# FACTORS INFLUENCING PERCEPTION OF FORTIFIED PRODUCTS: A STUDY OF NAIROBI RESIDENTS

*BY*

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# DECLARATION

I declare that this document is my original work and that it has not been submitted elsewhere before for examination purposes or award of degree.

Signed----------Date----------26/03/04----------

**NGAHU W JULIAH.**

D61/8072/01

This project report has been submitted for examination with my approval as university supervisor

Signed----------Date----------21/03/04----------

**DR MARTIN OGUTU**

# DEDICATION

This research paper is dedicated to my dear husband Mike and to our son Joe, for their moral an financial support and encouragement through out this study and my whole period at the university.

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I would like to thank the almighty God for giving me the knowledge and ability to carry out this study to completion. This study would not have come to a successful completion without much assistance from several people.

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- Last but not least to my immediate family members, Shiro, Michael, and my son Joe, thank you for your continued encouragement.

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## ABSTRACT

The objective of this study was first to establish whether consumer perception of fortified products is different from their perception of non-fortified products. The second objective was to find out the educational influence on perception of fortified products. In order to achieve the above objectives data was collected using a semi-structured questionnaire whose respondents were Nairobi residents who were above eighteen years of age. The head of the household was interviewed for each residence; in this case the father or the mother. In single households the person who lived in the house was interviewed.

The data was then analyzed using mean scores and standard deviations. Factor analysis was then done on some respondents to determine the factors that were common in determining perception of fortified products. The findings from the study suggest that fortified products are regarded as different from non-fortified products in terms of nutritional content, usage and benefits to the body. The data also indicates that the factors considered to be important in fortified products are also considered to be important in influencing the choice of the fortified product to buy or take. These factors include, the type of vitamins added, type of minerals added, the nutritional value and the availability of the brand in the market.

This study also indicates that the educational level influences consumer perception of fortified products. The findings indicate that the higher the educational level the lower the perception of fortified products as more nutritious, healthy, and good for body development and growth. The lower the educational level the higher the perception that fortified products are nutritious, healthy, expensive, and fattening.

From the results of this study it has emerged that the perception of fortified products is different from their perception of non- fortified products but only to a very small extent. This puts marketers in a challenging position on how to influence these perceptions to change to a significantly noticeable

difference. Most respondents didn't seem to understand the concept of fortification without much explanation to them. This reveals that marketers should embark more on educating consumers about this concept and its benefits in comparison to the non-fortified products if the fortified products are to remain competitive in this market and relevant to the consumers.

This study was more suggestive than conclusive and also faced many limitations. Due to time limitation this study concentrated on only educational influence on perception of fortified products. There is therefore need for further studies in the area which could be carried out to:

i. Determine the influence of other demographic variables on perception of fortified products.
ii. Determine the level and extent of usage of fortified products in the Kenyan market. A comparative study could be done in this area to determine if there is any difference in perception of fortified products for the rural and urban consumers.

# CHAPTER ONE
# INTRODUCTION

## 1.1 Background

Eating habits have changed over the past few decades. Greater prosperity and the resulting greater availability of food have been instrumental in changing our eating habits, mainly by skewing our diet towards excessive consumption, Ambruzzi et al (1993). Previously the tendency particularly in rural populations was to use a much greater range of unsophisticated foods. Vegetables were the main sources of protein and milk and eggs and meat were used to a lesser extent. The staples were always accompanied by vegetables supplementing the basic starch products with proteins, fibers and providing vitamins. Currently new technologies coupled with greater disposable income have brought a change in all this. A lot of imported foods have found their way into the local markets. These are from countries that have active consumerism movements and as a result have had to make products that are market oriented Gachanja, (1998).

According to Gachanja, the food industry in the Nairobi market is facing saturation and stiff competition from other foreign imported foodstuffs that are flooding the market and seem to gain more consumer acceptance than local products. These include food supplements, fortified products and other products that claim to have additional nutritional value that most of our local products didn't meet previously. The local market is also faced by the need for such products due to deficiencies of some important nutrients. According to the African journal of food and nutrition many countries face problems with deficiencies of iodine, iron, vitamin A and other essential minerals. However, deficiency of these minerals and other micronutrients have lessened in the past 10 years in Africa, though still significant (Wilma, 2002).

Among many control and prevention strategies that have been implemented, fortification of industrially processed foods in now common. Food fortification is being used as a nutritional as well as a marketing strategy for the health conscious consumers.

