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The impact of the environment on the mental health of a random sample of residents of Tripoli (case study)

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أثر البيئة على الصحة النفسية لعينة عشوائية من سكان مدينة طرابلس (دراسة حالة)

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المستخلص:

لقد نتج عن انتشار الملوثات البيئية وارتفاع معدلات الاحتباس الحراري وحدوث الكوارث الطبيعية، العديد من المشاكل على صحة وسلامة الإنسان من ضمنها مشاكل الصحة النفسية لفئات عديدة من أفراد المجتمع وما تترتب عليها من مشاكل مختلفة، التي تؤثر بصورة كبيرة على اقتصاديات الدول المختلفة، أن العلاقة بين البيئة والصحة النفسية معقدة، وتتداخل بها عوامل كثيرة منها العوامل الاجتماعية والاقتصادية والثقافية، مما يصعب تحديد التأثيرات بشكل دقيق، وتتمثل مشكلة الدراسة في ندرة الدراسات والأبحاث المرتبطة بموضوع الدراسة وصعوبة الحصول على نتائج واقعية أو شبه واقعية، وأيضاً إجراء الدراسات الميدانية يمكن أن يواجها صعوبات لوجستية، وأن قياس مشاكل الصحة النفسية المرتبطة بالمؤثرات البيئية تحتاج إلى أساليب وأدوات متقدمة ومتطورة للوصول إلى نتائج منطقية تشخص الواقع، وأخيراً في العادة يتم تجاهل قضايا الصحة النفسية والقضايا البيئية عند رسم السياسات العامة، وتهدف الدراسة للوصول إلى نتائج حقيقية بشأن التأثيرات البيئية على صحة الإنسان النفسية، ومعرفة تأثيرات الملوثات البيئية عليها، والعمل على الرفع من مستوى الوعي العام حول أهمية البيئة وتأثيرها على الصحة النفسية، وتشجيع الجهات العامة والمراكز البحثية لإجراء المزيد من الأبحاث والدراسات لفهم العلاقة بين البيئة والصحة النفسية بشكل أعمق. وتوصلت الدراسة إلى أن الغالبية العظمى من المشاركين لديهم معرفة بالبيئة بنسبة (86%)، مما قد يعكس نتائج إيجابية في برامج التعليم البيئي، وأن 88% من عينة الدراسة لديهم معرفة ووعي بتأثيرات البيئة على صحة الإنسان من حيث التأثيرات الملوثات البصرية والسمعية، و54% من عينة الدراسة يعيشون في مناطق لا تحتوي علي القدر الكافي من المساحات والحدائق والمنتزهات العامة، وأن 76% من عينة الدراسة علي علم بمدي تأثير الملوثات البيئية علي الصحة النفسية والمزاج العام، وأيضاً أن 58% من عينة الدراسة على استعداد للمشاركة في حملات توعوية للحد من التلوث، وأن 36% مما شملتهم عينة الدراسة يعتقدون أن وسائل الإعلام المحلية لا تقوم بدورها الفعال في التوعية من مخاطر التلوث البيئي، ويمكن ملاحظة أن هناك شكوكًا واسعة حول الجهود الحكومية في الحد من التلوث البيئي بمقدار 64% من المشاركين.

الكلمات المفتاحية: *البيئة، الصحة النفسية، العينة العشوائية، السكان.*

Abstract:

The spread of environmental pollutants, rising greenhouse gas emissions, and the occurrence of natural disasters have led to numerous problems affecting human health and safety, including mental health issues among various segments of society and the resulting diverse problems that significantly impact the economies of different countries. The relationship between the environment and mental health is complex, intertwined with many factors including social, economic, and cultural elements, making it difficult to accurately determine the effects. The problem of the study lies in the scarcity of studies and research related to the topic and the difficulty in obtaining realistic or semi-realistic results. Additionally, conducting field studies may face logistical challenges, and measuring mental health issues related to environmental influences requires advanced and sophisticated methods and tools to arrive at logical results that diagnose reality. Finally, mental health and environmental issues are often overlooked when formulating public policies. The study aims to reach real results regarding the environmental impacts on human mental health, understand the effects of environmental pollutants on it, raise public awareness about the importance of the environment and its impact on mental health, and encourage public entities and research centers to conduct more research and studies to understand the relationship between the environment and mental health more deeply. The study found that the vast majority of participants (86%) have knowledge of the environment, which may reflect positive results in environmental education programs. Additionally, 88% of the study sample are aware of the effects of the environment on human health in terms of visual and auditory pollution, and 54% of the study sample live in areas that do not have sufficient green spaces, parks, and public gardens. Furthermore, 76% of the study sample are aware of the extent of the impact of environmental pollutants on mental health and general mood. Also, 58% of the study sample are willing to participate in awareness campaigns to reduce pollution, and 36% of the study sample believe that local media do not play an effective role in raising awareness about the dangers of environmental pollution. There is widespread skepticism about government efforts to reduce environmental pollution, with 64% of participants expressing doubts.

Keywords: *Environment – Mental health – Random sample – Population*

Introduction:

Currently, the interest in environmental issues is increasingly capturing the attention of the international community, aligning with the current societal conditions of pollution threats and their effects on human health. The environment plays an important role in influencing psychological, mood, and social aspects, which in turn reflects on daily human behavior. Climate changes (such as rising temperatures and pollution) have a significant impact on individuals living in unhealthy environments, affecting psychological aspects such as depression, anxiety, and mental disorders. The environment is generally defined as "the medium in which a living organism exists, where it is affected by and affects this medium" (Hussein Al-Saadi, 2002). Humans have been interested in studying the environment and have established a science called ecology, which highlights the importance of the interrelationships between living organisms and their environment. The environment includes all natural resources surrounding a living organism, such as water, food, and air, which are essential for the continuity of life. Ecology, as a scientific field, studies how living organisms interact with each other and with non-living elements such as air, water, and soil, focusing on understanding ecosystems and their balance, as

