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Non communicable diseases and lifestyle disorders among laboratory personnel in a private tertiary care hospital in Bangalore, South India – a cross sectional study

Ashwini G S¹, Bobby Joseph², B Ramakrishna Goud²

Affiliation: 1 Assistant Professor, Dept. of Community Medicine, BGS Global Institute of Medical Sciences, Bangalore, 2 Professor & Head & 3 Additional Professor, Dept. of Community Health, St. John's Medical College, Bangalore

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***Author for correspondence:** Dr. Ashwini G.S., 'OMKARA', c/o Byre Gowda K. S., 4th Cross, Mahalakshmi nagar, 80 ft Road, Near SriRanga Vidya Mandira, Batwadi, Tumkur – 572103. E-Mail: ashgs22@gmail.com

ABSTRACT

Background: Non communicable diseases (NCDs) are the leading cause of death globally. Laboratory personnel working with so many hazards and difficult time schedule report job strain and stress at work place. They are prone for the development of NCDs. **Objectives:** To estimate the prevalence and profile of NCDs and lifestyle disorders and their associated factors among laboratory personnel in a private tertiary care hospital. **Methodology:** A cross sectional study was undertaken in a private tertiary care hospital in Bangalore, South India. Data was collected by interview, conducting medical examination and review of medical records. **Results:** Of the 115 laboratory personnel, majority were females, young (≤ 30 years), graduates and were married; worked in Clinical Pathology, involved in sample processing, permanent workers with a median work experience of 6 years. Obesity was the commonest health issue with a prevalence of 19.1%, followed by hypertension, hypothyroidism and alcohol consumption with prevalence of 14.8%, 12.2% and 12.2% respectively. Obesity was the commonest among most of the subgroups. Alcohol consumption and smoking were common among males, Microbiology and housekeeping workers. By univariate logistic regression analysis, workers in 41-50 years age, lesser educated, ever married, housekeeping, permanent and with more experience had significantly more number of health issues. By multivariate logistic regression analysis, workers with more experience had significantly more number of health issues (Adjusted OR: 5.3, 95% CI: 1.2-23.9) as compared to other groups. **Conclusion:** Findings from our study will provide a base for future interventional studies. Interventions in workplace settings are very cost-effective in preventing NCDs and lifestyle disorders. Healthy workers and healthy workplaces can positively impact even the health of household members of the workers.

Key Words: Non communicable Disease, NCD, Lifestyle disorder, Laboratory personnel, Laboratory workers.

INTRODUCTION

Global Non Communicable Disease (NCD) burden remains unacceptably high. Non communicable diseases (NCDs) are the leading global cause of death and are responsible for 41 million of the world's 57 million deaths which accounted to nearly 71% of deaths worldwide.¹ According to World Health Organization (WHO) NCD Country Profile Report 2018, NCDs accounted for 63% of total deaths in India.² The four major behavioral risk factors of NCDs identified are tobacco use, unhealthy diet, lack of physical activity and harmful use of alcohol are highly prevalent. This has led to four major metabolic risk factors like overweight/obesity, high blood pressure, raised blood sugar and raised blood lipids which are also on the rise.³ Similarly, psychosocial stress and job strain are also some of the identified risk factors for NCDs.^{4,5}

Laboratory personnel form an important part of health care workforce, they receive, process and analyze samples in laboratories. By the virtue of their work they are exposed to various occupational hazards – biological, physical, chemical and also psychological hazards.⁶ Laboratory personnel working with so many hazards,

with a difficult time schedule are prone for work related job strain. Studies have shown that, about one third of the laboratory personnel report stress at work place, owing to the high job demand and physical exertion.⁷ All these factors make them prone for the development of NCDs. Extensive review of literature revealed that there are no studies published in India which focus on NCDs and lifestyle disorders among laboratory personnel working in a tertiary care hospital. Hence the current study was undertaken so that health promotion and lifestyle modification measures can be implemented for these workers, if these issues were found to be prevalent in them.

Objectives: To estimate the prevalence and profile of NCDs and lifestyle disorders and their associated factors among laboratory personnel in a private tertiary care hospital.

METHODOLOGY

A cross sectional study was undertaken in a private tertiary care teaching hospital in Bangalore, South India.

