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INDOOR AIR POLLUTION: KNOWLEDGE, ATTITUDE AND PRACTICE AMONG RESIDENTS OF AJK

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Abstract

According to WHO, almost 3 billion people rely on solid fuel burning containing pollutants (i.e., CO, NO & PMs) and thus have increased risk of COPD, chronic bronchitis & lung cancer. Our research aims to help rectify this situation to provide information on current situation of this issue in AJK. The study was conducted on 168 houses having male-female ratio of 5:7 on residents of AJK. Performa was prepared and information was obtained regarding socio demographic characteristics, knowledge, attitude, and practice regarding indoor air pollution. Out of 168 participants {70 males (41.7%) and 98 females (58.3%)}, about 61 participants (36%) did not have any symptoms;43 participants (25%) suffered from headache;39 participants (23%) had sneezing and 25 participants (15%) suffered from cough. Regarding knowledge, 138 participants (82.1%) were aware of indoor air pollution related hazardous impacts.115 participants (68.4%) knew using gas stoves can cause lung problems.149 participants (88.7%) were aware that indoor smoking is injurious to health. 161 participants (95.8%) were aware that paint fumes cause respiratory problems. Regarding practice, 141 people (83.9%) do indoor air cleaning once weekly. About 125 people (74.4%) were using gas stoves. There is no significantly difference in the knowledge level of both males and females. Air quality of AJK area is affecting the residents but the affected people are quite less. Further survey is needed that compares the population's knowledge of indoor pollution based on their level of education and other dynamics that influence and are resulting it.

INTRODUCTION

Indoor air pollution is dirt/dust and the gases which is the part of the air inside a building e.g., homes and workplaces that could be harmful to breathe in. While most people are aware of the effects of outdoor air pollution, relatively few know of the detrimental effects of indoor air pollution (IAP). According to the WHO, an estimated premature death is about 4.3 million annually are accounted for by household air pollution (HAP) [1]. This is especially concerning since on average, 90% of a person's time is spent indoors [2]. Indoor air pollution is of two types, the first is particulate matter-tiny dust and dirt particles in the air, including soot and dust, and thesecond is gases such as sulphur dioxide, carbon monoxide, and nitrous oxide. Burning solid fuels (SF) including wood, coal, agricultural waste, animal dung, etc. is the leading cause of indoor air pollution in underdeveloped countries. Pollutants related with SF include mostly polycyclic aromatic hydrocarbons (PAHs), particulate

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matter (PMs), nitrous oxide (NO), carbon monoxide (CO), and sulphur dioxide (SO_2), and their concentrations being two to three times high in indoor environments [4]. According to a report by WHO, around the world, about 3 billion people use inadequate stoves and polluting fuels for heating and cooking [5]. Other sources of indoor air pollution include: passive exposure to tobacco smoke, radon decay products (mainly from ground under the building), building materials (asbestos containing insulation, flooring, carpets etc.), household cleaning products, personal care, heating and cooling appliances and biological processes i.e., mites, moulds [6].

In developed countries, among high-income countries, smoking is a significant source of indoor particulate matter, contributing from 50 to 90% of indoor PM concentrations [7]. Usage of gas stoves was found to increase pollutant exposure, with a study indicating that, gas stove or furnace increase 18 ppb NO_2 concentrations in 24h [8]. Many various chemicals, especially volatile aromatic compounds, are directly released into the air by housekeeping supplies, paints, insecticides, and other frequently used goods [9]. Inadequate ventilation, poor air distribution, high temperature, humidity extremes and air filtration problems increase the concentration of pollutants. State of housing and fuel used in households are major determinants of indoor air pollution [10]. Indoor air pollution poses no. of public health concerns worldwide. As a result, due to indoor air pollution, mortality rates and incidence of respiratory and CVS diseases has increased with alarming rates. Immediate health concerns such as eyes, nose and throat irritation, headache, dizziness, and fatigue. Pollutants exposure over time can results to pulmonary tuberculosis, nasopharyngeal and laryngeal carcinomas, cataract, asthma and most importantly lung cancer [11].

According to a research based on 19 cross-sectional studies and 5 case-control studies reported that women subjected to SF smoke had a 1.38 times greater chance of acquiring COPD and severe bronchitis than females which are exposed to clean fuel. Burning biomass fuel was found to be substantially linked to chronic bronchitis in women, according to a study carried out in Peshawar, Pakistan [12]. The study discovered a strong and favourable relationship between wood smoke, rice straw, dung cakes and living room cooking and chronic bronchitis [13]. Exposure to indoor particulate matter (more specially the coarse fraction), NO, and mouse allergen are important determinants of asthma morbidity in urban environments [14]. Human cancer (Group 1) is caused by indoor pollutants from coal burning in homes inducing lung cancer. Humans are likely to develop cancer from the indoor pollutants produced when biomass fuel (mostly wood) is burned at home and when food is fried at high temperatures. (Group 2A), with biomass being a probable risk for lung cancer [15]. In India, studies showed that long-term exposure to smoke from solid fuel burning was associated with the development of adenocarcinoma of the lungs in women with no smoking history [16]. In Nepal, those who were exposed to HAPs demonstrated that exposure to biomass combustion for longer periods of time was significantly connected with an increased risk of lung cancer [17]. In poor and middle income countries, a significant number of premature deaths are due to indoor air pollution owing to the use of SF [18]. Furthermore, infant deaths were significantly associated with coal usage as fuel in the indoor environment [19]. While searching for literature on indoor air pollution, IAP studies, in general, were scarce, with most studies aimed at working environments and not households. There was a shortage of studies focused on the issue of indoor air pollution in Pakistan. Studies based in AJK were practically non-existent. This research aims to rectify that situation, to help provide information on the current situation of this issue in AJK.