well as the impact of human activities on them (Ali Al-Shawawra, 2012). Regarding mental health, it is defined as "a state of complete physical, mental, and social well-being, and not merely the absence of disease" (Hassan Mansi, 2001). Therefore, we do not only focus on the causes and symptoms of illness to contribute to its treatment, but we also pay attention to the surrounding environment, as it is one of the most important factors contributing to illness. The World Health Organisation (WHO) defines environmental health as "those aspects of human health and disease determined by environmental factors." According to the 1999 document, it involves assessing and controlling environmental factors that can affect health. Environmental health, as used by the WHO Regional Office for Europe, includes the direct pathological effects of chemicals, radiation, and some biological factors, as well as the (often indirect) effects on health and well-being from the broader physical, mental, social, and cultural environment, which includes housing, urban development, land use, and transportation (Robert, 1999). Environmental health also concerns the theories and practical practices for assessing and controlling factors in the environment that affect health. It includes the direct pathological effects resulting from chemicals, radiation, and other biological materials, in addition to the effects that often occur indirectly and affect human physical, mental, social, or cultural health (World Health Organisation, 2016). The WHO also emphasised in its report on mental health the diversity of factors affecting mental health, such as heart diseases, depression, unhealthy patterns, drug abuse, poverty, insecurity, the spread of despair, low income, unemployment, and others. All environmental, psychological, and social factors can deprive individuals of enjoying psychological, health, and mental stability, leading to the spread of deviations, anxiety, and unhealthy behaviors (Gaza Mental Health Program, 2016). Recent research and reports have shown that residents of cities with large green spaces enjoy better physical and mental health than those in cities lacking green areas. Natural environments contribute to restoring focus and attention, as studies have proven that children living in residential buildings who suffer from attention deficit hyperactivity disorder (ADHD) are less focused than children living in natural environments. Spending time in nature, simply listening, looking, and contemplating positively affects mental health, reducing the intensity of psychological stress, depression, anxiety, and tension (Mohamed, Amal Jalal, 2015). Recent studies have shown that children with ADHD regain attention after strenuous effort when they live in more natural environments compared to children in residential buildings. These studies found that even listening to natural sounds affects relaxation and reduces nervous tension, in addition to spending time in green nature. The studies also indicated that residents living in green cities with large parks enjoy better physical and mental health than those in areas lacking green spaces. An international study involving 36 individuals relied on spending 10 minutes three times a week for eight weeks in places like public parks and green spaces near work. After the experiment, the results showed lower levels of cortisol compared to before the experiment (Asmaa Lotfi, 2022). The environment surrounding a person is considered a determinant of public health in general and well-being, as individuals need safe and healthy environments that support their health adequately. Generally, there is a degree of awareness and information through media, organisations, or governmental or non-governmental institutions regarding the impact of the environment on human health through the effects of environmental pollutants. This increases the severity of mental illness and anxiety regarding it. Additionally, the scarcity or depletion of resources or their pollution increases their impact on the health of

individuals and society in general. The problem of the study can be represented in the relationship between the environment and health. The psychological aspect is complex, and it is influenced by many factors such as social, economic, and cultural factors, which makes it difficult to accurately determine the effects. In addition, there is a scarcity of studies and research that link environmental aspects to mental health, making it challenging to reach realistic conclusions. It also faces a range of logistical challenges and difficulties, which necessitates further research and collaboration among various disciplines to achieve effective results. Measuring the environmental impacts on mental health requires advanced tools and methods, and self-reported data may be inaccurate. Moreover, issues related to the environment and mental health are often overlooked in public policies in Libya, which affects efforts to improve both. The objectives of the study are valued in an attempt to reach real results regarding the environmental impacts on human mental health, as well as to understand the effects of environmental factors such as green spaces, climate change, and pollution on the mental health of individuals and communities. The study also aims to raise the level of education and public awareness about the importance of the environment and its impact on mental health, in addition to encouraging researchers to conduct more studies and research to understand the relationship between the environment and mental health more deeply, in order to provide recommendations aimed at improving environmental and health conditions. The importance of the study is summarized in providing some indicators that environmental pollution negatively affects mental health and that it does not only impact physical health but can also lead to increased cases of depression, anxiety, and psychological stress. Furthermore, increasing environmental education and awareness enhances positive behavior among individuals and communities regarding the importance of the environment. A significant portion of diseases affecting humans is caused by and originates from the environmental medium, and individual behaviors can be changed to utilize nature properly to improve mental health. Additionally, it emphasizes the importance of studying the environment and its effects on human mental health, indicating an urgent need for more studies and research to understand the relationship between the environment and mental health, and to develop effective strategies to address natural challenges and their impacts. By studying this relationship, policies and programs can be developed aimed at improving the quality of mental life for individuals and communities.

First :The theoretical framework of the study:-

1- Environment:

The environment is generally defined as "the medium and place in which living organisms or other living beings exist, and it constitutes, in its expression, a set of conditions and factors that help the living organism to survive and continue its life" (Amin, Fahmy Hassan, 1984). The environment is also defined by scientists in several definitions, including, for example: "the environment is everything that surrounds humans, including water, air, land, outer space, and everything contained within these mediums, such as inanimate objects, plants, animals, various forms of energy, natural processes, and human activities" (General Administration for Curriculum Design and Development, 2008). This means the relationship of human activities related to these areas. Scientists currently agree that the concept of the environment includes all external conditions and factors in which living organisms exist and that affect the processes they

perform. For humans, the environment is the framework in which they live, containing soil, water, air, and the components of these elements, including inanimate materials and living organisms, as well as various weather phenomena such as climate, winds, rain, gravity, and magnetism, among others, and the mutual relationships between these elements. Therefore, discussing the concept of the environment is essentially discussing its natural components and the conditions and factors in which living organisms exist (Mohamed Ismail Omar, 2009). The environment is also defined in Libyan law for the protection and improvement of the environment, Law No. (15) of 2003, as "the surrounding environment in which humans and all living organisms exist, including air, water, soil, and food, whether in places of residence, work, or other activity locations" (Libyan Law No. 15 on the Protection and Improvement of the Environment, 2003).

2 - Components of the Environment:

2.1 Living components include the following:

- Plants: Including all trees, shrubs, and grasses, which are considered the main source of oxygen and food.
- Animals: Including all types of animals, from mammals and birds to reptiles, amphibians, and insects.
- Bacteria and fungi: Which play a fundamental role in decomposing organic materials and recycling nutrients (Shukri Al-Hassan, 2019).

2.2 Non-living components include the following:

- Water: Including oceans, lakes, rivers, and groundwater, representing about 71% of the Earth's surface, of which 2.5% is freshwater, and the rest represents oceans and seas.
- Soil: The surface that contains minerals and organic materials, considered the foundation for plant growth.
- Air: Composed of a mixture of gases necessary for respiration and photosynthesis.
- Light: Comes from the sun and is considered the main source of energy for living organisms (Mohamed Al-Audat, 2000).

2.3 Other environmental components include the following:

- Climate: Directly affects ecosystems through...

Temperature, humidity, winds, and rainfall.

• Geology: Includes rocks and topography that affect the distribution of living organisms.

Human factors: Include human activities such as agriculture, industry, and urban expansion, which have an impact on the environment. (Ali Al-Shawawra, 2012).

3 – Environmental Pollution:

Pollution and its effects on the environment in which living beings, including humans, exist is a significant concern. As the active element in this environment, humans must maintain the integrity of their surroundings to ensure their stable existence. This means that humans must protect the environment, including air, water, soil, and living organisms. This effort is aimed at preserving their environment from pollution, which is defined by Libyan Law No. 15 of 2003 concerning the protection and improvement of the environment as "any condition or circumstance that exposes human health or environmental safety to danger due to air pollution, sea water, water sources, soil, or the imbalance of living organisms, including noise, vibrations, unpleasant odour's, and any other pollutants resulting from the activities and actions of natural or legal persons" (Libyan Law No. 15 on the Protection and Improvement of the Environment, 2003).

