مدى فعالية العســــــل في مقاومة فيروس الكورونا كوفد-19 (COVID-19)

The Extent Effective of the Honey in Resistance the Coronavirus (COVID-19)

شكري عياد حليلة. قسم الأحياء. كلية التربية الزاوية. جامعة الزاوية
فاطمة رجب خضر. الاكاديمية العربية الافريقية للدراسات فرع الغربية. صرمان .ليبيا

الملخص:

نحل العسل *Apis mellifera* هو الذي يقوم بتخليق العسل، منذ القدم أستخدم العسل كغذاء ودواء، ولأهميته الغذائية والطبية ذكر في العديد من الكتب المقدسة، للعسل تأثيرات مضادة للجراثيم الممرضة للإنسان وكذلك يستخدم في علاج الحروق والجروح ومقوي للمناعة، يتركب العسل من 400 مركب كيميائي ومن اهم المركبات هي السكريات، الفركتوز 38%، الجلوكوز 31%، والسكروز اقل من 5% وماء بنسبة لا تزيد عن 20% وبنسب بسيطة من الاحماض العضوي. أوضحت الدراسة أن عدد المبحوثين الذين يتناولون العسل بشكل دائم وباستمرار حوالي (25) مبحوث ونسبتهم 26%، في حين أن عدد المبحوثين الذين لا يأكلون العسل هو (70) مبحوث ونسبتهم 74%. أكثر الفئات العمرية التي تتناول في العسل هي الفئات العمرية (20-30) و (30-40) سنة وكانت نسبتهم 24%.عدد المبحوثين الذين توقعوا الإصابة بهذا الفيروس هو (44) مبحوث ونسبتهم 46%، بينما عدد المبحوثين الذين لم يتوقعوا الإصابة هو (51) ونسبتهم 54%. عدد المبحوثين الذين طبقوا الإجراءات الاحترازية هو(76) ونسبتهم 80%، بينما عدد المبحوثين الذين لم يطبقوا الإجراءات الاحترازية هو (19) ونسبتهم 20%. هناك تباين في تأثير الإصابة بين المبحوثين فكان عدد (19) مبحوث ونسبتهم 20% كانت إصابتهم بدون الم، في حين كان عدد المبحوثين هو (65) ونسبتهم 68% كانت اصابتهم مصحوبة بألم بسيط، في حين عدد المبحوثين الذين كانت إصابتهم مصحوبة بألم شديد هو (11) مبحوث ونسبتهم 12%. أوضحت الدراسة أن قيمة Sig هي 0.097، أي أن توجد هناك علاقة بين تناول العسل وفعاليته في مقاومة فيروس (كوفيد- 19) وإن كانت هذه العلاقة علاقة ضعيفة.

مفتاح الكلمات: العسل. فيروس الكورونا كوفيد-19. منطقة الزاوية.

The Extent Effective of the Honey In Resistance the Coronavirus (COVID-19)

Shokri Ayad Halila[1] and Fatma R khadher[2]

[1] Biology of Department, Faculty of Education Zawia, University of Zawia.Libya

[2]Arab African Academy for Studies .Arab Diploma. Surman. Libya

ABSTRACT: the Honey bee *Apis mellifera* synthesizes Honey. Since ancient times, Honey has been used as food and medicine, and for its nutritional and medicinal importance, it is mentioned in many holy books. Honey has antibacterial effects that are pathogenic to humans, as well as is used in the treatment of burns and wounds and as an immune booster. Honey is composed of 400 chemical compounds, the most important compounds are sugars, fructose 38%, glucose 31%, sucrose less than 5%, water not more than 20%, and simple percentages of organic acids. The study showed that the number of respondents who eat Honey permanently and continuously is about (25), and their percentage is 26%, while the number of respondents who do not eat Honey is (70) and their percentage is 74%. The most age groups that are dealt with in Honey are the age groups (20-30) and (30-40) years, and their percentage was 24%. The number of respondents who expected infection with this virus was (44) and their percentage was 46%, while the number of respondents which did not expect infection it is (51) and their percentage is 54%.The number of respondents which applied the precautionary measures is (76) and their percentage is 80%, while the number of respondents which did not apply the precautionary measures is (19) and their percentage is 20%. The study showed that the Sig value is 0.097, meaning that there is a relationship between Honey intake and its effectiveness in resisting the (Covid-19) virus, although this relationship is weak.

Keywords: Honey; Coronavirus (COVID-19); Zawia area.

INTRODUCTION

The Honeybee, Apis Millifera, was known in ancient times by the Honey that it produces from special glands. The Honey is a sweet-tasting substance that is used in food and medicine.it is Honey is the first and main product of bees in most countries of the world, and it is the only sweet substance that is ready

to eat, and does not require any kind of treatment or manufacture. The sugar that we use precedes its arrival to us by an extraction process from sugar cane and then undergoes a refining process to purify it. And Honey is a sugary substance with different flavors and colors that Honeybees produce from the nectar of plant flowers after collecting, transforming, mixing it with special materials and storing it in wax tablets (1).

