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# Mothers' Awareness Regarding Health Hazards from Water Pollution at El Minia Governrate

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**Abstract**

Water pollution is major challenge that humanity is facing in the twenty-first century. It can be lead to various health hazards as gastrointestinal infections, typhoid fever, cholera, and dysentery. assess mothers' awareness regarding health hazards related to water pollution. This study was conducted at El Minia Governorate. A convenience sample was used in this study, 334 families. An interviewing questionnaire dived 3 parts: Socio-demographic characteristics, Asses mothers' health hazards related to water pollution, Assess mothers' knowledge regarding water pollution (1st tool). An environmental observation checklist. 34.4% from mothers with hepatitis A virus, 5.4% of them suffer from Ascaris and Schistosomiasis (2nd tool). 67.6 discovered health problems by medical examination at the health unit. 79.3% had poor level of Knowledge and 19.2% had good level regarding health hazards from water pollution. more than one third of the studied mothers suffer from hepatitis A virus, while minority of them suffer from Ascaris and Schistosomiasis, more than one third of them discovered health problems by medical examination at the health unit, all of them receive medical treatment and Places of therapeutic services introduced used by more than one third from studied mothers'. More than three quarters of them had poor level of Knowledge and less than one fifth of them had good level regarding health hazards from water pollution. Apply health education programs for mothers in different rural areas to improve awareness toward water pollution.

**Keywords:** Mothers awareness, Health Hazards, water pollution, Minia Governorate

**Full length article** **Corresponding Author*, e-mail: ptrservices2022@gmail.com

## 1. Introduction

The World Health Organization report that the rate of water pollution in Egypt is more than three times the global pollution rates, and the rate of pollution is worse in the governorates of Cairo than in other governorates of the Republic. The report of the Clinical and Environmental Toxicology Center at Kasr Al-Aini Medicine stated that the rates of poisoning resulting from pollution are high in those governorates. The share of Cairo Governorate was 35% of the poisoning cases, 12% in Giza, and 50% in Qalyubia (Inland water transport and knowledg, 2020). Over half the global population do not have safely managed sanitation services. Experts estimate that by 2025, half the world's population will live in a water pollution environment. Around 785 million people do not have basic drinking-water services [16]. Water pollution is a severe environmental problem that has an impact on people's health and well-being all over the world. Consuming polluted drinking water can lead to various health hazards, such as gastrointestinal infections, typhoid fever, cholera, and dysentery, also exposure to toxins, skin irritation, respiratory, reproductive, cardiovascular problems, liver & kidney damage, cancer and others diseases [4]. Mothers play an important role in water management. They are most often the collectors, users and managers of water in the household. Because of these roles, women must be have considerable knowledge about water resources, including quality and reliability, restrictions and acceptable storage methods and are key to the success of water resources development, also to prevent water pollution and to maintain family health [8]. Community health nurses play important role to increase mothers awareness toward water pollution and participate in health education which have become popular tools in reducing the burden of health hazards diseases. And perform assessment,

planning, implementation and evaluation to health hazards due to water pollution [1].

### *1.1 Significance of the study*

More than two million people worldwide die each year from diarrhoeal diseases, with poor sanitation and unsafe drinking water being the leading cause of nearly 90% of deaths and affecting children the most. More than 50 kinds of diseases are caused by poor drinking water quality, and 80% of diseases and 50% of child deaths are related to poor drinking water quality in the world. However, water pollution causes diarrhea, skin diseases, malnutrition, and even cancer and other diseases related to water pollution [15]. According to the 2021 UNICEF report, "Egypt is facing an annual water deficit of around 7 billion cubic meters to the mass pollution of Egypt's water sources." Later in the analysis, UNICEF stated that according to its projections, it is highly possible that the country could run out of clean water entirely by 2025. This would affect 1.8 billion people worldwide, who will be living in complete water scarcity [21].

### *1.2 Aim of the study:*

The aim of this study to assess mothers awareness regarding health hazards related to water pollution through:
1. Assessing environmental home related to water pollution
2. Appraising mothers' knowledge regarding water pollution.
3. Appraising mothers' health hazards related to water pollution.

Research Questions: -
1. What are levels of mothers knowledge about water pollution?
2. Is there relation between mothers' knowledge and studied sample socio-demographic characteristics?
3. What is health hazards related to water pollution?

## *2. Subject and Methods:*

The subject and methods for this study was portrayed under the four main items as follows:

### *I- Technical item*

The technical item included research design, setting, subject and tools for data collection.

