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Research Article

A STUDY ON WORK SAFETY FOR EMPLOYEES IN DIAGNOSTIC SERVICES – RECOMMENDATIONS TO IMPROVE WORK SAFETY

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ABSTRACT

Objectives: To assess the effectiveness of the safety training program in preventing occupational hazards for workers in clinical laboratories and radiology and make recommendations.

Methods: During the course of 2 months, health-care workers in radiology and central laboratory, including doctors, radiology technicians, and laboratory technicians were the subjects of this prospective analytical study. The design of the study was based on the lean methodology. Every participant received a structured questionnaire. Next, they attended a workshop on workplace safety, after which they completed a post-test questionnaire.

Results: Of the participants in the study, 38% were between the ages of 31 and 40. Almost 56% had completed their postgraduation education, and 62% had worked for more than 10 years. Of these, 42% were laboratory technicians, 24% were from the phlebotomy and radiology departments, and there was a highly significant difference ($p<0.01$) in the participants' awareness of OSH perceptions as well as prevention of physical risks and injury.

Conclusion: The laboratory workers' knowledge and actions addressing the prevention of laboratory hazards and safety environmental condition dangers have been improved by the training safety program.

Keywords: Occupational safety, Health, Diagnostic services.

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INTRODUCTION

Concerns about occupational health and safety (OSH) play a significant role in risk management, corporate social responsibility, and quality management. Thus, OSH considerations ought to be an integral part of company strategy, HR, and organizational development, among other managerial development activities. Many medical specialties place a strong emphasis on occupational health. It has been devoted to the security and well-being of employees at work.

It has mostly concentrated on worker education, protection, and injury prevention. The goal of OSH is to provide and sustain a secure and healthful work environment. To maintain their health and deliver quality care, health-care personnel need safe working environments. According to the National Institute of Occupational Safety and Health [1], approximately 100,000 individuals die each year from occupational health issues, and an additional 400,000 new cases of occupational diseases are discovered annually.

Health-care personnel are particularly susceptible to laboratory hazards since many are not aware of the possible risks in their workplace. Numerous elements, including biological, pharmacological, psychological, and ergonomic ones, pose a risk to health-care workers [2-4]. The study's objective was to evaluate the OSH risks that personnel in diagnostic services, such as the radiology department and clinical laboratories, are exposed to. The goals were to show how safety-conscious diagnostic service workers (radiology and clinical laboratory personnel) were; to gauge their understanding, attitudes, and practices regarding chemical and biosafety precautions; and to analyze the impact of their safety training program on preventing occupational hazards.

METHODS

This is a prospective analytical study conducted in health-care workers working in diagnostic laboratories and radiology department in a tertiary care teaching hospital located in South India. Around 50 health-care workers, health-care workers in all 4 departments – Biochemistry, Microbiology, Pathology, Phlebotomy, and Radiology were around 60 members –list obtained from Human Resource department.

The management principle of lean was utilized in the planning of the study design. An organization's performance can be enhanced with the use of this technology. It illustrates the five stages of workplace organization: Standardize, clean, maintain, sort, and straighten. Numerous advantages can result from using this technology, such as increased output, better quality, fewer errors, quicker response times, higher morale, and more professionalism.

Health-care workers in radiology and central laboratory including doctors, radiology technicians, laboratory technicians, laboratory attenders, and allied health science interns were included in the study. Health-care workers <3 months of employment in diagnostic services were excluded from the study.

The primary data were collected through a structured questionnaire prepared by the researcher. The secondary data for this study were collected from various research journals, books, and websites to add appropriate significance for the study. A structured interviewing questionnaire consisted of the following two parts:

Part one

Sociodemographic characteristics of the laboratory workers were collected. It included seven items about age, gender, education, residence, nature of job, years of experience, and income.

Part two

Designed to assess the laboratory workers' knowledge which included 27 items divided as: (a) Open-ended questions on knowledge about occupational safety, policy, means to prevent occupational hazards, etc., (b) awareness about occupational health hazards, (c) prevention of physical risks for health and safety, (d) prevention of occupational infections, and (e) prevention of psychosocial risks.

Furthermore, a sensitization session on occupational safety and health was conducted to all health-care staff working in diagnostic services. The collected data will be verified before computerized entry; statistical analysis will be done using the Statistical Package for the Social Science version 20. Data will be presented in tables using mean, standard deviation, number, percentage distribution, and the Chi-square and non-parametric tests (r). Statistical significance was considered at $p>0.05$ insignificant, $p<0.05$ significant, $p<0.001$ highly significant.

RESULTS AND DISCUSSION

Sociodemographic characters

Table 1 depicts the age distribution of the study participants. 31–40 years contributes to 38%, followed by 21–30 years (36 %), 41–40 years (20%), 51–60 years (4%), and 71–80 years (2%), respectively.

Table 2 shows the sample distribution based on the educational qualifications. The residents and consultants have completed postgraduation contributing to 56%, followed by laboratory technicians and radiology assistants (38%) who have completed under graduation. The laboratory attenders had completed high school contributing to 6% of the study.

