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Masood Ahmad Sheikh
Department of Medical Surgical Nursing Desh Bhagat University Mandi Gobindgarh Punjab, India

Nelofar Farooq
Department of Maternal and Child health Nursing, Kashmir University South Campus Anantnag, Jammu and Kashmir, India

Uzma Paddar
Department of Child Health Nursing, Tutor Govt. ANMT School Anantnag, Jammu and Kashmir, India

Tabasum Hussain
Department of Mental Health Nursing, Tutor Govt. ANM School Budgamg, Jammu and Kashmir, India

Corresponding Author:
Masood Ahmad Sheikh
Department of Medical Surgical Nursing Desh Bhagat University Mandi Gobindgarh Punjab, India

Descriptive study to assess the knowledge regarding prevention of bronchial asthma among workers in JK cement factory of Kashmir

Masood Ahmad Sheikh, Nelofar Farooq, Uzma Paddar and Tabasum Hussain

Abstract
Aim: The aim of this study was to assess the knowledge regarding prevention of bronchial asthma among workers in JK cement factory of Kashmir.
Introduction: Occupational asthma refers to asthma induced by exposure in the working environment to airborne dusts, vapors, or fumes, with or without preexisting asthma.. Over 250 materials encountered at the workplace can cause occupational asthma, which accounts for about 15% of all asthma cases.
Methodology: Descriptive research design and a sample of 50 workers were selected in JK cement factory of Kashmir by total enumerative sampling technique. Self-Structured interview schedule was used for data collection and data was analyzed by descriptive and inferential statistics using chi-square and t-test.
Results: The findings revealed that knowledge mean score was 7.00, median 7.50, standard deviation 2.25 and minimum score 5, maximum score 19 and range 14 at $p \leq 0.05$.Significant association of pretest knowledge score was found with duration of exposure and no significant association was found with age, educational status at ($p \leq 0.05$).
Conclusion: The findings of the study concluded that the pretest assessment was not satisfied in terms of knowledge which emphasis that there is need to impart planned teaching programme on knowledge among cement workers regarding prevention of bronchial asthma.

Keywords: Asses, knowledge, Bronchial asthma, prevention, workers and cement factory

Introduction
Asthma is a complex disorder of the conducting airways that was often classified into extrinsic and intrinsic asthma but there is considerable overlap [1].
Asthma is characterized by variable and recurring symptoms, reversible airflow obstruction, and bronchospasm. Symptoms include episodes of wheezing, coughing, chest tightness, and shortness of breath. These episodes may occur a few times a day or a few times per week. Depending on the person they may become worse at night or with exercise. Sputum may be produced from the lung by coughing but is often hard to bring up. During recovery from an attack, it may appear pus-like due to high levels of white blood cells called eosinophils. Symptoms are usually worse at night and in the early morning or in response to exercise or cold air. Some people with asthma rarely experience symptoms, usually in response to triggers, whereas others may have marked and persistent symptoms [2-7]. The main role of the respiratory system is to extract oxygen from the external environment and dispose of waste gases, principally carbon dioxide. This requires the lungs to function as efficient bellows, bringing in fresh air and delivering it to the alveoli, and expelling used air at an appropriate rate. Gas exchange is achieved by exposing thin-walled capillaries to the alveolar gas and matching ventilation to blood flow through the pulmonary capillary bed. In doing this, the lungs expose a large area of tissue, which can be damaged by dusts, gases and infective agents. Host defense is therefore a key priority for the lung and is achieved by a combination of structural and immunological defenses [1].
Occupational asthma is the most common occupational lung disease in industrialized countries, and the second most common occupational lung disease reported after pneumoconiosis in developing countries. The median proportion of adult cases of asthma attributable to occupational exposure is between 10% and 15%. The population attributable fraction appears to be similar in industrialized and developing countries characterized by rapid industrialization (13-15%), but lower in less industrialized developing countries (6%).

The high-risk occupations and industries associated with the development of occupational asthma vary depending on the dominant industrial sectors in a particular country. The reported mean annual incidence of occupational asthma in developing countries is less than 2 per 100 000 population, compared to very high rates of up to 18/100 000 in Scandinavian countries. While occupational asthma remains under-recognized, especially in developing countries, it remains poorly diagnosed and managed and inadequately compensated worldwide. Primary and secondary preventive strategies should be directed at controlling workplace exposures, accompanied by intense educational and managerial improvements. Appropriate treatment remains early removal from exposure to ensure that the worker has no further exposure to the causal agent, with preservation of income. However, up to one third of workers with occupational asthma continue to remain exposed to the causative agent or suffer prolonged work disruption, discrimination and risk of unemployment [27].

