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Attitudes, Practices, and Barriers of Probiotics Among Medical Faculty Members in Lorestan, Iran

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ABSTRACT

Probiotics, which contain beneficial bacteria, have been shown to enhance human health, reduce healthcare expenditures at the community level, and effectively prevent and treat various diseases. This descriptive-analytical study was conducted with 145 faculty members from the basic and clinical sciences departments at Lorestan University of Medical Sciences. Data were collected using a questionnaire comprising 35 items across three domains: perspectives, performance, and barriers to the use of probiotic products. The data were analyzed using independent t-tests and correlation coefficients with SPSS software version 25, with a significance level set at less than 0.05. The scores for attitudes, performance, and barriers to probiotic use were 19.93 ± 2.49, 17.86 ± 3.14, and 40.75 ± 6.27, respectively. No significant relationship was found between gender and educational group concerning the scores in the three domains of the questionnaire. However, a positive correlation was observed between attitude and performance, while an inverse relationship was noted between attitude and performance on one hand and consumption barriers on the other. The findings of this study underscore the urgent need to enhance educators' awareness and alter their perspectives regarding probiotics.

Keywords: Perspective; Awareness; Performance; Probiotic; Professors

Introduction

A primary objective of the health system is to improve public health and reduce the incidence and severity of chronic diseases, which are influenced by factors such as genetics, lifestyle, and social behaviors [1]. Food and pharmaceutical supplements have played a significant role in enhancing public health and reducing healthcare costs [2, 3]. Probiotic products are among the most crucial dietary and medicinal supplements [4, 5], as they are microorganisms that confer health benefits to their hosts [6]. These supplements contain bacteria that can augment the body's natural flora. In addition to maintaining the balance of microecology within the body, they prevent or mitigate adverse reactions and can enhance the therapeutic effects of medications [7]. Probiotic products possess antioxidant properties, reducing cellular oxidative stress by producing antioxidant metabolites such as glutathione and folic acid [8]. Other studies have demonstrated that probiotics may have antitumor effects and that their consumption, in conjunction with other drugs, results in synergistic effects [9, 10].

Moreover, the consumption of probiotics can increase the secretion of beneficial metabolites in the intestine, significantly contributing to human health by mitigating the negative consequences associated with drug use [11]. Probiotic products reduce intestinal inflammation caused by drug use by inhibiting

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the growth of harmful microbes in the intestine and regulating immune cells [12]. Additionally, probiotics enhance the efficacy of drugs while adjusting the natural flora of the intestine, and it is recommended that probiotics be incorporated into treatment guidelines [13, 14]. A study has highlighted significant gaps at the societal level regarding the use of probiotics and their therapeutic effects [15]. Various studies have revealed the contribution of probiotics to the health of the body and their role in preventing and treating diseases. However, these products are not widely used, possibly because of the low awareness of common people and those involved in educational, health, and treatment systems [16]. Considering that professors at the University of Medical Sciences play a very important role in education and treatment and given the current challenges in higher education, understanding their views and performance is vital to improving the quality of education and institutional efficiency. The present study investigated the attitudes and performance of professors working in various basic and clinical science departments of the Lorestan University of Medical Sciences concerning probiotic products and the barriers to their use.

Materials and Methods

In 2024, a cross-sectional descriptive analytical study was conducted involving 145 faculty members from Lorestan University of Medical Sciences. A stratified sampling method was employed, treating each educational group as a class, and the sample size was determined based on the volume of each class. Data collection was facilitated through a questionnaire distributed to the faculty members. The inclusion criteria required participants to be teaching at Lorestan University of Medical Sciences in 2024 and willing to participate, while the exclusion criterion was a reluctance to complete the questionnaire or leaving some questions unanswered. The questionnaire comprised several sections: the first part included demographic questions concerning age, sex, group, and medical history; the second part, addressing attitudes, consisted of five questions on a Likert scale ranging from strongly agree to completely disagree; the third part included five questions on a five-point Likert scale from strongly agree to strongly disagree regarding faculty members' practice in relation to probiotic product consumption; and the final section contained 13 questions on a five-point Likert scale from strongly agree to completely disagree concerning barriers to consumption. The validity of the questionnaire was evaluated based on criteria from a study by Pyahoo et al., expert opinions, and calculations (CVR and CVI greater than 0.8 for each field). The reliability was assessed using Cronbach's alpha coefficient, achieving an acceptable level (greater than 0.75 for each area) [17]. According to Masihi Nezhad et al. [18], the standard deviation of the perspective score is 0.169, with α=0.05 and D=0.03, leading to a desired sample size of 121, as calculated by the formula below. Accounting for a 20% attrition rate, the final sample size was set at 145.

$$n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{(\frac{1}{2}\ln(\frac{1+r}{1-r}))^2} + 3$$

Ethical approval

All procedures involving human participants adhered to the ethical standards of the institutional and national research committee, in accordance with the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical standards. The Ethics Committee of Lorestan University of Medical Sciences approved this study

(code IR. LUMS. REC.1403.097).

