

# An analytical study on perceived experiences of homemakers associated to the causes of indoor pollution

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## ABSTRACT

Right to live in a healthy environment is a fundamental human right. It is the basic requirement of all the living beings; including humans, livestock, plant, micro-organisms and the wildlife. In the society man constantly interacts with his environment which affects him both physiologically and psychologically. Study was conducted on the perceived experiences of rural and urban homemakers associated to the different causes of indoor pollution. Most frequently encountered experiences revealed by the respondents were: garbage burning, smoking, paddy burning in fields, high indoor humidity, abundance of dust etc. under the environmental causes. Similarly most frequently perceived experiences of indoor pollution due to chemical causes were: leaking of cooking gas, perfumes, mosquito, insects repellent with mean score = 2.53, room deodorizers, cosmetics, hair spray and insecticides/pesticides. Most frequently experiences under the category of constructional faults and household articles causing indoor pollution were: dust beneath carpet, uncovered dustbins, clogged drain pipes, dusting of rugs/carpet/bedding/sofa, damp and soiled bedding, cooking fumes, wall dampness, damp carpets, roof leakage, leaking pipes and worn off mattress. Maximum mean score was for dust beneath the carpet with mean score 2.50 and the least mean score was for worn of mattresses with mean score 1.77. Perceived experienced due to miscellaneous causes leading to indoor pollution as reported by respondents were: pet waste, cockroaches, lizards, insects, animal dander, stagnated water, fungus, black moulds and spider's webs.

## INTRODUCTION

The indoor environment is where people spend 90 per cent of their time. It is widely accepted that the indoor environment is important for public health and that a high level of protection against adverse health effects due to inadequate quality of the indoor environment should be assured. This is incorporated in the human right to a healthy indoor environment as formulated in the WHO Constitution (1985). The human right to a healthy indoor

environment includes the right to breathe clean air (WHO/EURO, 2000), the right to thermal comfort, and the right to visual health and visual comfort.

In the developing countries, it is the rural areas that face the greatest threat from indoor pollution, where some 3.5 billion people continue to rely on traditional fuels such as firewood, charcoal, and cow dung for cooking and heating. Concentrations of indoor pollutants in households that burn traditional fuels are alarming. Burning such fuels produces large amount of smoke and other air pollutants

in the confined space of the home, resulting in high exposure. Women and children are the groups most vulnerable as they spend more time indoors and are exposed to the smoke. In 1992, the World Bank designated indoor air pollution in the developing countries as one of the four most critical global environmental problems. Daily averages of pollutant level emitted indoors often exceed current WHO guidelines and acceptable levels. Although many hundreds of separate chemical agents have been identified in the smoke from bio-fuels, the four most serious pollutants are particulates, carbon monoxide, polycyclic organic matter and formaldehyde. Unfortunately, little monitoring has been done in rural and poor urban indoor environments in a manner that is statistically rigorous.

In urban areas, exposure to indoor air pollution has increased due to a variety of reasons, including the construction of more tightly sealed buildings, reduced ventilation, the use of synthetic materials for building and furnishing and the use of chemical products, pesticides, and household care products. Indoor air pollution can begin within the building or be drawn in from outdoors. Other than nitrogen dioxide, carbon monoxide and lead, there are a number of other pollutants that affect the air quality in an enclosed space.

Volatile organic compounds originate mainly from solvents and chemicals. The main indoor sources are perfumes, hair sprays, furniture polish, glues, air fresheners, moth repellents, wood preservatives, and many other products used in the house. The main health effect is the irritation of the eye, nose and throat. In more severe cases there may be headaches, nausea and loss of coordination. In the long term, some of the pollutants are suspected to damage to the liver and other parts of the body.

Tobacco smoke generates a wide range of harmful chemicals and is known to cause cancer. It is well known that passive smoking causes a wide range of problems to the passive smoker (the person who is in the same room with a smoker and is not himself/herself a smoker) ranging from burning eyes, nose and throat irritation to cancer, bronchitis, severe asthma and a decrease in lung function.

Pesticides, if used carefully and the manufacturers' instructions followed carefully they do not cause too much harm to the indoor air.

Biological pollutants include pollen from plants, mite, hair from pets, fungi, parasites and some bacteria. Most

of them are allergens and can cause asthma, hay fever, and other allergic diseases.

