Clinical Medicine and Health Research Journal (CMHRJ)
Volume 04, Issue 06, November - December, 2024
Page No. 1064-1071,

Research Article

Knowledge, Attitude, And Practice of Dermatologists and Family Physicians Regarding Probiotics in Atopic Dermatitis in Saudi Arabia

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Received: 25 October, 2024 : Accepted: 28 November, 2024 : Published: 05 December 2024

Abstract:

Background: Despite the growing evidence of significant probiotics' role in various diseases, including dermatological conditions, there is limited data on awareness dermatologists and family phsycians about its role in atopic dermatitis in Saudi Arabia.

Objectives: To assess knowledge, attitude, and practice of dermatologists and family physicians regarding probiotics in atopic dermatitis in Saudi Arabia

Methods: This study was a web-based cross-sectional study. Data were collected via an online questionnaire, targeting dermatologists and family physicians from different Saudi regions.The questionnaire included closed-ended questions on sociodemographic characteristics, knowledge, attitude, and practice of probiotic in atopic dermatits. Knowledge level and atitude scoring were assessed and compared based on participants' characteristics.

Results: The study analyzed responses from 273 participants, with a mean age of 34.5 ± 8.3 years. The majority of respondents were dermatologists (71.8%). Among the participants, 23.1% demonstrated good knowledge about probiotics in relation to atopic dermatitis, with a significantly higher level of knowledge observed among consultants (38.5%), dermatologists (24%), and those with 10 or more years of experience. While most respondents displayed a positive attitude toward the use of probiotics, actual prescription rates were low. Notably, 53.8% of participants did not engage in prescribing probiotics, and only 33.3% monitored patient outcomes associated with their use. The main barrier identified was a lack of knowledge, with 66.7% of respondents citing this as a significant challenge.

Conclusion: The study highlights the need for improved educational resources to enhance healthcare providers' understanding and confidence in using probiotics for atopic dermatitis. This research contributes to the growing body of literature on probiotics and underscores the need for targeted interventions to support healthcare professionals in delivering evidence-based care.

Key words: Probiotics, atopic dermatitis, dermatologists, knowledge, practices, Saudi Arabia.

Introduction

Atopic dermatitis (AD) is a chronic inflammatory skin condition characterized by dry, itchy, and inflamed skin, significantly impacting the quality of life for affected individuals [1]. The global prevalence of AD is estimated at 2.6%, affecting approximately 204.05 million individuals worldwide. This includes around 101.27 million adults and 102.78 million children, with prevalence rates of 2.0% for adults and 4.0% for children, respectively [2]. Additionally, females are more often affected by AD than males, with a global prevalence of 2.8% in females compared to 2.4% in males [2]. In Saudi Arabia, the burden of atopic dermatitis is particularly concerning, with a notable increase in cases reported among both children and adults. The prevalence rates among Saudi adults vary between 6% and 13% across different provinces [3]. The increased rate of AD among Saudi population has generated interest in various treatment options, including probiotics, which have emerged as a potential adjunctive therapy for managing atopic dermatitis [4].

Probiotics, defined as live microorganisms that confer health benefits when administered in adequate amounts, have gained attention for their role in modulating the immune response and enhancing skin barrier function [5,6]. Previous epidemiological studies indicate that probiotics may help reduce the severity and frequency of atopic dermatitis AD flare-ups, leading healthcare providers to consider their integration into standard treatment protocols [7-10]. Additionally, a recent meta-analysis of six clinical trials demonstrated that probiotics were effective in treating adult patients with AD, showing significant reductions in the Scoring Atopic Dermatitis score and improvements in quality of life [11]. Furthermore, a Delphi-mediated Knowledge, Attitude, and Practice (KAP) survey provided insights into the real-world application of probiotics in managing AD, suggesting they could serve as an effective adjunct therapy alongside traditional treatments for controlling AD and its flare-ups [12].

