

Assessment of Mothers' Knowledge and Their Health Habits Regarding Lead Pollution at Bani-Khaled Village in Minia Governorate

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Abstract

Background: Lead is a highly toxic and poisonous metal, it can cause severe mental and physical impairment to young children. Young children are most vulnerable because they absorb four to five times more ingested lead compared to adults from a given source. Mothers' awareness about lead poisoning and a deeper understanding of its effect on children can prevent lead poisoning. **Aim:** The study aimed to assess mothers' knowledge and their health habits regarding lead pollution at Bani-Khalid Village in Minia Governorate. **Study design:** Descriptive research design was used to conduct in this study. **Subject:** Systematic random sampling of 251 mothers were included in the study this number represents 20% of the total numbers of mothers in the village which is 1253 mothers according to the last national Egyptian census in 2017. The criteria for inclusion in the study were mothers of males and females child and agreed to participate. **Setting:** This study was carried out at Bani-khaled Village at Samalout District affiliated to Minia Governorate, East sea. Data collection started from the first of July 2021 to end of December 2021, the investigator visited Bani-Khaled Village twice a week (on Saturdays and Tuesdays) from 10 am to 12 p.m to recruit the study sample. According to inclusion criteria, all mothers having young children and agreed to participate (6:8 mother per week) were chosen. The average number of interview subjects per day was four, and the average time spent on each was about 25-30 minutes, depending on the individual's response. **Tools:** Three tools were utilized in this study, the **First tool** was an interviewing structured questionnaire sheet was contained two parts: **Part I:** Socio-demographic characteristics about the mothers. **Part II:** Mothers knowledge assessment questionnaire about lead pollution to assess mothers' knowledge about lead pollution such as: define pollution, lead pollution and lead poisoning, things that cause lead pollution in homes. **Second tool;** Mothers health habits questionnaire was to assess the practices of mother regarding lead pollution. **Third tool;** An observational Checklist to assess homes environment. **Results:** The results show that more than two fifth of study subjects have good knowledge scores regarding lead poisoning, but more than half of subjects have poor knowledge scores, more than three quarters of study subjects have satisfactory practices scores regarding lead poisoning, but more than one fifth of subjects have unsatisfactory practices scores and there is positive significant correlation between women knowledge about lead pollution and their practices. **Conclusion:** The most of the studied sample more than three quarters had satisfactory practices score, more than two fifth of study subjects have good knowledge scores and there was a positive significant correlation between women knowledge about lead pollution and their practices. **Recommendations:** Health education programs should be available for mothers about lead poisoning and appropriate protection measures. Emphasis for mothers and families should be made on early case finding and proper measures in order to avoid or minimize complications. **Keywords:** Health Habits, Knowledge, Lead Pollution, Mothers'

Introduction

Lead is stated often in early biblical accounts. The Babylonians used the metal as plates on which to record inscriptions. The Romans consumed it for tablets, water pipes, coins, and even cooking utensils; indeed, as a result of the last use, lead poisoning was recognized in the time of Augustus Caesar. Modern developments date to the exploitation in the late 1700s of deposits in the Missouri-Kansas-Oklahoma area in the United States (Amstock, 2017).

Healthy People 2020 recognize lead poisoning as a public health concern because it is not an element necessary for the human body. The Center for Disease Control and Prevention (CDC, 2019) defines elevated blood lead level (EBLL) as greater than or equal to 5 mcg/dl, as determined by a blood test. Exposure to lead has had devastating consequences for health, especially for children. Exposure to lead in high levels could affect the brain, academic performance, the central nervous system and cause seizures, coma, and even death (Majumder et al., 2021).

The major source of children's exposure to lead are, lead added to petrol, lead solder in food cans, ceramic glazes drinking water system, lead pipes, lead in products such as indigenous medicines, home remedies, cosmetics and toys, lead released by burning of lead-containing waste. Lead poisoning can be detected by simple blood test. Chelating therapy is used for children with 45 µg/dl of lead in the body (Yang et al., 2018).

Lead exposure remains a major public health problem, especially in Egypt and developing countries, whereas regulations and policies are missing, children, especially those living in the vicinity of industrial areas, are exposed to the highest levels of lead from different sources, such as petrol, lead released by burning of paper products, discarded rubber, battery casings, and painted wood for cooking and heating. Children are more at risk than adults to the toxic effects of lead. This correlates with their ability to walk, their hand-mouth behavior, and spending more time on dusty floors. Also, physiological functions of their blood-brain barrier and

liver detoxification systems are biologically immature (Moawad et al., 2016).