This study is basically directed towards assessing knowledge, attitude, and practice among residents of AJK to know how much knowledge they already have and to what extent they require awareness campaigns to reduce health problems related to IAP. The objectives is to assess the knowledge of indoor air pollution and its risk factors among residents of AJK, to evaluate attitude and practices to reduce the burden of associated diseases due to indoor air pollution among residents of AJK and to recommend suggestions to reduce health problems related to indoor air pollution.

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METHODOLOGY

A cross-sectional descriptive study was carried out with a sample size of 168 having male-female ratio of 5:7 on residents of AJK. The sample size was determined through WHO calculator sample size. We did consecutive non-probability sampling. Those people who are willing to participate in research were included, while those who are having any terminal illness were excluded. Individuals were selected from different classes in Mohi Ud Din Islamic Medical College and from city. Participation was anonymous and voluntary. The study and the questionnaire were explained to them. The study took 8 months, starting from March 2022 till October 2022. Pre-validated Performa was prepared and information on sociodemographic traits, knowledge, attitudes, and practices related to indoor air pollution were gathered after collecting written informed consent. The questionnaire was self-administered by the participants. The investigator designed the questionnaire based on earlier literature. A set of 27 statements was constructed that covered knowledge (9 items), attitudes (9 items), and practices (9 items). The data was entered and analysed by using SPSS-V22.

RESULTS

In the study 70 males (41.7%) and 98 females (58.3%) out of total 168 participated (Table no. 1). The age distribution and the other demographic details are depicted.

Table no.1: Demographic profile of the study population

Age, mean {S} = 23.45±3.455

		Number	*%*
Gender	Male	70	41.7%
	Female	98	58.3%
Income	< 50k	25	14.9%
	51k -150k	109	64.9%
	> 150k	34	20.2%

Do you have any family member suffer from any respiratory problem?

Family history		YES	NO
		58 (34.5%)	110 (65.5%)
Symptoms	Cough	26	15.5%
	Headache	42	25%
	Sneezing	39	23.2%
	Nil	61	36.3%

Participants agreed that they or their family members had symptoms due to indoor air pollution (cough, headache, and sneezing). While some participants also said they have no symptoms. Percentages of the individual symptom are shown in figure no.1

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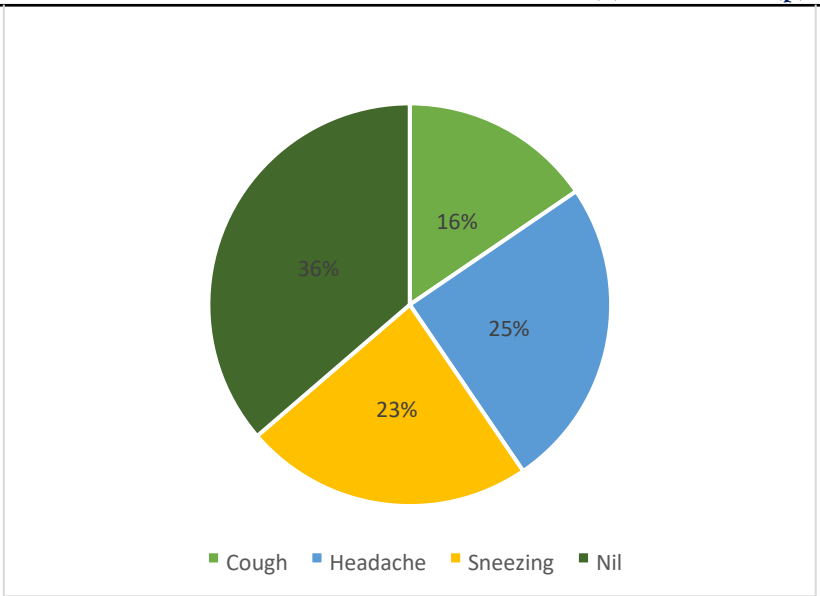

Figure no.1: Symptoms seen in participants

Most of the participants were aware of the indoor air pollution. Those who have knowledge about indoor air pollution is hazardous to health were 82.1% and using gas stoves affects lungs 68.4%. Maximum participants (88.7%) thought smoking inside house is injurious to health. Knowledge about paint fumes can cause respiratory problems was maximum (95.8%) (Table no.2).

