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Awareness of health and environmental effects of plastic bags in bakeries in Al-Laity district, Benghazi

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كلية الصحة العامة/ جامعة بنغازي/ ليبيا

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الملخّص

تهدف الدراسة الى تقييم وعي العامة بالمخاطر الصحية والبيئية المرتبطة بالأكياس البلاستيكية والبدائل المتاحة، تم إجراء هذا المسح المقطعي المستند إلى الاستبيان في مخابز مدينة بنغازي بمنطقة الليثي بالتحديد على مدى فترة دراسة من تاريخ 2023/3/6 إلى 2023/3/22 . وشملت رواد مخابز الليثي بشكل دائم الذين كانوا مقيمين في مجتمع الدراسة. وتم تحليل البيانات باستخدام برنامج SPSS ؛ وتم تحديد العلاقة بين الخصائص الاجتماعية الديموغرافية للمستجيبين والوعي بالآثار الضارة للأكياس البلاستيكية باستخدام اختبار مربع كاي.

النتائج: كان هناك 200 مستجيب تتراوح أعمارهم بين 20 سنة فأكثر. 56.5% (200/113) معظم المبحوثين من مستوى التعليمي جامعي فما فوق.41.0% (200/82) كانوا موظفين بالدولة ومعظم المستجيبين 91.5% (200/183) يشترون الخبز في الأكياس البلاستيكية يوميا. والنسبة الأكبر من المستجيبين 66.5% (200/133) يرمون أكياس البلاستيكية بعد استخدام واحد ، و30.5% (200/61) يحتفظون به ويعيدون استخدامه ، بينما 3.0% (200/6) يقومون بحرقه.

الاستنتاجات: كان معظم المستجيبين على دراية بالمخاطر الصحية والبيئية للأكياس البلاستيكية والبدائل المتاحة، وسيساعد الترويج لإعادة استخدام الأكياس البلاستيكية واستخدام البدائل المتاحة في السيطرة على هذا الخطر المتزايد.

الكلمات المفتاحية:
أكياس البلاستيك، مخاطر الصحية، مخاطر البيئية، الوعي.

Abstract

This study assessed public awareness of health and environmental risks associated with plastic bags and available alternatives. A questionnaire-based CT survey was conducted in Benghazi bakeries in the Al-Lathy area specifically over a study period from 6/3/2023 to 22/3/2023. The survey included the pioneers of Al-Laity Bakeries who were permanent residents of the study population. The data were analyzed using SPSS software. The relationship between the sociodemographic characteristics of respondents and awareness of the harmful effects of plastic bags was determined using the Chi-square test. The study involved 200 respondents aged 20 years and over, as proven by the results. Most of the respondents (56.5%; 113/200) had a university education level and above. Additionally, 41.0% (82/200) of the respondents were state employees. Furthermore, a majority of the respondents (91.5%; 183/200) reported purchasing bread in plastic bags on a daily basis. The largest percentage of respondents (66.5%; 133/200) reported throwing away plastic bags after a single use. In contrast, 30.5% (61/200) indicated that they would keep and reuse the bags, while a small percentage of 3.0% (6/200) reported burning them. It is noteworthy that most respondents demonstrated awareness of health and environmental risks associated with plastic bags and the availability of alternatives. Promoting the reuse of plastic bags and the utilization of available alternatives can help mitigate the increased risk posed by plastic bag usage.

Keywords
plastic bags, health risks, environmental risks, awareness.

1. Introduction

1.1 Plastic:

Since 1950s , industrial plastic output has increased rapidly, reaching 368 million tonnes annually by 2019. Plastic has grown to be one of the most popular materials due to its low cost, especially in the packaging sector. It is now a significant component of municipal waste (Bergmann et al., 2022)

1.2 Definition Polymers used in plastic:

High molecular mass organic polymers constitute the majority of plastics. Natural resources such as cellulose, coal, natural gas, salt, and crude oil are used as the basic materials for making plastics. The polymer chain topologies of various plastics vary, which significantly impacts their physical properties The majority of these polymers consist of carbon atom chains, either by themselves or in combination with oxygen, sulfur, or nitrogen. (Atta El-Saikaly & Jendia, n.d.)

An organic polymer, such as polyethylene, PVC, or nylon, is used to create plastic, which is a manmade substance. They can be molded into various shapes while they are still flexible and then fixed to a stiff or elastic form. (Kaynat et al., n.d.)

and Plastic is a versatile, lightweight, sanitary material that can be molded in many different ways and used in a variety of applications. Plastics do not rust or corrode like metals do. In the class of moldable polymers, this occurs to such an extent that their real name stems from this particular capacity. Plasticity is the general property of any materials that may deform irreversibly without breaking (Elamin et al., 2021) .

1.3 Plastic bag:

Since their introduction in the 1970s, plastic bags have grown in favor among shoppers and merchants. They are widely accessible and come in a large variety. It is estimated that around 500 billion plastic bags are used globally each year. This dawdpsediw use is a result of its low cost and ease of use (Almaqtari & Activities, 2014)

Plastic bags are container form of consisting of thin, flexible plastic film that can be used to transport and store items like waste, food, chemicals, ice, periodicals, and powders. It is a widely used type of packaging. Different materials are used to make plastic bags, and each of these materials gives users unique benefits. They also come in a variety of blended hues and shap (Elamin et al., 2021)

1.4 How is a plastic bag made?

Petroleum and natural gas are the two main non-renewable resources used to manufacture plastic bags. The primary raw materials used to create plastic bags are polyethylene, namely linear low-density polyethylene [LLDPE] and high density, low density polyethylene. (6)

