International
Journal of Human Sciences
ISSN:2458-9489

Volume: 21 Issue: 4 Year: 2024

Determination of health care workers' knowledge of apitherapy and bee products, and food neophobia

Biriz Çakır[1]
Ceylan Taşyürek[2]
Nurşah Kartal[3]

Abstract

Aim: To determine the knowledge of healthcare workers about apitherapy and bee products, and food neophobia.

Method: This study is a descriptive and cross-sectional study. A total of 456 healthcare workers working in different professions participated in the study. The questionnaire contained questions about demographic features, knowledge and use of apitherapy and bee products, and a food neophobia scale. The data obtained were evaluated with the SPSS program.

Findings: Of the healthcare workers, 66.4% were female, 45.6% were physicians/specialists+resident physicians and 34.0% were nurses. 54.0% of the healthcare workers were in the 20-29 age group and the difference between the age groups in consumption of bee products was statistically significant ($p<0.05$). 68.0% of healthcare workers stated that they had not heard of the term "apitherapy" and 71.0% stated that they did not know apitherapy products. Those who have never heard of its effects on health care 59%, while those who think it has a curative effect on diseases are 36.3%. On the other hand, 65.6% of healthcare workers consumed any of the bee products. Honey is the bee product consumed every day (5.1%). When weekly consumption was questioned, the frequency of consumption of honey, propolis and bee pollen 1-2 days a week was 27.1%, 2.2%, and 1.0%, respectively; the frequency of consumption 2-3 days a week was 20.9% for honey and 5.6% for propolis. Apilarnil was consumed once every six months (0.5%), while bee bread was never consumed. Among healthcare workers, 18.6% were food neophilic, 63.6% were neutral and 17.8% were food neophobic. The difference between the groups according to age, occupation, and use of food supplements was significant ($p<0.05$).

Conclusion: It was found that most of the healthcare workers had no knowledge about apitherapy and bee products; age, occupation, and using dietary supplements affected the food neophobia. However, further studies are needed to determine the existence or direction and strength of the relationship between these factors and food neophobia.

Keywords: apitherapy; bee products; food neophobia; healthcare workers; food consumption frequency

[1] Assoc. Prof. Dr., Kırıkkale University, Faculty of Health Sciences, Department of Nutrition and Dietetics, birizcakir@kku.edu.tr Orcid ID: 0000-0002-3501-3253

[2] Dietitan, tasyurekceylan81@gmail.com Orcid ID: 0009-0005-4582-1915

[3] Dietitan, nurshkrtl@gmail.com Orcid ID: 0009-0001-5683-0092

Submitted: 09/10/2024 Published: 08/12/2024

Çakır, B., & Taşyürek, C. (2024). Determination of health care workers' knowledge of apitherapy and bee products, and food neophobia. *Journal of Human Sciences*, *21*(4), 393-403. doi:10.14687/jhs.v21i4.6504

1. Introduction

Bees and bee products have been used to prevent and treat diseases in different parts of the world since ancient times. This form of treatment is called apitherapy and is recognized as a branch of complementary medicine. All bee products, honey, propolis, bee pollen, bee bread (Perga), royal jelly, bee venom, apilarnil, and beeswax, can be used in apitherapy (Habryka et al, 2016; Ekici & Gölgeli, 2021).

Honey has been used for therapeutic purposes since ancient times. Propolis is a bee product that worker bees bring to the hive by mixing the resins they collect from the buds and shoots of plants with beeswax and saliva secretions. Bee pollen is extremely important because it contains the nutrients necessary for the production of royal jelly and the growth and development of the offspring. Bee bread is a specially fermented form of pollen by bees. Royal jelly is a bee product secreted from the hypopharyngeal and mandibular glands of 5-15-day-old worker bees to feed the queen bee and larvae. Bee venom is a bee product that is yellowish, has a sharp odor and a bitter taste and crystallizes when it comes into contact with the air and is found in the venom sac of bees. Beeswax is produced by worker bees and used in honeycomb construction. Apilarnil, a product of drone and queen larvae, also is widely used in the pharmaceutical and cosmetic industries in many countries (Ekici & Gölgeli, 2021).

In the regulation on traditional and complementary medicine practices (TACMP) apitherapy is stated as using bees and bee products for preventive purposes and as a support in the treatment of certain diseases, and the authorization to practice is given to a certified physician (Ministry of Health, 2014). Many of these products have a protective effect against bacteria in the body (anti-bacterial), accelerate tissue regeneration, stimulate the body's defense system. (Habryka et al., 2016). However, the potential risks and health benefits should be well known and necessary precautions should be taken. In this context, apitherapy has also defined many issues such as the points to be considered in the application, product selection, purpose of use, method of use, what to do in case of sensitivity to products and allergic situations, etc. (Atayoğlu, 2019).

