

Knowledge and Attitude of Probiotics Among the Residents of Abeokuta, Ogun State

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Abstract

Probiotics are live bacteria and yeasts that offer beneficial effects in the body. Probiotics are functional foods whose beneficial effects cannot be over-emphasized. This study evaluated the association between the demography of residents of Abeokuta and their knowledge of probiotics. Descriptive study at evaluating the knowledge of probiotics among respondents was carried out. A combination of reviewed literature and structured questionnaire was administered to respondents in a purposively selected area of Abeokuta South and Abeokuta North local governments. All the five hundred (500) questionnaires were retrieved (100%). The result showed that there was association between the educational qualification of respondents and their knowledge of probiotics ($\chi^2=12.41$, $P < 0.053$) and the age of respondents and their knowledge of probiotics ($\chi^2=23.45$, $P < 0.003$). No association was found between the gender and the knowledge of probiotics ($\chi^2 = 2.08$, $P > 0.353$). Education and enlightenments of residents can be achieved through social media, print media and aggressive campaign to spread the knowledge of probiotics.

Keywords: Probiotics, Respondents, Questionnaire, Knowledge

Introduction

The live bacteria and yeasts that make up probiotics are already living in the human body, along with many others. Probiotics are dietary supplement containing potentially beneficial bacteria or yeasts. Probiotic supplements add to the existing supply of friendly microbes. When ingested in sufficient quantities, they are safe for human consumption (Ricci *et al.*, 2017; Nasrollahzadeh *et al.*, 2022). Adequate scientific evidences were found to support the beneficial effects of probiotics (Morelli & Capurso, 2012). Probiotics are known to enhance the nutritional value and maintain gut health (Milner *et al.*, 2021). *Bifidobacterium* and *Lactobacillus* genera are “friendly” bacteria that are considered as probiotics (Prasad, & Rejesvari, 2017). They are normally utilized in food and animal feed (Bahera *et al.*, 2018). They normally occur in the human gastrointestinal and genitourinary tracts, and help to support gastrointestinal health and strengthen the immune system (Palanivelu *et al.*, 2022). Probiotics are also known as functional foods. These functional foods are similar to traditional foods yet have physiological benefits (Kamar *et al.*, 2022). Probiotics have been reported to also regulate allergic reactions, reduce tumor growth in some cancer models, prevent colon cancer and control the level of blood cholesterol (Hajavi *et al.*, 2019). Probiotics also show activity against viruses like the rotaviruses (Ang *et al.*, 2016) and herpes simplex (Khani *et al.*, 2012). The exopolysaccharides produced by *Lactobacillus* had been shown to produce an antiviral action on human rotavirus induced diarrhea (Kim *et al.*, 2018) and transmissible gastroenteritis virus

(Yang *et al.*, 2017). Probiotics have been found to also have antiviral activities on respiratory viruses like influenza and syncytial viruses. Probiotics are able to activate the secretion of IgA and enhance the activities of neutrophils, natural killers, and macrophages, thereby boosting the immunity of individuals with the respiratory infections (Khan *et al.*, 2019; Singh, & Rao, 2021). Supplemental probiotics along with prescribed antibiotics has been encouraged to reduce the adverse effect of antibiotics in some studies (Prasad, & Rajesvari, 2017).

The benefits of probiotics are numerous and cannot be over-emphasized, hence the objective of this study is to evaluate the association between the demographic characteristics of residents of Abeokuta and their knowledge of probiotics.

Methods

Descriptive study at evaluating the knowledge of probiotics in residents was carried out. A combination of reviewed literature and structured questionnaire was administered to residents in a purposively selected study area of Abeokuta South and Abeokuta North local governments, to extract information. All the 500 questionnaires administered were retrieved. The questionnaire contained two sections, demography of respondents and the knowledge of probiotics. SPSS version 23 was employed for the descriptive statistics and chi-square analysis of data.

