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ORIGINAL ARTICLE / ARAŞTIRMA YAZISI

Evaluation of Microbiota Awareness Among the Healthcare Professionals in Kars Harakani State Hospital

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ABSTRACT

Purpose: This study aimed to evaluate microbiota awareness among the healthcare professionals in Kars Harakani State Hospital by their sex, educational status, marital status, and occupational groups.

Methods: This descriptive and cross-sectional study was conducted between 1-31 December 2023 with the participation of the healthcare professionals (n=329) working at Kars Harakani State Hospital. In the study, a questionnaire form inquiring about sociodemographic characteristics and the Microbiota Awareness Scale (MAS) were used. MAS consists of the subfactors of "general information", "product information", "chronic disease", and "probiotic and prebiotic".

Results: Product information, chronic disease, and probiotic and prebiotic subscale scores and MAS total scale scores of females were found to be higher than males. The general information mean score of those with graduate education levels was higher than those with associate degree levels. The product information score of the married participants was determined to be higher than the single participants. The general information mean score of physicians was higher compared to the mean scores of nurses and technicians, while the product information mean score of technicians was lower than the mean scores of physicians, nurses, and midwives. The chronic disease mean score of nurses was higher than that of physicians, and their probiotic and prebiotic mean score and MAS total scale mean score were higher compared to the mean scores of technicians.

Conclusion: Microbiota awareness levels among healthcare professionals vary according to their occupational groups.

Keywords: Microbiota awareness, prebiotic, probiotic, healthcare professionals

ÖZET

Amaç: Bu çalışma Kars Harakani Devlet Hastanesi sağlık çalışanlarının mikrobiyota farkındalıklarının cinsiyet, eğitim durumu, medeni durum ve meslek gruplarına göre değerlendirilmesi amacıyla yapılmıştır.

Yöntem: Tanımlayıcı kesitsel tipte olan bu çalışma 1-31 Aralık 2023 tarihleri arasında Kars Harakani Devlet Hastanesi sağlık çalışanları (n=329) ile yapılmıştır. Çalışmada sosyodemografik bilgileri içeren anket formuna ek olarak mikrobiyota farkındalık ölçeği (MFÖ) kullanılmıştır. MFÖ "genel bilgiler", "ürün bilgisi", "kronik hastalık" ve "probiyotik ve prebiyotik" alt faktörlerinden oluşmaktadır.

Bulgular: Kadınların ürün bilgisi, kronik hastalık, probiyotik ve prebiyotik ve MFÖ toplam puanları erkeklerden yüksektir. Eğitim durumu lisansüstü olanların genel bilgiler puanı, ön lisans olanlardan yüksektir. Evli olanların ürün bilgisi puanı bekâr olanlardan yüksektir. Doktorların genel bilgiler puanı, hemşire ve teknikerlerden yüksek; teknikerlerin ürün bilgisi puanı, doktor, hemşire ve ebelerden düşüktür. Hemşirelerin kronik hastalık puanı, doktorlardan; probiyotik ve prebiyotik puanı ve MFÖ toplam puanı teknikerlerden yüksektir.

Sonuç: Sağlık personeli içinde meslek gruplarına göre mikrobiyota farkındalık düzeyi farklılık göstermektedir.

Anahtar Kelimeler: Mikrobiyota farkındalığı, prebiyotik, probiyotik, sağlık çalışanları

The human body is colonized by trillions of microorganisms (1). The first data regarding the existence of these microorganisms were discovered by Antonie Van Leeuwenhoek and described as "animalcules" (2). Leeuwenhoek's article titled "A Letter on Protozoa" provides the preliminary definitions of protists and bacteria, and the data of the period are considered the precursor of todays' human microbiota studies (3).

In its general definition, the microbiota is the total sum of microorganisms (bacteria, fungi, archaea, viruses, and protozoans) living in different parts of the skin, mouth, excretory system, lungs, and gastrointestinal system in our body (4). Microbiota has been one of the most significant areas of research in recent years. Especially data on the intestinal microbiota shed light on the diagnosis and treatment of many diseases. Many studies have emphasized the relationship between the microbiota and various diseases such as obesity, diabetes, cardiovascular diseases, neurological diseases, cancer, etc., and a healthy microbiota is considered a powerful weapon to protect from such diseases (5,6). Two major studies in microbiota research, namely the European Metagenomics of the Human Intestinal Tract (MetaHIT) and the USA Human Microbiome Project (HMP), demonstrated that a healthy intestinal microbiota is closely related to the general health of the human body (1,7). Countless factors such as nutrition, prebiotics and probiotics intake, method of birth, stress, etc. are significant in the modulation of the microbiota (8-10).