Lead poisoning can be prevented by simple measures which include, washing hands and toys, cleaning dusty surfaces, removing shoes before entering the house, running cold water in old plumbing containing lead pipes for at least a minute before use, preventing children from playing in the soil, regular healthy nutrition, which include adequate calcium, Vitamin C and Iron. When lead is swallowed /inhaled, some poison remains in the body which causes serious health effect. Awareness of the public health influence of exposure to lead is growing but relatively few of these countries have introduced policies and regulations for significantly fighting the problem (Smith, 2019).

Also Alhammad et al., (2019), stated that 39.5% of mothers thought lead can be prevented by cleaning children hands and toys and surface cleaning, while 26% of mothers had no idea about how to avoid lead poisoning, and 16.25% of mothers thought it can be avoided by cleaning hands and toys and eating healthy food, and 8.75% of mothers believe it could be avoided by cleaning hands and toys and house cleaning.

The role of community health nurse to control lead pollutions approved primary health care that should include health assessment of individuals and communities of health problems and assessing knowledge about methods to prevent and control these health problems. also community health nurse should provide important activities including health promotion activities and ensuring adequate amounts of food and proper adequate nutrition; adequate safe water and safe basic sanitation; proper maternal and child health care, which should include family planning, immunization; adequate and appropriate treatment of common diseases and different injuries (WHO., 2019).

Significance of the study

In United States of America poisoning with lead caused a financial heavy burden for health care financial costs especially for children, in addition it may cause several health problems later in life which may include neurological problems, adult hypertension, blood pressure disorders, and osteoporosis (Wright et al., 2020).

Environmental monitoring of Egyptian Ministry of Health, reported that, arithmetic mean at year (2017) from points of air monitoring about measuring lead in Egypt. Minia was arranged as the third governorate in lead pollution. Also they observe that pollutions in Minia are increasing each year than previous years. Bani-khaled scored the highest level in lead pollution (Environmental monitoring center, 2017).

Egyptian children, like children from any other country, are at great risk for blood lead poisoning because of exposure to lead, although sources of exposure are different, in Egypt poisoning with lead forms a great health challenge, but there is no simple solutions are found to solve this problem. May be one of the few real solutions to be used in the short term is to assess mothers' knowledge about lead pollution and its sources (Safi et al., 2019).

Aim of the study

The aim of this study is to assess mothers' knowledge and their health habits regarding lead pollution at Bani-Khalid Village in Minia Governorate.

Research Questions:

The study will answer the following questions:

- 1- What is the mothers' knowledge about lead pollution?
- 2- Is there a relationship between mothers' socio-demographic characteristics and their knowledge?
- 3- Is there a relationship between mothers' knowledge?

Subjects and Methods

Research design:

Descriptive research design was used.

Setting

The study was conducted at Bani-Khaled Village at Samalout district affiliated to Minia governorate, east sea, the village is surrounded by four directions, from the west a river and from the east the cemeteries, and from the sea side a factory called Portlandi Helwan, from the tribal side, the Iron and Steel Factory, and most of the lands of the village are expropriated by the cement factory, it has the highest levels of lead pollution in Minia governorate in 2017 which exceeded allowed levels (Environmental monitoring center 2017), also Bani-khaled residents have a low socio-economic status, low level of education, have cement factory and iron and steel factory. This produces a polluted environment both physically and visually.

Sample: A convenient sample of 251 mother were included in the study this number represents 20% of the total numbers of mothers in the village which is 1253 mothers according to the last national Egyptian census in 2017, because the people living near the factory always complain from their health problem and talk to the mass media and write complain about their suffering to the responsible people. The inclusion criteria of the study were mothers of males and females child and agreed to participate.

Tools:

Tool I: interviewing Questionnaire:-

Three tools were designed after reviewing related literature to assess the mothers' knowledge and their health habits about lead pollution.

Tool I:- A Semi structured interview questionnaire, this questionnaire assessed the following:

Part I: - From Q1 to Q 9 assessed the demographic data of the studied subjects: such as age, monthly income, educational level of father, their occupation, educational level of mother and their occupation.

Part II: - Mothers knowledge assessment questionnaire about lead pollution such as: define pollution, lead pollution and lead poisoning, things that cause lead pollution in homes (Sivri & OzpuLat, 2015).