Table no.2: Knowledge questions about indoor air pollution

QUESTION	YES	NO
Q1. Do you know indoor air pollution is hazardous to health?	138 (82.1%)	30 (17.9%)
Q2. Do you know that using gas stoves affects lungs?	115 (68.4%)	53 (31.5%)
Q3. Do you know that using wood or coal as fuel causes breathing problems?	159 (94.6%)	9 (5.4%)
Q4. Do you know humidity can aggravate asthma?	133 (79.2%)	35 (20.8%)
Q5. Do you know that smoking inside house is injurious to health?	149 (88.7%)	19 (11.3%)
Q6. Do you know that body sprays and air fresheners can cause respiratory problems?	159 (94.6%)	9 (5.4%)
Q7. Do you know that paint fumes can cause respiratory problems?	161 (95.8%)	7 (4.2%)
Q8. Do you know that dust mites from carpets increase the risk of asthma?	150 (89.3%)	18 (10.7%)
Q9. Do you that aggravation by indoor air pollution can result in death in patients already suffering from allergies?	141 (83.9%)	27 (16.1%)

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On asking questions about practice, 83.9% participants told they will do indoor cleaning once weekly. Most participants prefer to use gas stoves to cook food (Table no. 3).

Table no.3: Practice questions related to indoor air pollution

VARIABLE		N (%)
Indoor cleaning	Once fortnight	18 (10.7%)
	One monthly	9 (5.35%)
	Once weekly	141 (83.9%)
Cooking devices (N= 168 FOR EACH VARIABLE)	Gas stove	125 (74.4%)
	Cylinder	48 (28.6%)
	Oven	74 (44%)
	Electric stove	58 (34.5%)
Carpet cleaning	Often	50 (29.8%)
	Regularly	89 (52.9%)
	Sometimes	29 (17.3%)
Allergy prevention	Anti-allergic drug	17 (10.1%)
	Avoid smoking	20 (11.9%)
	Face mask	91 (54.2%)
	Home remedy	40 (23.8%)

There is no discernible difference in knowledge levels between males and women, according to the gender-specific t-test study. (Table no.4)

Table no.4: The t-test results by gender for indoor air pollution knowledge, attitude, and practice.

Measure	Gender	N	Mean	S.D.	T	Df	Sig. (2-tailed)
Knowledge	Male	70	1.83	0.380	0.203	166	0.839
	Female	98	1.82	0.389			
Attitude	Male	70	1.96	0.204	2.614	166	0.01
	Female	98	1.83	0.381			
Practice	Male	70	2.61	0.708	-2.028	166	0.044
	Female	98	2.82	0.581			

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IAP in households that used solid fuels was projected to be the cause of over 2 million premature deaths in 2001 and to account for around 3% of the worldwide disease burden. The key outcome of this research is that there is significant knowledge among residents of AJK city about indoor air pollution. In contrast to a study done in Cameroon, which found that females are as knowledgeable about the indoor population as males, our study found that females had higher levels of knowledge than males [20]. The difference may be due to the relatively smaller sample size of our study. In our study, 82.1% of the participants know that indoor air pollution is hazardous to health. In a similar study conducted in Rawalpindi and Islamabad, 95.1% know indoor air pollution is detrimental to health [21]. The difference is due to the smaller sample area of our study. In our study, 94.6% know that using wood or coal as fuel causes breathing problems. In a similar study conducted in Rawalpindi and Islamabad, 96% know that there is link between indoor air pollution and respiratory diseases [21]. In present study, 88.7% thought that smoking inside house is injurious to health. While in a similar study, 78% thought that indoor smoking may cause health problems. This is because due to extensive awareness from government, now people are more aware to injurious effects of smoking [21]. In our research, 68.4% know that using gas stoves affects lungs. While in a similar study 59.2% thought gas stove is the cause of indoor air pollution [24]. This is since now people are more educated and aware. Amegah & Jaakkola (2016) [22] and Pilishvili et al., (2016) [24] noticed that the most crucial and frequently practical strategies to improve indoor air quality in homes are the implementation of construction standards and increased home ventilation by education. However, it should be highlighted that schooling does not appear to have made much of a distinction for the population examined in the current study. It is necessary to conduct research on the factors that influence people's decisions to engage in or refrain from polluting actions. In numerous investigations it is confirmed that stove has been identified as the primary cause of IAP [25], which is consistent with our research. According to a study done in India, symptoms of indoor air pollution are linked to children's respiratory health, including coughing, phlegm production, shortness of breath, wheezing, the common cold, and throat congestion. These symptoms are more common in homes where there is a family background of smoking [26].

CONCLUSION

It is concluded that although the air quality in the AJK area is having a noticeable impact on the health of residents, the overall number of individuals experiencing adverse effects remains relatively low. This suggests that while environmental concerns do exist, the severity or extent of exposure may not yet be widespread. Nonetheless, proactive measures are essential to prevent further deterioration and protect the broader population.

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