The tendency to avoid new or unknown foods to different degrees is defined as "food neophobia" (Pliner & Hobden, 1992). It has been accepted as a personal trait or behavior pattern (Karaağaç & Bellikçi-Koyu, 2023). It has been suggested that food neophobia is the most important factor affecting consumers' food consumption and acceptance and that neophobia plays a significantly stronger role than other factors in determining the likelihood of food rejection (Siddiqui et al., 2022).

It has been reported that the consumption of bee products as a functional food (nutraceutical) and dietary supplements by consumers in the world is increasing due to their health benefits (Habryka et al, 2016, Wills et al, 2020). However, the frequency of purchase and consumption of bee products except honey is quite low in Türkiye (Bölüktepe & Yılmaz, 2008; Niyaz & Demirbaş, 2017). It is thought that this situation may be due to the lack of awareness of bee products or food neophobia of consumers. In order to obtain good results in apitherapy applications, the first condition required is to choose the appropriate product (Atayoğlu, 2019). The knowledge of apitherapy and bee products by healthcare workers, especially physicians, is of particular importance for themselves, the individuals around them, and patients. The demand for TACMP applications is increasing in both developed and developing countries. In studies conducted in Turkey, it has been reported that usage rates vary between 25.2% and 86.3%, and that healthcare professionals should be aware of TACMP applications due to such a high level of demand and increasing usage (Şenol et al., 2020). Trumbeckaite et al. reported that having accurate information about complementary medicine practices enables patients to make informed decisions by providing accurate information on issues they are curious about (Trumbeckaite et al., 2015).

Çakır, B., & Taşyürek, C. (2024). Determination of health care workers' knowledge of apitherapy and bee products, and food neophobia. *Journal of Human Sciences*, *21*(4), 393-403. doi:10.14687/jhs.v21i4.6504

2. Purpose

This study aimed to assess healthcare workers' knowledge of apitherapy and bee products, their consumption status of bee products, and their food neophobia.

3. Method and Material

The study was conducted among healthcare workers working at Kırıkkale University Faculty of Medicine Hospital between January and September 2023.

3. 1.The place and time of the study

A total of 688 healthcare workers in different professions work at the Faculty of Medicine Hospital.

3.2. Population and sample selection

This number constitutes the population of the study and it was aimed to reach the population within the scope of the study.

3.3.Type of study

This is a descriptive and cross-sectional study.

3.4.Data collection

3.4.1.Data collection method

Before starting the study, healthcare workers were informed about the study by the researchers, and 456 (66.3%) healthcare workers voluntarily accepted to be include in the study.

3.4.2.Data collection tools

The researchers developed a face-to-face questionnaire applied in the study after a literature review. It consists of questions about socio-demographics, knowledge, and use of apitherapy and bee products, as well as the scale of food neophobia. Food Neophobia Scale (FNS) was developed by Pliner and Hobden (Pliner & Hobden, 1992). The Turkish validity and reliability of the scale was conducted by Uçar et al. It is a Likert-type scale with 10 items and 2 subscales and contains 7 categories between 10-70 points. High scores are associated with the presence of food neophobia. Evaluation was based on the mean (x) and standard deviation (SD) of the total scores. Individuals with a scale score $<x\pm1$SD are considered food neophilic, $x\pm1$SD neutral, and $>x\pm1$SD food neophobic (Uçar et al, 2021). Accordingly, for this study, $x\pm1$SD=35.31±10.39 and therefore, healthcare workers were classified as food neophilic with a total score of ≤24, neutral with a score between 25-45, and food neophobic with a score of ≥46.

3.4.3.Data collection time

January-September 2023.

3.5.Limitations of the study

The study was limited to healthcare workers working in a university hospital and cannot be generalized to all healthcare workers. In addition, healthcare professionals were evaluated only according to their professions in the study. Specialists' and resident physicians' areas of expertise were not questioned.

3.6.Research ethics

The study has the permission of the Kırıkkale University Non-Interventional Research Ethics Committee (21.12.2022/2022.12.09).

3.7.Evaluation of data

For the comparison of categorical variables, cross-tabulations were generated, and the number (n), percentage (%), and chi-square test statistics were reported. IBM SPSS Statistics 21.0 and MS-Excel 2007 programs were used. The statistical significance level was accepted as $p<0.05$.

4. Results

Of the healthcare workers, 66.4% were female and 33.6% were male, 45.6% were physicians/specialists + resident physicians and 34.0% were nurses. 54.0% of healthcare workers were in the 20-29 age group and it was found that age group affected the consumption of bee

Çakır, B., & Taşyürek, C. (2024). Determination of health care workers' knowledge of apitherapy and bee products, and food neophobia. *Journal of Human Sciences*, *21*(4), 393-403. doi:10.14687/jhs.v21i4.6504

products (p<0.001). The consumption status of any bee products was statistically significant in the 20-29 age group and the 30-39 age group (p<0.001). 54.2% of the healthcare workers were single and 19.5% of them had a chronic disease. Thirty percent of the workers used dietary supplements (Table 1).