Statistical analysis

Following data collection, central and dispersion indices (mean, standard deviation, frequency, and percentage) were calculated. Independent t-tests were utilized to compare the average scores of the independent variables, and Pearson's correlation coefficient was employed to examine relationships between the quantitative variables.

Results

The mean age of the professors participating in this study was 45.41±7.21 years, with an average work experience of 14.58±7.60 years. The study participants comprised 55.90% males and 52.40% professors from clinical science departments (Table 1). The findings indicated that the mean score for attitudes toward probiotics was 19.93±2.49, while the mean score for the use of probiotics was 17.86±3.14. Additionally, the mean score for barriers to using probiotics was 40.75±6.27.

The results regarding attitudes, practice, and barriers to the use of probiotics among participants provided several insights.

Sixty-one individuals (39.35%) expressed interest in learning more about probiotics, and 31.60% welcomed workshops on probiotic applications. Furthermore, 29.00% fully agreed with the statement, "I accept the use of live microbes in disease control and treatment" (see Table 2). Additionally, 22.10% reported using probiotic products in the treatment of certain diseases, 21.40% indicated the presence of various probiotic products in their household food basket, and 11.70% fully agreed with the statement, "If both antibiotics and probiotics can treat the disease, I prefer to use antibiotics" (see Table 2).

An analysis of the barriers to using probiotics revealed that 11.70% agreed with the statement, "There is no comprehensive and sufficient information about probiotic products." Moreover, 9.00% expressed concerns about the lack of information regarding the safety of probiotic products, and 6.90% fully agreed with the statement, "There are conflicting results regarding the clinical use of probiotics" (Table 3).

An investigation into the relationships between demographic variables and barriers, practice, and attitude toward the use of probiotic products revealed a slight difference in average scores between men and women, with no statistically significant differences observed across the three areas investigated (Table 6). The independent t-test indicated no statistically significant differences in average scores between basic and clinical professors concerning barriers, practice, and attitude related to the use of probiotics (Table 7).

Pearson's correlation coefficient analysis yielded several key findings regarding the relationship between demographic variables and attitudes on probiotics. An inverse correlation was identified between the age of the professors and their scores on the attitude to using probiotics ($r = -0.141$), which was not statistically significant. A significant inverse correlation was found between age and practice scores for the use of probiotics ($r = -0.209$, $P = 0.011$). Furthermore, an inverse correlation was observed between age and scores related to barriers to the use of probiotics ($r = -0.068$), which was not significant ($P = 0.414$). An inverse correlation was also noted between work experience and attitudes toward using probiotics ($r = -0.115$), though this was not statistically significant ($P = 0.168$). A significant inverse correlation was identified between work experience and practice scores concerning the use of probiotics ($r = -0.205$, $P = 0.014$).

Table 1. Distribution of the demographic variables of the faculty members who participated in the study

Variable	Scale	Number	Percentage	Mean	S D
Gender	Men	81	55.9	-	-
	Women	64	44.1	-	-
Educational Group	Basic sciences	69	47.6	-	-
	Clinical science	76	52.4	-	-
Age	Years	-	-	45.41	7.21
Average Work	Years	-	-	14.58	7.6.50

