

**KNOWLEDGE, PERCEPTION AND CONSUMPTION PATTERNS
OF DIETARY SUPPLEMENTS AMONG ADULTS IN IBADAN
NORTH LOCAL GOVERNMENT AREA**

BY

AKINGBALA, OLUWATOMI

B.PHARM (IBADAN)

MATRIC NO: 121251

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DEDICATION

This work is dedicated to the all knowing God who has all depth of knowledge.

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ABSTRACT

The high prevalence of consumption of dietary supplements in our community has led to increased research in this aspect in recent times. While studies have been carried out on knowledge and consumption, there is still much to be revealed about perception about supplements, consumption, consumption patterns and other key areas. This study described the knowledge, perception, usage patterns, reasons for consumption, duration of use and challenges associated with the use of supplements among adults in Ibadan North Local Government.

This was a cross-sectional descriptive study among 220 adults in 5 wards of Ibadan North Local Government who were sampled by multi-stage sampling technique. Data was collected from them using an interviewer-administered semi-structured questionnaire. The questionnaire had a 12-point knowledge scale, 12 point perception scale and other sections such as type and pattern of dietary supplement, reason for use, benefits and challenges were included. Analysis of quantitative data was done using descriptive (Mean, and percentages) and inferential (Chi square) statistics.

The mean age of the respondents was 36.4 ± 12.5 and the prevalence of use of supplements was 78.6%. The overall mean score on knowledge was 5.42 ± 3.01 out of a maximum of 12. The larger percentage of the respondents perceived supplements as useful for promotion of health (89.5%) and safe (84.1%) while 42.7% said it is more efficacious than conventional medicine. 89.1% had positive perception of dietary supplements and the overall mean score on perception was 6.97 ± 2.27 out of a maximum of 12. All the socio-demographic factors had a statistically significant relationship with respondents' level of knowledge about supplements as $P < 0.05$. Statistically significant relationship also exists between knowledge and consumption of supplements as $P < 0.001$. It was also reported that statistically significant relationship exists between socio-demographic variables of sex, education and employment status and consumption of supplements and consumption pattern of dietary supplements as $P < 0.05$. The most common supplement used by respondent was multivitamin and vitamin C and the most prominent reason for use of supplements was to promote and maintain health. The most common consumption pattern were daily and once in a while and supplement consumption in the last 3 months was at 75.7%. More than half of consumers' source recommendation from health workers and

about 86% make purchases of supplements from Pharmacies/chemists. Majority of consumers, 92.5% do not experience adverse effects and 67.1% reported that no challenge was associated with the use of supplements.

In conclusion, the study shows that supplement consumption was high but pattern of use was occasional while knowledge was fair. Educational interventions should be targeted to the adults in the IBNLGA in respect to content, safety and adverse effects of supplements.

Keywords: Knowledge, perception, consumption, consumption pattern, dietary supplements.

Word count: 438

CERTIFICATION

I certify that this work was carried out by **Akingbala Oluwatomi** in the Department of Health Promotion and Education, University of Ibadan under my supervision.

.....
SUPERVISOR

Ademola J. Ajuwon

B.Sc (Lagos), MPH., Ph.D. (Ibadan),

Professor,

Department of Health Promotion and Education,

Faculty of Public Health, College of Medicine,

University of Ibadan, Nigeria

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LIST OF ACRONYMS

BMI: Body Mass Index

CAM: Complementary and Alternative Medicine

CRN: Council for Responsible Nutrition

DNA: Deoxyribonucleic Acid

DSHEA: Dietary Supplement Health And Education Act

IBNLGA: Ibadan North Local Government Area

NAFDAC: National Agency For Food And Drug Administration and Control

NCCAM : National Center for Complementary and Alternative Medicine

NCCIH: National Centre for Complementary and Integrative Health

NHANES: National Health and Nutrition Examination Surveys

NIH: National Institutes of Health

PBC: Perceived Behavioural Control

RNA: Ribonucleic Acid

SPSS: Statistical Package For Social Sciences

TBP: Theory of Planned Behaviour

UCH: University College Hospital

US FDA: United States Food and Drug Administration

WHO: World Health Organization

DEFINITION OF TERMS

Adult: A term described as “full age” in the Nigerian constitution which was stated as anyone who is 18years and above (Nigerian constitution, 1999).

Complementary and Alternative Medicine (CAM): Health care systems, practices, and products that are not generally considered part of conventional medicine but are used together with or in place conventional medicine and purport to prevent or treat diseases (National Centre for Complementary and Alternative Medicine , 2009).

Dietary supplement: A product (other than tobacco) that is intended to supplement the diet, contains one or more dietary ingredients (including vitamins; minerals; herbs or other botanicals; amino acids; and other substances) or their constituents which is intended to be taken by mouth as a pill, capsule, tablet, or liquid and is labeled on the front panel as a dietary supplement (US Food and Drug Administration, 2011).

Drugs: A drug is a product used to diagnose, cure, mitigate, treat, or prevent diseases (US Food and Drug Administration, 2011).

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The United State congress, in the Dietary Supplement Health and Education Act, which became law in 1994, defined a dietary supplement as a product (other than tobacco) that is intended to supplement the diet, contains one or more dietary ingredients (including vitamins; minerals; herbs or other botanicals; amino acids; and other substances) or their constituents which is intended to be taken by mouth as a pill, capsule, tablet, or liquid and is labeled on the front panel as a dietary supplement (US Food and Drug Administration, 2011).

They are largely classified into vitamins, minerals and herbal supplements. The vitamins come in different forms (A, B, C, D, E, and K). The minerals such as magnesium, calcium, iron, are also very important in ensuring proper functioning of the body. Together, minerals and vitamins are important in prevention of micronutrient deficiency. Herbal supplements are quite different from vitamin and mineral supplements in that they are considered to have medicinal value in themselves. Herbs, also known as botanicals, are one of humanity's oldest health care tools, and the basis of many modern medicines. Although, dietary supplements have claims of being highly beneficial, it is important to know that they might not necessarily cure or treat a condition or health problem (Paul and Smith, 2015).

Dietary supplements are a major type of complementary and alternative medicine (CAM) which is described by National Center for Complementary and Alternative Medicine (NCCAM) as health care systems, practices, and products that are not generally considered part of conventional medicine but are used together with or in place conventional medicine and purport to prevent or treat diseases (Onyiapat, Okoronkwo and Ogonnaya, 2014). A study on self reported use of CAM in Jeddah, Western Saudi found that over 80% of the populations in developing countries depend on CAM products and/or traditional healing modalities, including herbal remedies, for health maintenance and therapeutic management of disease (Bahhotmah, 2010). In Nigeria, about 85% of adults are known to use and consult traditional medicine for healthcare, social, and psychological benefits because of poverty and dissatisfaction with conventional medical

care (Onyiapat et al, 2011). Among numerous herbal medicines in circulation in Nigeria, only about twenty (20) have been registered by the National Agency for Food and Drug Agency and Control (NAFDAC) and despite this, the use of supplements is aggressively promoted (Onyiapat et al, 2011). This consumption could have stemmed out of the general belief that they are of natural origin and hence, considered safe (Aina and Ojedokun, 2014).

The use of supplements in developed countries varies. For example, it is common in Germany and Denmark (43% and 59% of the adult population respectively) but is less so in Ireland and Spain (23% and 9% respectively). Women use supplements more than men (European food Information Council, 2013). In the United States, dietary supplement use among adults has increased over the past 30 years, and currently about half of adults report using one or more dietary supplements (Bailey, Gahche and Miller, 2013). Bailey explained the characteristics of people who use supplements as older, having a lower Body Mass Index (BMI), more physically active, less likely to smoke, and have higher educational attainment and socioeconomic status compared with nonusers.

The market for dietary supplement is also a very large one and the consumption of supplements has been on the increase globally. Reports by Persistent Market Research, (2015) have shown that dietary supplement global market which is currently USD109.8 billion is expected to reach US\$179.8 Billion, which is going to be the largest market by the year 2020. Currently, Asia-Pacific has the largest market globally. This is as a result of consumer awareness about the benefits and a wide range of supplements availability. Western Europe has the second- largest market for dietary supplement product (Euromonitor International, 2015).

Studies have shown that the rate of use of dietary supplements in Nigeria has equally been on the increase. A study conducted among North-Central Nigerian workers revealed the prevalence of use to be 79.3% (Banwat and Ejima, 2015). Another study among adult population in Enugu, Nigeria showed the prevalence of supplement use among adult population to be 84.7% (Onyiapat et al, 2011). This has necessitated the need for more studies to be conducted in this aspect. This study attempts to highlight the knowledge, perception, consumption pattern and factors associated with the use of dietary supplements in adults in Ibadan North Local government area (IBNLGA).

1.2 Statement of the problem

The belief that dietary supplements are safe has prompted the World Health Organization (WHO) to promote the global integration of traditional and complementary medicine into the national health care systems and to encourage the development of national policies and regulations (Abdelmonein and Dana, 2014). This belief has also led to a continual increase in the purchase of supplements in various communities. According to Euromonitor International (2015), the dietary supplements market is reported to be one of the fastest growing categories in consumer health in Nigeria. This report shows that Forever Living Products Nigeria Ltd, a company involved in marketing natural products and dietary supplements, leads in sales of dietary supplements in Nigeria in 2014 with a value share of 16%.

The availability of these products in the supermarkets, health food shops and internet has also increased the perception that they are safe. Laws regulating sales and distribution of dietary supplements are poor while access to herbal medicines is largely unrestricted. Indiscriminate use of dietary supplements in different forms is widespread. People continue to use dietary medicines at one time or the other in spite of the fact that their side effects are poorly understood (Aina et al, 2014).

The claims offered by the manufacturers of dietary supplements have also contributed to indiscriminate consumption of supplements. Manufacturers may claim that their product will diagnose, cure, mitigate, treat or prevent a disease which could even make consumers to perceive them as better and safer alternatives to orthodox medicine (National Institute of Health, 2014). The label of a dietary supplement may contain one of three types of claims: a health claim, nutrient content claim, or structure/function claim. Health claims describe a relationship between dietary supplement ingredient, and reducing risk of a disease or health-related condition. Nutrient content claims describe the relative amount of a nutrient or dietary substance in a product. A structure/function claim is a statement describing how a product may affect the organs or systems of the body but does not mention any specific disease (US Food and Drug Administration, 2011). Some of these claims have been buttressed by studies that show that dietary supplements could

actually have good therapeutic outcomes, even though, untoward effects may be developed from adulterated products or wrong dosage (Okoronkwo et al, 2011).

There has been indiscriminate consumption of supplements because they have been believed to be from natural products. Supplements tend to be consumed in the wrong doses and for the wrong purposes; the deficiencies or excesses of which could lead to complications (NIH, 2014). Although Research has been done in other populations such as Lagos and Enugu on knowledge and consumption of supplements (Onyiapat, 2011), this study focuses on the perception, which includes beliefs about safety and consumption pattern of dietary supplements among a general population of adults that includes those who do not suffer chronic diseases in Ibadan North Local Government Area (IBNLGA). This study would also assess knowledge and explain factors, benefits and challenges associated with the consumption of dietary supplements in IBNLGA.

1.2.1 Justification of the study

Valid data on knowledge, perception and consumption pattern of supplements would also be provided. This study seeks to identify the various types of supplements consumed by adult population, pattern of consumption, reasons for their use and other factors associated with their use. Benefits and challenges of the use of supplements would be highlighted.

This study would also bring to limelight the association between demographic profile and knowledge, knowledge and consumption, presence/absence of chronic condition and consumption, knowledge and perception of supplements. Sources of information about dietary supplements and adverse effects that might have been experienced due to consumption of supplements would be identified. The prevalence of consumption of supplements in the Ibadan North would also be highlighted in this study.

1.3 Research questions

- i. What is the knowledge about dietary supplements among adults in Ibadan North Local Government Area?
- ii. What do they think about supplement use?
- iii. What type of dietary supplement(s) is/are consumed by these adults?
- iv. How are these products consumed by this population?
- v. What are the reasons for use of dietary supplements?

- vi. What are the perceived benefits for the use of dietary supplements?
- vii. Are there any problems encountered in the use of dietary supplements?

1.4 Objectives of the study

The broad objective of the study is to investigate the knowledge, perception and consumption patterns of dietary supplements among adults in Ibadan North Local Government area. The specific objectives are:

- i. To assess the knowledge of dietary supplements among adults;
- ii. To determine the perception of Adults about the use of dietary supplements
- iii. To identify the types of dietary supplements consumed by these adults;
- iv. To determine the consumption patterns of dietary supplements among these adults;
- v. To determine the perceived factors which associated with use of dietary supplements among adults in Ibadan North Local Government area
- vi. To highlight the perceived benefits of the use of dietary supplements by the adult population
- vii. To identify the problems encountered in the use of supplements among adult population

1.5 Hypotheses

- 1. A. Null hypothesis: There is no association between demographic profile of the adult population and knowledge about dietary supplements.
B. Alternative Hypothesis: There is an association between demographic profile of the adult population and knowledge about dietary supplements.
- 2. A. Null Hypothesis: There is no relationship between knowledge and consumption of dietary supplements.
B. Alternative Hypothesis: There is a relationship between knowledge and consumption of dietary supplements.
- 3. A. Null Hypothesis: There is no relationship between demographic profile and consumption of dietary.
B. Alternative Hypothesis: There is a relationship between demographic profile and consumption of dietary supplements.

CHAPTER TWO

LITERATURE REVIEW

2.1 Types and nature of dietary supplements

Dietary supplements are of various types and there are various methods through which they can be produced. These methods include laboratory synthesis, microbial fermentation, or other chemical processes (Woodward, 2015). Usually, they contain similar nutrients as found in food. DSHEA stipulates that such products can be in the form of pills, capsules, tablets, gel caps, liquids, powders, or other forms, and not be represented for use as conventional foods. Dietary supplements could contain vitamins, minerals or herbs. They could also contain carbohydrates and amino-acids (US FDA, 2011).

Vitamins are essential organic compounds that perform numerous and diverse metabolic functions, often serving as enzymatic cofactors. They can be obtained from food or supplements. Vitamins obtained from supplements have similar chemical composition and function as those obtained from foods. However, they might be better absorbed by the body than naturally occurring ones. For instance, folic acid (Vitamin B9) in dietary supplements or fortified foods is better absorbed than naturally occurring folate in foods. (Woodward, 2015). Vitamin supplements however have tendencies to contain higher level of vitamin than contained in food which could be hazardous. Hence, manufacturers endeavour to keep per servings amount below level that can cause adverse effects. (Pulsipher, 2014).