Table 1 Plastic bag types and application:

kind of bag	Principal traits	Uses
Bags are made of high density polyethylene (HDPE)	relatively translucent; lightweight - Water- repellent. -resistant to temperature	Garbage bags, utility bags, T-shirt bags, and laundry bags are used for packaging and storing items in households, restaurants, and grocery shops.
Bags are made of low density polyethylene (LDPE)	Less durable than HDPE bags. -able to hold large objects in bulk, such as food and meat products. Clean and simple to recognize the contents -extremely adaptable -low melting point	-bags for food. -bags of the bread -bags with a moderate degree of strength and stretch. -use while heat sealing
Low Density Poly Ethylene Lining (LLDPE)	medium level of clarity	-paper tote bags. -bags for shopping. – Trash bags. -food storage in commercial kitchen freezers and refrigerators
Polyethylene Medium Density (MDPE)	-weak level of strength low level of stretch -not recommended for storing or transporting bulk materials	-bags for garbage. - packing for paper towels or toilet paper.
Propylene plastic (PP)	- High stamina. - Resistance to chemicals. - unbreathable - Because of their prolonged shelf life, are excellent for retail settings. - Transparency and clarity. Elevated melting point. -Food handling permitted by the FDA and the USDA	- Packaging for foods including sweets, nuts, herbs, and other confections. - to seal containers using heat

Source : (Elamin et al., 2021)

1.5 Advantages of plastic bags:

1. Plastic bags are a cheap and practical way to transport and store goods.
2. They are easy to create, strong, and lightweight.
3. In addition to being moisture and corrosion resistant, polyethylene bags make excellent food packaging.
4. Additionally, recyclable are plastic bags. i.e., they can be repurposed or reused. These aids in lowering the volume of plastic garbage dumped in landfills. Plastic bags are also a sustainable option because they are created from renewable resources.

1.6 The Drawbacks of Plastic Bags:

Despite their practicality, plastic bags have a number of drawbacks. One significant drawback is their non-biodegradable nature, meaning they can take hundreds of years to decompose, they can take hundreds of years to decompose, which can result in an accumulation of plastic waste in landfills and oceans that is bad for the environment.

Additionally, petroleum-based materials, which are not renewable, are used to make plastic bags.

Thus, the manufacture of plastic bags causes greenhouse gas emissions that could be harmful to the environment.

1.7 Environmental effects of plastic bags:

Despite their fragile and light appearance, plastic bags have a devastating impact on the environment.

The usage of plastic bags can lead to significant pollution at every stage of their life cycle, starting from the extraction of basic materials to production, transportation, and ultimately recycling or disposal, is their life cycle. In addition to their unfavorable aesthetic impact on beaches, parks, and trees, plastic bags may be one of the major sources of death for wildlife, including birds and marine animals. It is shocking that marine animals accidentally consume up to 100,000 or more plastic bags as food each year, killing them In other cases, harmful chemicals from the photo-degradation of plastic bags remained and could be consumed by fish, shellfish, or other marine life.

This enables the poisons to bioaccumulate and enter our food chain Plastic bags can leave a trail of trash in the air, on the ground, and in our waterways and streets because of their lightweight construction. The impact of plastic bags on Bangladesh's storm water drainage system is one of its most significant effects. Bangladesh's monsoon season flood has been linked in large part to drainage systems that are clogged by plastic bags. Up to 80% of the city's waterlogging after the 1998 storm was attributed, according to estimates, to polyethylene clogging sewers.(Zaman Tanu, n.d.)

The soil's ability to absorb sunshine and water is reduced and the flow of nutrients is disrupted by polythene. Use polythene kills helpful microbes in the soil, reducing its fertility and negatively affecting agriculture. Public health in Bangladesh is at risk due to improper plastic bag disposal since it raises the prevalence of mosquito-borne illnesses are including dengue and malaria Because more plastic debris clogs drains and the sewage system, there is more standing water, which serves as a mosquito breeding habitat Cancer, skin conditions, and other issues are all caused by polythene. Bags that aren't properly disposed of wind up in the sewer, where they cause blockages, water logging, and ponds as a result.(Friday Nkwocha, 2020)

Contain untreated sewage as well as various other items discharged of through the sewer. These ponds produce poisonous fumes at an alarming rate because to the sunlight-induced degradation of sewage components

The management of drainage infrastructure in Bangladesh will face a long-term difficulty because plastic takes 20 to 1000 years to decompose.

Plastic bag pollution is having a serious negative impact on the environment and human health in a number of nations, especially African nations . These harms range in severity from minor to major, including destruction of the natural beauty of the environment, obstruction of drainage systems, which in certain cases causes flooding, eradication of many species of terrestrial and aquatic life, etc. A pregnant dead whale with 22kg of plastic in its stomach washed up in an Italian tourist destination in 2019. A dead whale was found in the Philippines in 2018 with 80 pounds (36 kilograms) of plastic in its stomach, according to a previous report. According to UNEP (2018), Charles Moore found the largest of the numerous gyres in the Pacific Ocean, the Great Pacific Garbage Patch. oceans around the world, where a huge amount of plastic debris has accumulated and is endangering marine life. Sea turtles frequently die after eating plastic bags that they mistook for jellyfish. Plastic bags have an adverse effect on both the terrestrial ecology and the marine environment.

