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Perceptions of Medical Sciences Students Towards Probiotics

Laleh Payahoo[1], *Zeinab Nikniaz[2], Reza Mahdavi[3], Mohamad Asghari Jafar Abadi[4]

[1.a.] Students' Research Committee; [b.] Department of Biochemistry & Diet therapy, Faculty of Health and Nutrition, Tabriz University of Medical Science, Tabriz, Iran
*[*2.a.] Students' Research Committee; [b.] Department of Biochemistry & Diet therapy, Faculty of Health and Nutrition, Tabriz University of Medical Science, Tabriz, Iran*
[3.a.] Nutritional Research Center; [b.] Department of Biochemistry & Diet therapy, Faculty of Health and Nutrition, Tabriz University of Medical Sciences, Tabriz, Iran
[4.] Tabriz Health Services Management Research Center, Department of Statistics and Epidemiology, Faculty of Health and Nutrition, Tabriz University of Medical Sciences, Tabriz, Iran

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ABSTRACT

Background: Regarding the importance of probiotics in prevention of different diseases, the knowledge of people particularly health-related professionals about the beneficial effects and availability of probiotic products is important. Considering the limited studies, the present study was conducted to assess the knowledge of medical sciences students as future provider of health information about probiotics in Tabriz, Iran.
Methods*:* This cross-sectional study was carried out on 296 medical sciences students from different faculty majors with mean age of 22 ± 4 years. The students completed two self-administered questionnaires; the one was about the demographic characteristics and the other one with nine closed questions as for knowledge as well as probiotics and their health effects and 2 questions related to availability of probiotic products. Scoring of 9 knowledge questions was divided to three sections 0-3, 4-6, 7-9 and classified as poor, acceptable and good, respectively. The Chi-square test was used to examine the differences in knowledge of the students across different gender, major and degree groups.
Results*:* Six percent of students had poor, 43% acceptable, and 51% good knowledge. Total mean±(SD) of knowledge was 6.25 ±1.6 . Answers of students about the availability of probiotic products were 36.9% low, 48.1% moderate, and 15% high. Comparison of knowledge result between different major and degree groups was statistically significant ($P<0.05$).
Conclusion: Although students had approximately acceptable level of knowledge about probiotics and their health effects, their awareness about common available form of probiotic products was low. The use of efficient co-educational materials such as teaching new findings for students may be beneficial.

Keywords*:* Probiotics, Knowledge, Medical Science Students

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Introduction

Probiotics are live microorganisms that when consumed in enough amount exert their health benefits [1]. Several studies have shown the effectiveness of these bacteria in prevention and controlling of different diseases such as gastrointestinal disorders [2, 3], types of cancer [4], immune system disease [5,6], hypertension [7], allergy [8], atopic eczema [9], dental carriers [10] and obesity [11,12]. These compounds also have useful effects, including production of water-soluble vitamins such as B vitamins group

***Corresponding author: Zeinab Nikniaz**. Tel: +98 9144006831 *Email: znikniaz@hotmail.com*

[13], increased bioavailability of dietary iron [13] and de-conjugation of bile acids in gut [14].

Although, probiotics naturally are found in dairy and non-dairy foods [15], nowadays, different types of probiotic bacteria as a functional food are added to a wide variety of foods including cheese, ice cream, milk-based desserts, butter, mayonnaise and fermented foods of plant origin [16], fruit juices [17,18], vegetables, legumes and cereals [15], malt [19] and soybean [20, 21].

Despite the accessibility of variety of probiotic products [22] and also the availability of large number of data supporting the importance of probiotics in health in the past decade [23-30], their consumption is still low and may be due to the lack of knowledge of consumers and health-related professionals as provider of health information to people.

It seems that, investigating the knowledge of people particularly health-related professionals about beneficial effects of probiotics and several types of probiotic products is important. Considering the importance of probiotics in health promotion and due to lack of studies in this field in Iran, the present study was conducted to assess the knowledge of medical sciences students towards probiotics and their availability in Tabriz, Iran.

Materials & Methods

This cross-sectional study conducted on 296 students (male: 123, female: 173) selected randomly from different faculty majors (including dentistry, pharmacy, medicine, nutrition, public health, nursing, midwifery and paramedical). Sample size was determined based on the information derived on knowledge score in a pilot study from 50 samples. Considering a confidence level of 95% and using formula $N=Z^2S^2/d^2$, 296 samples was computed to be incorporated in the study.

Two self-administered questionnaires were completed by students. The one was about the demographic questions such as age, gender, degree (B.Sc, M.Sc and MD), major and the other one consisted of nine closed questions to assess students' knowledge about probiotics (n=6), their health effects (n=3), and two questions about probiotic products and availability of these products in local market (n=2). All nine questions about knowledge were evaluated using a corrected (coded as 1)/incorrect (code as 0). Therefore, the possible range for raw score was 0-9.