There are Many kinds of Honey.in Libya, Such as Spring Honey, Sardines, Citrus, thyme, Sidr, Harmal, Mila, al-Hanoun (Bitter Honey), Qa'moul, Carob ,and tamarisk, as well as nutritious Honey (feeding bees with a sugar solution), which many beekeepers started, especially beekeepers in the region. Significantly, for several reasons (2).

The Honey has an acidic effect and may crystallize (freeze) over time. It contains mainly several types of sugars, mostly fructose and glucose, as well as mineral salts, vegetable dyes, some enzymes, pollen and other chemical compounds (3).

RESEARCH IMPORTANCE

The Honey has received the attention of many ancient nations and civilizations, as it is beneficial to health, and it is God's gift to man, as it has healing for people, and this is manifested in the Almighty's saying in Surah An-Nahl, verse {69}(4).

Many studies have also shown its antibacterial effect that is pathogenic to humans, where researcher Bogdanov proved in 1984 AD that Honey is useful for treating wounds as it prevents germs from growing, and he also mentioned that it may one day replace antibiotics (5).

Several studies have confirmed the importance of Honey in resisting many pathogens caused by microorganisms such as bacteria, fungi, as well as viruses.

Viruses are organisms that can only be seen with an electron microscope. They are mainly composed of DNA or RNA, and they cause many diseases for plants, animals and humans, and cause serious diseases for humans, such as the Coronavirus (Covid-19), which the World Health Organization referred to as a pandemic due to its spread in most countries of the world. And caused the deaths of millions of people.

Al-Zawia is located to the west of Tripoli, about 45 km away.

The population is approximately 191514 (6).

RESEARCH AIMES

The research aims to study of Honey in terms its composition and nutritional, medical ,and therapeutic benefits in many bacterial diseases, as well as its topical uses in treating wounds and burns, its effectiveness in resisting the Covid-19 virus, and the side effects of infection with this virus.

PREVIOUS STUDIES

Honey is a luxuriously rich, sweet, sticky, golden fluid made from the nectar of flowers. Its natural sweetness endowed with health benefits makes it an adept substitute for white sugar. Nectar, often referred to as 'the drink of the gods, modified and stored in the honeycomb to be used as food. Often used as a nutraceutical agent and an important component of herbal remedies(7)

It is considered a natural substance with a sweet taste and is a viscous substance produced by Honey bees from the nectar of flowers or the secretions of live parts of plants or from the secretions of sucking insects of living parts of the plant, which Honey bees collect, transform and combine with certain substances, then stored in wax tablets. It is considered a natural wonder, and has been known since ancient times, yet we know very little about it. Honey has been a popular sweetener for foods and a powerful medicinal substance for centuries. It can be taken at any time, is easy to take, and is considered the best in treating sore throats (8).

Colloquial medicine asserts that it is effective in treating stomach ulcers, as well as in many treatments, and it can heal adult wounds as well as severe ulcers. It is still used in the treatment of wounds and burns, where a quantity of it is placed on the site of the wound or burn and covered with gauze or a clean piece of cloth. Then the gauze or cloth is removed after a while and this process is repeated dressing if necessary. Honey can have a quick effect on the healing process. For example, researcher Kumar mentioned that he was once exposed to a wound in the thumb and the wound rotted and did not treat it, but after applying Honey to the wound, he noticed after twenty-four hours, that the affected skin layer peeled off to reveal a new layer of pink skin under the wound. The use of Honey as a wound dressing, is an ancient remedy that has been re-used. Where Honey has become increasingly important, especially with the publication of several studies proving its efficacy (9).

Biochemical studies and research indicate that Honey contains 400 compounds, which are many sugars, the most important of which are (fructose 38%, glucose 31% and sucrose less than 5%), the water of no more than 20%, 0.08% of certain acids and 0.18% of minerals. Enzymes, phenolic acids, flavonoid amino acids as well as on various proteins, etc. Its medicinal properties are due to the presence of antioxidants, phenolic compounds, amino acids, and vitamins (10).

Despite being rich in carbohydrates, the glycemic index is considered low, ranging from 32-85, and therefore 50-85 grams can be safely consumed. The fructose content in Honey can to protect the liver. While the antioxidants in it provide effective protection against oxidation. The therapeutic character of Honey makes it a favorite food even for infants and diabetics. It contains antioxidant, immune-boosting, wound-healing, anti-inflammatory, healing, nutritional, and antibacterial properties (11).

The importance of Honey in the treatment of many diseases is due to several reasons, including its high ability to inhibit the growth of bacteria because it contains a substance called Inhibine, a substance called hydrogen peroxide), in addition to phenolic acids that have an inhibitory effect on the growth of bacteria, as well as the osmotic effect resulting from sugary components that cause In the rupture of the cell wall of bacteria, the high acidity and the lack of it containing water leads to an increase in the concentration of sugars, amino acids, and organic acids increase its acidity, and the high viscosity prevents bacteria from penetrating tissues and forming colonies on the surfaces of wounds in addition to containing oxidation and reduction enzymes (12).