Formaldehyde is a gas that comes mainly from carpets, particle boards and insulation foam. It causes irritation to the eyes and nose and may cause allergies in some people.

Asbestos is mainly a concern because it is suspected to cause cancer.

Radon is a gas that is emitted naturally by the soil. Due to modern houses having poor ventilation, it is confined inside the house causing harm to the dwellers.

Pollution occurs when pollutants contaminate the natural surroundings; which brings about changes that affect our normal lifestyles adversely. Pollutants are the key elements or components of pollution which are generally waste materials of different forms. Pollution disturbs our ecosystem and the balance in the environment. With modernization and development in our lives pollution has reached its peak; giving rise to global warming and human illness. In this connection, woman can play a pivotal role and can take initiative in showing concern about indoor pollution. Present study was therefore, conducted with the objective to examine the perceived experiences of rural and urban homemakers regarding indoor pollution.

## MATERIAL AND METHODS

The data for the present study was collected from 120 randomly homemakers *i.e.*, 60 rural and 60 urban respondents. Rural data was collected from randomly selected villages *i.e.*, *Majara* and *Phullanwal* of Ludhiana 1 block of Ludhiana district. Similarly urban homemakers were randomly selected from *Jawahar Camp* and *Canal Avenue* from D-zone of Ludhiana city. An interview schedule was prepared which sought information about the perceived experiences of homemakers regarding indoor pollution. The information was collected by personal interview method with open ended and pre-tested interview schedule. The data collected were coded and tabulated. For analyzing the data, simple averages, percentages, mean scores, t-test were used.

## OBSERVATIONS AND ANALYSIS

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

**Experience level :**

Indoor pollution is an area of interest when the well being of people is of prime importance. India, although still in a developing stage: is at a cross roads when major issues like population explosion, environmental degradation, illiteracy and poverty, hinder its developmental process. Therefore, actual experiences as felt by the respondents were recorded and data pertaining to these was presented from Table 1 to 4.

**Perceived experiences related to environmental causes :**

It can be seen from Table 1 that maximum number of respondents (39.17%) were able to recall the experience of ‘paddy burning in fields’ which caused indoor pollution during the period of paddy harvesting season way back on 15th October 1998 apart from such encounters every year during post paddy harvest. More rural respondents (58.33%) come across this experience in comparison to their urban counterparts where only 20 per cent had responded for such experience. Forty five respondents experienced ‘high humidity indoors adding’ to their miseries, afflictions and hardships. Whereas 36.67 per cent homemakers experienced that ‘garbage burning’ at home, increases indoor pollution instantly and straightway (may be for short duration), followed by ‘dusty indoor’ atmosphere as experienced by 34.17 per cent respondents. It was also noted that more urban respondents had these experiences as compared to their rural counterparts except in case of having the experience of ‘paddy burning’ in fields. Tripathi *et al.* (2013) also reported that although crop residue / biomass burning are cheap and easiest method to dispose the paddy straw yet they influence the atmospheric air quality including climate and also affects the human health. Least number of selected respondents (27.50%) responded that

‘combustion of kitchen fuels’ was causing any indoor pollution followed by experiences of ‘lacking proper ventilation’ where only 31.67 per cent respondents reported any affect on indoor pollution due to ‘poor cross ventilation’ inside their houses.

Information was also collected on four point scale regarding the indoor pollution experiences faced due to different environmental causes by recall method. As Table 1 reveals that maximum mean score was given to ‘garbage burning’ inside the house premises with respondents earning mean score 2.56, followed by ‘smoking’ may be cigarette/cigar/*beedhi* with mean score 2.48, ‘paddy burning’ (mean score 2.42), high level of ‘indoor humidity’ (mean score 2.29) and ‘dust in abundance’ as well as pollution due to ‘kitchen fuels’ with mean score 2.24 each. Minimum mean score was earned by respondents, for ‘poor cross ventilation’ with mean scores 2.30 and 1.50 by urban and rural respondents, respectively. With slight change in our working or performing different activities inside the home, one can reduce the affect of environmental causes to some extent.

The difference in the perceived experiences of rural and urban homemakers regarding indoor pollution due to environmental causes; ‘garbage burning’, ‘indoor smoking’ and ‘high indoor humidity’ was found to be statistically significant at 5 per cent level of significance and for ‘paddy straw burning’ and ‘poor cross ventilation’ were statistically significant at 1 per cent level of significance. The difference for other mentioned causes was found to be statistically non-significant.

