



## MOTHERS AWARENESS ABOUT INDOOR POLLUTION AND CHILD HEALTH PROBLEMS

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Research Article

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### Abstract:

Indoor pollution is a global public health crisis exposure to pollutants threatens the health of all ages in every part of the world in both urban and rural areas but it affect the most vulnerable groups as children. **Aim:** The study aimed to assess mother's awareness about indoor pollution and child health problems. **Design:** Descriptive design was applied in this study. **Sample:** Convenient sample was equal 90 homes. **Setting:** Tallh rural areas at El- Minia Governorate. **Tools:** Two tools was used, I) Interviewing questionnaire covering three parts. Part I. socio-demographic characteristic, part II. child health problems, and part III. mother's knowledge about indoor pollution, II) An observational checklist sheet to assess housing environmental condition and mother's practice. **Results:** The study results revealed that 70% of the mothers had incorrect knowledge about effects of indoor pollution on child health, 65% of mothers had inadequate done practice about indoor pollution, 83.3% of children complain from colds make the cough worse and increase the difficulty of breathing due to chest problems, 58.9% of the insects present inside the home, and 63.3% the presence of mice in the home. **Conclusion:** The present study showed that, more than two thirds of mothers had incorrect knowledge and inadequate done practice about indoor pollution and the majority of children have health problems regarding indoor pollution. **Recommendations:** Continuous implementing of educational program for mothers about indoor pollution in the home.

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**Key words:** Mothers awareness, Indoor pollution, Child health problems.

## **INTRODUCTION:**

Indoor is a building such as home, classroom, office, shopping center, hospital or gym. Contamination of indoor by smoke, chemicals, smells or particles building and heating methods the make use of airtight spaces, less ventilation and energy efficient heating. Sometimes synthetic building materials, smells from household care and furnishing chemicals can all be trapped indoors. The children and their family breath in indoor, the concentration of pollutants such as pollen, tobacco smoke, mold, pesticides, radon, asbestos and carbon monoxide trapped inside the building **(Hathway et al., 2015)**.

Indoor pollution gases or particles are released from a variety of sources that can decrease the quality of indoor. This pollution can range from harmless to irritating to downright deadly. And occurs when gases, dust particles, fumes(smoke) or odour are introduced into the atmosphere in a way that makes it harmful to humans, animals and plant. Pollutants include nitrogen oxides, carbon monoxides, hydrocarbons, sulphur oxides usually from factories, sand or dust particles, and organic compounds that can evaporate and enter the atmosphere **(Acciai et al., 2017)**.

Indoor pollution is a high environmental risk. Together, contaminated soil, house dust, allergens, volatile organic compounds (VOCs), hazardous household chemicals, indoor air pollution, tobacco smoke, and other pollutants pose a significant environmental risk to children, adults, and pets. Home pollutant exposure may result in retarded growth, learning disabilities, allergies, cancer, nervous system damage, and other illnesses. Exposure to these substances that would not be tolerated on the job or in the outdoor environment because most people, including political leaders are not aware of the problem. Ingestion, inhalation and contact with house dust can be primary routes of exposure for small children to pesticides, and allergens **(Brauer et al., 2016)**.

A major threat to child health is pollution. Children are particularly vulnerable to the damaging effects of pollution because their lungs are growing and their innate defenses against inhaled pollutants may be impaired. The effects of indoor pollutants from combustion of fossil fuels, but it is important to note that pollution from the combustion of biomass fuels in homes is one of the most important global environmental threats to child health **(Vulturius, 2018)**.

Childhood exposure to pollution by inhalation is associated with disease later in life. Exposure to various pollutants, , is linked to the development of asthma in children presumably due in large part to the generation of oxidative stress and airway inflammation. Research indicates that particulate matter (PM) may cause systemic inflammatory and immunological responses and remodelling in the lung as well it found that ultrafine particles (< 0.1 µm in diameter) can cross the alveoli, enter the bloodstream and cause cardiovascular and cerebrovascular disease **(Alexander et al., 2017)**.