It also contains a high percentage of potassium metal, which draws water from germs due to its voraciousness in absorbing water, so germs die due to dehydration. Because it contains pollen from different plants, and these factors all have a role in inhibiting germs of all kinds (13).

Studies have shown that Honey can to resist germs, including Gram-positive and gram-negative bacteria, aerobic and anaerobic bacteria, some types of fungi Aspergillus, Penicillium as well as some types of antibiotic-resistant bacteria such as Pseudomonas, Acinetobacter, Staphylococcus and aureus (14).

The frequent, random and irregular use of antibiotics leads to the emergence of antibiotic-resistant germs, which is a problem that has existed for long periods due to the lack of discovery of new antibiotics over the past few years, as well as the expensive production cost and side effects, which have increased Public health risks (15).

Scientists have increased interest in natural materials that were previously used for treatment, in addition to an increase in the number of studies that prove the effectiveness of these materials and their therapeutic ability in eliminating germs and obtaining natural and immune-boosting treatments. It can also be the integration of Colloquial medicine such as herbal therapy with bee products (16).

Natural medicinal products have been used for millennia in the treatment of multiple ailments. Although many have been superseded by conventional pharmaceutical approaches, there is currently, resurgence in interest in the use of honey and honey products by the general public. This alternative branch of medicine is called Apitherapy (17).

Acute gastroenteritis is inflammation caused by various types of germs (viruses, bacteria and parasites), and is highly effective in killing many intestinal pathogens, including salmonella, shigella, and enteropathogenic E. coli (18).

In addition to its anti-bacterial and anti-fungal effect, it showed that it has an anti-viral effect, and in the study of its topical effect on recurrent attacks of herpes virus lesions, the study showed that the use of Honey was effective and safe on recurrent lesions of oral herpes and genital herpes compared to Acyclovir Cream and that It has inhibitory effects on the activity of the rubella virus (19).

Honey clasps several medicinal and health effects as a natural food supplement. It has been established as a potential therapeutic antioxidant agent for various biodiverse ailments. Data report that it exhibits strong wound healing, antibacterial, anti-inflammatory, antifungal, antiviral, and antidiabetic effects. It also retains immunomodulatory, estrogenic regulatory, antimutagenic, anticancer, and numerous other vigor effects (20).

Are many pieces of evidences that indicate that it has positive effects on general health, on the respiratory, digestive, nervous and cardiovascular

systems, and is a good anti-oxidant, anti-inflammatory, and anti-bacterial, and is good for diabetics (21).

The Honey obtain approved by the US Food and Drug Administration (FDA) in 2007 for its use as a topical treatment for wounds. Because of its strong antimicrobial properties. Honey covers the throat area and kills potentially harmful germs while helping to moisturize the throat. It has also been shown to be a more effective cough suppressant than dextromethorphan and diphenhydramine (22).

The Honey can relieve bacterial diseases and has shown good antiviral efficacy such as rubella virus, smallpox virus (varicella-zoster virus (VZV), influenza as well as HIV (23).

Antiviral efficacies of honey have beenchecked against the respiratory syncytial virus. A series of testswere developed using cell cultures to assess efficacy of honeyagainst respiratory syncytial virus. The results indicated that honeyinhibited replication of viruses (24).

Honey is relatively free of adverse effects. Topical application of honey may lead to transient stinging sensation. Otherwise it is described in different forms as soothing, relieving pain, to be non-irritating and a painless dressing change. Allergy to honey is rare, but there could be an allergic reaction to either pollen or bee proteins in honey. Excessive application of honey may lead to dehydration of tissues which can however be restored by saline packs. Theoretical risk of rise in blood glucose levels may always be there when applied to large open wound in diabetics (25)

Recently, the world has experienced an outbreak of a serious infectious disease; the COVID-19 pandemic caused by severe acute respiratory syndrome–coronavirus 2 (SARS-CoV-2). This is the third global outbreak of a Betacoronaviruses (beta-CoVs) after the severe acute respiratory syndrome-coronavirus (SARS-CoV) in 2002 and the Middle East respiratory syndrome-coronavirus (MERS-CoV) in 2012.At the beginning of March 2020, COVID-19 was classified as a pandemic by the WHO, and has been creating a global health threat and affecting all aspects of life with more than 81 million reported cases and around 1.8 million death by the end of 2020, which has now surpassing the combined number of cases and deaths of two previously emerging coronaviruses(26).

Many people have contracted coronavirus disease (Covid-19) in (210) countries and the World Health Organization (WHO) declared it a pandemic on 12/3/2020, in the absence of an effective treatment or vaccine against this disease, It can offer some natural products that are used in the treatment and antiviral as an inexpensive and effective option in treating this disease. It has been observed that Honey bee products of Honey, Propolis, and bee venom have benefits against many diseases. Honey bee products are known for their nutritional and medicinal value. The products contain many chemicals that are potentially effective and help fight combat, or relieve symptoms of coronavirus disease (27).