The International Scientific Association for Probiotics and Prebiotics (ISAPP) defines prebiotics as substances used selectively by microorganisms living in our intestines and beneficial for health. While the safe and adequate intake amount of prebiotics is not definite, it is especially important in terms of supporting health that microorganisms in the intestinal microbiota produce short-chain fatty acids by using these substrata (11). As for probiotics, ISAPP defines them as living microorganisms that have beneficial effects on the health and physiology of the host when they are taken in adequate amounts. Various functions of probiotics such as strengthening the immune system, preventing diarrhea, and protecting from many infections affect human health directly or indirectly (12).

Healthcare professionals assume the role of providing consultancy in addition to providing medical care and treatment services. Therefore, microbiota awareness of healthcare professionals can be accepted as a criterion for the consultancy service they will provide to patients. This study aimed to evaluate the microbiota awareness of healthcare professionals by their sex, educational status, marital status, and occupational groups.

Material and Methods

This study was conducted as a descriptive and cross-sectional study between 1-31 December 2023. All healthcare professionals who agreed to participate in the study read and signed the Informed Consent Form, and a copy was given to them.

Study Population and Sample

The study population consisted of 780 healthcare professionals working at Kars Harakani State Hospital with at least an associate degree. The minimum sample size was calculated as 258 with a 95% confidence interval and 5% margin of error (13). 295 voluntary healthcare professionals who met the inclusion criteria were included in the study.

Study Inclusion Criteria

- Beig a healthcare professional working at Kars Harakani State Hospital,

- Having a minimum of associate degree in education,

- Being between 20-65 years old,

- Not having a chronic disease diagnosed by physicians,

- Not using any medications, and

- Volunteering to participate in the study.

Data Collection Tools

The study data were collected by using the sociodemographic questionnaire form prepared by the researcher in line with literature review and the Microbiota Awareness Scale (MAS).

The sociodemographic questionnaire form includes questions about certain characteristics of the participants such as age, sex, educational status, marital status, and occupations.

MAS is a scale developed by Külcü and Önal (2022) to evaluate the microbiota awareness of individuals (14). The

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first 16 items of MAS are 5-point Likert-type questions, and the last 4 items are open-ended questions, 20 items in total. For the Likert-type questions, the respondent is asked to choose among the options of "strongly disagree", "disagree", "undecided", "agree", and "strongly agree", which are scored as 1, 2, 3, 4, and 5, respectively. Questions 17 and 18 on the scale are knowledge questions with 5 options, and it is calculated out of *5 (number of correct answers marked / number of correct answers - number of incorrect answers marked / number of incorrect answers), and it is rounded to the closest digit among 1, 2, 3, 4, and 5. Items 19 and 20 on the scale are open-ended questions, and each correct response is given 1 point, 4 and above correct responses are scored as 5 points, and no correct response is scored as 1 point. The minimum and maximum scores to be obtained from the scale are 20 and 100 points. The scale has no cutoff point, and high scores obtained from the scale are interpreted as a high level of microbiota awareness. It has four subscales, which are general information (items 1, 2, 4, 5, 6, and 13), product information (items 17, 18, 19, and 20), chronic disease (items 8, 10, 12, 14, and 16), and probiotic and prebiotic (items 3, 7, 9, 11, and 15).

Ethical Approval and Institutional Permission for the Study

Ethical approval for the study was obtained from Agri Ibrahim Cecen University Scientific Research Ethics Committee with the decision dated 30.11.2023 and numbered 256, and institutional permission was taken from the Head Physician's Office of Kars Harakani State Hospital.

Statistical Analysis Methods Used

The data collected were analyzed by using the IBM Statistical Package for the Social Sciences (SPSS) 22® software, and the normal distribution assumption for quantitative variables was checked with the Kolmogorov-Smirnov test. Descriptive statistics were presented as median (25-75 percentile) for quantitative variables and as frequency (%) for categorical variables. In the comparison of independent groups, as the normal distribution assumption was not met, the Mann-Whitney U test and Kruskal-Wallis H test were used. The statistical significance level was accepted as $p < 0.05$.