Vitamin supplements are divided into fat-soluble vitamins and water soluble vitamins. Fat-soluble vitamins are more readily stored in the body, and therefore, have the potential to be more dangerous. They include vitamin A, D, E, K. Excess of Vitamins A and D can be hazardous causing spontaneous abortion and hypercalcemia respectively. Vitamins E and K are synthesized by the body and therefore, the use of supplements may not be necessary (NHS, 2015). Water solubles are easily destroyed or washed out during food storage and preparation. These include B-complex vitamins and vitamin C. The B-complex group is found in a variety of foods: cereal grains, meat, poultry, eggs, fish, milk, legumes and fresh vegetables. Examples of B-complex vitamins include thiamine, Riboflavin, Panthothenic acid and biotin. Citrus fruits are good sources of vitamin C

(Bellows and Moore, 2011). Vitamins supplements also may interact with prescription medications. For instance, Vitamin D may increase the toxicity of digoxin, vitamin K decreases the anticlotting effect of warfarin by its antagonistic effects. This means that vitamins can affect the metabolism and bioavailability of other nutrients or drugs (Royal Pharmaceutical society, 2013).

Minerals are inorganic compounds that are involved in such metabolic processes as muscle contraction, transmission of nerve impulses, maintenance of water and acid-base balance and catalysis of numerous other biological reactions. Minerals should be ingested in the appropriate quantities as excessive consumption of one mineral can lead to impaired absorption of others. Some of the examples of minerals needed by the body include Iron, Zinc and Magnesium (NIH, 2015)

Iron is an essential mineral that is an important constituent of haemoglobin. Iron is required for the formation of oxygen-carrying proteins, haemoglobin and myoglobin, and for enzymes involved in energy production. The deficiency of Iron can cause anaemia which can result in death if not well managed. Iron can interact with drugs to produce various effects. For example, Iron supplements can reduce the amount of levodopa that the body absorbs, making it less effective. However, iron also acts as pro-oxidant inducing free radical damage, and an excessive iron intake may promote lipid oxidation, damaging mitochondria and Deoxyribonucleic acid, DNA (NCCIH, 2014).

Zinc is involved in numerous aspects of cellular metabolism. It is required for the catalytic activity of approximately 100 enzymes and it plays a role in immune function, protein synthesis, wound healing, DNA synthesis and cell division. Zinc also supports normal growth and development during pregnancy, childhood, and adolescence and is required for proper sense of taste and smell. A daily intake of zinc is required to maintain a steady state because the body has no specialized zinc storage system (NCCIH, 2014). Zinc supplementation has been shown to be effective for preventing diarrhoea and pneumonia in children. When used as a therapy for acute or persistent diarrhoea, zinc reduces the duration of the episode as well as its severity and complications (Mazumder, Bhandari and Dube, 2010).

Magnesium plays a variety of roles in cellular metabolism (glycolysis, fat, and protein metabolism) and regulates membrane stability and neuromuscular, cardiovascular,

immune, and hormonal functions (National Institutes of Health, NIH, 2013). Magnesium is required for energy production, oxidative phosphorylation, and glycolysis. It contributes to the structural development of bone and is required for the synthesis of DNA, RNA, and the antioxidant glutathione. Magnesium also plays a role in the active transport of calcium and potassium ions across cell membranes, a process that is important to nerve impulse conduction, muscle contraction and normal heart rhythm (Rude, 2012). Magnesium supplements are available in a variety of forms, including magnesium oxide, citrate, and chloride. Absorption of magnesium from different kinds of magnesium supplements varies. Forms of magnesium that dissolve well in liquid are more completely absorbed in the gut than less soluble forms (Rude, 2012).

Herb or other botanicals are dietary supplements that contains herbs plant or part of a plant used for its flavor, scent, or potential therapeutic properties. They Include flowers, leaves, bark, fruit, seeds, stems, and roots; either singly or in mixtures. An herb (also called a botanical) is a plant or plant part used for its scent, flavor, and/or therapeutic properties. They are known to originate from natural sources and thus usually perceived be without harmful effects. This is not necessarily so. For example, the herbs kava and comfrey have been linked to serious liver damage (NCCIH, 2014). Herbal supplements can act in the same way as drugs. Therefore, they can cause medical problems if not used correctly or if taken in large amounts. The active ingredient(s) in many herbal supplements are not known. There may be dozens, even hundreds, of such compounds in an herbal supplement. In some cases, people have experienced negative effects even though they followed the instructions on a supplement label. Common preparations include teas, decoctions, tinctures, and extracts (US Food and Drug Administration, 2011). Examples of herbal supplements include Garlic, ginkgo, chamomile, dandelion, milk thistle, capsicum, valerian, yohimbe, guarana.

US Food and Drug Administration explains that it is important that the label bears statement of identity, which identifies the contents of the product; net quantity of contents; ingredient list (in descending order by weight); and the name and address of the manufacturer, packer, or distributor. FDA also differentiated supplements from drugs. A drug is a product used to “diagnose, cure, mitigate, treat, or prevent diseases,” whereas a

dietary supplement is meant to supplement (add to) diet by increasing the total dietary intake of a substance (US FDA, 2011).

2.2 Knowledge of dietary supplements

A study by Aina (2014) in Lagos on knowledge and use of supplements among university students showed a high awareness of dietary supplement among the respondents as higher percentage of them 96.6% have heard about dietary supplements. However, two-third of the students had some knowledge deficiency as they said supplements can be used to substitute natural nutrients derived from foods, which is not so. Another study by Banwat et al in 2015 on nutritional supplements in urban setting in North-Central Nigeria showed that out of the 390 respondents in the study, only 67(17.2%) of the respondents had good knowledge, 222(56.9%) had fair knowledge, and 101(25.9%) had poor knowledge. This was still similar to the results obtained from Aina, 2014 as most respondents do not have good knowledge of supplements.

A study conducted by Owens in 2014 on Knowledge, attitude and consumption of supplements in rural area in the United Kingdom showed that 61.1% gave correct response to the knowledge-based questions on regulation, purity, safety and efficacy of supplements. However, approximately 66% reported that they have never heard of DSHEA legislation of 1994. Another study in India by Saini and Hasan in 2015 on supplements showed that more than half of the respondents (56%) do not have knowledge about adverse effects of supplements or interactions of supplements. Another survey in Switzerland about dietary supplement used showed that (21%) consumers did not know the purpose of at least one product present in their supplement and did not even know the function of the supplements. All these show that there is still a dearth in knowledge about supplements (Troxler, Michaud and Graz 2013). Most of these studies have shown that most people do not have good knowledge about supplements both in Nigeria and in other parts of the world.

2.3 Perception about the use of supplements

Studies in times past have shown respondents have different perceptions about the use of supplement. The study by Aina et al, 2014 in Lagos showed that almost half of the students felt dietary supplements are important and 84.3% think that the use of supplements should be encouraged. Half of them (50%) also think that it is important for

their doctors to be aware of the supplements that they use (Aina et al, 2014). This reflects a positive perception of supplements by these respondents. Banwat's study reported perception of the respondents regarding nutritional supplements as generally positive; as 44.6% of the respondents considered them as equally effective as conventional medicine (Banwat et al, 2015).

The study by Owens in UK reported that most respondents indicated a preference for dietary supplements to conventional pharmaceuticals for treating medical conditions or to maintain health. Many also indicated a lower level of concern regarding potential adverse effects and drug-supplement interaction potential. These however, reflect public erroneous perception that as natural products, dietary supplements must be safer and more efficacious than conventional pharmaceuticals (Owens, 2014). Similar to this result, the report by Marinac, 2014 in Kansas showed that two-thirds of the respondents mistakenly believe that herbal products and dietary supplements are safe and pose no risk to the general public, 70% incorrectly believe that the FDA tests these products, and 60% falsely believe that the FDA regulates them. These misperceptions may be the reason that 22% of the respondents incorrectly believe that it is unimportant to disclose herbal/supplement use to their primary care physicians. Bin and Kiat analysed various studies in India on supplements use and also found that 75% users think they are safe, 45% believe they are safer than prescription medicine and 45%–47% think that supplements would result in fewer side effects compared to prescription medications (Bin and Kiat, 2010). There is also a wide spread belief that supplements help to maintain good health. Consumers think that one of the ways to being health conscious is to ensure that they consume supplements (Sekhri and Kaur, 2014). These perceptions are mostly shaped from the information obtained from media as most respondents perceived the media, in the form of books and magazines, to be a powerful influence on a person's decision to use supplements.

2.4 Consumption and consumption pattern of supplements globally, in Africa and Nigeria

There are varying patterns of consumption and supplements use in various parts of the world. In America, a study by Blendon showed that approximately half (48 percent) of all American adults surveyed reported that they regularly take some type of nonprescription vitamin or dietary or mineral supplement. One in six (16 to 18 percent) reported that they regularly use dietary supplements such as ginseng, amino acids, or nonprescription hormones. The reason for supplementation was mostly to promote and maintain health (Bailey 2013,).

National Health and Nutrition Examination Surveys (NHANES, 2007-2010), showed that 49 to 50% of respondents use supplements regularly, most likely on a daily bases. Users of dietary supplements typically take their chosen products every day, and many stick with their supplement regimen for years. In NHANES 1999–2000, 85% of those who took a multivitamin took it daily, as did 82% of those who took vitamin C and 90% of those who took vitamin E. Also, 25% of those who took a multivitamin had been taking it for 5 years or more, as had 38% of those who took vitamin C and 34% of those who took vitamin E. Many respondents used the supplements for 10 years or more, including 14% of those who took a multivitamin, 29% of those who took vitamin C, and 22% of those who took vitamin E. In a Multiethnic cohort, over 60% of white or Japanese-American supplement users, about 50% of black or native Hawaiian supplement users and about 40% of Latino supplement users reported taking multivitamins regularly for 5 years or more . Certain supplements such as vitamin A, vitamin C, vitamin E, calcium and iron were also substantial have been used for a long term bases (Dickinson et al, 2014). A series of nationally representative consumer surveys was conducted by Ipsos Public Affairs for the Council for Responsible Nutrition (CRN) in America. The CRN surveys for the five-year period from 2007 to 2011 found that 48 to 53% (average of 50%) of consumers considered themselves “regular” users of dietary supplements, while the overall prevalence of supplement use was 64 to 69% (average of 66%) when occasional and seasonal users were included. Results of these surveys suggest that the prevalence of regular supplement use among U.S. adults is about

50%, but the *overall* prevalence of supplement use may be closer to two-thirds of the adult population (Dickson et al; 2014).

A study on supplements in Europe by showed that dietary supplement use varied markedly in frequency and type across countries, although vitamins, minerals and/or Multivitamins dominated in most countries. Use of supplements is higher among the UK and Denmark population compared to other parts of Europe (Rethans, 2012). Oil-based supplements were popular in Norway, Denmark and the United Kingdom. The differences in supplement types result most likely from cultural patterns. For example, in Norway, cod liver oil has traditionally been consumed as a part of diet, particularly in the northern coastal areas. Health authorities have recommended a daily consumption of cod liver oil supplements as an effective means of preventing vitamin D deficiency. In total, vitamins C, E and D were the most frequently consumed ingredients, reflecting the popularity of vitamins, Multivitamins and oils. The overall use of supplements in Netherlands was 33.7% and the most common supplements used were multivitamin and minerals (Rethans, 2012).

Asia-Pacific is the largest market for dietary supplements globally. Consumer awareness about the benefits of dietary supplements and wide product availability are the major drivers for the market in Asia Pacific. A survey in an urban population in India highlights that the multivitamin supplements are commonly taken on a daily basis and consumers are unaware of any possible side-effects or drug-supplement interactions hence, a high prevalence of use of supplements (64.2%) (Saini and Hasan, 2015).

In Africa, the use of supplements is also becoming a widespread practice. A study in Egypt showed that complementary and alternative medicine in which supplements are included was mostly used among those who practiced self medication. The various reasons for use includes lesser side effects (54.4%) and positive previous experience with the use of CAM (Nimr, Wahdan, Kotb, 2015).

In Nigeria, Aina et al 2014 in University of Lagos reported a high awareness about supplementation as well as a high consumption as a prevalence of 86% was obtained. It also showed that the most common consumption pattern amongst them was occasionally and once in awhile. Oreagba, 2011 also attempted to assess the extent of use and the general knowledge of the benefits and safety of such natural products among

urban residents in Lagos, Nigeria. A high prevalence of 66.8% was obtained. Ezeome in 2007 showed that most of the respondents (77.9%) used CAM in which supplements are included daily; others use them weekly (1.9%) or occasionally (6.7%), while 5.8% used them only once a while. This was similar to the findings in NHANES 2007-2010 in the US reports where a higher number of respondents use supplements daily.

2.5 Factors affecting the use of dietary supplements among adults

Studies carried out in various parts of Nigeria have shown that socio-demographic factors are major factors associated with the use of supplements. A study in Enugu showed that educational level, sex, marital status, level of income were found to be important demographic factors which affected the use of supplements. More males, married people, people of low level incomes and no formal education were more likely to use these products more. However, age was not found to influence the use of supplements (Okoronkwo et al, 2011). Another study in North central Nigeria also showed that respondents aged between 30-39 years were most likely to use supplements and there was a statistically significant association between age and use of supplements. The study also found that more males (74.5%) were likely to use supplements than females (67.3%) (Banwat et al, 2015). A study in Nigeria in 2010 also explained that an attempt of preservation of health regardless of an individual's assessment of his or her own health status, medical history, or concomitant medications is a responsible factor for the use of dietary supplements. Friends, relatives and colleagues also influenced the use of supplements (Ogbera, Dada and Adeyeye, 2010). The study by Wiwat in 2013 reported that people in high socio-economic class with higher monthly incomes, and live in the large cities use more of these supplements. This was at variance with the results obtained from studies in Nigeria (Okoronkwo, 2011).

In a study in Europe, The mean percentage of dietary supplement use was higher in Northern than in Southern Europe, and was higher among women than among men, except in the UK health-conscious cohort, in which a similar consumption was observed for men and women. The mean frequency of use was higher in the older age groups, but a linear trend was observed only among men, although there was some heterogeneity between countries (Skeie, 2009). Barnes' study in the US reported that use was more

prevalent among women; adults aged 30 - 69 years, higher level of education, higher income and people with one or more health conditions.

