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RESEARCH ARTICLE

PUBLIC EXTENT OF KNOWLEDGE OF THE NATURE FROM WHICH FACE MASKS ARE MADE DURING COVID-19 IN THE LIBYAN COMMUNITY

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Abstract

The global pandemic coronavirus of 2019 (COVID-19) had led to an increase in face mask demand to minimise the spread of the virus. Consequently, the trade in face mask production had risen extremely to meet that need. Many categories of facemasks have been produced using different materials (e.g., polypropylene, polyester, polyacrylonitrile, and polycarbonate). In this survey study, we aimed to evaluate the extent of common knowledge about the nature of which face masks are made in Libyan society. We carried out an online questionnaire-based survey, which comprised many questions that assessed the knowledge and awareness of the Libyan community about the face masks during COVID-19. A total of 431 participants responded to the survey. The results obtained showed that there was a variation in knowledge and awareness about the face mask properties among the participants.

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Introduction:-

In January 2020, the World Health Organisation (WHO) declared coronavirus (COVID-19) a global pandemic, which infected more than 102 million of the world's population and caused 2,211,762 deaths (WHO 2021). COVID-19 can be transmitted through physical contact and respiratory droplets, which are generated when an infected individual sneezes or coughs. The severe acute respiratory syndrome coronavirus (SARS-CoV), Middle East respiratory syndrome coronavirus (MERS), and SARS-CoV-2 had similar transmission modes: person-to-person contact and respiratory droplets. The viruses could remain viable in the environment for hours or even days and could be a source of transmission (Jack 2006; McKinney et al., 2006; Nghiem et al., 2020; Van Doremalen et al., 2020). Moreover, COVID-19 could be transmitted by touching the objects or surfaces where the virus occurs and then re-touching the eyes, mouth, or nose (Wang, Cuiyan et al., 2020; Wang, Chuanyi et al., 2020; The Lancet 2020). During the COVID-19 pandemic, the trade in medical products has risen extremely, specifically for products related to the prevention, testing, treatment, and confrontation of the virus (WTO 2020). In this regard, there was an increasing need for face masks as personal protective equipment (PPE) and a public health measure to reduce the rapid spread of coronavirus. This resulted in increased face mask production globally to meet such demand. This issue became one of the main concerns for governments and decision-makers to prevent the spread of the coronavirus. To reduce and limit the spread of COVID-19, many countries around the world enforced confinement and required the use of masks for active individuals as a preventive measure. In this context, this practice was imposed in China and Hong Kong during the SARS epidemic in 2003 by catering companies to protect workers and the public (Fiorillo et al., 2020).

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There are different types of face masks, such as surgical, N95, and commercial fabric/cloth masks, used to deal with the pandemic. Based on the barrier properties and breathing resistance ASTM F2100 (ASTM, 2007) and EN ISO 15223-1 (BS EN ISO 15223-1, 2016), this mask was classified into different types (i.e., low barrier, moderate barrier, and high barrier) (Chellamani et al., 2013). The surgical mask is a hospital-grade mask and mainly consists of three layers: an outer hydrophobic non-woven layer (translucent), a middle melt-blown layer (generally in white colour), and an inner soft absorbent non-woven layer (green, blue, or white colour). Polypropylene (i.e., known as plastic) is used as a major material to produce this surgical mask. However, other polymers like polystyrene, polycarbonate, polyethylene, or polyester are also used to produce this mask (Abbasi et al., 2020). The highly-recommended mask to prevent the virus from spreading is N95, which consists of four layers of material: an outer layer of sun-bonded polypropylene; a second layer of cellulose/polyester; a third layer of melt-blown polypropylene filter material; and an inner (fourth) layer of spun-bound polypropylene. The typical raw material used to produce an N95 mask is polypropylene, similar to the surgical mask (Barycka et al., 2020). The weight of the surgical and N95 face masks is 3.5 g and 18.14 g, respectively. The ear loops of both face masks were made of natural and synthetic polyisoprene (i.e., latex-free) rubber. In contrast, the ear loops in the cloth mask were made of cloth. There are mostly two kinds of cloth masks: "commercial cloth masks" and "homemade cloth masks" (Santarsiero et al., 2020; Santarsiero et al., 2021). These cloth masks are made of multi-layered cloth, like old t-shirts and sewing material (Allison et al., 2020). Cloth masks are also made of cotton and nylon, which have water-resistant properties. Furthermore, the fabric of cloth masks falls under the non-medical mask category, while surgical and N95 masks are known as medical masks. The filtration performance of these cloth masks depends on many variables, such as thread count, number of layers, fabric type, and water resistance (Chughtai et al., 2020). Like in many other countries, in Libya, little is known about the public's knowledge of the nature from which medical masks are made. Therefore, this study aimed to examine the extent of common knowledge about the nature of which face masks are made in Libyan society.