According to the oxford Advanced English dictionary, to fortify is to increase the strength of food or drink by adding something to it for example vitamins, minerals and others. According to the African Journal of food and Nutrition, food enrichment means the addition of one or more nutrients to a food, whether it's normally contained in the food or not (Wilma, 2002).

Food fortification is a matter nutritionists have been pushing for a long time. Experience from developed countries indicates that such a strategy is one of the ways of managing micronutrients deficiencies. However, experts are concerned that though micronutrients are crucial to the body immunity and general health very few people take them. The Ministry of Health says the government would prefer that common foods such as flour, sugar, rice and milk be fortified with micronutrients. The ministry plans to make food fortification mandatory with priority being given to sugar and maize flour. In this respect the government of Kenya has sent out a passionate appeal to companies to boost their food products with micronutrients like vitamins and iron. This followed a national survey on anemia done by the University of Nairobi, Kemri and the ministry of health (2002) that revealed that 61.2% among children and 29.6% among mothers have a vitamin A deficiency. Marketers in Kenya have taken the cue and are increasingly using the fortification concept as a way to position their products competitively as well as meet the nutritional needs.

Nutritionists claim that food fortification is vital, their worry however, is that the government has no mechanism for monitoring and ensuring the producers use the right ingredients. As reported in the Daily Nation, nutritionists currently claim that the country has no capacity to analyze Vitamin B presence in a product, though many companies claim to have fortified their products with this fortificant. Today there are many products competing for the same customer class in the food market. There is also increased competition with majority of products reaching maturity stage of their life cycle, as well as growth of health conscious consumers, due to changes in consumers' lifestyles (Maffeirs, 1997). Marketers have increasingly used the fortification concept to position their products competitively. This involves the addition of iron, iodine, vitamins, calcium and other minerals. Fortification has particularly been applied for example in milk products, breakfast cereals, flour, jams, baby foods and other products. More and more people are also becoming more health conscious and for this reason they are increasingly selecting products which they perceive to be more healthy and nutritional.

## 1.2 Role of Kenya Bureau of Standards (Kebs) in Fortification

Fortification can have commercial consequences since any change in the way a product tastes, looks or smells can hurt sales and market share. Marketers may therefore fortify with fortificants that don't affect the basic products features but this may mean using a less effective fortificant in terms of strength. According to a Unicef report (1998), in the late 1980s in Venezuela, fortified maize flour turned from its familiar white color to grey during product tests. This led the national institute of Nutrition to allow producers to fortify with a blend of iron components that didn't affect the flour color. Regulatory issue is of special interest in the area of food and health. The role of kebs is to promote the competitiveness of Kenyan goods and services and to improve the quality of life through the application of measurements, standards, testing and quality management. (Standards Act, Cap 496). In regard to fortification KEBS has developed national standards and guidelines for processing of fortified foods. During development of these standards KEBS involves the relevant stakeholders including the scientific community (research and universities), government ministries, consumer organizations and the food industry.

Some of the standards for products in the market include: -

a) KS 05-229 –Kenya standard specification for edible salt (first revision). This is in regard to salt fortification with iodine, where all salt manufacturers are required to fortify their salt with iodine.
b) Ks 05-232 – Kenya standard specification for margarine. This deals with fortification of margarine.
c) Ks 05-168 – Kenya standards specification for dry milled maize products (first Revision). This concerns fortification of dry milled maize products, such as maize flour, cornflakes among others.

This study will therefore be important to empirically test the consumer perceptions and in order to establish exactly how consumers perceive fortified products. This will be important to properly guide marketers regarding market segmentation in relation to fortified products. It will also be important to find out the demographic factors influencing such perceptions of fortified products. If the research is done, marketers will be guided more properly on the consumer category to target in their communications and promotions on fortified products.

Due to this evident gap in the market regarding consumer awareness, perception, interest, and usage of fortified products, the researcher seeks to answer the following question:

- **Are consumer perceptions regarding fortified products different from their perception of non-fortified products?**
- **Does education level influence perception of fortified products?**

## 1.4 The Research Objectives

The objective of this study were:

a) To establish whether consumers' perception of fortified products is different from their perception of non-fortified products.

b) To find out the educational influence on perception of fortified products.

## 1.4 Importance of the Study

This study will assist food manufacturers and potential investors in the food industry to know how consumers perceive fortified products in comparison to non-fortified products. It will also contribute to the academic literature with regard to fortified products. The demographic variables that will be identified as important in influencing consumer perceptions of fortified products will help marketers know who exactly their target in the marketing of fortified products is.