The scoring of correct answers was classified as 0-3 weak, 4-6 acceptable, and 7-9 good. The panel of experts approved content validity of questionnaire. In a pilot study, the reliability of questionnaire was tested in a random sample of 50 students, the generated 9-item scale had alpha Cronbach of 0.65. For qualitative, and quantitative data, results were presented as mean ± SD and frequency (percentage), respectively. The chi-square test was used to examine the differences in knowledge of students across various gender, major and degree groups. *P*-values less than 0.05 considered as significant.

Results

Demographic characteristics of the participants are shown in Table 1. From total 296 students with mean age of 22±4 (mean ± SD) ranging from 18 to 42 years; about fifty-eight percent were female. About 50% of the students were at MD, 3.5% at MSc and 46% at BSc degree. Figure 1 indicates the level of students' knowledge about probiotics.

The results of answer to some important knowledge questions are presented in Table 2. Total mean (SD) of knowledge was 6.25±1.6. Although 83% of students defined the probiotic term correctly, surprisingly, 59.7% of them confirmed the high beneficial effects of probiotics in health (Table2). Regarding the availability of these products, most of the students (72.9%) noted yogurt and other dairy products as a common available form of probiotic products, 11.6% mentioned to added fiber containing products, and 3.6% of them stated the supplemented form. Unfortunately, 12% of stu-

dents were not familiar with different available probiotic products. As well as, 36.9%, 48.1% and 15% of students mentioned the availability of these products at low, moderate, and high level, respectively.

According to the results presented in Table 3, mean (SD) of score according to sex (female and male, respectively) was 6.3 ± 1.5 and 6.1± 1.6. In comparison with female students knowledge of male students was better but the differences were not statistically significant. Surprisingly, significant differences in the knowledge of students about probiotics were observed between different university degree groups (*P*=0.018) and the knowledge of B.Sc students was higher than MD students was (*P*=0.013). The mean (SD) of scoring for degree groups (B.Sc, MSc and MD) were 6.5±1.3, 6.4± 0.9 and 5.9± 1.8, respectively. In addition, a significant difference in the level of knowledge about probiotics across various majors was observed (*P*=0.005). In this regard, based on further evaluation, there were statistically significant differences between pharmacy and dental (*P*=0.013), pharmacy and midwifery (*P*=0.019), dental and nutrition (*P*=0.001), dental and midwifery (*P*=0.002), dental and health (*P*=0.001) students in their knowledge. Mean (SD) score according to majors was 6.1 (1.8), 6.3 (1.7), 5.4 (1.8), 7.1 (1.3), 6.1 (1.3), 6.6 (0.9), 6.7 (1.2), 5.8 (1.3) in medicine, pharmacy, dental, nutrition, nursing, midwifery, health and paramedical, respectively.

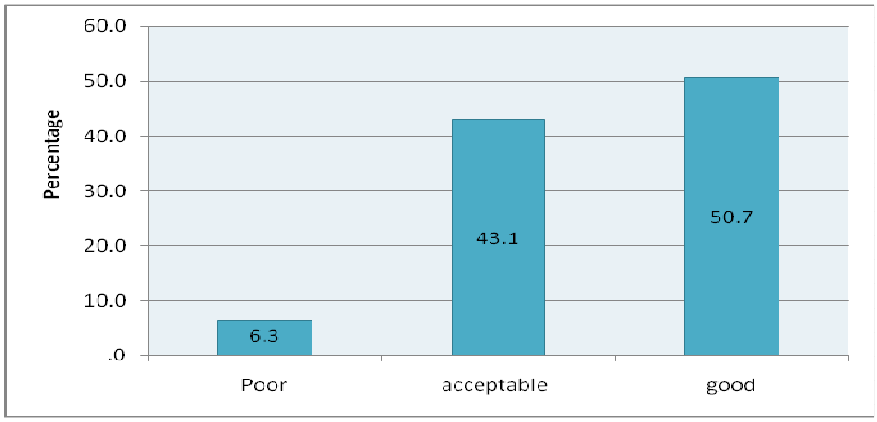

Fig.1: Classification of students´ knowledge regarding probiotics (n=296)

Table 1: Demographic characteristic of students (n=296)

Variable	Frequency	(%)
Gender		
Male	123	41.6
Female	173	58.4
Degree**		
MD	149	50.3
Msc	11	3.4
Bsc	136	46.3
Major		
Medicine	50	16.9
Pharmacy	48	15.9
Dental	51	17.3
Nutrition	27	8.8
Nursing	32	10.8
Health	33	11.2
Midwifery	31	10.5
Paramedical	25	8.5

**MD=Medicine, Pharmacy, Dental

Table2: Distribution of responses to knowledge questions about Probiotics (%)