Methodology:-

To obtain more useful and relevant data, careful consideration was given to the questionnaire design of the study. The survey was conducted online and filled out by people willing to participate in the study among the Libyan society through social media channels (Facebook, Twitter, and WhatsApp) and emails. This survey was performed on individuals for one month (15 January – 15 February 2022) during the COVID-19 pandemic, and mutations in the virus continue to escalate. The study was guided by research questions about the following aspects: the demographic data included gender, age, region, education level, and job; coronavirus knowledge; awareness and knowledge regarding the nature from which face masks are made during COVID-19; and awareness and practice of COVID-19 precautionary measures to confront the virus. The survey also included the following questions: What type of face mask do you use? Do you know the type of material from which medical masks are made? Are you interested in knowing the number of layers of the mask you use by reading the notes written on the mask box? Do you know that plastic is a material used in the manufacture of medical masks? The collected data were analysed by using SPSS statistical software, Version 26.0. A descriptive statistical analysis was conducted using the frequency of the survey.

Results:-

A total of 431 participants responded to the survey, including 237 males and 194 females, with percentages of 55% and 45%, respectively (Fig. 1). The respondents represented all parts of Libya, as follows: 289 (67.1%) from the western region; 38 (8.8%) from the central region; 45 (10.4%) from the southern region; and 59 (13.7%) from the eastern region (Fig. 2). For the rest of the demographic in terms of age, education level, and field of work, the majority of participants were in the age group of 36–45 years (28.8%); educated people (bachelor's [39.2%], master's [25.3%], and PhD degree holders [10.7%]); and working in the educational field (30.4%), as presented in Fig. 3, 4, and 5, respectively. The results showed that 58.5% of the participants were familiar with the type of material from which face masks are made (Fig. 6). Only 37.4% of the participants were interested in knowing the number of layers of the mask that respondents use by reading the notes written on the mask pack (Fig. 7). Regarding the types of masks that they use, the majority of participants (64%) reported that they use surgical masks (Fig. 8). It was noted that the majority of the participants (55.5%) did not know that plastic is a material used in the manufacture of face masks, and only 30.2% did (Fig. 9)

Discussion:-

The results reported in this survey study have shed light on the public awareness of the nature from which medical masks are made during COVID-19 in some regions of Libya. In terms of gender, there is a slightly higher percentage of males than females (55% and 45%, respectively) among the participants. The highest number of participants (with a percentage of 76%) were from the western part of Libya, including the capital Tripoli, which is the most populous city in the country (www.Worldometers.info; accessed on 22/08/2023), where the first COVID-19 case was officially confirmed. Subsequently, the outbreak first began in the southern region and then spread to the western and eastern parts of Libya (Bredan & Bakoush 2021).

The results indicated that the survey response rate was highly related to the education level of participants; the majority of participants in this survey were educated people (bachelor's, master's, and PhD degree holders); in other words, knowledgeable people are most likely willing to take part in the survey. Regarding the knowledge level of the manufacturing materials, 58.5% of the participants were familiar with the type of material from which face masks are made (Fig. 1). As shown in Fig. 2, only 37.4% of the participants were interested in knowing the number of layers of the mask that respondents use by reading the notes written on the mask pack.

This survey showed that the majority of the participants preferred surgical face masks to wear during COVID-19. Similar observations were seen in a previous study (Almomen et al., 2021). It had been proven that the using this type of facemask had important implications for the control of COVID-19, as some studies indicate that surgical facemasks help prevent transmission of human coronaviruses in coarse and fine aerosols from symptomatic individuals when worn by infected people (Chiang et al., 2020; Leung et al., 2020). Experimental studies have proved that surgical face masks are capable of providing both inward and outward protection against viruses (Pan et al., 2021). In fact, surgical masks have been used for decades and were originally designed to protect the patient from infection by the surgical staff (Oberg & Brosseau 2008). In our study, 64% of the participants reported that they use surgical masks. Nowadays, in addition to their efficiency, relatively low-cost surgical facemasks are used by common people and can be easily obtained in different styles and intended applications (Akhtar et al., 2023). Hence, these could be the reasons for the result of our study (64%). In contrast, only 8.4% of the participants use the highly-recommended N95 face mask for its efficiency in protecting the public from infection. This may be due to the lower availability and cost of the N95 mask, which is more expensive compared to other types of facemasks. For plastic material, the majority of participants (55.5%) did not know that plastic is a material used in the manufacture of face masks, and 30.2% did. The observations of our study show variations in the knowledge and awareness of the Libyan community about face masks in general.