Results

The general characteristics of the participants are presented in Table 1. Of the 329 healthcare professionals with a mean age of 32 years (range 21-62 years), 72.6% were female and 27.4% were male. Of the participants, 24.6% had associate degrees, 52.0% had undergraduate degrees, and 23.4% had graduate degrees. 56.8% of the participants were married, and 43.2% were single. 15.5% of the participants were physicians, 33.4% were nurses, 15.8% were midwives, and 35.3% were technicians.

Table1: General characteristics of the participants			
		n	%
Sex	Female	239	72.6
	Male	90	27.4
Age (years)		32.0 (26.0 – 38.0)	
Education Status	Associate degree	81	24.6
	Undergraduate degree	171	52.0
	Graduate degree	77	23.4
Marital Status	Married	187	56.8
	Single	142	43.2
Profession	Physician	51	15.5
	Nurse	110	33.4
	Midwife	52	15.8
	Technician	116	35.3
Descriptive statistics were expressed as frequency (n) and percentage (%) or median (25th-75th percentile).			

The comparison of the participants' MAS scores by sex is presented in Table 2. Female participants' mean scores on product information, chronic disease, probiotic and prebiotic, and MAS total scale scores were statistically significantly higher than those of male participants (p=0.012; p=0.006; p<0.001; p=0.002).

Table 2: Comparison results of MAS scores according to sex			
	Sex		
	Female	**Male**	**p***
General Information	26.0 (24.0 – 28.0)	27.0 (25.0 – 28.0)	0.219
Product Information	8.0 (5.0 – 10.0)	7.0 (5.0 – 9.0)	**0.012**
Chronic Disease	15.0 (17.0 – 19.0)	16.0 (12.8 – 18.0)	**0.006**
Probiotic and Prebiotic	20.0 (17.0 – 21.0)	17.0 (16.0 – 20.0)	**<0.001**
MAS Total	70.0 (65.0 – 75.0)	67.0 (61.0 – 73.3)	**0.002**
*:Mann-Whitney U test Descriptive statistics are expressed as median (25th-75th percentile).			

The results of the comparison of the participants' MAS scores by educational status are presented in Table 3. The general information mean score of those with graduate degrees was statistically significantly higher than the mean score of those with associate degrees (p=0.025).

Table 3: Comparison results of MAS scores according to educational status				
	Education Status			
	Associate Degree	Undergraduate Degree	Graduate Degree	p*
General Information	26.0 (24.0 – 27.0)[a]	27.0 (24.0 – 28.0)[a,b]	27.0 (26.0 – 28.0)[b]	**0.025**
Product Information	7.0 (5.0 – 9.0)	8.0 (5.0 – 10.0)	8.0 (5.0 – 10.0)	0.140
Chronic Disease	17.0 (15.0 – 19.0)	16.0 (15.0 – 18.0)	17.0 (14.0 – 18.0)	0.536
Probiotic and Prebiotic	19.0 (16.0 – 21.0)	19.0 (16.0 – 21.0)	19.0 (17.0 – 20.5)	0.999
MAS Total	69.0 (63.0 – 72.0)	69.0 (63.0 – 75.0)	70.0 (65.5 – 76.5)	0.360

*:Kruskal-Wallis H test
Similar letters in the same row indicate statistical similarity and different letters indicate dissimilarity.
Descriptive statistics are expressed as median (25th-75th percentile).

The results of the comparison of the participants' MAS scores by marital status are presented in Table 4. The product information mean score of the married participants was found to be statistically significantly higher compared to the mean score of the single participants (p=0.028).

Table 4: Comparison results of MAS scores according to marital status			
	Marital Status		
	Married	Single	p*
General Information	27.0 (24.0 – 28.0)	26.0 (25.0 – 28.0)	0.854
Product Information	8.0 (5.0 – 10.0)	7.0 (5.0 – 9.0)	**0.028**
Chronic Disease	17.0 (15.0 – 19.0)	16.0 (14.0 – 19.0)	0.919
Probiotic and Prebiotic	19.0 (17.0 – 21.0)	19.0 (17.0 – 21.0)	0.203
MAS Total	69.0 (64.0 – 75.0)	69.0 (63.8 – 74.0)	0.255

*:Mann-Whitney U test
Descriptive statistics are expressed as median (25th-75th percentile).

The results of the comparison of the participants' MAS scores by occupational groups are presented in Table 5. The general information mean score of the physicians was significantly higher than that of the nurses and technicians (p<0.001). The product information mean score of the technicians was significantly lower than that of the physicians, nurses, and midwives (p<0.001). The chronic disease mean score of the nurses was significantly higher than that of the physicians (p=0.002). The probiotic and prebiotic mean scores of the nurses were significantly higher than those of the technicians (p=0.002). The MAS total scale mean score of the nurses was significantly higher than that of the technicians (p=0.001).