Results

The bar chart (Figure 1) shows the demographic characteristics of respondents, 41.6 % of the participants were between 30-39 years, 30.0 % of the participants were between 18-28 years, and 21.8 % of the participants were between 40-49 years. The Mean age and standard deviation of the participants were ($\mu = 33.5, \pm = 13.84$). The mean age was between 30-39 years' interval. The results, as also presented in figure 2, showed that the males comprised a larger portion of the group at 52.6 %, whereas 47.4 % were females. The educational status of the respondents is presented in figure 3. The participants had varied levels of education, 15.2 % of them were NCE/ND Holders, 49.8 % of the participants were Bachelor degree holders or Higher National Diploma holders, 20.0 % were holders of Master degree /PhD holder and 15.0 % of them have other lesser certificates. Fig. 4 showed that large proportion of the respondents (79.8 %) had heard about Probiotics while only 14.8 % stated that they had not heard about probiotic. The respondent's source of information is shown in Fig 5, 33.6 % got the information from the doctor, 23.8 % got the information from health workers, 18.8 % got the information from family & friends, 18.6 % got the information from social media. Large proportion of the respondents (56.4 %) knew what probiotics are, 32.0 % didn't know anything about probiotics, while 11.6 % weren't sure about it (Fig. 6). Majority of the respondents 50.4 % were familiar with *Lactobacillus*, 28.2% of said bifidibacteria while 13.6 % mentioned yoghurt, 7.8 % wasn't sure or didn't know the term "probiotics". (Fig. 7). Sources of probiotics is shown in Fig. 8, majority of the health professionals (48.2 %) agreed Milk and Yoghurt, 35.8 % preferred meat sources, while only 10 % supported cereals and pulses. The results of respondents' knowledge of health importance of probiotics, as indicated in fig. 9, showed that 41.8 % believed they are used for chronic diarrhea, 27.4 % indicated probiotics are used to maintain good

gastrointestinal health, 13.4 % believed they are used to take care of allergic skin reaction while others (5.0 %) do not have any knowledge about their uses. Respondents' knowledge about uses of probiotics is shown in Fig. 10, 50.4 % of the residents believed probiotic displays antimicrobial activity against pathogenic bacteria, 28.2 % agreed they prevent antibiotic related diarrhea, 13.6 % agreed they improve immune response, while 7.8 % was of opinion that probiotics reduce cholesterol levels. Respondents' probiotics consumption is shown in Fig 11, 57.6 % of the respondent confirmed they have consumed probiotic before, and 42 % had not. Fig 12 showed that 36.8 % of the respondents were aware of that probiotics benefits while 51.0 % were not sure of its benefits. Respondent response on safety level assurance is shown in Fig 13, 44.2 % of the participants are not sure if probiotics are safer than prescription drugs, 32.4 % agreed that it is safer.

