



# Exploring the use of and perceptions about honey as complementary and alternative medicine among the general public in the state of Selangor, Malaysia

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## ABSTRACT

**Objective:** Honey has been used as a biologically-based complementary and alternative medicine (CAM) since ancient times. The present study aimed to explore the use of and the perceptions about honey as a CAM among the general public in Selangor.

**Method:** A cross-sectional study using a self-completed questionnaire was employed. Participants were recruited using convenience sampling method from three towns in the state of Selangor.

**Results:** 56 % (168/300) of respondents used honey as CAM. Most users used honey as a dietary supplement for well-being (71.4 %, 120/168), or to treat coughs (57.1%, 96/168), and sore throats (53 %, 89/168). A small percentage of users (13.1 %, 22/168) used honey to treat asthma. The respondents generally showed favourable perceptions about honey as CAM as more than 60 % of them rated strongly agree and agree for each of the perception item in the survey. The users obtained their supply of honey from supermarkets (42.3%, 71/168), grocery stores (32.7 %, 55/168), and friends/family (31%, 52/168). In addition, most users sought information about honey from friends/family (63.1 %, 106/168), the Internet (60.7 %, 102/168) and advertisements (39.3 %, 66/168).

**Conclusion:** The respondents generally had favourable perceptions about honey as CAM. Future work should aim to produce more scientific evidences of the benefits and safety of honey. The use of honey supplies from unreliable sources as CAM and unreliable sources of information as well as potential self-medication with honey for serious diseases should raise concerns.

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## INTRODUCTION

The use of the complementary and alternative medicine (CAM) is common among the general public (Ventola, 2010). The two main CAM categories are the biologically-based therapies (e.g., herbs, vitamins, and minerals) and the mind-body

practices (e.g., massage, acupuncture, and meditation). Among the CAM modalities, the biologically-based therapies have been reported as the most commonly used in many previous studies (Siti *et al.*, 2009; Clarke *et al.*, 2015; Barnes *et al.*, 2007). In a nationwide survey in Malaysia, 69.4 % (4821/6947) of the respondents had used CAM at least once in their lifetime and 55.6 % (3863/6947) of them had used CAM within the previous 12 months of the survey (Siti *et al.*, 2009). In the survey, the use of the biologically-based therapies were found to be the most common with 88.9 % and 87.3 % of the surveyed CAM users had used the modalities to overcome their health problems and maintain their health, respectively (Siti *et al.*, 2009).

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Honey has been used as a biologically-based CAM since ancient times (Eteraf-Oskouei and Najafi, 2013). In Malaysia, people have often used honey in combination with other herbs to treat diseases or to maintain their health (Siti *et al.*, 2009). The use of honey as CAM has also been reported in many other countries such as Argentina (Kujawska *et al.*, 2012), India (Savithamma *et al.*, 2007), Korea (Lee *et al.*, 2004) and the United States of America (U.S.A.) (Burge and Albright, 2002). In a survey carried out in Romania, 20.5 % (45/220) respondents stated that they would consume honey as medicine.

The 2003 survey has identified the medical benefit of honey as an important motivation factor for the Romanian people to use honey (Arvanitoyannis and Krystallis, 2006). In a more recent Romanian survey carried out in 2012, 98 % (1421/1449) of respondents reported that they had consumed honey and 88 % (1275/1449) of all respondents agreed that honey would be good for health (Pocol and Bolboacă, 2013). In another survey in Saudi Arabia, 87.3 % (289/331) of respondents claimed that they had used honey because of its medicinal properties (Ismail *et al.*, 2014).

