

Assessment of Knowledge, Attitude, and Practice of Parents Toward Probiotics and their Correct Use for Children

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Received: December 14, 2023; Published: December 27, 2023

Abstract

Background: Probiotics are live microorganisms that can provide health benefits when administered in appropriate amounts. They are used as immune boosters. They have also been discussed for treating acute infections, including gastroenteritis and respiratory tract infections.

Methods: We conducted a descriptive cross-sectional study among parents residing in Taif, Saudi Arabia. The questionnaire included questions about socio-demographic data and assessed the participant's knowledge, attitude, and practice concerning probiotics. Additionally, we evaluated the correct use of probiotics for their children. Statistical analysis was conducted using SPSS version 26. P-values less than 0.05 were considered statistically significant.

Results: The study included 285 parents who agreed to participate. About 38% of the participants possessed a good level of knowledge, 42% had a positive attitude, and 35% reported a good practice level regarding probiotics and their correct use for children. The highest percentage of participants with sound knowledge were those who used the internet as the primary source of information (56.3%) (p-value < 0.001). A better attitude was found among participants who depend on physicians as the primary source of information (p-value < 0.001) and non-Saudi participants (p-value = 0.005). Parents who depend on physicians as the primary source of information showed significantly higher practice levels (72.2%) (p-value < 0.001).

Conclusion: The study revealed that knowledge, attitude, and practice of probiotics were inadequate among parents in Taif City, Saudi Arabia, and needed to be improved. These findings suggest that policymakers, educational institutions, and scientific organizations should develop awareness programs to provide the public with adequate information about the benefits of probiotics to children and their correct use.

Keywords: Probiotics; Gastroenteritis; Respiratory; Pediatrics; Normal Flora; Saudi Arabia

Abbreviations

GIT: Gastrointestinal Tract; ISAPP: International Scientific Association for Probiotics and Prebiotic

Introduction

The International Scientific Association for Probiotics and Prebiotics (ISAPP) defines probiotics as live microorganisms that confer a health benefit on the host when administered in adequate amounts [1].

The probiotics are mainly normal flora found in body organs, including the gastrointestinal tract (GIT), mouth, and skin. GIT contains more than 500 species of bacteria, increasing the host's immunity against invading bacteria and viruses and aiding digestion [2]. It includes several species of bacteria, such as *Lactobacillus*, *Escherichia*, *Bifidobacterium*, *Streptococcus*, *Enterococcus*, and *Bacillus* [3]. The mucosal immune system can recognize the normal flora from pathogens without inflammatory responses that may disrupt the safety of GIT mucosa [2]. Furthermore, frequent antibiotics and immunosuppressive medications can alter the composition and negatively impact normal flora. For that reason, implementing living bacterial species as probiotics is considered an attractive choice to restore microbial equilibrium and stop further diseases [4].

Many countries classify probiotics as foods, dietary supplements, and medicines. Therefore, they can be easily purchased at health food stores without a prescription or professional advice. Yogurts and dairy drinks are common ways of consuming fermented foods. Probiotics supplements are available in tablets, liquids, capsules, packets, and granules [5]. Moreover, probiotic products such as yogurts, weaning foods, and liquid supplements are highly available for infants and children. Infant formulas now include probiotics due to bacteria in breast milk worldwide [6].

As children need higher protection from infections [3], Several studies have assessed the potential benefits of probiotics for treating and preventing pediatric diseases. These diseases include acute gastroenteritis, diarrhea caused by antibiotics, constipation, allergic disorders, and respiratory infections [7]. Probiotics may boost immunity and enhance gut microbiota, reducing gastrointestinal infections; however, the efficacy of probiotics depends on multiple factors, including bacteria species and strains, dosage, and length of administration [8].

To our knowledge, there are no previous studies among parents discussing probiotics use for children in Saudi Arabia. Therefore, it aimed to assess parents' knowledge, attitudes, and practices regarding probiotics use for their children.

Materials and Methods

Study design and setting

This cross-sectional study was conducted among parents residing in Taif City, Saudi Arabia.

Study populations

The study involved parents residing in Taif City, Saudi Arabia, who expressed their willingness to participate in the research. Participants provided verbal consent, and the ethical committee of the King Faisal Medical Complex Research Center approved the study with an approval number of 2023-B-442.

Sample size

The Roasoft sample size calculator was used to calculate the minimum representative sample of 267 participants, assuming a 50% population proportion, 90% confidence interval, and 5% margin of error.