Questionnaire items	Correct answers (%)
1. The term of probiotic	83
2. Presence of probiotics in foods	93.9
3. The best source of probiotics in foods	
4. Milk and dairy products as a probiotic source	81.8
5. Protein products as a probiotic source	73.7
6. Animals organs as a probiotic source	
7. Fermented products as a probiotic source	24.6
8. Animal fats as a probiotic source	
9. Health benefits of probiotic products	86.6
	84.2
	66.7
	59.7

Table 3: Differences in knowledge of students considering their demographic characteristics

Variable	Level of knowledge Low (%)	Moderate (%)	High (%)
Gender**			
Male	12.2	67.8	20.0
Female	13.3	63.0	23.7
Degree*			
MD	19.1	61.0	19.1
MSc	0	90.0	10.0
BSc	7.4	66.9	25.7
Major*			
Medical	13.6	65.9	20.5
Pharmacy	17.0	51.1	31.9
Dental	26.5	65.3	8.2
Nutrition	7.7	50.0	42.3
Nursing	9.4	70.0	15.6
Midwifery	0.0	75.8	24.2
Health	6.5	64.5	29.0
Paramedical	12.0	76.0	12.0

*P-value<0.05

** P-value>0.05

Discussion

There is growing evidence regarding the use of natural therapies due to their cost-effectiveness and fewer side effects compared to current drugs in prevention and treatment of various diseases [31]. One of these natural products is probiotics that attracts increasing interest among health-related professionals and consumers. Between 2002 and 2007, more than 800 articles were published about probiotics, while the number of records in the past twenty-five years was only 25 papers [32]. Besides, nowadays a variety of probiotic products are offered, however; the researcher indicated

that individuals do not have enough knowledge for choosing them [22].

In the present study, the medical science students had approximately acceptable level of knowledge (50.7 % high versus 6.3% low knowledge), that may be due to the high quality of training methods and use of growing number of evidence that support the health effects of probiotics. In contrast, in Babajimopoulos et al. study in Greece [33], consumers were not familiar with the term of probiotics. Venter and Hanekom showed that the knowledge about probiotics was in low level among consumers in South Africa [34]. In Robertson study [35], only 14% of the South African adults were aware about probiotics and Bogue [36] and Sorenson had reported that the Irish consumers were unaware about probiotics.

Low level of knowledge about probiotics is not limited to consumers because Anukam et al. [37] showed that 95.2% of Nigerian clinicians were not familiar with probiotics and in Edmunds survey [38] only 31% of clinicians in Canada were aware about probiotics.

To the best of our knowledge, there was no study about evaluation of the knowledge of university students regarding probiotics so we compared our results with the findings of previous studies in non-student groups. In the present study 83% of students correctly defined, the probiotic term while in Stanczak [39] survey only 43.9% and Hanekom study [34] 56.3% of consumers defined probiotics correctly. In Babajimopoulos et al. study [33] about 76% and Bogue study [40] 70% of consumers were not familiar with the term of probiotic. It can be concluded that students in this study were more familiar with probiotics than consumers were. About 81% of studied students mentioned the dairy products as a more available form of probiotics in local market that was similar to the results of Venter and Hanekom survey [34], while this rate was lower in American consumers (50.4%) [39].

About 60% of students mentioned the health benefits of probiotics correctly that this result was similar to the finding of Bogue [40] and Stanczak study [39]. While Babajimopoulos et al. in Greece showed that consumers (25% men and 50% of women) had low level of knowledge about beneficial effect of probiotics [33] and also only 12% of clinicians had evidence regarding the health effects of probiotics [37].

In the present study, although male students had higher level of knowledge than female students did, but the difference was not statistically significant that may be refer to similar training methods used for educating of students. While in Bogue [40] study in Irish, female consumers were significantly more aware than male consumers were (73% versus 57%).

Regarding students major, there were significant differences in their knowledge about probiotics. The scores of pharmacy and nutrition students were the highest while the scores of paramedical and dental students were the lowest in this study. These differences may be due to different curriculums and up-to-date nutritional findings in these fields.

In addition, our results indicated that the knowledge of students about probiotic was significantly different across different degrees. The high rate of knowledge in studied BSc students may be due to the high knowledge of nutrition students in this degree. It should be mentioned that as majority of nutrition students belonged to BSc degree so that the level of students 'knowledge was high in this degree.

The limitations of this study, is better to be noted, the sample size was small and knowledge of PhD and AS students was not assessed. In conclusion, according our results, medical sciences students in this field had approximately acceptable level of knowledge about probiotics. The level of knowledge about the common available form of probiotic products in local market was low. It can be suggested that, the use of efficient co-educational materials for educating students as a future provider of health information in this field such as teaching new finding, using appealing pamphlets

about probiotics in addition to advertising about various health promoting probiotic-containing products may increase knowledge about the available products in local market.

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