Honey mostly consists of fructose and glucose. However, it also contains a wide range of substances such as phytochemicals, flavonoids, enzymes, vitamins, minerals and other compounds (Ajibola, 2015). The constituents of honey work synergistically to produce its medicinal effects (Eteraf-Oskouei and Najafi, 2013; Ajibola, 2015). Over the past decades, numerous laboratory and clinical studies have shown the efficacy of honey especially in terms of its antibacterial properties, and in wound management (Eteraf-Oskouei and Najafi, 2013; Ajibola, 2015). In addition, the benefits of using honey in treating ophthalmic and dental diseases, and common ailments such as coughs, have also been reported (Salehi *et al.*, 2014; Atwa *et al.*, 2014; Paul *et al.*, 2007). Moreover, animal model studies have suggested that honey may be beneficial in the treatment of metabolic, cardiovascular, and neoplastic diseases (Eteraf-Oskouei and Najafi, 2013; Hussein *et al.*, 2012; Bardy *et al.*, 2008; Abdulrhman *et al.*, 2013). The usefulness of honey and its well-documented antioxidant and anti-inflammatory properties make it attractive and viable to be developed as a treatment modality for various diseases, and for the maintenance of health (Ajibola, 2015; Bhatti *et al.*, 2016). Although there are many studies which are in favor of the usefulness of honey in the treatment of various diseases, information about its use and perceptions of the general public about honey as CAM is still lacking. Previous studies which sought public opinions about honey were mainly market surveys or consumer behavior studies that focused on honey as food. This present study aimed to explore the use of honey and the perceptions of the public in the state of Selangor, Malaysia about honey as CAM.

The findings from this study may be used to assist the healthcare professionals in gaining a better understanding of the use of honey as CAM and may draw the attention of researchers for further investigations to produce more scientific evidences of the benefits and safety of honey.

## Methods

This study was a cross-sectional survey which explored the use of and the perceptions of the public about honey as CAM. A questionnaire was developed based on relevant literature with some modifications (Pocol and Bolboacă, 2013; Wahab *et al.*, 2014; Mitha *et al.*, 2013; Hassali *et al.*, 2012a). The questionnaire was constructed in the English language, translated into Malay and then back-translated into English to ensure its accuracy and validity. The final questionnaire contained survey items in both languages. To assess face and content validity, the questionnaire was reviewed by professors in pharmacy and researchers whose studies were related to honey. The questionnaire was then piloted among 50 adults who were sampled using convenience sampling technique to assess its readability, clarity and comprehensibility. However, results from the pilot survey were not included in the final data analysis. In the main study, honey would be considered as CAM if it was used to treat diseases, or to promote health and/or general well-being in the past three months. The questionnaire consisted of two sections: (1) respondents' demographic details and their patterns of honey use; and (2) perceptions about honey as CAM. In the second 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 study received ethical approval from the ethical committee of the Faculty of Pharmacy of *Universiti Teknologi MARA* (UiTM).

The respondents of the survey were members of the general public selected from three towns in Selangor, a west coast state of Peninsular Malaysia. The three selected towns, namely, Shah Alam, Puncak Alam, and Sabak Bernam, were chosen due to logistic reasons. In the present study, 100 respondents were recruited from each town using non-proportional quota sampling method.

In each town, one main business area was identified and two researchers approached potential respondents to be recruited as participants in the study. Selection of the respondents was performed in a non-probability manner. Each individual who agreed to participate in the survey was assured of confidentiality and anonymity. The survey was self-completed by the respondents. The completion of the questionnaire indicated consent for their participation in the study. All data were analyzed using SPSS statistical software (version 23). For the purpose of analysis, the Likert-type scale responses of "strongly agree and agree" and "strongly disagree and disagree" were grouped together. Data analysis utilized the chi-squared or Fisher's exact tests for categorical variables and the independent t-test for continuous variables. A *P* value of < 0.05 would be considered significant.

## RESULTS

Table 1 shows the demographic characteristics of the respondents. Out of 300 respondents who completed the questionnaires, 56 % (168/300) indicated that they had used honey as CAM in the past three months.