Data collection tool

The data collection tool was a self-administered online questionnaire based on a previous study in Saudi Arabia.¹ It consisted of four sections; the first section included the demographic characteristics of participants, and the remaining sections included questions that assessed the participant’s knowledge, attitude, and practice levels regarding probiotics and their correct use for their children. The questionnaire was translated into Arabic to be easily understood by the participants.

Statistical analysis

After extracting the data, it was revised and coded. The statistical analysis was performed using IBM SPSS, version 26 (IBM Corporation, New York, USA). The number of subjects and valid percentages were used to describe the categorical variables. For calculating the total knowledge and attitude score, each correct response scored 1 point. The total score for each participant was calculated by summing the scores for each question out of 4 and 5 points for knowledge and attitude, respectively. In addition, the total practice score was calculated by answering yes 2 points, somewhat 1 point, and the answer no 0. The total practice score for each participant was the sum of the individual scores for each question out of 6.

The association between knowledge, attitude, practice levels, and the independent variables was estimated using the Chi-square test. Statistical significance was determined by considering p-values below 0.05.

Results

Out of 285 respondents agreed to participate in the study. The majority of them were females (56.2%), Saudi (92.6%), married (83.5%), had a university degree (79.9%), aged less than 30 years (35.5%), and had two children or less (58.7%). Of them, 25.5% used the internet to obtain information, and approximately half of the participants preferred the syrup form of probiotics for their kids (40.3%) and mentioned that they had never heard about probiotics (43.9%). In addition, 47.9% of the respondents reported having a moderate knowledge of probiotics. Most of them (75.2%) indicated that they did not recommend probiotics for their children because they lacked knowledge about the correct use of probiotics, as shown in table 1.

Parameters	Category	Number	Percentage
Age (n = 262)	< 30 years	93	35.5
	30 - 40 years	79	30.2
	41 - 50 years	59	22.5
	> 50 years old	31	11.8
Gender (n = 281)	Female	158	56.2
	Male	123	43.8
Marital status (n = 255)	Married	213	83.5
	Divorced	28	11
	Widowed	14	5.5
Educational level (n = 283)	Elementary	5	1.8
	Intermediate	8	2.8
	High School	44	15.5
	University	226	79.9
Nationality (n = 282)	Saudi	261	92.6
	Other nationality	21	7.4

Number of children (n = 278)	Two children or less	163	58.7
	From three to four children	54	19.4
	More than four children	61	21.9
How is your knowledge about probiotics? (n = 282)	No information	24	8.5
	Little	84	29.8
	Moderate	135	47.9
	Good	39	8.5
Which kind of probiotic form do you like to prefer for your kid? (n = 278)	Powder	43	15.5
	Syrup	112	40.3
	Drops	106	38.1
	Capsules	7	2.5
	Tablets	10	3.6
Sources of information about probiotics (n = 278)	From a friend	15	18.7
	From the physicians	18	6.5
	From the internet (Facebook, Twitter, etc.)	71	25.5
	Other sources	147	62.6
Reasons for not recommending probiotics for your child (n = 270)	Negative experiences with prior use	3	1.1
	High cost	33	12.2
	Not convinced of the benefit of probiotics	31	11.5
	Lack of knowledge about the correct use of probiotics	203	75.2

Table 1: Demographic characteristics of the participants (n = 285).

The participants’ understanding and interpretation of “probiotics” and their effect on the gastrointestinal, immune, and respiratory systems were questioned. About two-thirds of them know that probiotics, which are live microorganisms found in foods like yogurt, are beneficial and can assist digestion (60.8%). Only 20.9% mentioned that probiotics affect the respiratory system. All details are illustrated in table 2.

Questions	Yes	No	Do not know
Knowledge questions			
Probiotics are live microorganisms found in things like yogurt. They are beneficial and aid in digestion (n = 283)	172 (60.8%)	9 (3.2%)	102 (36%)
Probiotics affect the gastrointestinal system (n = 282)	155 (55%)	15 (5.3%)	112 (39.3%)
Probiotics affect the immune system (n = 283)	115 (40.6%)	27 (9.5%)	141 (49.8%)
Probiotics affect the respiratory system (n = 282)	59 (20.9%)	56 (19.9%)	167 (59.2%)

Table 2: Questions related to the level of knowledge among participants toward probiotics and their correct use for children (n = 285).

