Assessment of the Knowledge and Perception of Probiotics among Medical Science Students and Practitioners in Lagos State

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Original Research Article

ABSTRACT

Aim: The study was conducted to assess the knowledge and perception of probiotics among medical science students and practitioners in Lagos state.
Study Design: This is a questionnaire based survey.
Place and Duration of Study: The study was conducted in Lagos state which is located in the south-western part of Nigeria. The questionnaires were distributed from March to August, 2013.
Methodology: Predesigned pilot tested questionnaires were randomly administered to 270 medical science students and professionals from various health institutes in Lagos state. The knowledge level was scored 0-3 as poor, 4-6 as fair and 7-9 as good and analyzed using Epi info version 3.5.3.

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Results: Of the 270 questionnaires distributed, 265(98.1%) were returned by 164 medical science students and 101 practitioners. The knowledge score of medical science students and practitioners was low (Mean±SD of 3.62±2.7). Ninety-four (57.3%) students disclosed that they have never heard of probiotics before and 139(84.8%) indicated interest in knowing more. Seventy (69.3%) practitioners were familiar with the term probiotics but 42(41.6%) had poor knowledge. Seventy three percent were not aware of any proven probiotic product in Nigeria and none has prescribed probiotic products for any medical condition. All indicated interest in knowing more about probiotics. The comparison of knowledge result across the various groups was statistically significant (P<0.05).
Conclusion: There is limited knowledge and poor perception on benefits of probiotic use among medical science students and professionals in Lagos state. The result of this study indicates a need for education on the availability, sources and benefits of probiotics.

1. INTRODUCTION

Probiotics are live microorganisms that confer health beneficial effects to the host when consumed in controlled and adequate amount as a single strain or combination of strains [1]. Their role as therapeutic agents for the prevention and management of gastrointestinal infections, allergic diseases and their anticancer potentials is globally recognized especially in developed countries. Foods such as some yoghurts, cheese and dairy drinks are developed with probiotics, and this practice has thrived in countries in Europe, Asia and the Americas [2]. Species of bacteria used as probiotics are mainly lactic acid producing strains which includes; *Lactobacillus, Bifidobacterium, Streptococcus thermophilus*; certain *Lactococcus, Leuconostoc*, and *Pediococcus* species [3,4]. The Non-lactic-acid probiotics include a specific beneficial strain of *Escherichia coli* called Nissle 1917, *Bacillus lacterosporus, Bacillus subtilis, Bacillus coagulans*, *Propionibacterium* species and the non pathogenic yeast *Saccharomyces boulardii* [5-8].

Probiotics offer remarkable potential for the prevention and management of various infective and non infective disorders [9] such as *Helicobacter pylori* infections, inflammatory bowel diseases [10], Irritable bowel syndrome [11], bacterial gastroenteritis, bladder infection [12], microbial vaginosis [13], allergy, colon cancer and breast cancer. They also help in reducing recurrent childhood infections such as diarrhea and upper respiratory tract infections, especially in infants aged 4-11months [14,15]. They may be introduced as a single species, or as multiple species into the human body as food products through the mouth or as yogurt soaked tampons, douches or encapsulated probiotic suppositories into the vagina.

Despite several evidences that are quickly accumulating to support the use of probiotics [13,16-19], the availability and use of probiotic is still low in this community and this may be due to poor awareness and knowledge of health practitioners as well as consumers on the sources and benefits of probiotics. A previous survey of the knowledge of probiotics by clinicians in Benin City, reported that very few clinicians 4.8% were familiar with the use of probiotics and none of them has ever recommended it to their patients [20].

From the Nigerian point of view, the deliberate and conscious introduction of the friendly bacteria into the diet or a specific food product or as a drug is relatively new. Be that as it may, there is need to seek how the merits of this science can be profitably exploited. Therefore this study assesses the level of knowledge of probiotics among Medical science students as future providers of health care and Medical practitioners in Lagos state, which is the most populous city in Nigeria.

2. METHODOLOGY

2.1 Study Location

The study was conducted in Lagos state which is located in the south-western part of Nigeria. Lagos state has a population of about 17.5 million as at 2006, with a growth rate of 3.2%. It has the highest population in Nigeria, which is over five per cent of the national estimate and the most economically important state of the country [21].