**Perceived experience related to chemical causes :**

Concerns about recent increases in the incidence of asthma and allergies worldwide have stimulated much research on potential chemical causes (Chan-Yeung and Becker, 2006). Most of the researches have focused on

Causes	Perceived experiences (n=120)			Extent of perceived experiences (3 point scale)			
	Rural (60)	Urban (60)	Total	Rural	Urban	t-value	Total
Garbage burning at home	7 (11.67)	37 (61.67)	44 (36.67)	2.43	2.69	1.97*	2.56
Smoking indoors (Cigarette/Cigar/Beedi)	7 (11.67)	12 (20.00)	19 (15.83)	2.35	2.60	2.14*	2.48
Paddy burning in fields	35 (58.33)	12 (20.00)	47 (39.17)	2.07	2.77	2.74**	2.42
High indoor humidity	18 (30.00)	27 (45.00)	45 (37.50)	2.12	2.45	2.21*	2.29
Dust in abundance	16 (26.67)	25 (41.67)	41 (34.17)	2.12	2.36	1.91	2.24
Pollution due to kitchen fuels	18 (30.00)	15 (25.00)	33 (27.50)	2.13	2.34	1.87	2.24
Poor cross ventilation	8 (13.33)	30 (50.00)	38 (31.67)	1.50	2.30	3.28**	1.90

Multiple responses,  
 Figures in parentheses indicate percentages.

# 4 Point scale: Always= 4, Often=3, Sometimes= 2, Rarely=1  
 \* and \*\* indicate significance of values at P=0.05 and 0.01, respectively

exposures in residences, where children and elderly family members spend the majority of their time. Mendell (2007) reported that risk factors identified most frequently included formaldehyde or particleboard, phthalates or plastic materials, and recently painted walls, doors etc. Findings for the other risk factors, such as aromatic and aliphatic chemical compounds, were limited but suggestive. Elevated risks were also reported for renovation and cleaning activities, new furniture, and carpets or textile wallpaper. Not only such products, there are many products in the houses that are an integrated and essential part of the dressing table such as hair spray, perfumes, different cosmetic products etc. are also chemical based products causing indoor pollution. So, information was also congregated, to know any noticeable effect of these chemical based products, experienced by the selected rural and urban respondents.

It can be seen from Table 2 that maximum number of respondents (80.83%) were able to recall the experience of 'insecticides and pesticides' which caused indoor pollution at some time in their knowledge. More of the urban respondents (86.67%) faced such experiences as compared to 75.00 per cent of their rural counterparts. Seventy selected respondents experienced 'leakage of gas' due to faulty or old pipes or from the defective cylinder adding to their miseries. Further 50.83 per cent respondents recalled that 'mosquito/insects repellents' have caused complications to their family member at one time or other, followed by recall of 'artificial fragrance' by 47.50 per cent respondents and 'room fresheners' as experienced by 30.00 per cent respondents. It was also noted that more number of the urban respondents could recall these experiences as compared to their rural counterparts. Least encountered experience was pollution being caused due to 'hair spray'

as disclosed by only 24.17 per cent followed by experiences of harmful effect of 'cosmetics' by 28.33 per cent respondents and 'perfumes' by 29.17 per cent respondents.

Data was also collected on four point scale regarding perceived experiences due to different chemical causes by recall method. As Table 2 depicted that maximum mean score was given to 'cooking gas leakage' due to defective pipes or due to faulty cylinders with respondents earning mean score of 2.75. Table further portrayed that 'perfumes' were one of the other chemical causes with mean score 2.56 followed by 'mosquito or insect repellents' with mean score 2.53, 'room fresheners' (mean score 2.46), 'cosmetics' (mean score 2.38) and 'hair sprays' that released HCFC with mean score 2.26. Least mean scores was given by respondents to 'artificial fragrance' and then to 'insecticides or pesticides' with mean scores 2.23 and 2.22, respectively. While comparing the least mean scores given by rural respondents it was 2.08 given to 'insecticides or pesticides'. The reason for this might be use of insecticides and pesticides by the rural folks in their agricultural fields. On the other hand least mean score *i.e.*, 2.26 was given to 'artificial fragrance' by the urban respondents.