In addition, the participants were asked about their thoughts regarding probiotics’ benefits in improving digestion, reducing bloating in children and the risk of antibiotic-induced diarrhea, and if probiotics should be taken before meals and if probiotics are harmful. About half of the respondents reported that probiotics could improve digestion and reduce bloating for their kids (52.2% and 43.4%, respectively). Moreover, only 4.7% thought that probiotics are harmful to health. All details are in table 3.

Questions	Yes	No	Do not know
Attitude questions			
Do you think probiotics can improve digestion for your kid? (n = 280)	149 (52.2%)	11 (3.9%)	120 (42.9%)
Do you think probiotics can reduce bloating for your kid? (n = 279)	121 (43.4%)	20 (7.2%)	138 (49.5%)
Do you think probiotics will reduce the risk of antibiotic-induced diarrhea? (n = 278)	109 (39.2%)	12 (4.3%)	157 (56.5%)
Do you think probiotics should be taken before a meal? (n = 278)	71 (25.5%)	46 (16.5%)	161 (57.9%)
Do you think that probiotics are harmful to health? (n = 277)	13 (4.7%)	119 (43%)	145 (52.3%)

Table 3: Questions related to the level of attitude among participants toward probiotics and their correct use for children (n = 285).

To assess the practice level of the participants, they were asked if they recommend giving probiotics to their children for diarrhea, immune health, and the prevention of respiratory infections. Participants’ answers are illustrated in table 4.

Questions	Yes	No	Somewhat
Practice questions			
Do you recommend giving your child probiotics for diarrhea? (n = 274)	84 (30.7%)	71 (25.9%)	119 (43.4%)
Do you recommend giving your child probiotics for immune health? (n = 273)	97 (35.5%)	55 (20.1%)	121 (44.3%)
Do you recommend giving your child probiotics for the prevention of respiratory infections?	73 (27.1%)	84 (31.2%)	112 (41.6%)

Table 4: Questions related to the level of practice among participants (n = 285) toward probiotics and their correct use for children.

The results showed that only 38% of the participants had a good knowledge level, 42% had a positive attitude, and 35% reported a good practice level regarding probiotics and their correct use for children. All details are in figure 1-3.

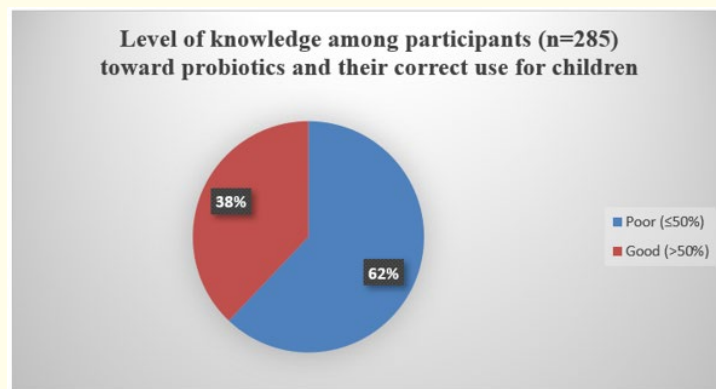


Figure 1: Level of knowledge among participants (n = 285) toward probiotics and their correct use for children.

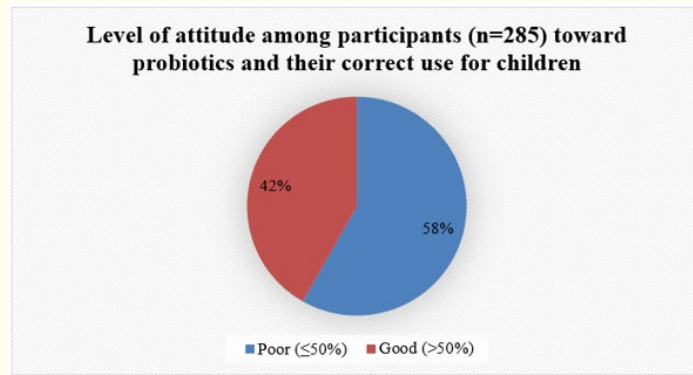


Figure 2: Level of attitude among participants (n = 285) toward probiotics and their correct use for children.