Asthma occurs in more than 10% of British adults, and bronchial carcinoma is the most common fatal malignancy in the developed world. The lung is the major site of opportunistic infection in those immune compromised by the acquired immunodeficiency syndrome (AIDS) or by anti-allograft and anti-cancer chemotherapeutic regimes; and tuberculosis (including multiple drug resistant strains) continues to increase, infecting one-third of the world's population [8].

Approximately 10 to 15% of the adults affected by the occupational asthma In the USA, occupational asthma is considered the most common occupational lung disease. At present, over 400 workplace substances have been identified as having asthma genic allergic properties [9].

A number of important research advances have occurred in recent years. Greater understanding of the genetics and cell biology of the lung has opened the way to noble therapies, including treatments targeting inflammatory mechanisms and the possibility of airway delivered gene therapy for cystic fibrosis. Finally recent advances in our understanding of the cellular and molecular mechanisms underlying diseases such as asthma and the acute respiratory distress syndrome (ARDS) are likely to lead to rational mechanism based therapy within the foreseeable future [8].

Diagnosis is usually based on the pattern of symptoms, response to therapy over time, and spirometry. Asthma is classified according to the frequency of symptoms, forced expiratory volume in one second (FEV1), and peak expiratory flow rate. It may also be classified as atopic or non-atopic where atopy refers to a predisposition toward developing a type 1 hypersensitivity reaction [10-13].

Medical care includes treatment of acute asthmatic episodes and control of chronic symptoms, including nocturnal and exercise-induced asthmatic symptoms. Pharmacologic management includes the use of control agents such as inhaled corticosteroids, long-acting bronchodilators (beta-agonists and anticholinergics), theophylline, leukotriene modifiers, and more recent strategies such as the use of anti-immunoglobulin E (IgE) antibodies (omalizumab) and anti-IL-5 antibodies in selected patients. Relief medications include short-acting bronchodilators, systemic corticosteroids, and ipratropium.For all but the most severely affected patients, the ultimate goal is to prevent symptoms, minimize morbidity from acute episodes, and prevent functional and psychological morbidity to provide a healthy (or near healthy) lifestyle appropriate to the age of child [14].

A stepwise (step-up if necessary and step-down when possible) approach to asthma management continues to be used in the current guidelines and is now divided into 3 groups based on age (0-4 y, 5-11 y, 12 y and older) [15].

For all patients, quick-relief medications include rapid-acting beta2 agonists as needed for symptoms. The intensity of treatment depends on the severity of symptoms [15].

About 42% of increase of asthma among males between 1982 and 1994. Incidence of asthma cause is projected to double by 2010 predicts the American Lung Association. Asthma is a 9thleading cause of hospitalization. Death from asthma was up over 200% from 1979 to 1997 from 2596 deaths to 5434 deaths. According to WHO estimates 300 million people suffer from asthma and 255000 people died of asthma in 2005.Asthma death will increase by almost 20% in the next 10 years if urgent action is not taken. In India there have been estimated 15 to 20 million persons of asthmatic. In India low literacy rate and low socio economic status is prevailing which also can affect the patient with asthma, so they are not able to afford treatment. In south Karnataka state has the first position in the incidence of asthma that is 3.849 in 29.5% among total population (5.27.33.950) this may due to climate with cold air humidity and rainfall [16].

Another survey conducted in China, between 2004-2005 on mortality proportion of respiratory diseases revealed, deaths from chronic obstructive pulmonary disease accounted for 81.49% of total respiratory death cases, infectious respiratory cases 12.27% and asthma cases 2.43% [17].

According to one of the article, survey conducted on respiratory diseases, morbidity and mortality among adults at Federal Medical Centre in Nigeria between November of 2006 and October of 2008 showed, respiratory diseases were predominant in the 25-44 year age (37.2%). Pulmonary Tuberculosis was the leading cause of morbidity (in 42.1%) followed by asthma (in 17.5%) and pneumonia (in 15.3%) [18].