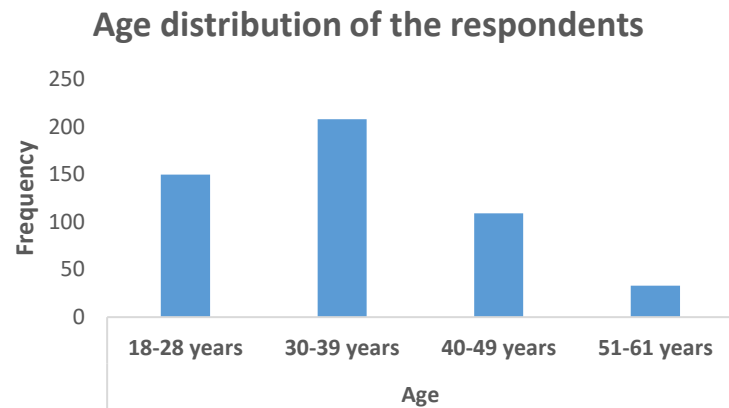


Figure 1: Age distribution of the respondents

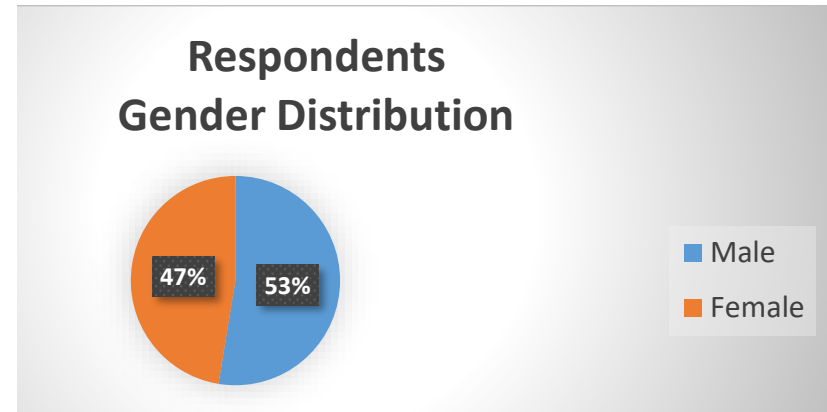


Figure 2: Gender distribution of the respondents

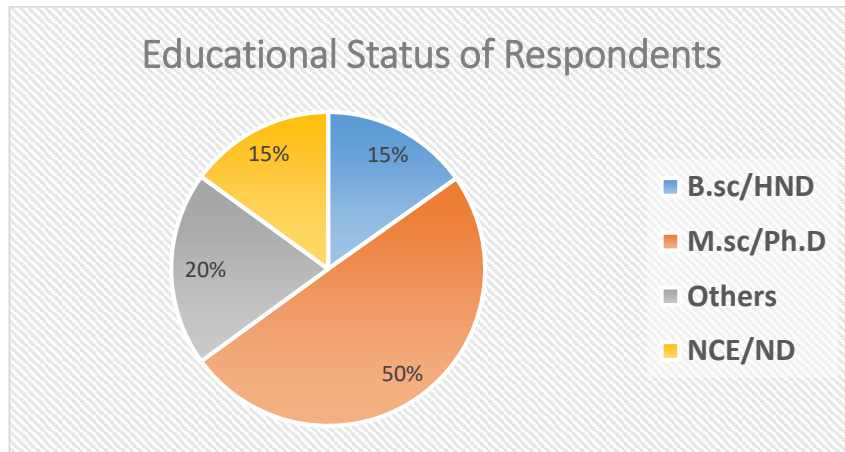


Figure 3: Respondents' educational status