Fig. 1 depicts the sample distribution by income, 46% of the study population had >15,000 as their monthly income and 54% had <15,000 as monthly income.

Occupational history

Table 3 depicts the sample distribution by years of working in this organization. 31 (62%) participants have worked for 10–15 years, followed by 12 (24%) for 1–5 years, 5(10%) have worked for 5–10 years and 4 (8%) have worked for more than 15 years, respectively.

Table 4 shows the distribution of study participants according to their job categories. Consultants 15 (30%), Resident doctors 10 (20%), laboratory technicians 21 (42%), followed by radiology assistants 4 (8%), respectively.

Fig. 2 shows the distribution of study participants according to working place, where 24% from phlebotomy, 24% from radiology, 22% from microbiology, 16% from biochemistry, and 14% from radiology department, respectively.

Table 5 shows the awareness about OSH perceptions between pre- and post-test and the test results are highly significant ($p<0.01$), similarly, prevention of physical risks and injury is also highly significant results, instilling knowledge among study participants. The other parameters such as occupational safety awareness, prevention of occupational infections, and prevention of psychosocial risks were less significant.

Table 1: Sample distribution by age (n=50)

Age (in years)	Number	Percentage
21–30	18	36
31–40	19	38
41–50	10	20
51–60	2	4
61–70	-	-
71–80	1	2

Table 2: Sample distribution by educational qualification (n=50)

Educational qualification	Number	Percentage
High School	3	6
Under graduation	19	38
Postgraduation	28	56

Table 3: Sample distribution by years of experience

Years of experience	Number	Percentage
1–5 years	12	24
5–10 years	5	10
10–15 years	31	62
15–20 years	2	4
Total	50	100

Table 4: Sample distribution by job category

Job category	Number	Percentage
Consultants	15	30
Residents	10	20
Laboratory technicians	21	42
Radiology Asst	4	8
Total	50	100

Table 5: Statistical difference of Work safety among health-care workers in diagnostic services (n=50)

Questionnaire on occupational safety	Pre-test		Post-test		p-value
	Mean	SD	Mean	SD	
Occupational Health and Safety – Perception and Knowledge	10.22	2.909	15.36	3.244	<0.01
Occupational safety awareness	6.84	1.942	6.84	1.942	> 0.05
Prevention of Physical risks for health and safety	4.34	1.022	5.30	1.111	<0.01
Prevention of Occupational infections	5.62	0.667	5.62	0.667	> 0.05
Prevention of Psychosocial risks	4.10	1.216	4.10	1.216	> 0.05

*high statistical difference <0.01

Occupational health refers to both protecting and promoting each employee's health. Each year, occupational hazards lead to the poor health or disability of hundreds of millions more individuals and cause or contribute to the untimely death of millions more people globally. Michell [5] claims that health workers are a group that has been overlooked when it comes to occupational health status monitoring and that employers do not give their health the consideration it needs.

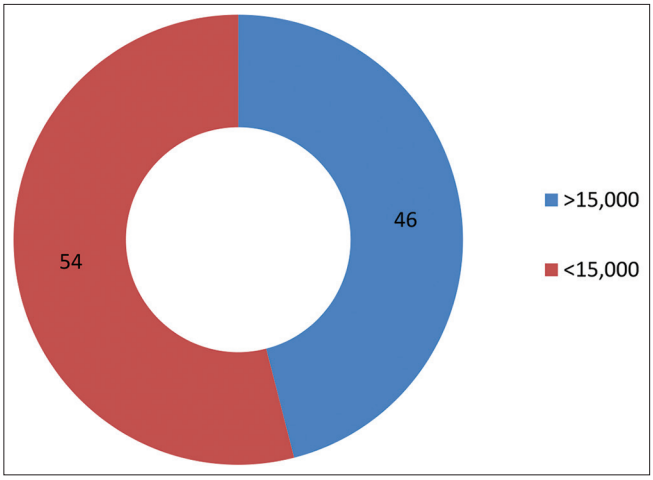

Fig. 1: Sample distribution by income

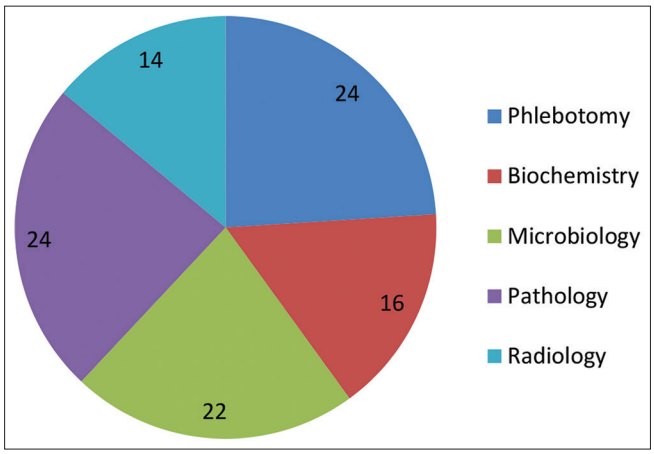

Fig. 2: Sample distribution by current working place (n=50)

Continuous improvement, value creation, unity of purpose, respect for the workforce, and visual management are among the core tenets of lean health care. These guidelines were applied in this research.