Scoring System:-

The scores of each item ranged from zero to 1 for yes answer, zero for no or don't know answer. The total knowledge score was calculated by summation of all knowledge items with total score (38) was computed. Therefore the studied subjects considered have good level of knowledge if the total score was $\geq 50\%$ ($\geq 19/38$), poor if the total score was less than 50% ($< 19/38$) for knowledge assessment part (Abel Galil et al., 2018).

Tool II: - Mothers health habits questionnaire , It concerned with the assessment of the practices of mother about lead pollution, it include sixteen (18) question, open-ended questions such as: (The mother puts on cosmetics, the mother uses hair dyeetc.), with answer yes or no (Abel Galil et al., 2018).

Scoring System:-

The practices assessment part of the questionnaire, the scores of each item ranged from zero to 1. Yes answer take score (1), No answer take score (0). The total practices score was calculated by summation of all practices items with total score (18) was computed. Therefore the studied subjects considered have Satisfactory level of practices if the total score was $\geq 50\%$ ($\geq 9/18$), unsatisfactory if the total score was less than 50% ($< 9/18$) for practices assessment of mothers (Abel Galil et al., 2018).

Tool III:- An observational Checklist to assess homes environment such as ways of cleaning house to decrease pollution with lead, drying food on newspaper... etc (Asunta et al., 2019).

Validity of Content:

The content validity of the data collection tools was determined through an extensive review of literature related to lead pollution. The tools were submitted to a panel of five experts in community health nursing and public health and preventive medicine to test their validity. Necessary modifications of the tools were done according to the panel judgment on appropriateness of the content, sequence of items and according to accuracy of items.

Pilot Study

A pilot study was carried out on 10% of cases; it tested the application and clarity of the questions of the study tool, and estimated that the time needed to complete the tool was 30-35 minutes according to the needed explanation. No modification was done in the study tool based on the pilot study. The pilot study was excluded from the total of the study sample.

Ethical Concern

The mothers were informed that their participation in the study was completely voluntary and there was no harm if they not participated in the study. Oral consent was taken to be included in the study subject. Explanation about the study was done to the mothers included the aim of the study and the potential benefits. The participant was informed about the withdrawal procedures if they decided to leave the study at any time before and during the completion of data collection, confidentiality of data, privacy, identity, voluntary

Results

Table (1): Distribution of the Study Subjects According to Their Demographic Characteristics at Bani-Khaled Village in Minia Governorate 2021 (n=251)

Variables	N	%
Age		
- 22 – 32 yrs.	157	62.5
- 33 - 43 yrs.	80	32.0
-> 43 yrs.	14	5.5
Mean age 32±6.5 years.		
The monthly income of the family		
- Enough	54	21.5
- Not enough	197	78.5
Father's education:		

participation, and the right to refuse to participate in the study was emphasized to subjects.

Study Procedure

Before starting data collection, formal letters were issued from faculty of nursing to conduct the study. Following ethical committee approval at Minia University's Faculty of Nursing, an official letter from the city council president of Bani-Khaled Village at Samalout district was obtained for data collection. This letter included a brief description of the study's goals, as well as a request for permission.

In 2021, the investigator created data collection methods after conducting an exhaustive analysis of applicable national and international literature. Five experts in the field of nursing from Minia University's faculty of nursing and faculty of medicine updated the study tools in order to assess their material validity and feasibility. The required modifications included rephrasing and rearrangements of some sentences. Prior to data collection, a pilot study of 25 mothers was performed, with those who were not included in the study being omitted.

From the first of July 2021 to December 2021, the investigator visited Bani-Khaled Village twice a week (on Saturdays and Tuesdays) from 10 am to 12 p.m to recruit the study sample. According to inclusion criteria, all mothers having young children and agreed to participate (6:8 mother per week) were chosen. The average number of interview subjects per day was four, and the average time spent on each was about 25-30 minutes, depending on the individual's response.

After obtaining oral consent from each participant and describing the purpose and goals of the study to gain their cooperation, the mothers were interviewed. The investigator met the participants in at times that were convenient for them. The questionnaire was introduced for the mothers to fill it out, unless the participant was unable to read or write, in this case the investigator filled it out. The investigator read the questions to the participant and recorded their exact responses. Participants were given the opportunity to ask questions and receive explanations.