Mother awareness play an important role in supporting improved cook stove behavior by creating the demand, promoting the correct use and maintenance of appliances as well as improving their sustainability. Improve change awareness in environmental health are notoriously difficult. Health education may be sufficient to elicit behavioral change. And reflected on reduce indoor pollution exposure at the household level **(Pidcock et al., 2014)**.

Role of community health nurse include mother awareness about prevention of indoor pollution as education of mothers about this issue , the serious threat it poses to their health , wellbeing help them in finding different ways of reducing exposures with better kitchen management and protection of children at home. Teach the mother about the use of alternative cleaner sources of energy to replace direct combustion of biomass fuel. The stakeholders must include not only mothers, but also politicians ,administrators to ensure their commitment and increase their awareness about health effects of indoor pollution **(Mortimer et al., 2017)**.

### **Significance of the study**

Egypt is located in the Eastern Mediterranean region and Egypt is ranked second in the world's most pollution by the World Health organization (WHO) in 2016, the geographic distribution maps of the study also indicate the early death rates in Egypt, according to World Bank estimates for the cost of environmental degradation determines the cost of pollution by about 5% of the annual, equivalent to 2.42 million dollars per year, these indicators indicate an increase in the health and economic burden of pollution **(World Health Organization (WHO),2016)**.

In Egypt, indoor pollution is a very real and dangerous thing because indoor is far more concentrated with pollutants than outdoor. It's estimated that 2.2 million deaths each year due to indoor pollution compared to 500,000 deaths from outdoor pollution (**Petrick et al., 2014**). More than 4 million children die in early stage of diseases related to indoor pollution. While inhalation of pollutant in houses cause more than 50% from child mortality and more than half of the population of developing countries and its rural area has no other method for cooking and heating (**WHO, 2014**).

Billions of children are exposed to unsafe levels of pollution. The result is a global public health, whether encountered outdoors or indoors, poses serious risks to children's health. In 2016, exposed 630 million children under five years to ambient levels of pollution that exceed the annual mean WHO of quality guideline. About three billion people were exposed to household pollution from the use of polluting fuels for cooking in 2016. The health burden of pollution on the world's children is immense. Environmental factors are responsible for an estimated 26% of all child deaths worldwide (**Prüss et al., 2018**).

**Aim of the study:**

This study aim to assess mothers awareness about indoor pollution and child health problems through:-

- 1- Assess mothers' knowledge about indoor pollution.
- 2- Assess child health problems.
- 3- Assess housing environmental condition.
- 4- Assess mothers' practices about indoor pollution in the house.

**Research questions:**

- 1- What are the mothers' level of knowledge about indoor pollution?
- 2- What are the mothers' practice about indoor pollution in the house?
- 3- What are the child health problems?
- 4- What are the source of home environment indoor pollution?

**2. Subject and method**

## **2.1 Study design:**

A descriptive research design was utilized in this study.

## **2.2 Study setting:**

This study will be conducted at 90 homes of Tallh rural areas Eizab which affiliated to El- Minia Governorate, called (El Hima, Omar Agha , Abo Shady , El Khalil , AbdAllh , Gharb El balad , Shiq El Sheikh , Juarnh ,and Wasat El balad) ten homes from each Eizba.

## **2.3 Tools for data collection:**

Data collection done by using two tools. It developed by the investigator based on extensive review of related literature to collect data pertinent to the study.

**Tool I-** A structural interview questionnaire: It contains 3 parts:

**Part (1)** Socio-demographic data about mothers as: Age, marital status, father education, father's occupation, mother education, mother's occupation, family income, number of rooms, number of family members, crowdedindex and housing condition.