Studies of occupational asthma suggest that a large proportion of the workforce (15-20%) may become asthmatic if exposed to potent sensitizers. Worldwide, approximately 300 million people have asthma and this is expected to rise to 400 million by 2025 [1].

The available epidemiological and comparative studies and reviews provide evidence that occupational agents cause 5 – 25% of all asthma cases [17, 15, 5]. besides these evident occupational asthma (OA) cases, there is probably an even larger population of sufferers of work-aggravated asthma [22-24].

A study was conducted in Great Britain in 2006-2008. The most common age group for new cases of occupational asthma was 35-44 and 45-54yrs, 80% of reported occupational asthma cases were in England with 13% in Scotland and 7% in Wales [25].

An estimated 11 million workers in a wide range of industries and occupation are potentially exposed to a least one of the many agent known to be associated with the development of occupational asthma. Exposure to the agent in industry has been recognized as a major contributor to asthma, highlighted the fact that asthma has emerged as the most prevalent occupational disease in the developed world [26].

As per the National Institute of Health and Family Welfare

of India statistics, there is 100 million occupational injuries causing 0.1 million deaths in the world. It also estimated that in India 17 million occupational non –fatal injuries, 17% of world, and 45000 fatal injuries i.e., 45% of total deaths due to occupational diseases in world occur each year. Out of 11 million cases of occupational diseases in world 1.9 million cases,17%, are contributed by India and out of 0.7 million death in the world 0.12 million is contributed by India [27].

According to National Institute of Health and Family Welfare the adverse occupational factors have been estimated to cost 2-14% of the gross national products for various countries. As the incidence of occupational related mortality is high in India it is false to say that out of total One million crore Rupees of Gross National Product in the year 1999, occupational disease caused a loss of 70000 crore. The amount paid as compensation for death and disablement resulting from work related injuries in India has increased from Rupees 8 million in 1961 to Rs.186 million in 1997.Occupational asthma plays a very significant role in this diseases [27].

In India the prevalence of self-reported asthma was 1.8% (95% CI 1.6–2.0) among men and 1.9% (95% CI 1.8–2.0) among women, with higher rates in rural than in urban areas and marked geographic differences. After adjustment for known asthma risk factors, women were 1.2 times more likely to have asthma than men. Daily/weekly consumption of milk/milk products, green leafy vegetables and fruits were associated with a lower asthma risk, whereas consumption of chicken/meat, a lower body mass index (BMI; <16 kg/m^2, OR 2.08, 95% CI 1.73–2.50) as well as a higher BMI (>30 kg/m^2, OR 1.67, 95% CI 1.36–2.06), current tobacco smoking (OR 1.30, 95% CI 1.12–1.50) and ever use of alcohol (OR 1.21, 95% CI 1.05–1.39) were associated with an increased asthma risk [28].

In Kashmir there has been a rapid increase in asthma cases in recent years in many parts of the world. In Jammu & Kashmir 2% of the population was reported to be suffering from Asthma. The reported level of asthma 1725/100000 is lower than the level reported for all India average. In Jammu &Kashmir the prevalence of Asthma is higher in rural area 1870/100000 than urban area 1158/100000. It is also higher among males 2035/100000 than females1397/100000. Age differences are sharp 444/100000in the age group of 0-14 and 9036/100000 in the age group of 60 and above [29].

Patil DS, Salunkhe HA, Kakade NR, Katti VA, Mohite RV conducted a Quasi experimental (one group for pre-test and post-test) research design in 2016 to assess the existing knowledge of the workers regarding occupational health hazards at Jaggery factory in Kolhapuron india.100 subjects from selected jaggery factories within 30 to 35 kilo meters around Kolhapur., Using Convenience sampling technique with randomly allocation of groups, It was observed that Overall Mean knowledge regarding occupational health hazards in the jiggery factory among the subjects was (33%) had good knowledge, (61%) had average, while (6%) had poor knowledge. The overall Mean knowledge about knowledge on prevention on occupational health hazards in jiggery factories among the subjects was (12%) had good knowledge, (87%) had average while (1%) had poor knowledge. Calculated $\chi 2$ values showed there is the statistically significant association between education ($p< 0.0215$) level of significance regarding occupational health hazards in the jaggery factory [30].