Table 2. Scores obtained in the attitude and practice area

	Item		Completely disagree	Disagree	No opinion	Agree	Completely agree
Attitude	I am interested in learning more about probiotics	Number	0.00	2.00	9.00	73.00	61.00
		Percent	0.00	1.40	6.20	50.30	42.10
	I welcome workshops on probiotic applications	Number	0.00	20	16.00	78.00	49.00
		Percent	0.00	1.40	11.00	53.80	33.80
	I accept the use of live microbes in disease control and treatment	Number	0.00	6.00	17.00	77.00	45.00
		Percent	0.00	4.10	11.70	53.10	31.10
	Probiotic foods are better than probiotic supplements	Number	0.00	4.00	47.00	52.00	42.00
		Percent	0.00	2.80	32.40	35.90	29.00
	Probiotics affect the outcome of any treatment protocol	Number	1.00	31.00	48.00	41.00	24.00
		Percent	0.70	21.40	33.10	28.30	16.50
Practice	I use probiotic products in the treatment of some diseases	Number	3.00	11.00	36.00	63.00	32.00
		Percent	2.10	7.60	24.80	43.40	22.10
	I use different probiotic products in my household food basket	Number	3.00	12.00	22.00	77.00	31.00
		Percent	2.10	8.30	15.20	53.10	21.40
	If antibiotics and probiotics can treat the disease, I prefer to use antibiotics	Number	9.00	52.00	21.00	46.00	17.00
		Percent	6.20	35.90	14.50	31.70	11.70
	When I buy dairy products, I buy probiotic products	Number	3.00	17.00	25.00	72.00	28.00
		Percent	2.10	11.70	17.20	49.70	19.30
	I buy and use probiotic products with confidence	Number	3.00	22.00	39.00	65.00	16.00
		Percent	1.20	15.20	26.90	44.80	11.00

Table 3. Scores obtained for the barriers to the consumption of probiotic products

Item		Completely disagree	Disagree	No opinion	Agree	Completely agree
There is no comprehensive and sufficient information about probiotic products	Number	0.00	20.00	23.00	85.00	17.00
	Percent	0.00	13.80	15.90	58.60	11.70
There is no information on the safety of probiotic products	Number	7.00	31.00	18.00	76.00	13.00
	Percent	4.80	21.40	12.40	52.40	9.00
There are conflicting results regarding the clinical use of probiotics	Number	2.00	11.00	74.00	48.00	10.00
	Percent	1.40	7.60	51.00	33.10	6.90
There are doubts about the quality of probiotic products	Number	3.00	12.00	55.00	59.00	16.00
	Percent	2.10	8.30	37.90	40.70	11.00
There are no or limited probiotic products approved for clinical use	Number	6.00	36.00	38.00	54.00	11.00
	Percent	4.20	24.80	26.20	37.20	7.60
The FDA does not approve probiotic dietary supplements	Number	4.00	26.00	92.00	14.00	9.00
	Percent	2.80	17.90	63.40	9.70	6.20
Probiotic products are expensive	Number	3.00	28.00	28.00	77.00	9.00
	Percent	2.10	19.30	19.30	53.10	6.20
The beneficial effects of probiotics are insignificant, and probiotic remedies do not have any advantage or superiority compared to standard treatments	Number	7.00	61.00	40.00	36.00	1.00
	Percent	4.80	42.10	27.60	24.80	0.70
I have a negative experience of the previous use of probiotic products	Number	12.00	57.00	58.00	15.00	3.00
	Percent	8.30	39.30	40.00	10.30	2.10
There is a risk of infection caused by consuming probiotic products	Number	5.00	52.00	61.00	25.00	2.00
	Percent	3.40	35.90	42.10	17.20	1.40
Probiotics do not have beneficial effects on health and do not reduce the chance of disease	Number	11.00	99.00	27.00	8.00	0.00
	Percent	7.60	68.30	18.60	5.50	0.00
The variety of probiotic products in the market is low	Number	3.00	20.00	30.00	77.00	15.00
	Percent	2.10	13.80	20.70	53.10	10.30
Access to probiotic products is limited	Number	0.00	36.00	32.00	71.00	6.00
	Percent	0.00	24.80	22.10	49.00	4.10

Table 4. Relationships between sex and barriers, practice, and attitude toward the use of probiotics

Variable	Gender	Mean	SD	P Value
Attitude	Men	19.91	2.82	0.895
	Women	19.96	2.02	
Practice	Men	17.61	3.67	0.294
	Women	18.71	2.31	
Barriers	Men	41.18	6.56	0.351
	Women	40.2	5.89	

Table 5. Examining the relationships between the educational group and barriers, practice, and attitude toward the use of probiotics

Variable	Educational group	Mean	SD	P Value
Attitude	Basic sciences	20.18	2.55	0.250
	Clinical science	19.71	2.42	
Practice	Basic sciences	18.15	2.90	0.294
	Clinical science	17.59	3.34	
Barriers	Basic sciences	40.52	6.14	0.351
	Clinical science	40.96	6.42	

Finally, there was an inverse correlation between work experience and scores related to barriers to using probiotics (r = -0.077), which was not significant (P = 0.358).

Pearson's correlation coefficient analysis revealed a positive correlation between perspective and performance in using probiotics (r = 0.329), which was statistically significant (P = 0.001). An inverse correlation was observed between perspective and obstacles to using probiotics (r = -0.392), which was also significant (P = 0.001). There was an inverse correlation between barriers and performance concerning the use of probiotics (r = -0.204), with statistical significance (P = 0.014).