In the world, the number of cumulative infections with the Coronavirus, Covid-19, reached about 234,809,103 positive cases, the number of deaths was 4,800,375, and the number of vaccinations reached about 6,188,903,420 vaccines(28).

In Libya, the number of COVID-19 infections reached 73,506 out of the total number of cumulative samples 343,240 cases, the number of recovery cases is 265,024, and the number of deaths from this virus is 4,710 deaths. Some 4,906 samples were taken, including 683 positive cases, the number of recovered cases is 1,164, the number of deaths is 8 cases, and the percentage of positive cases was 14%. The total number of vaccinated in the first dose is 1,408,295 and the number of vaccinated in the second dose is 246,750 vaccinated (29).

In the Central municipality of Al-Zawia of Libya, the first positive case of the Covid-19 virus was recorded on May 1, 2020 AD. The total number of samples taken from the month of 5/2020 until the month of 8/2021 AD was about 32,851 samples, of which 11,116 samples were positive, and the number of death cases was 66, meaning that the percentage of positive cases was 3% (30).

MATERIALS AND METHODOLOGY

Descriptive Curricula are Considered one of the Most Important and Important Scientific Curricula used in Scientific Studies and Scientific Research Curricula in General, as they contribute to Identifying the Phenomenon of the Study.

In this study, the descriptive approach was used to collect information of previous studies, and a questionnaire was prepared and distributed to people recovering from the Coronavirus (Covid-19), and the number was 95 respondents from the Zawia region in the State of Libya and analyzed statistically by the famous statistical program SPSS.

RESULTS AND DISCUSSION

Through the results obtained from this study, many important data were obtained, which were placed in the following points: -

1. The number of respondents who took Honey was (25), and their percentage was 26%, while the number of those who did not take Honey was (70) and their percentage was 74%. This means that the percentage of those who do not take Honey was a large 74%. Despite the importance of eating Honey, as well as its availability and reasonable prices, their percentage was small, 26%.
2. Most of the age groups that are dealt with in Honey were between (20-30) and (30-40) years old, and their percentage was 24%, respectively, and 20% for those whose ages ranged between (40-50) years, as well as those whose ages She was 60 years or older. They are followed by 8% for those aged (50-60) years, and the least for those who were less than 20 years old. Through these percentages, we note that the intake of Honey increases at the age of 20 years and above and until the age of 50 years, and then the intake of Honey decreases at the age of (50-60) years to rise after that at the ages of 60 years and above, and this indicates the importance of eating Honey And its role in maintaining the general health of these ages.
3. The number of male respondents is (51) males, and their percentage is 54%, and the number of female respondents is (44) females, and their percentage is 46%. That is, the rate of infection among male respondents is more than females.
4. The youngest age of the respondents was (15) years old, the oldest was (82) years old, and the average age was (44) years, and this is an indication that infection with this virus included even young people the age of (15) years.
5. Most of the injuries were in the ages of 40-50 years and their number is (27) respondents and their percentage is 28%, followed by the age group of 30-40 years and their number is (22) respondents and their percentage is 23%, followed by the age group from 50-60 years and their number (15) years Their

percentage is 16%, followed by the age group from 20-30 years and their number is (13) respondents and their percentage is 14%, followed by the age group whose age is over 60 years and their number is (12) respondents and their percentage is 13%, and the least of them are from the age group that is less than (20) years, and their number is (6) researched, and their rate is 6%. This is an indication that the highest rate of infection with this virus is in the old age group.

6. The number of respondents who expected infection with this virus is (44), and their percentage is 46%, while the number of respondents who did not expect infection is (51) and percentage is 54%. That is, the percentage of respondents who did not expect that they would be infected with this virus more than others, 54%.

7. The number of respondents who accepted this injury normally was (65) and percentage of 68%, and the number of respondents who accepted this injury badly is (21) respondents and their percentage was 22%, while the number of respondents who accepted this injury very badly was (9) respondents and their percentage is 10%. That is, most of them accept this infection normally, at a high rate of 68%.

8. The number of respondents who applied the precautionary measures was (76) and their percentage was 80%, while the number of respondents who did not apply these measures was (19) with a percentage of 20%. That is, the percentage of those who applied these procedures was high 80%, and this indicates the extent of society's awareness of the danger of infection with this disease and the need to implement the known precautionary measures for safety.

9. The number of respondents who were infected with this virus and the infection was without pain was (19) by 20%, and the number of respondents who had infections with mild pain was (65) and their percentage was 68%, while the number of respondents who had been infected with severe pain was (11) the percentage is 12%. That is, most of the injuries were painful, at 80%, which is a high percentage.

10. The periods of infection varied among the respondents, as the number of respondents whose period of infection was one week was (19) and their percentage was 20%,and the number of respondents whose period of infection

with this virus ranged from two weeks was (17) by 18%, and the number of respondents whose period of infection ranged Three weeks is (25) and their percentage is 26%, while the respondents whose period of infection lasted for a month is (22) and their percentage is 23%, and the respondents who have been infected for more than a month is (12), and their percentage is 13%.