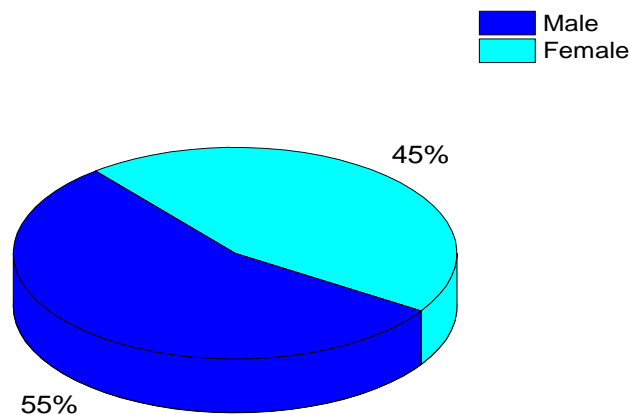


Fig (1):- Different gender of people who participated in the online survey.

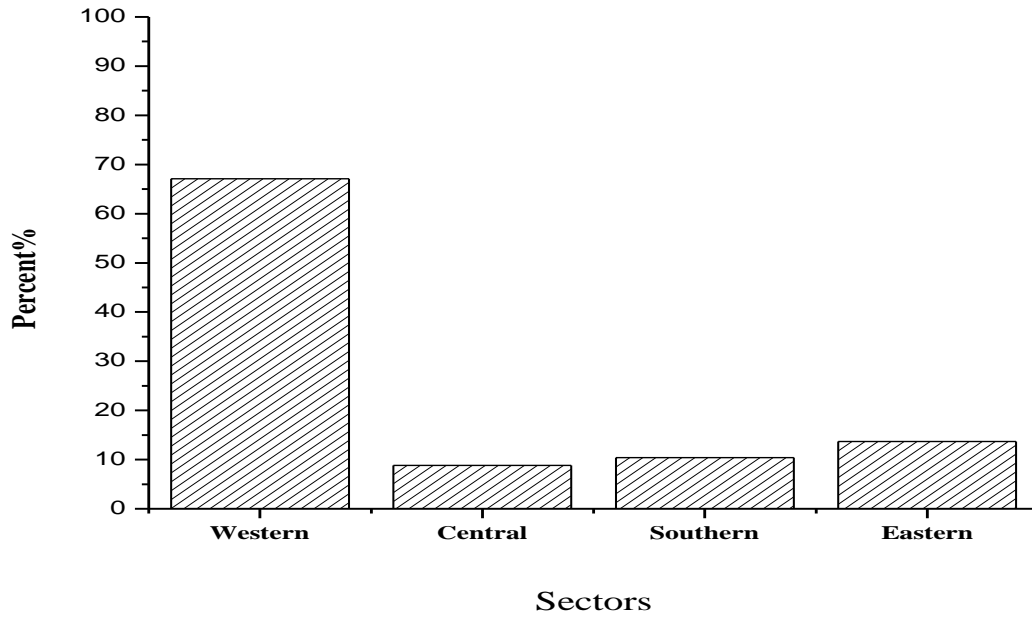


Fig (2):- Different sectors of people who participated in the online survey.