Despite the increasing evidence supporting the efficacy of probiotics there remains a gap in knowledge, attitude, and practice among healthcare professionals regarding their use in treating atopic dermatitis [13], as well as among healthcare students [14]. This discrepancy is particularly evident among dermatologists and family physicians in Saudi Arabia, where cultural, educational, and clinical factors may influence their approach to incorporating probiotics into patient care [15].

Understanding the current knowledge, attitude, and practice regarding probiotics is essential for developing effective educational interventions and clinical guidelines. This study aims to evaluate the perspectives of dermatologists and family physicians in Saudi Arabia regarding the use of probiotics in managing atopic dermatitis. By assessing their knowledge, attitudes, and practices, the study seeks to contribute to improved patient outcomes in a region facing an increasing incidence of this challenging condition.

Methods

This cross-sectional study gathered data from dermatologists and family physicians working in dermatology and family medicine clinics across public and private hospitals in Saudi Arabia. The study was conducted during the period from September 1 to September 30, 2024. A multistage, stratified sampling method was employed, randomly selecting five cities from the five designated regions of Saudi Arabia (Northern, Western, Southern, Eastern, and Central). Within each chosen city, one public and one private hospital were randomly selected.

The sample size was determined to include 245 subjects, based on recent research [14] indicating a 20% prevalence of adequate knowledge and practice regarding probiotics, with a 95% confidence level and an alpha error of 0.05. All dermatologists and family physicians in the selected hospitals were invited to participate in the study, utilizing a convenience sampling method to maximize respondent numbers.

Participants completed a structured, self-administered questionnaire The questionnaire was based on findings from previous studies, reviewed and validated by dermatology experts and an epidemiologist, and includes socio-demographic information such as age, sex, nationality, highest educational qualification, current job title, specialty, years of experience, and Saudi region, as well as assessing knowledge, attitude, and practice concerning probiotics in atopic dermatitis. Before data collection, the reliability of the knowledge and attitude questions was tested, achieving a score of approximately 94%. The questionnaire was distributed electronically via WhatsApp or email to the study population, allowing one one month for completion and submission.

Assessment of knowledge

Knowledge was evaluated using 10 questions, each with three response options (yes, no, and do not know). For analysis, responses of "no" and "do not know" were combined and classified as "no." Each correct response was scored as 1, while incorrect answers received a score of 0. Total knowledge scores were categorized into three levels: good (more than 70% correct), fair (50-70%), and poor (less than 50%).

Assessment of Attitude

Attitude toward the role of probiotics in atopic dermatitis was assessed using a modified Likert scale ranging from 1 to 3 (1 = agree; 2 = neutral; 3 = disagree). The attitude assessment included ten statements addressing various aspects of probiotics use. Scores were reported on a scale from +1 to -1, with the midpoint (0) indicating a neutral response. The 10 attitude items had a maximum score of +10 and a minimum score of -10. A mean score for all attitude items was calculated from individual scores.

Assessment of Practice

The practice assessment section consisted of four key questions aimed at measuring the frequency of specific practices related to the use of probiotics in atopic dermatitis. Each question utilized a Likert scale for responses: (Never, Occasionally, Often, Always). “Never” response is considered as “No” answer, and other scales are considered as “Yes” answer.

Statistical Analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS Inc., version 22.0, Chicago, IL). Descriptive statistics, including frequencies, means, and standard deviations (SD), were used to summarize the data. Chi-square and Fisher exact tests were used to compare knowledge levels based on participants' characteristics. Additionally, average attitude scores were compared according to participant characteristics using unpaired t-tests and one-way ANOVA as appropriate. A p-value of ≤ 0.05 was deemed statistically significant.

Ethical Consideration

Participation in this study was voluntary. Privacy and confidentiality were maintained as data were collected and handled anonymously. The study protocol was ethically approved by the Institutional Review Board (IRB) of the Health Directorate in Madinah City, Saudi Arabia.