11. The percentage of respondents who constantly eating Honey is a small percentage, which is 26%. The study showed that the Sig value is 0.097, as there is a relationship between Honey intake and its effectiveness in fighting this virus, although this relationship is weak. The nutritional, medical, and therapeutic benefits of Honey, many of which were mentioned in this study, show that eating Honey is very important, as it generally contributes to increasing immunity and maintaining public health, which certainly has a positive effect on resisting many bacterial and viral diseases.

Tables List

Sex	Frequency	Valid Percent	Cumulative Percent
Male	51	54%	54%
Female	44	46%	100%
Total	95	100%	

Table (1) shows the percentages of male and female respondents

Age Categories	Frequency	Percent	Cumulative Percent
< 20	6	6%	6%
20-30	13	14%	20%
30-40	22	23%	43%
40-50	27	28%	61%
50-60	15	16%	77%
≥60	12	13%	100%
Total	95	100%	

Table (2) shows the percentages of age groups infected with the virus

Eat Honey	Frequency	Percent	Cumulative Percent
Yes	25	26%	26%
No	70	74%	100%
Total	95	100%	

Table (3) shows the proportions of Honey intake by the respondents

Anticipate Injury	Frequency	Percent	Cumulative Percent
Yes	44	46%	46%
No	51	54%	100%
Total	95	100%	

Table (4) shows the expected infection with the virus

Accept injury	Frequency	Valid Percent	Cumulative Percent
Normal	65	68%	68%
Bad	21	22%	90%
Very Bad	9	10%	100%
Total	95	100%	Cumulative Percent

Table (5) shows the respondents' acceptance of infection with the virus "Covid-19"

Apply precautionary measures	Frequency	Percent	Cumulative Percent
Yes	76	80%	80%
No	19	20%	100%
Total	95	100%	

Table (6) shows the extent to which precautionary measures have been applied

Injury Effect	Frequency	Percent	Cumulative Percent
Without Pain	19	20%	20%
Simple Pain	60	63%	83%
Severe Pain	15	17%	100%
Total	95	100%	

Table (7) shows the effect of injury on the respondents

Injury Period	Frequency	Percent	Cumulative Percent
Week	19	20%	20%
Two Weeks	17	18%	38%
Three Weeks	25	26%	64%
Month	22	23%	87%
More Than a Month	12	13%	100%
Total	95	100%	

Table (8) periods of infection for the respondents

Eat Honey	Injury Period					Total
	Week	Two Weeks	Weeks	Month	More Than a Month	
Yes	9	1	8	3	4	25
No	2	3	9	8	3	25
Total	11	4	17	11	7	50

Table (9) places the intersection between Honey intake/infection period

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.929[a]	4	0.094
Likelihood Radio	8.425	4	0.077
N of Valid Cases	50		

Table (10) Shows the Chi-Square Tests LIST OF SHAPES

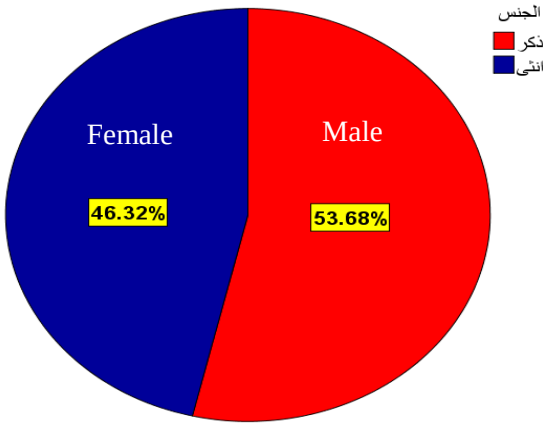
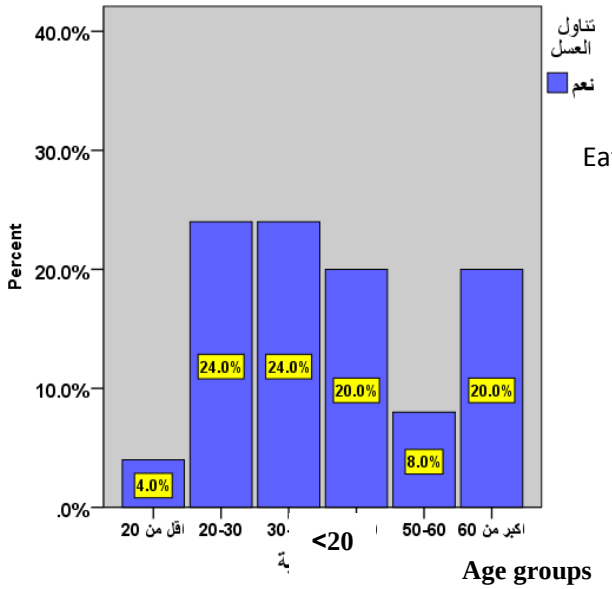