Table 1. Use of bee products according to demographic characteristics of healthcare workers (n=456)

	Consumption of any bee products			χ^2	P
	Yes n(%)	**No n(%)**	**Total n(%)**		
Sex					
Female	207 (69.2)	96 (61.1)	303 (66.4)	$\chi2$=3.018	0.082
Male	92 (30.8)	61 (38.9)	153 (33.6)		
Age (year)					
20-29	173 (57.9)[a]	73 (46.5)[b]	246 (54.0)	$\chi2$=21.668	**<0.001**
30-39	88 (29.4)[a]	76 (48.4)[b]	164 (35.9)		
40-49	23 (7.7)[a]	8 (5.1)[a]	31 (6.8)		
≥50	15 (5.0)[a]	0 (0.0)[b]	15 (3.3)		
Occupation					
Physician/Specialist	83 (27.8)	40 (25.5)	123 (27.0)	$\chi2$=7.814	0.349
Resident physician	51 (17.0)	34 (21.7)	85 (18.6)		
Nurse	101 (33.8)	54 (34.4)	155 (34.0)		
Midwife	8 (2.7)	3 (1.9)	11 (2.4)		
Health officer	36 (12.0)	13 (8.3)	49 (10.7)		
Pharmacist/dietitian/ physiotherapist	5 (1.7)	8 (5.1)	13 (2.9)		
Technician (lab)	6 (2.0)	2 (1.2)	8 (1.8)		
Others*	9 (3.0)	3 (1.9)	12 (2.6)		
Marital status					
Married	131 (43.8)	78 (49.7)	209 (45.8)	$\chi2$=1.428	0.232
Single	168 (56.2)	79 (50.3)	247 (54.2)		
Presence of chronic disease					
Yes	53 (17.7)	36 (22.9)	89 (19.5)	$\chi2$=1.775	0.183
No	246 (82.3)	121 (77.1)	367 (80.5)		
Using dietary supplement					
Yes	93 (31.1)	44 (28.0)	137 (30.0)	$\chi2$=0.464	0.496
No	206 (68.9)	113 (72.0)	319 (70.0)		

χ^2:Chi-square test, Different letters indicate difference at p<0.05 level

**. Psychologist, audiologist, biologist, medical secretary, technician, patient caregiver*

Çakır, B., & Taşyürek, C. (2024). Determination of health care workers' knowledge of apitherapy and bee products, and food neophobia. *Journal of Human Sciences*, *21*(4), 393-403. doi:10.14687/jhs.v21i4.6504

68.0% of the healthcare workers stated that they had not heard of the term "apitherapy" and 71.0% stated that they did not know apitherapy products. Those who did not know the effects of apitherapy on health were 59%, while 36.4% thought that it had a curative effect on diseases (Table 2).

Table 2. Healthcare workers' knowledge of apitherapy (n=456)

		n (%)
Heard the term "apitherapy"	Yes	146 (32.0)
	No	310 (68.0)
Awareness of apitherapy products	Yes	98 (21.5)
	No	324 (71.0)
	I am not sure	34 (7.5)
Knowledge about the health effects of apitherapy	I have no idea	267 (59.0)
	Very poor	79 (17.3)
	Poor	40 (8.7)
	Fairly good	57 (12.5
	Good	0 (0.0)
	Excellent	13 (2.8)
Thinking that apitherapy products have a curative effect on diseases	Yes	166 (36.4)
	No	290 (63.6)

65.6% of healthcare workers consume any of the bee products (Table 1). Honey was the only bee product consumed every day (5.1%). In terms of weekly consumption frequency, honey (27.1%), propolis (2.2%), and bee pollen (1.0%) are consumed 1-2 days a week. Bee bread is never consumed (Table 3).

Table 3. Frequency of consumption of bee products in healthcare workers*

	Never	**Once every 6 months**	**Once a month**	**2 per month**	**2-3 per week**	**1-2 per week**	**Every day**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Honey	19 (6.5)	18 (6.2)	41 (14.0)	59 (20.2)	61 (20.9)	79 (27.1)	15 (5.1)
Propolis	144 (67.0)	30 (14.0)	13 (6.0)	6 (2.8)	12 (5.6)	10 (2.2)	0 (0.0)
Bee pollen	168 (88.0)	16 (8.4)	5 (2.6)	0 (0.0)	0 (0.0)	2 (1.0)	0 (0.0)
Royal Jelly	181 (94.8)	8 (4.2)	2 (1.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Bee bread	191 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Apilarnil	168 (99.5)	1 (0.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

*Evaluated based on respondents.

Among healthcare workers, 18.6% were food neophilic, 63.6% were neutral and 17.8% were food neophobic. Age, occupation, and dietary supplement use were found to be affected by food neophobia levels. ($p<0.05$). (Table 4).