Statistical analysis

Data were scored, tabulated, and analyzed by computer using “the statistical package for social science” (SPSS) version 20 .Descriptive data were expressed as number and percentage. Quantitative data were presented by mean and standard deviation. Chi square test was used to see if there was a connection between two qualitative variables or if there was a difference between two or more proportions. Correlation was calculated between knowledge and practices using Pearson correlation test. Probability (p-value) less than 0.05 was considered significant in tests of relationships.

Variables	N	%
- Illiteracy	61	24.3
- Basic education	93	37.1
- Secondary	71	28.3
- University	26	10.3
Father's job:		
- Worker	109	43.4
- Craftsman	66	26.3
- Government employee	61	24.3
- Self-employment	15	6.0
Nature of The Craft		
- works in coloring and decorating glass	171	68.1
- Asturgy Furniture	16	6.4
- Painting walls	5	2.0
- Car battery repair	14	5.5
- Plumber	30	12.0
- Driver	10	4.0
- A seller of newspapers	5	2.0
Mother's Education		
- Illiteracy	116	46.2
- Basic education	55	21.9
- Secondary	51	20.3
- University	24	9.6
- Other	5	2.0
Mother job:		
- Housewife	206	82.1
- Works	45	17.9

Table (1) illustrates that, 62.5% of subjects their age ranged from 22 years to 32 years, 5.5% their age more than 43 yrs. with mean age 32±6.5 years. Regarding their monthly income 21.5% of study subject reports have enough income but 78.5% reports have not enough monthly income. The educational level of mother reveals that, 46.2 % are illiteracy, 21.9 % had basic education, 9.6% have university degree and 82.1% of mother are house wife. Regarding father education 37.1% of father has basic education, 28.3% have secondary school, 20.3% are illiteracy, and 68.1% of father works in coloring and decorating glass and 12% of fathers are plumber.

Table (2): Distribution of the Mothers According to Their Knowledge about Lead Pollution at Bani-Khaled Village in Minia Governorate 2021 (n=251)

Variables	N	%
A- Sources of Pollution		
1- Smoking		
- Yes	216	86.1
- No	35	13.9
2- Throwing dead animals into the river		
- Yes	204	81.3
- No	47	18.7
3- The smoke coming out of burning rubbish		
- Yes	215	85.7
- No	36	14.3
B- Hearing about lead Contamination Knowledge		
- Yes	34	13.5
- No	217	86.5

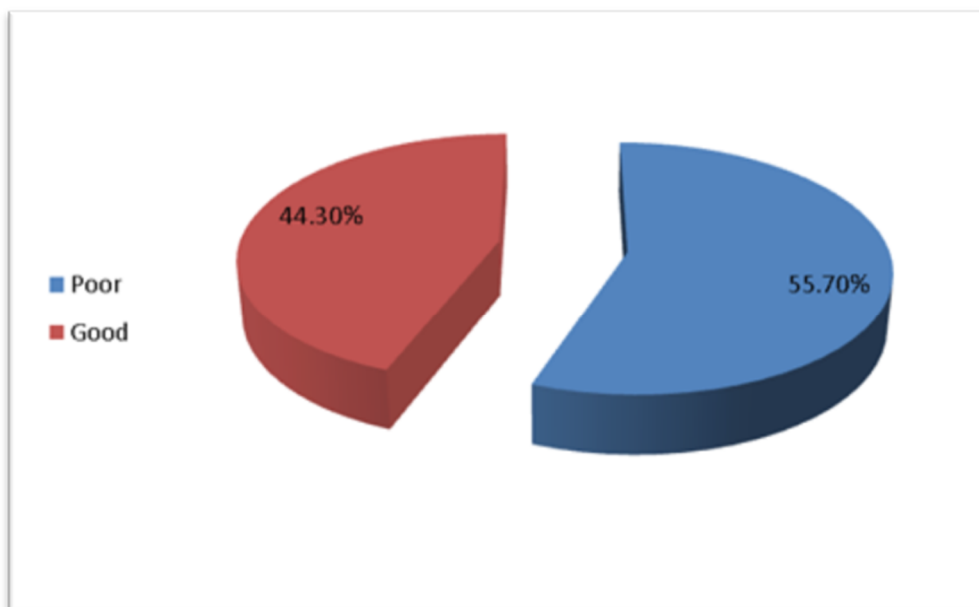
Table (2) shows that, 86.1% of mothers says smoking, 13.9 % says no smoke, 81.3% reports throwing dead animals into the river, but 18.7% reports no, 85.7% reports the smoke coming out of burning rubbish and 86.5% don't heard about lead contamination but 13.5% hear about lead pollution.