The difference in the perceived experiences of rural and urban homemakers regarding indoor pollution due to chemical causes *i.e.*, insecticides and pesticides was found statistically significant at 5 per cent level of significance. The difference for other mentioned causes was found to be statistically non-significant.

### Perceived experience related to constructional faults and household articles :

Sick Building Syndrome (SBS) occurs when the occupants of a building experience acute health effects

Causes	Perceived experiences (n=120)			Extent of perceived experiences (3 point scale)			
	Rural (60)	Urban (60)	Total	Rural	Urban	t-value	Total
Leaking gas pipes or cylinder	32 (53.33)	38 (63.33)	70 (58.33)	2.66	2.83	1.59	2.75
Perfumes	14 (23.33)	21 (35.00)	35 (29.17)	2.56	2.59	0.08	2.56
Mosquito/insects repellents	18 (30.00)	43 (71.67)	61 (50.83)	2.50	2.56	0.23	2.53
Room fresheners	7 (11.67)	29 (48.33)	36 (30.00)	2.41	2.51	0.78	2.46
Cosmetics	9 (15.00)	25 (41.67)	34 (28.33)	2.31	2.44	1.09	2.38
Hair spray (releasing HCFC )	6 (10.00)	23 (38.33)	29 (24.17)	2.22	2.29	0.42	2.26
Artificial fragrance	17 (28.33)	40 (66.67)	57 (47.50)	2.20	2.26	0.31	2.23
Insecticides and pesticides	45 (75.00)	52 (86.67)	97 (80.83)	2.08	2.35	2.02*	2.22

Multiple responses

Figures in parentheses indicate percentages.

# 4 Point scale: Always= 4, Often=3, Sometimes= 2, Rarely= 1

\* indicate significance of value at P=0.05

that seem to be linked to the time spent in a building. The complaints may be localized in a particular room or zone or may be widespread throughout the building. SBS can be caused by inadequate ventilation, chemical contaminants from indoor or outdoor sources and/or biological contaminants. Many volatile organic compounds, which are considered chemical contaminants, can cause acute effects on the occupants of a building. “Bacteria, molds, pollen, and viruses are types of biological contaminants” and can all cause SBS.

Parmar (2014) suggested another cause of SBS may be dampness or moisture may accumulate into the building structures or finishing materials through leaks or due to condensation as a result of insufficient ventilation or faulty construction. Moisture from the ground may also penetrate into the building walls. Excess water stimulates the growth of moulds which emit many different compounds and particles into the air. Dampness and moisture may also cause materials to start breaking up chemically, and to release compounds as they degrade. Inadequate ventilation may increase the level of these compounds in indoor air.

The microbes that grow in various dampness situations vary and not all dampness is equally harmful. There are many types of emission from a microbial growth e.g., particles including spores, vegetative cells and submicron-size fragments and toxins. Volatile Organic Compounds (VOCs) emitted from microbial growth include those that are known as odour of mould.

Many epidemiological studies have shown a link between building dampness and adverse health effects. The larger the extent of the damage caused by humidity

in the building, the worse the health effects. These effects range from irritation of mucous membranes, respiratory symptoms and infections, to chronic diseases, such as asthma, bronchitis and allergy. General symptoms, such as fever, fatigue, headache and difficulty to concentrate have also been reported, and clusters of cases of other diseases have also been associated with indoor dampness. However, it is still not known precisely how dampness intervenes in the appearance of these symptoms and which are the main substances responsible. Studies indicate that renovating the building either decreases or eliminates the symptoms.

Considering the seriousness of the fact that faulty construction and the other household stuff has adverse effect on the human beings especially the children, patients, elderly family member who spent maximum time indoor, an attempt was made to study any experience endured by the respondents of having any harmful effect on the human beings resulting from faulty construction or from other household stuffs possessed by the family. It can be seen from Table 3 that maximum number of respondents (47.50%) were able to recall the experience of ‘clogged drain pipes’ which caused indoor pollution at the time the problem was faced. While comparing the problem encountered by the rural and urban respondents, it was observed that more of the urban respondents (63.33%) undergone this experience in comparison to the 31.67 per cent rural respondents. The reason may be that in urban areas fittings of all plumbing pipes and drainage pipes are closed and concealed type. So due to this, any fault or damage could not be noticed immediately. Fifty five respondents experienced uncovered dustbins