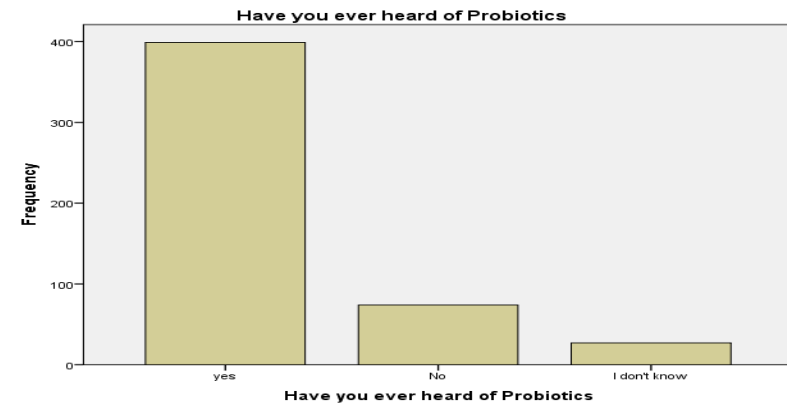


Figure 4: Respondents awareness about Probiotics

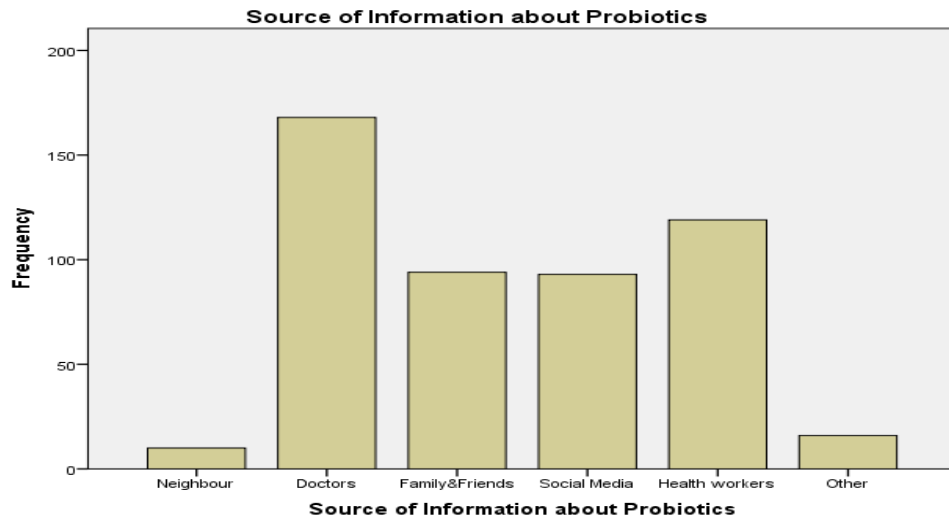


Figure 5: The respondents source of information about probiotics

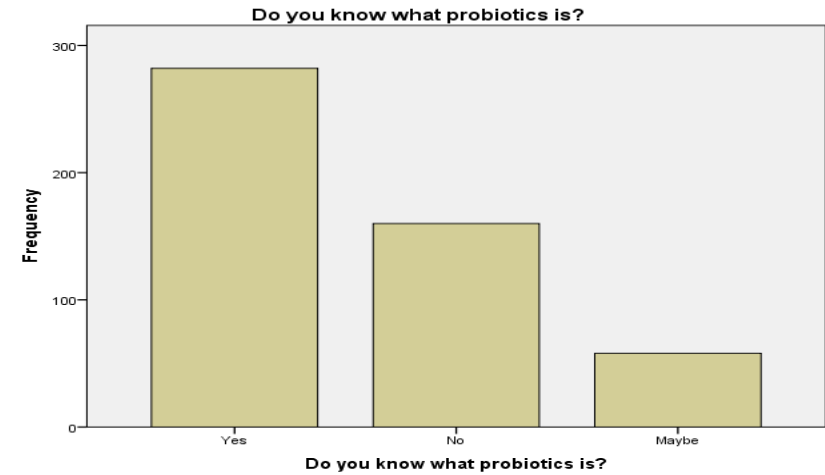


Figure 6: Respondents' knowledge about what probiotics are.