2.2 Study Design/ Data Collection

This questionnaire based survey was carried out using a predesigned pilot tested tool [22]. The questionnaires involves open ended and closed ended structured questions and were randomly administered to 270 medical science students and professionals from various Institutions, clinics and hospitals in Lagos state. The respondents included Dental science students, Medical students, and Pharmacy students and their professional counterparts; Dentist, Medical Doctors and Pharmacist. Written informed consent was signed by all participants who received the survey and sample size was determined from the information obtained from the knowledge score in the pilot study. The questionnaires were distributed from March to August, 2013 and included open ended and closed ended questions. It was divided into three sections A, B and C. Section A was demographic questions, B was on the knowledge and Perception of probiotics while C was open ended question requiring the respondents to freely list their concerns on the use of probiotics. The respondents were asked if they were familiar with the term probiotic and their level of knowledge. The knowledge questions consist of nine closed ended questions to assess their knowledge about probiotic and their health benefits. The scoring of correct answers was classified 0-3 as poor, 4-6 as fair and 7-9 as good. The range for raw score was 0-9.

After answering the knowledge questions, they were given a brief introduction of probiotics including the definition, its use and mode of action; and then asked if they accept the science of probiotics i.e. the use of live organisms in the management of medical conditions. This was used to evaluate their perception of probiotics. The results were analyzed using Epi info version 3.5.3. The chi-square test was used to examine the differences in the knowledge across the various groups. P-value less than 0.05 were considered as significant.

3. RESULTS AND DISCUSSION

Of the 270 questionnaires distributed, 265(98.1%) were returned by 164 medical science students and 101 practitioners (Table 1). 94(57.3%) students disclosed that they have never heard of probiotics before and 139(84.8%) indicated interest in knowing more. 70(69.3%) practitioners were familiar with the term probiotics but 42(41.6%) had poor knowledge (Table 2). Seventy three percent were not aware of any proven probiotic product in Nigeria and none has prescribed probiotic products for any medical condition. All the practitioners indicated interest in knowing more about probiotics.

There was no statistically significant difference in the knowledge of probiotics among the Medical students but there was a significant association of knowledge of probiotics with profession (P<0.05). The Medical doctors had the highest level of knowledge (61.1%), followed by the Pharmacist (44.1%) and least level of knowledge was found among the Dentist (6.5%). Nevertheless, when compared with students, practitioners had significantly higher level of awareness and knowledge of probiotic use (X^2=29.6, P<0.05).

The distribution of knowledge score across the different year of study of the medical students showed a generally poor knowledge score across the different years with most having less than 25% knowledge (Table 3). On the other hand, the medical practitioners showed considerable difference in the knowledge score across the various year of practice with the highest score seen in the '21-25' and '26 and above' distributions (Table 4).

Table 1. Socio-demographic distribution of the respondents

Respondents	Female	Male	Frequency (%)	Total
Dentist	16	15	31(30.7)	
Doctor	15	21	36 (35.6)	101 (100)
Pharmacist	19	15	34 (33.7)	
Dental science students	23	27	50 (30.5)	
Medical students	25	29	54 (32.9)	164 (100)
Pharmacy students	47	13	60 (36.6)	
Total	145 (54.7%)	120 (45.3%)	265 (100%)	

Table 2. Knowledge score of probiotics among respondents

Profession	Knowledge score no (%)			Mean knowledge score Chi square X^2	
	Poor	**Fair**	**Good**	**Mean ± SD**	**X^2**
Dentist	20(64.5)	9(29)	2(6.5)		
Doctor	9(25)	5(13.9)	22(61.1)		
Pharmacist	13(38.2)	6(17.6)	15(44.1)		X^2= 21.73
Total practitioners	42(41.6)	20(19.8)	39(38.6)	4.7±2.9	
Dental science students	38(76)	8(16)	4(8)		
Medical students	33(61.1)	14(25.9)	7(13)		
Pharmacy students	40(66.7)	13(21.6)	7(11.7)		X^2= 2.68
Total students	111(67.7)	35(21.3)	18(11.0)	2.96±2.9	
Total	153(57.7)	55(20.8)	57(21.5)	3.62±2.7	
		X^2= 29.6			

Table 3. Distribution of knowledge score across the different year of study of the medical students

Year of study (yrs)	No of students	Knowledge scores		
		Poor (%)	**Fair (%)**	**Good (%)**
2	7	5(71.4)	2(28.6)	0(0)
3	58	45(77.6)	11(19.0)	2(3.4)
4	6	2(33.3)	3(50.0)	1(16.7)
5	48	34(70.8)	9(18.8)	5(10.4)
6	45	25(55.6)	10(22.2)	10(22.2)
Total	164 (100)	111(67.7)	35(21.3)	18(11.0)