Kambli S conducted a cross sectional survey in 2012 to assess the knowledge regarding diagnosis and treatment among, 50 consecutive patients of bronchial asthma attending in and outpatient services of from Dr. D.Y Patil hospital and research center, Nerul, Navi Mumbai. The subjects were interviewed using questionnaire regarding pathology, key history points, risk factors, diagnosis, and management to determine how well informed they were about their disease. Majority of the patients had wrong concepts about etiology of disease, management, inhaled therapy, immunotherapy and the prognosis of asthma. The study concluded that Sincere and sustained efforts are required to impart health education to the patients and help them to participate in the self-management plans for asthma [31].

Ahmad HO, Newson-Smith conducted cross-sectional study 2010 to assess the knowledge and practice of workers in cement factory in Rasal-khaimah on occupational hazards by using semi-structured interview questionnaire. The majority 114 (74.5%) of the workers knew that exposure to the dust was a serious hazard to their health, but only 52.9% of the workers knew the hazards other than the dust that were associated with their work. All the workers mentioned that they had been provided with masks to protect them from dust; however, only 28.8% of them claimed that they used the masks all the time during working hours. The education about the hazards and training course about occupational health and safety were found to have a significant influence on the workers' knowledge about the occupational hazards and on their use of the personal protective equipment at work [32].

Meo SA conducted a quasi-experimental study in 2003 to determine the occupational hazards of cement dust on the lungs of cement mill workers. Healthy volunteer male cement mill 50 workers were randomly selected with an average of 13 years exposure with age ranging from 20-60 years. They were matched with 50, healthy male control subjects in terms of age, height, weight and socioeconomic status. Radiology was performed by Trophy radiology. The results showed that 12% of cases with interstitial lung disease and 2% of cases with pleural thickening and chronic bronchitis /asthma in cement mill workers. The researchers concluded that exposure to cement dust cause asthma, interstitial lung disease and chronic bronchitis in cement mill workers.

Zeleke ZK, Moen BE, Bratveit M conducted a combined cross-sectional and cross-shift study in 2010 in Dire Dawa cement factory in Ethiopia. 40 exposed production workers from the crusher and packing sections and 20 controls from the guards were included. Personal "total" dust was measured in the workers' breathing zone and peak expiratory flow (PEF) was measured for all selected workers before and after the shift. When the day shift ended, the acute respiratory symptoms experienced were scored and recorded on a five-point Likert scale using a modified respiratory symptom score questionnaire. The highest geometric mean dust exposure was found in the crusher section (38.6 mg/m3) followed by the packing section (18.5 mg/m3) and the guards (0.4 mg/m3). The highest prevalence of respiratory symptoms for the high exposed workers was stuffy nose (85%) followed by shortness of breath (47%) and "sneezing" (45%). PEF decreased significantly across the shift in the high exposed group. Total cement dust exposure was related to acute respiratory symptoms and

acute ventilatory effects. Implementing measures to control dust and providing adequate personal respiratory protective equipment for the production workers are highly recommended [33].

Poornajaf A, Kakooei H, Hosseini M, Ferasati, Kakaei H conducted a cross sectional study in 2010 to assess the effect of cement dust exposure and its relationship to lung function at a Portland cement factory in Ilam, Iran. Lung function tests were carried out on 112 workers at the cement factory in 2008-09. Simultaneously 85 non exposed workers were used as control. Lung function tests were performed for all subjects. Additionally, total dust level was determined by the gravimetric method. Moreover, X-ray diffraction (XRD) technique was performed to determine the SiO2 contents of the bulk samples. The arithmetic means (AM) of personal total dust were higher in the crusher (27.49 mg/m3), packing (16.90 mg/m^3), kiln (15.60 mg/m3), cement mill (13.07 mg/m3), raw mill (10.31 mg /m3) than in the maintenance (3.14 mg/m^3), and administration (1.55 mg/m^3). The geometrical mean (GM) concentration was 12.12 mg/m^3, which were considerably higher than occupational exposure limit (OEL) of the American Conference of Governmental Industrial Hygienists (ACGIH), which is 10 mg/m^3. Based on the results, the probability of the long-term mean exposure exceeding to the OEL of 10 mg/m3for total dust were higher in the kiln (100%), packing (100%), cement mill (90%), crusher (73%), raw mill (60%) than in the maintenance (0%), and administration (2.3%). Ventiliatory function evaluation, as measured by the function parameters, showed that 35.7% of the exposed workers had abnormality in lung function compared with 5.7% of those unexposed. Statistical analysis of the data indicated that exposed workers compared to the unexposed groups showed significant reductions in Forced Expiratory Volume in one second percent (FEV1), Forced Vital Capacity (FVC), and FEV1/FVC ($p< 0.05$) [34].

