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Transverse study of the perception and uses of honey as a complementary and alternative medicine in Ibadan, Nigeria

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ABSTRACT

Honey is the focus of many research projects for its varied biological activities. It is an age-old remedy that is currently being rediscovered as a complementary and alternative medicine (CAM) to be used in modern medicine. The present study aims to investigate the use and perception of honey as CAM among the general public in Ibadan metropolis. A cross sectional study was conducted using three local government areas in Ibadan, a structured and tested questionnaire was then adopted with re-adjustment. A total of 405 questionnaires were randomly distributed within the study area. These indicate that 63.5% (257/405) of the respondents used honey as CAM, and age significantly affects the usage/ none usage of honey in the study area ($p < 0.05$). Many respondents claimed they use honey as a dietary supplement for general well-being (79%, 203/257), or for treating burns/wounds (76.3, 196/257), cough (72.8%, 187/257) and sore throat (60.3%, 155/257). A small percentage of the respondents used honey to treat ulcers (17.1%, 44/257). Our work also revealed that a limited number of the respondents (13%, 32/257) buy honey from pharmaceutical stores, while information regarding honey was majorly gotten from friends and family (70%, 180/257). In addition, respondents have favourable perception of the use of honey as CAM – as over 60% of them rated strongly agree for each of the perception question. Respondents highlighted some risk factors affecting the use of honey as CAM, among which inadequate information on the use of honey ranked the highest (mean = 4.40), concerns were also raised on the quality (mean = 4.33) and a high price of honey used (4.31). There are favourable perception of the use of honey as CAM, but issues relating to honey quality should be determined before use. Future work should be done to test the perception and acceptance level of honey as CAM among health workers.

Keywords: complimentary medicine, alternative medicine, honey, disease, perception

1. INTRODUCTION

Global attention and interest about the use of complementary and alternative medicine (CAM) has been rekindled recently. CAM use is common among several populations. A study conducted in Enugu state Nigeria, 732 people participated in the study, out of which 84.7% (620) agreed to have use CAM ranging from one type to over 20 types (Onyiatpat *et al.*, 2011). CAM is an emergent area of healthcare within developed and developing countries and is increasingly popular with consumers and professionals. The term “Complementary and Alternative Medicine (CAM)” often refers to an expansive set of health-care practices that are not part of a country's own custom and are not integrated into the prevailing health-care system. Other terms sometimes used to describe these health-care practices include ‘natural medicine’, ‘non-conventional medicine’ and ‘holistic medicine’ (WHO, 2000). (Karl, 2009) grouped CAM into five overlapping domains: biologically based practice, manipulative and body based approaches, mind-body medicine, alternative medical system and energy medicine. Honey belongs to biological-based practice according to the report.

Honey has been a biological-based CAM since ancient times (Wahab *et al.*, 2017). In Nigeria, people use honey alone or in combination with other herbs for treating various ailments (Adebolu, 2005). Honey is produced by honeybees, especially by the species of *Apis mellifera* as flower honey by secreting nectars of flowers and honeydew honey (forest honey) is a honey made from honeydew secreted by plant-sucking insects, such as aphids (Liyanage and Horadugoda, 2017). Bees first convert the flower nectar into honey by a process of regurgitation and evaporation, then store it as a primary food source in wax honeycombs inside the beehive with the clear, golden amber color. The use of honey have been reported in many other countries, such as Malaysia (Wahab *et al.*, 2017), India (Kritika and Inuka, 2016) and USA (Hailemeskel, Anteneh *et al.*, 2017). Surveys have identified the many benefits embedded in using honey. (Wahab *et al.*, 2017) a survey carried out on the use of honey as CAM in Selangor, Malaysia, discovered that honey is popular among the general populace as 56% (168/300) of the respondents use honey as CAM. The study also indicated some ailments commonly treated with honey, including cough and sore throat.