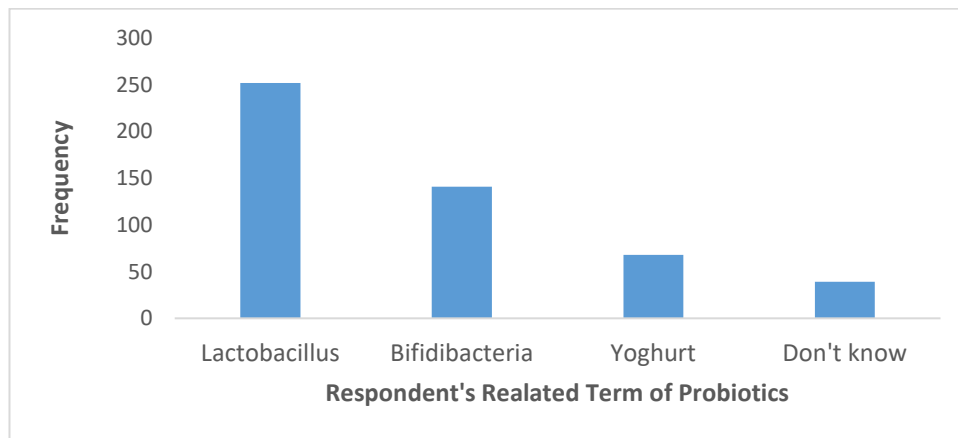


Figure7: The respondents' knowledge about what examples of probiotics

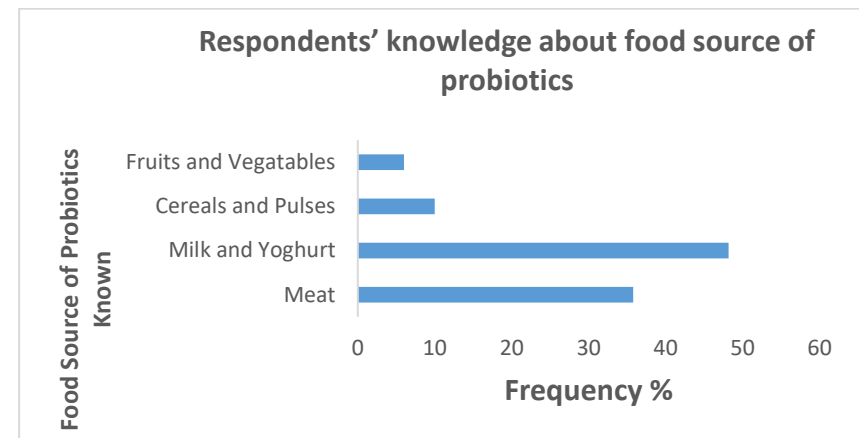


Figure 8: Respondents' knowledge about food source of probiotics

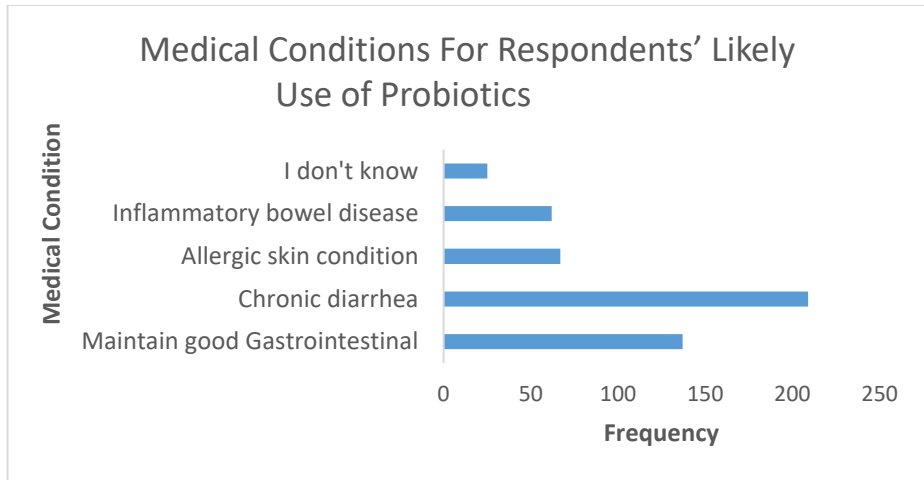


Figure 9: Respondents' knowledge of health importance of probiotics

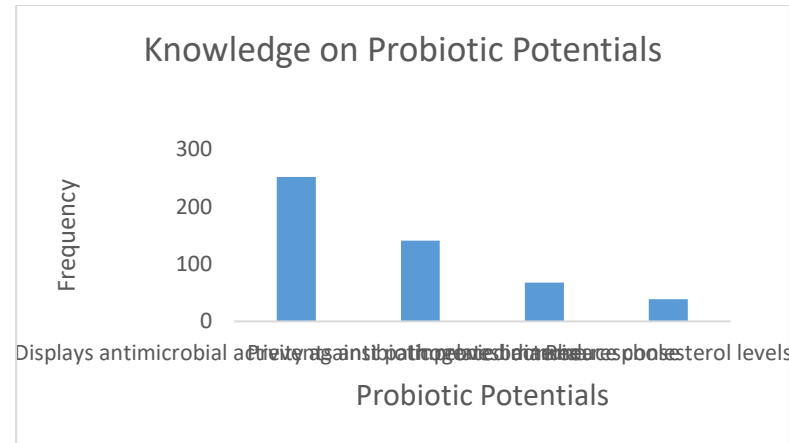


Figure 10: Respondents' knowledge about uses of probiotics.