Agrawal S, Pearce N, Millett C, Subramanian SV, Ebrahim S conducted a cross-sectional study 2014 on prevalence of increases studied occupations self-reported asthma among adult men and women in India. Analysis is based on 64 725 men aged 15–54 years and 52 994 women aged 15–49 years who participated in India's third National Family Health Survey, 2005–2006, and reported their current occupation. The prevalence of asthma among the working population was 1.9%. The highest odds ratios for asthma were found among men in the plant and machine operators and assemblers major occupation category (OR: 1.67; 95% CI: 1.14–2.45; p = 0.009). Men working in occupation subcategories of machine operators and assemblers (OR: 1.85; 95% CI: 1.24–2.76; p = 0.002) and mining, construction, manufacturing and transport (OR: 1.33; 95% CI: 1.00–1.77; p = 0.051) were at the highest risk of asthma. Reduced odds of asthma prevalence in men was observed among extraction and building trades workers (OR: 0.72; 95% CI: 0.53–0.97; p = 0.029). The results revealed that the findings from high income countries showing high prevalence of asthma in men in a number of occupational categories and subcategories; however, with no evidence of increased risks for women in the same occupations [35].

Jeebhay MF, Quirce S conducted a cross sectional study in 2007 on Occupational asthma among lung disease after pneumoconiosis in developing countries. The median proportion of adult cases of asthma attributable to occupational exposure is between 10% and 15%. The population attributable fraction appears to be similar in industrialised and developing countries characterized by rapid industrialization (13-15%), but lower in less industrialized developing countries (6%). The reported mean annual incidence of occupational asthma in developing countries is less than 2 per 100 000 population, compared to very high rates of up to 18/100 000 in Scandinavian countries. While occupational asthma remains under-recognized, especially in developing countries, it remains poorly diagnosed and managed and inadequately compensated worldwide. Appropriate treatment remains early removal from exposure to ensure that the worker has no further exposure to the causal agent, with preservation of income. However, up to one third of workers with occupational asthma continue to remain exposed to the causative agent or suffer prolonged work disruption, discrimination and risk of unemployment [36].

Yelin E, Ketz P, Balmer J, Trupin, Earnest G, Eisner M, *et al*. conducted a population based survey in 2006 to estimate the duration of work life among persons reporting diagnosis of COPD, asthma and rhinitis. The method used was random digit dialing and structured survey. The results showed that as age of 55, only 62% of persons with COPD continue to work Vs 72 and 78 percent of persons with asthma and rhinitis respectively, person with COPD, asthma and rhinitis all had an elevation risk of leaving work prior to age 65. The study concluded that COPD, asthma and rhinitis were associated with substantially shortened work life [37].

M waiselage J, Bratveit M, Moen BE, Mashalla conducted a cross sectional study in 2005 to assess the effects of cement dust exposure on acute respiratory health. A total of 120 exposed workers and 107 controls participated in this study. Information on demographics, occupational history, chronic respiratory symptoms, smoking habits, and use of respiratory protection equipment was collected by questionnaire. Chronic respiratory symptoms and COPD were correlated with cumulative total dust exposure and adjusted for age, pack–years, and education. The exposed workers had more chronic cough [odds ratio (OR) 4.5, 95% confidence interval (95% CI) 1.9–10.4], chronic sputum production (OR 10.8, 95% CI 4.4–26.4.), dyspnea (OR 5.3, 95% CI 1.9–15.2), work- related shortness of breath (OR 4.8, 95% CI 1.6–14.2), and chronic bronchitis (OR 5.5, 95% CI 2.0–15.3) than the controls. Chronic cough, chronic sputum production, dyspnea, work-related shortness of breath, and chronic bronchitis were significantly related to cumulative dust exposure of 20.0–99.9 and ≥100.0 versus <20.0 mg/m3- years. The prevalence of COPD was higher for the exposed group (18.8%) than for the controls (4.8%). The odds ratio for COPD was significantly increased for cumulative dust exposure, ≥100.0 versus <20.0 mg/m3-years (OR 11.2, 95% CI 2.2–56.0) [38].