Honey mostly comprises fructose and glucose, it also contains a wide range of a small amount of material such as photochemical, organic acids, flavonoids, enzymes, vitamins, minerals, pollen grains and other compounds (Adriane *et al.*, 2017). Honeys from different botanical origins may have different moisture contents. Thus, heather, clover and strawberry tree honeys have a high natural water content (Adriane *et al.*, 2017). All the components of honey works together to give the desired effect in medicine (Wahab *et al.*, 2017; Adebolu, 2005). Research has shown that honey is effective against many diseases and health issues, such as eye infection (Albietz and Lee, 2015), cardiovascular diseases (Yaghoobi *et al.*, 2008), Cancer (Laura *et al.*, 2016), cough and cold (Wahab *et al.*, 2017), and so on. Some veterinary applications of honey is also recorded in the literature (Saeed *et al.*, 2017; Maruhashi *et al.*, 2016). Honey is antimicrobial in function (Piotr, 2017; Libonatti *et al.*, 2014).

Many studies are in favour the use of honey as a CAM which is believed to be active against many diseases. Information about its uses and the perceptions of the general public about honey as CAM is still lacking, especially in Africa, despite a massive usage as CAM. Previous studies were majorly coined around the identifying different traditional medicines used as CAM, and a few laboratory experiments on effectiveness of honey as CAM. Therefore, this study may help the healthcare professionals to enhance their understanding of the use of

honey as CAM and may draw more attention of researchers to produce more evidence on the usefulness of honey.

2. MATERIALS AND METHODS

2. 1. Data collection

A cross-sectional analysis was used to determine the use and perception of the public about honey as CAM. A structured questionnaire was adopted, based on related literatures with some readjustments (Wahab *et al.*, 2017; Okoronkwo *et al.*, 2014; Poco and Bolboacă, 2013). In this study, honey was considered a CAM if it was used to treat disease or promote health and/or general well-being in the past three months. Respondents were selected from three randomly selected local government areas within Ibadan metropolis. The selected local governments areas were: Ibadan northeast, Oluyole and Ibadan northwest, the three locations were chosen for logistic reasons.

A total of 405 questionnaires were randomly shared within the areas selected. The inclusion criteria for the selection were if the respondents had lived in the areas for over two years and will partake in the study. The questionnaire comprises four sections; (1) Respondents demographic details, (2) Patterns of honey usage, (3) Perception of honey as CAM, and (4) Factors affecting the uses of honey as CAM. In the second part, most questions were scored using multiple options where respondents are given the freedom to tick as many as applied to them. Third section of the questionnaire, respondents were asked to indicate their agreement using a 5-point Likert type scale ranging from 1 = strongly disagree to 5 = strongly agree. The fourth section was characterized by questions relating to risk factors associated with honey use as CAM, Likert scale was used with categorization: 1 = strongly; 2 = agree; 3 = neither agree nor disagree; 4 = disagree; and 5 = strongly disagree. The questionnaire was self completed by the respondents, only completely filled questionnaires were counted valid.

2. 2. Statistical analysis

Data were analysed using IBM SPSS Statistic 23 (IBM Corp., Armonk, NY, USA). Descriptive statistics, such as mean, frequency, and percentage, were used to analyse the demographic, and multiple response analysis were used for multiple response data. The Likert-type scale responses of “strongly agree and agree” and “strongly disagree and disagree” were grouped together and analyzed. Chi-square analyses were used to test relationships between dependent and independent variables. *P* value of < 0.05 would be considered significant.

3. RESULTS

Table 1 shows the demographic characteristics of the respondents. Out of 405 respondents recruited for this study, 63.5% (257/405) have used honey as CAM in the last three months. Female gender (54.6%, 221/405) used more honey than their male counterparts.

The majority (41%, 166/405) of the respondents lived around Oluyole residential area. Age significantly affects the usage/ none usage of honey in the study area ($p < 0.01$). Respondents above 30 years of age (62%, 160/257) use honey as CAM in the last three months more than those below 30 years old despite having the highest (24.9%, 101/405) population of

the respondent between the age bracket of 21-30 years. Most of the respondents had a secondary school certificate (51.9%, 210/405).