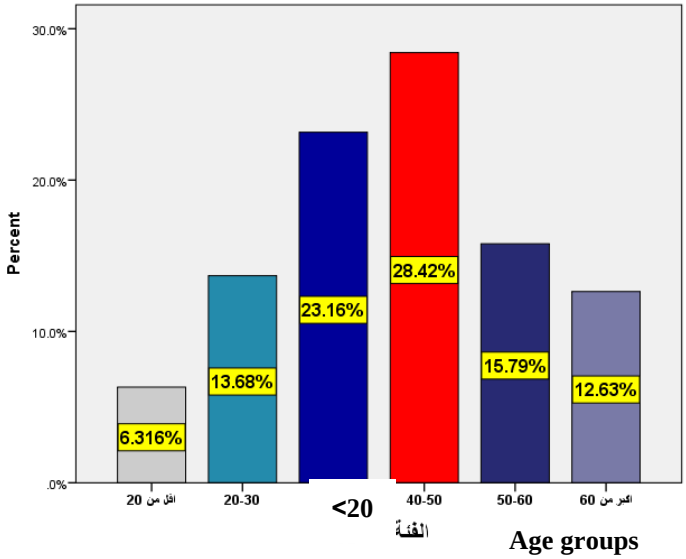
Figure (1) shows the proportions of males and females



