Health Risk Factors and Working Conditions among Employs of Hospitals and Nursing Homes: A Case Study of Gwalior

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ABSTRACT

We investigated general working conditions in the hospitals and nursing homes in Gwalior and assessed the health risk factors of employs in these hospitals April 2016 to August 2016. Sound Intensity Level (SIL) and light intensity was measured with sound and lux meter respectively. The temperature and humidity in hospitals and nursing homes was measured by thermo hygrometer. A pretested questionnaire was used to evaluate the health problems among the employs. Results indicated that employs in these hospitals were exposed to poor environmental conditions. The majority of these employs were suffering from musculoskeletal disorders, allergic reactions, respiratory disorders and other physical disorders.

Key words: Health Risk, Hospitals, Environment, Employs

ABBRIVATION

PPE= Personal Protective Equipments
WHO= World Health Organization
lx = lux
dBA = Decibel A weighted

INTRODUCTION

The person working in health sector constitutes about 12% of the work force in our country and is considered as one of the important profession [1]. However, working in this sector is not always safe and employs get exposed to different types of diseases and may vary according to the profession of the work itself and the unit of hospital where they are working. The possibility of getting different types of disease may occur due to the infections through contaminated needles, injuries with sharp instruments, or by mucosal splashes of infected body fluids [2, 3, 4]. Further, the presence of different chemicals used for diagnose and treatment of disease are also hazardous to employs health. The use of disinfectants, anesthetic agents, cytotoxic agents, drugs, some heavy metals like mercury, lead generated from hospitals aggravates the problems of hospital workers. Ionizing and non-ionizing radiation, noise, lighting, electrical assembly, slippery floors, temperature extremes, ventilation, vibration, and indoor pollution are the other physical factors that may cause risks to health professionals as well [5, 6, 7, 8].

Noise that disquiets people, complicates communication, restricts relaxation, adversely affects and harms the nervous system, reduces work efficiency, and creates different types of hearing problems. It is reported loudness has decreased the comfort level for patients and health professionals in hospitals over a period of time [7, 9, 10]. Moreover, the poor light and ventilation in different hospital rooms affects the health of patients and health professionals in terms of biological infections. The more harmonization is ensured between employer and work environment, the better the safety and efficiency that can be provided to employees [11, 12]. When there is inconsistency between the physical capacity of the laborer and the physical requirements of a job, occupational diseases may occur [13]. In particular, nurses are the third most likely after heavy industry workers and heavy vehicle drivers to experience musculoskeletal system problems [5, 14]. According to the 2002 report of the World Health Organization titled "Workplace Violence in the Health Sector," the International Labor Organization and the International Union of Nurses, it has been reported that more than 50% of health professionals have been exposed to violence [15]. It is reported that about 3%-17% of health professionals are exposed to physical violence, 27%-67% were vulnerable to verbal violence, 10%-23% were vulnerable to psychological violence, 0.78% were exposed to sexual violence, and 0.8%-

2.7% were exposed to ethnic violence [16]. The problems associated with this profession cause different long term impacts, job loss, decreased job satisfaction, anxiety, life-threatening injury, restlessness, anger, stress disorder, nightmares, sleep problems, and so on. The health employs have to work for a longer period of time without any rest may expose them to various types of musculoskeletal diseases. Apart from all the mentioned persons associated with this profession.

Further poor environmental conditions like poor ventilation, high intensity of noise, extreme temperature and poor management of wastes determine the already existing problems. Keeping the facts in view, a cross sectioned study was carried out to study the different types of health problems among hospital employs in Gwalior region.

Overall, there are 6 ergonomic (poor infrastructure), 29 physical (high noise, temperature, humidity, light), 25 chemicals (use of disinfectants), 24 biological (fungi and bacterial infection) and 10 kinds of psychosocial hazards are recognized in health sector [17]. The decrease in self-esteem, depression, somatic complaints, sleep disorders, and burn out are due to intense stress among health professionals. People in this profession usually use ineffective methods such as use of alcohol, tobacco, over eating to manage with stress and most of the time prefers to remain away from work. Hospital workers undertake various effective methods dealing with social activities, resting, relaxing, and cognitive coping techniques to deal with stress [18, 19]. This study will aware the employs about different health disorders and its relationship with poor environmental conditions. Hence, the aim of the present study was to investigate general working conditions in the hospitals and nursing homes of Gwalior and to assess the health risk factors of employs in these hospitals.