Results

A total of 273 subjects from different regions in Saudi Arabia were included in this study analysis. Table 1 presents the characteristics of the studied participants. The mean age is 34.5 years (±8.3, range 27-52), with 59.0% of participants under 35 years and 41.0% at or above 35 years. In terms of sex, 28.2% are male and 71.8% are female. Regarding nationality, 69.2% are Saudi, while 30.8% are not. Educational backgrounds include 12.8% with M.B.B.Ch, 10.3% with M.Sc, 28.2% holding Ph.D. degrees, and 48.7% certified by the Saudi Board. Current job titles include 38.5% residents, 28.2% specialists, and 33.3% consultants. The specialties are comprised of 71.8% dermatologists and 28.2% family physicians. The mean years of experience is 8.2 years (±6.1, range 1-25). Participants are from various Saudi regions: 61.5% from the Western region, 23.1% from the Eastern region, 8.1% from the Southern region, and 7.3% from Central and Riyadh City. Data are presented by mean ± SD or by n (%).

Table 1. Characteristics of the studied participants

Characteristics*	**N= 273**
Age in years, mean ±SD (range)	34.5 ± 8.3 (27-52)
Age categories	

< 35 years	161 (59.0)
≤ 35 years	112 (41.0)
Sex	
Male	77 (28.2)
Female	196 (71.8)
Nationality	
Saudi	189 (69.2)
Not Saudi	84 (30.8)
Education	
M.B.B.Ch	35 (12.8)
M.Sc	28 (10.3)
Ph.D	77 (28.2)
Saudi Board	133 (48.7)
Current job title	
Resident	105 (438.5)
Specialist	77 (28.2
Consultant	91 (33.3)
Specialty	
Dermatologist	169 (71.8)
Family Physician	77 (28.2)
Years of experience, mean ± SD (range)	8.2 ± 6.1 (1-25)
Saudi Regions	
Western	168 (61.5)
Eastern	63 (23.1)
Southern	22 (8.1)
Central and Riyadh City	20 (7.3)

*Data are presented by mean ± SD or by n (%).

Table 2. Distribution of the studied participants by their knowledge about probiotics in atopic dermatitis

Knowledge item	Yes	No	Don't know
Probiotics are live microorganisms that can confer health benefits when consumed.	252 (92.3)	7 (2.6)	14 (5.1)
Probiotics can help modulate the immune response in patients with atopic dermatitis	196 (71.8)	77 (28.2)	0 (0.0)
The effectiveness of probiotics in treating atopic dermatitis has been supported by scientific studies.	140 (51.3)	14 (5.1)	119143.6)
Probiotics can be found in fermented foods like yogurt and kefir.	266 (97.4)	0 (0.0)	7 (2.6)
Probiotics are safe for all patients, including infants and pregnant women.	161 (59.0)	28 (10.3)	84 (30.8)
Probiotics should be used as a first-line treatment for atopic dermatitis.	35 (12.8)	168 (61.5)	70 (25.7)
Different strains of probiotics have different effects on health.	147 (53.8)	7 (2.6)	119 (43.6)
There are specific probiotics recommended for managing atopic dermatitis.	56 (20.5)	7 (2.6)	210 (76.9)
Probiotics can reduce the frequency and severity of atopic dermatitis flare-ups.	175 (64.1)	0 (0.0)	98 (35.9)
The use of probiotics is a well-established practice in dermatology.	63 (23.0)	112 (38.5)	98 (35.5)