### *Research design:*

Descriptive study design was utilized in the study.

### *2.1 Setting:*

This study was carried out in El Minia Governrate that consists of nine center. select one center is Samalout center and select one village from this center is Bani Sumrag village, because their no sewage. A village with a not very large area in the center of Samalout in Minia Governorate. The population is 2017, including 334 families based on scientific research. Their educational level is average.

### *2.2 Sampling:*

A convenience sample was used in the study. The total number of families representing 334 families, from 2017 family one family in all houses.
Sampling size:
Yamane (1967) provides a simplified to calculate sample size A95 confidence level and P=0.05 are assumed for equation

$n = N/(1+n(e))$

Where N = Total population, n = sample size, e = level of precision = 0.05

$n = 2017/(1+2017\ (0.0025))$

$n = 2017/6.425 = 333.8$

Total number = $333.8 \simeq 334$ families.

### *2.3 Tools for data collection:*

#### *1st tool: An Interviewing Questionnaire*

A structured interview questionnaire designed by the investigator divided into four parts:
Part (1): Socio-demographic characteristics: as: mothers' age, education level, marital status...etc.
Part (2): Asses mothers' health hazards related to water pollution: assess mothers' health hazards related to water pollution as mother suffer from the following health problems, problem discovered...etc.
Part (3): Assess mothers' knowledge regarding water pollution: included meaning, causes, water transmit diseases, the diseases transmitted through water pollution, symptoms and signs of disease resulting from water pollution...etc.

### *2.4 Scoring system:*

19 question each knowledge question was scored by zero for wrong or no answer, and one for «correct ». The total knowledge scores ranged from 0-9, they were evaluated as follows:
Total score knowledge

Poor less than 50% (0: 4.41)
Average from 50%:75% (4.5:6.8)
Good more than 75 % (6.9: 9)

#### *2nd tool: Observational checklist*

Included source of water that use for showering, home filtered use for drinking water, taste colour in drinking water, taste salt in drinking water...etc., included 14 question
Scoring system for observed environment:
Each environment question was scored by one for a «yes», zero for a «no ».

### *2.5 Validity and reliability:*

The study tools were tested for content and face validity by jury test of five experts in community nursing field to evaluate the tools as well as the entire instrument as being relevant and appropriate to test what they wanted to measure. The face validity of the questionnaire was calculated based on experts' opinion after calculating content validity index (%) of its items and was 94%.

### *2.6 Ethical consideration:*

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee in the Faculty of Nursing - Helwan University before starting the study. Participation in the study is voluntary and subjects were 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 was not be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs were respected.

***II- Operational Item:***

***a ) Preparatory phase:***

Included reviewing of past, current, national and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection.

***b) Pilot study:***

The pilot study was done on 10% of the sample to examine the clarity of questions and time needed to complete the study tools. Based on the results, modification was done (if necessary). Subjects included in the pilot study were excluded from the study if major modifications are required.

***c ) Field work:***

The data collection started from April 2022 to October 2022. The investigator was available in the study setting 2 days per week. The investigator was introduced herself to the study subject prior to any data collection and explain aim of the study. The researcher start to collect data to assess mothers history related to water pollution was took 5 minutes to fill, assess mothers knowledge regarding water pollution was took 10 minutes, assess mothers reported practice regarding water pollution through 10 minutes. And observational checklist was took 10 minute, and took 6 mothers /day.

***III- Administrative Item:***

An official permission was obtained from the dean of faculty of nursing Helwan university to the local council of the village to apply the study.

***IV- Statistical Item:***

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 16, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category, using Chi-square test ($\chi^2$). Correlation between variables was evaluated using Pearson's correlation coefficient (r). Significance was adopted at $p<0.05$ for interpretation of results of tests of significance.

***3. RESULT and DISCUSSION***

Mothers' play a crucial role in safeguarding the health and well-being of their families and their awareness regarding health hazards from water pollution is of utmost importance. Water pollution poses significant risks to human health, including exposure to toxic chemicals, pathogens, and contaminants that can lead to various illnesses. It is essential for mothers' to understand these hazards and take appropriate measures to protect their families. Educating mothers' about water pollution and its potential health effects is vital in empowering them to make informed decisions and advocate for clean and safe water sources[14]. Efforts to raise mothers' awareness regarding health hazards from water pollution should involve the dissemination of accurate Knowledge, community engagement, and access to reliable resources. Public health agencies, non-governmental organizations, and educational institutions can play a pivotal role in conducting awareness campaigns, workshops, and educational programs targeting mothers'. These initiatives should focus on explaining the sources and types of water pollution, the potential health risks associated with contaminated water, and practical steps that can be taken to minimize exposure and promote clean water usage [7].