Approval from the Institutional Ethics Committee was obtained. The personnel from the Departments of Clinical Pathology, Biochemistry, Microbiology and Blood Bank services were included in the study. The sampling frame included all those personnel employed in the above mentioned departments. All personnel who were temporarily posted to these departments or transferred out to another department were excluded from the study. A total of 115 workers were recruited for the study. A written informed consent was obtained from the study subjects. An interview was held with each of the personnel during which information regarding demography, work profile and current health status including behavioral risk factors like alcohol consumption and smoking were collected. Medical examination of all the study subjects was conducted. Standard sphygmomanometer was used to document the blood pressure, stadiometer and weighing machine was used to document anthropometric measures. BMI was calculated and cut offs for Asian Pacific region was used – Overweight: 23-24.9 kg/m² and Obesity: ≥ 25 kg/m².⁸ Further, the above efforts were supplemented with review of medical records/ folder of each of the employees to document the morbidities, if any. The data were entered into a Microsoft Excel spread sheet and analyzed using standard statistical software.

RESULTS

Of the 115 laboratory personnel in our study, majority were females and in the age group of < 30 years; mean age being 35 years with a standard deviation of 11.7 years. Nearly two third of the study population were graduates and were married. Large majority of the study population worked in the Department of Clinical Pathology followed by Microbiology, Biochemistry and Blood Bank respectively. Nearly 70% of the workers were involved in actual sample processing followed by clerical and housekeeping staff. Majority were permanent employees with median work experience of 6 years and inter-quartile range (IQR) of 2 to 25 years. [Table 1]

Ten most common health problems identified among the laboratory personnel are as given in Table 2. Among the 115 clinical laboratory personnel examined, obesity was found to be the commonest health problem with a prevalence of 19.1%, followed by hypertension with a prevalence of 14.8%. Hypothyroidism and alcohol consumption formed the next common health related issues with a prevalence of 12.2% each. Diabetes mellitus and smoking formed the fourth common health related ailments with a prevalence rate of 8.7% each.

Distribution of these health issues among different subgroups of the study population is as shown in Table 3.

Gender: Prevalence of obesity, hypothyroidism and hypertension were common among females, whereas behavioral risk factors like alcohol consumption and smoking were common among male workers. There was

Table 1: Demography & Work profile of the study population (n=115)

Characteristics	Number (n)	Percentage (%)
Gender:		
Females	71	61.7
Males	44	38.3
Age group:		
< 30 years	53	46.1
31-40 years	27	23.5
41-50 years	19	16.5
> 51 years	16	13.9
Education status:		
\leq PUC	40	34.8
> PUC	75	65.2
Marital status:		
Ever married	70	60.9
Single	45	39.1
Department wise distribution:		
Clinical Pathology	52	45.2
Microbiology	31	27
Biochemistry	23	20
Blood Bank	9	7.8
Nature of work:		
Sample processing	70	60.9
Clerical	37	32.2
Housekeeping	8	6.9
Employment status:		
Permanent	82	71.3
Temporary	33	28.7
Work tenure:		
\leq 6 years	55	47.8
> 6 years	60	52.2

Table 2: Profile and Prevalence of Health Issues among laboratory personnel (n=115)

Sl No.	Health Issues	Number (n)	Percentage
1	Obesity	22	19.1
2	Hypertension	17	14.8
3	Alcohol consumption	14	12.2
4	Hypothyroidism	14	12.2
5	Diabetes mellitus	10	8.7
6	Smoking	10	8.7
7	Acid Peptic Disease	9	7.8
8	Inter Vertebral Disc Prolapse (IVDP)	8	7
9	Back Pain	7	6.1
10	Dyslipidemia	7	6.1

statistically significant association between behavioral risk factors like alcohol consumption and smoking with gender as shown in Table 4.

Table 3: Distribution of Health Issues with different subgroups of the study population (n=115)