Educational qualification of respondents significantly affects the usage and non-usage of honey as CAM in the study area $p < 0.05$. The majority (40%, 162/405) of the respondents have earned a little above national minimum wage 31,000-50,0000 naira. The majority (52.8%, 214/405) of the respondents were single.

Table 1. Demographic characteristics of the population

Demographic Characteristics (n = 148)	Users ^a (n = 257) n (%)	Non-users ^b n (%)	P value	Total (n = 405)
Location				
Ibadan northeast	82(31.9)	34(22.9)	0.132	116(28.6)
Oluyole	98(38.1)	68(46)		166(41)
Ibadan northwest	77(30)	46(31.1)		123(30.4)
Gender				
Male	119(46.3)	65(43.9)	0.360	184(45.4)
Female	138(53.4)	83(56.1)		221(54.6)
Age				
11-20	45(17.5)	23(15.5)	<0.001	68(16.8)
21-30	52(20.2)	49(33.1)		101(24.9)
31-40	46(17.8)	40(27)		86(21.2)
41-50	58(22.5)	18(12.2)		76(18.8)
50 and above	56(21.8)	18(12.2)		74(18.3)
Education				
Primary	67(26)	38(25.7)	0.016	105(25.9)
Secondary	122(47.5)	88(59.5)		210(51.9)
Tertiary	68(26.5)	22(14.8)		90(22.2)
Income (Naira)^c				
< 30,000	93(31.2)	54(36.5)	0.376	147(36.3)
31,000 – 50,000	100(38.9)	62(41.9)		162(40)
51,000 – 100,000	33(12.8)	22(14.9)		55(13.6)
>101,000	31(12.1)	10(6.8)		41(10.1)
Marital status				
Single	135(52.5)	79(53.4)	0.810	214(52.8)
Married	114(44.4)	66(44.6)		180(44.4)
Divorced	8(3.1)	3(2)		11(2.7)

^a Reported to use honey to treat diseases or to promote health and/or general well-being in the past three months.

^b Never use honey to treat diseases or to promote health and/or general well-being in the past three months.

^c 1 USD is approximately 360 naira.

Table 2 shows the pattern of honey use among respondents. Most of the residents use honey to treat burnt injury (76.3, 196/257), cough (72.8%, 187/257) and sore throat (60.3, 155/257). A small percentage of the respondents use honey to treat ulcer (17.1%, 44/257) and asthma (21.4, 55/257). Many respondents (79%, 203/257) claimed they have used honey as a dietary supplement for general well-being. However, most of the respondents (28.8%, 74/257) agreed to only use honey occasionally. Most of the respondents sourced for their honey from nearby stores (60.7%, 150/257) and from relatives (friends and family) (57.5%, 142/257). A few respondents bought honey from pharmaceutical stores. Majority of the respondents (70%, 180/257) agreed to get information on honey through friends and family while the least source of information was through mass media (6.2%, 16/257). Majority of the respondents spent between 5,000 to 10,000 naira on honey within the last three months of the study. There are positive relationships between the age groups and the frequencies of honey use ($p < 0.05$) (Figure 1). Older people tend to use honey more frequently than young people (Figure 1).

Table 2. Pattern of Honey Usage Among the Respondents^a (n = 257)

Pattern of Honey used	n (%)
Used honey for treatment of diseases^b	
Burnt/wound	196(76.3)
Cough	187(72.8)
Sore throat	155(60.3)
Stomachache	99(38.5)
Animal sting	73(28.4)
Asthma	55(21.4)
Ulcer	44(17.1)
Used honey as a dietary supplement for general well-being	203(79)
Frequency of using honey	
Very frequent	58(22.6)
Frequently	65(25.3)
Occasionally	74(28.8)
Rarely	40(23.3)
Source of obtainment of honey^b	
Nearby store	150(60.7)
Friends and family	142(57.5)
Supermarket	115(46.6)
Beekeepers	82(33.2)
Grocery stores	75(30.4)
Pharmacy	32(13.0)
Source of information about honey^b	
Friends and family	180(70)
Internet	167(64.9)
Advertisement	132(51.3)

Newspapers	90(35)
Books	60(23.3)
Health info	20(7.8)
Mass media	16(6.2)
Amount Spent on honey in the last 3 month^c	
Bellow 1,000	70(27.2)
1,001-5000	107 (41.2)
5,001-10,000	48(18.7)
>10,000	32(12.5)

^a Surveyed among honey users only.