Dickinson and Mackay, 2014 explained that dietary supplements are used by half to two-thirds of American adults, and the evidence suggests that this usage is one component of a larger effort to develop a healthier lifestyle. Dietary supplement users tend on average to be better educated and to have somewhat higher incomes than nonusers, and these factors may contribute to their health-consciousness. Dietary supplement use also tends to be more prevalent among women than among men, and the prevalence of use increases with age in both men and women. Numerous surveys document that users of dietary supplements are significantly more likely than nonusers to have somewhat better dietary patterns, exercise regularly, maintain a healthy weight, and avoid tobacco products. Overall, the evidence suggests that users of dietary supplements are seeking wellness and are consciously adopting a variety of lifestyle habits that they consider to contribute to healthy living

The influence of the media on the use of supplements can also be seen in the Nigerian population. There was a report of a cleanser that had gained so much popularity and public acceptance as it is widely advertised in various Nigerian media. These herbal mixtures were marketed by a registered Nigerian company which cultivated medicinal plants and manufactured medicinal herbal preparations. The herbal blood tonics were well patronized by common folks who claim their efficacy according to the manufacturer's stipulation that "they are safe, give strength and cleanse the blood and body of infection." A case report of liver damage was recorded due to the use of this "cleanser" in a young male adult (Ekor, Osonuga and Odewabi, 2010). Janaina, Maria and Toulson, 2010, also highlight how media influences the consumption of supplements among the Brazilian population. According to this study, the media plays an important role in the decision to use supplements. The population is increasingly exposed to more information from the media than from the scientific community. More than half of the study participants reported having achieved the desired result with supplement use. The study also explains that the amount of money spent by the study participants on dietary supplements was not considered to be excessive. The study also showed that people who

exercise at gyms consume dietary supplements, mostly without specialized guidance and possibly without real need of them.

Studies in Thailand by Wiwat and Kriangsak, (2013) have shown that sales strategy and market networking are also factors that influence to a large extent the use of dietary supplements. Network marketing allows the sales people to persuade customers into becoming their downstream agents, who will be awarded with bonuses according to the number of people in their own downstream and the sale performance of their entire network.

The use of supplements is not without problems and challenges. The global market of supplement use has increased and has caused the introduction of many more new products to the market which has led to public health issues, and concerns surrounding their safety. Most supplements have remained untested and their use is not monitored. They lack quality controls, appropriate labeling and patient information makes knowledge of their potential adverse effects very limited and identification of the safest and most effective therapies as well as the promotion of their rational use more difficult (Raynor, 2011). Various advertisements in the mass media including television and radio programmes have significantly increased consumers' awareness which has led to desire of consumers to purchase supplements at very high cost which is seen in the constantly increasing market of supplement (Frison and Vadensbosch, 2013); supplements undue credibility in recent times. Gardiner, (2015) reported that many people do not disclose their use of supplements to health providers. This could be for the fear of being judged or that they are unaware of the physician's need to know about them.

The factors that affect the use of supplements in Nigeria are similar to those of developed countries. However, in Nigeria, referral recommendations from relatives and friends and their previous experiences plays a very strong role and this factor could particularly predispose consumers to more adverse effects (Aina 2014).

2.6 Reasons for the use of dietary supplements

Various studies have attempted to explain the reasons behind the use of dietary supplements. In Nigeria, a study conducted in Enugu by Okoronkwo et al, (2014) reported that the major reason for use was for health maintenance and promotion. Another reason was the perception that they are safe as they are of natural origin. These

findings are in line with similar studies which reported the growing public acceptance of herb and other products because they are generally perceived to be more natural with fewer side effect(s), as well as influence well-being and quality of life (Oreagba, Oshikoya and Amachree, 2011; Okoronkwo et al; 2011). In University of Lagos, most of the students use supplements so as to maintain good health, boost immunity and improve appetite (Aina, 2014).

A survey conducted at Harvard School of Public Health by Blendon and colleagues, (Blendon, Benson and Botta, 2013) on 1579 people aged 18 or older on Users' Views of Dietary Supplements, gives reasons for the consumption of supplements. Reasons reported for taking supplements included "to feel better" (41%), "to improve your overall energy levels" (41%), "to boost your immune system" (36%), "digestive issues" (28%), "lower cholesterol" (21%). Further studies by Bailey and colleagues (Bailey et al, 2013) on Why US adults use dietary supplements also highlighted reasons for the supplement consumption. Women used calcium products for "bone health" (36%), whereas men were more likely to report supplement use for "heart health or to lower cholesterol" (18%). Older adults (≥ 60 years) were more likely than younger individuals to report motivations related to site-specific reasons like heart, bone and joint, and eye health. Less than a quarter of supplements used by adults (23%) were recommended by a physician or health care provider. Multivitamin-mineral products were the most frequently reported type of supplement taken, followed by calcium and ω -3 or fish oil supplements. Supplement users are more likely to report very good or excellent health, have health insurance, use alcohol moderately, eschew cigarette smoking, and exercise more frequently than nonusers. The most commonly reported reasons for using supplements however, were to "improve" (45%) or "maintain" (33%) overall health. Use of supplements was related to more favorable health and lifestyle choices.

The reasons given in a study by Janaina (Janaina et al, 2010) were similar to those earlier stated. The main reasons for supplement use were to restore nutrients/ avoid weakness (42.2%) and to increase strength/muscle mass (38.3%). Other reasons included to improve performance (22.7%), to lose weight (21.7%), to cover for nutritional deficiencies (16.3%), to decrease stress (15.3%), and to prevent future diseases (8.6%).

2.7 Conceptual frame work

The Theory of Planned Behaviour (TBP) will be adopted and used to explain this study. Developed from the Theory of Reasoned Action (Ajzen & Fishbein, 1980), the Theory of Planned Behaviour (TPB) was proposed by Ajzen in 1991. Applying the tenets of this model to this study would help to explain the reasons for the use of supplements.

One of the basic tenets of this theory is behavioural intention. Behavioural intention is assumed to be the strongest predictor of actual behavior, and that salient beliefs, attitudes, subjective norms and perceived behavioral control (PBC) determine behavioral intention (Ajzen, 1991). This is followed by Attitude. Attitudes toward a behaviour constitute one's evaluation of a behavior. Attitudes are thought to be influenced by behavioral beliefs about the consequences of the behaviour and by positive or negative judgments about these consequences. Conner , (2001), explained that beliefs underlying supplement use revealed differences between supplement users and non-users in relation to the notion that taking dietary supplements acts as an insurance against possible ill-health, with supplement users believing more strongly than non-users that taking dietary supplements would stop them getting ill and help them to be healthy. Both users and non-users of supplements also perceived the media, in the form of books and magazines, to be a powerful influence on a person's decision to use supplements..

In this study, behavioural intention was recognized as one of the factors associated with use of supplements. As adapted in the questionnaire (Appendix 1), the reasons for use such as it relates to maintenance of health, convenience, side effect and independence from physicians of adult users of supplements would be evaluated. This can be illustrated in a situation where an individual who holds the belief that taking dietary supplements would help in maintenance of good health. This would cause a favourable attitude towards taking supplements and this in turn would influence the individual's intention to consume more of these supplements.

Another major tenet is normative beliefs. It is assumed that normative beliefs in combination with the person's motivations to comply with different referents determine the prevailing subjective norms. These subjective norms are social pressures to perform or not perform a given behavior. The subjective norms in this study include sources of

information and experience about the use of supplements. This is usually obtained from family, friends, health practitioners, Media.

Perceived behavioural control is defined as perceived ease/difficulty of performing or willfully engaging in a behavior. It is influenced both by situational and internal factors which could either inhibit or facilitate performing the behavior (Ajzen 1991). Situational factors, such as access to healthcare services and health information, as well as internal factors including knowledge of how to perform health behaviors affect perceived behavioral control. A high PBC is associated with behavioral intention and subsequent execution of that behavior when perceptions of control accurately reflect actual control (Ajzen, 1991; Armitage & Conner, 2001). In this study, behavioural control was assessed by challenges associated with supplement use such as availability and ability to complete supplements use. Figure 2.1 shows a schematic representation of the Theory of Planned Behaviour.

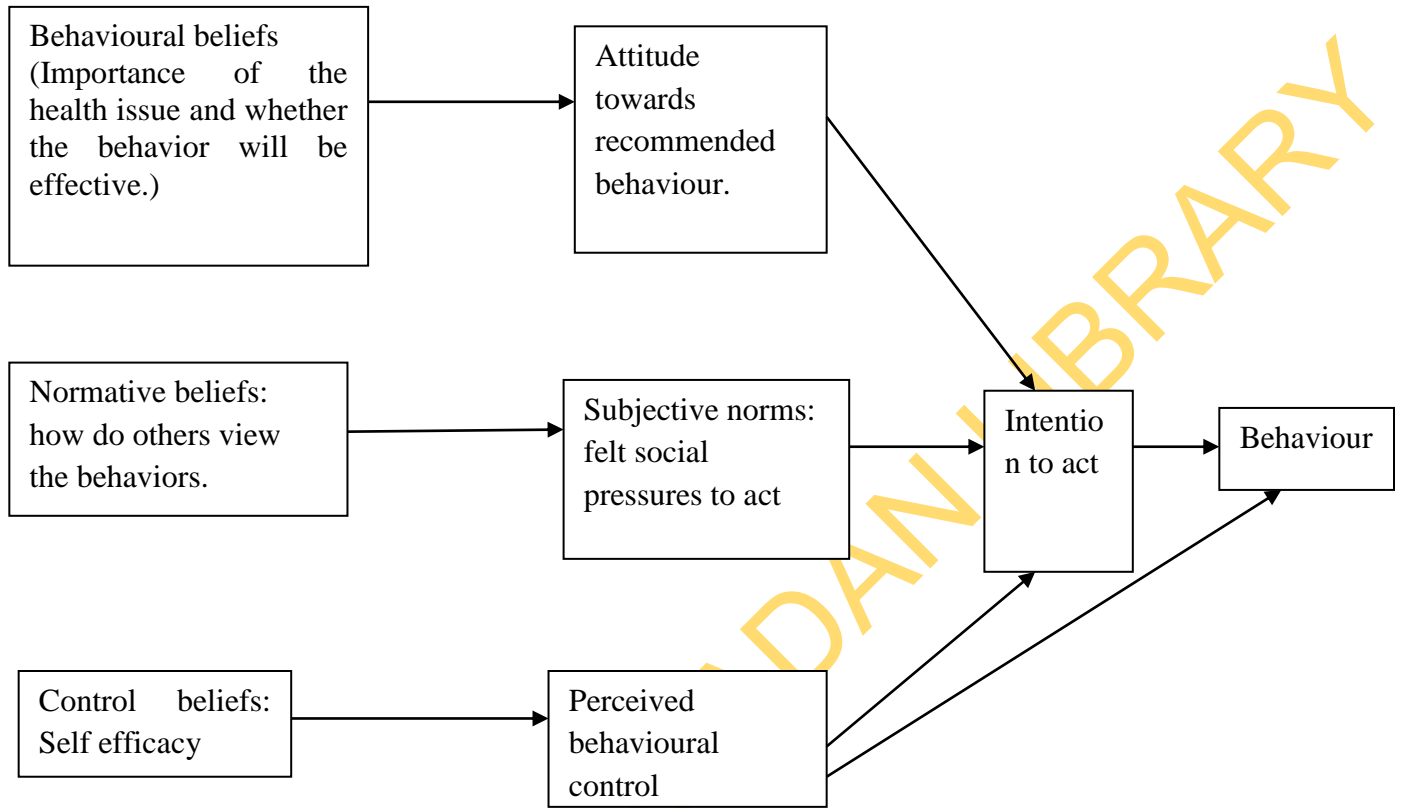


Figure 2.1: Schematic Representation of Theory of Planned Behaviour

Table 2.1 Adaptation of the tenets of Theory of Planned Behaviour to explain the knowledge, perception and consumption patterns of use of dietary supplements in this study

Below is a table to describe how the above tenets can be adapted to explain this study using different indicators for the evaluation of the variables to be studied.

Tenets	Variable	Example of Indicators in Questionnaire
Behavioural beliefs	Knowledge about supplements	Substitution of supplements for Balanced diet Supplements cure all diseases Only effective to boost appetite
Attitude and perception	Perception determines the attitude towards supplement use	More efficacious than orthodox medicine Safer than orthodox medicine Independence from doctors (i.e taken without doctor's prescription) Supplements can be used to promote health
Normative Beliefs	Factors associated with the use of supplement	Who recommended that you consume supplements? Is there anybody around you who consumes supplements? What are the sources from which dietary supplements are obtained? (Family Friends Doctor/Health Practitioner Health experts)

Subjective Norms (Stems out of normative norms)	Factors and Reasons for use of Supplements	<p>People who are important to me(Family, friends , Peers) all think I should take supplements</p> <p>People around me whom I respect take/recommend supplements for me</p>
Control Belief	<p>Knowledge</p> <p>Perception</p> <p>Factors</p> <p>Challenges</p> <p>Benefits</p>	<p>The knowledge I have is sufficient for me to want to engage in supplement use</p> <p>Supplements are of natural origin and therefore, are safe</p> <p>Cost and ability to use without doctor's prescription, Availability</p> <p>High Cost, Irregular dosage</p> <p>Promote and maintain health</p>
Behavioral intention	Knowledge, factors, challenges and benefits	Influence intention for use or not to use
Behaviour		Decision to use or not to Use of dietary supplements

CHAPTER THREE

METHODOLOGY

3.1 Study Design

This is a descriptive study that employs the use of cross-sectional based questionnaire which was used to assess knowledge, perception, types, consumption pattern, factors, benefits and challenges associated with use of dietary supplement in Ibadan North Local Government area.

3.2 Study location

This study was carried out in Ibadan North Local Government Area in Ibadan, Oyo state, Nigeria. Ibadan is located in south-western Nigeria. It is the capital of Oyo State; and is reputed to be the largest indigenous city in Africa, south of the Sahara. It has a land mass of about 1190sqkm and a population of 2,663,096 in 2006 (National census Populations, 2006) and an estimated population 3.2 million by 2011(Federal Republic of Nigeria Official Gazette, 2007).