MATERIALS AND METHODS

Study area

The Gwalior City with a population of 2,032,036 have 53 government hospitals [Government main hospital (15), maternity hospital (03), schedule caste hospital (05), T.B hospital (01), urban health centers (08) and primary health centers (21)] and 198 private nursing homes during April 2016 to August 2016. The employs have to work for a period of 8 hours continuously in shifts and have to treat at least 200 patients of with different ailments and as such are vulnerable to large no of infectious diseases. Most of the people who are living below poverty line and who have moderate economy prefer to visit these hospitals for different types of treatments. Emergency cases are always being dealt by these hospitals regularly.

Assessment of Ergonomics and work environment: The methods that were used in the current study to assess the ergonomics include self-reports from workers were used to collect data on workplace exposure to both physical and psychosocial factors by consulting worker diaries, interviews and questionnaires, observational methods direct measurements using monitoring instruments like Sound level meter, light meter, thermo-hygrometer.

a. Measurement of temperature and Humidity, light and Noise intensity

Indoor temperature and Humidity were measured by an indoor thermo-hygrometer (Thermo-hygrometer (288, CTH, Instruments and Machinery Corporation, Maharashtra, India) in morning, afternoon and evening for 10 consecutive days during April – August, 2016 by following the methodology of Wani *et al*., 2015.

b. Measurement of light and Noise intensity

Light intensity was measured by using a Digital Lux Meter (MS 6610 Instruments and Machinery Corporation, Maharashtra, India) at an interval of 20-30 sec for 45 min. six independent measurements were taken to analyze the average light value.

c. Measurement of light and Noise intensity

Sound intensity level was measured by using a sound level meter (Sound Level Meter (SL 4010, Digital Sound Level Meter, LUTRON Taiwan Make Model SL - 4010, Range: 35-130 dB instruments) at an interval of 20-30 sec for 45 min. Six different independent measurements were taken to evaluate the average noise value. [20]

d. Measurement of health disorders

The universe of this cross-sectional and descriptive study was composed of 140 health professionals of different Governmental and non-Governmental Hospitals during April 2016 to August 2016. Permission and the ethical approvals were obtained from the Jiwaji University. A board of experts that comprised of primary health care physicians, general and occupational physicians from medical colleges of Gwalior safety engineers, and field level health care workers were consulted to construct a structured questionnaire about occupational health risks. Resources provided in the public domain of the World Health Organization (WHO), International Labor Organization (ILO), and National Institute for Occupational Safety and Health (NIOSH) websites on Occupational Health Risk Assessment were consulted to frame the questionnaire. Questionnaire and consent form was also given to health professionals to read and understand the aim and content of the study. Each participant signed the form which declares that they voluntarily participate in the study. The questions that were asked to the respondents are socio-economic , demographic and work related hazards.

e. Personal Protective Equipment Assessment:
Observation method was used to study the use of personnel protective equipment among the hospital and nursing home employs for a period of 2 hours a weekly interval for 3 months.

f. Statistical Analyses:
The statistical analyses in this study were performed using SPSS 22.0 software package. Categorical measures were shown in numbers and percentages whereas numerical measurements were shown using mean and standard error (and maximum and minimum where necessary). The relationship between two age groups is depicted through chi-square tests. The significance level was set at $p<0.05$.

RESULTS

Participant demographics:

A total of 140 male health workers in the age group of 30-60 years participated in the present study. The participants were divided into two age groups viz., 30-45 years and 46 -60 years. The average age was 35.15 in the age group 30-45 years and 50.91 years in the age group of 45-60 years with 1499.5 BMR and 1609.35 BMR, respectively (Table 1).

