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## Awareness of healthcare professionals on micronutrients use in disease prevention and physical activity in Ibadan, Nigeria

Gloria Oiyahumen ANETOR

Public Health Unit, School of Health Sciences, National Open University of Nigeria (NOUN), 14/16 Ahmadu Bello Way, Victoria Island, Lagos, Nigeria.

E-mail: [yahuanet@yahoo.com](mailto:yahuanet@yahoo.com); Phone (GSM): +234 (0) 8033635551

### ABSTRACT

Micronutrients play fundamental roles in the aetiology, prognosis and resistance to diseases, as well as the protection against free radicals damage. These fundamental roles have made micronutrients to become an integral part of health management and physical activity. The understanding of healthcare professionals (HCP) of these benefits appears limited. This study therefore examined Healthcare professionals in Ibadan to ascertain their awareness of the use micronutrients in disease prevention and physical activity. A descriptive survey design was used for the study; 130 randomly selected HCP took part in the study. The HCP are Doctors, Nurses, Pharmacists, Physiotherapists and Medical Laboratory Scientists. The result revealed that HCP were aware of: micronutrients use for disease prevention;  $X^2_{\text{observed}} = 49.08$ ; table value = 18.55 and  $df = 12$ ;  $p < 0.05$  (significant); micronutrients use for physical activity:  $X^2_{\text{observed}} = 220.34$ ; table value = 18.55 and  $df = 12$ ;  $p < 0.05$  (significant). HCP in Ibadan appear to have adequate understanding of micronutrient use for disease prevention and physical activity. However, they should continue to go for update courses in nutrition and disease management to keep abreast of knowledge.

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**Keywords:** Micronutrients, free radicals, disease prevention with antioxidants, healthcare professionals.

### INTRODUCTION

Micronutrients are a collective term for vitamins and trace elements. Vitamins and trace elements were traditionally recognized for their roles in deficiency diseases such as scurvy (due to vitamin C deficiency), rickets (due to vitamin D deficiency), megaloblastic anaemia (due to vitamin B12 and or foliate deficiency) and night blindness (due to vitamin A deficiency). Over the last two decades, studies have shown that micronutrients play more fundamental

roles in the aetiology and or prognosis of disease (Willet and Stamper, 2013; Evans and Halliwell, 2001). Shenkin (2006) reported that there was a growing interest in the role of the micronutrients (essential trace elements and vitamins) in optimizing health, and in prevention or treatment of disease. In the same vein, Ray (2014) finds a direct link between micronutrient deficiency and increased epigenomic damage, resulting into elevated risk for adverse health outcomes during various stages of life, like infertility, tumor development and cancer. Although,

studies have revealed that clinical syndromes of vitamin deficiencies are unusual in western societies, but the developing societies are yet to ascertain this. However, suboptimal vitamin status is a global issue; suboptimal vitamin status is associated with many chronic diseases, including cardio vascular disease, cancer, and osteoporosis, arrhythmia, heart failure and many other cardiovascular disturbances (Lukaski, 2004; Willet, 2012; Jiménez et al., 2015).

Micronutrient is aimed at improving the patient's natural defence mechanisms, including the immune system. It is possible to improve human resistance with micronutrients to diseases. Micronutrient requirements are greater for those who suffer from chronic diseases and who are under medication (Gröber, 2009; Tulchinsky, 2010). The explanation for this being that most diseases gradually produce free radicals (Lipid peroxides) which in turn give rise to further cell damage. This is where the role of cell protective micronutrients comes into play; they are able to break the vicious circles by acting as antidotes (antioxidants) to free radicals. Diseases of the nervous system, recurring infections, ulcerative colitis, perfusion injury in the brain, arthritis, osteoporosis and cancer are some of the diseases that have positive response to the use of micronutrient and their management (Gröber, 2009; Jimenez et al., 2015). One out of every three cases of cancer, perhaps even up to 40% of all cases, is estimated to be due to nutritional factors. This is partly because there are a great number of carcinogenic substances in foodstuffs, and partly owing to the fact that many of people are not getting enough cancer - protective micronutrients. (Niedzwiecki et al., 2010; Willet and Stampfer, 2013). Reports have been gathered where secondary tumours (metastases) have diminished or have totally disappeared in the course of a treatment with vitamins, minerals and

essential fatty acids (Niedzwiecki et al., 2010; Ward, 2014).