The current study finding revealed that more than a third of the studied mothers' suffer from hepatitis A virus, while the minority suffered from Ascaris and Schistosomiasis. Regarding how they discovered the problem, more than half of mothers' discovered health problems by medical examination at the health unit. While all of them received medical treatment. Also, regarding the places of therapeutic services introduced, nearly half of studied mothers' received service in hospital. A study investigated the prevalence of waterborne diseases among mothers' in a rural community. The results showed a high incidence of hepatitis A virus infection among the studied mothers', aligning with current study findings. The study highlighted the role of water contamination as a significant factor in the transmission of hepatitis A, emphasizing the importance of addressing water pollution to mitigate the risk of such infections [17].

A study conducted by Barros [5] examined water-related diseases among mothers' in an urban setting. The findings highlighted the presence of parasitic infections, including Ascaris and Schistosomiasis, among the studied mothers'. The study emphasized the role of contaminated water sources in the transmission of these diseases and called for improved water sanitation and hygiene practices to reduce the burden of waterborne infections. In a study by Calisir [6], health problems related to water pollution were investigated among mothers' in a coastal community. The research reported that the majority of the mothers' discovered their health problems through medical examinations, consistent with current study findings. The study emphasized the importance of routine health check-ups to detect and manage health issues caused by water pollution.

On the contrast study by [2] examined healthcare-seeking behavior among mothers' exposed to water

pollution in a rural community. The findings revealed that a significant proportion of the affected mothers' ignored medical treatment for their health issues. The study emphasized the importance of access to healthcare services and the role of healthcare providers in addressing and managing the health impacts of water pollution. On the same line a study [18], the utilization of healthcare services among mothers' affected by water pollution was assessed. The research found that the majority of the affected mothers' received medical treatment for their health problems. It also identified various factors, such as socioeconomic status, access to healthcare facilities, and awareness levels that influenced the utilization of medical services by the affected mothers. The current study findings show that the total Knowledge level among mothers' regarding health hazards from water pollution, the majority of mothers' had poor level of Knowledge while less than quarter had good level.

This is agreed with s study aimed to assess the knowledge, attitudes, and practices of residents in urban areas of Brazil regarding water pollution and associated health risks. The researchers investigated participants' understanding of the sources and causes of water pollution, their knowledge about the health hazards posed by contaminated water, and their practices related to water use and sanitation. The study also examined the participants' attitudes towards water pollution and their perceptions of its impact on their health and well-being. The findings of this study revealed gaps in knowledge among urban residents regarding water pollution and its health risks. Many participants had limited awareness of the specific pollutants and diseases associated with contaminated water. Furthermore, their knowledge of preventive measures and safe water practices was found to be inadequate [7]. On the other hand, in a study aimed to assess the public perception and awareness of water pollution and its associated health risks in the United States. The researchers surveyed a diverse sample of participants from different regions and demographic backgrounds. The findings revealed varying levels of awareness, with some participants demonstrating a good understanding of water pollution sources, health risks, and preventive measures, while others had limited knowledge. The study emphasized the importance of targeted public education campaigns to improve awareness and foster sustainable behavior changes regarding water pollution [19].

From the researcher point of view the variance in the level of awareness and Knowledge regarding health hazards from water pollution depends on many factors such as social, educational, financial, and demographic determinants which directly affects and obviously appears in the difference between African and American samples in different studies. From the researcher point of view these findings highlight the need for comprehensive educational programs that focus on improving knowledge and awareness of water pollution and its health impacts in urban areas. Such interventions should emphasize the sources and causes of water pollution, the potential health risks involved, and the importance of adopting safe water practices. Additionally, efforts should be made to address misconceptions and promote positive attitudes towards water pollution, emphasizing the role of individuals in protecting their own health and the environment. Regarding Environmental Observation the current study illustrates that in indoor observation more than a half-used tape water for showering, the majority didn't use home filtered use for drinking water, more than a half notice Taste, odor and color in drinking water. While in outdoor observation the majority of them had no house connection to a sewage network, sewage overflow. Also, the majority of them had no Tank to store drinking water on the roof. On the same line a Study "Assessment of Tap Water Quality and Perception: A Case Study of an Urban Area in the United States" (2019) It investigated factors such as taste, odor, color, and overall satisfaction with tap water. The findings highlighted the importance of the awareness of regular water quality monitoring and addressing perceptual issues to enhance public confidence in tap water as a safe and reliable drinking water source [20].

