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Acceptance of apitherapeutic methods in patients consulting general physicians or gynaecologists

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ABSTRACT

Background: and purpose: Apitherapists promote the medical use of products from the beehive (bee venom, propolis, pollen, honey, royal jelly, dead bees, apilarnil, wax, wax moths), the use of beehive air or therapeutic sleep on a beehive. However, little is known about how far such treatment options are perceived as acceptable by patients.

Methods: Patients visiting either a family doctor in Kehl or a gynecologist in Weilburg (both in Germany) were asked to rate their knowledge of apitherapy as well as their readiness to use apitherapeutic measures.

Results: Honey and propolis represent the best-known bee products whereas beehive air and apilarnil are greatly unknown to the patients. Only honey seems to be an acceptable treatment option whereas propolis, pollen and royal jelly seem to be less acceptable. Bee venom was not considered an interesting treatment possibility and, in particular, live bee stings were considered less desirable. This study found that gender and acquaintance with a beekeeper influenced the patients' ratings but age, education and current medical condition did not.

Conclusion: Live bee stings, apilarnil or the inhalation of beehive air are not appealing to the majority of patients. Before apitherapeutic methods are promoted, it seems to be important to know about patients' willingness to tolerate such treatments. Perhaps therapy modifications can be offered which seem more acceptable.

1. Introduction

Apitherapy comprises the medical use of products from the beehive (bee venom, propolis, pollen, honey, royal jelly, dead bees, apilarnil, wax, wax moths), the use of beehive air or therapeutic sleep on a beehive. Currently there are two main trends. One has to be considered as alternative medicine because most proponents of apitherapy make claims for its health benefits which are largely not supported by evidence-based medicine; the other is a scientific approach which tries to assess the medicinal benefit of honey bee products. There has been significant research on honey and bee venom. Both have proven benefit in some medical conditions, e.g. honey for burns, mucositis associated with chemotherapy and radiotherapy, post-stroke shoulder pain and rheumatoid arthritis [1–4].

At first glance, treatment with bee products appears natural. Users may even consider consuming honey as pleasant. However, in some medical conditions like primary dysmenorrhea it is required that women consume 100 g of honey every day for 2 weeks. In fact, this amount in some studies made patients discontinue participation. Reasons for non-adherence were not being able to tolerate even smaller amounts of honey or disliking the taste of pollen [5,6]. Furthermore, the taste of pure royal jelly is quite bitter and may be disliked. Moreover, treatment with bee stings leads to pain and subsequent swelling [7].

Apitherapists claim that many diseases can be treated with the help of apitherapy. A list of these diseases can be found on the homepage of apitherapy.com [8].

As apitherapy mostly is offered by healers and non-medical practitioners or even by lay people, the attitude of patients and the public towards apitherapy is of interest. Therefore, the aim of this investigation was to assess the readiness of people to use various apitherapeutic treatments.

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2. Methods

For this investigation a standardized questionnaire was designed to assess the knowledge of lay people regarding apitherapy and various bee products, as well as their readiness to accept various apitherapeutic treatments and their former experiences with apitherapy. Participants were asked to rate their attitude on a 10-point scale from 1 (none, very unlikely) to 10 (very much, very likely). The questionnaire can be obtained from the first author of this paper. For better intelligibility of the results, the data were summarized as follows: 1 = none, very unlikely; 2–5 little, unlikely; 6–8 to some degree, likely; 9–10 = very much, very likely. Consecutive patients in a private gynaecological practice in Weilburg, Germany and in a practice for general medicine in Kehl, Germany were asked to complete the questionnaire assessment form. The questionnaire was distributed from July 2017 to December 2017. A second set of data was collected from patients at a practice for gynaecology in Weilburg, Germany between July 2017 and August 2017.

Statistics: PSPP software was used for data management and statistical analysis. Descriptive statistics, Spearman's bivariate correlation (two-sided), cross-tabulation and Pearson's $\chi 2$ test were used for statistical analysis; a probability of error less than 5% was regarded as significant.

Ethical vote: The study was approved by the ethics committee of the University of Jena, Germany.

3. Results

In all, 862 patients returned the questionnaire (return rate 90.7%). Because we sampled many patients in a gynaecological practice, the majority of patients in the entire collective was female. The majority of patients were healthy and had come for a routine check-up. Most patients had attended secondary modern school (years 5–10). Table 1 describes in detail the demographic data of the patients who returned the form.