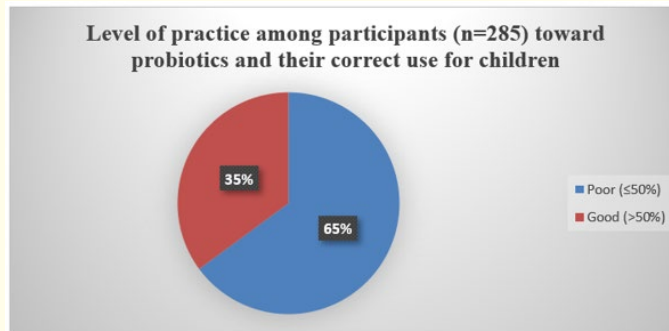


Figure 3: Level of practice among participants (n = 285) toward probiotics and their correct use for children.

When comparing the participants’ characteristics with the two levels of knowledge (Table 5), all subgroups showed no significant impact on the knowledge levels except for information sources. The highest percentage of participants who had good knowledge were those who used the Internet as the primary source of information (56.3%) and who had information from physicians (50%) (p-value < 0.001).

Factors	Poor	Knowledge level		Total (n = 285)	P-value
		Good			
Sex	Male	84 (68.3)	39 (31.7)	123	0.052
	Female	90 (57)	68 (43)	158	
Education	With no university degree	36 (63.2)	21 (36.8)	57	0.818
	Had a university degree	139 (61.5)	87 (38.5)	226	
Age	Less or equal to 40 years old	106 (61.6)	66 (38.4)	172	0.532
	Older than 40 years old	59 (65.6)	31 (34.4)	90	
Marital status	Unmarried	30 (71.4)	12 (28.6)	42	0.098
	Married	123 (57.7)	90 (42.3)	213	

Children number	Two children or less	101 (62)	62 (38)	163	0.741
	More than two children	69 (60)	46 (40)	115	
Source of information	Physicians	9 (50)	9 (50)	18	< 0.001*
	Internet and social media	31 (43.7)	40 (56.3)	71	
	Other sources	132 (69.8)	57 (30.2)	189	
Nationality	Saudi	166 (63.6)	95 (36.4)	261	0.059
	Non-Saudi	9 (42.9)	12 (57.1)	21	

Table 5: Knowledge level of probiotics and their correct use for children among the different subgroups.

*Statistically significant value.

Furthermore, participants’ characteristics were compared with their attitude level (Table 6). Sex, marital status, source of information, and nationality were significant factors that affected the total attitude level. A better attitude was found among females (p-value = 0.019), married participants (p-value = 0.011), participants who depend on physicians as the primary source of information (p-value < 0.001), and non-Saudi participants (p-value = 0.005).

Factors Poor		Attitude level		Total (n = 285)	P-value
		Good			
Sex	Male	81 (65.9)	42 (34.1)	158	0.019*
	Female	82 (51.9)	76 (48.1)	123	
Education	With no university degree	35 (61.4)	22 (38.6)	57	0.55
	With a university degree	129 (57.1)	97 (42.9)	226	
Age	Less or equal to 40 years old	102 (59.3)	70 (40.7)	172	0.812
	Older than 40 years old	52 (57.8)	38 (42.2)	90	
Marital status	Unmarried	31 (73.8)	11 (26.2)	42	0.011*
	Married	112 (52.6)	101 (47.4)	213	
Children number	Two children or less	96 (58.9)	67 (41.1)	163	0.495
	More than two children	63 (54.8)	52 (45.2)	115	
Source of information	Physicians	5 (27.8)	13 (72.2)	18	< 0.001*
	Internet and social media	26 (36.6)	45 (63.4)	71	
	Other sources	128 (67.7)	61 (32.2)	189	
Nationality	Saudi	157 (60.2)	104 (39.8)	261	0.005*
	Non-Saudi	6 (28.6)	15 (71.4)	21	

Table 6: Attitude level of probiotics and their correct use for children among the different subgroups.

*Statistically significant value.

Regarding the factors that affected the practice level among the participants, sex had a significant effect on the practice level of the participants; females showed a better practice level (43%) than males (25.5%) (p-value = 0.002). In addition, participants who depend

on physicians as the primary source of information showed significantly higher practice levels (72.2%) than those who depend on the internet and other sources (45.1% and 29.1%, respectively) (p-value < 0.001). All details are in table 7.