^b Respondents can provide more than one response and therefore responses do not add up to 100 %.

^c 1 Naira is equivalent to 0.0028 USD.

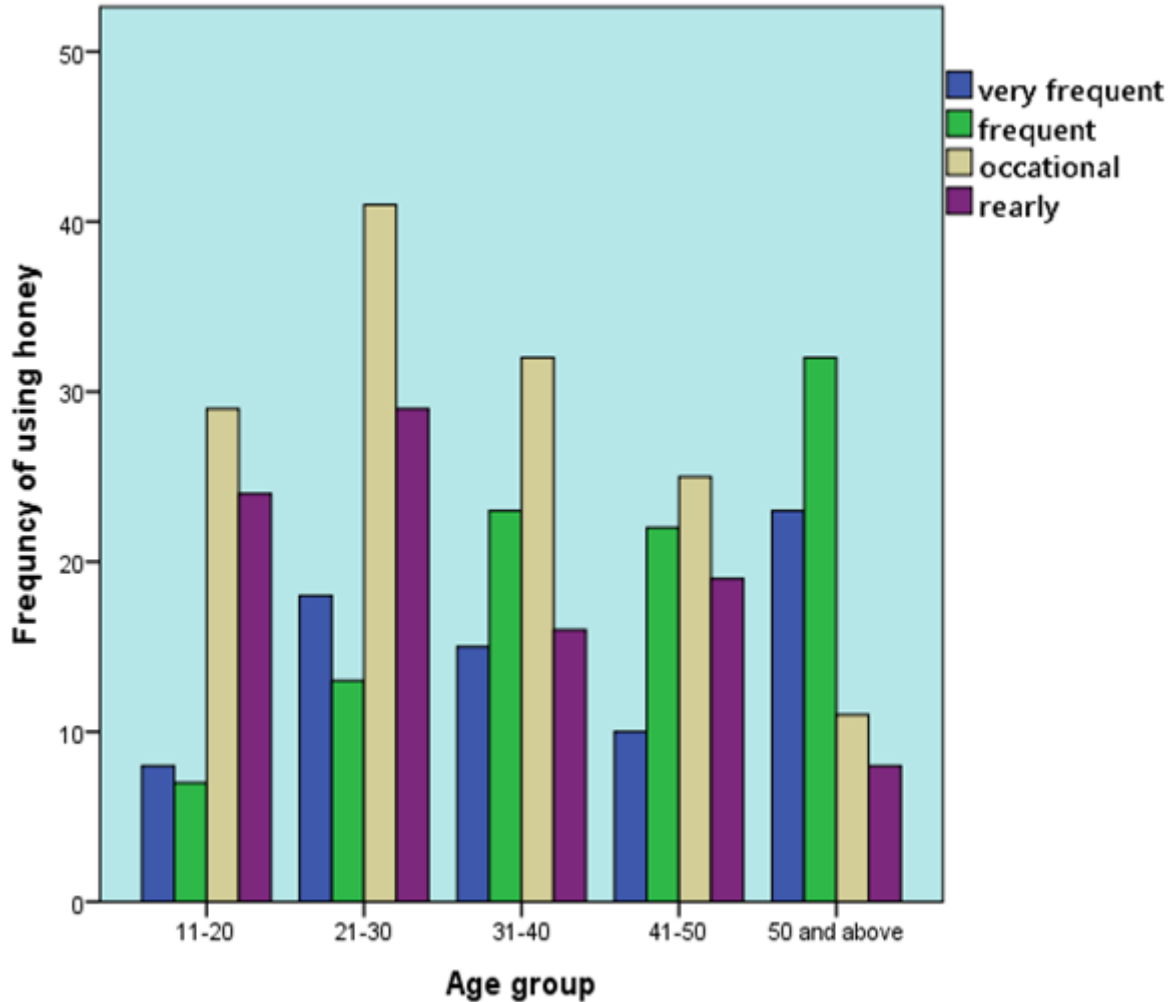


Figure 1. Frequency of using honey among various age groups ($p < 0.001$)