Table (3): Distribution of the Mothers According to Their knowledge about Lead home pollution at Bani-Khaled Village in Minia Governorate 2021 (n=251)

Variables	N	%
Things That are Used in the House and Contain Lead		
- Water pipes and some painted toys.	40	15.9
- TV remote control and decorative spoons	26	10.4
- More than one answers	45	17.9
- I don't know	140	55.8
Most Vulnerable to Lead Contamination		
- Youth	63	25.1
- Children from 1: 5 years old	11	4.4
- The elderly	108	43.0
- More than one answers	5	2.0
- I don't know	64	25.5
Areas Where Lead Dust Accumulate In The House		
- On windows and their edges, windowsills, stairs.	0	00.0

Variables		N	%
-	The doors and their frames, the internal and external walls of the house.	5	2.0
-	Wire the net and under the beds.	16	6.4
-	More than one answer	99	39.5
-	I don't know.	131	52.2

Table (3) clears that, 55.8% of mothers donot have knowledge about lead pollution, says smoking, 15.9 % says Water pipes and some painted toys, 10.4% reports TV remote control and decorative spoons. 43.0% of mothers says the elderly are the most suscepitable to lead contamination, 25.5% donot know the most vulnerable group. Regarding the area where lead dust accumulate in the house, 52.2% donot know, 2% says the doors and their frames, the internal and external walls of the house and 6.4% of mothers reports wire the net and under the beds.



Figur (1): Distribution of Mothers regarding Overall Knowledge scores about Lead Pollution at Bani-Khaled Village in Minia Governorate 2021 (n=251)

Figure (1), illustrates 44.3% of mothers have good knowledge scores, but 55.7% of mothers have poor knowledge scores.

Table (4): Distribution of Mothers Practice Practices about lead Pollution at Bani-Khaled Village in Minia Governorate 2021(n=251)

Practice about Lead Pollution	Yes		No	
	N	%	N	%
The mother buys eye powder or stone from the herbalist	150	59.8	101	40
The mother applies eye powder to the child	151	60.2	100	39.8
The mother puts on cosmetics	80	31.9	171	68.1
The mother uses hair dye	106	42.2	145	57.8

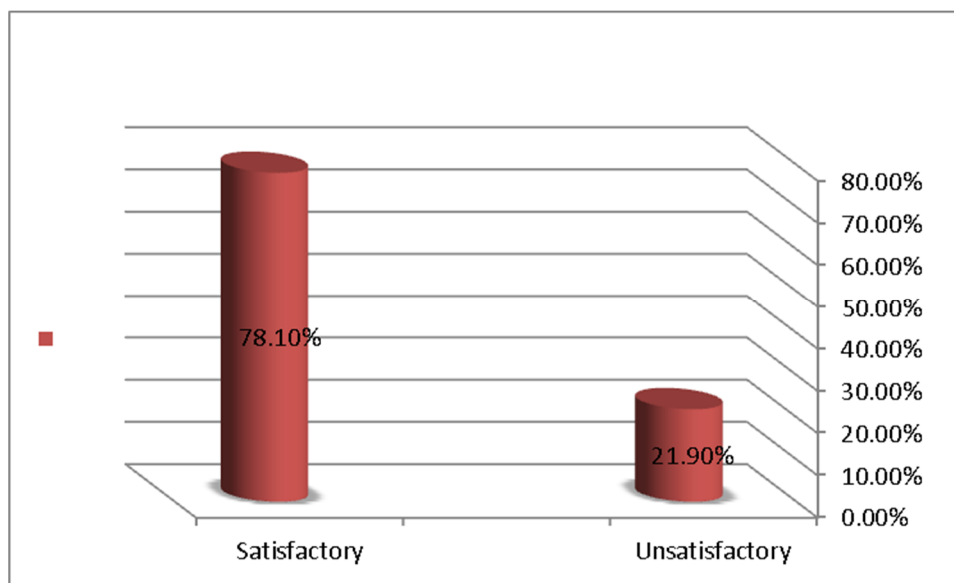
Table (4) illustrates that, 59.8% of mothers buys eye powder or stone from Al-Attar, 40.2% don't buy eye powder, 60.2% of mothers apply eye powder to their child but 39.8% don't, 68.1% of mothers don't puts on cosmetics and 31.9% of mothers use cosmetic. In addition 57.8% of mothers don't use hair dye.