Table 2 presents the distribution of participants' knowledge about probiotics in the context of atopic dermatitis. The majority of respondents correctly identified that probiotics are live microorganisms beneficial for health, with 92.3% answering "Yes." In terms of the immune response modulation, 71.8% acknowledged that probiotics can be beneficial for patients with atopic dermatitis. Support for the effectiveness of probiotics in treating atopic dermatitis was less pronounced, with only 51.3% agreeing, and a significant portion (43.6%) indicating uncertainty. Knowledge about the sources of probiotics was high, as 97.4% recognized that they can be found in fermented foods. Regarding safety, 59.0% felt probiotics are safe for all patients, including infants and pregnant women. Only 12.8% considered probiotics a first-line treatment. A little over half (53.8%) understood that different strains of probiotics have varying health effects. The knowledge about specific probiotics for managing atopic dermatitis was limited, with 76.9% unsure. Finally, while 64.1% believed probiotics can reduce flare-ups, only 23.0% viewed their use as well-established in dermatology. Out of the participants, 63 (23.1%) have good knowledge, 105 (38.5) have fair knowledge, and 105 (38.5%) have poor knowledge (Figure 1). The main sources of information about probiotics were identified as mass media and the internet (48.7%), journal articles (35.9%), textbooks (7.7%), and manufacturer representatives (5.1%). Only 2.6% of participants reported not reading about probiotics (Figure 2).

Figure 1: Percent distribution of the studied 273 participants according to their level of knowledge about probiotics in atopic dermatits

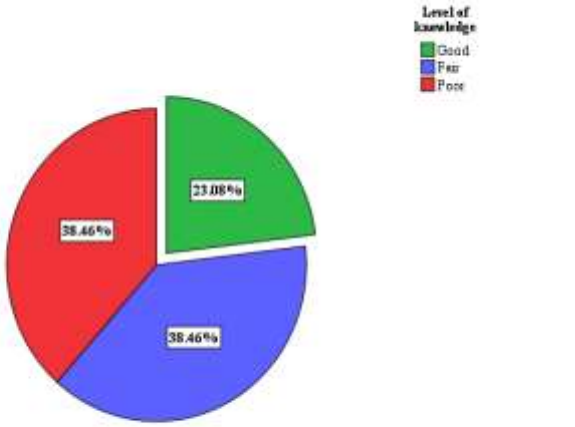

Figure 2: Percent distribution of information sources among the studied 273 participants regarding probiotics in atopic dermatits

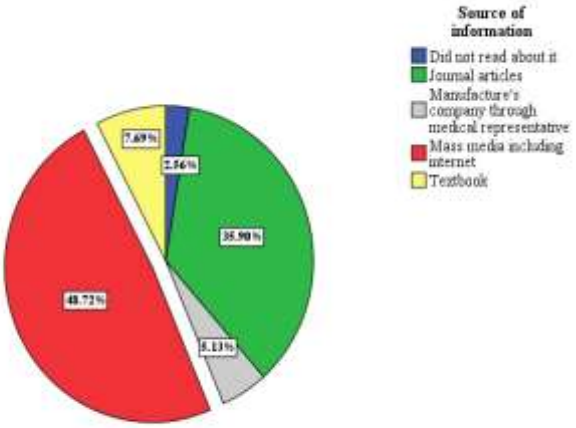

Table 3. Distribution of participants according to their level of knowledge about probiotics in atopic dermatitis by their characteristics