There are 11 local governments in Ibadan with Ibadan North Local Government Area (IBNLGA) being the second largest Local government with a population of 308,119. It covers a land mass of about 27km²(Federal Republic of Nigeria Gazette, 2009). The Local government is bounded by Akinyele Local Government council in the north, Ido Local government council in the west and bounded in the east by Ibadan North East and Lagelu Local Government respectively. The Local Government Area consists of 12 wards, each of which is made of communities and neighbourhoods. The list of the wards and some of the communities are as follows:

Ward 1: Agbadagbudu, Oke-Are, Odo-Oye

Ward 2: Ire-akari, Oke Oloro, Inalende

Ward 3: Adeoyo, Yemetu, Adabaale, Isale Alfa

Ward 4: Idi-Omo, Itu taba, Kube, Abenla

Ward 5: Bashorun, Oluwo, Ashi, Ikolaba

Ward 6: Abebi, Okepadi, Oniyanrin

Ward 7: Oke itunu, Coca-Cola, Oremeji

Ward 8: Sango, Ijokodo

Ward 9: Gbadebo, Ago tapa

Ward 10: Agbowo, Bodija, Awolowo

Ward 11: Samonda, Polytechnic, Univeristy of Ibadan

Ward 12: Agbowo, Ojurin, Barika

IBNLGA is a multi-ethnic local government area dominated by the Yorubas. Other ethnic groups such as Hausa, Igbo, Ijaw are also found in this area. People from other countries such as Ghana, Senegal are also found in the area. These inhabitants are mostly traders who engage in commercial activities. Such activities include sale of agricultural produce such as meat, cassava, palm oil and vegetables. Other products include provisions, fabrics and a host of others. They are sold in their commercial markets e.g. Bodija, Yemetu, Basorun and Agbowo. IBNLGA residents engage in other occupations ranging from artisans, civil servants to skilled professions.

IBNLGA has the three tiers of health facility. University College Hospital, UCH, is an example of a tertiary health facility health facility. The area has state hospitals (Secondary health facility) such as Adeoyo General Hospital and several Primary Health care centres at the Local Government level. There are also private clinics in the area. The area is also endowed with several community pharmacies and patent medicine shops for the purchase of pharmaceutical products.

There are several educational institutions in this local government. These include the prestigious University of Ibadan, the first University in the country and world renowned, Polytechnic Ibadan and a host of primary and secondary schools; both of government or private ownership. Institutions for training of priests (Seminary) can also found in this local government. Example is the Emmanuel College of Theology, Samonda.

The social facilities in this region include Churches, Mosques, Markets, Financial institutions, Offices (Public and Private), educational institutions and Health facilities and several recreation centres such as botanical Garden, the Zoological Garden (both of which are inside the University of Ibadan), Trans Wonderland Amusement park and Agodi gardens.

3.3 Study population

This study was carried out among adults aged 18 years and above who have ever used or who still use dietary supplements. Full age is the term used to describe adults in the Nigerian constitution which was stated as anyone who is 18 years to 64 years (Nigerian constitution, 1999).

3.4 Sample size determination

The sample size was determined using the Lwanga and Lemeshow (1991) sample size determination formulae of

$$n = \frac{Z^2 p(1-p)}{d^2}$$

Where n = minimum sample size required

Z = confidence limit of survey at 95% (1.96)

α = level of significance (0.5)

p = Prevalence of use of supplements obtained from a previous study (84.7% from the study on Patterns of Complementary and Alternative Medicine Use, Perceived Benefits, and Adverse Effects among Adult Users in Enugu Urban, Southeast Nigeria, conducted by Okoronkwo et al; 2014)

d = absolute deviation from true value (degree of accuracy: 5%)

Hence,

$$N = \frac{(1.96)^2 (0.847)(1-0.847)}{0.05^2} \approx 200$$

A non-response rate of 10% i.e. $200 * 10\% = 20$

Therefore a total of 220 questionnaires were distributed among adults in the Ibadan North LGA.

3.5 Questionnaire: Instrument for Data Collection

An interviewer-administered, close and open ended semi-structured questionnaire was employed for this study. The questionnaire was divided into seven (7) sections. (See Appendix 1).

Section 1: This section contained socio-demographic data such as age, sex, education, employment, ethnicity, marital status and presence/absence of chronic condition.

Section 2: This section was to assess knowledge about dietary supplement use. It contained six (6) knowledge questions that was developed based on this objective.

Section 3: This section was to determine the perception of respondents towards dietary supplements which could be positive or negative.

Section 4: This section combined the various types of dietary supplement and pattern of use of supplements which could be daily, weekly, monthly and once in a while. This section also involved the duration of use and the most recent use of supplements.

Section 5: This section was to highlight factors associated with the use of supplements. Promptings for dosage, side effects, recommendation and reasons for consumption or non consumption. Sources from which they are obtained were included in this section.

Section 6: The perceived benefits of supplements use were mentioned in this section.

Section 7: Challenges associated with the consumption of supplements were mentioned by the respondents in this section.

3.6 Sampling procedure

A multistage sampling was done as explained in the 4 stages below.

Stage 1: Simple Random selection of 5 wards out of 12 wards from the Ibadan North Local government was done by simple balloting based on their socio-economic class. The wards were classified into urban-slum and urban. 3 wards were selected from the 5 urban wards, 2 wards were selected from 4 urban-slum wards.

Stage 2: A community was randomly selected by balloting from each ward. The communities in urban-slum were found in ward 1 and 3 in Agbadagbudu and Adabaale respectively. The 3 chosen in urban area were selected from wards 2, 5 and 7. They are Irekari, Bashorun and Oke-itunu.

Stage 3: Systematic sampling was used to select 22 houses from each community and 1 household was randomly selected from each house, which makes the households also 22 in number. This was done by systematically selecting every other house.

Stage 4: Simple random selection was done to select 2 respondents from each household so that a total of 44 respondents were selected from each ward and 220 respondents from the 5 wards.

3.7.1 Inclusion criteria

All consenting adults aged 18-64 years who have heard about or have ever used /still use supplements were invited to participate.

3.7.2 Exclusion criteria

All who did not give informed consent were excluded to ensure that principle of voluntary participation is not violated.

Adolescents less than 18 and children were not included in this study.

Pregnant women who started the use of supplements for the purpose of antenatal care and did not consume supplements prior to the pregnancy were excluded.

3.8 Data collection

Research assistants were recruited and trained by the researcher on the objective of the study, the instrument for data collection and their interviewing skill for questioning was honed. Ethical issues were also discussed as it relates to the research. Interviewer-administered questionnaires were administered to eligible respondents who gave consent for participation in the research. The data collection process involved the following steps:

Step 1: A list of wards and communities was obtained from the Ibadan North Local Government Area and the selected wards and communities were identified by prior search of the communities few days prior to the commencement of the research.

Step 2: The respondents which fulfilled the inclusion criteria were then selected and briefly intimated on the nature of the study by explaining to them the objective of the study and the importance of the research.

Step 3: Questionnaires were administered to the respondents based on informed consent

Step 4: Data collection by researcher and two research assistants commenced on 8th September, 2015 and lasted till 16th September, 2015. The data was collected Tuesday to Saturday of the 1st week, then, Monday and Tuesday of the following week. Sundays were excluded because some of the respondents went to church. On Fridays also, the data collection was done before Friday Moslem Prayers as some Moslem respondents went to the mosque. The data collection involved interviewing of 220 eligible respondents who gave consent to participate in the study.

Step 5: Two (2) Small sachets of 15 grams detergent were distributed as incentive to appreciate each respondent for his/her time.

Step 6: The completed questionnaires were all checked for completeness and collated.

The challenge that was experienced however was that after the interview, some of the respondents wanted expert medical advice on their medical conditions and also drugs to be prescribed. This however was tackled by explaining that this was simply a study and not a medical outreach, and thus, they were advised to go to the clinic.

3.9 Validity of the instrument

Validity is defined as the degree to which a research study measures what it intends to measure. To ensure validity, the questionnaire was translated into Yoruba so as to be able to administer to respondents who did not understand English and then, translated back into English. A critical peer –review was also done in the Department of Health Promotion and Education, Faculty of Public Health, University of Ibadan. The supervisor also helped in fine tuning the questionnaire. All these were done to ensure face and content validity of the instrument.

3.10 Reliability of instrument

The location for the pretest was Onireke in Ibadan North West Local Government Area which shared similar characteristics with the study area. The pretest was conducted on 22 adults which represented 10% of the total population for the study. The pretest helped to provide insight into the respondents' understanding of the items on the questionnaire and also identify any adjustments needed to be done on the questionnaire. Reliability was ascertained by analysis of pretest data as Cronbach alpha was 0.79 and this revealed that the instrument is reliable.

3.11 Data management and analysis

All the filled questionnaires were checked for the purpose of completeness and accuracy. Collation, editing and sorting of questionnaire were carried out. The editing and sorting involved assigning serial number to each questionnaire for easy data entry. Coding guide for data entry was also developed.

Data was entered and managed using SPSS version 20 and analysis of quantitative data using descriptive (Mean, Modes and percentages) and inferential (Chi square) statistics to measure association between socio-demographic factor and consumption, knowledge and consumption and knowledge and socio-demographic factors; was done. The level of significance was set at $P \leq 0.05$ using the SPSS version 20.

The Overall assessment of knowledge and perception was done by scoring. The score for knowledge was done on a 12 point scale which was divided into three with 0-3 for poor knowledge, 4-8 fair knowledge and 9-12 good knowledge. The scoring for perception was also done on a 12 point scale which was divided into positive and negative perception. Those who scored <6 had a negative perception and those who scored ≥ 6 had a positive perception. For each knowledge and perception statement, each correct response was scored 2 points. The questionnaire was stored in a place where only authorized persons had access to them.

3.12 Ethical consideration

The proposal was submitted to Oyo State Ethics Review committee. After review and approval of the proposal by the committee, the researcher commenced implementation of the research. The research was conducted with highest level of responsibility at every phase of the research (Planning, implementation and dissemination). Steps were taken to ensure that all the principles of research were duly adhered to. Questionnaires were identified by serial numbers and not names in an attempt to ensure confidentiality. Those who participated in the research participated of their own free will and the content and nature of the research was made known too them. Informed consent forms were also given to participants which emphasised right of participant, title, purpose and benefits that is derivable from the study. The research was also relatively risk free which ensured that the principle of non-maleficence is not violated.

3.13 Limitations of the study

Some participants did not want to declare the use of dietary supplements for fear of being reprimanded for practicing self medication and some others did not remember the specific type of dietary supplements that they consume. The data obtained from this study might only be a representation of what obtains in the South-Western part of Nigeria and not in the other parts.

CHAPTER FOUR

RESULTS

4.1 Socio-demographic Characteristics

A total of 220 adult respondents participated in the study. Table 4.1 describes the socio-demographic characteristics of the respondents. A little above half of them were females 128(58.2%) while the rest 92(41.8%) were males. A larger number of them, 94(42.7%) were of them were 38 years or more. The rest fell in age range 18-27 and 28-37 years.

A little above half of the respondents had secondary education 116(52.7%) and very few of them, 6(2.7%) had no formal education. The data on education is presented in table 4.1.

Majority of the respondents were traders 92(42.7%), followed by the professionals 41(18.6%) and the unemployed 22(10%). Other groups of occupation present were artisans, civil servants and the data is presented in Table 4.1.

A higher population of the respondents 164(74.5%) were married, 45(20.5%) single and only 11(5%) were divorced. A higher percentage of the respondents were Christians 124(56.4%) while 90(43.6%) were Muslims. More than half of the respondents had no chronic diseases 154(70%). However, 23(10.5%) suffered from hypertension, 14(6.4%) from arthritis, 10(4.5%) from poor vision, 8(3.6%) from diabetes and the remaining 11(5%) from other chronic diseases. Nearly all the respondents, 207(94.1%), were of the Ethnic group Yoruba, while the remaining few were spread among other tribes such as Igbo 9(4.1%), Edo 3(1.4%) and Hausa 1(0.5%). The above socio-demographic characteristic is presented in Table 4.1.

Table 4.1 Socio-demographic characteristics of respondents N=220

Variable	No	%
Sex		
Female	128	58.2
Male	92	41.8
Age(Years)		
18-27	66	30
28-37	60	27.3
>38	94	42.7
Ethnicity		
Yoruba	207	94.1
Igbo	9	4.1
Edo	3	1.4
Hausa	1	0.5
Level of Education		
Secondary	116	52.7
Tertiary	61	27.7
Primary	37	16.8
None	6	2.7
Employment status		
Trader	94	42.7
Professional	41	18.6
Artisan	35	15.9
Unemployed	22	10
Transporter	12	5.5
Retired	9	4.1
Civil servant	7	3.2
Marital Status		
Married	164	74.5
Single	45	20.5
Divorced	11	5
Religion		
Christianity	124	56.4
Islam	90	43.6
Presence of chronic diseases		
None	154	70
Hypertension	23	10.5
Arthritis	14	6.4
Poor vision	10	4.5
Diabetes	8	3.6
Others	11	5
Total	220	

4.2 Knowledge on dietary supplements

The respondents had various responses to the individual statements to assess knowledge about dietary supplement. The data is presented in Table 4.2. The overall knowledge assessment showed that almost half of the respondents had fair knowledge of dietary supplements 105 (47.7%), 93 (42.3%) had poor knowledge and very few, 22 (10%) had good knowledge. This data is presented in table 4.2.1. The overall mean score on knowledge was 5.42 ± 3.01 out of a maximum of 12. This score fell in the range of fair knowledge as shown in Table 4.2.1.

Table 4.2 Responses to knowledge questions on dietary supplements

N=220

Variable	Yes	%	No	%	Don't know	%
A drug that prevents and cures all diseases	149	67.7	22*	10	49	22.3
Any product that supplements food	194*	88.2	1	0.5	25	11.4
It is only recommended for those who cannot eat well	71	32.3	122*	55.5	27	12.3
Dietary supplements can be taken in place of drugs	39	17.7	99*	45	82	37.3
Dietary supplements can be taken in place of food	130	59.1	51*	23.2	39	17.7
It is only effective to boost appetite	71	32.3	109*	49.5	40	18.2

*-Correct response to statement

Table 4.2.1 Overall knowledge assessment of respondents on the consumption of dietary supplements

Knowledge	No	%
Poor knowledge	93	42.3
Fair knowledge	105	47.7
Good knowledge	22	10
Total	220	

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4.3 Perception towards the consumption of dietary supplements

There were different responses to the individual statements to determine perception about dietary supplement. The data is presented in Table 4.3. Majority of respondents had a positive perception (89.1%) towards the consumption of supplements while only 24 (10.9%) had a negative perception. The overall mean score on perception was 6.97 ± 2.27 out of a maximum of 12. This score was found in the good perception range which implies that majority of the respondents had positive perception towards the consumption of dietary supplements as shown in Table 4.3. The responses to the perception statements are also shown in table 4.3.1.