Oliver LC conducted a cross sectional study in 2001 to investigate the possible respiratory problem among laborers, tunnel workers, and operating engineers in highway and tunnel construction due to dust exposure. Based on self-report, asthma and chronic bronchitis were categorized for asthma, (1) physician-diagnosed or (2) undiagnosed likely, and (3) for chronic bronchitis symptomatic. They checked the prevalence of asthma and chronic bronchitis, lung function outcome. The results showed that from 389 workers: 186 laborers, 45 tunnel workers, and 158 engineers prevalence of asthma was 13 and 11.4% for laborers and engineers, respectively, and of symptomatic chronic bronchitis, 6.5 and 1.9%, respectively. Undiagnosed asthma was significantly elevated in workers compared to engineers, and marginally elevated for chronic bronchitis. The study concluded that exposure to cement products or its dust may predispose workers in developing asthma and

associated respiratory problems [39].

Aruna S, BabuNR conducted a descriptive cross sectional research design study in 2017 to assess the knowledge on respiratory problem among weavers in Chennai, India. 30 samples were selected by Non Random Sampling technique method and questionnaire was used. The study findings showed that a majority of them 11[37%] had adequate knowledge, 19[63%] had moderate of knowledge. Results show that a significant proportion of the textile workers had good knowledge and appropriate attitude towards cotton dust exposure, but appropriate protective practices were not being adopted by most of them. Knowledge of the harmful effects of cotton dust appears to have some effect on the attitude towards safety measures, but both good knowledge and safe practices had little influence on the adoption of safe practices in the study group [40].

Khan S, Roy A, Christopher DJ, Cherian AM conducted a cross sectional study in 2002 to find out the prevalence of bronchial asthma among employees by using a simple questionnaire-based data collection in Tamil Nadu India. One hundred and twenty employees were studied in the age group 25-55 years in 4 centres of Vellore town. A one-page questionnaire in English regarding asthma and allergic symptoms was used to assess the prevalence and the details of medical care utilization by those who were asthmatics. The prevalence of self-37reported bronchial asthma was 8.3% and that of asthma-related symptoms 15.8%. There was a significant association between those who had symptoms of asthma and a positive family history of asthma. Most of the asthmatic subjects using allopathic medicines reported a poor quality of life, despite treatment. The study result showed that prevalence of asthma in Vellore town to be more than that reported in other studies carried out at different centers in India [41].

Objectives of the study

- To assess the pre-test knowledge score regarding prevention of bronchial asthma among workers in JK cement factory of Kashmir.
- To find the association between pre-test knowledge score regarding prevention of bronchial asthma among workers in JK cement factory of Kashmir with selected demographic variables {age, educational status and duration of exposure}.

Materials and Methods

A descriptive research design was conducted to assess the knowledge regarding prevention of bronchial asthma among workers in JK cement factory of Kashmir. Only fifty subjects were selected by total enumerative sampling technique. The tool consisted of demographic variables and self-structured interview schedule. Prior to data collection informed consent was obtained from the participants. The data was collected for analysis by using descriptive and inferential statistics.

Results

Table 1: Frequency and percentage distribution of Study subjects according to their age. n=50

Age in years	Study Subjects	
	Frequency	Percentage
0-20	19	38
21-40	21	42
41-60	10	20

The data presented in table 1 revealed that out of 50 study subjects most of the subjects were 21 (42%) in the age group of 21-40 years, 19 (38%) in the age group of 0-20 years and 10(20%) in the age group of 41-60 years.

Table 2: Frequency and percentage distribution of Study subjects according to their education. n=50

Educational Status	Study Subjects	
	Frequency	Percentage
Illiterate	24	48
Primary	17	34
Middle & above	9	18

The data presented in table 2 revealed that out of 50 study subjects most of the subjects 24(48%) were illiterate, 17(34%) were primary and 9(18%) were middle pass and above.

Table 3: Frequency and percentage distribution of Study subjects according to their duration of exposure. n=50

Duration of exposure	Study Subjects	
	Frequency	Percentage
0-10	19	38
11-20	21	42
21-30	10	20

The data presented in table 3 revealed that out of 50 study subjects 21(42%) had 11-20 years duration of exposure,19(38%) had 0-10 years duration of exposure and 10(20%) had 21-30 years duration of exposure.