**Table 1:** Characteristics of study respondents.

Demographic characteristics	Users <sup>a</sup> (n = 168)	Non-users <sup>b</sup> (n = 132)	P value	Total (n = 300)
	Number (percentage)			
Township				
Shah Alam	57 (33.9)	43 (32.6)	0.08 <sup>c</sup>	100 (33.3)
Puncak Alam	55 (32.7)	45 (34.1)		100 (33.3)
Sabak Bernam	56 (33.3)	44 (33.3)		100 (33.3)
Gender				
Male	63 (37.5)	57 (43.2)	0.32 <sup>c</sup>	120 (40)
Female	105 (62.5)	75 (56.8)		180 (60)
Age				
Mean (SD)	30.98 (9.15)	30.37 (10.9)	0.60 <sup>d</sup>	30.7 (9.97)
Age group				
30 and below	96 (57.1)	80 (60.6)	0.55 <sup>c</sup>	176 (58.7)
31 and above	72 (42.9)	52 (39.4)		124 (41.3)
Race				
Malay	144 (85.7)	91 (68.9)	<0.001 <sup>c</sup>	235 (78.3)
Non-Malay	24 (14.3)	41 (31.1)		65 (21.7)
Education level				
University level	126 (75)	96 (72.7)	0.66 <sup>c</sup>	222 (74)
Lower than university level	42 (25)	36 (27.3)		78 (26)
Monthly income <sup>e</sup>				
RM 2000 and lower	82 (48.8)	89 (67.4)	0.001 <sup>c</sup>	171 (57)
More than RM 2000	86 (51.2)	43 (32.6)		129 (43)

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

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

<sup>c</sup>Chi-squared used.

<sup>d</sup>Independent t-test used.

<sup>e</sup>RM 1 is approximately USD 0.25.

There was no significant difference in the use of honey as CAM among respondents from the three towns. Approximately 60 % (105/168) of the users were female. Most users (57.1 %, 96/168) were 30 years and younger. The majority of the respondents were Malays (78.3 %, 235/300). Compared to the non-users of honey, the users were significantly more likely to comprise of respondents who identified themselves as Malays (users: 85.7 % [144/168] vs. non-users: 68.9 % [91/132];  $P < 0.01$ ). In addition, the users of honey were significantly more likely to earn more than RM 2000 monthly compared to the non-users (users: 51.2 % [86/168] vs. 32.6 % [43/132];  $P < 0.01$ ). Table 2 shows the patterns of use of honey among the users. The most common type of honey used was Tualang (45.8 %, 77/168). The majority of respondents used honey as a dietary supplement for well-being (71.4 %, 120/168). Many users claimed that they used honey to treat common ailments such as coughs (57.1 %, 96/168), and sore throats (53%, 89/168). A small percentage of users (13.1 %, 22/168) used honey to treat asthma. The users obtained their honey supplies from the supermarkets (42.3 %, 71/168), grocery stores (32.7 %, 55/168), and from friends/family (31%, 52/168). In addition, most users (79.2%, 133/168) were willing to spend about RM 20 and higher for honey. Users sought information about honey from friends/family (63.1 %, 106/168), the Internet (60.7%, 102/168), advertisements (39.3 %, 66/168) and the newspaper (37.5 %, 63/168). In general, the respondents showed favourable perceptions about honey as CAM as more than 60 % of them rated strongly agree and agree for each of the survey statement (Table 3). The majority of both the honey users and non-users strongly agreed and agreed that there was a sufficient evidence supports the

benefits of honey as a complementary medicine (users: 66.1 % [111/168] vs. 68.2 % [90/132];  $P = 0.85$ ) and that the use of honey as food supplement for general health should be promoted (users: 86.9 % [146/168] vs. 80.3 % [106/132];  $P = 0.21$ ). We found no significant difference in the perceptions of the users and non-users for the two survey statement.

**Table 2:** Pattern of honey use by users<sup>a</sup> (n = 168).

Pattern of honey use	n (%)
Type of honey used <sup>b</sup>	
Tualang	77 (45.8)
Acacia	20 (11.9)
Kelulut	15 (8.9)
Nenas	11 (6.5)
Manuka	7 (4.2)
Gelam	6 (3.6)
Others	23 (13.7)
Unsure of the type	64 (38.1)
Used honey as dietary supplement for general well-being	120 (71.4)
Used honey for treatment of diseases <sup>b</sup>	
Coughs	96 (57.1)
Sore throat	89 (53)
Wound	28 (16.7)
Asthma	22 (13.1)
Animal stings	21 (12.5)
Skin diseases	21 (12.5)
Stomach ache	9 (5.4)
Ulcers	6 (3.6)
Others	25 (14.9)
Frequency of using honey	
Very frequent	19 (11.3)
Frequently	33 (19.6)
Sometimes	65 (38.7)
Occasionally	18 (10.7)
Rarely	33 (19.6)