Morbidities		Obesity	Hypertension	Hypothyroidism	Alcohol consumption	Diabetes mellitus	Smoking	Acid Peptic disease	IVDP	Back pain	Dyslipidemia
Gender	Female (n=71)	15 (21.1)	11 (15.4)	12 (16.9)	1 (1.4)	4 (5.6)	1(1.4)	4 (5.6)	4 (5.6)	5 (7)	5 (7)
	Male (n=44)	7 (15.9)	6 (13.6)	2 (4.5)	13 (19.5)	6 (13.6)	9 (20.4)	5 (11.3)	4 (9)	2 (4.5)	2 (4.5)
Age groups (years)	< 30 (n=53)	7 (13.2)		3 (5.7)	4 (7.5)		2 (3.8)	5 (9.4)		6 (11.3)	1 (1.9)
	31-40 (n=27)	5 (18.5)	4 (14.8)	6 (22.2)	5 (18.5)	1 (3.7)	5 (18.5)	1 (3.7)	2(7.9)		1 (3.7)
	41-50 (n=19)	6 (31.6)	6 (31.6)	4 (21.1)	2 (10.5)	6 (31.6)	1 (5.3)	1 (5.3)	5 (26.3)	1 (5.3)	3 (15.8)
	> 51(n=16)	4 (25)	7 (43.8)	1 (6.3)	3 (18.9)	3 (18.9)	2 (12.6)	2 (12.6)	1 (6.3)		2 (12.6)
Education status	≤ PUC (n=40)	10 (25)	10 (25)	7 (17.5)	8 (20)	9 (22.5)	6 (15)	4 (10)	5 (12.5)	2 (5)	5 (12.5)
	> PUC (n=75)	12 (16)	7 (9.3)	7 (9.3)	6 (8)	1 (1.3)	4 (5.3)	5 (6.6)	3 (4)	5 (6.6)	2 (2.6)
Department	Clinical Pathology (n=82)	11 (21.1)	8 (15.3)	7 (13.4)	4 (7.6)	7 (13.4)	2 (3.9)	6 (11.5)	5 (9.6)	4 (7.6)	3 (5.7)
	Blood Bank (n=9)	4 (44.4)	2 (22.2)	1 (11.1)					1 (11.1)		2 (22.2)
	Biochemistry (n=23)	1 (4.3)	2 (8.6)	2 (8.6)					1 (4.3)	2 (8.6)	1 (4.3)
	Microbiology (n=31)	6 (19.3)	5 (16.1)	4 (12.9)	10 (32.2)	3 (9.6)	8 (25.8)	3 (9.6)	1 (3.2)		3 (9.6)
Nature of Work	Sample processing (n=70)	10 (14.2)	7 (10)	7 (10)	7 (10)	2 (2.8)	6 (8.5)	5 (7.1)	5 (7.1)	5 (7.1)	3 (4.2)
	Housekeeping (n=8)		2 (25)	2 (25)	7 (87.5)	1 (12.5)	2 (25)				2 (25)
	Clerical staff (n=37)	12 (32.4)	8 (21.6)	5 (13.5)		7 (18.9)	2 (5.4)	4 (10.8)	3 (8.1)	2 (5.4)	2 (5.4)
Employment status	Permanent (n=82)	17 (20.7)	17 (20.7)	12 (14.6)	11 (13.4)	10 (12.1)	8 (9.7)	6 (7.3)	8 (9.7)	3 (3.6)	7 (8.5)
	Temporary (n=33)	5 (15.1)		2 (6)	3 (9)		2 (6)	3 (9)		4 (12.1)	
Work Tenure	≤ 6 years (n=55)	6 (10.9)	1 (1.8)	4 (7.2)	4 (7.2)		2 (3.6)	4 (7.2)	1 (1.8)	5 (9)	1 (1.8)
	> 6 years (n=60)	16 (26.6)	16 (26.6)	10 (16.6)	10 (16.6)	10 (16.6)	8 (13.8)	5 (8.3)	7 (11.6)	2 (3.3)	6 (9.9)

Table 4: Association between gender and behavioral risk factors among the study population (n=115).

Gender	Behavioral Risk Factors n (%)			Fischer's Exact, 'p' value
	Present	Absent	Total	
	Alcohol consumption			
Females	1 (1.4)	70 (98.6)	71 (100)	0.00,
Males	13 (29.5)	31 (70.5)	44 (100)	< 0.01
Total	14 (12.2)	101 (87.8)	115 (100)	
	Smoking			
Females	1 (1.4)	70 (98.6)	71 (100)	0.0007,
Males	9 (20.5)	35 (79.5)	44 (100)	< 0.01
Total	10 (8.7)	105 (91.3)	115 (100)	

Age: Among the younger age group workers, obesity was the commonest morbidity followed by back pain. In 31-40 years age group workers, hypothyroidism was the commonest, followed by obesity, alcohol consumption and smoking. Prevalence of obesity, hypertension and diabetes was high among workers in the age group of 41-50 years. Among the older age group workers, hypertension followed by obesity was the commonest morbidity.

Education: Obesity and hypertension were the commonest morbidities among both the groups with education up to PUC and above PUC in the study.

Nature of Work: Prevalence of obesity was high, followed by hypertension among workers involved in sample processing as well as among clerical staff. Whereas behavioral risk factors like alcohol consumption was the highest among housekeeping workers.

Employment status: Obesity was the commonest morbidity identified among both permanent and temporary workers, followed by hypertension among permanent workers.

