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KNOWLEDGE OF PROBIOTICS BY NIGERIAN CLINICIANS.

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ABSTRACT*: A reasonable proportion of clinicians in the Northern hemisphere may be familiar with the use of probiotics and some have clearly been involved in probiotic research for some time. However, we hypothesized that medical practitioners in Nigeria are yet to grasp the concept of using probiotics either as health promoting foods or as biotherapeutic agents for the treatment of diarrhea or urogenital infections. In order to determine the extent of awareness on the use of probiotics among qualified medical practitioners in Benin City, Nigeria, a survey was carried out. The survey involved the use of close-ended and open-ended structured questionnaires and 125 randomly sampled medical practitioners. The survey asked about current knowledge on the subject, and provided information to gauge the potential receptivity to using or recommending probiotics in patient care. 62 medical practitioners responded. The results showed that 95.2% of the respondents were not familiar with the term probiotics, and all (100%) indicated that they would like more information on the subject. Up to 75% of the participants raised some concerns bordering on the safety and receptivity of probiotics products among the prospective users. Many respondents (66.1%) stated that they would need positive clinical trial data to be convinced on the efficacy of probiotics before prescribing or recommending it to their patients. To access such data, 64.5% preferred medical textbooks, while only 27.4% indicated peer-reviewed medical journals, perhaps a reflection of the fact that many practitioners in Nigeria are busy and do not have easy access to such journals. Nevertheless, 64.5% were in favor of probiotics and stated they would approve it for health maintenance. 37% stated a preference for an oral capsule and 45.1% yogurts. The findings revealed that in spite of the concerns expressed, many clinicians are willing to participate in clinical trials on probiotics and are extremely interested to learn more about scientifically and clinically proven products.*

KEY WORDS: Nigerian clinicians, Probiotics, Probiotic knowledge

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INTRODUCTION

Almost a century ago, Elie Metchnikoff, a Nobel Prize winner, observed the beneficial effect of lactic acid bacteria in humans, as a result of consumption of fermented dairy products (Metchnikoff, 1907). His observation led the foundation for the concept of 'probiotics', which has been defined as "Live microorganisms which when administered in adequate amounts confer a health benefit on the host" (FAO/WHO, 2001). Probiotics have been available in the developed countries for more than half a century, yet the health benefits that are associated with their consumption have not reached the radar screen of physicians in Africa, in part because few products are available on this continent. A large body of evidence is mounting for the use of probiotics for prevention and treatment of diarrheal diseases (Perdone et al., 1999) and for prevention of urogenital infections (Reid et al., 2001; Reid et al., 2003). In the latter instance, the potential to reduce the incidence of bacterial vaginosis (BV) is most relevant in Africa, where this condition significantly increases the risk of HIV (Sewankambo et al., 1997). Currently, the therapeutic armament for the treatment of bacterial vaginosis still remains antibiotics, with products such as metronidazole, only moderately effective against *Gardnerella vaginalis*, *Mobiluncus spp* and with no effect against *Mycoplasma hominis*. Recently using polymerase chain reaction (PCR)-denaturing gradient gel electrophoresis (DGGE) and 16S rRNA sequencing, we have shown that the microbiota of most Nigerian women diagnosed with BV are dominated by *Mycoplasma hominis* (Anukam *et al.*, submitted). The obliteration of vaginal lactobacilli, dominance of anaerobes and subsequent elevation of vaginal pH and induction of inflammation lead to a condition that afflicts large numbers of women, even when odor and discharge is not evident (Klebanoff et al., 2004).

Folklore has led to some patients resorting to yogurt douching to treat urogenital symptoms, but studies are too few to evaluate

this approach (Shalev et al., 1996), and yogurt organisms are designed to ferment milk not be probiotic in the vagina. Recent studies have shown that oral daily intake of *Lactobacillus rhamnosus* GR-1 and *Lactobacillus fermentum* RC-14 can resolve urogenital infection, and asymptomatic BV patients reverted to normal lactobacilli dominated microbiota (Reid et al., 2001; Reid et al., 2003).

In recent times, large numbers of reviews have been published on probiotics and while many Northern Hemisphere physicians may have access to them or through conferences hear about this topic, it is not clear how well informed physicians in Africa are. A recent survey on the receptivity of probiotic products among female students in an African university showed a lack of knowledge but a tremendous interest in the topic (Anukam et al., 2004a), yet no surveys have been published that assess the knowledge of 'supposedly informed' health care providers in sub-Saharan Africa about probiotics The aim of the present study was to gauge the level of knowledge on probiotics of Nigerian physicians.