Çakır, B., & Taşyürek, C. (2024). Determination of health care workers' knowledge of apitherapy and bee products, and food neophobia. *Journal of Human Sciences*, *21*(4), 393-403. doi:10.14687/jhs.v21i4.6504

Table 4. Demographic features of healthcare workers according to Food Neophobia Scale (FNS) Score classification (n=456)

	FNS score classification				
	Food Neophilic	**Neutral**	**Food Neophobic**	χ^2	**P**
	n (%)	**n (%)**	**n (%)**		
Sex					
Female	55 (64.7)	198 (68.3)	50 (61.7)	$\chi2$=1.305	0.521
Male	30 (35.3)	92 (31.7)	31 (38.3)		
General	85 (18.6)	290 (63.6)	81 (17.8)		
Age (year)					
20-29	42 (49.4)[a]	164 (56.6)[a]	40 (49.4)[a]	$\chi2$=16.204	**0.013**
30-39	33 (38.8)[a]	106 (36.6)[a]	25 (30.9)[a]		
40-49	7 (8.3)[a,b]	11 (3.7)[a]	13 (16.0)[b]		
≥50	3 (3.5)[a]	9 (3.1)[a]	3 (3.7)[a]		
Occupation					
Physician/Specialist	17 (20.0)[a]	90 (31.0)[a]	16 (19.8)[a]	$\chi2$=45.995	**<0.001**
Resident physician	12 (14.1)[a]	64 (22.1)[a]	9 (11.1)[a]		
Nurse	43 (50.6)[a]	75 (25.9)[b]	37 (45.7)[a]		
Midwife	2 (2.4)[a]	5 (1.7)[a]	4 (4.9)[a]		
Health officer	5 (5.9)[a]	38 (13..1)[a]	6 (7.3)[a]		
Pharmacist/dietitian/ Physiotherapist	5 (5.9)[a]	3 (1.0)[b]	5 (6.2)[a]		
Technician (lab)	0 (0.0)[a]	6 (2.1)[a]	2 (2.5)[a]		
Others*	1 (1.1)[a]	9 (3.1)[a]	2 (2.5)[a]		
Marital status					
Married	37 (43.5)	129 (44.5)	43 (53.1)	$\chi2$=2.111	0.348
Single	48 (56.5)	161 (55.5)	38 (46.9)		
Presence of chronic disease					
Yes	15 (17.6)	53 (18.3)	21 (25.9)	$\chi2$=2.592	0.274
No	70 (82.4)	237 (81.7)	60 (74.1)		
Using dietary supplement					
Yes	35 (41.2)[a]	74 (25.5)[b]	28 (34.6)[a,b]	$\chi2$=8.628	**0.013**
No	50 (58.8)[a]	216 (74.5)[b]	53 (65.4)[a,b]		

χ^2:Chi-square test, Different letters indicate difference at p<0.05 level
**Psychologist, audiologist, biologist, medical secretary, technician, patient caregiver*

5. Discussion

Apitherapy is accepted among complementary medicine practices in Türkiye as it is all over the world. When bee products are not used regularly and under the control of a physician, there is a possibility of toxic effects, and sometimes these conditions may cause various organ failures (Baydaş et al., 2024). In this study, the knowledge of physicians, who are apitherapy practitioners, and other

Çakır, B., & Taşyürek, C. (2024). Determination of health care workers' knowledge of apitherapy and bee products, and food neophobia. *Journal of Human Sciences*, *21*(4), 393-403. doi:10.14687/jhs.v21i4.6504

health workers about bee products and apitherapy, consumption of bee products, and food neophobia were investigated.

In a study carried out with consumers, it was reported that more than half of the consumers of bee products were female and the majority were in the middle age group (Niyaz and Demirbaş, 2017). In this study, although the majority of healthcare workers were female, it was found that sex did not affect bee product consumption ($p>0.05$), while age group was affected ($p<0.05$). It was determined that those who consume bee products were higher in the 20-29 age group and those who did not consume were higher in the 30-39 age group than the other groups ($p<0.05$). This result showed that healthcare professionals under the age of 30 year were more interested in bee products.

The impact of bee products on health has been reported by many researchers (Habrydka et al., 2016; Martinello & Mutinelli, 2021; El-Seedi et al., 2022;) and although not yet supported by sufficient evidence based on clinical studies, it has been reported that it can be used as a promising complementary treatment for various diseases (Cucu et al., 2021). A study conducted with family physicians reported that 63.38% of physicians heard the term apitherapy, 1.41% practiced it themselves, 14.55% recommended it to their patients, and 0.94% applied it to their patients (Dağcı & Öztürk, 2021). In a study conducted with nurses, it was determined that most nurses did not have sufficient knowledge about apitherapy and that their existing knowledge was obtained from unreliable sources (i.e.internet). In addition, it was determined that nurses most frequently use honey as an apitherapy product and they think that apitherapy products can be used in the treatment of various diseases (immune system, digestive system, respiratory system diseases etc.) (Kavurmacı & Tan, 2019). In another study in which physicians, nurses, and other healthcare workers participated, 57.9% of the employees reported that they used TACM practices and 84.4% reported that they recommended these practices to someone else. When asked about apitherapy knowledge and awareness, only 3.5% of the employees stated that they knew apitherapy well, 24.2% knew it a little, 20.4% were aware of it, and 51.9% were not aware of it (Sarman & Uzuntarla, 2022). In this study, it was observed that only about one-third of healthcare workers had heard of the concept of apitherapy before, the majority (84.9%) had no or little/little knowledge of the effects of apitherapy on health, and 36.3% thought that apitherapy/bee product had a curative effect on diseases. These results consider that the awareness of all healthcare workers, especially physicians, about apitherapy and bee products should be increased.