Work Tenure: Obesity and hypertension were the commonest morbidities among workers with more work experience followed by hypothyroidism, diabetes mellitus and alcohol consumption. Among workers with less work experience, obesity was the commonest followed by hypothyroidism, acid peptic disease and alcohol consumption.

It was noticed that many of the study subjects had suffered from multiple health issues; with median of one health issue and an IQR of 1 to 3. Majority of the study

Table 5: Number of morbidities among the study subjects (n=115)

Variable	Number of morbidities		Unadjusted Odd's Ratio (95% CI)	'p' value	Adjusted Odd's Ratio (95% CI)	'p' value	
	≤ 1	≥ 2					
Age groups	≤ 30	37 (69.8)	16 (30.2)	1	1		
(in years)	31-40	13 (48.1)	14 (51.9)	2.4 (0.95-6.4)	0.06	1(0.2-4.6)	0.99
	41-50	3 (15.8)	16 (84.2)	12.3 (3.1-8.3)	< 0.001	0.25(0.05-1.4)	0.11
	≥ 51	6 (37.5)	10 (62.5)	3.8 (1.1-12.4)	0.02	1.13(0.16-7.6)	0.9
Education status	≤ PUC	13 (32.5)	27 (67.5)	3.3 (1.5 - 7.4)	0.004	0.44(0.1-1.8)	0.26
	> PUC	46 (61.3)	29 (38.7)	1		1	
Marital status	Ever married	30 (42.9)	40 (57.1)	2.4 (1.1-5.2)	0.02	2.3(0.5-9.7)	0.24
	Single	29 (64.4)	16 (35.6)	1		1	
	Sample processing	42 (60)	28 (40)	1		1	
Nature of work	House keeping	1 (12.5)	7 (87.5)	10.5 (1.2-9)	0.03	0.23(0.02-2.3)	0.2
	Clerical staff	16 (43.2)	21 (56.8)	1.9 (0.88-4.4)	0.89	0.72(0.18-2.9)	0.6
Employment status	Permanent	37 (45.1)	45 (54.9)	2.4 (1.04-5.6)	0.04	1.06(0.3-3.9)	0.92
	Temporary	22 (66.7)	11 (33.3)	1		1	
Work tenure (in years)	≤ 6	40 (72.7)	15 (27.3)	1		1	
	> 6	19 (31.7)	41 (68.3)	5.7 (2.5-12.8)	< 0.001	5.3 (1.2-23.9)	0.02

subjects (30.4%) had one health issue prevailing in them. The association between number of health problems and the various demographic and work profile factors are described in Table 5. By univariate logistic regression analysis, the odds of occurrence of health issues was 12 times more in the workers of age group 41 to 50 years (95% CI: 3.1-8.3) and it was 4 times for workers above 50 years (95% CI: 1.1-12.4) as compared to younger age group workers. There was no statistically significant association for the workers in the age group of 31 to 40 years. Odds of occurrence of morbidities were nearly 3 times more for lesser educated workers (95% CI: 1.5-7.4) as compared to better educated workers. Workers who were ever married had more than twice the number of morbidities (95% CI: 1.1-5.2) as compared to workers who were single. Occurrence of health issues among housekeeping workers were nearly 10 times more as compared to workers involved in sample processing (95% CI: 1.2-9) However, there was no statistically significant association between the workers involved in clerical work and the number of health problems. Odds of occurrence of health problems were more than 2 times in permanent workers (95% CI:1-5.6) as compared to temporary workers and it was 6 times more for more experienced workers (95% CI: 2.5-12.8) than workers with lesser work experience. However, by multivariate logistic regression analysis, after adjusting for all the co-variables, it was found that work tenure was the only significantly contributing factor for number of health issues among

laboratory personnel (Adjusted OR: 5.3, 95% CI: 1.2-23.9).

DISCUSSION

Most common health issue among laboratory personnel was found to be obesity with a prevalence rate of 19.1% followed by hypertension with a prevalence rate of 12.2%. The prevalence rate of obesity in India as per WHO NCD Global Status Report 2018 was 4%.² One of the reasons for huge disparity in the prevalence rate of obesity as per the WHO report and our study is because of the higher BMI cut offs used in the WHO report (BMI ≥ 30 kg/m²). In our study, BMI cut offs for Asia Pacific region were used – Overweight: ≥ 23 kg/m² and Obesity: ≥ 25 kg/m². As per a study conducted to assess the prevalence of obesity among staff of a tertiary care hospital and medical college in Ahmedabad using BMI cut offs for Asia Pacific region was around 48%.⁹ As per the WHO report mentioned above, the prevalence rate of NCDs like hypertension was 24% and behavioral risk factors like smoking was 11% in India which are higher than our study findings, whereas prevalence of diabetes mellitus was 8% which is similar to our study findings.²

