

ORIGINAL ARTICLE

Occupational Hazards of Plastic Exposure among the Workers of Selected Plastic Industry

Rajeswari S^{2*} Arivu Malar C²

¹Professor, Department of Child Health Nursing, Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, (Deemed to Be University) Puducherry, India- Email rajeswaris@kgnc.ac.in

²Assistant Professor, Department of Child Health Nursing, Kasturba Gandhi Nursing College, Sri Balaji Vidyapeeth, (Deemed to Be University) Puducherry, India- email malararivu783@gmail.com

ABSTRACT

Hazards arising from workplaces could impair the health and well-being of the workers; therefore, it is necessary to anticipate, recognize, evaluate, and control such hazards. This study is aimed to assess the effectiveness of the Information, Education, and Communication Package (IEC) on knowledge and practice regarding the prevention of occupational hazards of plastic exposure among the workers of selected Plastic industry. The quasi-experimental research design was carried out in the plastic industry at Puducherry. The sample consists of 40 workers in the plastic industry. Non-probability convenient sampling technique was used to select the samples. During data collection, the pre-test was conducted with the help of a Semi-structured questionnaire followed by the Teaching session conducted on occupational plastic hazards after 7 days post-test was conducted and data was analyzed. The Pre-test level of knowledge shows that no one had adequate knowledge, 7(17.5%) had moderate knowledge and 33 (82.5%) had inadequate knowledge regarding occupational hazards, and 40(100%) samples had poor practice methods. the post-test knowledge and practice after Information, Education, and Communication package teaching program among the plastic industry workers show that the level of Knowledge, 33(82.5%) had Adequate knowledge, 7(17.5%) had Moderate knowledge and none of the workers had Inadequate knowledge, 40(100%) samples had excellent practice methods. There is a significant association of knowledge with the Experience ($P= 0.0407$) of the workers, there is no association with other variables. There is an improvement from the Pre-test to the post-test among the workers regarding the knowledge and practice regarding occupational hazards which shows that the Information, Education, and Communication package teaching program was effective.

Keywords: Occupational hazards of plastics, Information, Education, and Communication Package, Industrial workers

Received 09.02.2023

Revised 26.03.2023

Accepted 24.05.2023

How to cite this article:

Rajeswari S, and Arivu Malar C Occupational Hazards of Plastic Exposure among the Workers of Selected Plastic Industry. Adv. Biores. Vol 14 [3] May 2023. 252-256

INTRODUCTION

Hazards arising from workplaces could impair the health and well-being of the workers; therefore, it is necessary to anticipate, recognize, evaluate and control such hazards.

An occupational hazard is experienced in the work place. Whenever people inhale airborne dust at work, they are at the risk of occupational disease.

Working in plastic industry is a hazardous profession with a multiplicity of factors that can endanger the health of a workers, such as heat, burn, radiation, noise, fumes, gases, electrocution, uncomfortable posture involved in the work; high variability in the chemical composition of plastic dyes, which differs according to the work place, method employed and surrounding environment and the routes through which these harmful agents enter the body. Some of the effect of plastic exposure on health includes skin infection, respiratory infection, alopecia and others [1-3].

Plastic is everywhere in our today's life. It's used for packaging, protecting, serving, and even disposing of all kinds of consumer goods. Through industrial revolution mass production of goods started and plastic seemed to be a cheaper and effective raw material. Today, every vital sector of the economy starting from agriculture to packaging, automobile, building construction, communication or InfoTech has been virtually revolutionized by the applications of plastics [4-6]. Exposure to plastics and dyes cause many problems as

distant as breast cancer, reproductive problems in humans and animals, genital abnormalities and much more. The risks to the family health and safety would increase and, above all the environmental burden would be manifold [7].

Statement of the problem

A Study to assess the effectiveness of Information, Education and Communication package [IEC] on knowledge and practice regarding prevention of occupational hazards of plastic exposure among the workers of selected plastic industry, Puducherry.

HYPOTHESIS:

H1: There is a difference between the level of knowledge and practice among workers of plastic industry on occupational hazards of plastic exposure before and after IEC on prevention of occupational hazards.

H2: There is a relationship between knowledge and practice among workers of plastic industry on occupational hazards of plastic exposure.

LIMITATIONS:

The sample was limited to

- Who are working in the plastic industry
- Male workers at general shift duty.
- Workers of all age groups.
- Workers who are willing to participate.

MATERIAL AND METHODS

PROCEDURE FOR DATA COLLECTION:

The sample of forty workers were recruited by convenient sampling method after informed consent. The study was approved by the academic committee of the university and carried out in accordance with declaration of Helsinki. As this is an observational study, it concurs with no risk according to ICMR risk 2017. The data was collected from the plastic industry for a period of 7 days. Before starting the data collection, researchers obtained permission from the manager and consent was obtained from the workers of plastic industry. By using non-probability convenient sampling technique the sample was used on the basis of selection criteria. The data was collected from 40 workers a day. Data was collected with the use of semi structured Questionnaires. Information Education and Communication package comprises of definition, signs and symptoms, prevention methods, home remedies for the conditions like Alopecia, Dermatitis and Respiratory infections were given through the Power Point presentation. Usage of Personal protective equipment was explained and basic information on occupational hazards was given as information, education and Communication. During the data collection, the workers were very cooperative. The data were fed into the computer for statistical analyses. The mean and standard deviation were calculated. The primary outcome measure was to find out the correlation between knowledge and the use of protective equipment. The Pearson correlative analyses was used and results derived.

