuduxike G et al., where younger participants (<25 years compared with >30 years) shown a significantly higher tendency of having a satisfactory knowledge compared with other occupational groups.<sup>[16]</sup> In contrast to this, certain similar studies demonstrated that age of the participants did not have significant association with the level of knowledge.<sup>[13,15,17]</sup> Our study demonstrated that education had a significant association with the level of knowledge ( $p=0.000$ ) and people having education of diploma and above were having good level of knowledge as compared to others. This was in agreement with the findings of other studies.<sup>[11,17,18]</sup> Chelladurai UM et al. and Faris SH et al. concluded in their study that education did not have a significant association with the level of knowledge.<sup>[19, 20]</sup>

Occupation ( $p=0.000$ ) and working experience ( $p=0.001$ ) were significantly associated with the level of knowledge of the participants in the present study. Chelladurai UM et al. showed in their study that profession and experience had a significant association with the level of knowledge.<sup>[19]</sup> Abuduxike G et al. demonstrated that occupation had a significant association with knowledge.<sup>[16]</sup> Several other studies have also demonstrated that work experience had significant influence on the level of knowledge<sup>[13,17,21]</sup>, which further support our finding. In contrast to this, Obono M et al. found in their study that both occupation and work experience were not significantly associated with level of knowledge.<sup>[18]</sup>

On other hand, training on occupational hazard and safety measures ( $p=0.19$ ), working overtime ( $p=0.226$ ) and working in multiple facilities ( $P=0.864$ ) were not

statistically significant when compared with the level of knowledge. Asmr Y et al. also demonstrated that training was not associated with the level of knowledge of the participants.<sup>[22]</sup> Major proportion of the participants in this study (61%) was having a positive attitude towards the occupational hazards and safety measures, which is consistent with the finding of Nagwa CH et al. <sup>[10]</sup> Several other studies have demonstrated the proportion of people having positive attitude to be lower than the findings of this study.<sup>[14,16,19]</sup> Age and occupation of the respondents had a significant association with the attitude with  $p=0.017$  and  $p= 0.026$  respectively. Aluko et al. and Abuduxike et al. had a similar finding in which occupation was significantly associated with positive attitude.<sup>[11,16]</sup>

Education, training on occupational hazard and safety measures, working experience, working overtime and working in multiple facilities had no significant association with the attitude. Certain studies had similar findings in which age, education, working experience and occupation did not have a statistically significant association with the attitude of the respondents.<sup>[18-20]</sup> As high as around 67% of the participants had a good level of practice towards the occupational hazards and safety measures. This was higher than the findings of other similar studies, where proportion of respondents having good practice ranged from 25- 57 %.<sup>[14-16,18]</sup> Some of the factors that can be attributed to the good level of practice of participants in our study like fear of coming in contact with the diseases like HIV, HBV etc, difference in socio-demographic parameters, availability and supply of various equipments including personal protective equipments.

Education and occupation of the participants had a significant association with the practice and it was in agreement with the finding of Abuduxike G et al.<sup>[16]</sup>Obono M et al. demonstrated that both education and occupation was not associated with the level of practice.<sup>[18]</sup>Sabita K et al. and Faris SH et al. also showed that education did not have any association with practice.<sup>[15,19]</sup> Similarly, training on occupational hazard and safety measures ( $p=0.014$ ) was also associated with good practice and this finding was in agreement to the finding of Asmr Y et al and Beyamo A et al. in Ethiopia<sup>[22,23]</sup> but opposite to Faris SH et al. where training was not associated with the level of practice.<sup>[19]</sup>

Age and working experience were not having significant association with the level of practice in our study. This finding was in line with the findings of certain similar studies<sup>[13,16]</sup> but different than Beyamo A et al. where age and experience both had a positive association with the level of practice.<sup>[23]</sup> Similarly working overtime and working in multiple facilities were not having any association with level of practice.

### **Limitations**

The study had certain limitations. Being cross-sectional in nature, causal relationship could not be established. Our study findings could also prone to respondent's bias.

## Recommendations

Occupational health hazards can be avoided and prevented through taking essential precautionary measures. Promotion of safe healthcare practices can ensure occupational safety at the workplace and thus minimizing the risk of exposure to hazards. Therefore, government and other policy makers should ensure to provide support at all levels including adequate supply of personal protective devices, mandatory proper training and re-training of the staff on safety practices and enforcement of compliance to health and protection measures in the health care settings.

## Conclusion

The study has revealed that majority of the participants had good knowledge (69%), positive attitude (61%) and good level of practice (67%) towards occupational hazards and safety measures at their workplaces. Age, education, occupation and working experience were having significant association with the level of knowledge. Only age and occupation were associated with attitude of the participants and education, occupation and training had significant association with level of practice.

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