Table 4: Mean, Median, Standard Deviation and Range of knowledge Score of subjects regarding management of bronchial asthma. n=50

knowledge Score	Mean	Median	Standard Deviation	Minimum Score	Maximum Score	Range
Pre-test	7.00	7.50	2.25	5	19	14

The data presented in table 4 revealed that pre-test knowledge mean score of study subjects was 7.00, median 7.50, standard deviation 2.25, minimum score 5, maximum score 19 and range 14 at $p \leq 0.05$.

Table 5: Association between pre-test knowledge score regarding prevention of bronchial asthma with demographic variables (age, educational status and duration of exposure).

Parameter	Category	Frequency	Poor	Average	Good	Chi-square	df	p-value	Result
Age	0-20	19	11	2	6	5.52	4	.242	NS
	21-40	21	16	1	4				
	41-60	10	8	2	0				
Education	Illiterate	19	19	4	1	6.34	4	.175	NS
	Primary	12	12	2	3				
	Middle & above	4	4	4	1				

Duration of exposure	0-10	19	10	7	2	12.70	4	.013	S
	11-20	21	18	3	0				
	21-30	10	7	0	3				

The data presented in the table 5 revealed that significant association was found between pre-test knowledge score with this demographic variable (Duration of exposure) at ($p \leq 0.013$). The data also presented in the table 5 revealed that no significant association was found between pretest knowledge score with these demographic variables (Age and Educational Status).

Hence the investigator rejected null hypothesis and accepted research hypothesis with this variable e.g. duration of exposure (H_1: There is significant association between pre-test knowledge score of study subjects with their demographic variables) and also the investigator accepted null hypothesis but rejected research hypothesis with these variables age and educational Status (H_0: There is no significant association between pre-test knowledge score of study subjects with their demographic variables)

Discussion

The major findings of the study were compared with the similar studies conducted by other researchers. The findings of the study were discussed as per the objectives and hypotheses. The findings of the study showed that in pre-test out of 50 study subjects majority of the subjects were 21 (42%) in the age group of 21-40 years, 19(38%) in the age group of 0-20 years and 10(20%) in the age group of 41-60 years.

The findings also revealed that majority of the study subjects 24(48%) were illiterate, 17(34%) were primary and 9(18%) were middle pass and above.

The findings also portrayed that out of 50 study subjects 21(42%) had 11-20 years duration of exposure, 19(38%) had 0-10 years duration of exposure and 10(20%) had 21-30 years duration of exposure.

The findings also revealed that In pre-test out of 50 study subjects most of study subjects 5(10%) had good knowledge, 10(20%) had average knowledge and 35(70%) had poor knowledge regarding prevention of bronchial asthma among workers in JK cement factory of Kashmir.

The findings also revealed that pre-test mean knowledge score of study subjects was 7.00, median was 7.50, standard deviation was 2.25 and minimum score was 5, maximum score was 19 and range was 14 at $p \leq 0.05$.

The present study findings are consistent with the findings of a descriptive cross sectional research design conducted by Aruna S, Babu NR in 2007 to assess the knowledge on respiratory problem (asthma) among weavers in arani. The findings of the study revealed that 11[37%] had good knowledge, 19[63%] had average knowledge and none of them had poor knowledge [40].

The present study findings are consistent with the findings of quasi-experimental research design conducted by Patil DS, Salunkhe HA, Kakade NR, Katti VA, Mohite RV in 2016 to assess the knowledge on occupational Health Hazards among workers in selected factory Kolhapur India. The findings of study revealed that (9%) had good knowledge, (61%) had average while (30%) had poor knowledge regarding prevention of occupational asthma among workers with mean knowledge score 9.98. The findings of study revealed that (12%) had good knowledge, (87%) had average and only (1%) had poor knowledge regarding prevention of occupational hazards (asthma) among workers with mean knowledge score 3.87 and 0.6139 [30].

The findings are also supported by the findings of the study of a quasi-experimental pre-test post-test research design conducted by Manchana V, Mahal R. in 2014 to assess the impact of asthma educational intervention on self-care management of bronchial asthma among adult. In this study out of 30 samples 1 (3.33%) had above average knowledge, 13 (43.33%) had average knowledge and 16 (53.33%) had below average knowledge, respectively in the pre-test knowledge score level [42].