Table 1: Socio demographic features of health care employs

Parameter	Age	
	30-45 (N= 83)	46-60 (N= 57)
Age (years)	35.15	50.91
Height (feet)	5.5	5.59
Weight (Kg)	60.70	76.17
BMR	1499.51	1609.35
Smokers	14	19
Non smokers	69	38

Evaluation of temperature and humidity

Mean temperature during the study period was 26.4^{oC}, 29.7^{oC} and 32.12^{oC} in hospital corridor, patient ward and outside hospital respectively and the maximum temperature was 41.8^{oC} with minimum temperature of 22.4^{oC}. The average humidity at the study area was 60.62%, 59.17%, and 59.08% in hospital corridor, patient ward and outside hospital respectively during the study period (Table 2).

Table 2: Noise, light, temperature and humidity at different places in selected hospital and nursing homes

Places	Noise (dBA)			Light (lx)			Temperature (oC)			Humidity (%)		
	Average	Max	Min	Average	Max	Min	Average	Max	Min	Average	Max	Min
Hospital corridor	55.64±0.31	64.3	50.3	598.52±57.09	1983	108	26.4	32.3	22.4	60.62	86.1	38
Patient Ward	58.54±0.53	78.0	49.4	27.88±2.17	49.5	12.3	29.7	41.1	24.7	59.17	85	36
Outside hospital	64.61±0.51	77.9	50.7	1540.75±65.32	2091	780	32.12	41.8	25	59.08	84.8	35

Evaluation of Light and Noise intensity:

The mean level of light intensity in the hospitals and nursing homes was 598.52, 27.88, 1540.75 (lx) in hospital corridor, patient ward and outside hospital (Table 2). The minimum level of light intensity in the hospitals and nursing homes was 108, 12.3, 780 (lx) in hospital corridor, patient ward and outside hospital. Maximum level of light intensity in the hospitals and nursing homes was 1983, 49.5, 2091 (lx) in hospital corridor, patient ward and outside hospital. The mean sound intensity in the hospitals and nursing homes was 55.64, 58.54, 64.61 (dBA) in hospital corridor, patient ward and outside hospital. The minimum sound intensity (dBA) in the hospitals and nursing homes was 50.3, 49.4, 50.7 (dBA) in hospital corridor, patient ward and outside hospital. The maximum level of sound intensity was 64.3, 78.0, and 77.9 in hospital corridor, patient ward and outside hospital (Table 2).

Evaluation of Health risk factor

The evaluation of different diseases among hospital staff revealed that a good number of hospital staff is suffering from musculoskeletal disorders, allergic reactions, respiratory disorders and other problems. Back pain was found in 2.40 and 7.01% of the respondents in the age group of 30-45 and 46-60 years, respectively. Eye irritation was reported in 8.43 and 15.78% of the respondents in the age group of 30-45 and 46-60 years, respectively. Chest pain was reported in 3.61 and 8.77% of the respondents in the age group of 30-45 and 46-60 years, respectively. On an average Anxiety and headache was reported by 25.71% and 14.28% of the people who are working in different hospitals and nursing homes of Gwalior, respectively (Table 3).

DISCUSSION

The present work shows that poor environmental conditions and occupational health related problems are prevalent among the employs of different hospitals and nursing homes of Gwalior. The majority of the health related issues are due to poor working environment and working style of the employs. Further, this type of environment may aggravate the already existing problems of the patients admitted in these hospitals. Although, different diseases like respiratory and allergic reactions can be prevented by the proper usage of protective personal equipment, but only 20.48% and 21% of the employs were using PPE in the current study (Fig 1) and no protective measures are taken to minimize such incidents. Working in extreme temperature 41.8oC and high humidity (86.1%) has a high potential for inducing different health problems to the employs. High relative humidity may cause some physical disorder relative