# CHAPTER TWO
# LITERATURE REVIEW

## 2.1 Introduction

This review of the literature seeks to examine the existing literature about the meaning of fortification, methods of fortification, identify objectives of fortification and reasons why food manufacturers pursue it. It will also focus on the concept of perception and how marketers can successfully use the understanding of consumer perceptions, to improve their sales growth.

## 2.2 The Concept of Perception

Combs (1959), argue that, people do not behave according to the facts as others see them. They behave according to the facts as they themselves see them. What governs behavior from the point of view of the individual himself are his unique perceptions of himself and of the world he lives. Perception is one of the psychological factors influencing consumer-buying behavior. Different scholars have different definitions of perception. Kibera and Waruingi (1998) defines perception as the process by which people receive, interpret and remember information coming from the world around them. That is the process by which we attribute meaning to incoming stimuli received through our five senses. Schiffman and Kanuk (1995) explain perception as the process by which an individual selects, organizes and interprets stimuli into a meaningful and coherent picture of the world. For the purposes of this study, the definition by Kibera and Waruingi (1998) will be adapted.

When dealing with perceptions, stimulus and receptors are important aspects. A stimulus is any unit of input to any of the senses, which includes products, advertisement commercial among others. Sensory receptors are the human organs that is, the eyes, ears, nose, mouth, and skin, which receive the sensory inputs. Their sensory functions are to see, hear, smell, taste and receive sensory inputs. All these functions are called into play either singly or in combination for the evaluating or use of most consumer products. Sensation is the immediate and direct response of the sensory organs to simple stimuli for example an advertisement. Human sensitivity refers to the experience of sensation. Sensitivity to stimulus varies with the amount or intensity of the stimuli receptors. Sensation itself depends on energy change or differentiation of input.

**The Perceptual Process**

The perceptual process involves knowing how perceptions form and how they influence attitude and behavior. Figure 1. Illustrates the perceptual process by showing how objects, events and people in the environment are received into our perceptual field, and how they are selected organized and interpreted.

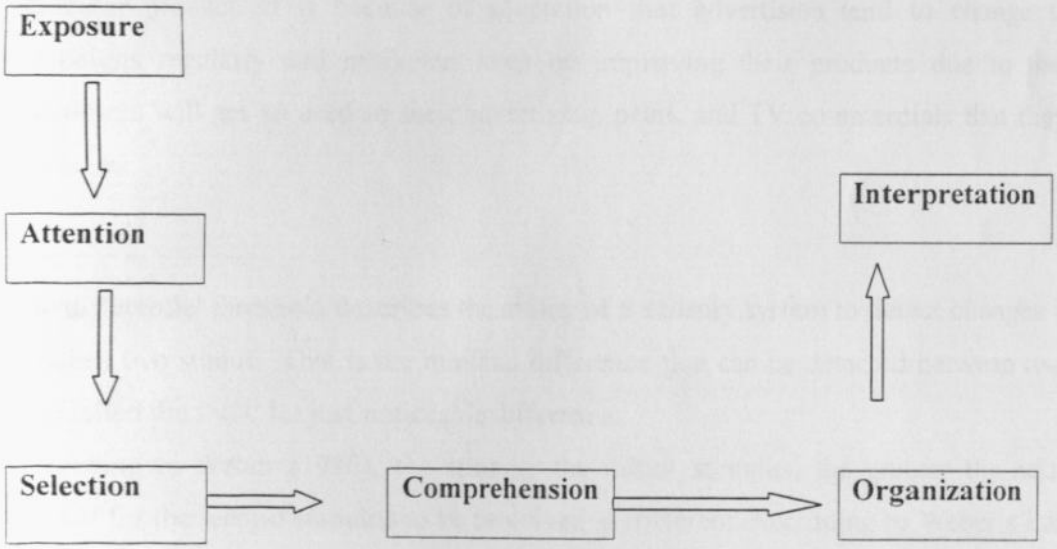



**Fig. 1: The Perceptual Process**
**Source: Kibera and Waruingi (1998).**

Exposure is the physical proximity, which a product may have, hence offering an opportunity for the consumer to notice the product. For example the availability of fortified products in the shops and supermarkets. Attention refers to the process of the customer paying attention to a particular product because he has noticed the features in them such as color, size, package and others. Comprehension is when the consumer interprets something about the product, based on the information provided in the package. For example the consumer may interpret that a product is natural, fortified, energy booster and others. Retention is said to occur if the consumer remembers an advertisement he had seen about the product at this point when he is making a purchase decision, this means the advertisement has gained retention in the consumers' mind and will play a part in influencing his decision to buy.