	Profession				
Table 5: Comparison results of MAS scores according to occupational groups					
	Physician	**Nurse**	**Midwife**	**Technician**	**p***
General Information	27.0 (28.0-28.0)[a]	26.0 (24.0-28.0)[b]	27.0 (24.0-28.0)[a,b]	26.0 (24.3-27.8)[b]	**<0.001**
Product Information	8.0 (6.0-10.0)[a]	8.0 (6.0-11.0)[a]	8.0 (5.0-10.0)[a]	6.0 (5.0-8.8)[b]	**<0.001**
Chronic Disease	15.0 (13.0-17.0)[a]	17.0 (15.0-19.0)[b]	16.0 (14.0-18.0)[a,b]	16.0 (14.0-19.0)[a,b]	**0.002**
Probiotic and Prebiotic	18.0 (17.0-20.0)[a,b]	20.0 (17.8-21.0)[a]	19.0 (18.0-21.0)[a,b]	18.0 (16.0-21.0)[b]	**0.002**
MAS Total	69.0 (64.0-73.0)[a,b]	72.0 (67.0-76.0)[a]	69.0 (64.0-72.0)[a,b]	67.0 (61.0-73.0)[b]	**0.001**

*:Kruskal-Wallis H test
Similar letters in the same row indicate statistical similarity and different letters indicate dissimilarity.
Descriptive statistics are expressed as median (25th-75th percentile).

Discussion

Healthcare professionals assume the responsibility of providing consultancy to their patients as well as medical treatment services. Therefore, their knowledge of the relationship between microbiota and health and their high level of microbiota awareness can be accepted as a criterion for the consultancy they will provide to their patients. This study aimed to evaluate the microbiota awareness of the healthcare professionals working at Kars Harakani State Hospital.

In the study, the product information, chronic disease, probiotic and prebiotic, and MAS total scale mean scores of the female participants were found to be higher than those of the male participants. In the study they conducted, Deniz Akan et al. (2020) determined that male healthcare professionals had higher levels of microbiota awareness, while Serinçay (2021) reported that the probiotic information level of the physicians receiving specialty education in medicine did not differ between males and females (15,16). In a study that was conducted on Nutrition and Dietetics students as healthcare professional candidates and in which the same scale was used, no difference was found between male and female students in terms of microbiota awareness (17). In a study including 1,066 healthcare professionals from 30 countries, no statistically significant difference was observed between female and male healthcare professionals in terms of probiotic information (18). In another study conducted on university students, the scale mean scores of the females were reported to be higher than those of the males (19).

In the study conducted by Oliver et al. (2014), it was determined that females believed more in the benefits of probiotics and prebiotics for health than males did (20). In a similar study, it was demonstrated that females knew the concept of probiotics more compared to males and that females displayed a more positive attitude regarding the dissemination of information about the use of probiotics (21). These results similar to the results of the present study may have stemmed from the fact that women are more interested in nutrition and cuisine culture in society.

In the present study, the general information score of the individuals with graduate education level was found to be higher than that of the participants with associate degree education level. In their study, Deniz Akan et al. (2020) found that the microbiota information levels of those with graduate education level were higher (15). In another study, in which the relationship between educational levels and prebiotic and probiotic information was examined, it was determined that the participants with master's degrees scored statistically significantly higher compared to those with undergraduate education levels (22). In this context, it can be stated that different study areas in graduate education in health departments may have increased microbiota awareness.

In the present study, the product information score of the married participants was found to be higher than that of the single participants, but another study reported that single individuals knew more about the microbiota concept (15). In a study covering 1,265 Australian adults, marital status did not create a difference in terms of prebiotic and probiotic awareness (23).