humidity of the air directly affects temperature perception [21.[

Table 3: Prevalence of occupational diseases among health care employs

Complaints	Yes N= 140	Age (30-45) N=83	Age (46-60) N=57	*P value* <0.05
Musculoskeletal diseases				
Pain in fingers	2 (1.42)	0	2 (3.50)	***0.08***
Swelling tonsils	12 (8.57)	4 (4.8)	8 (14.03)	***0.066***
Swelling in your legs and feet	26 (18.57)	10 (12.04)	16 (28.07)	***0.030***
Pain in wrest	2 (1.42)	0	2 (3.50)	***0.08***
Back pain	6 (4.28)	2 (2.40)	4 (7.01)	***0.19***
Joint pain	48 (34.28)	15 (18.07)	33 (57.89)	***0.01***
Allergic reactions				
Occupational contact dermatitis	22 (15.71)	17 (20.48)	5 (8.77)	***0.06***
Eye irritation	16 (11.42)	7 (8.43)	9 (15.78)	***0.23***
Respiratory Disorders				
Chronic Bronchitis	2 (1.42)	0	2 (3.50)	***0.08***
Shortness of Breath	2 (1.42)	0	2 (3.50)	***0.08***
Shortness of Breath When Walking Fast and slow	4 (2.85)	1 (1.20)	3 (5.26)	***0.12***
Coughing	4 (2.85)	2 (2.40)	2 (3.50)	***0.71***
Chest Pain	8 (5.71)	3 (3.61)	5 (8.77)	***0.22***
Physical disorders				
Numbness	10 (7.14)	6 (7.22)	4 (7.01)	***0.82***
Injuries	26 (18.57)	17 (20.48)	9 (15.78)	***0.33***
Anxiety	36 (25.71)	28 (33.73)	8 (14.03)	***0.01***
General weakness	24 (17.14)	8 (9.63)	16 (28.07)	***0.01***
Weakness in any of your arms	12 (8.57)	7 (8.43)	5 (8.77)	***0.77***
Headache	20 (14.28)	16 (19.27)	4 (7.01)	***0.03***
Depression	12 (8.57)	8 (9.63)	4 (7.01)	***0.56***
Biological Hazards				
Sharp related injuries such as needle sticks cuts and wounds	16 (11.42)	6 (7.22)	10 (17.54)	***0.09***
Air borne diseases	36 (25.71)	23 (27.71)	13 (22.80)	***0.18***
Infectious Diseases\ blood borne Pathogens\vectors	16 (11.42)	9 (10.84)	7 (12.28)	***0.63***
Non Biological Hazards				
Stress	2 (1.42)	2 (2.40)	0	--
Physical. Psychological, Sexual or verbal abuse	2 (1.42)	2 (2.40)	0	--
Other chemical spills\noise\ burns and radiations	16 (11.42)	07 (8.43)	09 (15.78)	***0.23***

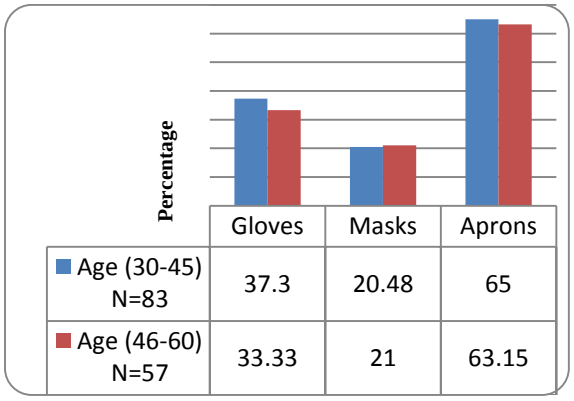

Fig. 1: Use of PPE by employs in hospitals and nursing home

This study revealed that health discrepancies are due to poor lighting conditions, unsuitable temperature and humidity, in these hospitals. Extremely low (below 20%) relative humidity may also cause eye irritation among the hospital employs [22, 23] and moderate to high levels of humidity is reported to reduce the severity of asthma [24, 20]. Moreover, due to high-temperature workers are compelled to adopt different harmful postures to retain and lose heat from their body that develops constriction of back muscles. The poor circulation of blood under such conditions may develop into back pain and joint pain among the employs in these hospitals. The questionnaire showed that musculoskeletal symptoms were common among employs. The workers within the hospital employs in Gwalior are also exposed to low level of light as compared with the standard mentioned in earlier reports. The poor level of illumination is very unhealthy for the type of work, which is performed by hospitals. The minimum level of light intensity in the hospitals and nursing homes was 108, 12.3, 780 (lx) in

hospital corridor, patient ward and outside hospital. The prevalence of eye irritation among 8.43% and 15.78% workers in the age group of 30-45 years and 46-60 years respectively may be also due to the low level of illumination in these hospitals. However, no significant difference at P<0.05 was observed between the two age groups. The observed humidity and temperature at the workplace were beyond the limit's sets by American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) [25]. Only few workers reported the problems of hearing loss in our study. The noise intensity at the workplace was well within the limits set by Central Pollution Control Board (CPCB) India. However, 11.42% staff reported that they are uncomfortable with the intensity of sound. The sound intensity in the health care centers is due to movement of people and machinery. Further, 95% of these hospitals are located close to main roads and link roads in Gwalior city.