## 2.3 The Sensory Thresholds

The absolute threshold refers to the minimum amount of stimulation that can be detected by human senses. That is the lowest level at which an individual can experience a sensation, as Solomon, (1996) defines it. The point at which an individual can detect a difference between something and nothing is that person's absolute threshold for that stimulus. In the field of perception, adaptation refers specifically to getting used to certain sensations, for example people talk of getting used to a particular product. It is because of adaptation that advertisers tend to change their advertising campaigns regularly and marketers keep on improving their products due to their concern that consumers will get so used to their advertising, print, and TV commercials that they will no longer see them.

The differential threshold describes the ability of a sensory system to detect changes in or differences between two stimuli. That is the minimal difference that can be detected between two stimuli; this is also called the JND, for just noticeable difference.

According to Weber (1986), the stronger the initial stimulus, the greater the additional intensity needed for the second stimulus to be perceived as different. According to Weber's Law, an additional level of stimulus equivalent to a J. n. d. must be added for the majority of people to perceive a difference between the resulting stimulus and the initial stimulus. According to Schiffman and Kanuk (1995), manufacturers and marketers endeavor to determine the relevant J.n.d. for their products for two reasons: So that negative changes such as reductions in product size, increases in product prices, or changes in packaging are not readily discernible to the public and to enable product improvements be readily discernible to consumers without being wastefully extravagant.

## 2.4 The Dynamics of Perception

These are the perceptual mechanisms that are used in processing received information.

Perception is not a function of sensory input alone, rather, it is the result of two different kinds of inputs which interact to form the personal pictures, the perceptions that each individual experiences. One type of input is physical stimuli from the outside environment while the other type of input is provided by individual themselves in the form of certain predispositions, such as expectations,

motive, and learning based on previous experience. The combination of these two different kinds of inputs produces for each of us a very private, very personal picture of the world according to Schiffman and Kanuk (1995). Since each individual is a unique entity with unique experiences, wants, needs and expectations, each individual perceptions are different.

People actually receive or perceive only a small fraction of the stimuli to which they are exposed Solomon. (1996). This is because a person exercises selectivity in perception and perceives only those stimuli that are considered relevant for their purposes Chung (1981). The stimuli selected depend on two major factors in addition to the nature of the stimulus itself. These two factors are: - The consumer's previous experience as it affects her expectations and her motives at the time, which is determined by her needs, desires, and interests.

Each of these two factors can serve to increase or decrease the probability that the stimulus will be perceived, and each can affect the consumer's selectivity, exposure to and selective awareness of the stimulus itself Kotler (1995). The consumer's selection of stimuli from the environment is based on the interaction of expectations and motives with the stimulus itself. These factors give rise to a number of important concepts concerning perception.

Selective exposure is one of these concepts. Palmer (2000) argues that individuals make active decisions as to which stimuli they wish to expose themselves to and that consumers are aware of stimuli that relate to their current needs. Consumers decide what to process depending on their past experience with that kind of stimuli. Consumers actively seek out messages that are pleasant or with which they are sympathetic, and they actively avoid painful or threatening ones. Consumers also selectively expose themselves to advertisements that reassure them of the wisdom of their purchase decisions.

Selective attention is the other concept in which according to Kotler (1995), consumers screen out information coming to them and attend only to a few. Hence they are likely to notice advertisements for products that meet their needs. People also vary in the kind of information in which they are interested and in the form of message and type of medium they prefer. Consumers therefore exercise a great deal of selectivity in terms of the attention they give to commercial stimuli.

Perceptual Interpretation is the interpretation of perceived events and objects. People interpret the meaning of the perceived world in order to make it useful to their purposes. One of the characteristics of perceptual interpretation as outlined by Chung (1981) is that, it is a subjective process. This is because the perceptual interpretation serves the perceiver, making it highly subjective. This means that the more important the perceived world is to the perceiver, the greater the influence subjective elements like emotions, bias and feelings. The other characteristic outlined is that it is a judgmental process. The perceived world is usually expressed in judgmental terms that is, good or bad, right or wrong and others. A favorably perceived object is pleasing to the perceiver, while and object that is negatively perceived causes the perceiver to act defensively. Chung, also argues that the perceptual process can easily be distorted. This is because informational inputs are added or subtracted from the perceived world, which is usually different from the real world. The perceiver actively molds the real world to suit his or her needs. If confronted with unpleasant objects or events the perceiver may distort their meaning or deny their existence.