In the present study, the general information mean score of the physicians was found to be higher than those of the nurses and technicians, while the product information mean score of the technicians was determined to be lower compared to those of the physicians, nurses, and midwives. Moreover, the chronic disease mean score of the nurses was higher than that of the physicians, and their probiotic and prebiotic mean score and MAS total scale mean score were higher than those of the technicians. In a study evaluating the microbiota information and awareness of midwives and nurses working in an obstetrics clinic, it was reported that 26.2% of the participating midwives and nurses never heard of the term microbiota, and 36.2% heard about it but did not exactly know what it was (24). In a study evaluating the information levels of physicians, nurses, and other healthcare professionals working at a university hospital about microbiota, it was observed that the physicians had a higher level of microbiota awareness compared to the nurses and other healthcare professionals (15). Another study found that although physicians generally knew about probiotics, it was seen that when they were presented with more specific information, they did not have adequate information (16). A study conducted on a comprehensive sample showed that more than 80% of the physicians and three-fourths of the nurses defined probiotics correctly (18). In a study including dietitians, pediatricians, and practicing physicians, the possibility of recommending probiotics-containing foods was found to be higher among the pediatricians and practicing physicians compared to the dietitians (25). In a study including dietitians, nurses, physicians, and pharmacists, it was found that the participants were more familiar with the definition of probiotics (88%) than the definition of prebiotics (22%), and it was interpreted that this situation may have been associated with the marketing and advertisement of supplements that contain probiotics (20). In the study they conducted in different countries of Europe, Pettoello-Mantovani et al. (2019) demonstrated that dietitians, pediatricians, and practicing physicians had a high level of consensus on the attitudes of healthcare professionals toward nutrition recommendations and probiotics (26).

Conclusion

Appropriate consultancy provided to patients by healthcare professionals is in direct proportion to their awareness levels. The present study showed that healthcare professionals had different levels of microbiota awareness but at an inadequate level in general.

The relatively small sample size and the inclusion of only one hospital's healthcare workers in the study are among the limitations of the study. However, it is important to evaluate the microbiota awareness levels of healthcare professionals with an appropriate measurement tool. In this context, this study is important in terms of being the first study to evaluate the microbiota awareness levels of healthcare workers using the MAS developed by Külcü and Önal (2022), the validity and reliability of which were accepted to be good.

Many studies in the literature show that the microbiota awareness levels of healthcare professionals are generally poor and that although their probiotic information levels are high, they are hesitant to recommend probiotics to their patients due to inadequate data about them.

In conclusion, it is necessary to train healthcare professionals on microbiota, probiotics, and prebiotics in a way that will contribute to their clinical practices and most importantly, with an evidence-based approach. Thus, their trust in the products they will recommend to their patients and the efficiency of the treatment provided to the patients will be increased.

Declarations

REFERENCES

1. Qin J, Li R, Raes J, et al. A human gut microbial gene catalogue established by metagenomic sequencing. Nature. 2010;464:59-65. DOI: 10.1038/nature08821

2. Leeuwenhoek AV. Observations, communicated to the publisher by Mr. Antony van Leewenhoeck, in a dutch letter of the 9th Octob. 1676. here English'd: concerning little animals by him observed in rain-well-sea-and snow water; as also in water wherein pepper had lain infused. Philosophical Transactions of the Royal Society of London. 1677;12(133):821-831. DOI: 10.1098/rstl.1677.0003

3. Lane N. The unseen world: reflections on Leeuwenhoek (1677)'Concerning little animals'. Philosophical Transactions of the Royal Society B: Biological Sciences. 2015;370(1666):20140344. DOI: 10.1098/rstb.2014.0344

4. Sekirov I, Russell SL, Antunes LCM, et al. Gut microbiota in health and disease. Physiological Reviews. 2010;90:859-904. DOI: 10.1152/physrev.00045.2009

5. Hou K, Wu ZX, Chen XY, et al. Microbiota in health and diseases. Signal Transduction and Targeted Therapy. 2022;7(1):135. DOI: 10.1038/s41392-022-00974-4

6. Valdes AM, Walter J, Segal E, et al. Role of the gut microbiota in nutrition and health. BMJ. 2018;361:k2179. DOI: 10.1136/bmj.k2179

7. Human Microbiome Project Consortium. Structure, function and diversity of the healthy human microbiome. Nature. 2012;486:207-214. DOI: 10.1038/nature11234

8. Nova E, Gómez-Martinez S, González-Soltero R. The influence of dietary factors on the gut microbiota. Microorganisms. 2022;10(7):1368. DOI: 10.3390/microorganisms10071368

9. Coelho GDP, Ayres LFA, Barreto DS, et al. (2021). Acquisition of microbiota according to the type of birth: an integrative review. Revista Latino-Americana de Enfermagem. 2021;29:e3446. DOI: 10.1590/1518.8345.4466.3446

10. Geng S, Yang L, Cheng F, et al. Gut microbiota are associated with psychological stress-induced defections in intestinal and blood–brain barriers. Frontiers in Microbiology. 2020;10:3067. DOI: 10.3389/fmicb.2019.03067