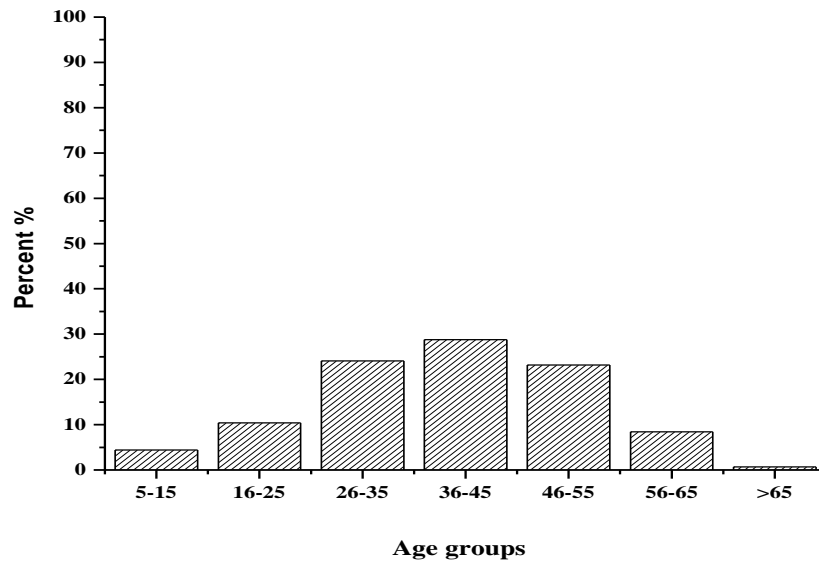


Fig (3):- Different age group people who participated in the online survey.

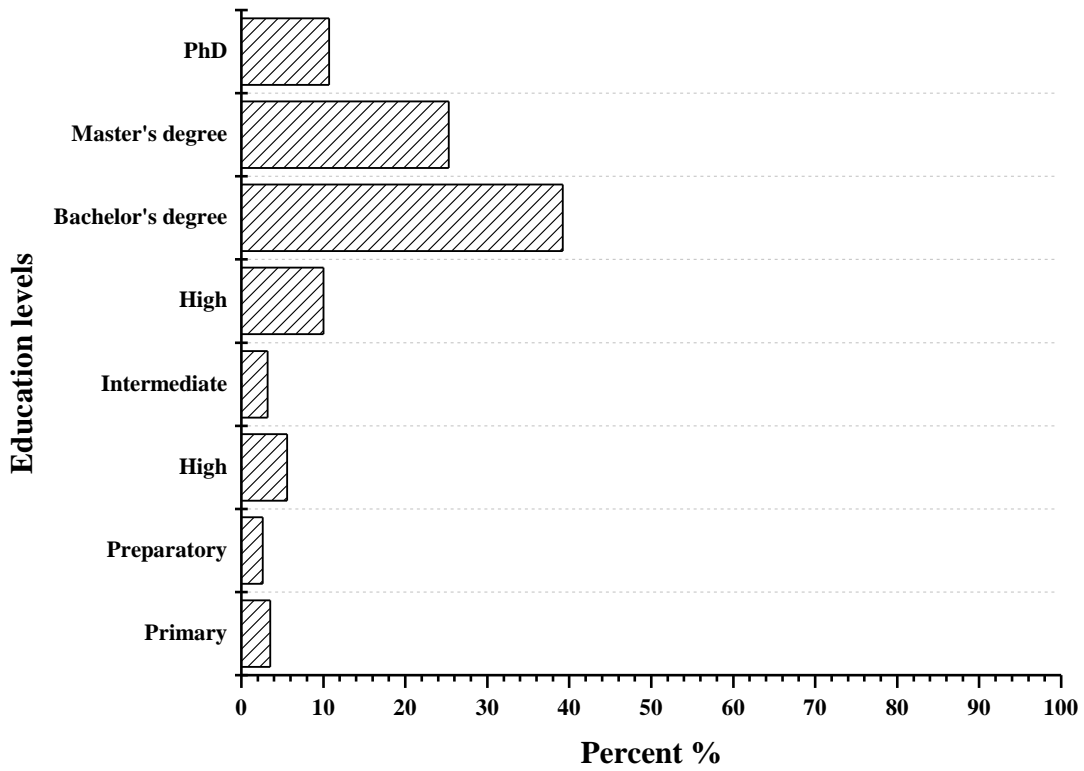


Fig (4):- Different education levels of people who participated in the online survey.