Also, a study: "Assessment of Sewage Infrastructure and Public Health Risk in European Urban Areas" (2018). It explored issues such as awareness of people awareness regarding sewage network connectivity, treatment capacity, and the prevalence of sewage overflow incidents. The findings underscored the importance of investing in sewage infrastructure to prevent waterborne diseases and protect the environment [3]. From the researcher's point of view these studies contribute to the importance of understanding tap water quality, home water filtration, sewage infrastructure, and water storage practices in different contexts. They highlight the importance of addressing these aspects to ensure access to safe and clean water, minimize health risks, and promote sustainable water management practices. It is worth noting that there is a vast body of literature available on these topics, and the studies mentioned above are just a few examples. Researchers and policymakers continue to explore these areas to identify effective strategies and interventions for improving water quality, sanitation, and hygiene practices. Regarding the relation between total Mothers' Knowledge and their demographic characteristics the current study revealed that there was no statistically significant relation. On the other side, a study: "Determinants of Knowledge and Practices of Water Pollution Control among Rural Residents" (2018). It examined various demographic characteristics such as age, education level, income, and occupation to identify their influence on knowledge levels. The findings revealed that education level and occupation were significant predictors of knowledge and practices, while age and income showed mixed results [11].

In a study "The Impact of Socioeconomic Factors on Public Perception and Knowledge of Water Pollution in Developing Countries" (2017). It examined demographic variables such as education level, income, and occupation and their relationship with awareness and understanding of water pollution issues. The findings suggested that higher education levels and income were associated with greater knowledge and awareness of water pollution [12]. These studies demonstrate that demographic characteristics, such as education level, occupation, and income, can play a role in shaping individuals' knowledge and awareness of water pollution and its health hazards. However, it's important to note that findings may vary across different populations, regions, and study contexts.

**Table (1):** Frequency Distribution of the Mothers' health hazards related to water pollution, (n=334).

| Items | The studied sample (n=334) | |
|---|---|---|
| | No. | No. |
| **Mother suffer from the following health problems** | | |
| • Hepatitis A | 115 | 34.4 |
| • Cholera | 21 | 6.3 |
| • Typhoid fever | 85 | 25.4 |
| • Gastroenteritis | 26 | 7.8 |
| • Ascaris | 18 | 5.4 |
| • Ancylostoma | 51 | 15.3 |
| • Schistosomiasis | 18 | 5.4 |
| **Problem discovered** | | |
| • By medical examination at the health unit | 226 | 67.7 |
| • By chance | 79 | 23.7 |
| • After the Multiples of disease complications | 29 | 8.7 |
| • Otherwise | - | --- |
| **Did you receive treatment** | | |
| • **Yes** | 334 | 100 |
| **Places of therapeutic services introduced** | | |
| • Hospital | 157 | 47 |
| • Government clinic | 120 | 35.9 |
| • Private clinic | 57 | 17.1 |

Table (1): delineate that 34.4% from mothers suffer from hepatitis A virus, while 5.4% suffer from Ascaris and Schistosomiasis. 67.6% discovered health problems by medical examination at the health unit.

**Table (2):** Percentage Distribution of Total Knowledge among Mothers' regarding health hazards from water pollution, (n=334)

| Total Mothers' Knowledge | Studied Sample | | $\chi^2$ | P |
|---|---|---|---|---|
| | No. | % | | |
| **Levels of total Mothers' Knowledge:** | | | **385.4** | **0.000** |
| **Poor** | **265** | **79.3** | | |
| **Average** | **5** | **1.5** | | |
| **Good** | **64** | **19.2** | | |
| Range | **9** | | | |
| Mean ± SD | **2.63±2.64** | | | |

Table (2): reveal total Knowledge among mothers regarding health hazards from water pollution, 79.3% had poor level of Knowledge while 19.2% had good level with highly statistical significant differences.