4 - Pollutants and Their Impact on Human Mental Health, which can be divided into:

4.1 Natural Pollutants, including:

1.4.1 Earthquakes and Volcanoes:

Earthquakes and volcanoes are natural phenomena that can have severe effects on the mental health of individuals and communities. Exposure to a seismic or volcanic event can lead to psychological trauma, resulting in disorders such as post-traumatic stress disorder, anxiety, and depression. Natural disasters can cause feelings of despair and loss of identity, and individuals face drastic changes in their lifestyles after disasters, such as displacement and relocation due to loss of property, which affects their psychological stability and the structure of society as a whole. This leads to the disintegration of social bonds and an increased sense of isolation. Earthquakes and volcanoes pose significant challenges to mental health, and public authorities must take effective steps to enhance psychological and social support for affected individuals following disasters (Ibrahim Al-Ahidab, 1998).

4.1.2 Climate Change:

Nature plays a fundamental role in our lives, especially concerning human mental health. Francisco has provided substantial evidence through a series of studies showing that distancing from nature leads to psychological and physical problems, and any change in climate will affect us. From this perspective, psychologists have reached numerous conclusions indicating that psychological changes resulting from rising temperatures have led to increased violence, irritability, and aggressive behaviour (Fathi Ben Hamida, 2024). A report from the American Psychological Association stated that climate change affects human mental health, including increased depression, anxiety, stress, post-traumatic stress disorder, and feelings of weakness and fatigue. There is a noticeable increase in unconscious actions among many individuals, primarily attributed to climate changes and fluctuations. Human behaviour is responsible for the changes occurring in the climate and environmental pollution; human behavior is an integral part of the factors that have caused global climate change, being the primary reason for most crises facing our environment. Weather changes significantly impact our mental state, and thus many associate good weather with increased productivity at work (Faisal Al-Anari, Mansour Al-Ajmi, 2022). John Cresswell noted in his studies that "increasing individuals' awareness of climate change and enhancing their interest in protecting and preserving the environment from pollutants means that we can conserve energy through various behaviors. Everything that community members do to contribute to combating climate deterioration has a significant positive impact, as cooperation among individuals enhances physical and mental health and well-being. It also indicates their awareness of the importance of human concepts that contribute to psychological stability, which in turn reflects on climate stability. Therefore, we must recognize how individual changes can affect the surrounding environment because protecting the environment from pollutants is an effort that starts from the bottom up" (Amani Abdul Salam, Hanaa Mahmoud, 2023). Research shows that children living in areas with high levels of air pollution may be more susceptible to psychological disorders. Their future life stages, studies have found a link between continuous exposure to air pollution and its impact on brain development and psychological growth, which can lead to an increased risk of depression and anxiety. This highlights the importance of improving air quality and protecting the environment to ensure the mental and physical health of children, especially in large cities. Air pollution

is indeed a major concern, as studies have shown that children living in areas with high air pollution in London are more likely to suffer from depression by the age of 18 compared to their peers in cleaner air areas. These findings emphasize the importance of taking action to improve air quality to protect public health, especially the health of children. Research conducted by scholars in the United States and Denmark indicates a clear link between air pollution and an increased risk of psychological issues such as bipolar disorder, schizophrenia, and personality disorders. According to statistics, about 1-2% of the population in the United Kingdom experiences bipolar disorder at some point in their lives, while the same percentage applies to schizophrenia. Furthermore, estimates show that around 5% of people in the UK face personality disorders at some stage in their lives. These connections highlight the importance of addressing the issue of air pollution due to its serious health and psychological consequences. (Arabi Post, 2019).

4.1.3 Global Warming:

Global warming, which refers to the gradual increase in Earth's temperatures due to greenhouse gas emissions, has profound effects on mental health. Concerns related to climate change, such as natural disasters and environmental threats, lead to increased levels of anxiety and depression, as well as heightened severity of climate phenomena such as floods and droughts. This can result in the loss of homes and agricultural land, leading to psychological trauma and loss of identity. Consequently, many individuals are forced to leave their areas due to deteriorating climatic conditions, resulting in feelings of loss and isolation. Global warming also affects natural resources, such as water and food, which may exacerbate psychological and social pressures on individuals and communities. Therefore, global warming requires special attention from society to improve the mental health of affected individuals. It is important to promote awareness and psychological support to address the challenges arising from climate change (Saeed Al-Najjar, 2018). One of the main causes of increased global warming is the rise in greenhouse gas emissions, such as carbon dioxide, sulfur dioxide, and nitrogen oxides. A study published in the journal Investigative Medicine revealed a link between long-term exposure to vehicle exhaust and age-related macular degeneration (ARMD), which is one of the leading causes of vision problems in the elderly. The researchers used health insurance data from 2000 to 2010, which included about 40,000 people aged 50 in Taiwan, along with air quality data from 1998 to 2010 related to the locations of the medical centres visited by these individuals. The team found that patients who visited medical centres due to high levels of nitrogen dioxide (in the first quarter of the study) were twice as likely to be at risk of developing age-related macular degeneration compared to those who visited the centres in the last quarter. A similar link was found for carbon monoxide pollution. However, the researchers noted that many other factors, such as family history of disease, were not taken into account, which could affect the accuracy of the results. Additionally, it is likely that individuals with lower chances of respiratory infections in less polluted areas may have also influenced the results, necessitating further studies to confirm and better understand these links (Amer Nasr, 2010). Professor Andrei Rezitsky from the University of Chicago confirmed in their article in the journal PLOS Biology that they took a general approach to examine the links between air pollution and various diseases. The study was based on insurance data concerning 1.5 billion people during the period (2013-2016), where they analyzed rates of mental disorders in U.S. counties in parallel with average air pollution levels. They found that the rate of bipolar

disorder was 27% higher in the poorest 14% of counties in terms of air quality compared to the richest 14% of states. They also observed a link between depression and air pollution. The team then moved on to study air pollution data in Denmark, where data was collected within a one-kilometer square range. They studied exposure to air pollution during the first ten years of life for 1.4 million people born and living in Denmark between 1979 and 2002, using estimates based on their home addresses. The analyses included 14 types of pollutants, compared to 87 types in the American part of the study, to measure total exposure to air pollution during those years. The team examined diagnoses of bipolar disorder, schizophrenia, personality disorders, and depression until the end of 2016. After considering factors such as age, gender, and socioeconomic status, they found that the rate of the four mental disorders was higher among individuals exposed to greater levels of air pollution during their childhood. When participants were divided into seven equal groups based on the levels of pollution they were exposed to by the age of ten, the researchers found that the rates of bipolar disorder, schizophrenia, depression, and personality disorder were higher in the last 14% of individuals exposed to the highest levels of pollution. These are higher rates than those found in the first 14% of participants who were exposed to the lowest levels of pollution. Therefore, if the link between mental health disorders and air pollution levels is confirmed, it could open new avenues for prevention and treatment. Rzhetsky emphasised that "the environment can be changed, unlike genetic predisposition" (Andrei Rzhetsky, 2021).