Factors Poor		Practice level		Total (n = 285)	P-value
		Good			
Sex	Male	92 (74.8)	31 (25.2)	123	0.002*
	Female	90 (57)	68 (43)	158	
Education	With no university degree	37 (64.9)	20 (35.1)	57	0.965
	With a university degree	146 (64.6)	80 (35.4)	226	
Age	Less or equal to 40 years old	111 (64.5)	61 (35.5)	172	0.60
	Older than 40 years old	61 (67.8)	29 (32.2)	90	
Marital status	Unmarried	26 (61.9)	16 (38.1)	42	0.766
	Married	137 (64.3)	76 (35.7)	213	
Children number	Two children or less	107 (65.6)	56 (34.4)	163	0.504
	More than two children	71 (61.7)	44 (38.3)	115	
Source of informa- tion	Physicians	5 (27.8)	13 (72.2)	18	< 0.001*
	Internet and social media	39 (54.9)	32 (45.1)	71	
	Other sources	134 (70.9)	55 (29.1)	189	
Nationality	Saudi	172 (65.9)	89 (34.1)	261	0.092
	Non-Saudi	10 (47.6)	11 (52.4)	21	

Table 7: Practice level of probiotics and their correct use for children among the different subgroups.

*Statistically significant value.

Discussion

The gastrointestinal flora plays an essential and complex role in developing healthy immunologic and digestive functions in children [9]. Probiotics are beneficial in several clinical conditions, such as infantile diarrhea, antibiotic-associated diarrhea, *Clostridium difficile* colitis, inflammatory bowel disease, *Helicobacter pylori* infections, and female urogenital infection [10]. Moreover, regarding the recent scientific attention on the positive effects of probiotics for children and the increasing availability of their products, practitioners need to understand the parents' knowledge, attitude, and practice levels about probiotics and their use for their children.

It was evident that probiotics are new horizons for scientists that show beneficial effects and support digestive health, but they are unknown to many [11]. In the same concept, a previous study suggested that people do not have a strong knowledge of probiotics, which was supported by our findings [12]. The present study indicated that only 38% of the participants showed a good knowledge level, and this relatively small percentage was reflected in their attitude and practice levels. A positive attitude was reported by only 42% of our participants, as well as only 35% of them had a good practice level. Similarly, a previous study in Saudi Arabia that targeted the total population revealed that about 73% of their participants did not know much about probiotics [13]. Another study among mothers in Turkey also reported inadequate knowledge and practice regarding probiotics [14]. These findings suggest that health professionals must better explain probiotics' protective and beneficial impacts on children and adults. On the contrary, a study in Canada among mothers revealed that awareness and understanding of probiotics were high [7].

Regarding sources of information, 25.5% of the participants in the present study used the Internet and social media as the primary source of information. Moreover, parents who depend on the internet and social media to learn probiotics showed better knowledge levels. Our results are consistent with literature suggesting that social media platforms take necessary actions toward spreading knowledge and awareness regarding health education across populations [15]. Unfortunately, only 6.5% reported receiving information about probiotics from their physician; this is not good as physicians have a vital role in communicating these issues to patients. In a similar study in Saudi Arabia, only 7% of the participants indicated that they depend on their doctors for adequate probiotic information [13]. Furthermore, a previous study in Saudi Arabia among pediatricians reported that most of its participants had little knowledge regarding probiotics [1], which may alarm policymakers responsible for creating pediatric guidelines should be alarmed by the lack of probiotic knowledge.

On the other hand, physicians showed a significant impact on the level of attitude and practice of the parents toward probiotics and their correct use, which resulted from the fact that physicians are responsible for treating patients and prescribing medications.

In the present study, married participants had a better attitude than unmarried participants. In the Indian study results, married respondents had a better attitude than unmarried respondents, supporting ours [10].

Supporting the concept that the mother is more concerned with primary decisions about children's health care and behaviors [16], females in the present study reported better attitudes and practice levels than males. In previous studies, females had a better awareness of probiotics than males [10,17].

On the other hand, 75.2% of parents in this study reported that they did not recommend probiotics for their children as a result of a lack of knowledge about the correct use of probiotics, which encourages medical professionals to create awareness programs about the benefits of probiotics among children through social media, TV, and medical centers.

Conclusion

The study demonstrated that knowledge, attitude, and practice levels of probiotics were inadequate among parents in Taif City, Saudi Arabia, and needed to be improved. These findings suggest that policymakers, educational institutions, and scientific organizations should develop awareness programs to provide the public with adequate information about the benefits of probiotics to children and their correct use. Utilizing health-promoting channels and social media can be an effective way to achieve this goal. It is recommended that future studies on probiotics in Saudi Arabia be conducted with larger sample sizes from various regions to evaluate parents' level of knowledge, practice, and associated factors.

Conflict of Interest

The authors don't have any conflict of interest to declare.

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Volume 20 Issue 1 January 2024

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