Tables 2 and 3 summarize the responses regarding knowledge of apitherapy and bee products as well as the perceived likelihood of using a certain bee product for medical purposes. Table 2 shows that the patients are mostly not familiar with apitherapy and bee products. Honey and propolis represent the best-known bee products whereas beehive air and apilarnil are greatly unknown. Table 3 depicts that, apart from honey, the patients are reluctant regarding the medical use of bee products. Propolis, pollen and royal jelly seem acceptable by some patients. Injections of bee venom are not liked very much. Although the injection of bee venom should produce similar pain and swelling as live bee stings, there is a great difference between the reported acceptance rates (24.9% versus 4.5%).

Further analysis showed that gender plays a role regarding the responses. In general, women considered themselves better informed about apitherapy and bee products. One-way ANOVA found highly significant differences for honey ($F = 10.2$; $p = 0.001$), propolis ($F = 9.2$; $p = 0.002$), pollen ($F = 6.3$; $p = 0.012$) and royal jelly ($F = 5.0$; $p = 0.025$). With the exception of live bee stings ($F = 4.2$; $p = 0.041$), women were also more willing to use bee products for medical purposes. Significant differences in favour of women were found for the oral intake of propolis ($F = 13.0$; $p < 0.001$), the oral intake of 30 g pollen ($F = 7.1$; $p = 0.007$) and the oral intake of royal jelly ($F = 5.4$; $p = 0.021$).

Also, being related to or closely acquainted with a beekeeper had a positive influence on knowledge of apitherapy and bee products as well as on readiness to use bee products for medical purposes. With the exception of apilarnil, patients related to or closely acquainted with a beekeeper considered themselves better informed about apitherapy and bee products (F 10.2–28.7; $p \leq 0.001$). Significant differences were also found regarding the readiness to use bee products for medical purposes, i.e. for oral intake of honey ($F = 5.2$; $p = 0.025$), external use of honey ($F = 9.3$; $p = 0.002$), live bee stings ($F = 5.1$; $p = 0.024$) and beehive air ($F = 12.9$; $p < 0.001$). Generally, knowledge regarding apitherapy and one bee product correlated with a high likelihood for knowledge of another bee product (rPearson = 0.355–0.782; $p < 0.001$) and with readiness to use a certain bee product for medical purposes. Patients who considered themselves as knowing more about honey were more willing to use honey externally (rPearson = 0.187; $p < 0.001$);

Table 1
Characteristics of patients in this study.

Characteristic of participants	
Age	
Mean (SD)	39.7 (15.0)
(Range)	(15–84)
Gender (%)	
Women	620 (71.9)
Men	242 (28.1)
Type of patient (%)	
Patient with acute disease	211 (25.1)
Patient with chronic disease	100 (11.9)
Healthy person for routine check-up	344 (41.0)
Patient for follow-up visit	61 (7.3)
Cancer patient	12 (1.4)
Others	111 (13.2)
School leaving certificate (%)	
None	4 (0.5)
Elementary school	10 (1.1)
Secondary modern school (years 5–9)	198 (23.1)
Secondary modern school (years 5–10)	384 (44.8)
Vocational diploma	102 (11.9)
University entrance diploma	81 (9.5)
University degree	69 (8.1)
Others	9 (1.1)
Relationship to beekeeping	
Beekeeper	2 (0.2)
Related to beekeeper	75 (8.5)

Table 2
Knowledge of patients regarding apitherapy in general as well as various bee products.

Method/bee product	None [n; (%)]	Little [n; (%)]	To some degree [n; (%)]	Very much [n; (%)]
Apitherapy	604 (77.5)	148 (19.0)	16 (2.1)	11 (1.4)
Honey	386 (49.6)	276 (35.4)	95 (12.2)	22 (2.8)
Propolis	488 (63.1)	198 (24.4)	70 (9.1)	26 (3.4)
Pollen	500 (65.5)	198 (26.0)	51 (6.7)	14 (1.8)
Bee venom	530 (69.5)	191 (25.0)	27 (3.5)	15 (2.0)
Royal jelly	569 (73.7)	163 (21.1)	26 (3.4)	14 (1.8)
Beehive air	622 (80.6)	132 (17.1)	12 (1.6)	6 (0.8)
Beeswax	543 (70.7)	189 (24.6)	25 (3.3)	11 (1.4)
Apilarnil	647 (83.7)	115 (14.9)	5 (0.6)	6 (0.8)

Table 3
Readiness to accept various bee products for medicinal purposes.