Table 3 shows the perceptions of the respondents towards honey use as CAM. Most honey users and non users agree and strongly agree that there are enough evident supporting the use of honey as CAM (84.9%, 344/405); ($p = 0.436$) and honey as food supplements for general health (64.2%, 260/204), the latter statement is significant at $P < 0.05$. Older people believe in the benefits of honey as CAM than the younger people. This statement is also significant ($p < 0.005$). Married respondents believe that honey usage as food supplements should be promoted. Most of the respondents (72.6, 294/405) perceived that more information is needed regarding the health benefits of honey, although the statement is not significant ($p > 0.05$). The more educated the respondents are, the more they believe promoting the health benefit of honey among public is important ($p < 0.05$). Most of the respondents believe that honey stimulates the body natural therapeutic power (69.4%, 281/257) and that they would rather use honey to treat common ailments, such as cough and sore throat than using modern medicine (74.9%, 304/405). Most of the respondents (78.8%, 319/405) were ready to recommend honey use as CAM although this is significant with age ($p < 0.05$) and increases with an increase in age. Most respondents (72.6, 294/405) perceived that they will not mind spending money on honey as CAM, also most of them (66.2%, 268/405) believes honey is easy to use as CAM, the statement honey is easy to use is significant among the users and non users ($p < 0.05$). Majority (83%, 336/405) of the respondents believe that honey has no side effect, this statement is significant with respondents marital status ($p < 0.05$).

Table 3. Perceptions of respondents towards honey as CAM

Frequency (%) of respondents <i>P</i> value									
Statement	Strongly agree & agree	Neutral	Disagree & strongly disagree	Users & non user	Gender	Age	Educational level	income	Marital status
Sufficient evidence supports the benefits of honey as a complementary medicine	344(84.9)	18 (4.4)	43(10.6)	0.436	0.244	0.003	0.498	0.421	0.578
The use of honey as food supplement for general health should be promoted	260(64.2)	58(14.3)	87(21.5)	0.048	0.205	0.023	0.496	0.9190.	0.001
More information should be provided to the public regarding the health benefits of honey	294(72.6)	79(19.5)	32(7.9)	0.242	0.332	0.814	0.002	0.628	0.112
I believe that honey can stimulate body natural therapeutic power	281(69.4)	82(20.2)	42(10.3)	0.815	0.607	0.079	0.398	0.590	0.828

I would rather use honey to treat common ailments such as coughs and sore throats than using modern medicines	304(74.9)	59(14.6)	42(10.6)	0.542	0.322	0.354	0.904	0.601	0.319
I would recommend honey to others as an alternative to modern medicine in treating common ailments	319(78.8)	53(13.1)	33(8.2)	0.841	0.073	0.006	0.857	0.791	0.634
I would not mind spending money on honey as a complementary or alternative medicine	294(72.6)	80(19.8)	31(7.6)	0.189	0.399	0.820	0.300	0.932	0.404
Honey is easy to use as a complementary or alternative medicine	268(66.2)	75(18.5)	62(15.3)	0.002	0.106	0.817	0.722	0.368	0.122
Honey has no side effects	336(83)	21(5.2)	48(11.8)	0.788	0.176	0.775	0.680	0.174	0.001

Respondents highlighted the associated risk factors affecting the use of honey as CAM (**Table 4**), inadequacy in information of the usefulness of honey as CAM ranked the highest among the risk factors (mean = 4.40). Risk factors, such as variation in quality of honey used as CAM (mean = 4.33) and expensiveness of honey (mean = 4.31) also ranked high. Honey is not usually available and honey is too sweet ranked the lowest among the perceived risk factors.