Most of the employs reported experiencing exertion and tough work schedules in an inconvenient work environment with scanty career development prospects. This causes anxiety among one quarter of the employs in these health care centers. The anxiety was more (33.73%) among employs in the age group of 30-45 years than 46-60 years of age group i.e., 14.03%. A significant difference at P<0.05 was observed between the two age groups. This may be attributed to the fact that employs that are in the age group of 46-60 years have completed more than half tenure of their Job and most of them are reaching to the retirement age. On an average, 17.14% of the employs have reported general weakness due to the exertion and tight schedules with unsuitable work environment. Employs in the age group of 46-60 years reported more tiredness (28.07%) as with the passage of age people become more tired and a significant difference at P<0.05 was observed between the two age groups. However, majority of employs were satisfied with the work organization and reported better interpersonal relationship with associates.

Lack of knowledge and reluctance to use by gloves HCWs in these hospitals expose them to different injuries by sharp objects and needles. In this study, on an average 11.42% employees reported injuries due to sharp objects. These findings are in agreement with pervious other studies that have found similar nonconformity by employs to standard health precautions [26, 27, 28]. Nursing staff in these hospitals also reported incidents of attack by patients and their relatives, mostly during night shifts and attributed this to lack of security in the hospitals.

CONCLUSION

Our study indicated that people working in extreme poor environment are more prone to various occupational diseases. Further research is required to build up effective preventative or ergonomic strategies that may be applied to hospitals to decrease the incidence of occupational diseases among hospital employs. Therefore, there is an immediate need for government cooperation to provide a safer environment to employs in hospitals and nursing homes of Gwalior. There must be some provisions to use masks, earplugs, and proper uniform as personal protective equipment that may reduce the burden of diseases among workers. It is, therefore, crucial that workers be retrained with modules focused on occupational safety for hospital employs. Training must be provided by experienced occupational health specialists and they must educate hospital employs to identify occupational health hazards in their workplaces.

ETHICAL ISSUES

The study was approved by Jiwaji University, Gwalior (India) University Institutional Ethics Committee prior to data collection and informed consent was obtained from respondents.

CONFLICT OF INTEREST

There are no conflicts of interest.

AUTHORS' CONTRIBUTION

All contributors were involved in designing, conducting, analysis, and writing of this manuscript.

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REFERENCES

[1] Mollaoglu M, Fertelli TK, Tuncay FO. Evaluation of the perceptions of the nurses working at the hospital on their perception of their work. Fırat Saglik Hizmetleri Dergisi. 2010; 5(15): 17-30.

[2] Erol S, Ozkurt Z, Ertek M, Kadanalı A, Tasyanaran MA. Occupational contacts with blood and body fluids in health care workers. J Hosp Infect. 2005; 9(2): 101-06.