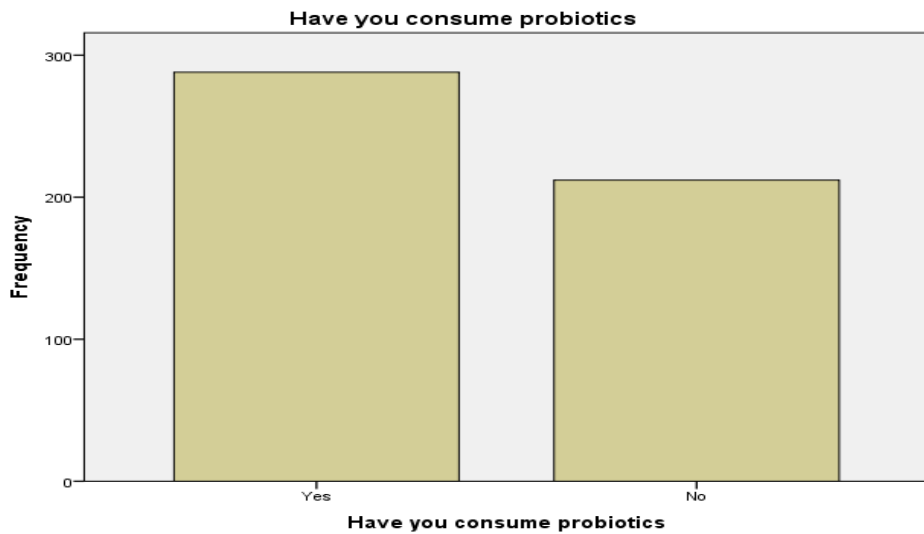


Figure 11: Respondents' probiotics consumption

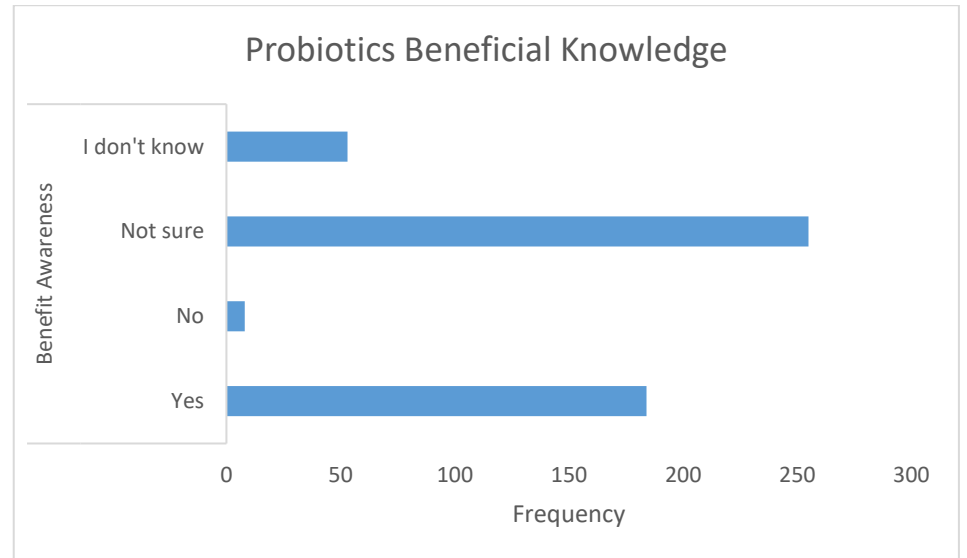


Figure 12: Respondents' probiotics beneficial knowledge.

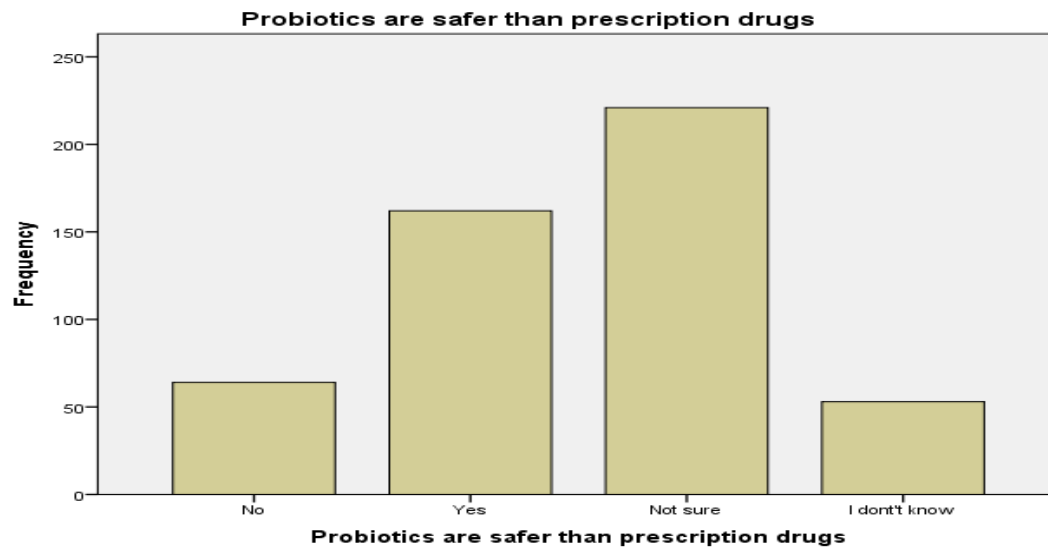


Figure 13: The respondents' knowledge that probiotics are safer than prescribed drugs.

Discussion

The association between the demography (age, gender, educational qualification) and the knowledge of probiotics of respondents was carried out using the chi-square analysis. An association was found between the educational qualification of respondents and their knowledge of probiotics ($X^2=12.41$, $P<0.053$). Association was also found between the demography and the age of respondents ($X^2=23.45$, $P<0.003$). No association was found between gender and the knowledge of probiotics among respondents ($X^2=2.08$, $P>0.353$). The result is in line with the research of Prasad *et al.*, (2017) who found the knowledge of probiotics predominant in younger age groups. The result is in contrast with another study which showed that highly educated respondents (70% with either high school or university) was independent /not in association with the knowledge of Probiotics (Viana *et al.*, 2007). A large percentage of respondents in this study had heard of the term probiotics. This is in line with the work of Pradito et al. (2020) that most students of Jabodetabek college in Indonesia had basic knowledge of probiotics. The result is also in agreement with the study