Table 4. Risk Factors Affecting Honey Usage as CAM

Risk factors	Mean	Rank
Inadequate information on the usefulness of honey as CAM	4.40	1 st
Variation in quality honey used as CAM	4.33	2 nd
Honey is very expensive	4.31	3 rd
Honey is bee vomit	3.13	4 th
Honey smells bad	3.07	5 th
Honey is not usually available	2.97	6 th
Honey is too sweet	1.7	7 th

Mean score ≥ 3.0 suggests major factors (code range:0-5)

4. DISCUSSION

This study showcased the use of honey and the perception about honey as CAM among the public in Ibadan metropolis. Using honey is not strange to the respondents, as about 63.5% of the respondents agreed to have used honey as CAM in the past three months. Evidence supporting the use of honey as CAM in Nigeria can be found in literature (Adebolu, 2005; Okoronkwo, Jane-lovena *et al.*, 2014; Abdullahi, 2011). Female uses honey for CAM more frequently (54.6%) than male, this is similar to (Wahab *et al.*, 2017) who reported that 62.5% of their respondents who use honey were female. Age significantly affects the usage/ none usage of honey in the study area ($p < 0.01$), the older the people the more they use honey in the study area. Diseases, such as diabetics are age dependent in Nigeria, (Ogbera and Ekpebegh, 2014) reported that diabetics is most common among older people over 30 years. Using honey as CAM to control diabetics has been reported in the literature (Liyanage and Horadugoda, 2017; Erejuwa, 2014; (Otilia *et al.*, 2018). Using honey as a CAM to prevent and control diabetics may be one reason older respondents adopted the use of honey. This study also shows that the frequency of using honey is significantly affected by age ($p < 0.01$) and increases with an increase in age.

In the present study, 76.3% (196/257) of the honey users used the substance to treat burnt and other wounds. Using honey to treat wound and burnt is not new; it has been used for this purpose since ancient times (Malone and Tsai, 2016; Subrahmanyam, 2007). Recent studies have shown prospective benefits of honey in the treatment of burns or wounds because of its various antibacterial and anti-inflammatory properties, which improve wound healing. Wounds have been shown to not only heal faster compared to conventional treatment, but also have decreased inflammation and reduced scar formation (Malone and Tsai, 2016). As a result, honey has been used for the treatment of partial-thickness burns and post-operative wounds with positive results (Malone and Tsai, 2016). Besides being cost effective, it is largely safe, has anti-oxidant, anti-bacterial and anti-inflammatory properties and is highly tolerable (Reza *et al.*, 2013). A study conducted by (Malik *et al.*, 2010) compared the effectiveness of silver sulphadiazine to treat superficial bunts with honey, the result of the study shows that the site treated with honey healed fully in less than 21 days against 24 days for the site treated with silver sulphadiazine. Six patients had a positive culture for *Pseudomonas aeroginsa* in honey-treated site, whereas 27 patients had a positive culture in silver sulphadiazine treated site. Despite the benefit of using honey to treat burns, many health practitioners won't prescribe it for their patients, reasons for these needs to be further scrutinized.

Among the regular users of honey as CAM in the study area, 72.8% (187/257) and 60.3% (155/257) agreed to have used honey as CAM to treat cough and sore throat, respectively. Raw honey in a combination of other substance has been reported to be effective against cough (Naveed *et al.*, 2013; Udoh and Meremikwu, 2018; Cohen, Rozen, and Kristal, 2012) and sore throat (Amira and Gamal, 2015; Manpreet and Shiv, 2016). A few respondents believed that honey can treat gastric ulcer, despite many researches backing the use of honey as an effective treatment of gastric ulcer (Annua *et al.*, 2018; Mulazim *et al.*, 2011). The limited number of respondents who uses honey to treat gastric ulcer maybe linked to poor information. Nearly 70% received their information from friends and family. Information obtained from friends and family may be inaccurately supplied to them and may not be scientifically founded. Therefore, patients planning to use or already using honey as CAM should be recommended to talk to their healthcare providers so that they can be informed about both, the benefits and limitations of

using honey in treating diseases. Honey is also listed to be a treatment of asthma by a few of the respondents (21.4%). Wahab *et al.*, (2017) reported that studies reporting the use of honey have been reported, however the studies were majorly conducted on small mammals and non-randomized human studies. There are needs for a randomized study on the use of honey to treat asthma.