**Part (2)** Assessment of child health problems as : Child general appearance, eye problems, , respiratory system problems, nose problems,throat problems, chestproblems, skin problems, gastrointestinal problems, nutrition problems,problems related tothe central nervous system,problems with circulatory system, times number go to the doctor during the last year and reason for go to the doctor.

**Part (3)** Assess mothers knowledge about indoor pollution as: Meaning of pollution inside the house, effects of indoor pollution on child health, sources of pollution inside the house,impact of exposure of the child for a long period of pollutants , methods of protecting children from pollution in the house and factors reducing the pollution in the house .

**Scoring system: Scoring System:** For knowledgewas presented as correct and complete answer, or incorrect or incomplete answer thetotal scored of knowledge was 12 grads, (one) score was given for each correct answer and (zero) score was given to incorrect answer the total knowledge is scored as the following the mother had satisfactory knowledge when total score equal  $\leq 50\%$  or above and unsatisfactory if below  $> 50\%$

**Tool II- An** observation checklist regarding indoor pollution include:

(a) Assessment of housing environmental condition as: Building type, materials used to paint the house, insects inside the house, presence of mice in the house, type of sanitary drainage, bathroom, surrounds the house and cleaning of the house.

(b) Mothers' practices in the house about indoor pollution regarding: Waste disposal, animals in the home , pesticides used in the home, are they used indoor, types of pesticides used in the home, pesticides used while children are present , pesticides prepared manually at house, use of cleaning materials, type of materials are used in cleaning, where cleaning materials are kept, methods of retention of cleaning materials, methods of cleaning dust at house, how ventilation is done, when ventilation, ventilation in the kitchen, place of cooking and type of fuel used.

**Scoring system:** The practice was presented as done practice scored take (one) and not done practice scored (zero). The mothers total done practice were considered adequate practice ,if the percentage score was  $\leq 50\%$  or above ; while it was considered inadequate practices , if percentage score was less than  $>50\%$  .

#### **2.4 Validity:**

The validity of the tool was tested through a panel of five experts from Community Health Nursing Faculty staff to review relevance of the tools for, comprehensiveness, understanding and applicability.

#### **2.5 Reliability:**

Reliability coefficients were calculated for questionnaire items. The cronbach's alpha was 0.81 for practice and 0.93 for knowledge.

#### **2.6 Pilot study:**

A pilot study it was carried out on 10% (9) of the mothers to ensure clarity and determine the time required to complete data collection tools. According to the results of the pilot study no modifications were needed. So they were included in the actual study sample.

## **2.7 Field work:**

The actual fieldwork started from beginning of April till the end of June 2019 for the data collection for a period of three months, a sample of 90 house were the mothers in their homes have children under five years were interviewed after the investigator introduced himself and explained the purpose of the study and components of the tool was explained to mothers at the beginning of the data collection.

The investigator make home visite to El-Minia in 90 homes of Tallh rural areas Eizaband collected data in the morning or afternoon each visit take about 20-25 minute two days/ week (Sunday and Thursday) of each week from 9 am to 1 pm, the investigator met every mother that have children under five years, written consent was taken from each mother after explanation the purpose of the study and the component of the tool.

## **2.8 Ethical consideration:**

An official permission to conduct the proposed study was obtained from the Scientific Research Ethical Committee. Participation in the study is voluntary and subjects was given complete full information about the study and their role before signing the informed consent. The ethical considerations was include explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it will not be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs were respected.

## **2.9 Statistical analysis:**

Upon completion of data collection, data were computed and analyzed using Statistical Package for the Social Sciences (SPSS), version 24 for analysis. The P value was set at 0.05. Descriptive statistics tests as numbers, percentage, mean  $\pm$  standard deviation ( $\pm$  SD), was used to describe the results. Appropriate inferential statistics such as "F" test or "t" test was used as well.