Table 4. Distribution of knowledge score across the different year of practice of the medical practitioners

No of years in practice	No of practitioners	Knowledge scores		
		Poor (%)	**Fair (%)**	**Good (%)**
0-5	67	24(35.8)	16(23.9)	27(40.3)
6-10	21	12(57.2)	2(9.5)	7(33.3)
11-15	6	4(66.6)	1(16.7)	1(16.7)
16-20	2	1(50.0)	1(50.0)	0(0)
21-25	4	1(25.0)	0(0)	3(75.0)
26 and above	1	0(0)	0(0)	1(100)
Total	101(100)	42(41.6)	20(19.8)	39(38.6)

Several factors such as the rising levels of drug resistance among pathogenic organisms particularly in hospitals as well as the increased demands of consumers for natural substitute for drugs, has led physicians to examine other alternatives to pharmaceutical remedies. The emergence of scientific and clinical evidence showing the efficacy and effectiveness of some probiotic strains has made it attractive as an adjunct to antibiotics. Although probiotics use has flourished in Europe, Asia and America, there is still a lot of reservation in the use of these products in Nigeria [20,23]. In the present study, the knowledge level of medical science students and practitioners was low (Mean knowledge 3.62±2.7) with 11.0% and 38.6% having good knowledge respectively. The medical science students had poor knowledge

score (mean score 2.96±2.9) with 57.3% of them disclosing that they have never heard of probiotics, though 84.8% indicated interest in knowing more. When asked if they welcome the science of probiotics, only a few (39.0%) said they accept the practice. Majority of them (46.9%) were indifferent and the rest (14.6%) stated categorically that they do not accept the practice of probiotics (Table 5). There was no statistically significant association of knowledge of probioitcs with student's degree (X^2= 2.68, P>0.05). Contrary to this result, a similar study to assess the perception of medical science students to probiotics in Iran showed higher (50.7%) level of knowledge and a significant difference in knowledge of probioitcs across different majors and degree groups [22].

A more positive response was obtained from the medical practitioners in this study. 69.3% of them were familiar with the science of probiotics and were willing to prescribe it to their patients, though 41.6% admitted to poor knowledge. Nevertheless, none of them has ever prescribed probiotics for their patients and 74.3% were not aware of proven probiotics product available. All the practitioners indicated interest in knowing more about probiotic use. This report contrasts with the previous study in Benin-city by Anukam and workers [20], where only 4.8% of the clinicians indicated that they were familiar with probiotic use. However, in the present study 83.3% clinicians (Doctors) stated that they were familiar with the term probiotics. There was a significant association of knowledge of probiotics with profession (X^2=21.73, P<0.05), with Medical doctors having the highest level of knowledge (61.1%), followed by the Pharmacist (44.1%) and then the Dentist (6.5%) (Table 2). When compared with students, practitioners had significantly higher level of awareness and knowledge of probiotic use (X^2=29.6, P<0.05). A similar study by Al-Muammar et al. [24] reported fair knowledge of probiotics among consumers, though most of them had poor behavior (58.6%) towards probiotic containing products in Egypt.

There is overall poor knowledge and perception of probiotics among medical practitioners and medical science students in Lagos state (Table 2). The medical science students had poor knowledge of probiotics with mean knowledge score of 2.96±2.9. Although the practitioners had approximately fair level of knowledge (mean±SD of 4.7±2.9) about probiotics and their health benefits, they lamented the unavailability of clinically proven products and expressed reservation in prescribing it for their patients (Table 6). A questionnaire based study on the receptivity of probiotic among premenopausal female University students in Benin, Nigeria, revealed that 55.3% of the students believe that they were at risk of acquiring sexually transmitted diseases and would welcome probiotic products in capsular form for vaginal instillation or oral administration to improve vaginal health [23]. Subsequently, Anukam et al. [13] showed that five days of intravaginal probiotic lactobacilli treatment promotes cure of bacterial vaginosis and restores the natural vaginal lactobacilli. The authors suggested that the use of Lactobacilli may help reduce the risk of HIV, although this has not yet been tested. However, availability is still a great challenge and from this study, none