RESULTS AND DISCUSSION

The data were analysed based on the objectives of the study.

Demographic variables

The demographic variables shows that regarding the age of the workers in the industry only one worker (2.5%) belongs to the age group below 20-25 years, 19(47.55%) belongs to age group between 26-30 years, 20(50%) belongs to the age group between 30-40, regarding the sex, 40(100%) of workers were Male, regarding the worker's educational status only one (2.5%) was illiterate, 13(32.5%) were primary level education, 21(52.5%) were higher secondary level education five workers (12.5%) were graduate and above, regarding religion 34(85%) belongs to Hindu religion five workers (12.5%) belongs to Christian religion, only one worker (2.5%) belongs to Muslim, regarding monthly income only one (2.5%) were getting Rs.6000

The first objective is to assess the knowledge and practice regarding prevention of occupational hazard of plastic exposure among the workers of plastic industry.

Regarding over all categorization from selected 40 samples, no one was found to have adequate knowledge, seven (17.5%) was found to have moderate knowledge, 33 (82.5%) was found to have inadequate knowledge regarding the occupational hazards and 40(100%) samples was found to have poor practice methods.

The results co-related with a study conducted by Budhathoki, *et al.* [3] performed a cross sectional study to assess the awareness of hazards and personal protective equipment and use of personal protective equipment among the workers in Nepal and to correlate between awareness and use of personal

protective equipment among the plastic industry workers in Nepal.300 plastic industry workers in Nepal were selected as sample. Simple random sampling techniques were used and was conducted using semi structured questionnaire. Overall 272 workers were aware of at least one hazard .However 47.7% used one or more types of personal protective equipment. Education and Duration of employment were significantly associated with the awareness of hazards and of PPE and its use. There is a gap between being aware of hazards and (90%) and use of PPE (47%)[4].

The second objective of the study to evaluate the effectiveness of IEC on knowledge and practice regarding prevention of occupational hazard of plastic exposures among the workers of plastic industries.

The Results revealed that 33(82.5%) was found to have adequate knowledge, Seven (17.5%) was found to have moderate knowledge, 40(100%) samples was found to have excellent practice method.

Assessment of Knowledge and the practice regarding prevention of occupational hazards among the plastic industry workers.

Table 1 Frequency and Percentage distribution of workers by their knowledge level on occupational hazards between Pre-test and Post-test.

Level of Knowledge	Pre- test		Post-test	
	No.of students	Percentage (%)	No.of students	Percentage (%)
Adequate knowledge	-	-	33	82.5
Moderately adequate knowledge	7	17.5	7	17.5
Inadequate knowledge	33	82.5	-	-

The above table 1 reveals that 33 (82.5%) had inadequate knowledge, seven (17.5%) had moderately adequately knowledge regarding occupational hazards during Pre-test where as in Post - test 33 (82.5%) had adequate knowledge, seven (17.5%) had moderately adequately knowledge regarding occupational hazards.

The result is co-related with a study conducted by Sati Pc, et al.(2011)performed a cross sectional study to assess the effect of styrene on lung functions and occupational hazards in Styrene exposed plastic industry workers in USA.40 samples were selected using simple random sampling technique. Structured questionnaires were used to conduct the study. Assessment of lung functions showed a Statistically significant reduction(p<0.05) in most of the lung volumes, capacities and flow rates ,The result shows that styrene inhalation by workers leads to increased level of oxidative stress, which is supposed to be the cause of lung damage[14].

The third objective of the study is to Correlate the Knowledge and Practice regarding prevention of occupational hazards during Pre-test and Post-test.

The results revealed that there is no significant relationship between Knowledge and practice regarding prevention of occupational hazards.

The study was conducted in one of the Egyptian plastic industry. Non probability sampling techniques. 40 male workers who were not using the personal protective equipment working in the plastic industry were selected as the samples. The study results showed a statistically significant correlation between the duration of styrene exposure and ventilator function parameter [6, 7].

Table 2. Correlation between knowledge and practice regarding occupational hazards.

CORRELATION		MEAN	MEDIAN	STD.DEVIATION
PRE-TEST	KNOWLEDGE	7.62	8	2.667
	PRACTICE	10	10	0
POST-TEST	KNOWLEDGE	18.48	18	2.342
	PRACTICE	26	26	0

The table 2 shows that the Pre - test knowledge mean score 7.62 was lesser when compared to practice mean score 10 whereas the Post-test knowledge mean score 18.48 was greater than practice mean score 26 hence there is no significant relationship between knowledge and practice regarding prevention of occupational hazards.

The results revealed that all the demographic variables were not significant except the experience of workers. P value $P > 0.005$ show that the result was found to be non-significant [Table 3].