## **1. RESULTS:**

**Table (1):** Shows that the mean age of the mothers ranged between 18-38 years, with meanand $\pm$ SD20.8 $\pm$ 6.8years. 88.9% of mothers were married, regarding the father's level of education 62.2% had primary or secondary education, and the majority of them (94.4%)

were working. Regarding mother's educational level 44.4% had primary or secondary education, the family income 65.6% not enough. According to the number of rooms it was observed that 77.8% of them have two rooms. Regarding to crowded index 55.5% of them were >2, and 66.7% of housing condition were shared.

**Figure (1):** Shows that the 70.0% of mothers had unsatisfactory level of total knowledge regarding indoor pollution, while 30.0% of them had satisfactory level of total knowledge regarding indoor pollution.

**Figure (2):** Illustrates that 65% of mothers had inadequate done practice regarding indoor pollution, while 35% of them had adequate done practice regarding indoor pollution in the home.

**Table (2):** Reveals that 70% of the mothers had incorrect knowledge about effects of indoor pollution on child health. While 83.3% of them had incorrect knowledge about sources of pollution inside the home. And 63.3% of them had incorrect knowledge about methods of protecting children from pollution in the house.

**Table (3):** Illustrates that 88.9 % of children general appearance were clean, 22.2% & 18.9 of children complain from redness and swelling in the eye, 85.6% of children complain of existence of secretions from their nose, 42.2% complain from difficulty swallowing and elevation of temperature due to throat problems. Also, 83.3% of them complain from colds make the cough worse and increase the difficulty of breathing due to chest problems. Also, 59.7% of children have breathing with loud voice and 44.4% of them have difficulty breathing and sound at night in the absence of fatigue or cold, while 24.4% of children have difficulty breathing or coughing during use of detergents, respectively.

**Table (4):** Illustrates the home environmental condition 88.8 % of the building types is from brick, according to materials used to paint the home it was observed that 66.6 were plastic and 58.9% of the insects present inside the home, and 63.3% the presence of mice in the home. Regarding the types of sanitary drainage, 77.7% of them had modern

bathroom. As regard to surrounding the home 44.5% of them had Garbage mold. Also, 58.9% of housing environmental conditions were cleanliness.

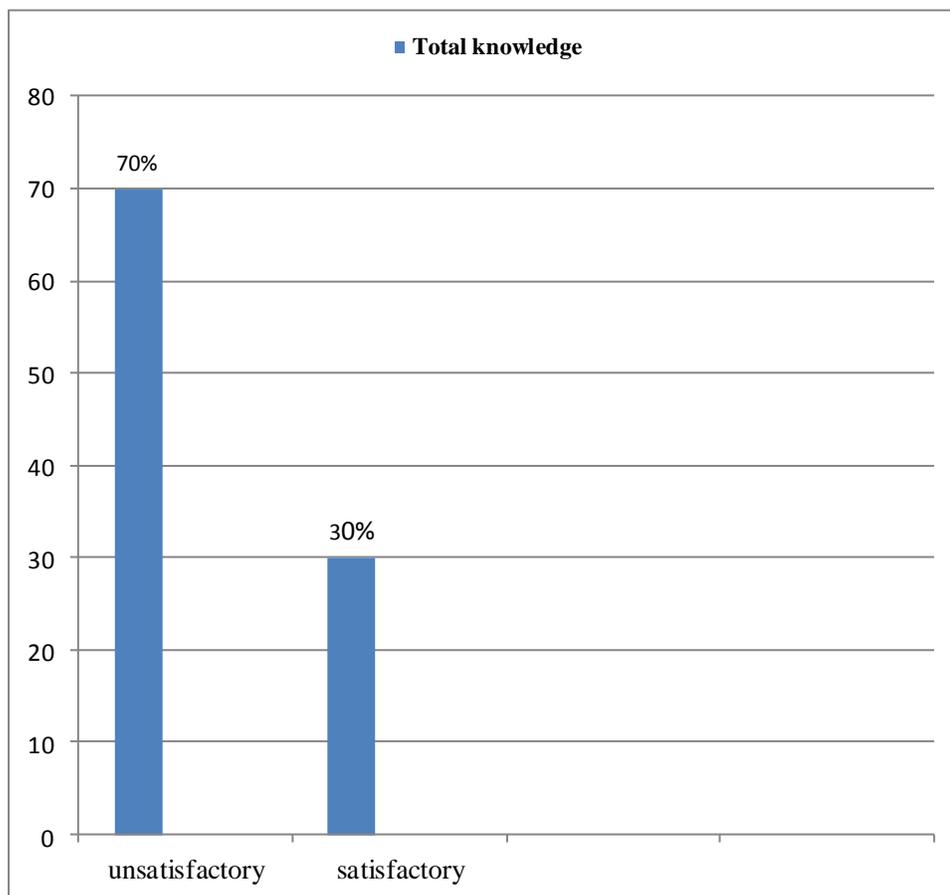
**Table (5):** Explains that there was a highly statistically significant difference between the mean scores of mother's total knowledge and mother's total done practices.