1.8 Impacts of plastic materials on health and toxicity:

The monomeric components of plastics, such as Bisphenol A, their additives, such as plasticizers, or a combination of the two (such as antimicrobial polycarbonate), can pose health concerns to humans . Hazardous substances released by plastics are numerous. We concentrate on the most concerning additives and parts of plastics, like Bisphenol A and phthalates. BPA is most well-known as the monomeric component of polycarbonate polymers. It was first created in 1891 and is often used as plastics additive, particularly with polyvinyl chloride (PVC) in 2003; BPA was produced globally on an annual basis at a rate of 2.2 million metric tons. This material comes into contact with food in significant amounts. BPA molecules can gradually leak out of beverage and food containers and into beverages and foods because the polymerization of BPA leaves some monomers unbound. Repeated cleaning of the containers and storage of the polymer-degrading acidic or basic materials speed up the leaching process. BPA is therefore known to gradually leach into food over time, especially at high temperatures, and is commonly used to make baby bottles, food cans, and reusable water bottles. According to studies, food and beverages kept in such containers, especially the common transparent water bottles that hang from almost every hiker's backpack, may contain traces of the hormone-disrupting chemical bisphenol A (BPA). The primary sources of BPA exposure in humans are thought to be food and inhalation

Because it mimics the reproductive hormone "estrogen," BPA is regarded as a hormone. According to numerous studies, BPA has been linked to a range of health issues, including type 2 diabetes, cardiovascular disease, obesity, ovarian chromosomal damage, reduced sperm production, early puberty, rapid immune system alterations, and so on. Additionally, according to some research, BPA raises the risk of diseases like discomfort, metabolic abnormalities, and cancers of the breast and the prostate.(Proshad et al., 2017) Obesity, endometrial hyperplasia, recurrent miscarriages, sterility, and polycystic ovarian syndrome are all linked to BPA in women and poor health.

1.9 Identifying compounds emitted from low density polyethylene plastic bags used only once:

only one use Toluene, ethyl benzene, methyl oxirane, supraene, various types of aldehydes, and even carcinogenic dioxin-like substances like 2,3-dihydro-1,4-dioxin are found in LDPE plastic bags, which are harmful to humans. These chemicals may migrate into contact foods and enter the human body through food, resulting in a variety of deadly diseases and bodily disturbances like cancer. This can happen when these chemicals come into contact with hot food or drinks. (Htway et al., 2020)

Table 2 The Effects of Single-Use Thin Plastic Bags on the Environment

The outcome	Affected	Description
Diversity in biology	-forest animals. -domestic creatures like sheep, goats, cows, and birds	-as they graze in the fields, animals perish from ingesting plastic garbage. Plastic bags prevent soil nutrients from forming and cause suffocation deaths.
Agriculture	Agricultural lands	-blocking air from penetrating the soil and stopping crops from growing by burying the soil. - eliminating of soil organisms responsible for the farmlands' tilt. -A paper bag or other piece of garbage has the potential to catch fire if struck by a spark.
A body of water	marine plants and animals	Plastics pollute the water and block water species' access to sunlight by floating on the surface of water bodies. - Plastic bags damage marine life because animals mistake them for food as seen in figures (2.1), (2.2), and (2.3), respectively. - the eaten plastic is released back into the environment and causes issues once more. - The leftover material may harm the soil and contaminate groundwater.
Human general health	- Respiratory conditions -cancer -foodborne illness -hormone dysregulation. -nervous system diseases.	As seen in fig. 1, quitoes, which breed in still water, can spread West Nile virus and malaria (2.6). - When burned, they generate hundreds of chemicals and compounds that contaminate the air for extended periods of time, as seen in fig (2.5). -urea formaldehyde breaks down when exposed to heat from hot foods and drinks or sunlight. – the utilization of plastic storage containers in microwaves. Especially foods high in fat, as high temperatures cause the release of plastic dioxins, which mix with food and cause sickness.

	-limited mental capacity. -reduced immunity	-putting water in plastic bottles and refrigerating or freezing them
air toxicity	Animals, plants, and people	The smoke that arises from burning plastic garbage contains the gases (CO) and (CO2)
Visual blight	Human	- Alterations to the environment that harm tourism (fig 2.7). - When plastic bags obstruct gutters and drains, rainwater cannot exit the area to flow away, resulting in flooding whenever it rains.

Source: (Elamin et al., 2021)

1.10 Substitutes for plastic bags:

1-A folding, recycled shopping bag:

There are bags that are eco-friendly available. The fact that foldable shopping bags can be used repeatedly is one of their best features.

2. Cotton shopping bags are strong; compared to paper or plastic bags, a single cotton bag can support more weight.

The most popular bags to use when you go shopping are those made of cotton.

3. The Reusable plastic bags can be made from post-industrial waste or post-consumer recycled materials.

4. Non-woven of polypropylene bags are produced using polypropylene plastic.

5. Bags are made of renewable natural resources that can be composted.

They have been approved for composting environments at home or in commercial facilities.

6. Jute bags—possibly the oldest and most effective substitute for plastic bags. Hessian bags are renowned for their superior resilience and great longevity when compared to alternate solutions like bags of cotton .

7. The French Filet Bag is right on trend, making us think of baguettes and fresh veggies as we stroll around Paris.

Sling this over your shoulder before going to the store or out on the town since the stretched cotton crochet can fit almost everything you decide to put within.

These bags are very environmentally friendly because they were made with lead-free dyes. For an extra $4, you can choose to have yours made from organic cotton.

8. The Cotton bags are both recyclable and biodegradable. Additionally, the fact that they are made from sustainable and natural resources is advantageous.

Despite the fact that bags of cotton are more expensive to produce and less durable than plastic bags, cotton bags are still a fantastic alternative to plastic bags.

9. The basket bags – If you want to go old school, basket bags are also a fantastic option with an endless useful life.

They have remained popular over time since they have a rustic appearance and are an excellent alternative for some people.

10. The Paper bags are completely biodegradable, in contrast to plastic bags. Additionally, they can be recycled and reused.(Elamin et al., 2021)

Paper bags are more environmentally friendly than plastic bags and may be able to withstand more pressure or weight.

1.11 Plastic bags' future:

Plastic bags' future is questionable. In an effort to cut down on plastic waste, many nations have banned single-use plastic bags. Businesses are creating more environmentally friendly alternatives to plastic bags. For instance, biodegradable bags

As well as washable cotton bags. Plastic bags will probably still be utilized in some manner. However, it is evident that we need more environmentally friendly alternatives. With ongoing creativity and awareness. The amount of plastic waste produced by plastic bags can be decreased.