Table 4.3 Responses to perception statements about dietary supplements

Variable	Agree	%	Disagree	%	Undecided	%	Total
I think that the use of dietary supplements can be used to promote health	197*	89.5	0	0	23	10.5	220
I think the use of dietary supplements should be encouraged	194*	88.2	2	0.9	24	10.9	220
I think the use of supplements are safe because they are made from natural products	185	84.1	2*	0.9	33	15.0	220
I don't think supplements are more efficacious than orthodox medicine	94	42.7	42*	19.1	84	38.2	220
I don't consider it important to talk to a Health professional before using supplements	93	42.3	73*	33.2	54	24.5	220
Eating a variety of food provides all the vitamins and minerals required for health	207*	94.1	7	3.2	6	2.7	220

*-Correct response to statement

Table 4.3.1 Perception scores of respondents about dietary supplements

N=220

Variables	No	%
Positive perception	196	89.1
Negative perception	24	10.9
Total	220	

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4.4 Users and non users of dietary supplements

Of the 220 respondents, 173 (78.6%) have ever used dietary supplements while the remaining 47 (21.4%) have never consumed supplements. The result is represented graphically in figure 4.0.

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N=220

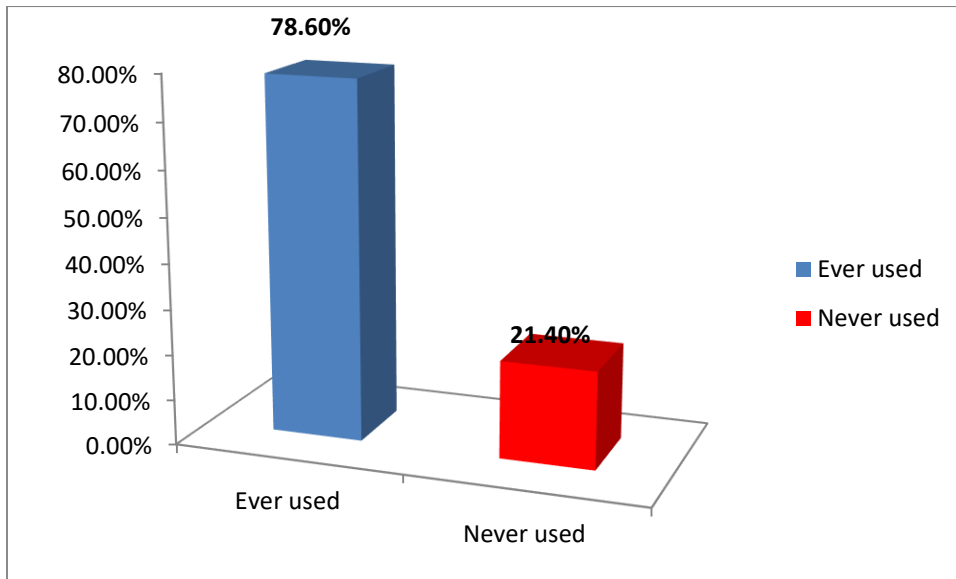


Figure 4.0 Respondents who have ever used and never used supplements

4.5 Types of dietary supplements consumed by users

The various types of dietary supplements consumed are shown in Table 4.5 with Vitamin C having the highest consumption rate 99 (57.2%), followed by Multivitamins 86(49.7%) and Iron 61(35.3%). The least consumed include Folate 19(11%), Garlic 15(8.6%), and Vitamin A, 12 (6.9%).

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Table 4.5 **Types of Dietary Supplements consumed N=173**

Dietary supplement consumed	No	%
Vitamin C	99	57.2
Multivitamin	86	49.7
Iron	61	35.3
Fish oil	28	16.2
Calcium	26	15
Herb	24	13.9
Folate	19	11
Greentea	16	9.2
Garlic	15	8.6
Vitamin A	12	6.9

*Multiple responses included

4.6 Respondents' pattern of consumption of dietary supplements

A large number of the respondents consumed supplements once in a while 82(37.3%), 79(35.9%) consumed them daily, 46(20.9%) monthly and only 34(15.5%) weekly. This is represented in table 4.6. Each of the supplements had varying patterns of consumption by respondents. Vitamin C was most consumed with the most frequent consumption pattern recorded as “once in a while” at 46(46.5%). Multivitamins was also consumed once in a while at 31(36%). Calcium, folate, fish oil were the supplements that were mostly used daily at 12(46%), 8(42.1%) and 13(46.4%) respectively. This is shown in Table 4.6.1. Some of the responses were multiple responses as respondents used more than one supplement in different patterns.

Table 4.6 Summary of consumption pattern of dietary supplements used by respondents

N=173

Frequency	No	%
Once in a while	82	37.3
Daily	79	35.9
Monthly	46	20.9
Weekly	34	15.5

*Multiple responses included

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Table 4.6.1 Consumption pattern of individual dietary supplements as used by respondents

	Daily No	%	Wee kly No	%	Monthly No	%	Once a while No	%	Total
Vitamin C	33	33.3	9	9	11	11.1	46	46.5	99
Multivite	30	34.9	6	7	19	22	31	36	86
Iron	15	24.6	4	6.6	11	18	31	50.8	61
Fishoil	13	46.4	4	14.2	4	14.2	7	25	28
Calcium	12	46	2	8	4	16	8	31	26
Folate	8	42.1	3	15.8	4	21	4	21	19
Greentea	4	25	7	44	2	12.5	3	18.8	16
Garlic	2	13.3	5	33.3	5	33.3	3	20	15
Vitamin A	3	25	8	66.7	4	33.3	9	75	12

*-Multiple responses included

4.7 Most recent use of dietary supplements by respondents and the duration of use

Table 4.7 shows that a large number of the respondents 131 (75.7%) used dietary supplements in the last three months and very few, 3(1.7%) used it in the last 7-12 months. Those who have used supplements for 12months or less (92.3%) were considered as current users. This data was extracted from Table 4.7 and the graphical representation is shown in figure 4.1. The lengths of use of dietary supplements among the respondents that consume them vary. More of the users 68 (39.3%) have used supplements for over 60 months. The rest have used supplements for the various durations represented in table 4.7.1.

Table 4.7 Most recent consumption of dietary supplements

N=173

Most recent use of dietary supplements(Months)	No	%
1-3	131	75.7
4-6	22	12.7
7-12	3	1.7
>12	17	9.8

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N=173

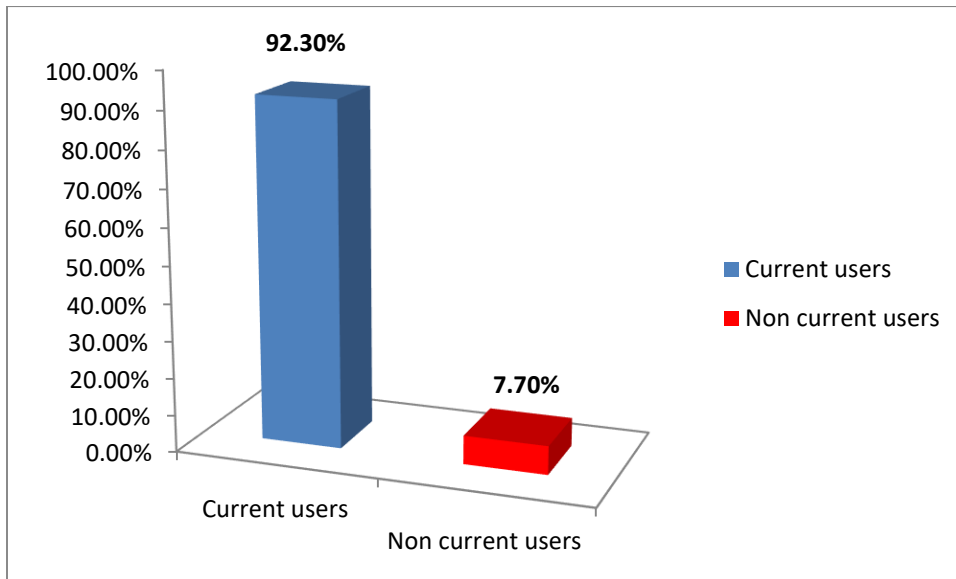


Figure 4.1: Current and non current users of supplements

Table 4.7.1 Duration of dietary supplements' use

N=173

Duration of use of dietary supplements(Months)	No	%
1-3	18	10.4
4-6	16	9.2
7-12	25	14.5
13-24	46	26.6
>60	68	39.3
Total	173	

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4.8 Perceived factors associated with the use of supplements

Some of the factors identified as reported by the respondents that were associated with the use of supplements are shown in the categories in table 4.8. The source of recommendation was reported as major factor associated the use of supplement. Results in table 4.8 show that more than half of the respondents, 90(52%) had dietary supplements recommended to them by health workers and 34(19.7%) by themselves. Others were recommended by relative, friends and marketers.

Reasons for consumption were also seen as factors that influence supplement use. Table 4.8. shows that more than half of the respondents, 99(57.2%) consumed supplements to promote and maintain health and 23(13.3%) used them to build immune system. Other reasons for use were shown in table 4.8. Promptings for dosage per time i.e. what prompts the dosage of use of supplements is also seen as a factor. Almost half of respondents 85(49.1%) had their dosage of use prompted by how they feel. The remaining 56(32.4%) depended on instructions on the leaflets and 32(18.5%) followed prescriptions by the health professional. Perceived adverse effects by respondents was also associated with the use of supplements. A larger population of the respondents 160(92.5%) reported that they did not experience any side effect. Few, 10(5.8%) experienced diarrhea while only very few, 3(1.7%) experienced other side effects.

Table 4.8 Perceived factors associated with use of supplements

	No	%
People who recommend dietary supplements to respondents		
Health Worker	90	52
Self	34	19.7
Relative	20	11.6
Friend	19	11
Marketer	10	5.8
Reasons for consumption		
Promote and maintain health	99	57.2
Build immune system	23	13.3
To treat cold	16	9.2
Supplement diet	14	8.1
Treat chronic diseases	9	4.9
Others	12	6.9
Prompting for Dosage		
How I feel	85	49.1
As instructed on the leaflet	56	32.4
As prescribed by health professional	32	18.5
Total, n=	173	

4.9 Sources from which dietary supplements are obtained/purchased

Table 4.9 shows that about 88(50.9%) obtained supplements from the chemist and pharmacy 61(35.3%). The remaining sources included purchase from public markets and relatives.

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Table 4.9 Sources from which dietary supplement is obtained

N=173

Sources of dietary supplements	No	%
Chemist	88	50.9
Pharmacy	61	35.3
Market	9	5.2
Relative	8	4.6
Drug hawker	7	4
Total	173	

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4.10 Other drugs used by respondents

Table 4.10 shows that more than half of the respondents who consumed supplements did not use other drugs 95(54.9%). 42(24.3%) used analgesics; the rest used antimalarials and drugs to treat chronic diseases which they suffered.

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Table 4.10 Other drugs used by respondents

N=173

Other Drugs	No	%
None	95	54.9
Analgesic	42	24.3
Drugs for the chronic diseases disease I suffer	16	9.2
Antimalarial	4	2.3
Others	16	9.2
Total	173	

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4.11 Perceived benefits obtained from the consumption of dietary supplements

The most common benefit obtainable from the consumption of dietary supplements as reported by the respondents was to maintain and promote good health 100(57.8%). Other benefits such as treatment of cold 16(9.2%), increased blood level 12(6.9%), quick recovery 12(6.9%) were also reported. The data is presented in table 4.11.

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Table 4.11 Perceived benefits obtained from the consumption of dietary supplements by respondents

Benefits	No	%
Promote and maintain health	100	57.8
Treatment of cold	16	9.2
Weight control	14	8.1
Cures chronic diseases	13	7.5
Increased blood level	12	6.9
Reduces pain	6	3.5
Quick recovery	12	6.9
Total	173	

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4.12 Challenges experienced by respondents associated with the consumption of dietary supplements

Majority of the respondents 116(67.1%) reported no challenges associated with the use of dietary supplements. 41(23.7%) reported that they were costly, 4(2.3%) reported inability to complete the dosage while 6(3.5%) reported that there were no dosage prescriptions.

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4.13 Respondents' reasons for not consuming dietary supplements

Few respondents, 47 (21.4%) who have never used supplements stated various reasons for this. Some of these were that “they eat good food and as such, do not need dietary supplements”, 19(40.4%); some considered it unnecessary 14(29.8%), some didn't know about them; 8(17%) and others perceived themselves as healthy and so did not use supplements.

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Table 4.13 Reasons responsible for not consuming dietary supplements

N=47

Factors for not using supplements	No	%
I eat healthy food	19	40.4
Supplements are unnecessary	14	21.8
I don't know about them	8	17
I am healthy and so do not need them	4	8.5
Other	2	4.3
Total	47	

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Test of hypothesis

4.14.1 Relationship between respondents' demographic characteristics (age, level of Education, Employment status and presence or absence of chronic disease) and knowledge of the use of dietary supplements

- A. Null hypothesis: There is no association between the knowledge about dietary supplements and demographic profile of the adult population.
- B. Alternative Hypothesis: There is an association between the knowledge about dietary supplements and demographic profile of the adult population.

Table 4.14.1 shows that statistically significant relationship existed between age of respondents and their knowledge of supplements as $P=0.026$ and therefore the alternative hypothesis was not rejected but the null hypothesis was rejected. From the table 4.14.1, out of 66 respondents aged 18-27, 35(53%) of them had poor knowledge, 27(40.9%) had fair knowledge. The remaining had good knowledge. For the age group 28-37, out of the total respondent of 60 in this age group, it was also seen that almost half of them, 28(46.7%), had a poor knowledge and the 94 respondents with ages ≥ 38 , 55(58.5%) had fair knowledge.

Statistically significant relationship also existed between the level education and knowledge of supplements as $P=0.003$ which is less than 0.05 and this makes the null hypothesis to be rejected and the alternative hypothesis not rejected. A little above half of the respondents, 116(52.7%) had secondary education. Out of those these, more than half of them 60(51.7%) had poor knowledge. This also goes with those who had no formal education as most of them, 4(66.7%) also had poor knowledge. A higher number of respondents with tertiary 39(63.9%) and primary education 18(48.6%) had fair knowledge. The data is presented in Table 4.14.1.

Statistically significant relationship also existed between employment status and knowledge as $P=0.005$. This showed that relationship between employment status and knowledge was statistically significant. It can be seen from Table 4.14.1 that there were 94 respondents who were traders, 35 skilled workers and 22 unemployed. In these groups, a larger number of them had poor knowledge. Of the traders, 45(47.9%) had poor knowledge. Of the skilled, 20 (57.1%) had poor knowledge and the unemployed 13(59.1%) had poor knowledge. The rest had fair and good knowledge. Out of the 41 who

are professionals, majority of them, 27(65.9%) had a fair knowledge and those who fell into other groups also has a high number of respondents with fair knowledge. A very small number of all the employment classes had good knowledge. Table 4.14.1 gives further details.