of the respondents were sure of any clinically proven probiotics available anywhere in Lagos. Pharmaceutical companies that manufacture probiotics are challenged with finding a suitable market for it in this community as a result of various drawbacks ranging from storage and distribution problems, revenue generation and problem of Cultural acceptance [25]. The vehicle of delivery of these agents would probably be the greatest factor determining how acceptable this science will be to the public. Some of Nigerian fermented foods such as *Ogi, Kunnu*, *Iru, Lafun*, "*Ogi*", "*Ogi-baba*", "*Fufu*", "*Wara*" *Kindirmo*, *nunu*, *warankasi* and *Ogiri* have been found to contain probiotic organisms and have been consumed for millennia [26]. In this regard, it is suggested that alternative approach using these familiar local fermented foods are utilized instead of such vehicles obtained in westernized societies. This may significantly increase the level of acceptance of the science of probiotics in our communities. Therefore, well-designed clinical studies at the local level are still needed to further investigate the optimal dose, duration and specific effects of each probiotic strain present in our local fermented foods especially when consumed by the infants and the elderly. Although much has been uncovered, much more remains to be learnt.

Hitherto, there is no documented evidence of translocation, bacteremia or adverse metabolic effects from *Bifidobacterium* and *Lactobacillus* probiotic organisms except in cases of pelvic infections or bowel perforation. Species of *Lactobacilli*, *Bifidobacteria* and *Propionibacterium freudenreichii* received the "Generally Recognized As Safe" (GRAS) [27]. The European food safety authority has also granted "Qualified Presumption of Safety" (QPS) status to species of *P. freudenreichii* [28]. Unfortunately, this is not the case for some other probiotic organisms like *Enterococcus* spp which is an important cause of nosocomial infections [29] and *Saccharomyces boulardii* which has been implicated in certain fungemia [30]. Although probiotics has been successfully used in pregnant women, nursing mothers and neonates [16], care should be taken when administering it to immunocompromised individuals, patients undergoing chemotherapy or radiation and those with intestinal bleeding [31]. Also excessive immune stimulation should be avoided in individuals who are susceptible to the development of arthritis or other complication the development of arthritis or other complication [32].

Table 5. Distribution of familiarity and acceptance score regarding probiotic use

Profession	Familiarity with probiotics		Total	Acceptance of the science of probiotics		
	Yes (%)	No (%)		Yes (%)	No (%)	Indifferent (%)
Dentist	15(48.4)	16(51.6)	31	7(22.6)	3(9.7)	21(67.7)
Doctor	30(83.3)	6(16.7)	36	28(77.8)	1(2.8)	7(19.4)
Pharmacist	25(73.5)	9(26.5)	34	17(50.0)	0(0)	17(50.0)
Total	**70(69.3)**	**31(30.7)**	**101**	**52(51.5)**	**4(3.9)**	**45(44.6)**
Dental science students	13(26.0)	37(74.0)	50	14(28.0)	14(28.0)	22(44.0)
Medical students	31(57.4)	23(42.6)	54	28(51.9)	5(9.3)	21(38.9)
Pharmacy students	26(43.3)	34(56.7)	60	21(35.0)	5(8.3)	34(56.7)
Total	**70(42.7)**	**94(57.3)**	**164**	**63(38.4)**	**24(14.6)**	**77(47.0)**
Total	**140(52.8)**	**125(47.2)**	**265**	**115(43.4)**	**28(10.6)**	**122(46.0)**

Table 6. Summary of concerns listed by some of the respondents

Probiotics are expensive; most of products that are affordable are adulterated
Still have a long way to go in the use of probiotics in Nigeria
Adverse effect and unsubstantiated claims of the manufacturers or promoters
Receptivity of the product; not many patients will believe that it works
Risk of bacteria multiplication
Little or no idea about probiotics
Not yet in wide use
Availability of these products, where we can purchase these products?
No data on safety and effectiveness
Not enough or adequate evidence for the use
More awareness required for us in Nigeria
Non availability of clinically proven products
Very poor knowledge
Bioavailability

4. CONCLUSION

There is limited knowledge and poor perception on the benefits of probiotic use among medical science students and professionals in Lagos state. The result of this study indicates a need for education on the availability, sources and benefits of probiotics. It is not surprising that the students had poor knowledge since their senior counterparts who are supposed to impact the knowledge also have very little or poor knowledge of probiotics. The knowledge has to flow from the practitioners to the students. It can be suggested that efficient educational tools such as, Conferences, seminars, workshops and journal club are used to educate the medical practitioners and students as future providers of health information in this field and this may go a long way to improve the awareness and knowledge of probiotic use.

CONSENT / ETHICAL APPROVAL

All authors declare that written, informed consent was obtained from all participants who received the Survey and participation was completely voluntary. The study was approved by Research Grants and Experimentation ethics committee of the College of Medicine, University of Lagos.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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