4.1.4. Floods:

Storms and floods resulting from natural phenomena cause numerous damages to the education, health, and environmental systems, as well as to roads and other infrastructure. The storm (Daniel) in the city of Derna in 2023 exacerbated the difficulty of accessing service facilities due to heavy rains. It not only prevented access to services but also led to flash floods that resulted in the deaths of thousands of people and significant property losses. Entire neighbourhoods, along with their residents, were destroyed and disappeared in the city of Derna after being swept away by water following the collapse of two dams, leading to a real disaster. This made the situation catastrophic and beyond control. According to the World Health Organisation, the number of victims reached (4006 people) and (8545 people) were reported missing, not including material losses (UNICEF, 2023).

4.1.5 Pests and Diseases:

In 1785, an unknown epidemic struck the city of Tripoli, resulting in the death of a quarter of its population of 14,000. Corpses were left lying in the streets, and the epidemic did not subside until the summer of 1786, during which most of the population emigrated. Libya faced several outbreaks of the plague in the years 1858, 1913, and 1922, with one of the main causes of its spread being the pilgrims and Ethiopian soldiers used by Italy after its invasion of the country. Ignorance of the causes of the disease, its transmission, and treatment also contributed to its spread. Additionally, smallpox was one of the most dangerous diseases that struck Libya and the world. Malaria spread in the country with the onset of the Italian invasion, affecting men, children, and women, with the infection rate in the city of Tawergha reaching 62% of the population. In 1932, trachoma affected more than 70% of children in Libya and was a major cause of blindness, alongside other diseases such as schist osmosis and Malta fever. In recent years, the COVID-19 pandemic hit the country, leading to changes in daily life patterns, forcing the state to take measures to prevent movement and gatherings to limit the spread

of the epidemic. These events highlight the health challenges Libya has faced throughout its history and their impact on the population (Ali Al-Hawat, 2023).

4.1.6 Crises and Disasters:

Individuals who have experienced negative events (unemployment, loss of a loved one, or traumatic events such as disasters) are more susceptible to mental health issues such as depression and anxiety. Stress and depression can, in turn, lead to further stress, impaired performance, and deterioration of the individual's living conditions, exacerbating the illness itself (World Health Organization, 2016). For example, Libyan families have faced intertwined shocks over the past decade that have severely affected their well-being. These shocks include prolonged conflict that caused the displacement of more than 135,000 people, a severe food and commodity crisis due to a decrease in import volumes, and a decline in currency value in 2021, and finally, the COVID-19 pandemic, which led to a sharp slowdown in economic activity and limited recovery (Hind Eryam, et al., 2023).

In light of the limited accurate data on poverty and vulnerability levels in Libya, estimates indicate that 2% of the population, approximately 135,000 people in 2021, suffer from multidimensional poverty, and 11.4% are classified as at risk of multidimensional poverty, around 765,000 people in 2021. On the other hand, the decline in food security levels in recent years has been significant, driven by disruptions in food supplies and rising prices of essential food items due to the global pandemic and the Russian invasion of Ukraine. The prices of essential goods, including housing, food, and water, have contributed to rising inflation levels since 2021, affecting families in terms of social and health care (World Bank Statistics, 2022). Natural resources also have implications for mental health, as senior officials in the UK's National Health Service have warned that skyrocketing energy and food bills will lead to a "major mental health crisis," which will increase pressure on health service facilities and threaten "people's lives." With the sharp rise in British households' bills, Saffron Corduroy, the interim chief executive of NHS Providers, which represents all NHS hospitals and ambulance services in England, pointed to a direct relationship between feelings of deprivation and increased demand for healthcare (INDEPENDENT, 2023).

4.2 Industrial Pollutants:

4.2.1 Electromagnetic (Radiation) Pollutants:

Electromagnetic pollutants are radiations emitted by electrical and electronic devices, such as mobile phones, computers, and Wi-Fi devices. These pollutants include electromagnetic fields that range from low to high frequencies. Some studies indicate that continuous exposure to electromagnetic fields may increase levels of anxiety and stress, as individuals who use electronic devices intensively may…

They feel an increase in feelings of anxiety, and there is evidence suggesting that exposure to electromagnetic radiation may be associated with an increased risk of depression. Some research also indicates that this radiation may affect serotonin levels, which is an important neurotransmitter for mental health. In fact, many people complain of headaches and fatigue when exposed to electromagnetic fields for long periods. These symptoms may affect mood and increase feelings of frustration (Omar Azab, 2018).

4.2.2 Visual Pollution:

Visual pollution is a term that refers to the impact of colours, shapes, and lights on human visual perception. The term is used to describe various effects on vision and visual

perception, which can include colours, shapes, and different patterns that affect how things are seen and understood (Saada Ali, 2021). This concept includes how the eye and brain interact with different scenes and how this can affect emotions and behaviour. Colours significantly influence psychological states; for example, warm colors like red and orange can evoke feelings of excitement and energy, while cool colors like blue and green enhance feelings of calmness and relaxation. In contrast, dark colours can lead to depression, stress, and psychological disturbances (Mohamed Abdel-Sami, 2011).

Geometric shapes, architectural designs, and public spaces also have effects on individuals' behaviour and mental health. Open and bright spaces encourage social interaction, while closed spaces may enhance feelings of introversion. Additionally, the intensity and distribution of lighting can affect mood and productivity; bright lighting promotes activity, while dim lighting contributes to relaxation. Continuous exposure to negative visual stimuli, such as clutter or discordant colours, can affect concentration and productivity, potentially leading to health issues like stress and anxiety. It can be said that visual pollution has profound effects on humans, ranging from emotions and behaviour to mental health (Majd Mareesh, 2021).

4.2.3 Chemical Pollution:

Chemical pollution refers to the presence of harmful chemicals in the environment and is considered one of the serious environmental issues affecting human health in general. This pollution can result from industrial activities, agriculture, and the use of chemicals in daily life. Consequently, exposure to chemicals can lead to physical health problems such as respiratory and skin diseases. Research indicates that continuous exposure to chemical pollutants is associated with increased levels of anxiety and depression. For example, a study published in "Environmental Health Perspectives" showed that exposure to heavy metals is linked to increased symptoms of depression. Pollution can also affect sleep quality, increasing stress levels. Furthermore, negative environmental impacts contribute to a general sense of anxiety and insecurity, affecting mental health. Therefore, it can be said that the longer the exposure to pollutants, the greater the health risks. Additionally, the type of chemical can sometimes have a more significant impact on mental health than others, along with individual responses to pollutants based on genetic and environmental factors. Chemical pollution is an important health issue that requires greater attention at present (Environmental Health Perspectives, 2018).