**Table 3: Perceived experiences regarding indoor pollution due to constructional faults and household articles**

Causes	Perceived experiences (n=120)			Extent of perceived experiences (3 point scale)			
	Rural (60)	Urban (60)	Total	Rural	Urban	t-value	Total
Dust beneath carpeting	8 (13.33)	33 (55.00)	41 (34.17)	2.48	2.52	0.10	2.50
Uncovered dustbins	20 (33.33)	35 (58.33)	55 (45.83)	2.70	2.14	3.39**	2.42
Clogged drain pipes	19 (31.67)	38 (63.33)	57 (47.50)	2.60	2.14	2.81**	2.37
Dusting of rugs/carpet/bedding/sofa	13 (21.67)	20 (33.33)	33 (27.50)	2.02	2.65	2.74**	2.34
Damp and soiled bedding	12 (20.00)	18 (30.00)	30 (25.00)	2.18	2.45	2.19*	2.32
Cooking fumes	10 (16.67)	26 (43.33)	36 (30.00)	2.23	2.35	1.39	2.29
Wall dampness	10 (16.67)	35 (58.33)	45 (37.50)	2.00	2.48	2.37*	2.24
Damp carpets	8 (13.33)	20 (33.33)	28 (23.33)	1.93	2.07	1.52	2.00
Roof leakage	11 (18.33)	24 (40.00)	35 (29.17)	1.68	2.16	2.53*	1.92
Leaking pipes	12 (20.00)	22 (36.67)	34 (38.33)	1.73	1.93	1.74	1.83
Worn off mattresses	7 (11.67)	25 (41.67)	32 (26.67)	1.60	1.93	2.39*	1.77

Multiple responses

Figures in parentheses indicate percentages.

# 4 point Scale: Always= 4, Often=3, Sometimes= 2, Rarely=1

\* and \*\* indicate significance of values at P=0.05 and 0.01, respectively

as one of the cause of indoor pollution. Further 37.50 per cent respondents reported the experience of the effect of 'wall dampness', 34.17 per cent remembered that the 'dust under the carpet' producing harmful effect on the inmates, 30.00 per cent recalled that 'cooking fumes' causing atmospheric discomforts and 29.17 per cent respondents acknowledged the 'roof leakage', as a cause of indoor pollution (38.33%) respondents also experienced that 'leaking cooking gas pipes' increased indoor pollution instantly. Further, 27.50 per cent respondents remembered 'dusting of rugs, carpet, bedding, sofa' caused some bad effects on the inmates. It was also noted that more urban respondents had these experiences as compared to their rural counterparts. Least encountered experience was pollution being caused due to 'damp carpets' as disclosed by only 23.33 per cent respondents followed by experiences of 'damp and soiled bedding' by one fourth (25.00%) respondents and 'worn off mattresses' by 26.67 per cent respondents reported it as a case of indoor pollution. Richardson (1991) stressed the importance of weather, environment conditions, structural movement and workmanship while constructing any building. He also suggested that defects could be prevented with proper selection of building materials and housing construction condition.

Information was also collected on four point scale regarding the indoor pollution experiences faced due to different building constructional faults and household articles causes by recall method. As Table 3 highlighted that maximum mean score was given to 'dust under the carpet' with mean score 2.50 by respondents. Table further portrayed that 'uncovered dustbins' were given second highest score (2.42) by respondents, followed by 'choked drain pipes' (mean score 2.37), 'dusting of carpets, beds, sofa etc.' (mean score 2.34) and 'soiled bedding' with mean score (2.32). As it is clear from the

table, that less than 2.00 mean scores were given to 'leakage of roof' (1.92), 'leaking pipes' (1.83) and 'worn off mattresses' (1.77). Similar type of scores were given by rural respondents whereas, urban homemakers, they gave maximum mean score to 'clogged or choked drain pipes' (mean score 2.65). 'Worn off mattresses' were given least scores (1.60 and 1.93) by rural and urban homemakers, respectively.