In various studies on the awareness and consumption frequency of bee products among consumers, honey ranked first (Bölüktepe & Yılmaz, 2008; Sayılı, 2013; Tunca et al., 2015; Niyaz & Demirbaş, 2017; Şahinler et al, 2021;). In studies on bee consumption among university students, honey consumption also ranked first (Soylu & Silici, 2018; Saral & Yavuz, 2020). Similar to the studies conducted in various groups of society, in this study, it was observed that healthcare workers consumed honey most frequently. Honey is the only bee product consumed every day (5.1%). Saral and Yavuz (2020) reported that honey was recognized the most among bee products, consumers preferred to consume it for health and consumed it with the recommendation of family/friends/neighbors/relatives (Saral & Yavuz, 2020). In another study, similarly, it was stated that honey is the most consumed bee product among bee products and that awareness of bee products increases with education level and income level (Şahinler & Çetinkaya, 2021). In this study, it was determined that honey (27.1%), propolis (2.2%), and bee pollen (1.0%) were consumed 1-2 days a week frequently, royal jelly was never consumed, and bee bread and apilarnil were consumed very rarely. Tunca et al. (2015) reported that although consumers are relatively knowledgeable about the benefits of bee products, they have serious trust problems towards these products (Tunca et al., 2015). In addition, a review of 139 articles concluded that according to available evidence, fear of new foods is negatively associated not only with new/unfamiliar foods but also with acceptance of familiar foods (Karaağaç & Bellikçi-Koyu, 2023). In this context, it is thought that healthcare workers may have trust problems towards bee products available in the market, bee products other than honey are unfamiliar new foods for them, and even if they know the products, they have difficulty in accepting and consuming them.

Çakır, B., & Taşyürek, C. (2024). Determination of health care workers' knowledge of apitherapy and bee products, and food neophobia. *Journal of Human Sciences*, *21*(4), 393-403. doi:10.14687/jhs.v21i4.6504

Many researchers have investigated the relationship between food neophobia which affects individuals from childhood to adulthood, and demographic characteristics such as sex, age, marital status, etc. (Muhammad et al., 2015; Tuorila et al., 2001; Keskin & Sezen, 2020; Ceylan & Şahingöz, 2019). The results related to sex are different in the studies. In some studies, sex affected food neophobia (Muhammad et al., 2015; Tuorila et al., 2001) while in other studies sex did not affected food neophobia (Keskin & Sezen, 2020; Ceylan & Şahingöz, 2019). In this study, similarly, sex did not affect food neophobia. Although most of the healthcare workers participating in this study were female, the difference between the sexes was not significant, suggesting that female healthcare workers may have similar experiences, values or habits, and this may not create to meaningful differences. Besides, cultural or social norms may lead both sexes to develop similar attitudes towards unfamiliar/new foods. Finally, the sample size may have been insufficient to reveal a statistically significant difference.

Studies investigating the relationship between age and food neophobia have also yielded different results (Muhammad et al., 2015; Soucier et al., 2018; Demattè et al., 2013; Campo et al., 2024). In a study of 200 university students from different cultures, it was reported that food neophobia increased with age (Muhammad et al., 2015). In a study conducted on older individuals (>65 years), it was found that a high degree of food neophobia in older individuals was associated with a reduced desire to try unfamiliar foods or new products (Soucier et al, 2018). Conversely, in another study, it was reported that individuals aged 20-22 years had higher food neophobia than individuals aged 23-59 years (Demattè et al., 2013). In this study, it was observed that healthcare workers aged 20-29 were included in the food neophilic, neutral and food neophobic groups at a higher rate than other age groups (49.4%, 56.6% and 49.4%, respectively). It was thought that this may be because most of the healthcare workers participating in this study were young adults in the 20-29 age group. On the other hand, in the 40-49 age group, the difference between the neutral and food neophobic groups was statistically significant ($p<0.05$). The ratio of individuals aged 40-49 in the neutral group is lower than those in the neophobic group. In addition, in this study, it was seen that the rate of food neophilia was higher in healthcare workers under 40 years old (21.7%), and the rate of food neophobia was higher in healthcare workers aged 40 and over (34.8%). This result considers that individuals under 40 years old spend more time in social environments, become familiar with different foods, and may be more open-minded in their food preferences.

When the effect of marital status was examined, different results were reported in the studies (Muhammed et al., 2015; Baş & Hamurcu 2021). In a study, food neophobia was found to be high in married individuals (Muhammad et al., 2015), and in another study, it was reported that marital status did not affect food neophobia (Baş & Hamurcu, 2021). Although married healthcare workers were seen to be more neophobic than single healthcare workers in this study, it was determined that marital status did not effect food neophobia ($p>0.05$).