Characteristics	Level of knowledge			P value
	Good N= 63 n (%)	Fair N= 105 n (%)	Poor N= 105 n (%)	
Age categories				
< 35 years	21 (13.0)	70 (43.5)	70 (43.5)	
≤ 35 years	42 (37.5)	35 (31.3)	35 (31.3)	<.0001*
Sex				
Male	21 (27.3)	35 (45.5)	21 (27.3)	
Female	42 (21.4)	70 (35.7)	84 (24.9)	0.05*
Nationality				
Saudi	42 (22.2)	77 (40.7)	70 (37.0)	
Not Saudi	21 (25.0)	28 (33.3)	35 (41.7)	0.51
Education				
M.B.B.Ch	0 (0.0)	14 (40.0)	21 (60.0)	
M.Sc	14 (50.0)	7 (25.0)	7 (25.0)	
Ph.D	14 (18.2)	35 (45.5)	28 (36.4)	
Saudi Board	35 (26.4)	49 (36.8)	49 (36.8)	<.0001*
Current job title				
Resident	7 (6.7)	42 (40.0)	56 (53.3)	
Specialist	21 (27.3)	21 (27.3)	35 (45.5)	
Consultant	35 (38.5)	42 (46.2)	14 (15.4)	<.0001*
Specialty				
Dermatologist	47 (24.0)	100 (51.2)	49 (25.0)	
Family Physician	16 (20.8)	5 (6.5)	56 (72.7)	<.0001*
Years of experience				
< 10 years	14 (7.1)	84 (42.9)	98 (50.0)	
≥ 10 years	49 (63.6)	21 (27.3)	7 (9.1)	<.0001*
Saudi Regions				
Western	42 (25.0)	42 (25.0)	84 (50.0)	
Eastern	21 (33.3)	28 (44.4)	14 (22.2)	
Southern	0 (0.0)	14 (70.0)	6 (30.0)	
Central and Riyadh City	0 (0.0)	21 (95.5)	1 (4.5)	<.0001*

***Significant**

Table 3 displays the distribution of participants' knowledge levels about probiotics in atopic dermatitis based on various characteristics. Younger participants (<35 years) primarily show poor knowledge (43.5%). Males (27.3%) have a higher percentage of good knowledge compared to females (21.4%). Nationality does not significantly affect knowledge levels. Education plays a crucial role, with none of the M.B.B.Ch holders exhibiting good knowledge, while those with advanced degrees show higher percentages of good knowledge. Consultants demonstrate the highest proportion of good knowledge (38.5%), whereas residents have a significant portion classified as poor (53.3%). Dermatologists have better knowledge levels compared to family physicians. Additionally, participants with 10 or more years of experience show significantly better knowledge. Regional differences also exist, with varying distributions of knowledge levels. All comparisons yield statistically significant results.

Table 4. Frequency distribution of the studied participants regarding their attitude toward probiotics in atopic dermatitis

Attitude items	Agree	Neutral	Disagree
I believe that probiotics can play a significant role in managing atopic dermatitis.	84 (30.8)	168 (61.5)	21 (7.7)
I feel confident in my ability to recommend probiotics to patients with atopic dermatitis.	49 (17.9)	126 (46.2)	98 (35.9)
I believe that more research is needed to fully understand the benefits of probiotics for atopic dermatitis.	224 (82.1)	49 (17.9)	0 (0.0)
I think that patients would benefit from being educated about probiotics for atopic dermatitis.	175 (64.1)	98 (35.9)	0 (0.0)
I am open to integrating probiotics into my treatment plans for atopic dermatitis.	154 (56.4)	91 (33.3)	28 (10.3)
I believe that probiotics are a safe alternative treatment for patients with atopic dermatitis.	105 (38.5)	1112 (41.0)	56 (20.5)
I feel that the current guidelines adequately address the use of probiotics in dermatology.	42 (15.4)	147 (53.8)	84 (30.8)
I think that patient preferences should guide the use of probiotics in their treatment.	112 (41.0)	119 (43.6)	42 (15.4)
I would recommend probiotics to a friend or family member with atopic dermatitis.	98 (35.9)	119 (43.6)	56 (20.5)
I am likely to discuss probiotics during patient consultations for atopic dermatitis.	105 (38.5)	126 (46.1)	42 (15.4)

Table 4 presents the frequency distribution of participants' attitudes toward the use of probiotics in managing atopic dermatitis. A significant majority (82.1%) expressed the belief that more research is necessary to understand the benefits of probiotics in this context. While 64.1% felt that patients would benefit from education about probiotics, only 30.8% agreed that probiotics can play a significant role in managing atopic dermatitis. Confidence in recommending probiotics was lower, with 17.9% expressing certainty, and 35.9% disagreeing. In terms of willingness to integrate probiotics into treatment plans, 56.4% were open to the idea. Regarding safety, 38.5% viewed probiotics as a safe alternative treatment. Opinions on current guidelines were mixed, with 15.4% agreeing that they adequately address probiotics, while 53.8% remained neutral. Additionally, 41.0% felt that patient preferences should guide the use of probiotics, and 35.9% indicated they would recommend probiotics to friends or family, with 38.5% likely to discuss them during patient consultations.