**Table (3):** Number and Percentage Distribution of Environmental Observation, (n=334)

| Items | Environmental Observation | |
|---|---|---|
| | No. | % |
| **the source of water that use for showering** | | |
| - A water pump | **170** | **50.9** |
| - Water tanks | **42** | **12.6** |
| - River water | **82** | **24.6** |
| - Tap water | **40** | **12** |
| **home filtered use for drinking water** | | |
| **Yes** | **12** | **3.6** |
| **No** | **322** | **96.4** |
| **Taste colour in drinking water** | | |
| **Yes** | **220** | **65.9** |
| **No** | **114** | **34.1** |
| **Taste salt in drinking water** | | |
| **Yes** | **160** | **47.9** |
| **No** | **174** | **52.1** |
| **change in water color** | | |
| **Yes** | **303** | **90.7** |
| **No** | **31** | **9.3** |
| **change in water Odor** | | |
| **Yes** | **302** | **90.4** |
| **No** | **32** | **9.6** |
| **change in water Taste** | | |
| **Yes** | **213** | **63.8** |
| **No** | **121** | **36.2** |
| **disinfect drinking tanks at home by mother** | | |
| **Yes** | **16** | **4.8** |
| **No** | **318** | **95.2** |
| **House connect to a sewage network** | | |
| **Yes** | **39** | **11.7** |
| **No** | **295** | **88.3** |
| **Waste water disposal method** | | |
| - Hole absorbency | **18** | **5.4** |
| - Open sewer channels | **21** | **6.3** |
| - Not applicable | **295** | **88.3** |
| **sewage overflow occur in the area** | | |
| **Yes** | **264** | **79** |
| **No** | **70** | **21** |
| **The most times the overflow occurs in a season** | | |
| -Summer season | **100** | **29.9** |
| -Winter season | **43** | **12.9** |
| - Not tied to specific chapters | **191** | **57.2** |
| **Tank to store drinking water in roof** | | |
| **Yes** | **40** | **12** |
| **No** | **294** | **88** |
| **-If yes, nature of tank material:** | | |
| Plastic | **10** | **3** |
| Metal | **12** | **3.6** |
| Cement | **18** | **5.4** |

Table (3): express distribution of environmental observation indoor and outdoor, regarding indoor observation 50.9% from the studied mothers used water pump as a source of water for showering, 96.4% not used filtered water for drinking at home, 65.9 and 47.9% Taste color and salt in drinking water respectively. 90.7%, 90.4% and 63.8% note change in water color.

**Table (4):** Relation between total Mothers' Knowledge and their demographic characteristics (n=334)

| Demographic characteristics | Total Mothers' Knowledge (n=334) | | | | | | $\chi^2$ | P |
|---|---|---|---|---|---|---|---|---|
| | Poor 265 | | Average 5 | | Good 64 | | | |
| | n | % | n | % | n | % | | |
| • **Age** | | | | | | | | |
| - 18 <38 | 132 | 80.5 | 2 | 1.2 | 30 | 18.3 | 39.04 | 0.000 |
| - 38<58 | 132 | 83.5 | 2 | 1.3 | 24 | 15.2 | | |
| - 58 and more | 1 | 8.3 | 1 | 8.3 | 10 | 83.3 | | |
| • **Education level** | | | | | | | | |
| - No read and write | 14 | 82.4 | 0 | 0 | 3 | 17.6 | 5.300 | 0.725 |
| - Read and write | 75 | 78.9 | 2 | 2.1 | 18 | 18.9 | | |
| - Basic education | 25 | 80.6 | 1 | 3.2 | 5 | 16.1 | | |
| - Secondary | 100 | 78.1 | 0 | 0 | 28 | 21.9 | | |
| - University and above | 51 | 81 | 2 | 3.2 | 10 | 15.9 | | |
| • **Marital Status** | | | | | | | | |
| - Married | 204 | 79.7 | 2 | .8 | 50 | 19.5 | 4.32 | 0.364 |
| - Widow | 47 | 78.3 | 2 | 3.3 | 11 | 18.3 | | |
| - Divorced | 14 | 77.8 | 1 | 5.6 | 3 | 16.7 | | |
| **Number of children** | | | | | | | | |
| - 1 | 62 | 81.6 | 0 | 0 | 14 | 18.4 | 2.656 | 0.851 |
| - 2 | 53 | 79.1 | 1 | 1.5 | 13 | 19.4 | | |
| - 3 | 89 | 79.5 | 3 | 2.7 | 20 | 17.9 | | |
| - 4 | 61 | 77.2 | 1 | 1.3 | 17 | 21.5 | | |
| • **Marital Status** | | | | | | | | |
| - 500-<1000 | 127 | 79.4 | 3 | 1.9 | 30 | 18.8 | 3.487 | 0.900 |
| - 1000-<1250 | 33 | 80.5 | 0 | 0 | 8 | 19.5 | | |
| - 1250 - <1800 | 60 | 78.9 | 1 | 1.3 | 15 | 19.7 | | |
| - 1800-<2000 | 14 | 77.8 | 1 | 5.6 | 3 | 16.7 | | |
| - > 2000 | 31 | 79.5 | 0 | 0 | 8 | 20.5 | | |
| **Overcrowding rate** | | | | | | | | |
| - **1.5** | 25 | 80.6 | 0 | 0 | 6 | 19.4 | 7.713 | 0.957 |
| - **1.6** | 6 | 75 | 0 | 0 | 2 | 25 | | |
| - **2** | 29 | 78.4 | 0 | 0 | 8 | 21.6 | | |
| - **2.3** | 13 | 76.5 | 0 | 0 | 4 | 23.5 | | |
| - **2.5** | 34 | 77.3 | 1 | 2.3 | 9 | 20.5 | | |
| - **3** | 96 | 80 | 1 | 8 | 23 | 19.2 | | |
| - **4** | 38 | 79.2 | 2 | 4.2 | 8 | 16.7 | | |
| - **5** | 15 | 83.3 | 1 | 5.6 | 2 | 11.1 | | |
| - **6** | 9 | 81.8 | 0 | 0 | 2 | 18.2 | | |