In this study, when evaluated according to FNS classes, the difference between healthcare profession groups was found to be statistically significant ($p<0.05$). It was observed that among healthcare workers, nurses were in both food neophobic and food neophilic classes at a higher rate than physicians/specialists and resident physicians, and other healthcare workers. Half of the food neophilic group and almost half of the food neophobic group were nurses. The ratio of nurses and pharmacists/dietitians/ physiotherapists in the neutral group is lower than in the neophilic and neophobic groups. No study on food neophobia among healthcare workers by occupation has been encountered in the literature. Individuals with different professions may exhibit different approaches to new foods. On the other hand, it can be thought that this situation may be related to professional training as well as personal characteristics. There is a need for comprehensive studies investigating the relationship between professional training and food neophobia in healthcare workers.

Various studies have investigated the effect or relationship between food neophobia and individuals' nutrition and health status. (Proserpio et al., 2016; Çakır et al., 2023; Campo et al., 2024). A study conducted with overweight and obese individuals reported a relationship between BMI and chronic diseases and food neophobia and determined that individuals with chronic diseases and those

Çakır, B., & Taşyürek, C. (2024). Determination of health care workers' knowledge of apitherapy and bee products, and food neophobia. *Journal of Human Sciences*, *21*(4), 393-403. doi:10.14687/jhs.v21i4.6504

on a disease-specific diet are concerned that eating new foods may negatively affect their health. (Campo et al., 2024). In another study, the food neophobia score was found to be higher in those with chronic diseases (Çakır et al., 2023). On the other hand, it has also been reported that food neophobia is not related to nutritional status (Proserpio et al., 2016). In this study, it was found that the presence of chronic diseases did not affect the food neophobia of healthcare workers ($p>0.05$). This suggests that healthcare workers are better aware of the relationship between chronic diseases and nutrition habits due to their professional training and therefore make food choices considering their health benefits.

As the health-beneficial components (antioxidants, dietary fiber, etc.) of foods become known, it has been reported that the consumption of dietary supplements containing these beneficial components has increased, and the most commonly used dietary supplements are vitamins and vitamin-mineral complexes (Atalay & Erge, 2018). A study involving 800 people from different regions of Türkiye reported that 35.3% of the participants used food supplements (Kılıç Kanak et al., 2021). Similarly, this study found that 30% of healthcare workers used dietary supplements, and the consumption of bee products did not affect the preference for using dietary supplements ($p>0.05$).

Dietary supplements are products consisting of concentrates or extracts of nutrients or substances of plant, plant and animal origin, bioactive substances, etc. with nutritional or physiological effects, with a determined daily intake dose and used to supplement normal nutrition (Ministry of Food, Agriculture and Livestock, 2013). It was observed that the use of dietary supplements in the food neophobic group was lower than in the food neophilic group and higher than in the neutral group. The ratio of food supplement use in the neutral group is lower than in the neophilic group and the differences between groups were significant ($p<0.05$). This result suggests that neophobic health workers may be more cautious about dietary supplements, as they are about new and unknown foods, and that these individuals prefer to use dietary supplements that they know and find reliable to support their energy and nutrient needs. More comprehensive studies are needed to investigate the relationship between food neophobia and dietary supplement use.

6. Conclusions and recommendations

As a result, in this study, it was observed that the knowledge of healthcare workers working in a university hospital had low knowledge about apitherapy and bee products, that they did not know enough about bee products other than honey, and that they did not consume them frequently. It was thought that this situation could be due to the inadequate promotion of bee products or the food neophobia of healthcare workers. Having accurate and sufficient information about apitherapy and bee products, and knowing the products and their properties, play an important role in disease management and in guiding patients correctly. In this context, it is thought that the awareness of all healthcare workers about apitherapy and bee products should be increased.

This study also found that most healthcare workers were neutral towards unfamiliar/new foods, while approximately one in five healthcare workers was food neophobic or food neophilic. It was determined that sex, marital status and the presence of chronic disease did not affect food neophobia, while age, occupation, and use of dietary supplements created a significant difference in food preference. However, this study was conducted on a small sample. Therefore, more detailed and comprehensive studies are needed to determine the apitherapy knowledge and practices of healthcare workers and the food neophobia and the affecting factors.

7. Funding

This study supported by the Scientific and Technological Research Council of Türkiye (TÜBİTAK) within the scope of "2209-A University Students Research Projects Support Program (2022/1).

Acknowledgements

The authors are thankful to the Scientific and Technological Research Council of Türkiye (TÜBİTAK) for their financial support and to health workers who accepted to participate in this study.

References

Atalay, D., & Erge, H.S. (2018). Gıda takviyeleri ve sağlık üzerine etkileri. *Food and Health,* 4(2), 98-111. (In Turkish) DOI: 10.3153/FH18010

Atayoğlu, A.T. (2019). Apiterapiye genel bakış. *J Biotechnol and Strategic Health Res*, 3 (Özel Sayı), 61-66 (In Turkish) DOI: bshr.593566.