4.2.4 Noise Pollution:

Noise is considered one of the most common environmental stressors, especially in cities experiencing heavy traffic and industrial activity, which activates the nervous system. Noise can lead to discomfort and stress, resulting in negative feelings in the body, and these experiences can lead to physiological psychological responses to stress, which are associated with depression (Abdul Qadir Mahfouz, 2021). Some studies indicate that objectively measured noise levels are correlated with symptoms of depression. In some samples, there is a correlation between sensitivity to depression and noise. Additionally, sleep disturbances are often caused by noise (Hassan Shehata, 2000).

4.2.5 Waste Pollution:

Waste pollution is the environmental contamination resulting from the accumulation of solid and liquid waste, including household and industrial waste. This pollution can lead to the degradation of environmental quality and negatively affect public health. Exposure to waste-polluted environments can lead to feelings of anxiety and depression, as people

living near landfills or in highly polluted areas may worry about their health and the health of their families (Khalifa Arabiya, 2010). The presence of waste in the surroundings can increase...

From levels of stress, including ugly sights and unpleasant odours, which can lead to a general feeling of discomfort, waste pollution can affect the overall quality of life, leading to a decrease in personal satisfaction and a sense of well-being. This impact can extend to social relationships and interaction with the community; thus, waste pollution has multiple negative effects on mental health.

4.2.6. Food Pollution:

In recent years, new terms related to pollution issues have emerged, including food pollution, which refers to the deterioration of food quality due to environmental pollution, and which can have negative effects on human health, including mental health (Ahmed Abdel Azim, 2012). These effects include several aspects:

1. Chemical Effects: Exposure to chemicals such as heavy metals and pesticides can negatively affect brain chemistry, potentially leading to disorders such as depression and anxiety.
2. Nutrient Deficiency: A deficiency in essential vitamins and minerals, such as Omega-3 and B vitamins, may be associated with increased levels of depression and anxiety.
3. Proper Nutrition: Research indicates that a balanced diet rich in fruits and vegetables can enhance mental health and reduce symptoms of depression.
4. Processed Foods: Foods high in sugar and unhealthy fats may exacerbate mental conditions, as studies have shown that these types of food are linked to increased anxiety and depression (General Administration of Environmental Health / Food Resources Management, 2014).

Secondly: Practical Framework of the Study:-

1 - Research Materials and Methods:

1.1 - Study Methodology:

Measuring the impact of the environment on mental health is considered one of the modern trends in scientific research and has profound effects on individuals in society. The city of Tripoli is characterised by cultural diversity, a dense population, and good infrastructure compared to other Libyan cities. The study included a range of multiple influences such as pollution, infrastructure, availability of green spaces, and social and economic pressures. The study relied on descriptive and analytical methods, which included:

• Random Sample: A sample of the residents of Tripoli was selected randomly to ensure accurate representation of the community, and data was collected through questionnaires.
• Statistical Analysis: The data was analysed to determine the relationship between environmental factors and mental health using statistical tools.

2.1 - Study Location:

Tripoli was chosen as the study and research site because it reflects a complex environmental and social reality, providing a deep understanding of how environmental conditions affect mental health. This location offers an opportunity to explore the interactions between environmental factors and mental health in an urban context facing multiple challenges. Additionally, due to its large population, it contains specialised centres and institutions that benefit research in this field. The city also attracts the attention of researchers and specialists, and it has a variety of environmental and social factors, geographical and environmental diversity, cultural and social diversity among the

population, availability of data and research resources. Given the lack of previous studies on this topic in the city, all of this reinforces the choice of this area for research and study.

3.1 - Research Methods in the Study:

1.3.1 Sample Collection:

Regarding the study community, the study targeted:

• Age Group: The age groups included the following divisions:
(Age group 30-40 - Age group 40-50 - Age group 50-60)

• Educational Level: It included various educational institutions as follows:
(Educational institutions - University education institutions - Health and social service centres).

• Employment Category: The employment categories included the following divisions:
(Employee - Private work - Student - Freelance work)

• Living Standards Category: The following categories were included:
(Low income - Medium income - Good income)

• Place of Residence Category: The following categories were included:
(Living in the city - Living in the countryside)

1.3.2 Statistical Analysis and Results:

The study included the distribution of 310 questionnaires, resulting in 300 valid questionnaires. The questionnaires for the study sample were distributed to 186 men and 114 women. Regarding the educational level of the study sample, 126 individuals had a university degree, 114 individuals had an academic level, and 60 individuals had a high school diploma. As for the age groups, the most frequent age group was between 30-40 years, accounting for 36%, followed by the age groups (20-30), (40-50), and (50-60) at rates of 24%, 22%, and 18%, respectively. The highest percentage of the study sample were government employees, accounting for 44%. Regarding the living standards of the study sample, they were as follows: 52% had medium income, 36% had good income, and 12% had low income. The questionnaire was distributed to a random sample of the residents of Tripoli, where 80% were native to the city and 20% had origins from the nearby rural areas.

Through Table (1), which illustrates the results of the study's questionnaires, it is noted that 86% of those surveyed had knowledge of the environment, as shown in Figure (1). The most common response among participants was "I know," with 86% of them being aware of environmental issues. This indicates that the majority of participants have a good environmental awareness. The least common response was "I don't know," which represented only 4% of the answers, meaning that most participants are aware of environmental matters. The response indicating weak knowledge accounted for 10% of the answers, reflecting a small group of participants with limited or weak knowledge of the environment.

The analysis indicates that the vast majority of participants have knowledge of the environment (86%), which may reflect positive outcomes in environmental education programs or community awareness. Although the percentage of those with "weak knowledge" (10%) is small, it shows that there are some individuals who need to improve their environmental knowledge. Since only 4% of participants do not know about the environment, this opens the door to expanding environmental awareness programs in certain areas or groups where environmental awareness may not be sufficient.