Method/bee product	Very unlikely [n; (%)]	Unlikely [n; (%)]	Likely [n; (%)]	Very likely [n; (%)]
Honey 50 g orally	65 (8.2)	220 (27.7)	261 (32.9)	247 (31.1)
Honey external use	48 (6.1)	281 (35.8)	278 (35.4)	178 (22.7)
Propolis orally	69 (9.1)	344 (45.5)	234 (31.0)	109 (14.4)
Pollen 30 g orally	85 (11.1)	394 (51.6)	204 (26.7)	81 (10.6)
Bee venom injections	141 (18.3)	437 (56.8)	154 (20.0)	38 (4.9)
Bee venom ointment	303 (39.4)	382 (49.6)	64 (8.3)	21 (2.7)
Live bee stings	500 (64.3)	243 (31.2)	18 (2.3)	17 (2.2)
Royal jelly	127 (16.4)	397 (51.2)	169 (21.8)	82 (10.6)
Beehive air	164 (21.2)	401 (51.9)	138 (17.9)	70 (9.1)
Vaporized propolis	157 (20.3)	419 (54.1)	143 (18.5)	55 (7.1)
Apilarnil	176 (22.8)	422 (54.7)	128 (16.6)	45 (5.8)

however, knowledge about honey did not play a role regarding the likelihood of oral intake of honey. Patients who considered themselves knowledgeable about propolis were more willing to use propolis internally (rPearson = 0.299; $p < 0.001$) or in vaporized form (rPearson = 0.149; $p < 0.001$). Similar findings were true for pollen (rPearson = 0.113; $p = 0.002$), bee venom (bee venom ointment: rPearson = 0.141; $p < 0.001$; injections of bee venom: rPearson = 0.232; $p < 0.001$; live bee stings: rPearson = 0.2287; $p < 0.001$), royal jelly (rPearson = 0.277; $p < 0.001$) and beehive air (rPearson = 0.173; $p < 0.001$) but not for apilarnil. Age, education and current medical condition (type of patient) did not influence the knowledge of apitherapy and bee products or the readiness to use bee products for medical purposes.

Patients were also asked whether they would prefer the medical use of bee products over other treatment approaches; 93% (725/780) answered that they considered this very unlikely or unlikely. Gender did not influence the response to the question but being related to or closely acquainted with a beekeeper did, yet negatively ($\chi 2 = 20.0$; $p < 0.001$). For the statement about whether one would prefer the use of bee products only if they had shown superiority to other naturopathic approaches, this was regarded as likely (31.6%; 249/788) or very likely (17.3% 136/788) by almost half of the patients. Being related to or closely acquainted with a beekeeper did not influence the results but gender did. Men agreed significantly more frequently to this (57.0% versus 45.3%; $\chi 2 = 10.3$; $p = 0.016$).

Finally, we asked for prior therapeutic experiences with bee products. The answers are shown in Fig. 1. Only honey and propolis (both orally and externally) had been used earlier to some extent. People with earlier experience of medical uses of honey and propolis were more likely to use them again (honey 50 g p.o. – $F = 31.2$; $p < 0.001$; honey externally – $F = 54.8$; $p < 0.001$; propolis p.o. – $F = 41.7$; $p < 0.001$).

4. Discussion

To the best of our knowledge, this is the first study to assess patients' perspectives of apitherapeutic approaches as well as their knowledge regarding apitherapy. In the German population, the vast majority of people knows little to nothing about apitherapy and the medical uses of bee products. However, this does not mean that they are opposed to its medical use. Except for honey, most bee products do not seem to be very appealing to patients. For example, patients are reluctant to use some methods, especially live bee stings. Information and earlier experiences seem to be key issues regarding the likelihood of using a bee product for medical purposes. Interestingly, there is a great difference regarding gender between the readinesses to accept injections of bee venom in comparison to live bee stings. Since the effects of the venom should be very similar for both types of intervention, the lower acceptance rates may be due a greater fear of bees in women. This hypothesis is well in line with the fact that fears of both snakes and spiders are more common in women than in men [9].