1.12 Disposal:

Since plastic bags can harm wildlife and the environment if they are not disposed of correctly, it is crucial to address this issue. Plastic bags typically deteriorate between 500 and 1000 years, according to broad consensus. The estimate of 500 to 1000 years is typically just to highlight the point that plastic bags would take a long time to decompose, even though they are very resilient. No one can be certain that our bags would actually be around in the 26th century, and even if they are, the estimate is usually just for emphasis. The fact that plastic bags do not react in respirometry testing suggests that the allegations may have some merit.

A solid sample is placed in a container with compost that has been treatntly aerated.A solid sample is placed in a container with compost that has been microbe-enriched, and the container is subsequently aerated as part of a respirometry test.Some solid samples break down rather quickly, but since a plastic bag is not considered food, it does not react to composting. Because of this, researchers have estimated that it will take a plastic bag between 500 and 1000 years to biodegrade. A different material would be preferable if it meant less time was needed to breakdown if polyethylene bags actually do take decades to break down. Plastic is recycled more than any other material, but since there is so much plastic created, it is not recycled as much as other materials in terms of % per manufactured ton. Despite the fact that the figures differ, it is generally agreed that only 5 Only 8% of plastic gets recycled, and according to some studies, up to 80% of it ends up in landfills.

The U.S. Environmental Protection Agency states that 50% of paper, 37% of metal, and 22% of all glass may be recycled. The difficult sorting and processing needed may be the cause of the low recycling rate for plastic. Additionally, plastic containers are typically "downcycled" into secondary recycled items rather than being produced into new containers of the same sort. Plastic recycling offers a number of advantages. For instance, recycling plastic helps conserve fossil fuels that are not renewable. Half of the oil used in the creation of plastic is utilized as a feedstock, while the remaining 8% is used in the manufacturing process. Recycling also lowers energy use, the volume of garbage dumped in landfills, and carbon dioxide, nitrogen oxide, and sulfur dioxide emissions. Plastic recycling offers a number of advantages. For instance, recycling plastic helps conserve fossil fuels that are not renewable. Half of the oil used in the creation of plastic is utilized as a feedstock, while the remaining 8% is used in the manufacturing process. Recycling also lowers energy use, the volume of garbage dumped in landfills, and carbon dioxide, nitrogen oxide, and sulfur dioxide emissions.

Recycling comes in many forms, including recycling used in the production of plastic. Reprocessing, as it is more frequently known, is the process of using leftover polymers from the manufacture of plastic as a new source of raw materials. Recent studies conducted in the UK estimate that around 250,000 tons of waste plastic are made up of plastic scraps, 95% of which is recycled. Because there is always a consistent supply of the garbage and the plastic is clean, reprocessing makes sense. (Camann et al., 2010)

Post-use plastic recycling is gathering plastic that has already been fully utilized and reusing it to create new plastic items. The problem of collecting is the main obstacle to post-use recycling. In a perfect world, all plastic goods would

1.13 The World Health Organization:

Has also talked about the harmful effects of plastic on health."Many studies have been conducted in the last few decades To improve the scientific understanding of toxicity and Human health effects of exposure A limited subset of NMp (nano- and Microplastic particles) Including epidemiological data on adverse effects Professional inhalation of synthetic fibers, such as nylon and plastic dust generated from polyvinyl chloride and polyurethane Foam. While adverse effects, including the accumulation of Macrophages, frustrated phagocytosis, lung depression function, interstitial lung disease and lung cancer."

WHO is today calling for further assessment of microplastics in the environment and their potential impacts on human health, following the release of an analysis of current research on microplastics in drinking water? WHO also calls for the reduction of plastic pollution in a manner that is beneficial to the environment and reduces human exposure. (Negussie, 2017)

2. Literature review

The impact of environmental awareness and consumer style of the citizen in solving the problem of waste plastic bags Case Study: Khartoum State, Sudan 2021.

This study examines the issue of plastic bag waste's harmful environmental consequences and how it relates to residents' environmental consciousness as well as the production and consumption patterns of plastic bags in the state of Khartoum. In the state of Khartoum, plastic bag waste makes up a very small portion of the total municipal solid waste, but because of its light weight, ability to be carried by the wind, and difficulty in recycling in comparison to other types of plastic waste, it has a long history of harming the environment. A thorough questionnaire was administered in the state of Khartoum to ascertain the consumer behavior of its residents, and the

theoretical foundation of issue was explored from prior references by examining the experiences of other countries. and how much they are aware of how waste plastic bags affect about the environment. To ascertain the scope of the issue, its underlying causes, and the technical and legal remedies that have previously been implemented in the state, some interviews with government representatives were also undertaken. According to the study's findings and the interpretation of the questionnaire, variables relating to production and consumption are jointly to blame for the state's growing waste plastic bag problem. A population is a large group of people who share observable traits and among whom the researcher hopes to generalize the findings of the study. In this study, seven areas in Khartoum State's peri-urban centers representing a total population of 6,014,132 people of all ages were chosen as the study's focus 74% of the state's inhabitants listed their region of origin as being outside of Khartoum, and 79% of the population lives in metropolitan areas. The majority of people are employed by government, business, and banking. Also, there are a lot of traders, immigrants, and displaced people operating in marginal fields. The majority of rural residents work in agriculture and livestock keeping the capital city of Khartoum supplied with fresh produce, dairy products, and other goods. There are also some people who live along the banks of rivers who work in industries that are reliant on the rivers, like fishing, pottery, and brickmaki. (Elamin et al., 2021)

Usage of Plastic Bags and Health Hazards: A Study to Assess Awareness Level and Perception about Legislation Among a Small Population of Mangalore City 2016.