Willet and Stampfer (2013) further revealed that recent studies suggest that deficiencies of  $\beta$ -carotene, Vitamins A, C and E and the trace mineral like selenium can increase the risk of developing different sites cancer. Conversely, it seems that sufficient intake of these micronutrients can have an influence in protecting individuals from cancer (Holick, 2004; Tulchinsky, 2010). Several retrospective studies have shown that healthy people who later develop cancer have low circulating levels of micronutrient such as selenium, (Carotene and vitamin E in their serum compared to those who remain healthy (Ward, 2014).

Micronutrients (vitamin E and selenium) have also been identified to be effective against skin diseases especially boils and some micronutrients help to prevent damage caused by ultraviolet light and skin cancer (Fairfield and Fletcher, 2002; Al-Nagger and Chen, 2011). Vitamin E, like other antioxidants can scavenge free radicals and may as a result prevent oxidative damage. Vitamin E is also needed in immune function and its supplementation enhances cell mediated immunity in elderly patients (Willet, 2012).

The role of micronutrients has also been demonstrated in physical activities. Micronutrient deficiencies can result in reduced activity and exploration. The health benefits of physical activity are well established and there is increasing recognition of the importance of fitness as a key modulator of chronic disease. The impact of physical activity on micronutrient requirements is a topic of tremendous interest to the lay public (Akabas and Dollins 2005; Ramirez Velez et al., 2011). Additionally, they protect against free radicals damage generated during intense physical activities through antioxidant properties. Both iron and zinc deficiencies even in mild forms, decrease activity in animals, even

before growth faltering, and some studies believe that it can be reversed with supplementation (Golub et al., 2000). Chronic exercise training should up-regulate muscle antioxidant enzyme activities. Furthermore, there is convincing evidence that endurance exercise training results in an increase in antioxidant enzyme activity in active skeletal muscles (Powers et al., 2004; Aburto et al., 2010).

It has been pointed out that for physically active persons, adequate amounts of magnesium, zinc and chromium (micronutrients) are needed in the diet to ensure the capacity for increased energy expenditure and work performance. Most physically active individuals consume diets that provide amounts of magnesium and zinc sufficient to meet population standards (Lukaski, 2000). Other studies also revealed that the importance of micronutrients in physical activities is because they help to regulate diversity of metabolic processes (Lukaski, 2000; Drewnowski, 2005; Aburto et al., 2010). In a similar study, Ramírez-Vélez et al. (2011) also revealed that complementation with micronutrients during pregnancy and/or regular physical exercise can be an early and innovative alternative to strengthen the prevention of chronic diseases in the population.

However, some studies reported that the absence of clear recommendations; micronutrient supplementation is often indiscriminate without regard to nutrient status due to the belief that it cannot hurt and may help; this assumption may be erroneous. In some instances, additional micronutrient ingestion beyond the daily dietary requirement (DRI) not only has no effect on exercise performance but may have negative impact on general health (Urso and Clarkson, 2003; Zoller and Vogel, 2004; Lukaski, 2004).

In developing world, of which Nigeria is one, high incidences of diseases have been associated with inadequate intake and absorption of micronutrients (Ijarotimi, 2004; Woodside et al., 2005). Ijarotimi (2004), revealed that low intake of micronutrients in Nigeria, could be as a result of peoples' belief that fresh green vegetables and fruit are ruminant feed except for those in middle to high socio-economic status. This kind of misconception needs to be corrected by healthcare professionals who should be knowledgeable enough to provide health counseling and treatment to individuals.