conducted by Kolady *et al.*, (2018) about the awareness among millennials in the United States as well as the study conducted by Mejia *et al.*, (2019) about the knowledge of probiotics among students of Laguna college in the Philippine. 33.6% of the respondents in this research had the doctors as their source of information on probiotics while 23.8% had other health workers as their source of information. This study is in contrast with the result of another work where information on probiotics was received mostly from social media or internet (45.3%), product advertisements (29.6%) (Pradito *et al.*, 2020). The result is also in contrast with another study that showed that younger generation spent more than 20 hours on social media and that most of the information they get were from social media (Casey, 2017). The fact that 41.6% of respondents in this research were between the ages of 30-39 years did not necessarily mean that social media would be their most rated source of information among these groups of people. Social media still remains the best mode of information dissemination (Pradito *et al.*, 2020). The respondents (50.4%) agreed that *Lactobacillus* is related to probiotics, 28.2% agreed that Bifidobacteria are related to probiotics while only 7.8% did not have an idea. The most common group of probiotics are *Lactobacillus* and *Bifidobacterium* (Song *et al.*, 2012; Kumar *et al.*, 2022). Other strains have been identified to be effective as probiotics e. g *Enterococcus*, *Saccharomyces*, *Pediococcus*, *Streptococcus salivarius*, *Leuconostoc* (Li *et al.*, 2022; Rhanja *et al.*, 2021). *Lactobacillus plantarum* has been identified as probiotics in fermented foods (Behera *et al.*, 2018). Some of the respondents in the study (48.2%) were able to identify the food source of probiotics as milk/yoghurt. *Lactobacillus acidophilus*, *Bifidobacterium* sp. and *Lactobacillus casei* have been utilized in dairy products while *Lactobacillus rhamnosus* have been used in the production of yoghurt (Kamal *et al.*, 2018; Kumar *et al.*, 2022). In the present study, 41.8% responded that they would use probiotics for chronic diarrhea while 27.4% responded that it would be used to maintain gastrointestinal health. Probiotics have come to action as medical remedies for gastrointestinal and non-gastrointestinal ailments such as diarrhea, irregular bowel movements, inflammatory reactions etc (Depoorter, & Vandenplas, 2022). Other authors have found probiotics as a medical therapy for Crohn's disease, vulvovaginal candidiasis in females (Xie *et al.*, 2017) while probiotics have been found as medical therapy for diarrhea, constipation, irritable bowel syndrome, asthma, atopic dermatitis, peptic ulcer, colon cancer, and coronary heart disease (Doleyres, & Lacroix, 2005). The result of this study has been able to provide information on the level of knowledge of probiotics among the population in Abeokuta. The result showed that much enlightenment and education should be embarked on through aggressive social media campaign to raise awareness on probiotics.

Conclusion

Probiotics foods are functional foods with potential health benefits. Despite the awareness of probiotics among a good number of respondents in this study, there is a limited usage of probiotics because of the lack of adequate knowledge.

Recommendation

Appropriate training, education, aggressive media campaign/social media will improve the knowledge of probiotics among the residents of Abeokuta.

References

- Ang, L. Y. E., Too, H. K. I., Tan, E. L., Chow, T. K. V., Shek, P. C. L., & Tham, E. (2016). Antiviral activities of *Lactobacillus reuteri protectis* against coxsackievirus A and Enterovirus 71 infection in human skeletal muscle and colon cell lines. *Virology Journal*, 13(1), 1-12. <https://doi.org/10.1186/s12985-016-0567-6>
- Behera, S. S., Ray, R. C., & Zdolec, N. (2018). *Lactobacillus plantarum* with functional properties: an approach to increase safety and shelf-life of fermented foods. *Biomedical Research International*, 10 (1155) 936-1614
- Casey (2017). Nielson social media report. Retrieved on July 31, 2019 from Nielson Website. <http://www.nielsen.com/us/en/insights/report/2017/2016-nielson-social-media-report>
- Depoorter, L., & Vandenplas, Y. (2022) Probiotics in pediatrics, *Probiotics*, 425-450. <https://doi.org/10.3390/nu13072176>
- Doleyres, Y., & Lacroix, C. (2005). Technologies with free and immobilized cells for probiotics Bifidobacteria production and protection. *International Dairy Journal*. 15(10), 973-988. <https://doi.org/10.1016/j.idairyj.2004.11.014>.
- Hajavi, J. E., Smaili, S. A., Varasteh, A. R., Vazini, H., & Atabati, H., Mardani, F. (2019). The immunomodulatory role of probiotics in allergy therapy. *Journal of Cell Physiology*, 234(3), 2386-2398. <https://doi.org/10.1002/jcp.27263>
- Kamal, R. M., Alnakip, M. E., Abd, El Aal, S. F., and Bayonmi, M. A. (2018). Bio-controlling capability of probiotic strain *Lactobacillus rhamnosus* against common foodborne pathogen in yoghurt. *International Dairy Journal*, 85, 1-7
- Khani, S., Motamedifar, M., Golmoghaddam, H., Hosseini, H. M., & Hashemizadeh, Z. (2012). In-vitro study of the effect of a probiotic bacterium, *Lactobacillus rhamnosus* against herpes simplex virus type 1. *Brazil Journal of Infectious Diseases*, 16(2), 129-135. <https://doi.org/10.1590/s1413-86702012000200004>.
- Khan, R., Peterson, F. C., & Shekhar, S. (2019). Commensal bacteria: an emerging player in defense against respiratory pathogens. *Frontiers in Immunology*, 10, 1203. <https://doi.org/10.3389/fimmu.2019>
- Kim, K., Lee, G., Thanh, H. D., Kim, J. H., Konkitt, M., & Yoon, S. (2018). Exopolysaccharide from *Lactobacillus plantarum* LRCC5310 offers protection against rotavirus-induced diarrhea and regulates inflammatory response. *Journal of Dairy Science*, 101(7), 5702-5712. <http://doi.org/10.3168/jds.2017-14151>.
- Kumar A., Mangla S. K., & Kumar P. (2022) An integrated literature review on sustainable food chains. *Food production, processing and Nutrition*, 821(3), 417
- Li, X., Wang, Q., Hu, X., & Liu, W. (2022). Current Status of probiotics as supplements in the prevention and treatment of infectious diseases. *Frontiers in cellular and infection Microbiology*, 12, 789063. <https://doi.org/10.3389/fcimb>
- Milner, E., Stevens, B., An, M., Lam, V., Ainsworth, M., Dihli, P., & Segars, K. (2021). Utilizing probiotics for the prevention and treatments of gastrointestinal diseases. *Frontiers in Microbiology*, 12(6), 899-918