The majority of the participants in this survey (86.4%) were aware of at least one health risk associated with plastics. This was better than the findings of studies carried out in India and other countries where 50% to 81.1% of participants were aware of related health risks . A Delhi-based survey found that, compared to our observations, only 74.5% of housewives and 81.5% of professionals were aware of the health risks connected with the use of plastics . However, the study conducted in Delhi found higher levels of awareness among students (93%) and lower socioeconomic groups (52%). Any awareness effort must prioritize student awareness. In their academic curriculum, students are required to be knowledgeable about a range of societal public health issues, including the dangers of using plastic bags. As a result, they can contribute effectively to community health education initiatives. By avoiding the added cost burden of having to train the additional staff, this would benefit both the government and non-government groups . According to reports, the main factor contributing to the adoption of ecologically unfavorable practices in developing nations is a lack of widespread public knowledge . Initiatives for raising awareness should be supported by the many methods for making information easily accessible. For instance, putting up banners to promote the use of alternate bags could be a successful and inexpensive informational tactic. At checkouts or cash registers in grocery stores and other retail establishments, pamphlets explaining the dangers of plastic bags should be posted. Information can also be widely disseminated by radio and television. This will encourage people of all ages to use paper or cloth bags or other eco-friendly alternatives . The ready availability of plastic bags and their durability were the most often cited benefits in this study. This was consistent with the results of a study conducted in Delhi, where convenience for shopping was the most often cited factor . Another study conducted in a city in Ethiopia found that the popularity of plastic bags among its users was mostly due to their low cost, simple accessibility, and light weight. 20% of participants in this survey continued to use plastic bags after the initial use. This was consistent with research conducted in California, The USA, where 18.9% of participants used reusable bags. Just 4.6% of participants in a different study conducted in Delhi brought their own plastic bags when they went shopping. The aforementioned study also noted that among those who previously purchased their own bags, more women (11.9%) than men (9.7%) utilized reusable bags, which is consistent with our findings. According to Gupta K et al., 89% of consumers acknowledged that they began copying others who were shopping with their own bags. That was similar to leading by example in terms of reducing the use of plastic bags. The majority of participants in the settings were aware of the health risks associated with the use of plastic bags and supported their abolition. Yet, the majority of the participants were found to have bad habits when it came to using alternative bags or recycling old ones. The spread of knowledge about these tactics and the successful

execution of legislation may contribute to a reduction in the community's use of plastic bags.(Joseph et al., 2016)

Assess the awareness regarding hazards of plastic bag use among adults Chitrakshi Khairnar, Shiya Rose G Shaji, Dipak Khemnar, Sandarbh Vyas, Anosh Gadkari and Dr. Sujita Devi 2019.

The study's conclusions had been addressed in regard to its goals. Among the samples, 95% were aware of the risks associated with using plastic bags, while 5% were not. With a standard deviation of 2.39 and 16.99 mean values, it appeared that most respondents had correctly answered about 17 out of 20 questions. We deduced from these results that residents who are aware of the dangers of using plastic bags—95% of the sample—are the foundation of our country. These informed folks have the power to fundamentally alter how plastic bags are used and disposed of. They can minimize the use of plastic bags and promote the use of eco-friendly conventional carry bags, like cloth bags, by being aware of the dangers brought on by excessive and unnecessary use of plastic bags and irresponsible discarding of them. The aforementioned results also demonstrated the necessity for 5% of samples that were ignorant of the risks associated with using plastic bags to be made aware of them through booklets, health talks, ads, and awareness campaigns. According to reports published by the Economic Times on June 21st, 2018 by a market research firm, "although over 85% of the participants were aware of the plastic usage restriction and the adverse impacts of plastic on environment," this study can be justified. Another Times of India article titled "Prolonged use of plastic bags a health hazard" from June 3, 2017, also states that "Experts claim plastic bags contain polymers and chemical toxins like lead, cadmium, mercury, and carcinogens and direct contact with these substances over long periods of time can lead to serious health consequences." 3 analysis of data relating to the correlation between knowledge of the risks associated with the usage of plastic bags and particular demographic factors. There was a strong correlation between persons' education levels and their understanding of the risks associated with using plastic bags. Adults' understanding of the risks associated with using plastic bags and their age, gender, and occupation were not linked.

The purpose of the current study was to gauge adult awareness of the risks associated with using plastic bags in a few key districts of Pune City. For the study, a non-experimental descriptive research methodology was adopted, and 200 participants were chosen using a non-probability sampling technique. The tool's reliability and content validity were assessed, which revealed that it was trustworthy. The viability of the investigation was proven by the pilot study, that used 20 samples.

The tool was employed for the main investigation because there were no significant faults discovered with it as well. Descriptive and inferential statistics were used to analyze the data and interpret it in light of the goals. The results demonstrate that 95% of the samples were aware of the risks associated with using plastic bags, whereas just 5% of the samples were not. The Samples were restricted to a certain region.The study cannot be generalized because of the small sample size.(Khemnar Bharati Vidyapeeth et al., 2019)

Participants were chosen using a non-probability technique, which limited the study's generalizability.

3. Aim of the study

To measure public awareness of the risks associated with the use of plastic bag.

4. Methodology

4.1 Tools and methodology utilized

The study employed a descriptive methodology to provide a comprehensive description of plastic bags, encompassing their composition, types, drawbacks, features, alternatives, and appropriate disposal methods. Described the environmental and human health effects of plastic bags and intended to raise public awareness about these influences. The data were statistically analyzed using SPSS version 25, and a quantitative method was utilized to describe and present the study of the survey data.

The Target of group: Pioneers of bakeries in the Leithi area of Benghazi**.**

The schoolhouse: Al-Lithi district Benghazi, Libya

4.2 Sources and procedures for gathering data and conducting quantitative analysis:

4.2.1 Data gathering phase:

The process of gathering was apparent data for the study involved a number of sources. The most significant sources on which we relied were:

''Direct'' Main Sources:

As one of the most crucial components of this scientific investigation by choosing the sample, this stage comprised the examination of the questionnaire data. Here is a synopsis of the example.

sample of population :

A total of 200 citizens were selected, 137 male and 63 female

Form of the questionnaire:

The questionnaire was distributed between 6/ 3/ 2023 to 22/3/2023 and it was directly distributed to citizen distributed directly to citizens

Secondary sources those are "indirect":

This featured a number of intellectual letters, papers, books, and publications.