Source of obtainment of honey <sup>b</sup>	
Supermarkets	71 (42.3)
Grocery stores	55 (32.7)
Friends and/or family	52 (31)
Health / organic stores	35 (20.8)
Pharmacies	34 (20.2)
Traditional medicine outlets	26 (15.5)
Night markets	21 (12.5)
Beekeepers	20 (11.9)
Online	12 (7.1)
Other sources	18 (10.7)
Spending on honey <sup>c</sup>	
<RM 20	35 (20.8)
RM 20 – RM 40	52 (30.9)
RM 41 – RM 60	51 (30.4)
>RM 60	30 (17.9)
Source of information about honey <sup>b</sup>	
Friends and/or family	106 (63.1)
Internet	102 (60.7)
Advertisements	66 (39.3)
Newspapers	63 (37.5)
Mass media (e.g. radio, television, etc.)	60 (35.7)
Books	50 (29.8)
Scientific articles	33 (19.6)
Health professionals	29 (17.3)
Others	12 (7.1)

<sup>a</sup>Surveyed among honey users only.  
<sup>b</sup>Respondents can provide more than one response and therefore responses do not add up to 100 %.  
<sup>c</sup>RM 1 is approximately USD 0.25.

In addition, although not using honey as CAM for the past 3 months of the survey, the majority of the non-users (65.2 %, 86/132) rated strongly agree and agree that they would rather use honey to treat common ailments such as coughs and sore throats than using modern medicines. The honey users were significantly more likely to strongly agree and agree with the other 6 survey statements compared to the non-users. It was also observed that a significantly higher proportion of male respondents strongly agreed that there was sufficient evidence that supports the use of honey as CAM compared to the female respondents

(male: 75 % [90/120] vs. female: 61.7 % [111/180];  $P = 0.04$ ). The female respondents however were significantly more likely to strongly agree and agree that honey can stimulate body natural therapeutic power compared to their male counterpart (male: 55.8 % [67/120] vs. female: 64.4 % [116/180];  $P < 0.01$ ). In regards to age, although the younger respondent group (30 years and below) were significantly more likely to strongly agree and agree that there is a need to disseminate information about honey to the public (younger: 84.7 % [149/176] vs. older: 74.2 % [92/124];  $P < 0.01$ ), significantly higher proportions of respondents from the older group (31 years and above) strongly agree and agree that honey can stimulate body natural power (younger: 56.8 %, [100/176] vs. older: 66.9 % [83/124];  $P = 0.04$ ), and that honey is easy to be used (younger: 78.4 % [138/176] vs. older: 82.3 % [102/124];  $P = 0.01$ ). Compared to their younger counterpart the respondents in the older group were also significantly more likely to strongly agree and agree that they would rather use honey as CAM to treat common ailments than using modern medicines (younger: 63.1 % [111/176] vs. older: 73.4 % [91/124];  $P = 0.03$ ). Overall, the Malay respondents appeared to be more favorable towards honey as CAM compared to the non-Malays. Significantly higher proportion of the Malay respondents rated strongly agree and agree to 7 out of 9 survey statements. Our findings also showed that those who had university education were more likely to strongly agree and agree that they would not mind to spend money on honey as CAM (university level: 64 % [142/222] vs. lower than university level: 57.7 % [45/78];  $P < 0.01$ ). Although we found that those who earn more than RM 2000 and above monthly were more likely to use honey as CAM in the past 3 months of the survey compared those who earn less than RM 2000 a month, the higher earner group showed no significant difference in their perceptions about honey as CAM when compared to those in the lower earner group.