Table 5. Comparison of the average attitude score regarding probiotics in atopic dermatitis by participants' characteristics

Characteristics	Attitude score Mean ± SD	Neutral
Age categories		
< 35 years	3.6 ± 2.5	
≤ 35 years	4.9 ± 2.8	<.0001*
Sex		
Male	5.4 ± 3.2	
Female	3.7 ± 2.3	<.0001*
Nationality		
Saudi	3.7 ± 2.5	
Not Saudi	5.2 ± 2.9	<.0001*
Education		
M.B.B.Ch	3.0 ± 2.3	
M.Sc	4.3 ± 3.5	
Ph.D	4.0 ± 2.9	
Saudi Board	4.6 ± 2.4	0.01*
Current job title		
Resident	3.8 ± 2.5	
Specialist	3.3 ± 3.0	
Consultant	5.4 ± 2.2	<.0001*
Specialty		
Dermatologist	4.5 ± 2.5	
Family Physician	3.5 ± 3.2	0.01*
Years of experience	3.8 ± 2.5	
< 10 years	5.0 ± 2.9	0.002*
≥ 10 years		
Saudi Regions		
Western	3.8 ± 2.8	
Eastern	4.2 ± 2.4	
Southern	6.2 ± 1.0	
Central and Riyadh City	5.5 ± 2.7	<.0001*

***Significant**

Table 5 compares average attitude scores regarding probiotics in atopic dermatitis across various participant characteristics. For age, participants under 35 years have a mean score of 3.6, while those 35 years and older score 4.9. Males score higher (5.4) than females (3.7), and non-Saudis have a mean of 5.2 compared to Saudis at 3.7. Educational levels show variation, with scores ranging from 3.0 for M.B.B.Ch holders to 4.6 for those with a Saudi Board certification. In terms of job title, consultants report the highest average score (5.4), while residents and specialists score lower. Dermatologists have a mean score of 4.5, whereas family physicians score 3.5. Participants with 10 or more years of experience score higher (5.0) than those with less experience (3.8). Regionally, participants from the Southern region have the highest average score of 6.2. Statistical significance is indicated for all comparisons.

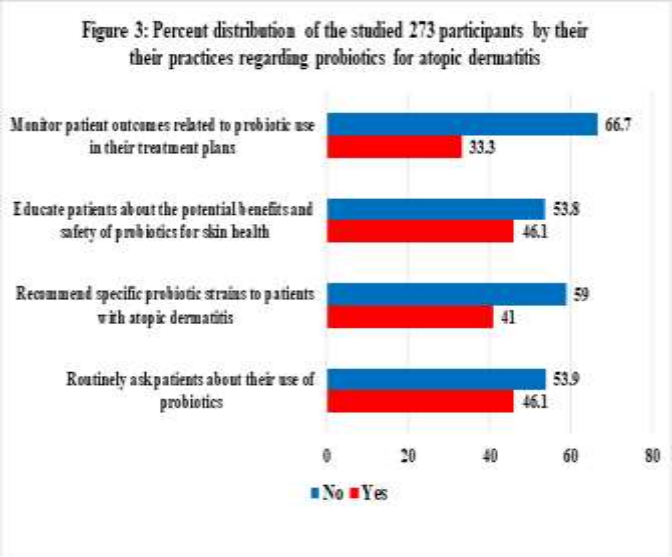

Figure 3 illustrates the practice of 273 participants concerning probiotics in atopic dermatitis. It indicates that 46.2% regularly inquire about probiotic use and inform patients about potential benefits, while 41.0% recommend specific strains. In contrast, a majority, 53.8%, do not engage in these practices. Monitoring patient outcomes related to probiotics is the least prevalent, with only 33.3% of participants doing so. Additionally, 66.7% identified a lack of knowledge as a significant barrier to these practices. Other barriers included high costs, noted by 42 participants (15.4%), difficulty in availability, reported by 35 participants (12.8%), and perceived ineffectiveness of treatments, mentioned by 7 participants (2.6%). Another 7 participants (2.6%) cited patients' reasons as a barrier (Table 6).