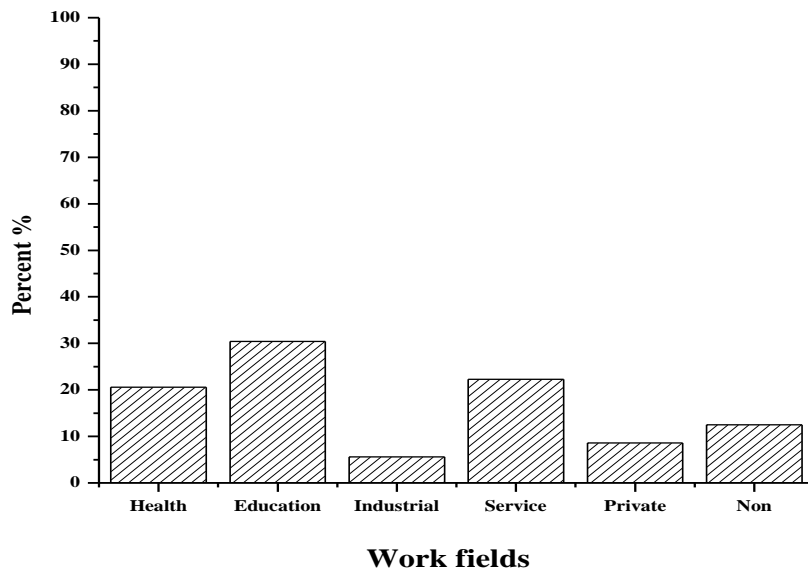


Fig (5):- Different work fields of people who participated in the online survey.

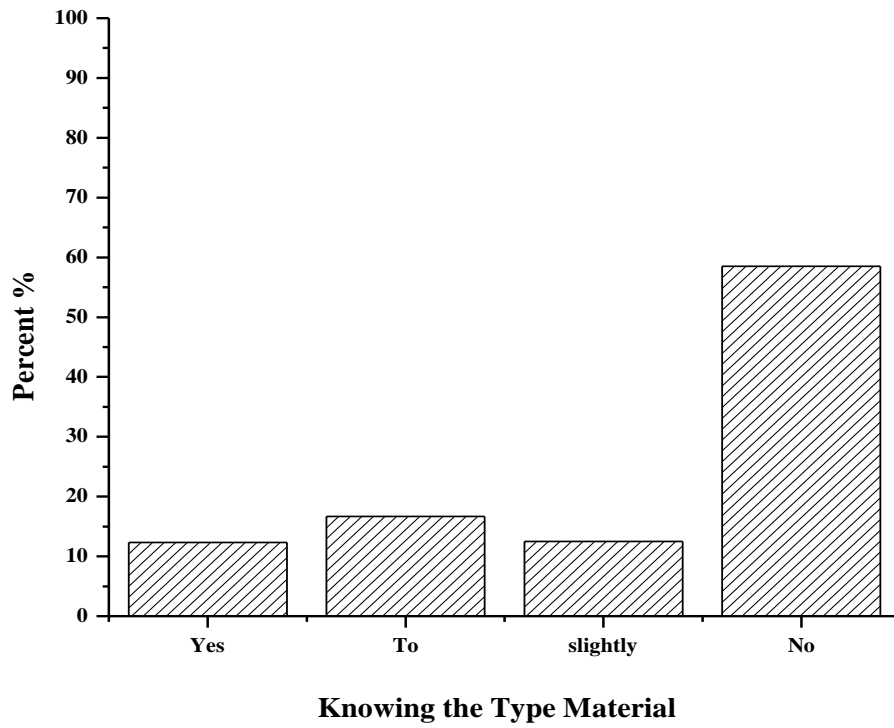


Fig (6):- Knowing the Type Material Face Mask Made.

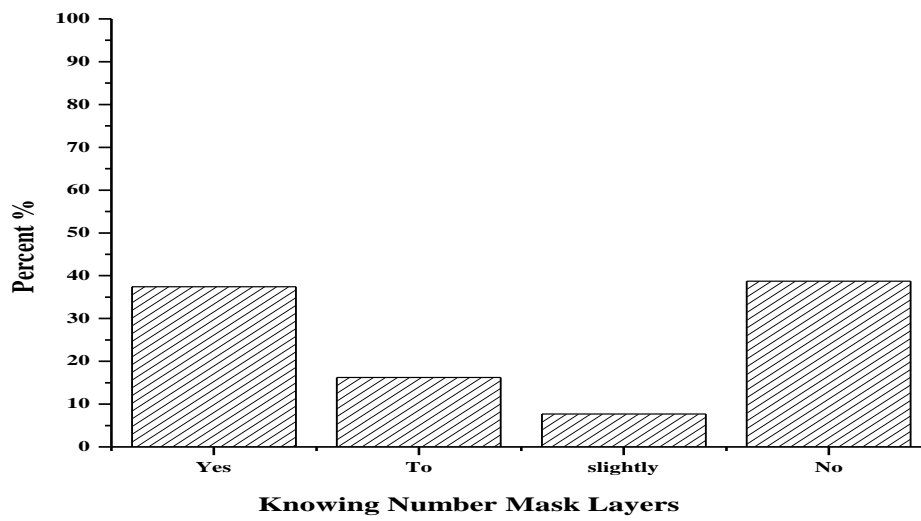


Fig (7):-Number of mask layers.