Despite the great potential benefits and promise of this emerging field of immense public health significance, most healthcare professionals are still at the traditional level of micronutrients understanding and practice (Frank, 2004; Vetter et al., 2008). This undesirable situation calls for investigation to determine the magnitude of the problem and probably devise strategies for remedies in order to take advantage of the potential benefits of knowledge of micronutrients as a weapon against disease and maintenance of optimum health. This problem is particularly serious as a single micronutrient deficiency can lead to genomic instability and development of degenerative diseases in various stages of life (Ray, 2014). In line with this development, it is important that healthcare professionals are aware of the evidence for the nutritional essentiality of these substances on disease prevention and their effects on physical activity so that they can encourage their clients on adequate consumption especially in situations where an increased intake may lead to clinical benefit. Therefore, this study examined the healthcare professionals in the University College Hospital (UCH) Ibadan to ascertain their awareness of micronutrients use in disease prevention and physical activity.

## MATERIALS AND METHODS

### Study area

This study was carried out at the University College Hospital (UCH) located in Ibadan Nigeria. The hospital is the largest and oldest teaching hospital in Nigeria. Many healthcare professionals are trained in this hospital and research is conducted on regular basis. Many patients are referred from all over the country to the hospital for specialist attention. Because it is a specialist centre, and many healthcare professionals work in this hospital, the researcher perceived it as a good centre to carry out this study.

### Materials

Self-developed structured questionnaire was used for this study. This questionnaire contained 21 items (section A comprised of 5 questions-demographic and section B comprised of 16 questions testing variables of the study). The questionnaire instrument was validated using Pearson product moment correlation to establish the reliability ( $r = 7.0$ ).

### Methods

The descriptive survey research design method was used for this study. This method permitted the researcher to critically and carefully describe and explain the variables that exist in the study based on the data collected. Purposive sampling technique was used to select five (5) healthcare groups: Doctors, Nurses, Pharmacists, Physiotherapists and Medical Laboratory Scientists from the nine (9) Healthcare groups at the University College Hospital, Ibadan. This group of professionals was selected in terms of availability to Patients or Individuals in the hospital, as well as the numerical strength of each professional group. Proportionate sampling technique was used to select one hundred and eighty two (182) participants from the selected professionals according to the numerical strength of the selected professionals as follows: doctors 15% = 45 out of 300; Nurses 15% = 68 out of 450. Twenty-five percent of the other three

professionals were selected as follows because of their relative small number: Pharmacists 25% = 25 out of 100; Physiotherapists 25% = 23 out of 90 and medical laboratory scientist 25% = 21 out of 85. However, 130 participants (71%) returned their questionnaire completely filled and were finally analyzed for the study.

### Statistical analysis

The data was processed using SPSS 12. The descriptive statistics of percentages and mean were used; while the inferential statistics of variance, standard deviation and Chi-square ( $X^2$ ) were also used to test the variables of study. A level of significance of 0.05 was adopted for the study.

## RESULTS

Table 1 shows the distribution of the gender distribution of the respondents. More females participated in the study than males (63:36). Table 2 shows the frequency distribution of respondents by age; most of the participants are between 26-30; 31-35 and 36-40 years of age. Table 3 shows that most of the respondents have working experience 10 years and below in U.C.H. Table 4 reveals that most of the respondents have a university degree: 57% have university degrees and 33% do not have degrees. Table 5 shows the result of the awareness of healthcare professionals on the current use of micronutrient in disease prevention. All the variables tested were significant since the calculated value exceeds the critical value:  $X^2$  (observed value) = 49.08 and  $X^2$  table value or Crit.value = 18.55 and df (degree of freedom) = 12;  $p < 0.05$  (significant).

Table 6 shows the result of the awareness of Healthcare Professionals on the effect of micronutrients on physical activity. All the variables tested were significant since the calculated value exceeds the critical value:  $X^2$  observed value = 220.34;  $X^2$  table value = 18.55; degree of freedom (df) = 12;  $p < 0.05$  (significant).