Baş, H., & Hamurcu, P. (2021). Gıda neofobisinin yetişkinlerde incelenmesi, Sağlık ve Yaşam Bilimleri Dergisi, 3(3), 165-173. (In Turkish) DOI: 10.33308/2687248X.202133229

Baydaş, G., Aksoy, F.T., Güngördü Dalar, Z., Aksakal, M.N., Çoruhlu, İ., Çıbık, S., Özcan, E.S., Toptaş, Ö., Kul, Z. (2024). Possible health problems caused by bee products and uncontrolled use, *Türk Doğa ve Fen Dergisi*, 13(1), 176-188.

Bölüktepe, F.E., & Yılmaz, S. (2008). Arı ürünlerinin bilinirliği ve satın alınma sıklığı. *Uludağ Arıcılık Dergisi,* 8(2), 53-62. (In Turkish)

Campo, C., Bouzas, C., Monserrat-Mesquida, M., Tur, J.A. (2024). Food neophobias in Spanish adults with overweight or obesity by sex: their association with sociodemographic factors and the most prevalent chronic diseases. *Foods, 13*, 2030. https://doi.org/10.3390/foods13132030

Ceylan, V., & Şahingöz, S.A. (2019). Yetişkin bireylerde gıda neofobi düzeyinin belirlenmesi. *Journal of Tourism and Gastronomy Studies,* 2, 772-784. (In Turkish)

Cucu, A.A, Baci, GM, Moise, AR, Dezsi, S, Marc, BD, Stângaciu, S, Dezmirean, D.S. (2021). Towards a better understanding of nutritional and therapeutic effects of honey and their applications in apitherapy. *Appl. Sci.,***(**11), 4190. https://doi.org/10.3390/app11094190.

Dağcı, M., & Öztürk, O. (2021). Samsun ilindeki aile hekimlerinin geleneksel ve tamamlayıcı tıp hakkındaki bilgi düzeyleri ve tutumları. *Ankara Med J,* 3, 398-409. 10.5505/amj.2021.56833**.** (In Turkish)

Demattè, M.L., Endrizzi, I., Biasioli, F., Corollaro, M.L, Pojer, N., Zampini, M., Aprea, E., Gasperi, F. (2013). Food neophobia and its relation with olfactory ability in common odour identification. *Appetite,* 68, 112-7. doi: 10.1016/j.appet.2013.04.021.

Ekici, T., & Gölgeli, A. (2021). Geleneksel ve tamamlayıcı tıpta apiterapi. *Erciyes Üniversitesi Sağlık Bilimleri Dergisi*, 30, 200-203. (In Turkish)

El-Seedi, H.R., Eid, N., Abd El-Wahed, A.A., Rateb, M.E., Afifi, H.S., Algethami, A.F., Zhao, C., Al Naggar, Y., Alsharif, S.M., Tahir, H.E., Xu, B., Wang, K., and Khalifa, S.A.M. (2022). Honey bee products: preclinical and clinical studies of their anti-inflammatory and immunomodulatory properties. *Front. Nutr,* 8,761267. doi: 10.3389/fnut.2021.761267

Habryka, C., Kruczek, M., Drygas, B. (2016). Bee products used in apitherapy. *World Scientific News,* 48, 254-258.

Jezewska-Zychowicz, M., Plichta, M., Drywień, M. E., & Hamulka, J. (2021). Food Neophobia among Adults: Differences in Dietary Patterns, Food Choice Motives, and Food Labels Reading in Poles. *Nutrients*, *13*(5), 1590. https://doi.org/10.3390/nu13051590.

Karaağaç, Y., & Bellikçi-Koyu, E. (2023). A narrative review on food neophobia throughout the lifespan: relationships with dietary behaviours and interventions to reduce it. *British Journal of Nutrition*, 130, 793–826. (In Turkish)

Kavurmacı, M., & Tan, M. (2019).Determination of knowledge and attitudes of nurses about aptherapy. *Complementary Therapies in Clinical Practice,* 36, 39–42. (In Turkish)

Keskin, E., & Sezen, N. (2020). Restoranları deneyimleyen misafirlerin neofobi ve neofili düzeylerinin belirlenmesi: Kapadokya örneği. *Türk Turizm Araştırmaları Dergisi,*4(2),1592-1606. (In Turkish)

Kılıç Kanak, E., Öztürk, S.N., Özdemir, Y., Asan, K., Öztürk Yılmaz, S. (2021). Gıda takviyeleri kullanım alışkanlıklarının değerlendirilmesi, *Niğde Ömer Halisdemir Üniversitesi Mühendislik Bilimleri Dergisi*, 10(1), 168-177. (In Turkish)

Çakır, B., & Taşyürek, C. (2024). Determination of health care workers' knowledge of apitherapy and bee products, and food neophobia. *Journal of Human Sciences*, *21*(4), 393-403. doi:10.14687/jhs.v21i4.6504

Martinello, M., & Mutinelli, F. (2021). Antioxidant activity in bee products: a review. *Antioxidants,* 10, 71. https://doi.org/10.3390/antiox10010071.