Table (4): indicate insignificant relation between mothers' Knowledge regarding health hazards from water pollution and their demographic characteristics except age.

Regarding, relation between mothers' total Reported Practice and their demographic characteristics the current study revealed that there was a statistically significant relation except monthly income there was no statistically significant relation with mothers' total Reported Practice. This result is supported by Study "Determinants of Household Water Treatment and Safe Storage Practices in Developing Countries. A Systematic Review and Meta-Analysis" (2019) this systematic review and meta-analysis examines the determinants of household water treatment and safe storage practices in developing countries. The study analyzes various demographic characteristics, including maternal age, education level, household income, and access to improved water sources, to assess their association with reported practices [9].

Also in a study: "Socioeconomic Factors and Safe Water Handling Practices in Rural Bangladesh" (2017). This study investigates the relationship between socioeconomic factors and safe water handling practices in rural Bangladesh. It explores demographic characteristics such as maternal education, occupation, income, and household size, to understand their influence on reported practices related to water treatment, storage, and hygiene [13]. On the other hand, a Study "Determinants of Safe Water Handling Practices among Mothers' in Rural Ethiopia: A Cross-Sectional Study" (2020). This cross-sectional study examines the determinants of safe water handling practices among mothers' in rural Ethiopia. The research explores demographic factors, including maternal age, education level, economic status, marital status, and access to Knowledge, to assess their association with reported practices related to water treatment, storage, and hygiene [22].

From the researcher's point of view demographic characteristics such as age, education level, marital status, and occupation have been commonly explored in relation to reported practice regarding health hazards of water pollution. These factors can influence individuals' knowledge, awareness, and access to resources, which in turn may impact their reported practices. For instance, higher education levels have been associated with better knowledge and awareness of water pollution issues, which may lead to more informed and appropriate reported practices. Marital status and occupation can also play a role, as different household structures and occupations may have varying levels of exposure to and understanding of water pollution risks. However, the lack of a statistically significant relationship with monthly income in the current study suggests that income alone may not be a strong predictor of reported practice regarding health hazards of water pollution. Other factors, such as access to Knowledge, cultural beliefs, and personal attitudes, may have influenced mothers'' reported practices in the study.

## 4. Conclusions

In the light of current study findings, it can be concluded that, More than three quarters of the studied women had poor level of Knowledge and less than one fifth of them had good level while minority of them had average level of Knowledge regarding health hazards from water pollution. Moreover there was insignificant relation between mothers' Knowledge regarding health hazards from water pollution and their demographic characteristics except age. There was highly statistically significant relation between mothers' reported practice about (covered storage Containers; about washed clothes and dishes in the river side; Treat drinking water; Swim children in the water canals and drains; and eat fish caught from polluted water) and their demographic characteristics except monthly income;) and mothers demographic characteristics except monthly income. Additionally more than one third of the studied mothers suffer from hepatitis A virus, while minority of them suffer from Ascaris and Schistosomiasis.

## RECOMMENDATIONS

Based on the current study finding the following recommendations were proposed:

- Booklets about the water pollution and health hazards related water pollution should be distributed to all mothers in rural areas
- Establishing preventive educational programs for mothers in MCH centers clinics regarding water pollution

**Further research about**

- Effects of water pollution on family health in community especially in rural areas.
- Further studies about water pollution prevention among mothers

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