**Table (1): Distribution of studied mothers according to their socio-demographic characteristics (n=90).**

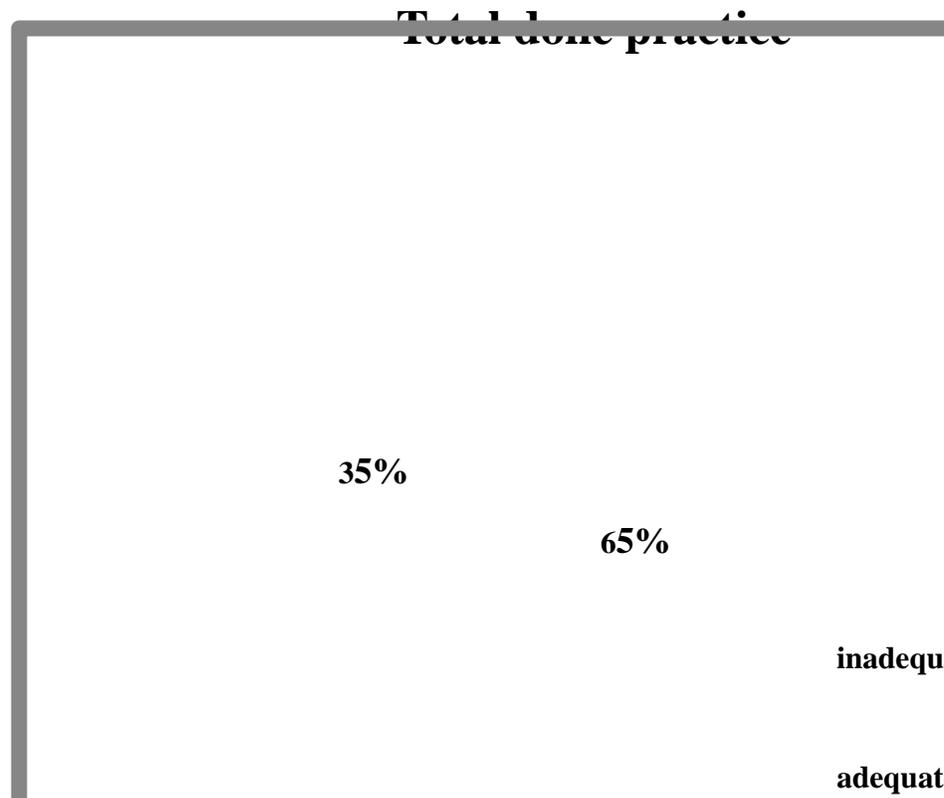
Socio demographic characteristics	No.	%
<b>Age (years)</b>		
≥18	36	40.0
19 -≥28	51	56.7
29- ≥38	3	3.03
<b>Mean ± SD</b>	20.8±6.8	
<b>Range</b>	18-38	
<b>Marital status</b>		
Married	80	88.9
Divorced	10	11.1
<b>Father education</b>		
Illiterate	5	5.6
Read and writes	14	15.6
Primary or secondary education	56	62.2
University or more	15	16.6
<b>Father's occupation</b>		
Working	85	94.4
Not working	5	5.6
<b>Mother education</b>		
Illiterate	10	11.1
Read and writes	14	15.6
Primary or secondary education	40	44.4
University or more	26	28.9
<b>Mother's occupations</b>		
Worked	18	20.0
Housewife	72	80.0
<b>Family income</b>		
Enough	31	34.4
Not enough	59	65.6
<b>Number of rooms</b>		
One room	10	11.1
Two room	70	77.8
Three rooms	10	11.1