A study was done to assess NCD risk factors in four healthcare institutes in Manipal, Karnataka found that poor dietary habits, suboptimal blood pressure and physical inactivity were the most common risk factors, whereas in our study obesity, hypertension and alcohol consumption formed the most common health issues

among the laboratory staff.¹⁰ Another study done in Taiwan among hospital employees can be compared with our study which also had similar findings. Obesity was the commonest morbidity with a prevalence rate of 24.7% followed by hypertension, hypercholesterolemia and type 2 diabetes mellitus.¹¹ Further, in a study done to assess cardiovascular disease risks in health care workers in Mexico, showed that the prevalence of hypertension was 22% and type 2 diabetes 8% which is comparable to our study.¹² A study done in a Tehran Medical University found that the prevalence of overweight (BMI: ≥ 26 kg/m²), obesity (BMI: ≥ 30 kg/m²) and hypertension was 14.7%, 17.8% and 11.7% respectively. In addition smoking was reported by 5.6% of the respondents in this study which is similar to our study findings.¹³ As per a multicenter study, prevalence rate of hypothyroidism in adult population was found to be 10.95% in India and 9.2% in Bangalore, which is slightly lower than our study findings.¹⁴

Prevalence of health issues like obesity and hypertension were higher in females in our study. This can be compared with the WHO NCD Global Status Report 2018, wherein the prevalence of obesity was higher in females though prevalence of hypertension was higher in males.² Hypothyroidism was higher in females and younger age group workers in our study, as compared to the multicenter study mentioned earlier it was significantly higher in females but common in older age group individuals.¹⁴ In our study, prevalence of lifestyle related risk factors like alcohol consumption and smoking were significantly high in male subjects which is similar to the findings in WHO Report on Non Communicable Diseases in the South East Asia Region.³ In comparison to an NCD study done in Thailand among health workers where the prevalence of smoking was 6.2% and alcohol consumption was 54%, our study showed lesser prevalence of these risk factors. However, and as in our study both these behavioral risk factors were significantly higher in males.¹⁵ In our study, workers involved in sample processing and clerical work had a higher prevalence of obesity and ergonomic related issues like back pain, this may be because of their work profile which predominantly included deskbound and sedentary work. A study conducted in a hospital in Singapore found that the prevalence of risk factors like diabetes mellitus, obesity, hypertension and smoking were higher in Non Healthcare Workers (NHWs) than Healthcare Workers. The possible explanation given was that most NHWs were likely to hold administrative jobs that were predominantly deskbound.¹⁶ For unknown reasons, but probably due to peer pressure behavioral risk factors like smoking and alcohol consumption were strikingly high in Microbiology workers and workers involved in housekeeping.

A study done to assess the risk factors score of non-communicable diseases among the staff of a private medical college of Jaipur, India found the prevalence of hypertension, diabetes, smoking, alcohol consumption to

be 15%, 24.4%, 33.9% and 18.9% respectively which are much higher than our study findings. Majority of them had four risk factors and the number of risk factors increased with age.¹⁷ In our study, majority had one health issue and it was also significantly higher among older age group workers. Additionally, in our study, logistic regression analysis revealed that workers with poorer educational status, married workers, workers involved in housekeeping, permanent workers and more experienced workers had higher number of risk factors.

Conclusion

Among the laboratory personnel examined, obesity was the commonest health issue identified with a prevalence rate of 19.1%, followed by hypertension with a prevalence rate of 14.8%. Obesity was the most common health ailment identified in most subgroups of the study population. Whereas behavioral risk factors like alcohol consumption and smoking were strikingly common in some of the sub groups of our study population like male workers, workers involved in housekeeping and worked in Microbiology department. When assessed for the number of health issues, majority of the study subjects (30.4%) had one health issue prevailing in them. Number of health issues was significantly higher in more experienced workers by multivariate logistic regression analysis after adjusting for all the co-variables.

Findings from our cross sectional study will provide a base for future interventional studies. This will aid in planning and provision of primary and secondary NCD prevention services at the workplace. As workplace can be used as a setting for health promotion and preventive health activities not only to prevent occupational injury, but to improve worker's health holistically. Interventions in workplace settings are very cost-effective in preventing NCDs and lifestyle disorders. These interventions have a potential to reach even the homes of the workers. Healthy workers and healthy workplaces can positively impact even the health of household members of the workers.

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