**Table 1:** Frequency distribution of respondents by gender.

Value label	Value	Frequency	Percent	Cum percent	
Males	1	47	36.2	36.2	
Females	2	83	63.5	100.0	
Mean _____	1.638	Std dev _____	482	Variance _____	233

**Table 2:** Frequency distribution of respondents by age.

Value label	Value	Frequency	Percent	Cum percent	
21-25	1	11	8.5	8.5	
26 – 30	2	26	21.5	30.0	
31-35	3	42	32.3	62.3	
36-40	4	23	17.7	80.0	
41-45	5	15	11.5	91.5	
46+	6	11	8.5	100.0	
	Total	130	100.0		
Mean _____	3.277	Std dev _____	375	Variance _____	1.892

**Table 3:** Frequency distribution of respondents by years of experience.

Value label	Value	Frequency	Percent	Cum percent	
0-5	1	66	50.8	50.8	
6-10	2	26	20.0	70.8	
11-15	3	22	16.9	87.7	
16-20	4	5	3.8	91.5	
21-25	5	7	5.4	96.9	
26	6	4	3.1	100.0	
	Total	130	100.0		
Mean _____	2.023	Std dev _____	1.350	Variance _____	1.821

**Table 4:** Frequency distribution of respondents by professional qualification.

Value label	Value	Frequency	Percent	Cum percent
RNM	1	24	18.5	18.5
RNM, RPON	2	12	9.2	27.7
MBBS	3	38	29.2	56.9
B. Pharm	4	15	11.5	68.5
B.Sc Med. Lab Science	5	17	13.1	81.5
B.Sc.Physiotherapy	6	11	8.5	90.0
B.Sc Nursing	7	6	4.6	94.6
Others	8	7	5.4	100.0
	Total	130	100.0	

**Table 5:** Awareness of Healthcare Professionals on the current use of micronutrient in disease prevention.

		OPTIONS									
Item		SD	D	A	SA	Total	X <sup>2</sup> obs	Df	X <sup>2</sup> crit.	P	Decision
1	Fo	8	6	78	38	130	49.08	12	18.55	0.05	Significant
	Fe	6.2	4.6	60.0	29.2	20.0	49.08	12	18.55	0.05	Significant
2	Fo	25	16	59	30	130	49.08	12	18.55	0.05	Significant
	Fe	19.2	12.3	45.4	23.1	20.0	49.08	12	18.55	0.05	Significant
3	Fo	3	8	71	48	130	49.08	12	18.55	0.05	Significant
	Fe	2.3	6.2	54.6	36.9	20.0	49.08	12	18.55	0.05	Significant
4	Fo	10	14	71	35	130	49.08	12	18.55	0.05	Significant
	Fe	7.7	10.8	54.6	26.9	20.0	49.08	12	18.55	0.05	Significant
5	Fo	7	3	84	36	130	49.08	12	18.55	0.05	Significant
	Fe	5.4	2.3	64.6	27.7	20.0	49.08	12	18.55	0.05	Significant
Total	Fo	53	47	363	187	650	49.08	12	18.55	0.05	Significant
	fe (%)	8.2	7.2	55.8	28.8	100.0	49.08	12	18.55	0.05	Significant

All the variables tested were significant; X<sup>2</sup> (observed value) = 49.08 and X<sup>2</sup> table value or Crit.value = 18.55 and df (degree of freedom) = 12; p < 0.05 (significant).

**Table 6:** Awareness of Healthcare Professionals on the effect of micronutrients on physical activity.

		OPTIONS									
Item		SD	D	A	SA	Total	X <sup>2</sup> obs	Df	X <sup>2</sup> crit.	P	Decision
1	Fo	21	39	53	17	130	220.34	12	18.55	0.05	Significant
	Fe	16.2	30.0	40.8	13.1	20.0	220.34	12	18.55	0.05	Significant
2	Fo	25	24	64	17	130	220.34	12	18.55	0.05	Significant
	Fe	19.2	18.5	49.2	13.1	20.0	220.34	12	18.55	0.05	Significant
3	Fo	4	1	72	53	130	220.34	12	18.55	0.05	Significant
	Fe	3.1	0.8	55.4	40.8	20.0	220.34	12	18.55	0.05	Significant
4	Fo	3	2	85	40	130	220.34	12	18.55	0.05	Significant
	Fe	2.3	1.5	65.4	30.8	20.0	220.34	12	18.55	0.05	Significant
5	Fo	55	33	33	9	130	220.34	12	18.55	0.05	Significant
	Fe	42.3	25.4	25.4	6.	20.0	220.34	12	18.55	0.05	Significant
Total	fo (%)	108	99	307	136	650	220.34	12	18.55	0.05	Significant
	fe (%)	16.6	15.2	47.2	20.9	100.0	220.34	12	18.55	0.05	Significant

All the variables tested were significant; X<sup>2</sup> observed value = 220.34; X<sup>2</sup> table value = 18.55; degree of freedom (df) = 12; p < 0.05 (significant).