<b>Number of family members</b>		
Two	9	10.0
Three	35	38.9
More than four	46	51.1
<b>Crowded index</b>		
< 1	10	11.1
1-2	30	33.4
> 2	50	55.5
<b>Housing condition</b>		
Separated	30	33.3
Shared	60	66.7

**Figure (1): Percentage distribution of mothers' total knowledge about indoor pollution (n=90)**



**Figure (2): Percentage distribution of mother’s total practices regarding indoor pollution in the house.**



**Table (2): Frequency distribution of mothers’ knowledge about indoor pollution (n=90)**

Mothers’ knowledge	Correct & complete		Incorrect or incomplete	
	No	%	No	%
Meaning of pollution inside the house	30	33.3	60	66.7
Effects of indoor pollution on child health	27	30.0	63	70.0
Sources of pollution inside the house	15	16.7	75	83.3
Impact of exposure of the child for a long period of pollutants	37	41.1	53	58.9
Methods of protecting children from pollution in the house	33	36.7	57	63.3
Factors reducing the pollution in the house	30	33.3	60	66.7

**Table (3): Frequency distribution of children health problems (n=90)**

Child health problems:	Yes		No	
	No.	%	No.	%
<b>Child general appearance</b>				
Clean	80	88.9	10	11.1
Unclean	10	11.1	80	88.9
<b>Eye problems</b>				
Redness	20	22.2	70	77.8
Existence of secretions	15	16.7	75	83.3
Infections	10	11.1	80	88.9
Swelling	17	18.9	73	81.1
Presence of eye dilution	10	11.1	80	88.9
<b>Respiratory system problems "Nose problems"</b>				
Presence of itching	30	33.3	60	66.7
Existence of secretions	77	85.6	13	14.4
Presence of nasal obstruction	68	75.6	22	24.4
Redness	17	18.9	73	81.1
Dust showing symptoms of nose problems	35	38.9	55	61.1
<b>Throat problems</b>				
Difficulty swallowing	38	42.2	52	57.8
Swelling	33	36.7	57	63.3
Elevation of temperature	38	42.2	52	57.8
<b>Chest problems</b>				
Existence of unpleasant cough	31	34.4	59	56.6
Presence of sound during breathing	31	34.4	59	65.6
Presence of blue face	5	5.6	85	94.4
The child breathed with a loud voice	46	59.7	31	40.3
Difficulty breathing and sound at night in the absence of fatigue or cold	40	44.4	50	55.6
Colds make the cough worse and increase the difficulty of breathing	75	83.3	15	16.7
Difficulty breathing or coughing while in the presence of animals	18	20.0	72	80.0
Difficulty breathing or coughing during dust at home	45	50.0	45	50.0
Difficulty breathing / coughing during use detergents	22	24.4	68	75.6
Difficulty breathing or coughing during vapors	30	33.3	60	66.7
Difficulty breathing or coughing during the presence of fresheners	26	28.9	64	71.1
Difficulty breathing or coughing	68	75.6	19	21.8