Yes

Eat the Honey

Figure (2) shows the age groups and the percentage of Honey intake



<20 >60

Figure (3) shows the age groups with the injur

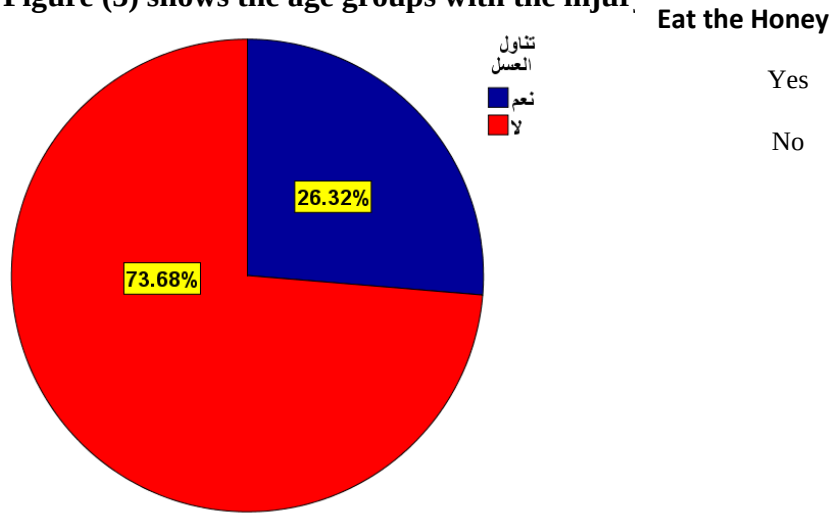


Figure (4) shows the proportions of Honey intake

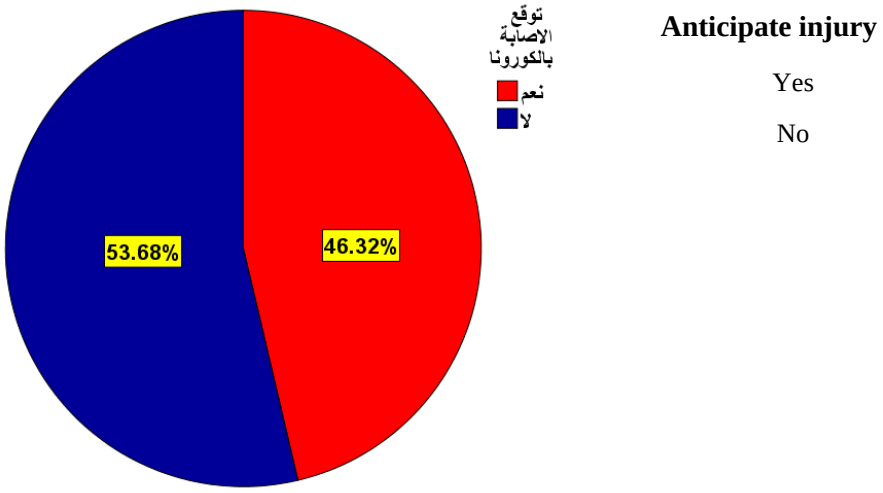


Figure (5) shows the prediction of infection with the Coronavirus Covid-19

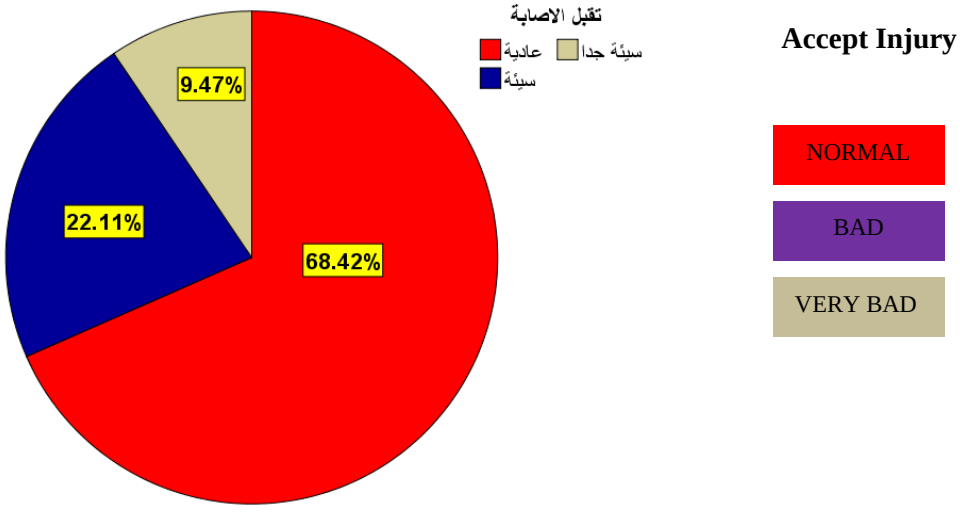


Figure (6) shows the acceptance of the injury among the respondents

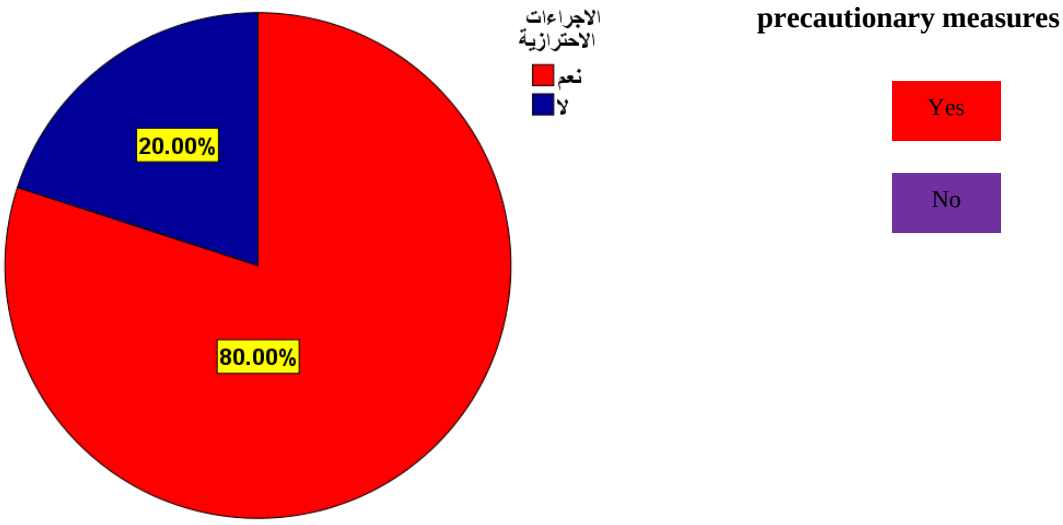


Figure (7) shows the precautionary measures for the respondents

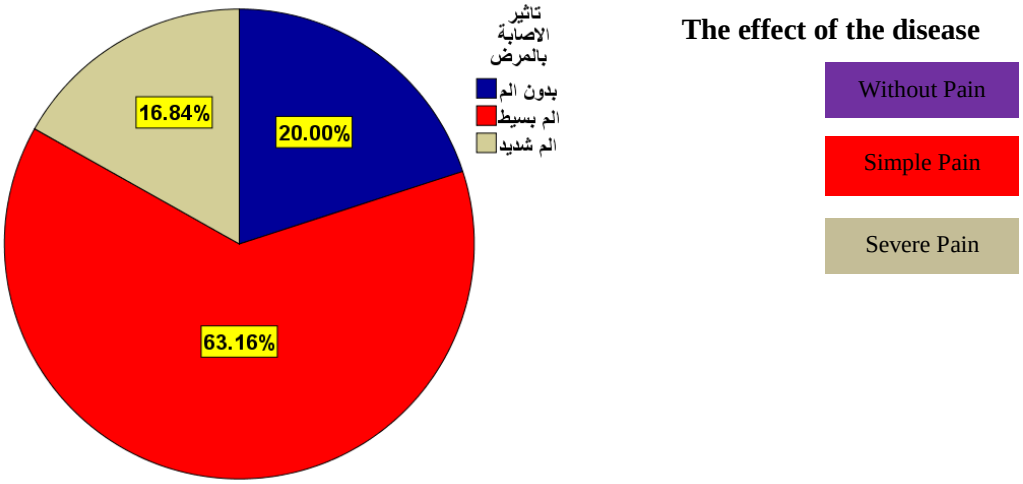


Figure (8) shows the effect of injury on the respondents

RECOMMENDATIONS

Important data were obtained that was included in the recommendations, namely:

1. It is recommended to eat Honey due to its nutritional, medicinal, and therapeutic value.

2. It is recommended that Honey be present in every home, for its use as food and medicine, as well as for use as a topical treatment on wounds and burns.
3. Broadcasting health awareness programs through various media as well as social networking sites explaining the importance and benefits of Honey.
4. Conducting many research and studies on the composition of Honey.
5. Conducting research and studies on Honey and its effectiveness in combating some bacterial diseases.
6. Encouraging beekeeping and supporting beekeepers.