The difference in the perceived experiences of rural and urban homemakers regarding indoor pollution due to faulty building construction and household articles *i.e.*, 'damp and soiled bedding', 'wall dampness', 'roof leakage' as well as 'worn off mattresses' were found statistically significant at 5 per cent level of significance. The difference between the perceived experiences of rural and urban homemakers, for the causes such as for 'uncovered dustbins', 'choked drain pipes', 'dusting of rugs/bedding/upholstered furniture', were also found statistically significant at 1 per cent level of significance. The difference for other mentioned causes was found to be statistically non-significant.

#### Perceived experience related to miscellaneous causes :

Data was also gathered to know the experiences of the selected respondents regarding indoor pollution due to pet waste, insects such as cockroaches, lizards, animal dander and stagnated water. Respondents were asked to give information through recall methods based on some very serious effects of above mentioned causes on the health of the inmates. As it can be seen from Table 4, that maximum number of respondents (65.83%) was able to recall the experience of 'stagnated water' which caused pollution indoors at that time. More of the urban respondents (73.33%) endured such type of experience in comparison to the rural respondents (58.33 %). From

Causes	Perceived experiences (n=120)			Extent of perceived experiences (3 point scale)			
	Rural (60)	Urban (60)	Total	Rural	Urban	t-value	Total
Pet waste	36 (60.00)	42 (70.00)	78 (65.00)	2.60	2.27	2.34*	2.44
Cockroaches, lizards, insects	19 (31.67)	32 (53.33)	51 (42.50)	2.26	2.32	0.19	2.29
Animal dander	32 (53.33)	35 (58.33)	67 (55.83)	2.00	2.21	1.52	2.11
Fungus, black mould	12 (20.00)	21 (35.00)	33 (27.50)	2.02	2.17	1.13	2.10
Stagnated water	35 (58.33)	44 (73.33)	79 (65.83)	1.60	2.45	3.29**	2.03
Spider's webs	24 (40.00)	35 (58.33)	59 (49.17)	1.72	1.96	1.47	1.84

Multiple responses

Figures in parentheses indicate percentages.

# 4 Point scale: Always= 4, Often=3, Sometimes= 2, Rarely = 1

\* and\*\* indicate significance of values at P=0.05 and 0.01, respectively



the table, it can further be observed that 78 respondents out of the total selected respondents could recall some unforgettable health problem experiences due to 'pet waste', 55.83 per cent respondents experienced that 'animal dander', increases indoor pollution instantly causing some skin problem and few respondents reported of asthma problem, followed by 'spider's webs' as experienced by 49.17 per cent respondents. It was also noted that more urban respondents could recall these experiences as compared to their rural counterparts. Least encountered experience was of pollution being caused due to 'cockroaches, lizards, insects' as mentioned by 42.50 per cent respondents followed by some perceived experiences from 'fungus, black mould' was by only 27.50 per cent respondents. These findings are substantiated with the findings of Johnson *et al.* (2002) who also reported that the indoor residential risk factors of primary interest, for asthma, allergies, and respiratory health of the human beings, included allergens such as dust mites, cockroaches and pet dander; moisture, mold and endotoxin; and combustion byproducts from appliances, tobacco, or other indoor combustion sources.

Thorough perusal of the Table 4 indicated the highest mean score (2.60) by rural respondents was given to the 'pet waste' whereas urban respondents gave highest mean score (2.45) to the 'stagnate water' near their living areas having any harmful effect on the inmates. This might be because of the water borne diseases that spread during rainy season; malaria, dengue etc., in collected or stagnated water near the residential areas. Overall picture of the mean scores given by the respondents was 2.44 to the harmful effects due to 'pet wastes', followed by 'cockroaches, lizards, insects' (mean score 2.29), 'animal dander' (mean score 2.11), due to 'fungus, moulds' (mean score 2.10) and 'stagnated water' was given second last mean score *i.e.*, 2.03. The least mean score was attributed to health problems due to 'spider's web' with mean score 1.84.

The difference in the perceived experiences of rural and urban homemakers regarding indoor pollution due to 'pet waste' and 'stagnated water' as miscellaneous causes was found statistically significant at 5 per cent

and 1 per cent level of significance respectively. The difference for other mentioned causes was found to be statistically non-significant.

### Conclusion :

It can be concluded that the rural and urban homemakers were perceiving different environmental, chemical, constructional faults and household articles and miscellaneous causes resulting into indoor pollution. But the perceived experience level was higher among the urban homemakers as compare to rural homemakers.

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