In this study, the perception that the promotion of honey as food a supplement for general wellbeing is significant among users and nonusers ($p < 0.05$). (Stefan *et al.*, 2009) reported in their research on honey nutrition that honey has a variety of positive nutritional and health effects, if consumed at higher doses of 50 to 80 g per intake. They also stated that honey contains essential nutrients and minerals for enhanced health. Most honey users and non-users agree and strongly agree that there are enough evident supporting the use of honey as CAM (84.9%, 344/405). This view does not translate to the healthcare providers, as honey is not a common prescription for patients with ailments in which honey has proven to be effective. The majority of the respondents (72.6, 294/405) perceived that more information is needed regarding the health benefits of honey. In fact, the more educated the respondents are the more they believe promoting the health benefit of honey among public is important ($p < 0.05$). This implies that accurate and targeted information on the health importance of honey should be encouraged. Most of the respondents believe that honey stimulates the body's natural therapeutic power (69.4%, 281/257) and that they would rather use honey to treat common ailments, such as cough and sore throat than using modern medicine (74.9%, 304/405). Hegazi *et al.* (2015) reported in their experiment on the antitumor effect of honey on mature mice bearing Ehrlich ascites carcinoma (EAC), the result shows that there is modulation of cell-mediated immune response and immunoglobulin levels, in EAC bearing mice. Also the general opinion is to use honey to treat common ailments may be due to its availability, effectiveness, however, the high cost of honey should be subsidized among the populace.

This study shows that the majority (83%, 336/405) of the respondents believed that honey has no side effect. This also shows lack of adequate information, Chan *et al.* (2011) reported honey poisoning such as the type that causes botulism. The combination of honey with other substances should be tested for health safety before usage. Risk factors affecting honey use as CAM were identified by the respondents. The highest rank among the factors identified is that there is inadequate information on the usefulness of honey as CAM (mean = 4.40). Information on the relevance of honey as CAM, dosage, disease addressed, quality and type of honey need to be prescribed by trained medical personnel. Variation in quality of honey (mean = 4.33) and honey is expensive (4.31) also ranked high. Kugonza and Nabakabya, (2008) reported that common processing methods, such as harvesting immature honey, bad extraction methods and contamination by extraneous materials during handling could affect the quality of honey. Bett, (2017) also stated that animals such as parasites, pests and predators lower the quality of honey by introducing pollen, lumps of soil and droppings into the hives. Quality of honey should be ascertained before prescribing it for use medically. Honey has both strengths and limitations and is better prescribed by a medical expert for any treatment. This is because the quality will be properly checked. The limitation of honey to a local medical system as CAM can be made widespread if honey has a treatment modality. There should be a concern if patients rely solely on honey for treatment and avoid medical attention, especially the treatment of serious diseases.

In addition, members of the public who intend to use honey to treat diseases or maintain their health should be made aware of both, its strengths and limitations.

5. CONCLUSIONS

Most of the respondents showed favourable opinions about honey as CAM and had either used the substance to treat diseases or to promote health and general well-being. The study identified a trend in using honey common to older participants than the young. The study also reveals that the sources of information by the respondents affect its application as CAM. Respondents believe that honey can treat many diseases with their sources of information being their friends and relatives or internet which may not be reliable. The perception that honey has no side effect was common among the respondents, and a majority of the respondents recommend honey as CAM to treat common ailments. Some risk factors affecting the use of honey in the study area were identified by the respondents. Inadequate information on the use of honey as CAM and variation in honey quality were spotted as the top-ranked factors affecting honey usage as CAM. Future work should be to done on the methods of improving the quality of honey, the attitude of healthcare professionals on the use of honey as CAM. Issues on safety of the honey and consumer misconceptions should be properly addressed.

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