**Table (4): Home environmental observation regarding to indoor pollution: (n=90)**

Items of housing environment	Present		Not present	
	No	%	No	%
<b>Building type</b>				
Clay	10	11.2	80	88.8
Brick	80	88.8	10	11.2
<b>Materials used to paint the house</b>				
Gear	20	22.3	70	77.7
Oil	10	11.2	80	88.8
Plastic	60	66.6	30	33.4
<b>Insects (mosquito, flies, cockroaches) inside the house</b>	53	58.9	37	41.1
<b>Presence of mice in the house</b>	57	63.3	33	36.7
<b>Type of sanitary drainage</b>				
Government network	90	100.0	0	0.0
<b>Bathroom: -</b>				
Separated	60	66.7	30	33.3
Shared	30	33.4	60	66.6
Balady	20	22.3	70	77.7
Modern	70	77.7	20	22.3
<b>Surrounds the house</b>				
Agricultural environment	20	22.3	70	77.7
Nurseries and banks	30	33.4	60	66.6
Garbage mold	40	44.5	50	55.5
<b>Cleanliness of the house</b>	53	58.9	37	41.1

**Table (5): Relation between mother’s total knowledge and mother’s total done practices about indoor pollution.**

Variable	Total done practice (n=90)	
	Correlation Coefficient	P value
Total knowledge	0.39	<0.001*

(\*) high statistically significant at  $P \leq 0.001$

### **3. DISCUSSION**

According to the socio-demographic characteristics of mothers, the present study findings indicated that the mean age of mothers were  $20.8 \pm 6.8$  years. This result is similar with study conducted by **Osagbemi et al. (2017)** in Oke – Oyillorin with (study sample 130 families) about "Awareness, attitude and practice towards indoor air pollution amongst residents" who found that mean age of mothers were  $21.18 \pm 6.9$  years. As well it is nearly consistent with **Bruce et al. (2016)** conducted in Pakistan (study sample 200 families) entitled "Indoor air pollution in developing countries: A major environmental and public health challenge" who represented that mothers mean age were  $20.17 \pm 10.8$  years.

Concerning the fathers and mothers' education, the current study result revealed that less than two thirds of fathers and less than half of mothers had primary or secondary level of education. This result was in the same line with the study conducted by **Osagbemi et al. (2017)** who found that, less than half of mothers and fathers have diploma education.

Regarding the mothers and fathers occupation, the current study revealed that the majority of fathers were working and the majority of mothers were housewife. This finding was in accordance with study done by **Bruce et al. (2016)** who found that, 90% of fathers working. While, the majority of mothers were housewife.

Regarding the family income, the current study revealed that less than two thirds of them have not enough family income. This finding disagree was in accordance with study done by **Tanimowo (2017)** in Africa with (study sample 222 families) entitled as "Air pollution and respiratory health in Africa" who founded that the majority of participate have enough family income. From the investigator point of view, in Egypt the family income level is not enough for daily living needs this might due to high standards of living.

Concerning knowledge of mothers related to indoor pollution, the findings of the present study showed that, more than two thirds of mothers had incorrect knowledge about effects of indoor pollution on child health. While most of them have incorrect knowledge about source of pollution inside the house. These findings disagreement with the study done by **Ritz & Yu (2018)** in United States of America about "families life style to avoid their children indoor pollution" who found that two thirds of mothers have correct knowledge about effects of indoor pollution on child health and most of them have correct knowledge

about source of pollution inside the house. This could be because the mothers felt the seriousness of the indoor pollution and want to decrease the health risks on themselves and their children, immediately, and by the time, the enthusiasm fades.

Regarding the mother's total practice the current study showed that, slightly less than two thirds of mothers were not done practice regarding indoor pollution. This finding was supported by **Holt (2017)** who conducted study in Western Australia about "Programming for responsiveness to environmental antigens that trigger allergic respiratory disease in adulthood is initiated in the prenatal period" found that 60% of mothers were not done practice regarding indoor pollution. From the investigator point of view, these results were due to lacking of mother's knowledge about indoor pollution and these reflected on their practices which consider risk factor for increase pollution.