METHODS

Two forms of survey questionnaires were employed; closed-ended structured questionnaires and open-ended questionnaires.

Participants and Data collection.

All the participants provided consent. A random sampling technique was employed throughout the survey period. The respondents were all qualified medical practitioners from both private and Government health institutions in Benin City, Nigeria. The closed-ended questionnaires were administered to each participant at the place of work and these addressed number of years in practice, familiarity and recommendation of probiotics, aware of any probiotic research in Nigeria, knowledge of availability of any probiotic product, access to postgraduate medical journals. Questions were asked, on whether the respondents would participate in a clinical trial, and the need for information on probiotics. The respondents were asked to indicate what sort of evidence that would convince them on the benefits of probiotics and where they would like to read it. Also using the 'Likert scale', participants were asked to 'strongly agree or approve', 'agree/approve', 'disagree/disapprove', 'strongly disagree/ disapprove' or answer 'don't know', to questions on approval of proven probiotics for urogenital health maintenance.

The participants were also asked whether they would welcome a probiotic product in oral/vaginal form, or in milk-based food products such as yogurt.

The second questionnaire to the same respondents, was open-ended. Following definition of probiotics and providing clinical conditions in which probiotics can be used, to the participants, it asked the participants to freely list any concerns or fears they may have in relation to probiotic products.

RESULTS

A total of 62 Clinicians participated in the study. 18 (29%) (Table 1) respondents have been in practice for 15 years, while 12 (19%) have been in practice between 1 to 5 years. Only 9 (14.5%) practiced for more than 30 years. Of the respondents, only 3 (4.8%) indicated that they are familiar with the use of probiotics (2 stated through article publication in journals, the other knew of it by personal communication through a friend) and are aware of research in Nigeria or elsewhere to support the use of probiotics. None of the respondents has ever recommended probiotics to their patients and none was sure that any proven probiotic is available presently in Nigeria.

Table 1. Number and percentage of Clinicians with knowledge on probiotics

Number of Clinicians	12	3	18	7	13	9	Total=62
No of Years in practice	1-5	6-10	11-15	16-20	21-30	31-above	
Familiar with the use of probiotics		0	0	0	0	3	3 (4.8%)
Accepted practice	0	0	3	5	9	0	17 (27.4%)
Ever recommended probiotics	0	0	0	0	0	0	0 (0%)
Aware of any research on probiotics	0	0	0	0	3	0	3 (4.8%)
Access to postgraduate journals	6	3	11	4	9	7	40 (64.5%)
Would need more information on probiotics	12	3	18	7	13	9	62 (100%)
Would participate in a clinical trial	8	0	12	5	11	6	46 (74.1%)
Prescribe antibiotics on a regular bases	12	3	18	7	13	9	62 (100%)
Aware of any proven probiotic product available in Nigeria	0	0	0	0	0	0	0 (0%)

Table 2. Number of Clinicians responding to what evidence would convince them of the benefits of probiotics and where they would like to read it.

Number of Clinicians	12	3	18	7	13	9	Total=62
No. Years in practice	1-5	6-10	11-15	16-20	21-30	13-above	
Clinical trials	7	3	11	5	9	6	41 (66.1%)
Case reports	1	0	2	0	1	1	5 (8.0%)
Laboratory experiments	4	0	5	2	3	2	16 (25.8%)
In: Peer reviewed medical journals	2	1	4	3	5	2	17 (27.4%)
Information in Medical text books	9	2	12	4	7	6	40 (64.5%)
Company information	0	0	1	0	0	0	1 (1.6%)
Patient testimonials	1	0	1	0	1	1	4 (6.4%)
Web site materials	0	0	0	0	0	0	0 (0%)

Table 3. Number of Clinician's response on the approval of proven probiotics for health maintenance and preference of probiotic products.

Number of Clinicians	12	3	18	7	13	9	Total=62
Years in practice	1-5	6-10	11-15	16-20	21-30	31-above	
Strongly approve	0	0	0	0	3	0	3 (4.8%)
Approve	3	1	12	5	10	6	37 (59.6%)
Disapprove	4	2	2	2	0	1	11 (17.7%)
Strongly disapprove	5	0	2	0	0	2	9 (14.5%)
Vaginal capsules	1	0	2	3	0	2	8 (12.9%)
Oral capsules	4	1	5	4	8	1	23 (37%)
Yogurts	5	3	10	0	4	6	28 (45.1%)
Milk-based foods	2	0	1	0	1	0	4 (6.4%)

Table 4. Summary of concerns raised by 75% of the respondents.