11. ISAPP. Understanding prebiotics and fiber both prebiotics and fiber are dietary tools to promote health. Published [2018]. Accessed [13 May 2024]. https://isappscience.org/wp-content/uploads/2019/04/Prebiotic-Fiber-Infographic-Final.pdf

12. ISAPP. Probiotics. Published [2019]. Accessed [13 May 2024]. https://isappscience.org/wp-content/uploads/2019/04/Probiotics_0119.pdf

13. Sample size calculator. Published [2004]. Accessed [13 May 2024]. http://www.raosoft.com/samplesize.html

14. Külcü A, Önal Ö. Microbiota awareness scale validity and reliability study. Süleyman Demirel Üniversitesi Tıp Fakültesi Dergisi. 2022;29(2):205-212. DOI: 10.17343/sdutfd.1031515

15. Deniz Akan D, Adıyaman A, Işık G, et al. Bir üniversite hastanesinde çalışan sağlık çalışanlarının mikrobiyota hakkındaki bilgi düzeylerinin incelenmesi. International Anatolia Academic Online Journal Health Sciences. 2020;6(3):347-359.

16. Serinçay H. Tıpta uzmanlık eğitimi alan hekimlerin probiyotikler ile ilgili bilgi düzeyleri ve tutumları. Uzmanlık Tezi, Bursa Uludağ Üniversitesi Tıp Fakültesi, Bursa, 2021.

17. Hamurcu P, İsmailoğlu Ö. Mikrobiyota farkındalığı: beslenme ve diyetetik öğrencileri üzerine bir araştırma. Journal of Immunology and Clinical Microbiology. 2022;7(1):5-18.

18. Fijan S, Frauwallner A, Varga L, et al. Health professionals' knowledge of probiotics: an international survey. International Journal of Environmental Research and Public Health. 2019;16(17):3128. DOI: 10.3390/ijerph16173128

19. Kocaadam Bozkurt B, Arslan M. Üniversite öğrencilerinin mikrobiyota farkındalık düzeylerinin değerlendirilmesi: Erzurum ili örneği. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi. 2023;12(4):1615-1622. DOI: 10.37989/gumussagbil.1226297

20. Oliver L, Rasmussen H, Gregoire MB, et al. Health care provider's knowledge, perceptions, and use of probiotics and prebiotics. Topics in Clinical Nutrition. 2014;29(2):139-149. DOI: 10.1097/01.TIN.0000445898.98017.eb

21. Al-Fawares OA, Rayyan WA, Fararjeh AFS, et al. Probiotic therapy: a survey of Middle Eastern healthcare providers' attitudes, beliefs, and practice patterns. Journal of Applied Pharmaceutical Science. 2023;13(10):172-180. DOI: 10.7324/JAPS.2023.143603

22. Yücel Şengün İ, Kırmızıgül A, Özaydın İ, et al. Tüketicilerin probiyotik ve prebiyotik gıdalara yönelik bilgi düzeyleri ve tüketim durumlarının belirlenmesi: İzmir/Bornova örneği. Gıda. 2020;45(1):103-114. DOI: 10.15237/gida.GD19123

23. Khalesi S, Vandelanotte C, Thwaite T, et al. Awareness and attitudes of gut health, probiotics and prebiotics in Australian adults. Journal of Dietary Supplements. 2021;18(4):418-432. DOI: 10.1080/19390211.2020.1783420

24. Uğurlu M, Karaoğlu FN, Öktem ÖH, et al. Kadın doğum kliniklerinde çalışan ebe ve hemşirelerin mikrobiyota konusundaki bilgi ve farkındalıklarının incelenmesi. Mersin Üniversitesi Tıp Fakültesi Lokman Hekim Tıp Tarihi ve Folklorik Tıp Dergisi. 2023;13(1):207-217. DOI: 10.31020/mutftd.1203756

25. Wilson Z, Whitehead K. A cross sectional survey to assess healthcare professionals' attitudes to and understanding of probiotics. Clinical Nutrition ESPEN. 2019;34:104-109. DOI: 10.1016/j.clnesp.2019.08.004

26. Pettoello-Mantovani M, Çullu Çokuğraş F, Vural M, et al. Pilot study for the understanding and use of probiotics by different paediatric healthcare professionals working in different European countries. Italian Journal of Pediatrics. 2019;45(1):1-11. DOI: 10.1186/s13052-019-0648-4

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