Table (5): Distribution of the Mothers practices According to Their Child about lead Pollution at Bani-Khaled Village in Minia Governorate 2021 (n=251)

Mothers practices to their child lead pollution	Yes		No	
	N	%	N	%
- Baby crawling on the ground	201	80.1	50	19.9
- The child sucks his fingers	201	80.1	50	19.9
- The child puts bits of wall paint in his mouth	70	27.9	181	72.1
- The child licks the beds and the sofa	132	52.6	119	47.4
- The child puts colored ornaments in his mouth	127	50.6	124	49.4
- The child chews newspapers and magazines	121	48.2	130	51.8
- The child eats without washing hands	150	59.8	101	40.2
- Children play with materials available in the environment	215	85.7	36	14.3
- Clean kids toys	181	72.1	70	27.9
- Baby puts toys in his mouth	221	88.0	30	12.0
- Child playing in the street	166	66.1	85	33.9
- The child has toys with battery stones	216	86.1	35	13.9
- The child puts the battery in his mouth	176	70.1	75	29.9

Mothers practices to their child lead pollution		Yes		No	
		N	%	N	%
-	The child uses the pencil	206	82.1	45	17.9
-	The child puts the pencil in his mouth	190	75.7	61	24.3
-	The child draws his face on occasions and holidays	98	39.0	153	61.0

Table (5) depicts that, 80.1% of mothers their children baby crawling on the ground and their child sucks on one of his fingers but 19.9% of mothers reports no. Also 72.1% of mothers their children don't bits of wall paint in his mouth, 52.6% of mothers their child licks the beds and the sofa, 50.6% of mothers their child puts colored ornaments in his mouth, 51.8% of mothers their child don't chews newspapers and magazines, 59.8% of mothers their child eats without washing hands, 85.7% of mothers their children play with materials available in the environment, 72.1% of mothers clean kids toys, 88.0% of mothers their babies puts toys in his mouth, 66.1% of mothers their child playing in the street, 86.1% of mothers their child has toys with battery stones, 70.1% of mothers their child puts the battery in his mouth, 75.7 % of mothers their child puts the pencil in his mouth and 39.0% of mothers their child draws his face on occasions and holidays.



Figur (2): Distribution of Mothers Practices scores regarding Lead Pollution at Bani-Khaled in Minia Governorate 2021 (n=251)

Figur (2), illustrates 78.1% of mothers have satisfactory practices scores, but 21.9 of mothers have unsatisfactory practices scores.

Table (6): Relation between practices of Mothers and Their Some Demographic characteristics at Bani-Khaled Village in Minia Governorate 2021(n=251)

Variables	Satisfactory		Un satisfactory		Chi	P
	N	%	N	%		
Age						
-22-32 years	129	82.1	28	17.9	1291.8	0.001**
-33-43 years	59	73.7	21	26.3		
-More than 43 yrs	8	57.1	6	42.9		
Education					219.5	0.001**
-Illiterate	102	87.9	14	12.1		
-Basic education	53	96.3	2	3.7		
-Secondary	26	50.9	25	49.1		
-University	10	41.6	14	58.4		

Significant at (p-value <0.01)

Table (6): points a positive statistically significant relationship between practices score , age and education p value 0.001.

Table (7) : Relation between knowledge of Mothers and Their Some Demographic characteristics at Bani-Khaled Village in Minia Governorate 2021 (n=251)

Variables	Good		Poor		Chi	P
	N	%	N	%		
Age						
-22-32 years	80	50.9	77	49.1	1881.2	0.001**
-33-43 years	30	37.5	50	62.5		
-More than 43 yrs	1	7.1	13	92.9		
Education					157.8	0.002**
-Illiterate	35	30.1	81	69.9		
-Basic education	34	61.8	21	38.2		
-Secondary	26	50.9	25	49.1		
-University	14	58.4	10	41.6		

Significant at (p-value <0.01)

Table (7): points a positive statistically significant relationship between total knowledge scores scores, age and education p value 0.001, 0.002 respectively.

Discussion

The aim of this study is to assess mothers' knowledge and their health habits regarding lead pollution at Bani-Khalid Village in Minia Governorate.