Comments Raised	Percentage (%)
How safe is probiotic products?	20
There may be possibility of the Lactobacilli becoming wild	5
Risk of infecting the patient with probiotics	10
It may lead to overwhelming secondary infections	15
The morbid fear of using live micro-organisms	10
May not confer beneficial effect on patients	3
Any clinical evidence to shown that it confers health benefits?	12
Allergic reactions may occur	8
May not be accepted by prospective users if they realize that it is live bacteria	6
I don't know anything about probiotics, why not test it on guinea pigs or other animals first?	4
It may have mutagenic potential or may become carcinogenic	2
Vaginal insertion may not be generally accepted, probiotic yogurt would be better	5
Would it be available and affordable?	25
Marketing of the proven probiotic products should be aggressive, proactive and inclusive	10
Would probiotic products meet NAFDAC requirements for registration?	5

NAFDAC = National Agency for Food and Drug Control.

Even though forty respondents stated that they have access to postgraduate medical journals none of them knew about probiotics, some commenting that they may have come across the word but did not pay any attention to it, while all the participants (100%), indicated that they would need more information on the use of probiotics and its mechanisms of action. More than half stated that they would need to be sensitized through seminars and conferences on the application of probiotics. Based on the interest generated by the respondents, 46 (74.1%) indicated that they would participate in a clinical trial. When asked what evidence would convince them on the benefits of probiotics (Table 2), 41 (66.1%) stated that human clinical trials would give them enough evidence, while 16 (25.8%) indicated laboratory experiments. Most respondents (64.5%) stated that they would like to read the evidence on the benefits of probiotics in medical textbooks, while only 17 (27.4%) stated in peer reviewed medical journals, of which 12 are in the academia. None of the respondents indicated website materials and company information as the preferred source of information on the benefits of probiotics.

In another close-ended response, more than half of the participants (59.6%) indicated "approve" (Table 3), when asked whether they would approve proven probiotics for the maintenance of urogenital and gastrointestinal health, while only 14.5% strongly disapproved of probiotic use for general health maintenance. 45.1% of the respondents indicated a preference for yogurt as a form of probiotic, while 37% and 12.9% preferred oral and vaginal capsules respectively (Table 3).

The results of the open-ended questionnaire that asked the participants to freely write down any fear, questions and concerns they may have on probiotics revealed less critical issues that verge on lack of adequate knowledge on the subject. 75% of the participants raised some concerns summarized in table 4.

DISCUSSION

There has been a progressive increase in interest on the use of natural remedies to prevent or treat human ailments. The growth of probiotic products in the developed world has been rapid. As knowledge on probiotics continues to increase on daily basis typified by over 1600 probiotic publications that appeared on PupMed between 1980 and 2004, the present study showed that 95% of Nigerian clinicians surveyed are not familiar with this term. In spite of a plethora of information available on probiotics, all the participants in the survey indicated a desire for more information on the subject. This illustrates the enormity of the gap that exist in the dissemination of scientific information to the medical community in sub-Saharan Africa. To date, companies producing probiotic products in the US, Canada, Europe and Japan have generally not made probiotic products available in Africa.

Most of the participants preferred reading any evidence in medical textbooks, which perhaps explains why they have not read the recent reviews on the topic. Access to medical journals requires annual subscription, which may hinder knowledge transfer in Africa.

Only a minority (4.8%) of the respondents stated being aware of any research in Nigeria or elsewhere to support the use of probiotics. The finding on the awareness of any research is revealing but similar in a study on the use of probiotics by family physicians in Canada (Edmunds, 2001).

Generally Nigerian clinicians would welcome probiotics, as 65% indicated their willingness to approve probiotics use for urogenital and gastrointestinal health, similar to our previous study among premenopausal female students (Anukam et al., 2004a).

A large number of respondents preferred probiotic yogurt, suggesting that probiotics would be better accepted if incorporated in food. Yogurt is consumed by a considerable number of people in Nigeria, so it should be feasible to use this vehicle to introduce probiotics. Besides, a recent study of probiotic yogurt consumption in 202 subjects for 8 days showed prevention of antibiotic-associated diarrhea (AAD) (12% diarrhea vs. 24%; P = 0.04), and significantly less total diarrheal days (23 vs. 60) (Beniwal et al., 2003).