4.2.2 The following stages of data classification, tabulation, and presentation:

Following the completion of the data collection procedure, the data was gathered from the statistical forms (the questionnaire form) and entered into a unique form known as a Master Sheet. Where a symbol was assigned to each variable.

This step includes information-unloading techniques using techniques and formats (tables, graphs, or visual representations, etc.) that simply and clearly reflect the study's topic.

4.2.3 Data analysis stage:

This step involved variables that had overlapping correlations with one another and was therefore analyzed using statistical measurements and quantitative methodologies suitable for the data, such as a chi-square.

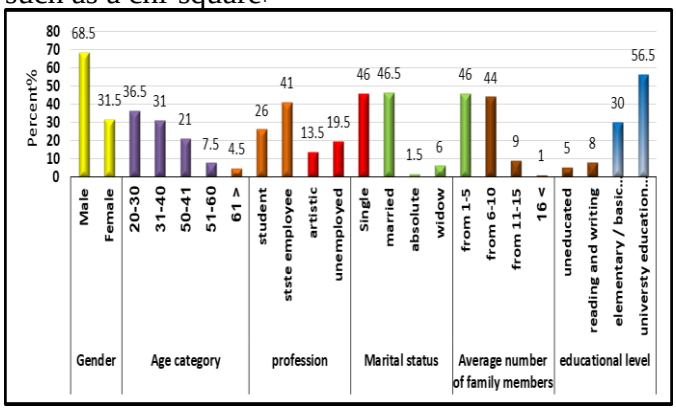


Figure 1 Demographic characteristic of study participants

5. Results and discussion

Figure 1 shows that the number of participants in the study was 200, of whom 137 (68.5%) were males, while 63 (31.5%) were females.

While another study was conducted in India on the pattern of Indians in the use of plastic bags, among the 320 respondents surveyed, 199 (62.2%) were males, while 121 (37.8%) were females. [18]

ages ranged from 20-30 the number was 73 (36.5%), 31-40 the number was 62 (31.0%), 41-50 the number was 41 (21%), and between 51-60 the number was 15 (7.5%), and 61 and over the number was 9 (4.5%).

While another study conducted in the United States of America was about measures aimed at reducing the use of plastic bags, the results of the survey conducted on 100 participants showed,

The results showed that the number of respondents whose ages ranged between 18-25 (9), between 26-35 (14), between 36-45 (14), between 46-55 (16), between 56-65 (16) , and <65 (31) . (Musa et al., 2013)

The figure shows in our study that there are 92 (46%) out of 200 single, 93 (46.5%) married, 3 (1.5%) divorced, 12 (6.0%) widowed.

While there is a study conducted in the city of Basoko and found that 35.6% of the respondents are married, followed by bachelors representing 35%. (Mosindo et al., 2022)

In illustrative form The number of respondents in our study who answered were illiterate 10 (5.0%), read and write 16 (8.0%), primary or secondary school 61 (30%), the university graduates 113 (56.5%).

While another study was found in eastern Ethiopia about the society's perception of the use and disposal of plastic bags, the results, which were attended by 302 participants, showed that the educational level of the participants was primary education 143 (47.4%), illiterate 33 (10.9%), and higher education 33 (10.9%).(Negussie, 2017)

A figure showing that the number of respondents in our study was 52 (26%) students, 82 (41%) employees, 27 (13.5%) private technicians, and 39 (19.5%) without work.

In another study in the state of Khartoum and Gedo, 21.6% of the sample are students, 18.2% are working in the government sector. 26.9% work in the private sector, 9.9% work in a private job or daily laborer, 11.7% are housewives, and 11.7% work in another job. (Elamin et al., 2021)

In a figure showing the number of family members in the participants in our study, 92 (46%) were 5-1, 88 (44%) were 6-10, 18 (9%) were 11-15, and 2 (1.0%) were 16 and above.

While there is another study in Kenya on consumer awareness and behavior towards the plastic bag family size ranged with 1-2 people

33%, 3-4 people 41%, 5-6 people 23% and more than 7 people 3. Respondents .(Omondi & Asari, 2021)

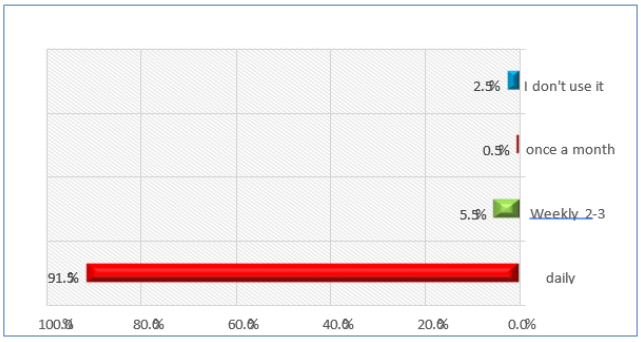


Figure 2 The number of times you buy bread and food from bakeries and restaurants in plastic bags

The figure shows the number of times bread is bought in plastic bags. In our study of 200 participants, 183 (91.5%) responded daily, 11 (5.5%) weekly, 1 (0.5%) once a month, and 5 (2.5%) did not use it.