Concerning the child health problems the current study revealed that, the majority of the children general appearance were clean, nearly one fifth of them complains from redness and swelling of the eye. This finding in accordance with **Oguntoke et al. (2018)** who conducted study in South West Nigeria about "Indoor air pollution and health risks among rural dwellers in Odeda area" whose found that, 25% of children in rural area suffering from eye problems as redness and swelling of the eye. From the investigator point of view, this result might be due to that most of children in the villages play in dust of the streets and this leads to many diseases as eye problems.

Regarding the nose problems, the current study revealed that, majority of them complain from nose problems as existence of secretion. More than two fifths of them have difficulty swallowing and elevation of temperature because of throat problems. This finding agreement with study done by **Smith et al. (2017)** in Geneva, entitled "Indoor air pollution from household use of solid fuels" who found that, most of children complain from nose problems such as existence of secretion, have difficulty swallowing and elevation of temperature.

Regarding chest problems the current study revealed that majority of them complains from cold make the cough worse and increase the difficulty of breathing. Also, more than half of children complain from breathing with a loud voice. While slightly less than one quarter of them have difficulty breathing or coughing during use of detergents,

These findings were in accordance with **Aizhamal et al. (2017)** who conducted study in Kyrgyzstan with (study sample 170 houses) about "Indoor air pollution and respiratory symptoms, and pneumonia in highland children" and found that more than three quarters of children complains from cold make the cough worse and difficulty of breathing. On the other hand this result was disagreement with study done by **Afolabi et al. (2016)** who conducted study in south west Nigeria with (study sample equal 250) entitled as "Awareness of indoor air pollution and prevalence of respiratory symptoms in an urban community" who found that, less than one fifth of children complains from cold make the cough worse and increase the difficulty of breathing.

Concerning housing environmental observation, the majority of the housing made from brick, and two third of house paints by the plastic materials. This result in accordance with study done by **Ezeueand Diogu (2017)** who mentioned that more than half of the housing from brick building, and more than two thirds of house paints by plastic materials. Also the lead paint becomes hazardous only if it is cracked, peeled or chipped from walls.

Regarding to relation between total knowledge and total practice, the current study revealed that, there was highly statistically significant relation between total knowledge and total practice. This finding was supported with study done by **Lin et al. (2017)** Conducted in Taiwan about "Increased risk of preterm delivery in areas with indoor pollution from a petroleum refinery plant|" who found that, there was highly statistically significant relation between total knowledge and total practice.

## **2. CONCLUSION:**

**On the light of the current study result, and answered the research question it can be concluded that:** There was 70% of the mothers had incorrect knowledge about effects of indoor pollution on child health, 83.3% of them had incorrect knowledge about sources of pollution inside the home. and 63.3% of them had incorrect knowledge about methods of protecting children from pollution in the home. Concerning mother's practice findings 65% of mothers had inadequate done practice regarding indoor pollution, while 35% of them had adequate done practice regarding indoor pollution in the home. As regard child health problems results indicated that, 88.9 % of children general appearance were clean, 85.6%

of children complain from existence of secretions from their nose, 42.2% complain from difficulty swallowing and elevation of temperature due to throat problems. Also, 83.3% of them complain from colds make the cough worse and increase the difficulty of breathing due to chest problems. While 88.8 % of the building types is from brick, according to materials used to paint the home it was observed that 66.6 were plastic, and 63.3% the presence of mice in the home.

### **3. RECOMMENDATIONS:**

**On the light of the results of this study, the following recommendations were suggested:**

- Continuous implementing of educational program for mothers about indoor pollution in the home.
- Disseminating health education booklets to increase mothers awareness about child health problems.
- Apply further research about indoor pollution in other setting for generalization.
- Further researches recommended for mothers about preventive strategies for indoor pollution and related health problems.

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