The relationship between respondents' chronic diseases and knowledge of respondents was statistically significant as $P=0.02$. Out of the total number of respondents who had chronic disease i.e. 66, majority of them 41(62.1%) had fair knowledge. The remaining had a poor knowledge 19(28.8%) and good knowledge, 6(9.1%). For the 154 respondents who had no chronic disease, almost of half of them, 74(48.1%) had poor knowledge, a large number also had fair knowledge 64(41.4%) and only 16(10.4%) had good knowledge. Table 4.14.1 gives a representation of the details. The result shows that the Relationship between respondents' demographic characteristics (age, level of Education, Employment status and presence or absence of chronic disease) and knowledge of the use of dietary supplements were all statistically significant.

Table 4.14.1 Relationship between respondents' demographic characteristics (age, level of education, employment status and presence or absence of chronic disease) and knowledge of the use of dietary supplements.

N=220

Knowledge	Poor (No)	%	Fair (No)	%	Good (No)	%	Total (100%)	X²	P-value
Socio-demographics									
Age group								11.05	0.026*
18-27	35	53	27	40.9	4	6.1	66		
28-37	28	46.7	23	38.3	9	15	60		
≥38	30	31.9	55	58.5	9	9.6	94		
Level of Education								20.09	0.003*
Secondary	60	51.7	46	39.7	10	8.6	116		
Tertiary	12	19.7	39	63.9	10	16.4	61		
Primary	17	45.9	18	48.6	2	5.4	37		
None	4	66.7	2	33.3	0	0.0	6		
Level of Employment								21.89	0.005*
Trader	45	47.9	43	45.7	6	6.4	94		
Professional	7	17.1	27	65.9	7	17.1	41		
Skilled workers	20	57.1	11	31.4	4	11.4	35		
Unemployed	13	59.1	8	36.4	1	4.5	22		
Others	8	28.6	16	57.1	4	14.3	28		
Chronic Disease								8.23	0.02*
No	74	48.1	64	41.6	16	10.4	154		
Yes	19	28.8	41	62.1	6	9.1	66		
Total n=	93		105		22		220		

*Statistically significant relationship exists between demographic profile and supplement knowledge

4.14.2 Relationship between respondents' knowledge and consumption of dietary supplements

A. Null Hypothesis: There is no relationship between knowledge and consumption of dietary supplements.

B. Alternative Hypothesis: There is a relationship between knowledge and consumption of dietary supplements

Table 4.14.2 shows that 61(65.2%) of those who had poor knowledge, 92(87.6%) of those who had fair knowledge and 20(90.9%) of those who had good knowledge consumed supplements. The table also reports that 32(34.4%) of those with poor knowledge, 13(12.4%) of those who had fair knowledge and 2(9.1%) of those with good knowledge have never consumed supplements. Statistically significant relationship exists between knowledge and consumption of supplements as $P < 0.001$.

Table 4.14.2 Relationship between knowledge and consumption of dietary supplements

	Yes	Ever used supplements		Total	X ²	P-value
		%	No			
Knowledge					16.44	0.00*
Poor	61	65.6	32	93		
Fair	92	87.6	13	105		
Good	20	90.9	2	22		
Total	173		47	220		

*Statistically significant relationship exists between knowledge and consumption of supplements

4.14.3 Relationship between demographic profile and consumption of dietary supplements

A. Null Hypothesis: There is no relationship between demographic profile of respondents and consumption of dietary supplements.

B. Alternative Hypothesis: There is a relationship between demographic profiles of respondents and consumption of dietary supplements.

Table 4.14.3 also shows that within all the age groups, a larger of them have ever used supplements. In age group 18-27, 28-37 and ≥ 38 ; 51(77.3%), 50(83.3%) and 72(76.6%) have ever used supplements respectively.

In all the level of education, a larger number of them have ever used dietary supplements. In secondary, 92(79.3%) of them have used supplements. In tertiary, 54(88.5%), in primary, 23(62.2%) and of those with no formal education, 4(66.7%). The details is presented in Table 4.14.3.

Majority of the professionals, 37(90.2%) used supplements. Other classes of employment also had a high number of consumers. For traders, 72(76.65) and skilled workers 25(71.4%) were found to be consumers. The data is represented in table 4.14.3

Majority of those who suffered chronic conditions, 55(83.3%) consumed supplements and 118(76.6%) of those who did not suffer chronic conditions also consumed supplements. Details are shown in Table 4.14.3. From the table, socio-demographic characteristics of sex, education and employment had statistically significant relationship with the consumption of supplements as $P \leq 0.05$.

4.14.3 Relationship between Socio-demographic profile and consumption of supplements

	Ever used supplements				Total (100%)	X ²	P-value
	Yes	%	No	%			
Sex						4.48	0.03*
Female	107	83.6	21	16.4	128		
Male	66	71.7	26	28.3	92		
Age						1.09	0.58
18-27	51	77.3	15	22.7	66		
28-37	50	83.3	10	16.7	60		
≥38	72	76.6	22	28.4	94		
Education						10.07	0.02*
Secondary	92	79.3	24	20.7	116		
Tertiary	54	88.5	7	11.5	61		
Primary	23	62.2	14	37.8	37		
None	4	66.7	2	33.3	6		
Employment status						9.44	0.05*
Traders	72	76.6	22	23.4	94		
Professionals	37	90.2	4	9.8	41		
Skilled workers	25	71.4	10	28.6	35		
Unemployed	14	63.6	8	36.4	22		
Others	25	89.3	3	10.7	28		
Chronic condition						1.24	0.26
Yes	55	83.3	11	16.7	66		
No	118	76.6	36	23.4	154		
Total n=	173		47		220		

*Statistically significant relationship exists between the demographic profile and consumption of supplements

4.15 Other Relationships between variables

4.15.1 Relationship between knowledge and perception of supplements

Out of those who had poor knowledge, 70 (75.3%) had positive perception. All of those with fair knowledge, 105(100%) had positive perception and 21(95.5%) of those with good knowledge also had positive perception. The remaining had a negative perception about supplements.

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Table 4.15.1 Relationship between knowledge and perception of supplements

Knowledge	Perception				Total	X²	P-value
	Positive	%	Negative	%			
Poor	70	75.3	23	24.7	93	32.06	0.00
Fair	105	100	0	0.0	105		
Good	21	95.5	1	4.5	22		
Total	196		24		220		

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4.15.2 Relationship between perception and consumption of supplements

Table 4.15.2 shows that a very high number 162(82.7%) of those who had positive perception about supplements had ever consumed supplements. Only 34(17.3%) of those who had positive perception had never consumed supplements. It can also be seen from the table that more than half of the respondents, 13(54.2%) who had negative perception had never used supplements and only 11(45.8%) of them were consumers. The relationship was statistically significant as $P < 0.01$.

Table 4.15.2 Relationship between perception and consumption of supplements

Perception	Ever used supplements				Total(100%)	X ²	P-value
	Yes	%	No	%			
Positive	162	82.7	34	17.3	196	17.26	0.00
Negative	11	45.8	13	54.2	24		
Total	173		47		220		

CHAPTER FIVE

DISCUSSION

5.0 Socio-demographic characteristics of respondents

Out of 220 respondents, almost 60% of them are females. The mean age is 36.4 ± 12.5 . A large number (42.7%) of the respondents fall in the ≥ 38 age group. Majority of the respondents belong to the Yoruba ethnic group due to the fact that the study location is situated in the western part of the country. A larger number of the respondents have secondary education 116(52.7%) and 61(27.7%) have tertiary education. Most of the respondents are traders. A larger population of the respondents, 164(74.5%) are married and the rest are single or divorced. The 2 main religions are ably represented as a little above half of the respondents are Christians and the rest, Muslims. Majority of the respondents, 154(70%) do not have chronic disease but 66 (30%) of the respondents suffer chronic disease.

5.1 Knowledge of supplements

From this study, almost half of the respondents have fair (47.7%), only 22(10%) of the respondents have good knowledge and the rest; poor knowledge. This result is similar to that obtained from the study conducted on alternative medicine use among workers in an urban setting in North-Central Nigeria where only 17.2% of the respondents had good knowledge, 56.9% had a fair knowledge, and 25.9% had poor knowledge (Banwat, 2015).

For the knowledge statement “a drug that cures all diseases, only 10% supplied the correct response as “No”. Majority of respondents said “yes” which is incorrect as dietary supplements do not cure all diseases. A larger number agreed that it can be used to supplement food and answered “no” correctly to the statement that it should only be recommended for those who cannot eat well. A lot of the respondents are also said that supplements could be taken in the place of food but answered no to the statement that it should be taken in place of drugs. The overall assessment for knowledge showed that almost half of the respondents, 105(47.7%) have fair knowledge which is a large number of the respondents.

5.2 Relationship between socio-demographic factor and knowledge of supplements

This study shows that most of the respondents of lower ages i.e. <37 years have poor knowledge while a larger number of those who were ≥ 38 years have fair knowledge. Very few have good knowledge. A higher number of those who have no formal education, primary education and secondary education have a poor knowledge of supplements. Only those with tertiary education have a higher percentage of fair (63.9%) and good (16.4%) knowledge.

Most of the respondents are traders and a high number of them have poor; 45(47.9%) and fair 43(45.5%) knowledge of supplements. Almost two-third of skilled workers and unemployed also have poor knowledge. The professionals, however, have a higher majority (65.9%) with fair knowledge and have the highest number of respondents, 7(17.1%) with good knowledge. This could be because the professionals have one form of higher education or the other which makes them more enlightened about supplements. This also correlates with the observation that those with tertiary education also have a higher number of people with good knowledge of supplements as compared to others.

Most of those who do not suffer chronic diseases have poor knowledge of supplements while majority of those who suffer chronic condition have a fair knowledge. This could be due to the fact that those who suffer chronic diseases tend to search for knowledge and cure for the diseases which they suffer. This study also reports that statistically significant relationship exists between all the socio-demographic variables and knowledge.

5.3 Perception about consumption of supplements

In this study, Majority of the respondents have positive perception about supplements. Majority of the respondents (89.5%) also agreed that dietary supplements can be used to promote health. This is a general perception as seen in most studies such as Owen's survey of dietary supplements (Owen, 2014) and Banwat's study on Alternative medicine use among workers in an urban setting in North-Central Nigeria (Banwat, 2015).

Most of the respondents think that the use of supplements should be encouraged 194 (88.2%). This is in line with results in Lagos on knowledge of dietary supplement among university students (Aina, 2014) which found that 84.6% said the use of

supplements should be encouraged. Most of them; 94.1% also think that eating variety of food provides all the vitamins and minerals required for health. This perception is also positive. A large number of them also think that because they are natural products, they are safe and more efficacious than conventional medicine. This is not necessarily so. This agrees with the result obtained from study carried out by Owens in 2014 (Owen 2014) which showed that most of the respondents indicated a preference for dietary supplements to conventional pharmaceuticals for treating medical conditions or to maintain health.

Most of them do not think it is necessary to speak with a health professional before the use of supplements. The relationship between knowledge and perception shows that majority of those who have poor and good knowledge have positive perception of supplement. All of those who have fair knowledge i.e. 100% also have positive perception. The relationship between perception and consumption of supplements shows that most (82.7%) of those who have positive perception consume supplements while more than half (54.2%) of those who have negative perception do not consume supplements. The difference in the consumptions could be due to the different perceptions they have towards the supplements.

5.4 Consumption of supplements

This study showed that 51(77.3%) of young adults aged 18-27 consumed dietary supplements. This use of supplements by young adults which includes teenagers of 18 and 19 supports the fact that younger people are under the influence of dietary fad(REF). This is explained as a situation where young adults depend on supplements to obtain nutrients which would ordinary have been obtained from food. The public health concern about this is that this group of people have subjected themselves to being malnourished so as to ensure adequate weight control.

In this study, a prevalence of 78.6% for consumption of supplements was recorded. This is a high prevalence and is of public health importance as it means that a large number of people consume supplements. This is similar to the prevalence obtained in a similar study in North Central Nigeria by Banwat (Banwat et al, 2015) which was 79.3% and 86% in a similar study conducted in Lagos (Aina, 2014). The most consumed supplements are Vitamin C (57.2%) and Multivitamin (49.7%), followed by iron. This is in line with Bailey's result in 2013 that Multivitamin-minerals (MVMs) were the most

common type of dietary supplements reported for use (Bailey, 2013). The least consumed is vitamin A (6.9%). This is of public health importance as Vitamin A deficiency contributes up to 25% infant, child and maternal mortality in Nigeria. More than 9 million children and 6 million mothers are Vitamin A deficient in Nigeria (Nigerian Food Consumption and Nutrition Survey NFCNS, 2003). Folate is also found to be among the least consumed of the supplements which is also of public health importance especially for the women as women of reproductive years should take folate daily to avoid congenital malformation in their babies.

More of the females (83.6%) consume supplements more. This could be due to the fact that the female population surpasses the male population and males also are assumed to have a poor health seeking behavior and hence, are less likely to use supplements (Banwat, 2015). The result is in variance with studies about use of dietary supplements where both Banwat, 2015 and Aina, 2014 reported that males consume dietary supplements more.

It was also observed that the age group ≥ 38 are the highest consumers of supplements. The use of supplements is also found to increase with age which could be because older people have a better health seeking behaviour. This agrees with Bailey's result in "Why adults use dietary supplement" (Bailey et al, 2013) that the older population used supplements more.

More of those with tertiary education are reported to consume supplements more. Majority of professionals (90.2%) and traders (72.6%) are also high consumers supplements. It was reported previously in this study that the professionals have larger percentage of fair and good knowledge and this could be responsible for their consumption of supplements. The unemployed are found to use the least of the supplements. This could be related to the cost as the unemployed might not be able to afford them.

Consumption of supplements among those who have chronic disease is high at 83.3%. This could be as a result of a high degree of health seeking behaviour among this group of respondents. Hence, the need to try various supplements. Consumption among those who do not have chronic disease is relatively high at 76.6%. This could be due to the perception that they are safe and devoid of adverse effects and using them can be a

measure taken to secure their health. This study also shows that statistically significant relationship exists between sex and consumption; Education and consumption and Employment status and consumption.