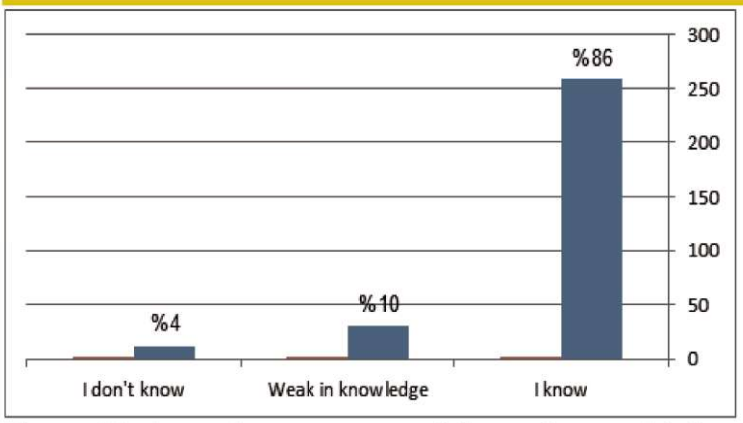

Figure (1) shows the percentage of the study sample's knowledge of the environment.

Furthermore, 92% are aware of the relationship between the environment and human health. The table also shows that 88% of the study sample have knowledge and awareness of the effects of the environment on human health, particularly regarding the impact of visual and auditory pollutants due to the lack of aesthetic views in their living areas and environmental surroundings, as illustrated in Figure (2). The analysis indicates that the majority of participants recognize the significant impact of the environment on their health. Although 10% believe that the environmental impact is acceptable, a large majority emphasises the importance of environmental effects on health. There is a 2% uncertainty among participants who do not know how the environment affects their health, indicating some gaps in environmental awareness. This necessitates targeting the group that perceives the environmental impact as "acceptable" and dedicating awareness campaigns to clarify the seriousness of environmental effects on health, as 10% of participants see only an acceptable impact. Since 2% of participants are unaware of the environmental impact on health, this group can be targeted with direct awareness materials.

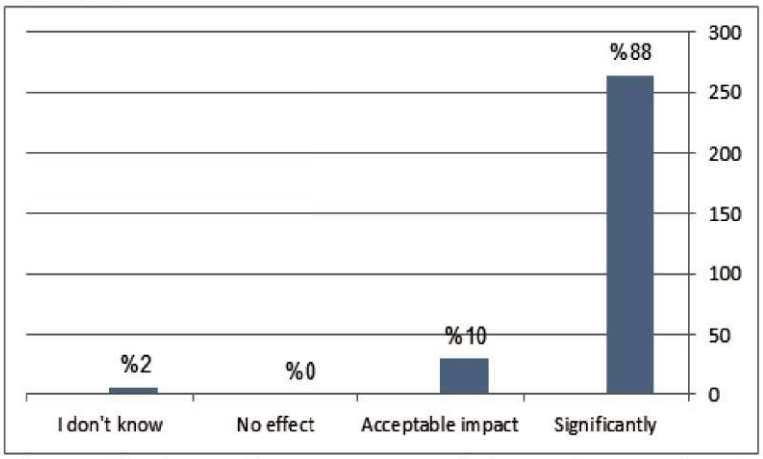

Figure (2) shows the percentage of the study sample's knowledge of the impact of the environment on human health.

Additionally, 54% of the study sample live in areas that do not have sufficient green spaces, parks, and public gardens, which are considered essential elements of the environment that contribute to improving mental health and the overall mood of residents. Furthermore, looking at noise levels and air quality in the study area, which reached 44% high levels, this has affected the mental health of the study sample. The

table also shows that 76% of the study sample answered "yes" regarding the impact of environmental pollutants on mental health and overall mood. This indicates that the majority of participants recognise the relationship between pollution and mental health. It is known that the environmental surroundings in which a person lives can help improve overall mood and reduce the severity of depression. Many recent studies and research have indicated that the environment plays an important role in treating such conditions, as highlighted and confirmed by Professor Andrei Rezitsky from the University of Chicago in their article in the journal PLOS Biology. The response "I don't know" was the least common, with no participants indicating that they believe they do not know the impact of pollution on their mental health. This response largely accounted for 14% of participants, reflecting a lower estimate than the "yes" response, but it still indicates a noticeable impact. Meanwhile, 10% of participants believe that pollution does not affect their mental health. The analysis indicates that the vast majority of participants (76%) acknowledge that pollution has a significant impact on their mental health, highlighting the increasing awareness of the psychological effects of pollution. A small percentage of participants believe that pollution does not affect their mental health, representing about 10%, which may result from a lack of awareness or disregard.

The psychological effects of pollution, where 0% of the participants indicated that they do not know the impact of pollution on their mental health, reflecting a general awareness among the participants on this subject. The following figure (3) illustrates the percentage of the extent to which environmental pollution affects changes in human mental health for the study sample.

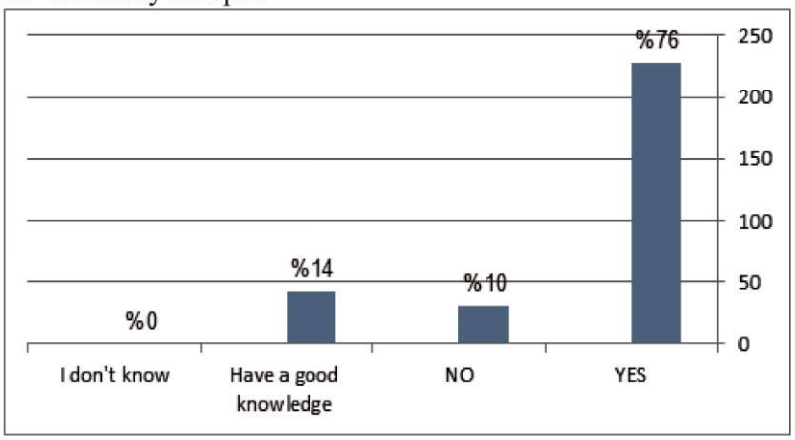

Figure (3) shows the percentage of the extent to which pollution affects changes in human mental health for the study sample.

Regarding the question of how serious the government is in taking measures and actions to reduce pollution, about 32% of the study sample believes that the government is not serious in this regard. Additionally, another 32% believe that the government is somewhat fulfilling its duties in terms of measures and actions to reduce environmental pollutants by amending some laws, regulations, and legislation, activating the role of the environmental police, and supporting the environmental sanitation management in municipalities, which are considered deterrent efforts to reduce pollution and work on protecting and improving the environment.

The government has also launched projects for revitalization, represented in the construction of roads, maintenance of infrastructure, and attention to public parks and recreational areas, which has become evident in some municipalities, especially in the

capital, Tripoli. This contributes to improving the mental health of citizens and reducing disturbances and crises related to living in an unsuitable and clean environment.

Through analysis, it can be observed that there are widespread doubts about government efforts to reduce environmental pollution, with 64% of participants believing that the government is either not serious (32%) or somewhat serious (32%). Only 24% of participants believe that the government is fully serious about reducing pollution, reflecting a lack of trust in current government actions. Additionally, 12% of participants are uncertain about whether the government is serious in this area, indicating a need for clarification of government efforts to reduce environmental pollution. Given that a large percentage of participants (64%) have doubts about the government's seriousness in addressing pollution, the government should enhance its transparency in implementing environmental policies and announce future plans and progress made. The government should also increase awareness campaigns that clearly explain the measures and policies it follows to combat environmental pollution. Since 12% of participants do not know if the government is serious in this regard, it is important to conduct opinion polls and analyze the environmental needs of citizens to ensure that government policies meet public expectations. Figure (4) illustrates the percentage of how serious the government is in reducing environmental pollution.