Among the 50 participants, most of them belong to 31–40 years (38%) followed by 21–30 years (36%) which is in concordance with the done in Middle East [6]. Nearly 76% of the study group was female and the remaining were male. A study done in Indonesia in 2016, also reported the mean age group of laboratory technicians being 36.23±8 years and the majority (64.2%) were females [7].

In the present study, the majority of study participants have work experience of 10–15 years (64%) followed by 1–5 years (24%). This can be justified by the fact that most of the students had graduated and were still seeking employment. Laboratory technicians contributed 42%, followed by consultants (30%) and residents (20%) by their job category. This is in concordance with the study done in Turkey [8]. In most study participants belong to pathology department (24%) and phlebotomy (24%) followed by microbiology department (22%).

In the present study, knowledge and perception regarding OSH were significantly increased in post-test (mean 15.36, SD 3.23) when compared to pre-test (mean 10.22, SD 2.99). This is similar to the study done in the year 2013 [9], though the study participants were aware of training programs they did not have in-depth knowledge regarding various aspects of occupational safety.

There was little difference in knowledge of workplace safety awareness between the pre- and post-tests. The statistics showed that the majority of participants-of which laboratory professionals made up 90.7%-had previously been exposed to laboratory surroundings and had received safety training [6]. This is so that staff members may get training credits for laboratory accreditation, which is why the majority of hospitals continuously offer workshops and training. Research indicates that health-care personnel' safety awareness and knowledge are positively impacted by the use of instructional initiatives for laboratory safety.

In comparison to the pre-test (mean 4.34, SD 1.02), the post-test (mean 5.30, SD 1.11) showed a substantial increase in the prevention of physical risks for health and safety. There were glaring shortcomings in a few areas, according to a Nigerian study on knowledge, attitudes, and practice of laboratory safety in pathology laboratories (personnel protection equipment, specimen collecting and processing, and infective waste disposal) [10].

In contrast to Germany, where the use of safety equipment is sluggish, the United States had the lowest incidence of sharp injuries and the highest utilization of safety-engineered devices [11,12]. The management and transportation of patient samples, the elimination of contaminated trash, and the use of equipment not intended for aerosol containment have all been found to include some really subpar procedures [13]. According to Hofmann and associates, the percentage of injuries in Germans was just 6.3% and 14.7% [14]. The incidence rate of needle stick injuries among health-care workers, including laboratory technologists, in South East Asia is 0.11 per person-month. It appears that installing safety-engineered equipment significantly reduces the number of these injuries across all occupations [15].

There was little difference in the prevention of occupational infections between the pre- and post-test. In contrast, a research conducted in Brazil by [16] found that 92% of blood-borne illnesses happened in hospitals. A research conducted in Africa [17] found that 40.9% of health workers had encountered a work-related mishap; 84.5% reported injuries from sharp objects, 33% musculoskeletal injuries, and 36.9% reported exposure to bodily fluids or blood. According to a study, 64% of 988 health-care workers had at least one infection as a result of coming into contact with blood or bodily fluids [18].

There was little variation in the prevention of psychosocial hazards between the pre- and post-tests. According to a research by Chirico *et al*., [19], many personnel experienced psychological issues, such as verbal abuse from patients and their relatives. The same conclusions are supported by a research by Landsbergis [20], which found that health-care professionals experienced physical strain, stress from their jobs, and exposure to hazards. IN addition, he stated that working in hospitals comes with a heavy workload and a high degree of demand, which causes stress and pressure on health-care professionals.

CONCLUSION

According to the study's findings and research assumptions, a safety training program can enhance laboratory workers' knowledge and improve their behaviors for preventing risks in the laboratory and in the environment ($p<0.001$). The study suggested that to guarantee fundamental laboratory and radiation safety procedures in hospitals, the regulatory training program should be reinforced. In addition, a significant number of hospital laboratory staff should be trained in the prevention of laboratory risks, safety, and environmental conditions. In India, the safety of diagnostic services must be integrated into the entire hospital safety program. This can be accomplished by implementing a quality control program in both general hospitals and laboratory settings. All radiology departments and laboratories should be required to become accredited, and their performance should be evaluated based on predefined benchmarks.

AUTHORS' CONTRIBUTORS

Dr. Anupriya Asaithambi: Design the study, execution, data collection, and writing the draft. Dr. Priya Banthavi Siva Subramanian: Supervision,

Data curing, and final drafting. Dr. Chitra Rajalakshmi Parthasarathy: Data collection and partial draft writing.

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CONFLICTS OF INTEREST

Nil.

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