Discussion

The findings of this study elucidate participants' attitude, practice, and barriers associated with the use of probiotics. These insights can facilitate a more comprehensive analysis of the current level of public awareness regarding probiotics and their societal acceptance. The mean score for the perspective on probiotic use suggests that participants generally held negative attitudes towards these products. This score may reflect a lack of awareness or misinformation about the health benefits of probiotics, influencing public attitudes. For instance, some individuals may perceive probiotics merely as dietary supplements with negligible health benefits. Consequently, there is a need for effective educational programs to enhance understanding of the scientific benefits of probiotics.

The average practice score indicates limited use of probiotic products, potentially due to restricted access to high-quality products and insufficient knowledge of their benefits and proper usage. To enhance performance in this domain, it is essential to disseminate detailed information on the appropriate timing and methods of probiotic consumption. Furthermore, encouraging regular consumption among patients and the general public could significantly improve performance.

The average score for barriers highlights substantial barriers to probiotic consumption, including lack of awareness, high costs, limited access to quality products, and misconceptions. Further research could aid in precisely identifying factors impeding probiotic use and developing strategies to address these issues.

For example, educational programs targeting healthcare professionals could expand their knowledge of probiotics, enabling them to guide patients more effectively.

In a study, most patients utilized probiotics despite lacking specific information about them. The authors recommended that physicians remain informed about the increasing use of probiotics among patients and provide necessary guidance while keeping their knowledge current [19]. Richa Soni et al. found that although students are familiar with the term "probiotics," they lack comprehensive knowledge of their mechanisms of action, with most believing probiotics are beneficial for patients [20]. A study by Güneş et al. assessed the awareness and perspectives of 356 doctors and 361 pharmacists in Turkey regarding probiotics between 2017 and 2018. Approximately two-thirds of participants were familiar with the mechanisms and effects of probiotics. In this study, probiotics were predominantly prescribed for digestive disorders and genitourinary system diseases. Güneş et al. also reported that due to the increasing number of licensed probiotic products and the insufficient knowledge among nonspecialists in the healthcare system, measures should be implemented to enhance their understanding of probiotics and update information resources [21]. A study involving health professionals and students in Lahore, Pakistan, demonstrated that while many participants possessed a clear understanding of probiotics, their knowledge regarding specific strains of beneficial bacteria was inadequate [22]. Similarly, a 2020 study in Jordan revealed that although healthcare professionals held a positive view of probiotics, their knowledge was not particularly noteworthy [23]. Another investigation conducted in 2024 on 517 students in Saudi Arabia assessed their knowledge, perspectives, and performance. The findings indicated that over half of the students were familiar with probiotics, one-third held positive views toward probiotic products, and the majority exhibited high performance in relation to probiotics [24]. Teng Sin Ong et al. reported that 48% of health sciences graduates demonstrated a profound understanding of probiotics, yet 69.2% showed poor performance in related practices. Additionally, 67.2% of participants maintained neutral attitudes toward probiotics, with women displaying more extensive knowledge than men [25]. In a separate study at the University of Brisbane, Australia, 58.9% of participants who used probiotics were young, highly educated women with acceptable knowledge of probiotic products. Furthermore, 59% of those who did not use probiotics expressed willingness to do so if recommended by a medical specialist. This research underscored the critical role of medical expert recommendations and education about probiotics in enhancing their usage [26]. In 2020, Shreenidhi et al. reported that most individuals were unaware of the benefits and side effects of probiotics, yet consumed them based on advice from family and friends. They advocated for effective measures to enhance knowledge and attitudes toward probiotic products, potentially increasing their consumption [27]. A 2024 study with European nutritionists indicated that probiotics are valuable products with significant nutritional benefits. These experts recommended their use. While this study effectively examined faculty members' knowledge, attitudes, and practices, it was limited by the absence of an investigation into influential factors, such as face-to-face interviews.

Conclusion

Given the potential public health benefits of probiotic products, this study underscores the urgent need to enhance the awareness of faculty members at Lorestan University of Medical Sciences regarding probiotics and to shift their attitudes. The beneficial properties of probiotics and their increasing consumption necessitate the implementation of evidence-based educational programs to raise awareness among professionals, familiarize individuals with the benefits of probiotics, and identify and address existing barriers. A comparison of the present study's results with those from other studies revealed that, despite geographical

differences, similar challenges regarding awareness and acceptance of probiotics persist, warranting serious attention and action.

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Conflict of interest

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

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