Lead is a highly toxic and poisonous metal; it can cause severe mental and physical impairment. Young children are most vulnerable because they absorb four to five times more ingested lead compared to adults from a given source. Children's curiosity behavior and their age-appropriate hand-to-mouth behavior results in their mouthing and swallowing lead-containing objects, such as contaminated soil or dust flakes from decaying lead-containing paints further increasing the risk of lead poisoning. Mothers' awareness about lead poisoning and a deeper understanding of its effect on children among family can prevent lead poisoning (**Fernandes et al., 2019**).

Regarding the socio- demographic characteristics of the studied sample, the present study illustrated that, less than two third of the studied sample their age ranged from 22 years to 32 years, the most of the studied sample had insufficient monthly income and more than two fifth of them were illiteracy and one third of the parents had basic education. This result was confirmed with (**SlvrI and OzpuLat, 2015**) who studied "Mothers' Knowledge Levels Related to Poisoning" and reported that the most of the studied mother their ranged from 25-33, slightly less than half of the studied mothers had insufficient income. But the author differs with the current study in reporting that more than one third had primary education.

This result come in accordance with (**Fernandes et al., 2019**) who studied "A study on knowledge of mothers on lead poisoning among children at selected hospital, Mangalore" and stated that, the most of participant age of the participants ranged from 22 to 30 years with mean and the most of the studied sample were home maker. But the present study come inconsistent with the same author in reporting that about half the proportion of the mothers had secondary education. Also this result come inconsistent with (**SlvrI and OzpuLat, 2015**) who studied "Mothers' Knowledge Levels Related to Poisoning in Turkish" and stated that more than half of mother were in between 16-30years, the most of them had sufficient income and more than one third of them had primary education.

Regarding the studied sample knowledge regarding lead pollution, the current study showed that, the most of the studied sample says smoking could pollute the place, the most of them reported that throwing dead animals into the river, the most of them reports the smoke coming out of burning rubbish and the most of them don't heard about lead contamination. This result may be due to low level of education that affects their knowledge. This result come in the line with (**Adebamowo et al., 2016**) who studied "An examination of knowledge, attitudes and practices related to lead exposure in South Western Nigeria" and reported that the most of the studied sample had poor knowledge regarding the basic knowledge regarding lead pollution. But this result come in accordance with (**Alhammad et al., 2018**) who studied "Knowledge and awareness of mothers about lead poisoning in young children in Saudi Arabia "and stated that two third of

the studied sample had good knowledge regarding lead pollution.

Concerning the studied sample knowledge about Lead home pollution, the current study cleared that, more than half of the studied sample didn't have knowledge about source of lead pollution, less than fifth of them says Water pipes and some painted toys, the tenth of them reports TV remote control and decorative spoons. Concerning the most vulnerable persons, more than two fifth of subjects says the elderly are the most vulnerable to lead contamination, more than one quarter don't know the most vulnerable group. Also more than half of them don't know the area where lead dust accumulates in the house. This result may be due to the studied didn't receive any previous educational program about lead pollution.

This result come in accordance with (**Fernandes et al., 2019**) who reported that more than half of the studied sample had average knowledge regarding things that contain lead, the most vulnerable individual and the accumulation site. Also this come in consistent with (**Anderson et al., 2019**) who studied "Maternal perceptions of lead poisoning in children with normal and elevated lead levels. J Pediatr Health Care" and reported that less than three quarter of the studied sample had higher knowledge regarding the source of lead pollution.

As regarding mothers practices about lead pollution, the present study illustrated that, more than half of subjects buy eye powder or stone from Al-Attar, slightly more than two fifth of them didn't buy eye powder, less than two third of subjects applied eye powder to their child, more than two third of subjects didn't puts on cosmetics and less than one third of subjects use cosmetic. In addition more than half of subjects don't use hair dye. This result may be related to the tradition and customs of the studied sample. this result come in accordance with (**Dooyema et al., 2015**) who stated that mothers had poor practices reagrding prevention of lead poisoning.

Concerning the studied sample child practices about lead Pollution, the current study showed that, the most of the studied sample 80.1% their children baby crawling on the ground and their child sucks on one of his fingers. Also less than three quarter of them their children didn't bits of wall paint in his mouth, more than half of them their child licks the beds and the sofa and puts colored ornaments in his mouth, more than half of them of subjects their child didn't chews newspapers and magazines, more than half of subjects their child eats without washing hands, the most of them their children play with materials available in the environment, more than two third of them clean kids toys, the most of them their babies puts toys in his mouth, near two third of subjects their child playing in the street, the most of subjects their child has toys with battery stones, more than two third of subjects their child puts the battery in his mouth, the most of them their child puts the pencil in his mouth and of subjects their child draws his face on occasions and holidays. This result may due to the studied sample have low level of knowledge regarding the lead poisoning sources and causes.