5.5 Consumption pattern of supplements

In this study, 82(37.3%) of respondents consume supplements once in a while and 79(35.9%) consume them daily. The rest consume them monthly and weekly. The results show that “once in a while” and “daily” consumption patterns had higher frequencies than weekly and monthly consumption patterns. This is in line with the study on knowledge about dietary supplements conducted by Aina in 2014 which showed that a larger number of respondents consumed supplements “once in a while” and “occasionally”. These responses were also noted to be multiple responses as one respondent can use more than supplement in varying patterns.

5.6 Period and duration of supplement intake

In this study, most of the respondents have used supplements in the last three months. Few used it between 4-6months ago and the remaining about a year ago. It shows that the respondents currently consume supplements as their most recent time of consumption ≤ 3 months. People who used supplements in the last 12 months are considered as current consumers. This study reveals that most of the respondents; 92.3% fall into this category.

More than one-third 68(39.3%) of consumers have used supplements for more than 5 years and 46(26.6%) within the past 2years. This is in line with the results from a similar study by Goston, and Correia (2010) which showed that more of the respondents have used dietary supplements for more than 2years

5.7 Perceived factors associated with the use of supplements

Respondents reported some factors which they think influences their supplement use. In this study, the reason for consumption is reported as a factor associated with supplement use. This study found that most of them; 57.2% consume supplements to promote and maintain health. This is similar to the findings in Bailey’s studies (Bailey, 2013) where more than half of respondents who consume supplements do so for promotion and maintenance of health. Some respondents use them to boost their immune system, some to treat diseases and others supplement diet as reported in this study. Aina ,

2014 reported similar results where respondents reported dietary supplements as useful for promoting health and wellness.

The source of recommendation is also a contributory factor to the use of supplements. Most of the respondents' recommendations usually come from health workers (52%). This also explains why most of them; more than 80% obtain supplements from chemist or pharmacies. However, this does not necessarily mean that they follow dosage prescriptions given as almost half of them; 49.1% take doses dependent on how they feel. Very few of the respondents' take doses of supplements as instructed by the physician. Other recommendations come from relatives, friends and self. Result from this study differs from report from Bailey, 2013 where less than a quarter of supplements used by adults (23%) were recommended by a physician or health care provider. However, similar to this study's finding, Aina 2014 reported about half of the population have the doctor aware of the use of supplement. The result from this study highlights the fact that while they seek recommendation of the type of supplement to use from health professionals, they do not comply with dosage given.

In this study, majority of the respondents; 92.5% who consume dietary supplements claimed that no adverse effects are associated with the use and this might have been responsible for their consumption in the first place. The report that no adverse effect is associated with use of supplements could be due to the perception that they are safe and thus, do not have adverse effects as seen in a similar previous studies (Owen, 2014 and Goston, 2010). There were very few respondents in this study; however who experienced gastro-intestinal side effects such as diarrhea and nausea. This is similar to the results obtained from a study on knowledge and use of supplements in Lagos where only 5(35.7%) of the respondents experienced gastrointestinal side effects (Aina et al, 2014).

5.8 Sources of supplements

About half of the respondents obtain supplements from the Chemist and almost one-third obtain supplements from the Pharmacy. This is in tandem with the report that they source for recommendations from health workers and most of the respondents are willing to make sure they take precautions as to ensure the purchase of the right quality of supplements. This is in variance with Goston's studies (Goston et al, 2010) which showed

that users reported taking supplements by self-prescription, suggestion from a friend or even a clerk in a store, or under the influence of advertisements.

5.9 Other drugs preferred for consumption by respondents besides supplements

More than half of the respondents, 95(54.9%) who consume supplements would not use other drugs; few use analgesic and antimalarial. The antimalaria drugs serve as prophylaxis for some while some others use them in treatment. This could be due to the fact that malaria is very common in Nigeria and it accounts for over 300,000 deaths per year (US Embassy in Nigeria, 2011).

5.10 Challenges associated with the use of supplements

This study shows that most of the respondents reported no challenges associated with the use of dietary supplements. This is in agreement with the report in this study which shows that majority of respondents have positive perception about supplements and most of them consider supplements to be highly beneficial. This might have limited their view about the challenges that might have arisen from the use of supplements. 47 out of all the respondents do not use dietary supplements at all. The most common reason was because the respondents believe that they eat healthy food and as such do not need to use dietary supplements, some have never heard about them while some simply think they are unnecessary.

5.11 Health Education Implication

Public health Education should be encouraged. Knowledge about supplements should be increased by health education. Education on the types of supplements to be used with or without prescription is very important. This is done by enlightening individuals about the supplements which they can use that pose minimal risk, and those that are of very high risk. For instance, the study showed that Young adults especially those aged 18-25 undergo a fad diet where they tend to replace adequate nutrition with supplement use, in order to obtain a drastic weight control. Public health education about supplement use, level of safety, efficacy and adverse effects of supplements should be promoted so as to ameliorate this effect. Accurate information should also be disseminated by health professionals and places where supplements are purchased. The general perception about supplements that they are safe has led to wide acceptance and thus, it is necessary that the public should be educated that there is no such supplement which guarantees absolute safety or no side effects. This would help to mitigate the indiscriminate use of supplements to a very large extent.

It is also important to emphasise that supplements could only add to the essential nutrients found in food and should never be used as substitute for food. Hence, eating of nutritionally adequate diet should be promoted and the importance nutrients obtained from food should not be underplayed. While it is absolutely important to recommend supplements when there is need for them, it should never be seen as a supplement for the food eaten. Supplements should also not be seen as substitute for drugs. Consumers should be educated on the need for drugs to be used as prescribed and that the use of supplements does not substitute drugs as there are certain conditions which drugs are meant to take care of. This would help to ensure that medically related health conditions are appropriately managed and treated.

The belief that supplements can be used to treat any kind of disease also has to be dissociated from. Consumers should also be educated enough to know that claims made about supplements are simply claims and there is no guarantee of any supplements' ability to perform an absolute function. The use of communication materials such as posters, leaflets and documentary on consumption of supplements should be made available to the public to influence their knowledge. Literacy especially for consumers should also be encouraged and people should read the instructions on leaflets for supplement use if made available. If not, a quick search on the World Wide Web could provide blanket information which should be streamlined as one filters through.

Training of health professionals is also important. Health professionals should be trained to make it a priority to find out all supplements used by their patients and the appropriateness of such for their health. This training is important as it affords health professionals to develop interviewing skills that would enable consumers to tell which supplements to be used. Some of the consumers might not want to disclose the use of supplements to their physicians due to the fear of being reprimanded. Health workers should be trained on adopting the right attitude towards such disclosed information and how to help the individual. It is also important that health workers themselves are trained about supplements. Aina et al in 2014 explained that most of the students in the college of Medicine, LUTH including medical and pharmacy students do not know so much about supplements. This could be a reflection of what happens as these students enter into the profession. As a result of this, conscious attempt should be made for health professionals

to be trained on supplements and their use. Training could begin at the primary health care centres since these are the health workers that attend to the public at the grass root. This could then be scaled up to the secondary, Tertiary and private clinics.

Most of the marketers of supplements are more profit oriented than interested in the health of the consumer. Unfortunately, consumers have swallowed information provided to them hook, line and sinker. This means that consumers should be informed to beware of purchases from marketers who seem to come to them in the name of multi-level marketing saying that getting another person to purchase would increase chances of making money. These are simply marketing strategies and does not hold the interest of supplement use in mind; hence safety of such cannot be guaranteed.

To successfully carry out the above recommendations, it is important that skilled and knowledgeable health professionals such as doctors, pharmacist and public health consultants should be made available. Furthermore, the ministry of health at both state and federal level should ensure appropriate monitoring of supplements in the market. Random checks should be done on supplements and investigated to ensure safety and content are as stated.

5.12 Recommendation

Young adults especially those aged 18-25 should be educated on the importance of proper nutrition and the use of supplements. This would help to reduce abuse of supplements due to dietary fad within this age group. Public health education about level of safety, efficacy and adverse effects of supplements should be promoted as most respondents believe that they are free of adverse effects and this is not necessarily so. Accurate information should also be disseminated by health professionals and places where supplements are purchased.

A regulatory body different from that which regulates drugs should be set up for supplements in Nigeria. This would ensure that supplements claims such as health claims, nutritional supplements claim, and label claims are duly verified. This body can also ensure clinical trial on the claims and adverse effects associated with the use of supplements is done to ensure safety and efficacy of product.

Strategies to provide supplementation micronutrient deficiency such as Vitamin A deficiency should be made available. For instance, promotion of adequate infant and

young child feeding practices for children and ensuring fortification of foods with Vitamin A for adults should be put in place.

5.13 Conclusion

Supplement use has become highly acceptable in IBNLGA as seen in the high prevalence obtained from the study; but this use is based on poor knowledge and information. This has also led to the indiscriminate use of the products. This study also concluded that the population's positive perception about supplements has made the population to embrace the use despite the poor knowledge obtainable in the population.

REFERENCES

- Abdelmonein A. and Dana A. (2014). Public awareness, patterns of use and attitude towards health product in Kuwait: *BMC Complimentary and Alternative medicine*. 14(105),1472-6882
- Aina and Ojedokun. (2014). Knowledge and use of dietary supplements by students of College of Medicine , University of Lagos , Idi - Araba . *Journal of Basic and Clinical Pharmacy*, 5(2), 34–39. <http://doi.org/10.4103/0976-0105.134952>
- Bahhotmah, B.A., Alzahrani, H.A (2010). Self-reported use of CAM products in topical treatment of diabetic foot disorders by diabetic patients in Jeddah, Western Saudi Arabia. *BMC Research* 3(254). doi: 10.1186/1756-0500-3-254.
- Bailey, R. L., Gahche, J. J., Miller, P. E., Thomas, P. R., & Dwyer, J. T. (2013). Why US adults use dietary supplements. *JAMA Internal Medicine*, 173(5), 355–61. <http://doi.org/10.1001/jamainternmed.2013.2299>
- Banwat, E., Adaji I. and Kajo J.(2015). Alternative medicine use among workers in an urban setting in north-central Nigeria. *International Journal of Biomedical Research*; 6(4); 268-273
- Bellows and Moore (2011). Water-Soluble Vitamins: B-Complex and Vitamin C. Colorado State University Extension Publication no. 9.312
- Bin, Y.S and Kiat, H. (2010). Prevalence of dietary supplement use in patients with proven or suspected cardiovascular disease. *Evidence Based Complementary and Alternative Medicine*, 2011(2011): 12 pages.
- Blendon R., Benson J., Botta M and Weldon B (2013). Users' Views of Dietary Supplements; *JAMA Intern Med*; 73(1):74-76
- Conner M., Kirk S., Cade J and Barrett J.(2001). Why do women use dietary supplements? The use of the theory of planned behaviour to explore beliefs about their use. *Social Science and Medicine*; 52(4):621-33.
- Dickinson A and MacKay D (2014). Health habits and other characteristics of dietary supplement users: a review . *Nutrition Journal*2014; 13:14
- Dickinson, A. and Mackay D (2014). Health habits and other characteristics of dietary supplement users: a review. *Nutritional journal*, 13:14
- Economic Economic section, United States Embassy in Nigeria, 2011. Nigeria Malaria Facts Sheets. Accessed in September, 2015 from <http://nigeria.usembassy.gov>
- Ekor M., Osonuga O. A., Odewabi A. O., Bakre A. G. and Oritogun K. S. (2010). Toxicity evaluation of Yoyo ‘cleanser’ bitters and fields Swedish bitters herbal preparations

following sub-chronic administration in rats. *American Journal of Pharmacology and Toxicology*, 5 159–166 10.3844/ajptsp.2010.159.166

Euromonitor International (2015). Vitamin and Dietary Supplement market research. Accessed in June 2015 from <http://www.euromonitor.com/vitamins-and-dietary-supplements>

European Food Information Council (2013). Food supplements: who needs them and when? Accessed from http://www.eufic.org/article/en/artid/Food_supplements_who_needs_them_and_when/ February, 2016

Federal Republic of Nigeria Official Gazette (2007). "Legal Notice on Publication of the Details of the Breakdown of the National and State Provisional Totals 2006 Census" Accessed June 2015.

Food and Drug Administration, 2013. Summary of qualified health claims subject to enforcement discretion. Retrieved June, 2015 from www.fda.gov/food/ingredientspackaginglabelingnutrition/ucm073992.htm

Janaina L., Maria I and Toulson.(2010). Intake of nutritional supplements among people exercising in gyms and influencing factors. *Nutrition* 26 (2010) 604–611

Lwanga,S. and Lemeshow,S. (1991). Sample size determination in health studies: a practical manual. *World Health Organization*. pp1–3.