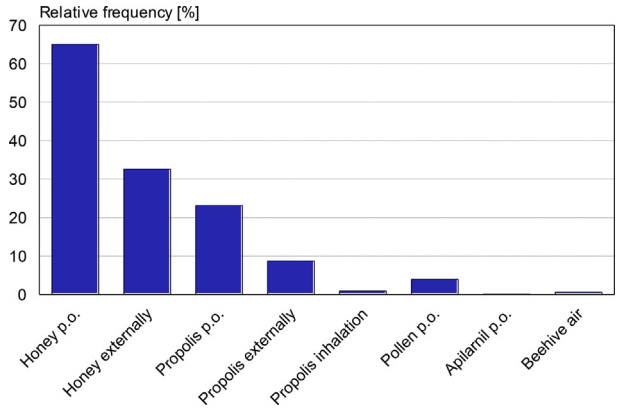

Fig. 1. Prior therapeutic experiences with bee products.

Whereas there is a multitude of publications on the potential health benefits of bee products, there are few studies which address consumers' and patients' knowledge and beliefs of apitherapy and bee products [10]. These few studies showed that sweet and mild honeys with familiar sensory properties are preferred while honeys with strong odour, flavour and colour are regarded as unfamiliar and unpleasant [11]. A study from Poland showed that honey is regarded mainly as a food, namely as a sandwich spread and sweetener. Medical and cosmetic purposes were less popular [12]. Another study from Italy found that local honey was preferred to foreign honey and that consumers are not willing to pay higher prices for products from organic beekeeping [13]. Finally, it was demonstrated that the incorporation of beehive products in quinoa bars increases the total polyphenol content and functional properties but reduces consumer acceptability because of greater astringency, bitter flavour and pungency [14].

A recent review analysed the potential role of bee products as a treatment for primary dysmenorrhea. It showed that 92% of the books evaluated are not evidence-based [15]. This means that most apitherapeutic treatments must be considered as irrational and esoteric. None of the apitherapeutic books analysed considered the results of well-conducted clinical studies. Furthermore, the use of bee products is not the first choice when effectiveness, potential side effects and costs are considered [15]. In summary, apitherapy is not a standalone therapeutic system or even holistic medicine but it may be part of supportive treatments from conventional as well as complementary medicine which are selected according to the patient's needs and existing evidence.

There are some limitations of our study. The sample represents a convenience sample. There may be some selection bias but since the patients were not approached in practices with a focus on apitherapy, and this study did not find that the characteristics of patients influenced their responses, the selection bias should be low. We also only assessed patients' perceived knowledge and did not check whether they really knew about the methods and if their knowledge was correct. Furthermore, the results only reflect the situation in Germany. It is very likely that the readiness to accept bee products for medicinal purposes is different in other countries. It can be assumed that in countries with have a long tradition for the medicinal use of bee products, e. g. Lithuania, and those in which the holy Quran plays an important role, the readiness to accept bee products will be much greater [16,17].

There is a need for better information on the health effects of bee products for lay people as well as physicians. Although personal treatment experiences using bee products may be inspiring, it is clear that these cannot replace properly conducted clinical trials. Apitherapists do not inform patients and people interested in the field properly about possible indications and thus they may not be able to use bee products rationally. Systematic reviews as well as an evidence-based textbook on apitherapy would help to inform physicians as well as patients and others interested. To the best of our knowledge, there is just one book which summarizes the current knowledge [10]. But most of all, this study shows that apitherapy is not a treatment concept for all people. Even the most accepted apitherapeutic option of honey (in a low dose) is not considered likely or very likely to be used by more than 35% of respondents. Live bee stings are more or less rejected by more than 95% of the study population. This clearly shows that such concepts are not real-life options, in contrast to what is told in some apitherapy books [18]. Future investigations should focus on the question why people in Germany reject some types of apitherapy, what quantities can be regarded as acceptable, and how they can be better educated to use evidence-based treatment options with bee products.

5. Conclusions

At present, apitherapy cannot be considered a viable treatment option in Germany because the acceptance of most bee products for medicinal purposes must be considered to be very low. Since there are reasonable and evidence-based medicinal uses of bee products it seems important to educate patients and physicians on the subject.

Conflicts of interest

There are no conflicts of interest, except that KM is a hobby beekeeper.

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