Table 6. Barriers of not practices of probiotics in the management of atopic dermatitis

Barrier	n (%)
Lack of knowledge	182 (66.7)
High price	42 (15.4)
Difficulty in availability	35 (12.8)
Not effective	7 (2.6)
Patients' reason	7 (2.6)

Discussion

There is growing evidence suggests that probiotics play a significant role in modulating systemic inflammation and disease. Epidemiological studies indicate that they may reduce the severity and frequency of atopic dermatitis flare-ups, prompting healthcare providers to consider incorporating them into standard treatment protocols [7-12]. This study examines the knowledge, attitudes, and practices regarding probiotics in atopic dermatitis among dermatologists and family physicians in various regions of Saudi Arabia. The findings reveal that a substantial majority of respondents (92.3%) correctly identified probiotics as live microorganisms that are beneficial for health, and 97.4% were aware of their sources. Additionally, 71.8% recognized the potential benefits of probiotics for patients with atopic dermatitis. In contrast, a similar study involving 417 healthcare providers in Lahore, Pakistan, found that 76.1% could accurately define probiotics, while only 62.7% could correctly identify prebiotics [14]. Notably, the results from Saudi Arabia indicated that only 57.7% of healthcare practitioners knew the definition of probiotics [16]. Among medical students, awareness was similarly low, with only 54.3% able to define probiotics in a study conducted in Jordan [17]. Furthermore, a recent cross-sectional study from a university in Riyadh reported that 56.3% of students had a moderate understanding of probiotics [13].

The current study found that only 63 participants (23.1%) demonstrated good knowledge of probiotics. Although this percentage is relatively low, it is significantly higher than in similar studies, where only 9.9% of medical students showed a good level of knowledge [13]. For example, a study in Indonesia reported that just 9.2% of health science students had good knowledge of probiotics [18]. In Africa, research has assessed the knowledge, awareness, and perceptions of probiotics among healthcare providers in Nigeria, revealing similarly low levels of understanding [19,20]. In contrast, studies conducted in the USA, Europe, and Asia [21,22] reported a much higher familiarity with the term "probiotics" among health professionals. The primary sources of information about probiotics among participants were mass media and the internet, accounting for 48.7% of responses, followed by journal articles at 35.9%. This trend highlights the significant role that accessible, non-academic sources play in shaping healthcare professionals' knowledge and perceptions of probiotics. Such findings are consistent with similar studies that have noted the reliance on mass media and online resources for information on health-related topics [13-16]. This reliance may suggest that while journal articles remain important, there is a growing trend toward obtaining health information from more readily available platforms. As a result, it emphasizes the need for healthcare professionals to critically evaluate the quality and reliability of the information accessed through these channels, ensuring that their knowledge base is both accurate and evidence-based [23].

The comparison of knowledge levels among participants reveals several key trends. Younger individuals (under 35 years) predominantly show poor knowledge (43.5%), suggesting a gap in education or experience regarding probiotics in dermatology. Gender differences are evident, with males (27.3%) demonstrating better knowledge than females (21.4%). Consultants, typically more experienced, reported the highest good knowledge rate (38.5%), indicating a need for enhanced training in residency programs. Additionally, those with advanced degrees demonstrated higher percentages of good knowledge, emphasizing the importance of continued education. Similar findings were observed among Saudi pediatricians, where consultants, specialists, and those with higher educational qualifications exhibited significantly greater knowledge regarding the use of probiotics in pediatrics [16].