This result come in agree with (**Zolaly et al., 2018**) who studied and stated that the parents follow measures that protect their children from lead poisoning. This result come in

accordance with (Jordan et al., 2017) mothers had incompetent practices regarding lead poisoning among their children. This result come in the line with (Yabe et al., 2020) who studied "Current trends of blood lead levels, distribution patterns and exposure variations among household members in Kabwe, Zambia" who reported that the most of the household member poor practices regarding precaution to protect children from lead poisoning.

Regarding the total practices scores about lead pollution, the present study illustrated more than three quarter of study subjects have satisfactory practices scores, but more than one fifth of subjects have unsatisfactory practices scores. This result may be due to Egyptian community health centers periodically organizing training program for improving the community health awareness. This result come in accordance with (Mohammed et al., 2021) who studied "Mothers Perception regarding Poisoning among their Preschool Children in Egypt" and mentioned that two third of the studied mothers 67.7% had unsatisfactory total of reported practices about poisoning.

Regarding the total knowledge scores about Lead Pollution, the current study illustrated that more than two fifth of study subjects had good knowledge scores, but more than half of subjects had poor knowledge scores. This might be due to low educational level of the mothers. This was consistent with (Abel Galil et al., 2018), who conducted a study on "Mother's Knowledge and Practices Regarding Care Of the Children with Accidental Poisoning at Zagazig University", and revealed that less than two thirds of the mothers in the studied sample were having satisfactory knowledge.

This result differ with (Fernandes et al., 2019) who showed that half the proportion of the participants had average knowledge, had good knowledge, less than fifth of them had very good knowledge and 4.1% had poor knowledge. This result differ with (Mohammed et al., 2021) who stated that less than two third of mothers had poor total knowledge regarding poisoning among preschool age children

Regarding the Relation between the studied sample practices and their age, education, the present study showed a positive statistically significant relationship between practices score, age and education p value 0.001. This result may due to the age and educational level will reflect the mothers' experiences in managing their child and house measures.

Concerning the relation between the studied sample knowledge and their socio-demographic data, the current study showed that there was a positive statistically significant relationship between total knowledge scores score, age and education p value 0.001, 0.002 respectively. This result may be due to the mothers' age and educational level affects the ability of the mother to acquire new knowledge. This result come in accordance with (Fernandes et al., 2019) who mentioned that there was a significant association between knowledge and education level of mothers. But the current study come inconsistent with the same author who stated no significant association was found between the knowledge of mothers and age.

Also the current study come in the same line with (Sivri & OzpuLat, 2015) who reported that there were statistical significance differences between the studied sample knowledge and their educational level. Also this result was confirmed with (Abel Galil et al., 2018) who mentioned that there was significant statistical significant differences between the mother knowledge and their educational level. But this result differ with (BakrMoshtohry et al., 2018) who showed

there is no statistical significant difference between mothers 'educational level and their knowledge.

Conclusion

Based on the findings of the present study, it can be concluded that less than two third of mothers their age ranged from 22 years to 32 years, the most of the studied mothers had insufficient monthly income and more than two fifth of them were illiteracy. The most of the studied mothers had insufficient monthly income and more than two fifth of them were illiteracy, more than half of study mothers (51.3%) get information from their Neighbors.

Also the majority of the studied mothers had satisfactory practices score, less than half of studied mothers have good knowledge scores and more than half of studied subjects get information from their Neighbors. Also there was a positive statistically significant relationship between total practices score and total knowledge scores regarding age and education. Also there was a positive significant correlation between women knowledge about lead pollution and their practices.

Recommendations:

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

- Health education programs should be made available for mothers about lead poisoning and appropriate protection measures.
- Emphasis for mothers and families should be made on early case finding and proper measures in order to avoid or minimize complications.
- Health teaching about access to Poison Control Center for information about different poison agents and their proper management
- Providing training for mothers about how to maintain health home environment free from lead poisoning sources.
- Periodic blood investigation screening for children for early identification of blood leads level.
- Conduct different in-service educational programs for the maternal child health centers (nurses and physicians), regarding the importance of health education to prevent lead poisoning among children.
- Conduct further researches to investigate the contributory factors leading to lead poisoning among children.

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