Consumers protect themselves from bombardment of stimuli by blocking such stimuli from achieving conscious awareness this is referred to as perceptual blockage. People will forget much that they learn but will tend to retain information that supports their attitudes and beliefs. They remember only those aspects of a product or message that is perceived as necessary to them. Subliminal perception refers to stimuli that are too weak or too brief to be consciously seen or heard but may be enough to be perceived by one or more receptor cells. This process occurs when stimuli is below the level of conscious awareness though obviously not beneath the absolute threshold of the receptors involved. However, Solomon (1996) indicates that this works only in individuals whose value systems make them predisposed to suggestions.

## 2.4 Factors Influencing Perception

The individual is also subject to a number of influences that tend to distort perception. These are either internal or external factors. These factors cause individuals to see the same perceived object differently. As reported by Chung (1981), both types of factors affect all phases of perception but, external factors tend to have more influence on the selection phase, while external factors have more influence on the interpretive phase. Several scholars highlight different factors that influence perception. The researcher has therefore combined the factors that are most relevant to this study to be the ones influencing perception.

### 2.5.1 Internal Factors Influencing Perception

Internal factors in perception are the characteristics of the perceiver. The perceiver has a tendency to use him or herself as a basis for perceiving others. Some of the most important internal factors influencing perception are expectations, motives and needs, past experience, self-concept and personality. Expectations affect the way someone will perceive an object or event. People usually see what they expect to see, and what, they expect to see is usually based on familiarity on previous experience, or on preconditioned set. In marketing context, according to Schiffman and Kanuk (1996), people tend to perceive products and product attributes according to their own expectations for example A person who has been told by his friend that a brand of brand of maize flour has a sweet taste will probably perceive the taste to be sweet. On the other hand, stimuli that conflict sharply with expectations often receive more attention than those that conform to expectations.

Motives and needs also influence consumer perception of events. A motive is a need sufficiently stimulated in an individual such that the individual is moved to seek satisfaction. As reported by Stanton (1991) it is an aroused need, which in turn activates behavior, intended to satisfy this need. One form that behavior takes is collecting and processing information from the environment, in the process of perception. Buying motives however are dependent on consumer awareness and willingness to indulge them. People tend to perceive things they need or want, the stronger the need, the greater the tendency to ignore unrelated stimuli in the environment. In general, there is a heightened awareness of stimuli that are relevant to one's needs and interests, and a decreased awareness of stimuli that are irrelevant to those needs.

As reported in Kotler (1995), An individual's perceptual process simply attunes itself more closely to those elements of the environment that are important to that person. Marketing managers recognize the efficiency of targeting their products to perceived needs of consumers. Schiffman and Kanuk (1995), identifies a number of applications of perceived consumer needs. The marketer can segment the market according to consumer's attributes of the product category. The marketer can also develop different marketing strategies for each segment depending on perceived needs of each segment.

The marketer can also vary the product advertising to specific market segments so that consumers in each segment will perceive the product as meeting their own specific needs, wants and interests. According to the journal of advertising, consumers assign meaning based on a set of beliefs to which a stimulus is assigned, through a process called priming. Stimulus ambiguity can occur when a stimulus is not clearly perceived or when it conveys a number of meanings. Consumers in this case project their own wishes and desire to assign meaning in such a case Frieddmann, (1988).

The process of leaning from past experience influences perception by creating a readiness to perceive an object or person in a certain way. If a consumer has a good experience using a particular product, this affects how he will perceive that product even if it changes slightly. Self-concept is the way we perceive ourselves. It forms the basic frame of reference we use in perceiving things and people around us. The perceived world is organized around the perceived self (Leavitt, 1972). Personality is another internal factor that influences perception. It affects the way people perceive others. As reported in Chung (1981), Rodgers indicates that individuals who perceive themselves realistically can function effectively without being defensive of their shortcomings.

### 2.4.2 External Factors Influencing Perception

External factors are the characteristics of the perceived object or person. The knowledge of these characteristics has some implications for understanding and influencing human behavior. Some of the most relevant external characteristics include, appearance, stereotypes, contrast, intensity and nature of stimuli. Appearances influences perceptions where people tend to attribute the qualities they associate with certain people to others who may resemble them whether or not they consciously recognize the similarity. This applies to products too.