Another study in Norway contributes a significant proportion of the total amount of food wasted in the household at around 19%. Fresh bread is usually packaged either in paper bags, plastic bags, or in a paper mix with a plastic "window" on the front, while 8.2% bought fresh bread every day, while 44.2% bought fresh bread 3-4 times a week. Among those who waste small amounts, only 0.5% buy bread every day, while 6.1% buy fresh bread 3-4 times a week. the week. 36.6% of those with little waste bought fresh bread less than once a week, while only 4.1% of those with waste bought fresh bread infrequently. (Østergaard & Hanssen, 2018)

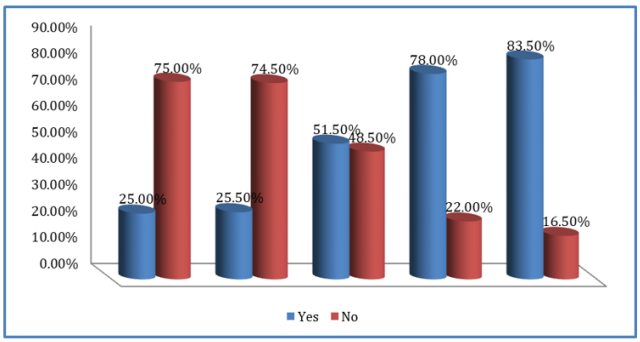


Figure shows that among the 200 participants in our study, 50 (25%) answered yes that they use plastic containers inside the microwave, and 150 (75%) answered no.

And 51 (25.5%) answered yes that they prefer to use plastic containers to feed children and infants, and 149 (74.5%) answered no.

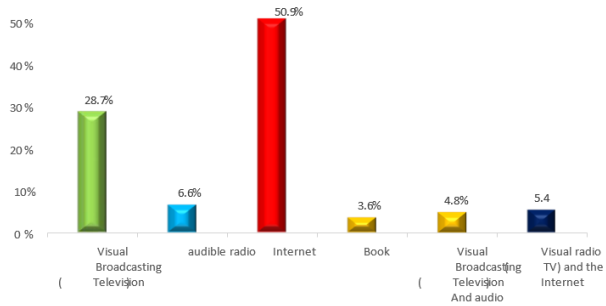
103 (51.0%) answered yes to the use of plastic bags to transport and preserve food, and 97 (48.5%) answered no.

And 155 (78%) said they had knowledge of the dangers of plastic bags, and 44 (22%) said no.

While there is a study in the capital, Sana'a, which found that residents are forced 3 times a day to buy bread and a hot loaf from about 1,370 bakeries, and this bakery consumes approximately 680,000 thousand bags per day to fill the bread, and this means that the bakery in the capital, Sana'a, consumes 244.8 million a year.(Almaqtari & Activities, 2014)

The figure illustrates a method used to find out the risks of plastic bags. Our study showed that among 200 subscribers, the largest percentage, 85 (50.9%) of them, had.

Figure 4 Cultural awareness of citizens about the



health hazards of plastic bags

heard of the dangers via the Internet, 48 (28.7%) through television, 11 (6.6%) audio broadcasting, and 6 (3.6%) books.

While the researchers collected data from 173 individuals from the Pakistani cities of Islamabad and Rawalpindi. Most of the respondents (30.63%) evaluated the important role of television and radio in communicating the negative effects of plastic bag waste. (Ahsan et al., 2020)

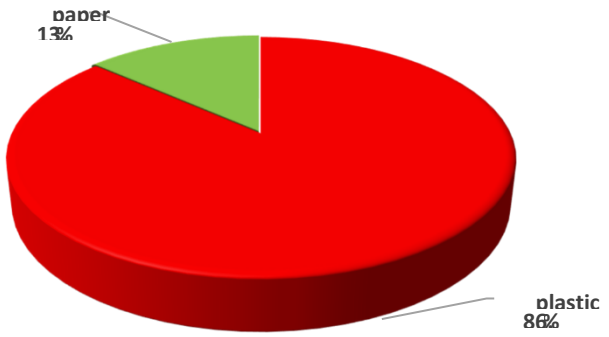


Figure 5 Use to transport bread

The figure shows the method of transporting bread. In our study, it was clear that 173 (86.5%) out of 200 use plastic bags, and 27 (13.5%) use paper bags.

While a study was conducted in Zimbabwe, samples were taken from clients in the city of Bindora. Among the survey respondents, the most frequently reused type of shopping bag was plastic at 59.6%, followed by cotton shopping bags (21.9%) and finally paper shopping bags (18.5%).(Mukucha et al., 2023)

Figure 6 when you finish using plastic bags what you do with them

Figure shows that among the 200 participants in our study, the largest proportion of them, 133 (66.5%), dispose of plastic bags after they are done using them, while 61 (30.5%) reuse them, and only 6 (3%) prefer incineration.

While a study conducted in Jimma City, Southwestern Ethiopia The function of the results is that out of 274 participants, 137 (59.56%) of them prefer to dispose of plastic bags in open dumps, 94 (40.86%) burning, 43 (18.69) burial (Adane & Muleta, 2011)

Table 3 Cross-tabulation of awareness and knowledge of the health and environmental hazards of plastic bags and containers with use microwave food in plastic containers

Relationship	Do you have an awareness and knowledge of the health and environmental hazards of plastic bags and containers				K squared test x^2	Probability value
			Yes	No		
Do you use microwave food in plastic containers	Yes	Number	30	20	12.587	0.00
		%	19.2 %	45.5 %		
	No	Number	126	24		
		%	80.8 %	54.5 %		

The test shows the relationship between the variable you use a microwave in food inside the plastic container and the variable do you have an awareness of the health and environmental risks of plastic bags and plastic containers

K squared $x^2 = 12.587$ and the corresponding probabilistic value for the test = $P\_value = 0.00$ and it's less than statistically significant level significant $\alpha = 0.05)$ which shows that the relationship is statistically significant between the two variables.

Notice it is possible to increase the relationship between the two variables:

1-(phi=0.251) and its probability value (0.001) and it's less than (0.05)

This level of morale gives a strong relationship if there are significant differences, which is to say, the relationship - %25.1 between the two variables.