Dermatologists generally have better knowledge (24%) than family physicians (20.8%), reflecting a focus on specialized training. Additionally, participants with 10 or more years of practice exhibited significantly better knowledge, suggesting that experience enhances understanding of probiotics in atopic dermatitis management [24,25]. Regional variations in knowledge levels point to disparities in access to educational resources and clinical practices in some regions of Saudi Arabia. Together with our observation, the data demonstrated that probiotics are popular among gastroenterologists for the treatment of gastrointestinal disorders [26].

Despite this, the respondents maintained a positive attitude toward the application of probiotics. A significantly higher positive attitude was observed among participants from the Southern region, consultants, males, those with 10 or more years of experience, individuals with Saudi Board certifications, dermatologists, and participants aged 35 years and older. These findings align with previous studies, where 63.2% of medical students reported a positive attitude in a study at a university in Riyadh, Saudi Arabia [13], and 52.9% in a study conducted in Indonesia [18]. Among healthcare providers and pediatricians, the results were also consistent as positive attitude was notable toward probiotics application in different diseases [16,24]

The actual prescription of probiotics for managing atopic dermatitis was limited in this study. Only 46.2% of participants reported regularly inquiring about probiotic use and informing patients about potential benefits, while 41% recommended specific strains. In contrast, a majority (53.8%) did not engage in these practices. Monitoring patient outcomes related to probiotics was the least common, with only 33.3% of participants doing so. These findings highlight various challenges faced by participants, particularly concerning knowledge and accessibility; notably, 66.7% identified lack of knowledge as a barrier in this study. Several studies have also emphasized the need for healthcare providers to receive more information about probiotics to confidently advise patients [19,27].

This study has several strengths and limitations. One notable strength is the relatively large sample size of dermatologists and family physicians, which enhances the reliability of the findings about knowledge and practices regarding probiotics in atopic dermatitis. The diverse geographic representation of dermatologists and family physicians from various regions of Saudi Arabia contributes to a comprehensive understanding of the topic, although the absence of participants from the

Northern region may limit the generalizability of the results and overlook regional differences. The existing literature on prebiotics primarily examines the knowledge, attitudes, and practices of medical and health science students, as well as healthcare providers regarding probiotics. However, this study is the first to specifically investigate the use of probiotics in atopic dermatitis among dermatologists and family physicians in Saudi Arabia. Furthermore, it addresses a timely issue in dermatology, reflecting current practices in the field. However, the cross-sectional design provides only a snapshot of knowledge and attitudes at a single point in time, preventing the assessment of changes over time or the establishment of causal relationships. Furthermore, the reliance on self-reported measures may introduce response bias, as participants might overestimate their knowledge or practices. Lastly, while the study focuses specifically on probiotics in the context of atopic dermatitis, it may not encompass the broader landscape of treatments and considerations in dermatological practice.

Conclusion

The findings of this study highlight a concerning lack of awareness regarding probiotics in atopic dermatitis among dermatologists and family physicians in Saudi Arabia, with only a small percentage demonstrating good knowledge. Despite a generally positive attitude towards probiotics, actual prescription rates and the monitoring of patient outcomes remain low, indicating significant barriers related to knowledge and accessibility. The findings underscore the necessity for enhanced educational resources and training to equip healthcare providers with the information needed to confidently integrate probiotics into clinical practice. By addressing these gaps, we can improve the management of atopic dermatitis and ultimately enhance patient care. Future research should focus on evaluating the long-term effects of probiotics in dermatological conditions and exploring effective strategies for disseminating knowledge among healthcare professionals.

Acknowledgement

The author would like to express her sincere gratitude to all the participants in this study.

Funding

The author fully funded this research and did not receive any specific grants from public, commercial, or nonprofit funding agencies.

Conflict of interest

The author declares no conflicts of interest.

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