Table 3. Association between the knowledge and practice regarding occupational hazards among the plastic industry workers.

Demographic Variables		N=40	KNOWLEDGE SCORE			KW/ MW TEST	P-VALUE
			MEAN	MEDI AN	STANDARD DEVIATION		
Age group	20-25years	1	5	5	.	2.7043	0.2587 (NS)
	26-30years	19	8	8	2.36		
	31-35years	20	7.4	7	2.96		
Education	Illiterate	14	5	5	.	1.4599	0.6916 (NS)
	Primary level	0	7.77	7	3.42		
	Higher secondary level	21	7.67	8	2.46		
	Graduate and above	5	7.6	8	1.52		
Religion	Hindu	34	7.88	8	2.74	2.4562	0.2928 (NS)
	Christian	5	6	5	1.87		
	Muslim	1	7	7	.		
Monthly income	6000	1	10	10	.	3.1537	0.3685 (NS)
	6001-8000	22	7.18	7	2.68		
	8001-10000	16	8.06	8	2.74		
	>10000	1	8	8	.		
Experience	<2years	3	8.67	9	1.53	8.2706	0.0407 *(S)
	2-5 years	20	6.9	7	2.86		
	6-9years	13	8.92	8	2.25		
	>9years	4	6.25	6.5	2.06		
Habits	Smoking	17	6.82	7	2.1	4.1207	0.2487 (NS)
	Consumption of Alcohol	1	8	8	.		
	Use of Tobacco	1	12	12	.		
	Others	21	8.05	8	2.94		
Frequent respiratory infection	Yes	33	7.64	8	2.87	0.0082	0.9999 (NS)
	No	7	7.57	8	1.51		
Symptoms of allergic reactions	Yes	19	8.26	8	2.54	2.3739	0.1234 (NS)
	No	21	7.05	7	2.71		
Diseases occurs due to plastic industry	Yes	8	8.25	8	3.37	0.4719	0.4921 (NS)
	No	32	7.47	8	2.5		
Dermatological problem	Yes	22	7.5	7	3.13	0.9343	0.3337 (NS)
	No	18	7.78	8	2.05		
Use any personal protective equipment	Yes	20	7.7	8	2.6	0.5303	0.4665 (NS)
	No	20	7.55	7	2.8		
Medical health check-up	Never	36	7.92	8	2.61	5.1393	0.2733 (NS)
	Per annum	4	5	5	1.63		

(s) – Significant (NS) – Non - Significant

It is evident that only experience of the demographic variable is 0.0407, found to be significant because the “p” value is less than 0.05. Other demographic variables were not significant.

CONCLUSION

The study concluded that out of 40 samples, each subject had an excellent level of practice of using protective devices. Regarding the knowledge's 33(82.5%) have adequate knowledge and Seven (17.5%) have inadequate knowledge regarding the occupational hazards in plastic industry the study findings enable the nurses to plan and implement health education programs improve their knowledge of workers, their preventing the occupational hazards by adopting the use of protective devices in their industry.

REFERENCES

1. Helal SF, Elshafy WS. (2013). Health hazards among workers in plastic industry. *Toxicol Ind Health.* ;29(9):812-9. doi: 10.1177/0748233712442728.
2. Abu Salem ME, Abdel Rasoul GM, Mahrous OA, Hendy OM, Allam HK, Elbadry AM. (2017). Health disorders among workers in a plastic factory in Egypt. *Menoufia Med J* ;30:81-6.
3. Budhathoki SS, Singh SB, Sagtani RA, et al. (2014). Awareness of occupational hazards and use of safety measures among welders: a cross-sectional study from eastern Nepal *BMJ Open* 4:e004646. doi: 10.1136/bmjopen-2013-004646.
4. Sati PC, Khaliq F, Vaney N, Ahmed T, Tripathi AK, Banerjee BD. (2011). Pulmonary function and oxidative stress in workers exposed to styrene in plastic factory: occupational hazards in styrene-exposed plastic factory workers. *Hum Exp Toxicol.* ;30(11):1743-50. doi: 10.1177/0960327111401436.
5. Wongvijitsuk S, Navasumrit P, Vattanasit U, Parnlob V, Ruchirawat M. (2011). Low level occupational exposure to styrene: its effects on DNA damage and DNA repair. *Int J Hyg Environ Health.* ;214(2):127-37. doi: 10.1016/j.ijheh.2010.09.007.
6. Khaliq F, Singh P, Chandra P, Gupta K, Vaney N. (2011). Pulmonary functions in plastic factory workers: a preliminary study. *Indian J PhysiolPharmacol.* 55(1):60-6.
7. M.R.Suchitra , S. Parthasarathy , Mohamed Hanifah. (2020). Evaluation of Lung Function in Automobile Diesel Mechanics in A Semi Urban Town of South India- Kumbakonam Urban Rural Epidemiological Study – KURES 6 *Indian Journal of Public Health Research & Development.* ,Vol. 11, No. 01. 553 - 557

Copyright: © 2023 Author. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.