**Table 3:** Perceptions of respondents towards honey as CAM.

Statement	Frequency (%) of responses			Users / Non-users	Gender	Age	Ethnicity	Education level	Income
	Strongly Agree and Agree	Neutral	Disagree and Strongly Disagree						
Sufficient evidence supports the benefits of honey as a complementary medicine	201 (67)	88 (29.3)	11 (3.7)	0.85	0.04	0.01	0.02	0.11	0.24
The use of honey as food supplement for general health should be promoted	252 (84)	39 (13)	9 (3)	0.21	0.95	0.42	0.07	0.92	0.10
More information should be provided to the public regarding the health benefits of honey	241 (80.3)	54 (18)	5 (1.7)	<0.01*	0.13*	<0.01*	<0.01*	0.11*	0.14*
I believe that honey can stimulate body natural therapeutic power	183 (61)	76 (25.3)	41 (13.7)	<0.01	<0.01	0.04	0.02	0.76	0.62
I would rather use honey to treat common ailments such as coughs and sore throats than using modern medicines	202 (67.3)	78 (26)	20 (6.7)	0.18	0.64	0.03	0.26	0.73	0.90
I would recommend honey to others as an alternative to modern medicine in treating common ailments	211 (70.3)	69 (23)	20 (6.7)	<0.01	0.33	0.61	0.01	0.11	0.91
I would not mind spending money on honey as a complementary or alternative medicine	187 (62.3)	85 (28.3)	28 (9.3)	<0.01	0.73	0.09	<0.01	<0.01	0.47
Honey is easy to be used as a complementary or alternative medicine	240 (80)	53 (17.7)	7 (2.3)	<0.01*	0.44*	0.01*	<0.01	0.16	0.81
Honey has no side effects	217 (72.3)	69 (23)	14 (4.7)	0.02	0.36	0.78	<0.01	0.07	0.53

\* $P$  value by Fisher's exact test

## DISCUSSION

The current study presented the use of and the perceptions about honey as CAM among the general public in Selangor. The findings indicated that more than half of the respondents used honey in the past three months as CAM. The use of honey as dietary supplement for general well-being was noted in more than 70 % of the users. The Malays were noted to be significantly more likely to use honey as CAM in the past three months of the survey. The Malay respondents were also observed to be more favourable towards honey as CAM as significantly more Malay respondents strongly agreed and agreed with 7 out of 9 survey statements. The use of honey in the Malay traditional medicine is undeniably common and has been applied in this medical system for centuries. Moreover, honey is regarded as nutritious and healthy in Islam, which is the main religion for the Malays in Malaysia (Eteraf-Oskouei and Najafi, 2013). Therefore, the high usage of honey as CAM among the Malay respondents in the current study may have been influenced by their local culture and religion.

Although most indications for honey use by the users in the present study involved common ailments, 13.1 % (22/168) of them used honey to treat asthma. The use of honey as CAM for asthma is in fact not uncommon (Savithamma *et al.*, 2007; Alshagga *et al.*, 2011; Orhan *et al.*, 2003). In a cross-sectional survey carried out among adult asthmatic patients in a Malaysian general hospital, 61.1 % (58/95) of the patients used CAM and honey was identified as one of the most common type of CAM used (Alshagga *et al.*, 2011). Studies using honey to treat asthma have also been published (Rhman, 2007; Kamaruzaman *et al.*, 2014). Despite yielding promising findings, these studies were confined to research on small animal and non-randomized human studies. Randomized clinical trials to verify the efficacy and safety of honey in asthma are still lacking. Hence, the fact that a small percentage of the respondents in the current study used honey as CAM to treat asthma has raised a cause for concern. Although honey use may be argued to be relatively safe, such practice may delay appropriate treatment and may put patients at risk of disease exacerbations. Therefore, the use of honey in treating asthma especially as an alternative medicine should not be recommended (Eteraf-Oskouei and Najafi, 2013).

In the present study, 57.1 % (96/168) and 53 % (89/168) of the honey users used the substance to treat coughs and sore throat, respectively. The potential usefulness of honey on its own or in combination with other ingredients for treating coughs (Paul *et al.*, 2007; Raessi *et al.*, 2013; Cohen *et al.*, 2012; Sulaiman *et al.*, 2011) and sore throats (Sulaiman *et al.*, 2011) has been reported in previous studies. Honey is in fact recommended in treatment guidelines to treat coughs (Morice *et al.*, 2006; Fashner *et al.*, 2012). Nonetheless, evidence of the effectiveness of the local honeys (e.g., Tualang, Kelulut, and Nenas) in treating coughs, sore throats and other common ailments are still limited. This paucity warrants further studies. In the present study, the majority of the honey users and non-users strongly agreed and

agreed that there was sufficient evidence for the benefits of honey. Despite such belief, it should be noted that the majority of honey users utilized the Internet and advertisements as their sources of information about honey. As a matter of fact, the use of the Internet to seek information about CAM is common among the public (Hyodo *et al.*, 2005; Diaz *et al.*, 2002). Nevertheless, such information obtained from the Internet would not necessarily be reliable and valid, and it could be misleading (Hyodo *et al.*, 2005). Furthermore, a previous study by Hassali *et al.* (2012b) found that many advertisements for CAM did not comply with the Medicine Advertisements Board (MAB) guidelines and the Malaysian Code of Advertising Practice. 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.