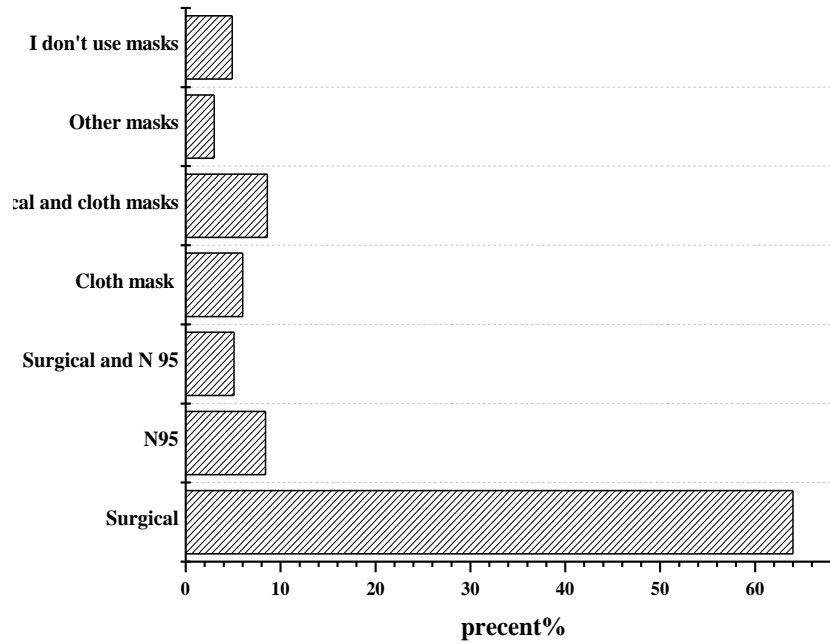


Fig (8):-Different types of masks that are used.

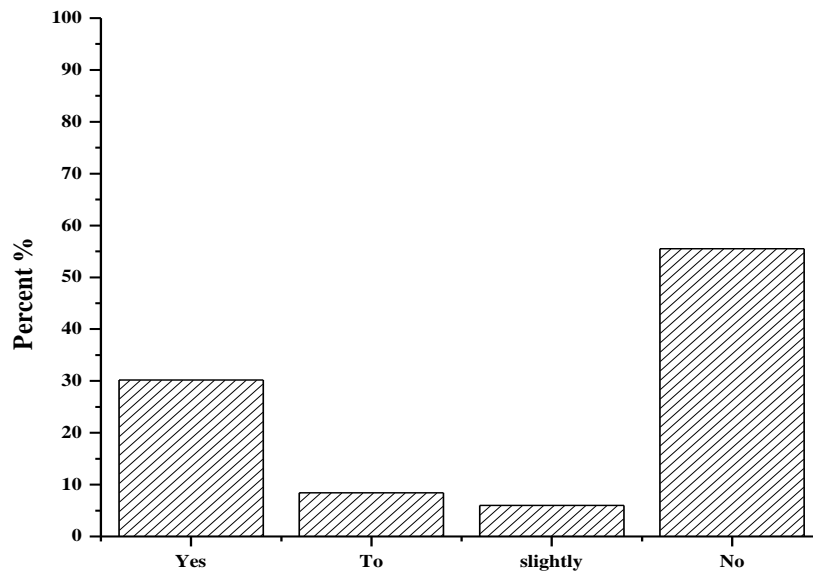


Fig (9):- The knowledge about using a plastic as raw material in manufacture of medical masks.

Conclusion:-

During the COVID-19 pandemic, many countries around the world enforced confinement and obliged the use of masks for active individuals as a preventive measure. There were many types of face masks, such as surgical, N95, and commercial fabric/cloth masks, used to deal with the pandemic. In this survey study, we examined the extent of

common knowledge about the nature of which face masks are made in Libyan society. It was obvious that there was a variation in knowledge and awareness about the face mask properties among the participants.

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