The findings of the present study are in conformity with the findings of a cross sectional survey conducted by Kambli S in 2012 to assess the knowledge regarding diagnosis and treatment of bronchial asthma. In this study out of 50 samples 3(6%) had good knowledge, 28 (56%) members had average knowledge, and 19(38%) had poor knowledge [31].

The present study findings are consistent with the findings of the pre-experimental research study design conducted by Truong CD in 2011 to assess the knowledge regarding use of personal protective devices to prevent respiratory diseases (asthma) among garment workers. The results of the study showed that 3.72% had good knowledge, 18.11% had average knowledge and 78.16% had poor knowledge [43].

The present study findings are consistent with the findings of quasi-experimental research design conducted by Patil DS, Salunkhe HA, Kakade NR, Katti VA, MohiteRV in 2016 to assess the knowledge regarding occupational hazards among workers with special emphasis to prepare health educational material in selected jiggery factories at Kolhapur India. The findings of the study revealed that mean post- test knowledge score 13.06 and t-value =25.798, P<0.0001 of structured teaching program was apparently higher than the mean pre- test knowledge score 9.0613 and t-value = 59.748,P<0.0001 respectively. Therefore it could be concluded that structured teaching programmeis effective in gaining knowledge score regarding management of bronchial asthma [30].

The present study findings are consistent with the findings of quasi experimental pretest post-test research design conducted by Manchana V, Mahal R in 2014 to assess the impact of educational intervention on self-care management of bronchial asthma among adult. The findings revealed that there was significant difference in knowledge before and after the planned educational intervention with mean difference 83,mean=2.8±1.22, df=29 and calculated t" value 12.72 at p value <0.05. respectively [42].

The present study findings are consistent with the findings of quantitative research design conducted by Chithra RA, Raju J in 2017 to assess the effect of structured teaching program on knowledge regarding respiratory therapy among the patients with respiratory disorders Rajasthan India. The findings of the study revealed that the mean post-test skill score 23.52±2.65 at P<0.0001 of STP was apparently higher than the mean pre- test skill score 5.88±1.54 at P<0.0001 respectively with mean difference 17.64. Therefore it could be concluded that structured teaching programme is

effective in gaining skill score regarding management of bronchial asthma [44].

The findings portrayed that the association of demographic variables with pretest knowledge scores by using Chi – square test revealed that there was statistically significant association between pretest knowledge score with this demographic variable as duration of exposure evidenced that there was statistically significant association at $p \leq 0.05$ level. No significant association was found with age and educational status.

The present study findings are consistent with the findings of a descriptive cross sectional research design conducted by Aruna S, Babu NR in 2017 to assess the knowledge on respiratory problem (asthma) among weavers in Arani. Where there was statistically no significant association between pretest knowledge score with selected demographic variable as age, education and duration of exposure [40].

The findings are also supported by the findings of pre experimental research design conducted by Chithra RA, Raju J in 2017 to assess the effect of structured teaching program on knowledge regarding respiratory therapy among the patients with respiratory disorders (asthma) Rajasthan India where there was statistically no significant association between pretest knowledge score with selected demographic variable as age and education [44].

Conclusion

This study was conducted with the objective to assess the knowledge regarding prevention of bronchial asthma among workers in JK cement factory of Kashmir. The findings concluded that majority of the study subjects were not having good knowledge regarding prevention of bronchial asthma. The findings also revealed that there was significant association between pretest knowledge score with this variable (duration of exposure) and no association was found between pretest knowledge score with these variables (age and educational status). So it indicates that there is need to enhance the knowledge by developing planned teaching programme, awareness programmes and demonstrations regarding prevention of bronchial asthma among occupational workers.

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Conflict of interest and funding

As such there was a bit conflict and compromise between the workers and investigator because the workers were not ready to cooperate while doing pre-assessment on knowledge regarding prevention of bronchial asthma. Moreover, the investigator first motivated the cement workers regarding the benefits of this knowledge and study. In addition of this, the fact is that workers remain very busy in factories and are getting very less time to achieve such type of opportunities during their life. The investigator also felt that there should be planned teaching programmes, awareness programmes, demonstrations in order to enhance the level of knowledge for occupational workers. The investigator also done this work very ethically without getting any fund or any support from any organization.

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