## DISCUSSION

This was conducted to ascertain the awareness of healthcare professionals on the use of micronutrients in disease prevention and physical activity. More females took part in the study (Table 1). This may be due to the large number of nurses dominated by females in the hospital.

Young professionals both in age and working experience took part in the study (Tables 2&3); these characteristics of the participants is suggestive that they may be current with new knowledge, as new information must have been taught when they were in school. This may have influenced their responses to questions asked about micronutrients. They may have given their information mainly on classroom teachings. Also, having few of the older and more experienced professionals taking part in this study may also imply that the younger groups of professionals were probably more positively disposed to research than the older group. It was also noted that majority of the participants had university degrees (Table 4). This further buttresses the fact that most good responses by the healthcare professionals may have been influenced by their high educational level; one can infer that university degree promotes understanding and knowledge of micronutrient use.

The first variable tested was to ascertain if healthcare professional are aware of the use of micronutrients in disease prevention, all questions asked have a significant level (Table 5). This implies that healthcare professionals may be significantly aware and may have a good understanding of the use of micronutrients in disease prevention. The healthcare professionals at the University College Hospital, Ibadan appear to be abreast of knowledge and know the current findings with micronutrients globally. This finding is very impressive, particularly with the very good responses that healthcare professionals gave to the usefulness of antioxidants like vitamins A, C and E in reducing abnormalities in cell kinetics which may

implicate a precancerous condition. Previous studies had pointed to the very harmful effects of inadequate or lack of these vitamins (Holick, 2004; Tulchinsky, 2010). With this development, healthcare professionals may be able to impact the required information and treatment on clients as necessary to aver harmful effect of inadequate vitamins and by this result they demonstrated that they have probably benefitted from current literature. This finding appears contrary to the finding of Vetter et al. (2008) where they reported that physicians did not have the expected nutritional knowledge commensurate to their training.

The second variable tested was to ascertain if healthcare professionals are aware of micronutrients use in physical activity and the result was significant (Table 6). Again, this supports the logical conclusion that healthcare professionals may have significantly recognized the effects of micronutrients on exercise and physical activity; which also implies that healthcare professionals at the University College Hospital are abreast of current findings in literatures as projected in developed countries. Earlier studies were able to observe in the United States as well as other regions that prolonged physical activity result in increase production of free radicals and other forms of reactive oxygen species (ROS) (Lukaski, 2004, Powers et al., 2004 and Ward, 2014). This therefore makes it obligatory for people engaged in prolonged or chronic physical activities to have an increased dose of antioxidants (micronutrients) especially vitamin E which will help to absorb free radicals which are toxic to the body (Urso and Clarkson, 2003; Aburto et al., 2010). It is an appreciable finding to know that healthcare professionals at the University College Hospital, Ibadan appear to have this important knowledge which will be beneficial in curbing this type of pathology and very useful in health promotion and disease prevention.

## Conclusion

Healthcare professionals appear to be aware of the current use of micronutrients in disease prevention and on exercise and physical activity. It is expected that this awareness (knowledge) will help them to advise their clients (individuals) on how to get micronutrients adequately consumed from their food by eating a variety of food, eat to meet their needs, protect the quality and safety of their food and to keep active and stay fit. Healthcare professionals should make concerted efforts to keep abreast of current use of micronutrients at all times to promote nutrition education among their clients; thereby enhancing disease prevention.

## COMPETING INTERESTS

The author declares that there are no competing interests.

## AUTHOR'S CONTRIBUTIONS

This is a single authored paper; the author conceived and carried out the research.

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