Mzumder S.,^a Taneja S.,^a Bhandari N.,^a Dube B.,^a Agarwal R.,^b Mahalanabis D., Fontaine O and Black R.(2010). Effectiveness of zinc supplementation plus oral rehydration salts for diarrhoea in infants aged less than 6 months in Haryana state, India. *World Health Organization* ;88:754-760

National Centre for Complementary and Alternative Medicine (2009). Time to talk:Ask your patient about their use of Complementary and Alternative Medicine. Accessed from <http://nccam.nih.gov/health> in June 2015

National Centre for Integrative and alternative medicine, 2014. Using Dietary supplements wisely. Accessed from <https://nccih.nih.gov/health/supplements/wisecuse.htm> in June, 2015

National Centre for Integrative and alternative medicine, 2014. Zinc. Accessed in June, 2015 <https://ods.od.nih.gov/factsheets/Zinc-HealthProfessional/>

National Institute of Health(2015). Vitamins and minerals. Accessed from <https://nccih.nih.gov/health/vitamin> in February, 2016

National Population Commission (2006). Population and Housing Census of Nigeria

- Nimr, N.A., Wahdan, H.I., Wahdan, H.A. and Kotb, R (2015). Self-medication with drugs and complementary and alternative medicines in Alexandria, Egypt: prevalence, patterns and determinants. *Eastern Mediterranean Health Journal*, 21(4): 256-65
- Ogbera A., Dada O., and Adeyeye F. (2010). Complementary and Alternative Medicine Use in Diabetes mellitus; *West African Journal of Medicine*; 29(3):158-62
- Okoronkwo I., Onyia-pat J., Okpala P., Agbo M.,1 and Ndu A.(2014).Patterns of Complementary and Alternative Medicine Use, Perceived Benefits, and Adverse Effects among Adult Users in Enugu Urban, Southeast Nigeria. *BMC Complimentary and Alternative medicine*. 11(19)
- Paul and Smith (2015). The smart and safe use of dietary supplements. Accessed in June 2015 from <http://www.helpguide.org/articles/healthy-eating/dietary-supplements.htm>
- Persistence Market Research. (2015). Global Market study on dietary supplements:Botanical supplement to be the largest market by 2020. Accessed in June 2015 from <http://globenewswire.com/news-release/2015/04/23/727513/10130416/en/Dietary-Supplements-Market-is-Expected-to-Reach-US-179-8-Billion-Globally-in-2020-Persistence-Market-Research.html>
- Raynor D. K., Dickinson R., Knapp P., Long A. F., Nicolson D. J. (2011). Buyer beware? Does the information provided with herbal products available over the counter enable safe use? *BMC Medicine*. 9:94 10.1186/1741-7015-9-94
- Rethans, E(2012). Dietary supplement use in the Netherlands. National Institute of Public Health and the Environment. Retrieved from http://www.fao.org/fileadmin/templates/nutrition_assessment/Oral_presentations/A3_Buurma.pdf in November, 2015
- Royal Pharmaceutical Society of Great Britain (2012). Digoxin. *British National Formulary*. Vol 63; 84
- Rude R. Magnesium. In: Ross A., Caballero B., Cousins R., Tucker K and Ziegler T (2012). *Modern Nutrition in Health and Disease: Lippincott Williams & Wilkins* 2012:159-75
- Saini S. and Hasan N (2015). A survey of multivitamin supplement knowledge, attitude, and use in the urban community of Bikaner, Rajasthan. *CHRISMED Journal of Health and Research*: 2(4):329-332

Skeie, G(2009). Use of dietary supplements in the European Prospective Investigation into Cancer and Nutrition calibration study. *European Journal of Clinical Nutrition* (2009) 63, S226–S238

Sulaiman O., Aljaloud., Salam A and Ibrahim. (2013). Use of Dietary Supplements among Professional Athletes in Saudi Arabia. *Journal of Nutrition and Metabolism* . Article ID 245349, 7 pages

Troxler, D., Michaud and Graz (2013). Exploratory survey about dietary supplement use: a hazardous and erratic way to improve one's health? *European Journal of Medical Sciences*, 143;6 pages

US Food and Drug Administration (2011). Background information on Dietary supplements. Retrieved in June 2015 from <http://ods.od.nih.gov/factsheets/DietarySupplements-HealthProfessional>

APPENDIX 1

KNOWLEDGE, PERCEPTION AND CONSUMPTION PATTERN OF DIETARY SUPPLEMENTS AMONG ADULTS IN IBADAN NORTH LOCAL GOVERNMENT AREA

INFORMED CONSENT FORM

My name is Akingbala Oluwatomi, a postgraduate student of the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan. The purpose of this study is to investigate the perception and consumption pattern of dietary supplements among adults in Ibadan North Local Government.

Dietary supplements are products for ingestion as a supplement to diet. They can be vitamins, minerals, herbs; amino acids in the form of pill, capsule, tablet or liquid form. The result of this study will help identify the types of dietary supplements consumed by these adults, determine the consumption pattern of dietary supplements among these adults and identify the factors that influence the use of dietary supplements, the consumption pattern among adults

Your identities, responses and opinions will be kept confidential and will be used for the purpose of this research. Please do not write your name on the questionnaire. Kindly answer the questions below as accurately as possible to ensure the success of the research. This is a voluntary participation and you have the right to withdraw at anytime. Your contribution is valuable to the success of this research. Thank you for your time.

Consent: Now that I understand the content of the process of this study, I am willing to take part in filling the questionnaire.

Initials/Signature.....

Interview date.....

SECTION 1 : Socio-demographics

1. Serial No:

2. Location.....

3. Respondent's sex: 1. Male 2. Female

4. What was your age as of your last birthday?

5. What is your ethnic group? 1. Yoruba 2. Hausa 3. Igbo

Others(Specify).....

6. What is your educational level? 1. None 2. Primary 3. Secondary 4.

Tertiary 5. Others(Specify).....

7. What is your employment status? 1. Unemployed 2. Artisan(Tailor, bricklayeretc)Pls sepecify which..... 3. Trader 4. Professional

5. Retired 6. Others(Specify).....

8. Marital Status: 1. Single 2. Married 3. Divorced 4. Seperated 5. Co-habiting.....

9. Religion : 1. Christianity 2. Islam 3. Others.....

10. Do you know or have you been told if you have any of the following conditions?

1. Hypertension 2. Diabetes 3. Arthritis 4. Heart Disease 5. Others

(Specify)

SECTION 2 Knowledge about dietary supplements among adults

Which of the following describes dietary supplement? **Please tick (✓) the appropriate box for each question**

S/N	Indicator	Yes	No	Don't know
11	A drug that prevents and cures all diseases			
12	Any product that supplements food			
13	It is only consumed by those who cannot eat well			
14	Dietary supplement can be taken in place of drugs			
15	Dietary supplement can be taken in place of food			
16	It is only effective when one has to boost his appetite			

SECTION 3 Perception towards dietary supplements:

Please insert tick (✓) in the corresponding box that most appropriately reflects your response

	Statement	Agree	Disagree	Undecided
17	I think that the use of Dietary supplements can be used to promote health			
18	I think that the use of Dietary supplements should be encouraged			
19	I think that supplements are safe because they are made from natural ingredients			

20	I don't think supplements are more efficacious than orthodox medicine			
21	I don't consider it important to talk to a medical doctor or pharmacist before using supplements			
22	Eating a variety of foods provides all the vitamins and minerals necessary for health.			

SECTION 4: Types and Pattern of use of dietary supplements

23. Have you ever used ANY dietary supplements? Yes No

If NO, please answer only question 40

24. Please kindly indicate the dietary supplement that you use/ ever used and how you use it/them. **Please tick as appropriate**

	Supplement type	Currently using	Daily	Weekly	Monthly	Once in a while	Indicate Most recent use of DS
25	Calcium						
26	Folate						
27	Iron						
28	Garlic						
29	Green tea						
30	Fish oil						
31	Vitamin A						
32	Vitamin C						

33	Multivitamin						
34	Herbal tea						

35. Others (Specify).....

36. How long have you been using this/these dietary supplement(s)?

SECTION 5 Factors associated with use of dietary supplements among adults

37. What prompts the dosage of use that you take per time?

depends on how I am feeling as instructed on the leaflet as prescribed by a health professional depends on the severity of the disease

38. Who recommended the use of supplements for you?

39. Have you ever experienced an unwanted side effect or reaction when using dietary supplements?

Yes No

If yes, Please tick (✓) all that apply

Nausea Vomiting Diarrhoea Constipation Nervousness/Anxiety Dizziness Skin rash others (Specify)

If NO, please go to question 41

40. If you have never used dietary supplement, what is/are the main reason(s)

.....

41. Why do you use dietary supplements?

44. What is/are the source(s) from which you obtain your dietary supplement?

45. Which other drugs apart from dietary supplements would you rather use and why?

SECTION 6: Benefits obtainable from supplements

46. What benefits are obtainable from using these supplements?

SECTION 7: Challenges associated with supplement use

47. What challenges are associated with the use of supplements consumed?

- Costly unavailability no dosage prescription no specific use Others

(specify).....

Thank you for your time.

APPENDIX 2

Yoruba Translation of the Questionnaire

IMO,ERO ATI ONA ILO AWON AFIKUN OUNJE LARIN AWON AGBALAGBA NI IJOBA IPINLE ARIWA TI IBADAN

IWE IBEERE

Oruko mi ni Akingbala Oluwatomi, akeko agba ni eka ti ati n gbe ilera laruge ati eko re ni eka ti ilera ilu, ile iwe isegun, ile eko giga ti Ibadan. Idi ti mo fin se ise iwadi yi ni lati mo nipa irisi ati bi ati nlo awon afikun ounje laarin awon agbalagba ni Ijoba ibile Ariwa ti Ibadan.

Awon afikun ounje ni gbogbo awon oun ti a n lo tabi gbemi lati fun wa ni awon oun isaralore ti o ma n saaba wa ninu ounje. Awon nkan wonyi le je faitamini, minirali asaralore, nkan ogbin, oun asaralore ti a n pe ni amino acids ti o wa ni oni koro tabi olomi. Esi ti a ba babo nibi iwadi yii yo ran wa lowo lati mo iru awon afikun ounje ti awon agbalagba yii nlo, bi won se nlo si ati lati mo awon oun ti o nse okunfa lilo awon afikun ounje wonyi.

Awon ami idanimu, idahun ati ero ti e ba fun wa yoo je asiri, a ko si ni lo fun nkan mii yato si ise iwadi yi. Ejowo e mase ko oruko yin si ori iwe ibere yi. Ejowo e pese idahun to peye lati je ki ise iwadi yii je asejori. Ikopa ninu iwadi yi ki se tipatipa e si le pinu lati ma kopa mo ni igbakugba. Ikopa yin se pataki si asejori ise yii. E se pupo fun asiko yin.

Itekan/ami.....

Ojo

Abala Kini: Idamo

1. Nomba:
2. Agbegbe.....
3. Ako/Abo:1. Ako 2. Abo
4. Kini ojo ori yin ni ojo ibi yin ti odun to koja?
5. Eya wo ni e ti wa? ? 1. Yoruba 2. Hausa 3. Igbo Omiran(Etoka).....
6. Ipele wo ni iwe kika yin de?1. Mi o kawe rara 2. Mo ka ile iwe kini si ikefa
3. Mo ka ile iwe grama 4. Mo ka ile iwe eko giga
7. Iru ise wo le nse? 1. Mi o ni ise lowo 2. Oni ise owo 3. onitaja 4. Akosemose
5. Mo ti fehinti 6. Omiran
8. Esin wo ni o n se? 1. Igbagbo ninu Kristi 2. Musulumi 3. Esin Omiran
9. Kini Ipo Igbyawo yin? 1. Mi o ti ni iyawo/ tabi oko rara 2. Mo ti se igbeyawo 3.
Labe ofin, mo ti ko oko/iyawo tabi iyawo sile 4. Emi ati oko/iyawo mi a ko gbe papo
mo
10. Se e ni aarun Kankan to tipe lara? Beeni Beeko
To ba je beeni, ewo ninu gbogbo aisan yi le ni?
 Ifupa giga Ito suga aisan egungunriro aarun okan awon omiran

ABALA KEJI:Imo nipa afikun ounje

Ewo ninu gbogbo awon nkan wonyi ni e lero pe o se atokasi oun ti o je afikun ounje? E ko ami (✓) si inu apoti eleyi ti e ba mu

S/N	Indicator	Beeni	Beeko	Mi o mo
11	Ogun ti on dina gbogboarun ati wo gboogbo arun san			
12	Ounkoun ti a n fi kun ounje			
13	Awon ti ko le jeun daadaa ni ko le je			
14	A le lo awon afikun ounje yii dipo ogun			
15	A le lo awon afikun ounje yii dipo ounje			
16	Igba ti a ba fe ki ounje wu wa je daadaa nikan ni a maa n lo			

ABALA KETA : Ero nipa awon afikun ounje

E fi ami (✓) si inu abe eyi yi o ba esi yin mu si awon ibeere wonyi

	Statement	Mo gba	Mi o gba	Mi o pinnu
17	Mo lero wipe lilo awon afikun ounje le gbe ilera ara laruge			

18	Mo lero wipe o ye ki a gbe lilo awon afikun ounje laruge siwaju si			
19	Mo lero wipe ko si ijanba kanakan ni lilo awon afikun ounje tori ara awon oun ti Olorun da lati se won			
20	Mi lo lero wipe awon afikun ounje n sise ju ogun oyinbo lo			
21	Mi ko lero wipe o ye ki n koko ba onisegun oyinbo tabi apoogun po soro ki nto lo awon afikun ounje			
22	Jije orisiirisi awon ounje ma n pese gbogbo eroja asaraloore ti faitamini ati minirali ti o se koko fun ilera			

ABALA KERIN: Iru awon afikun ounje ti a n lo ati lilo re

23. Nje o ti lo afikun ounje rara ri? Beeni Beeko

Ti o ba je beeko, e lo si ibere 40

24. Ewo ninu awon afikun ounje yi ni e n lo? E se ami (✓) si eyi ti e n lo ati bi e se nlo

	Iru afikun ounje	Eyi ti mo nlo lowo	Lilo ojojumo	Lilo ose ose	Lilo ososu	Lilo orekore	Osu melo wo lo lo seyin
25	Calcium						
26	Folate						
27	Iron						
28	Garlic						
29	Green tea						

30	Fish oil						
31	Vitamin A						
32	Vitamin C						
33	Multivitamin						
34	Herbal tea						

35. Omiran

ABALA KAARUN: Awon oun ti on se okunfa lilo afikun ounje laarin awon agbalagba

36. O to igba wo ti e tin lo afikun ounje?

37. Bawo ni ese mo iwon ti e maa nlo ti e ba fe lo awon afikun ounje yi?

O da lorii Bi o se wumi lati lo gege bi atoka iwe to ba afikun ounje naa wa bi onisegun mi ati awon oni imo eto ilera mi toka kin lo Bi aisan to ba n se mi ti le to

38. Tani o so fun yin ki e maa lo awon afikun ounje wonyi?

39. Nje awon afikun ounje wonyi ti fa ewu lilo Kankan fun o

Beeni Beeko

Ti o ba je beeni, e yan aami (✓) si eyi (tabi awon) ti o ba je ninu awon wonyi

Aya rinrin Eebi Igbe gburu Airigbeya Aniyan Oyi

Ara sisu Omiran (E ko iru eyi ti o je)

Ti o ba je beeni, akoko wo ninu awon wonyi ni e ti lo afikun ounje

Ni osu mejila ti o koja Ni osu mefa ti o koja Ni osu meta ti o koja Omiran

Ti o ba je beeko, e losi ibere 41

40. Ti e ko ba lo afikun ounje ri, kini awon idi?

.....
.....

41. Ki ni idi ti e fin lo afikun ounje?

42. Awon ibo ni e ti n ri awon afikun ounje?

43. Ogun miran wo ni e ba ma lo yato si awon afikun ounje ati wipe kini idi?

ABALA KEFA: Anfani ti e ri lara afikun ounje

46. . Kini awon anfani ti o wa ninu ki e ma lo afikun ounje?

ABALA KEJE: Ipenija to jemo lilo afikun ounje

47. Kini ipenija ti e ba pade ni lilo afikun ounje?

- O won lati ra ko si ni arowoto mi ko ni iwe atoka nipa lilo re ko ni nkan
pato ti an lo fun Omiran(E jowo, e menu ba).....

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