2- As for the test Odds Ratio for (Risk ratio)

Do you use microwave food in plastic containers (Yes/No) value 0.286))

3- They said yes Do you have awareness of the health and environmental risks of valuable plastic bags and containers (0.714)

4-They replied No Do you have any awareness of the health and environmental risks of valuable plastic bags and containers (2.5)

Table 4 Cross-tabulation of awareness and knowledge of the health and environmental hazards of plastic bags and containers with the use of plastic bowls to feed babies and babies preference

Variables	Do you have an awareness and knowledge of the health and environmental hazards of plastic bags and containers				K squared test x^2	Probability value
			Yes	No		
I prefer to use plastic bowls to feed babies and babies.	Yes	Number	32	19	9.284	0.001
		%	20.5%	43.2%		
	No	Number	124	25		
		%	79.5%	56.8%		

The testing shows the relationship between the best use of plastic bags to feed boys and individuals and the variable do you have awareness and knowledge of the health and environmental hazards of plastic bags and containers K squared $x^2 = 9.284$ Probabilistic value corresponding to test

$P\_value = 0.001$ Which is less than statistically significant level significant($\alpha = 0.05$) Which shows that the relationship is statistically significant between the two variables

Table 5 **Cross-tabulation of awareness and knowledge of the health and environmental hazards of plastic bags and containers with the use of plastic bags for transporting and preserving food preference**

Variables	Do you have an awareness and knowledge of the health and environmental hazards of plastic bags and containers				K squared test	Probability value
			Yes	No		
Do you prefer plastic bags for transporting and preserving food	Yes	Number	69	34	15.001	0.00
		%	44.2 %	77.3 %		
	No	Number	87	10		
		%	55.8 %	22.7 %		

The testing shows the relationship between the variable do you prefer the use of plastic bags to transport and preserve the food and the variable are you already aware of the health and environmental hazards of plastic bags and plastic receptacles K squared $x^2 = 12.587$ And the corresponding probabilistic value for the test= $P\_value = 0.00$ Which is less than statistically significant level significant($\alpha = 0.05$) Which shows that the relationship is statistically significant between the two variables

Table 6 Cross-tabulation of awareness and knowledge of the health and environmental hazards of plastic bags and containers with read or heard of the health hazards of plastic bags and bowls.

Variables	Do you have an awareness and knowledge of the health and environmental hazards of plastic bags and containers				K squared test	Probability value
			Yes	No		
Have you ever read or heard of the health hazards of plastic bags and bowls	Yes	Number	148	19	66.556	0.00
		%	94.9%	43.2%		
	No	Number	8	25		
		%	5.1%	56.8%		

Through the test, the relationship between the variable is clarified, have you ever read or heard about the health risks of plastic bags and containers, and the variable, do you have awareness and knowledge of the health and environmental risks of plastic bags and containers, as the chi-square test shows $x^2 = 66.556$

and the corresponding p-value of the $P\_value = 0.00$

It is smaller than the level of statistical significance

($\alpha = 0.05$)Level Significant, which shows that there is a statistically significant relationship between two variables.

Table 7 Cross-tabulation of awareness and knowledge of the health and environmental hazards of plastic bags and containers with you finish using plastic bags what do you do with then.

Variables	Do you have an awareness and knowledge of the health and environmental hazards of plastic bags and containers				K squared test	Probability value
			Yes	No		
When you finish using plastic bags what do you do with them	Reused	Number	46	15	8.01	0.018
		%	29.5 %	34.1 %		
	Get rid of it	Number	108	25		
		%	69.2 %	56.8 %		
	I burn it with the trash	Number	2	4		
		%	1.3%	9.1%		

The test shows whether you have awareness and knowledge of the health and environmental risks of plastic bags classified as yes or no and variable after the plastic bags have been completed what the workbook does with them in (reused, disposed and incinerated with waste) where the K squared

$$x^2 = 8.01$$

and the corresponding probability value of testing $P\_value = 0.018$ is smaller than the level of statistical significance $(\alpha = 0.05)$ significant of relationship between two variables is demonstrated.

6. Conclusion and Recommendation

6.1 Conclusion:

The majority of respondents were aware of health and environmental risks associated with plastic bags In addition to alternatives available but often not used.

The result of the current study indicated that most respondents, regardless of their age and educational level, use plastic bags significantly, and use them mainly for transporting bread, low cost and ease of access are the main factors for increasing the use of plastic bags. It was found that there is an urgent need to raise awareness of the dangers of plastic bags, especially online, where a high response was observed in our study (online awareness is more widespread and accessible), Additionally ,the need to encourage the reuse of bags as well as the use of

Available alternatives (such as paper bags, cloth) through inclusive education Campaigns which will aid in controlling this escalating risk.

Professional bodies of this health care can develop strategies to educate their members.

And enlighten policymakers about the seriousness of this issue Public awareness is also essential in addressing this matter**.**

6.2 Recommendation:

1. For public enlightenment, campaigns and use of the incentives will help raise awareness regarding the use of alternative bags.
2. Reducing the use and invention of plastic bags Substitutions are the most welcome step
3. Using alternative options and promoting the reuse of plastic bags are important strategies in reducing their environmental impact .
4. Appropriate technology (T) should be properly implemented for the collection, recycling, waste-to-energy programs, and disposal of used bags .
5. Creating awareness by conducting workshops and media awareness
6. Regulate production and consumption by banning or taxing plastic products that are harmful to the environment, without prejudice to public health or food safety;
7. Reducing plastic consumption through the removal of unnecessary packaging (eg, double-wrap), labeling, outreach, and education, and by providing environmentally friendly alternatives to plastic when possible without unintended consequences;
8. Increasing the demand for recycled plastics through the implementation of benefits, penalties or taxes imposed on plastics
9. It recommends not to use plastic bags and plates inside the anthill and avoid exposing plastic to high temperatures .
10. Do not use plastic bags for storing, preserving and transporting food, especially hot bread.

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