The various concerns raised by the participants were not unexpected, as no probiotic product is presently available in Nigeria and the physicians are used to dealing with side effects of antibiotics/antifungals chronicled in pharmaceutical compendia. They need to be assured of safety and efficacy, and studies showing safety, (Anukam et al., 2004b; Reid, 2002; Ishibashi & Yamazaki, 2001; Wolf et al., 1998), will contribute to this reassurance on the ingestion of probiotics.

As a next step, Africans must try and work together with researchers and companies from the Northern hemisphere to: 1) set up and fund trials at the local level to assess applicability to different populations; 2) introduce proven products at an affordable price; 3) exchange students to enhance training and eventually form a basis for the development of new research centres or local companies able to produce probiotic foods and supplements; 4) use various educational tools, including peer-reviewed publications, media, seminars, university courses to introduce the concepts and explain advantages and limitations of these products; 5) connect with local industries, especially dairies, to provide advice and training on the creation and distribution of probiotic foods.

REFERENCES

Anukam KC, Osazuwa EO, Reid G, Katsivo MN. (2004a). Receptivity for probiotic products among pre-menopausal female students in an African university. Sexually Transmitted Disease **31**: 460-464.

Anukam KC, Osazuwa EO, Reid G, Ozolua RI. (2004b). Feeding probiotic strains ***Lactobacillus rhamnosus*** GR-1 and ***Lactobacillus fermentum*** RC-14 does not significantly alter hematological parameters of Sprague-Dawley rats. ***HAEMA*** **7:** 497-501.

Beniwal RS, Arena VC, Thomas L, Narla S, Imperiale TF, Chaudhry RA, Ahmad UA.(2003). A randomized trial of yogurt for prevention of antibiotic-associated diarrhea. Digestive Disease Science **48:** 2077-2082.

Edmunds L. (2001). The underuse of probiotics by family physicians. *Canadian MedicalAssociation Journal* **164:**11.

FAO/WHO (2001). Evaluation of health and nutritional properties of powder milk and live lactic acid bacteria. Food and Agriculture Organization of the United Nations and World Health Organization Report. http://www.fao.org/es/ESN/Probio/probio.htm. Accessed July 20, 2003.

Ishibashi N and Yamazaki S (2001). Probiotics and Safety. American *Journal of Clinical Nutrition* **73:** 465S-470S.

Klebanoff MA, Schwebke JR, Zhang J, Nansel TR, Yu KF, Andrews WW. (2004).Vulvovaginal symptoms in women with bacterial vaginosis. *Obstetrics and Gynecology* **104:** 267-72.

Metchnikoff E. (1907). The prolongation of life.G.P.Putnam and Sons, The Knickerbocker Press, New York.

Perdone CA, Bernabeu AO, Postaire ER, Bouley CF, Reinert P (1999). The effect of supplementation by *Lactobacillus casei* (strain DN-114 001) on acute diarrhoea in children attending day care centers. *International Journal of Clinical Practice* **53:** 179-184.

Reid G. (2002) *Lactobacillus* safety as probiotic agents. *Clinical Infectious Disease* **35:** 349-350.

Reid G, Bruce AW, Fraser N, Heinemann C, Owen J, Henning B. (2001). Oral probiotics can resolve urogenital infections. *FEMS Microbiology and Immunology* **30:** 49-52.

Reid G, Charbonneau D, Erb J, Kochanowski B, Beuerman D, Poehner R, Bruce AW. (2003) Oral use of *Lactobacillus rhamnosus* GR-1 and L. *fermentum* RC-14 significantly alters vaginal flora: randomized, placebo-controlled trial in 64 healthy women. *FEMS Immunology and Medical Microbiology* **35**: 131-134.

Sewankambo N, Gray RH, Wawer MJ, Paxton L, McNaim D, Wabwire-Mangen F, Serwadda D, Li C, Kiwanuka N, Hillier SL, Rabe L, Gaydos CA, Quinn TC, Konde-Lule J. (1997) HIV-1 infection associated with abnormal vaginal flora morphology and bacterial vaginosis. *Lancet* **350**: 546-50.

Shalev E, Battino S, Weiner E, Colodner R, Keness Y. (1996). Ingestion of Yogurt Containing *Lactobacillus acidophilus* Compared With Pasteurized Yogurt as Prophylaxis for Recurrent Candidal Vaginitis and Bacterial Vaginosis. *Archieves of Family Medicine* **5**:593-6.

Wolf BW, Wheeler KB, Ataya DG, Garleb KA. (1998) Safety and tolerance of *Lactobacillus reuteri* supplementation to a population infected with human immunodeficiency virus. *Food Chemical and Toxicology* **36:**1085-1094.