[3] Kokturk M, Kursun S, Yavuz M, Dramalı A. Investigation of Cutter Drill Injuries in the Health Care Workers at the Hospital. Izmir: 4th National Congress of Surgery and Operating Room Nursing; 2003: 305-15.
[4] Ortabag T, Gulessen A, Yava A, Bakir B. Exploring the frequency of sharps injuries and affecting factors among health care workers in a university hospital. Anatol. J. Clin. Investig. 2009; 3(4):208-12.
[5] Meydanlioglu A. Sickness and Security of Health Care Workers. Balikesir Journal of Saglik Bilimleri. 2013; 2: 192-99.
[6] Saglik M. Problems of health and safety in Saygun workshops. TAF Prev Med Bull. 2012; 11: 373-82.
[7] Parlar S. An Obsolete Situation in Health Care Workers: Healthy Work Environment. TAF Prev Med Bull. 2008; 7: 547-54
[8] Kunduracilar Z. Physical Hazards and Precautions and Precautions of Health Workers in Working Stage (Group Work-1). Ankara: 3rd National Congress of Saglik 3th Congress of Saglik Workers 2011; 166-9.
[9] Guler Ç. Ergonomics Introduction. First Edition. Ankara: Environmental Sagliki Basic Resource Series No: 45; 1997: 43-55.
[10] Beyzadeoglu H, Cengiz I. Risks and Healthy Teams of Healthy Employees. Health Care and Medical Culture Magazine Autumn. 2013; 28: 28-33.
[11] Vaizoglu S, Güler Ç. Ergonomic Hazards and Risk Factors and Precautions of Health Care Workers in the Work place. (Group Work 4). Ankara: 3rd National Congress of the Saglik Workers Congress Book of Congress, November 18-20; 2011: 177-83.
[12] Atasoye, Keskin F, Baskkesen N, Tekingündüz S. Assessment of Musculoskeletal System Problems and Ergonomic Risks in Laboratory Workers. Saglikta Performance and Quality Magazine. 2010; 1: 90-13.
[13] Ergonomics Washington, DC: Occupational Safety and Health Administration (OSHA), U.S. Department of Labor. Available at: http://www.osha.gov/SLTC/ergonomics. Accessed June 24, 2015.
[14] Ilhan MN. Emergency Mapping of Electromagnetic Fields in the Hospital of a Medical School and Healthy Places in Places with Electromagnetic Fields. Doctoral Thesis. Ankara: Ankara University Institute of Health Sciences; 2007.
[15] Nau J, Halfens R, Needham I, Dassen T. The De-escalating aggressive behaviour scale: development and psychometric testing. J Adv Nurs. 2009; 65(9):1956-64.
[16] Chen WC, Hwu HG, Kung SM, Chiu HJ, Wang JD. Prevalence and determinants of workplace violence of health care workers in a psychiatric hospital in Taiwan. J Occup Health. 2008; 50(3):288-93.
[17] Health O, Emiroglu N. Hospital Health and Health Guidance Services for Hospital Health Centers. The Journal of the College of Nursing at the University of the Republic of Turkey 2006; 10: 43-50.
[18] Bilgili N. Evaluation of General Psychological Situations of Adult Nurses at Ankara External SSK Hospital. National Nursing Congress. 1997: I47-61.
[19] Callaghan P, Tak-Ying SA, Wyatt PA. Factors related to stress and coping among Chinese nurses in Hong Kong. J Adv Nurs. 2000; 31(6):1518-27.
[20] Wani KA, Khan R, Mamta. Evaluation of occupational exposure of carpet weavers in northern province of Madhya Pradesh (India) during different seasons. Indian J. Occup. Environ. Med. 2015; 19(2):110-18.
[21] Meyer B. Indoor Air Quality. Mass: Addition‐Wesley; 1983.
[22] MacIntyre DA. Response to atmospheric humidity at comfortable air temperature: A comparison of three experiments. Ann Occup Hyg. 1978; 21(2):177‐90.
[23] Eng WG. Survey on eye comfort in aircraft: I. Flight attendants. Aviat Space Environ Med. 1979; 50(4):401‐04.
[24] Strauss RH, McFadden ER Jr, Ingram RH Jr, Deal EC Jr, Jaeger JJ. Influence of heat and humidity on the airway obstruction induced by exercise in asthma. J Clin Invest. 1978; 61(2):433‐40.
[25] American Society of Heating, Refrigerating, and Air Conditioning Engineers. ASHRAE Handbook of Fundamentals. Atlanta, GA, USA: American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.; 2009.
[26] Muralidhar S, Singh PK, Jain RK, Malhotra M, Bala M. Needle stick injuries among health care workers in a tertiary care hospital of India. Indian J Med Res. 2010; 131(3): 405-10.
[27] Kotwal A, Taneja DK. Health care workers and universal precautions: perceptions and determinants of non-compliance. Indian J Community Med. 2010; 35(4):526-28.
[27] Senthil A, Anandh B, Jayachandran P, Thangavel G, Josephin D, Yamini R, Kalpana B. Perception and prevalence of work-related health hazards among health care workers in public health facilities in southern India. International Journal of Occupational and Environmental Health. 2015; 21(1):74-81.