- Morelli, L. & Capurso L. (2012). FAO/WHO Guidelines on Probiotics 10 Years Later. *Journal of Clinical Gastroenterology*, 46 (10), S1-S2
- Nasrollahzadeh, A., Mokhtari, S., Khomeiri, M., & Saris, P. E. (2022). Antifungal preservation of food by lactic acid bacteria. *Foods*, 11(3), 395. <http://doi.org/10.3390/foods.11030395>.
- Prasad, S. & Rajesvari, P. (2017). Probiotic awareness among general dentists in Chennai. *Journal of Oral Medicine, Oral Surgery, Oral Pathology and Oral Radiology*. 3(1), 45-47.
- Pradito, I. Y., Wardana, A. A., Lo, D., Waspodo, P. & Surono, I. S (2020). Determinants of knowledge and perception of probiotics by Jabodetabek college students. *Food Research*, 4(5),1815-1819. <http://www.foodresearch.com>
- Palanivelu, J., Thanigaivel, S., Vickram, S., Dey, N., Mihaylova, D., & Dessava, I. (2022). Probiotics in functional foods: survival assessment and approaches for improved viability. *Applied Sciences Journal*, 12(1), 455
- Rhanja, M.M.A.N, Shafique B., Batool, M., Kowalczewski, P.L., Shehzad, Q., Usman M. Manzoor, F. M., Zahra, S.M. & Aadil, R.M.(2021). Nutritional and Health Potential of Probiotics, *Applied Sciences Journal*, 11(23), 204
- Ricci A, Allende A, Bolton D, Chemaly M, Davies R and Fernandez Escamez P. S (2017). Scientific opinion on the update of the list of QPS-recommended biological agents intentionally added to food as notified by EFSA. *European Food Safety Authority Journal*, 15(3), 4664.
- Singh, K., & Rao, A. (2021). Probiotics: a potential immunomodulator in covid-19 infection management. *Nutrition Research*, 87, 1-12. <https://doi.org/10.1016/j.nutres.2020.12014>.
- Song, D., Ibrahim, S., & Hayek, S. (2012). Recent application of probiotics in food and agricultural science. *Probiotics*, 10, 1-34. <https://doi.org/10.5772/50121>
- Viana, J. V., De Cruz, A. G., Zoellner, S. S., & Silva, R. C., & Batista, A. L. (2007). Probiotic foods: Consumer perception and attitude. *International Journal of food Science and Technology*, 43, 1577-1580.
- Xie, H. Y., Feng, D., Wei, D. M. L., Chen, H., Wang, X., & Fang, F. (2017). Probiotics for vulvovaginal candidiasis in non-pregnant women. *Cochrane Database of systematic reviews*, 11(11), CD10496 .<https://doi.org/10.1002/14651858.CD010496>.
- Yang, Y., Song, H., Wang, L., Dong, W., Yang, Z., & Yuan, P. (2017). Antiviral effects of a probiotic metabolic products against transmissible gastroenteritis coronavirus. *Journal of Probiotics Health*, 5(3), 1-6.