Ministry of Health of Türkiye. (2014). Regulation on Traditional and Complementary Medicine Practices. Official Gazette, No. 29158, 27 October 2014. (In Turkish)

Ministry of Food, Agriculture and Livestock of Türkiye. (2013). Turkish Food Codex, Food Supplement Circular. Official Gazette, No: 28737, 16 August 2013. (In Turkish)

Muhammad, R., Abdullah, K.M., Zahari, M.S.M., Sharif, M.S.M. (2015). Revealing the scenario of food neophobia among higher learning institution students from Klang valley, Malaysia. *Social and Behavioral Sciences,* 170, 292–299.

Niyaz, Ö.C.,& Demirbaş, N. (2017). Arı ürünleri tüketicilerinin genel özellikleri ve tüketim tercihleri: Çanakkale ili örneği. *Tarım Ekonomisi Dergisi*, 23(2), 255-262. (In Turkish)

Pliner, P., & Hobden, K. (1992). Development of a scale to measure the trait of food neophobia in humans. *Appetite*, 19(2), 105-120.

Proserpio, C., Laureati, M., Bertoli, S., Battezzati, A., Pagliarini E. (2016). Determinants of obesity in Italian adults: the role of taste sensitivity, food liking, and food neophobia. *Chemical Senses*, 41(2), 169-176. doi: 10.1093/chemse/bjv072.

Saral, Ö., & Yavuz, A.Y. (2020). Rize ili üniversite öğrencilerinin arı ürünlerini tanıma durumu ve kullanım alışkanlıklarının belirlenmesi, *Uludağ Arıcılık Dergisi*, 20(2), 172-180. (In Turkish)

Sarman, A., & Uzuntarla, Y. (2022). Altitudes of healthcare workers towards complementary and alternative medicine practices: A cross-sectional study in Turkey. *European Journal of Integrative Medicine*, 49, 102096.

Sayılı, M. (2013). Tokat ilinde tüketicilerin arı ürünleri tüketim durumları ve alışkanlıkları. *Uludağ Arıcılık Dergisi*, 13(1), 16-22. (In Turkish)

Siddiqui, S.A., Zannou, O., Karim, I., Kasmiati, Awad N.M.H., Golaszewski, J., Heinz, V., Smetana, S,. (2022). Avoiding food neophobia and ıncreasing consumer acceptance of new food trends—a decade of research. *Sustainability*, 14,10391.

Soucier, V.D., Doma, K.M., Farrell, E.L., Leith-Bailey, E.R., Duncan, A.M. (2019). An examination of food neophobia in older adults, *Food Quality and Preference*,72,143-146.

Soylu, M.,& Silici, S. (2018). Honey consumption preferences of university students. *Int J of Human Sciences*, 15(1), 386-398. (In Turkish)

Şahinler, N., Çetinkaya. S., Toy, N.Ö. (2021). Uşak ilinde arı ürünlerinin tüketim durumları. Mustafa *Kemal Üniversitesi Tarım Bilimleri Dergisi*, 26(1),155-162. (In Turkish)

Şenol Y, Erdemli B, Demirezen B. (2020). Tıp fakültesi öğrencilerinin geleneksel ve tamamlayıcı tıp hakkındaki bilgi ve davranışlarının incelenmesi. *Anadolu Güncel Tıp Derg*, 2(1), 6-12. (In Turkish)

Tunca, R.İ., Taskın, A., Karadavut, U. (2015). Türkiye'de arı ürünlerinin bazı illerdeki tüketim alışkanlıklarının ve farkındalık düzeylerinin belirlenmesi. *Türk Tarım – Gıda Bilim ve Teknoloji Dergisi*, 3(7), 556-561. (In Turkish)

Tuorila, H., Lähteenmäki, L., Pohjalainen, L., & Lotti, L. (2001). Food neophobia among the Finns and related responses to familiar and unfamiliar foods. doi: DOI: 10.1016/S0950-3293(00)00025-2. *Food Quality and Preference, 12*(1), 29-37.

Trumbeckaite, S., Dauksiene, J., Bernatoniene, J., Janulis, V. (2015). Knowledge, attitudes, and usage of apitherapy for disease prevention and treatment among undergraduate pharmacy students in Lithuania. *Evidence-Based Complementary and Alternative Medicine*, 172502. DOI: 10.1155/2015/172502.

Uçar, E.M., Gümüş, D., Karabulut, E., Kızıl, M. (2021). Yeni besin korkusu ölçeğinin Türkçeye uyarlaması ve uygun faktör yapısının belirlenmesi. *Türkiye Klinikleri*, 6(3), 393-400. (In Turkish)

Wills Doko, T., Salaric, I., Bazdaric, K. (2020) Complementary and alternative medicine use among Crotian health studies students-A single center cross-sectional study. *Acta Medica Academica*, 49(3), 240-248.