The non-users of honey in the present study appeared to be skeptical towards honey in several instances. For examples, the non-users were noted to be less likely to strongly agree and agree that honey as CAM would be free from side effects, and that it could stimulate the body's natural therapeutic power. In addition, the non-users were also less likely to strongly agree and agree that they are willing recommend honey as CAM to others and to pay for honey as CAM. These skeptical attitudes and the unwillingness to pay for honey as CAM could be the reasons why honey was not a choice of treatment modality among the non-users. Interestingly, although not using honey as CAM in the past 3 months of the survey, the non-users also showed interest in using honey to treat common ailments than using the modern medicines.

In the present study, honey users in general held the belief that honey would have no side effects, probably due to the fact that honey is a natural product, and therefore is presumed safe. Nevertheless, although relatively harmless, the adverse effects from the consumption of honey have been reported (Paul *et al.*, 2007; Özhan *et al.*, 2004; Yocum and Khan, 1994). In a previous study in the U.S.A., the use of honey to suppress coughs produced a combination of mild reactions that included hyperactivity, nervousness, and insomnia (Paul *et al.*, 2007). Other adverse effects relating to honey that have been reported include bradycardia and hypotension due to honey poisoning (Özhan *et al.*, 2004; Jauhari *et al.*, 2009), and allergy reactions (Yocum and Khan, 1994).

The present survey also showed that the majority of users obtained their honey supplies from the supermarkets and grocery stores. Previous studies on international market also indicated similar findings (Ványi *et al.*, 2011; Batt and Liu, 2012). However, whether the honey obtained from the supermarkets and grocery stores would have similar quality and therapeutic effects to those reported in previous laboratory and clinical studies has remained questionable. The limitations of using table honeys obtained from the supermarket for treating wounds compared to the use of medical-grade honeys (MGH) have been reported in a British study (Cooper and Jenkins, 2009). The study found that honey obtained from the supermarkets in Britain showed low antibacterial activities compared to those of the MGH. Moreover,

honey obtained from the supermarkets contained a wide range of potentially pathogenic microorganisms (Cooper and Jenkins, 2009), including *Clostridium botulinum* (Küplülü *et al.*, 2006). Furthermore, the rise of counterfeit and adulterated honey that has become commonplace in the market in the recent years should provide a cause for concern (Yeow *et al.*, 2013). Counterfeit and adulterated honey may not have the health benefits of pure honey and can be harmful.

Honey as a CAM has both strengths and limitations. Due to the local traditional medical systems that often incorporate honey as a treatment modality, the use of honey as CAM can be widespread. Healthcare providers especially doctors and pharmacists should therefore remain vigilant of the CAM modalities used by their patients (Miller *et al.*, 2000). Moreover, they should be proactive in inquiring their patients about the use of CAM in an open and non-judgmental manner (Wahab *et al.*, 2016). There should be a concern if patients rely solely on honey for treatment and avoid medical attention especially for 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. The present study has several limitations. In this study the respondents were recruited using convenience sampling method. Potentially those who agreed to participate in the study were generally interested in honey, even if they were not using it, thereby predisposing the results of this study to sampling bias. Because only three towns were selected, and that the selection of participants was made using convenience sampling method, the respondents were not representative of the local population; thus, the generalizability of the results of this study would be limited even at the regional level.

## CONCLUSION

The majority of the respondents showed favourable perceptions about honey as CAM, and had either used the substance to treat diseases, or to promote health and general well-being. However, three issues have raised some concerns: the use of table honeys from unreliable sources and of questionable quality as CAM; the use of unreliable sources of information for honey use; and, the potential self-medication using honey for treating serious diseases. Future work should not only aim to produce more scientific evidences of the benefits and safety of honey, but also to enhance consumers' understanding about both the strengths and limitations of honey as CAM to prevent misconceptions.

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