REFERENCES

1. الفلاح والمحجوب. 2004.تربية نحل العسل. مصلحة الوسائل والمستلزمات التعليمية. مطابع اديتار. ليبيا.
2. الفلاح والمحجوب. 2004.(Op.Cit).
3. الفلاح والمحجوب. 2004.(Op.Cit).
4. آدم، خديجة. 2018. دراسة تأثير العسل الطبيعي ومستخلص صمغ النحل ضد بعض الجراثيم الممرضة للإنسان. رسالة ماجستير منشورة. جامعة سبها. كلية العلوم. قسم النبات. ليبيا.
5. آدم، خديجة. 2018.(Op.Cit).
6. حليلة والمسلاتي.2020. تربية نحل العسل ودور النحالة في مكافحة أهم الأمراض والآفات بحث ميداني على النحالين في منطقة الزاوية. مجلة كليات التربية. العدد السابع عشر. الجزء الاول. جامعة الزاوية. ليبيا.
7. Rana, Seema et al.2018.Medicinal uses of Honey: a review on its benefits to human health. Vol. 20 No. 1-S (2018): Supplement: Nutraceutical, Medicinal Plants and Functional Foods. https://www.researchgate.net/publication/344193511.
8. Abeshu, Motuma, Geleta, Bekesho, .2016. Medicinal Uses of Honey. Biology and Medicine. DOI: 10.4172 / 0974 -836 9.1000279. Https: //www.researchgate.net/publication/www.researchgate.net/publication/293638941.
9. Kumar, Sampath ,et al. 2010. Medicinal uses and health benefits of Honey: An Overview. Journal of Chemical and Pharmaceutical Research. 2010, 2(1): 385-395. https://www.jocpr.com/articles/medicinal-uses-and-health-benefits-of-Honey-an-overview.pdf.
10. Rana, Seema et al.2018. (OP.Cit).
11. Rana, Seema et al.2018.(OP.Cit).
12. آدم، خديجة. 2018.(OP.Cit).
13. آدم، خديجة. 2018.(OP.Cit).
14. آدم، خديجة. 2018.(OP.Cit).
15. آدم، خديجة. 2018.(OP.Cit) .
16. آدم، خديجة. 2018.(OP.Cit) .

17. Manyi-Loh, Christy, Clarke, Anna, Ndip, Roland. 2011.An overview of Honey: Therapeutic properties and contribution in nutrition and human health. African Journal of Microbiology Research 5(8). https://www.researchgate.net/publication/268432512.
18. Abeshu, Motuma, Geleta, Bekesho, .2016. (OP.Cit).
19. Oskouei, Taherah and Najafi, Moslem. 2012.Traditional and Modern Uses of Natural Honey in Human Diseases: A Review. Iran J Basic Med Sci. 2013 Jun; 16(6): 731–742. https://www.NCBI.NLM.nih .gov/ PMC /articles/PMC3758027.
20. Ahmed, Sarfraz et al.2017.Honey as a Potential Natural Antioxidant Medicine: An Insight into Its Molecular Mechanisms of Action. Oxidative Medicine and Cellular Longevity 2018(56):1-19 DOI:10.1155/2018/8367846https://www.researchgate.net/publication/322599455_Honey_as_a_Potential_Natural_Antioxidant_Medicine_An_Insight_into_Its_Molecular_Mechanisms_of_Action.
21. Naggar, A Yahya et al.2020. Fighting against the second wave of COVID-19: Can Honeybee products help protect against the pandemic? Saudi Journal of Biological Sciences Volume 28, Issue 3, March 2021, Pages 1519-1527. https://www.sciencedirect.com/ science/article/ pii/ S1319562X20306951.
22. Naggar, A Yahya et al.2020.(OP.Cit).
23. Naggar, A Yahya et al.2020.(OP.Cit).
24. Naggar, A Yahya et al.2020.(OP.Cit).
25. Oskouei, Taherah and Najafi, Moslem. 2012.(OP.Cit).
26. Naggar, A Yahya et al.2020.(OP.Cit).
27. Naggar, A Yahya et al.2020.(OP.Cit).
28. WHO Coronavirus (COVID-19) Dashboard.2021.WHO.(4/10/2021). https://covid19.who.int
29. المركز الوطني لمكافحة الأمراض. 2021. التحديث اليومي للوضع الوبائي المحلي لفيروس كورونا المستجد ليوم الاثنين: 04/ 10/ 2021- ليبيا-https://ncdc.org.ly/Ar/situation-of-corona/.
30. البوعيشي. اسماعيل.2021. احصائيات عمل فرق الرصد والتقصي بلدية الزاوية المركز. فريق الرصد والتقصي والاستجابة السريعة ببلدية الزاوية المركز. المركز الوطني لمكافحة الامراض. ليبيا.