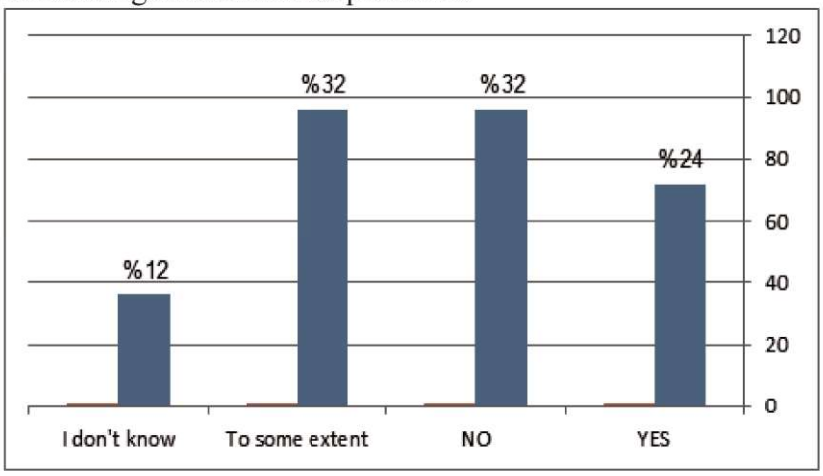

Figure (4) shows the percentage of how serious the government is in reducing environmental pollution.

The results from the survey indicate that 58% of the study sample is willing to participate in awareness campaigns to reduce pollution. This result aligns with other questions such as "Do you believe that citizens have an important role in reducing environmental pollution?" where the majority answered yes at a rate of 68%. Also, regarding the question "Are you willing to change your habits to reduce environmental pollution?" the answer was yes at a rate of 76%. In summary, the discussion leads us to conclude that citizens are willing to engage in tree-planting campaigns and cleanliness campaigns, especially those led and endorsed by trusted and well-known entities, whether public bodies, institutions, or civil society organizations.

Data from Table (1) indicates that some participants in the study sample believe they have not suffered from diseases due to environmental pollution, with 42% of the study sample possibly attributing this result to their lack of awareness of the causes of their illnesses, even though they may be a result of environmental pollution. Meanwhile, 36% of participants believe that environmental pollution has affected their health or the health

of those around them, indicating that a significant percentage of people acknowledge the direct impact of pollution on their health. Additionally, 12% of participants indicated that they were partially affected by pollution, suggesting that the impact may be less obvious or less severe. Furthermore, 10% of participants do not know whether environmental pollution has affected them, reflecting a lack of awareness or information available to them regarding the effects of environmental pollution on health.

Some studies and research have indicated that most diseases, if not the majority, may result from environmental pollutants, which are the environment in which humans live. One such scientific study titled "The Impact of Pollution on Public Health," published in the Journal of Environmental Health in 2017, confirmed that environmental pollution, especially air pollution, is closely linked to many health problems such as respiratory diseases, heart diseases, and even cancer. The study showed that individuals living in highly polluted areas are more likely to suffer from chronic diseases compared to those living in cleaner environments. This study supports the survey results, as 36% of participants believe that environmental pollution has affected them or their health environment. The relationship between disease incidence and environmental pollution can also be inferred from a scientific study titled "The Impact of Environmental Pollution on Children," published in 2015 in the journal Environmental Health Perspectives, which confirmed that children living in polluted environments suffer from more health problems such as asthma and allergies. Children are more susceptible to the negative effects of environmental pollution due to the development of their respiratory and physical systems. This can explain the 36% of participants in the survey،those who reported suffering from illnesses due to environmental pollution indicated that there is a noticeable impact on people's physical and mental health, which reinforces the findings of this study that focuses on children, and thus this can be generalized to other segments of society.

Considering the studies that have linked environmental pollution to psychological effects such as anxiety and depression, part of the health impact mentioned in the survey may be related to mental health. While only 36% of participants reported being affected, this percentage may actually be higher if unrecognized psychological effects were included in the study. The disparity among participants who are unsure if they have been affected by environmental pollution (10%) indicates a lack of awareness regarding environmental impact. Figure (6) illustrates the percentage of individuals suffering from illnesses due to environmental pollution in the study sample.

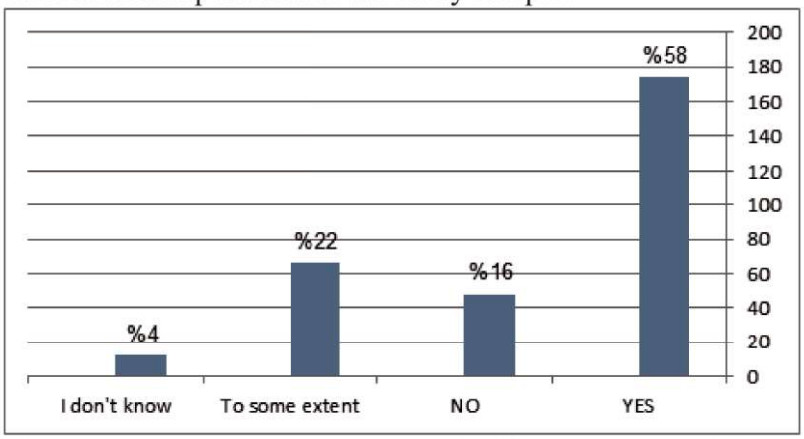

Figure (5) shows the percentage of willingness to participate in voluntary campaigns to reduce environmental pollution among the study sample.

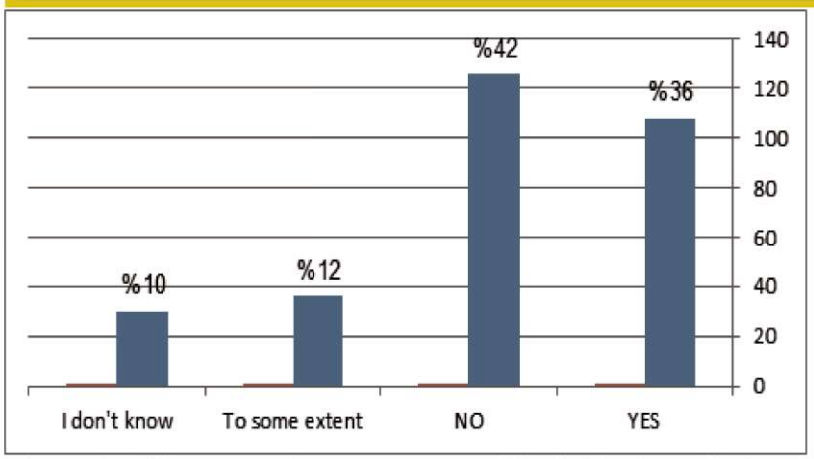

Figure (6) illustrates the percentage of individuals suffering from diseases as a result of environmental pollution in the study sample.

It is evident from Figure (7) that 36% of the study sample believe that local media do not play an effective role in raising awareness about the dangers of environmental pollution, while about 30% of the study sample think that the media do play an effective role in awareness. Approximately 24% of those surveyed responded that local media do their job to some extent. The results may indicate a weakness and inadequacy in the role of media in raising awareness about the dangers of environmental pollution. However, the closeness of the results may suggest differences among the survey participants in sourcing their information and following local media, considering the presence of many such media from which they receive their information. These results are attributed to the fact that about 46% of the study sample seek their environmental knowledge from internet sources, while 36% obtain it from international sources, with local media accounting for the lowest percentage at around 18%.

Considering that 36% of participants reported that the media do not fulfill their complete role in raising awareness about the dangers of environmental pollution (answering "no"), it is important to note that this aligns with the large percentage of individuals who feel that environmental awareness may not be sufficient. Additionally, 50% of participants reported that they would report pollution if it occurs, indicating the interest of individuals in communities suffering from environmental pollution. However, at the same time, we find that 16% of participants do not contribute to reporting pollution, which may be due to a lack of awareness or absence of incentives to report. The results showed that 46% of participants gain environmental awareness from the internet, while 36% obtain awareness from international sources. These percentages indicate that most participants rely on the internet for environmental information. It is also important to note that only 18% rely on local media as a primary source of environmental awareness, highlighting the weak role that local or national media play in disseminating environmental awareness compared to international sources or the internet. Figure (7) illustrates the percentage of how local or national media fulfill their role in raising awareness about the dangers of environmental pollution in the study sample.

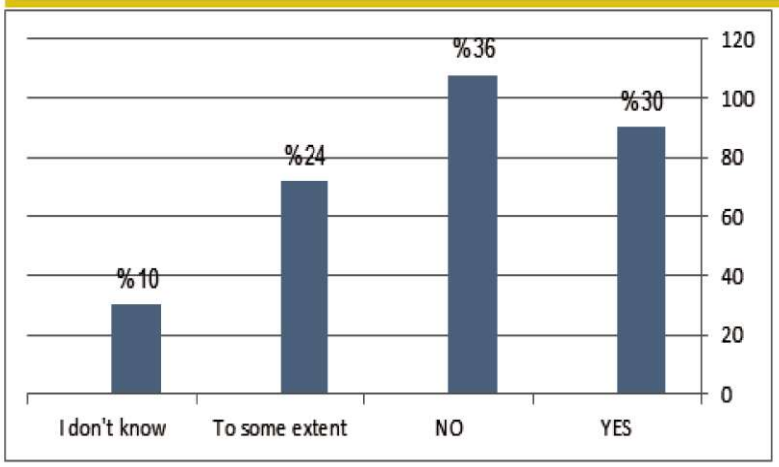

Figure (7) shows the percentage of how local or national media fulfill their role in raising awareness about the dangers of environmental pollution in the study sample.

Table (1) shows the breakdown of the questionnaires from the study sample.

Answers								Questions	NO
12	I don't know		30	Poor knowledge		258	I know	How well do you know about the environment?	1
6	I don't know		18	Poor knowledge		276	I know	How well do you know about the environment and its relation to human health?	2
6	I don't know	0	No impact	30	Acceptable impact	264	Significantly	How much does the environment affect human health?	3
12	Very many	30	Many	96	Moderate	162	Few	How much green space and public parks are available in your living area?	4
0	I don't know	42	Low	126	Moderate	132	High	How much air and noise pollution is there in your residential area?	5
30	Well available	36	Moderately available	84	Available a little	150	Not available	Are there suitable recreational and cultural facilities in your area	6
0	I don't know	42	To a large extent	30	No	228	Yes	Does pollution have a significant effect on your mental health?	7
36	High	126	Moderate	66	Low	72	Very low	To what extent do you feel safe and secure in your surrounding environment?	8
24	I don't know	96	Positively	84	No significant effect	96	Negatively	How does your environment affect your energy, vitality, and activity levels?	9
36	I don't know	96	To some extent	96	No	72	Yes	Do you think the government is serious about reducing environmental pollution?	10
18	I don't know	30	To some extent	48	No	204	Yes	In your opinion, do you think citizens have an important role in reducing environmental pollution?	11
12	I don't know	30	To some extent	30	No	228	Yes	Are you willing to change your habits to reduce environmental pollution?	12
12	I don't know	66	To some extent	48	No	174	Yes	Are you willing to participate in volunteer campaigns to reduce environmental pollution?	13
0	I don't know	54	To some extent	48	No	198	Yes	Do you feel a great concern about environmental pollution in your area?	14
36	Radioactive and noise	30	Soil	48	Water	186	Air	In your opinion, what is the most severe type of pollution in your area?	15
30	I don't know	36	To some extent	126	No	108	Yes	Have you or any of your family members or people in your area suffered from diseases due to environmental pollution?	16
30	I don't know	72	To some extent	108	No	90	Yes	Do local or national media play their role in raising awareness about the dangers of environmental pollution?	17
18	Not interested	84	To some extent	48	No	150	Yes	Do you help report pollution cases if they occur?	18
0	Not interested	138	Internet	54	Local	108	International	Where do you gain your environmental awareness from, and what media do you acquire it from?	19

2- Recommendations

1. Increase awareness campaigns to clarify the seriousness of the impact of environmental pollutants on public health, especially mental health, through scientific seminars and television discussion panels on government media channels, as well as within school educational activities.
2. The government should work on enhancing its transparency in implementing environmental policies and announcing future plans and progress made. Additionally, the government should involve citizens in policy implementation through opinion polls and analysing the environmental needs of citizens to ensure that government policies meet public expectations.
3. Support municipalities in creating parks, green spaces, and public gardens to enhance mental health through recreation and improving the general mood, thereby reducing mental illnesses associated with the surrounding environment and maintaining it through supporting cleanliness efforts represented by public service companies and other relevant entities concerned with protecting and improving the environment.
4. Update laws and regulations related to improving and protecting the environment to include strict standards for protecting water, air, soil, and public spaces from pollution. Establish laws prohibiting polluting activities such as dumping municipal and industrial waste in residential areas, and tighten penalties on companies that violate environmental standards. Amend urban planning laws to include sustainability concepts, provide green spaces, reduce congestion, and focus on infrastructure.

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