As Chung (1981), indicates the appearance of the perceived concept influences perceptual judgment Imposters use this concept to con other people into believing them, and marketers can also use it t make consumers perceive their products favorably.

According to Chung (1981), stereotyping is the tendency to judge a product based on th characteristics (real or imagined) of groups to which they belong. Individuals tend to carry pictures i their minds, of meanings of various kinds of stimuli. These stereotypes serve as expectations of wha specific situations or people or events will be like and are important determinants of how much stimuli are subsequently perceived. Contrast is where a generalized impression that may be favorable or unfavorable is extended to the interpretation of non-relevant stimuli. This effect tends to be more pronounced when the perceiver is interpreting stimuli with which he has little experience. Marketers take advantage of hallo effects when they extend a brand name associated with one line of products to another, Schiffman and Kanuk (1995).

Consumers tend to give added perceptual weight to advice coming from sources they respect. When required to form a difficult perceptual judgment, consumers often respond to irrelevant stimuli for example, selling a car at a high price with respect to luxury and emphasizing color, upholstery, rather than mechanical or technical superiority. First impressions tend to be lasting; yet in forming such impressions the perceiver does not yet know which stimuli are relevant, important, or predictive of later behavior for example, Introducing a new product before it has been perfected may be fatal, as consumers will retain memory of first failure. Many people jump to conclusions before examining all the relevant evidence. Hence consumers may perceive the beginning of an ad and jump to conclusions about the message. Marketers should ensure they say the best things right from the beginning. Intensity also accentuates the perceive stimulus. The more intense a stimulus the more likely it is to be perceived as Palmer (2000) reports. For example the more a company emphasizes that their products are fortified the more likely consumers will perceive them as so.

The nature of the stimulus can also affect how consumers perceive a product. Marketing stimuli include an enormous number of variables, all of which affect the consumer's perception, such as the nature of the product, its physical attributes, the package design, the brand name and others. In general, contrast is one of the most attention- compelling attributes of a stimulus, Merilke & Cheesman, (1987). Advertisers often use extreme attention- getting devices to achieve maximum

contrast and thus penetrate the consumer's perceptual screen. With respect to packaging, astute marketers usually try to differentiate their packaging sufficiently to ensure rapid consumer perception. Packages with low recognition scores obviously do not provide sufficient sensory input to the consumer to be readily perceived and remembered. For example most of the fortified products in the market have very brightly colored and noticeable packages with large labels to indicate they are enriched.

## 2.6 Special Cases in Perception

Perception affects behavior. People tend to develop attitudes towards what they have perceived. These attitudes are the perceptual outcomes and they influence the perceiver's behavior and how he of she will perceive things in the future. Perceived quality is one of these attitudes developed. Consumers often judge the quality of a product on the basis of a variety of information cues, which they associate with the product. Kibera and Waruingi (1998), define Perceived quality as the customers' perception of the overall quality or superiority of a product or service with respect to its intended purpose relative to alternatives available. As reported by Kisese (2002), in his unpublished MBA project perceived quality is the assessment of customers' perception of a brand on the basis of what they think constitutes a quality product.

The perceived risk also influences the consumers' perceptions. Consumer behavior involves risk in the sense that any action of a consumer will produce consequences, which he cannot anticipate with anything approximating certainty. The degree of risk the consumers perceive and their own tolerance for risk-taking serve to influence their purchase strategies. Consumers perceive risk because they may have had little or no experience with the product or because the product concept is new in the market. They may experience any of the following risks as outlined by Schiffman and Kanuk (1995).
Functional risk is the risk that the product will not perform as is expected. Physical risk is a risk to self and others that the product may pose for example it might cause harm whereas financial risk is the risk that the product will not be worth its cost. Social risk is a risk that a poor product will result in embarrassment before others. Psychological risk on the other hand is the risk that a poor product choice will bruise the consumer's ego, For example embarrass him in public.

## 2.7 The Concept of Fortification

Food fortification according to the African Journal of Food and Nutrition refers to the addition of nutrients to processed foods at levels above the natural state. This refers to food enrichment by addition of one or more nutrients to a food whether its normally contained in the food or not (Chen, 2002). According to the oxford Advanced English dictionary, to fortify is to increase the strength of food or drink by adding something to it for example vitamins, minerals and others.

The products generally used to fortify products include are called fortificants and they include, Vitamins, minerals like Iron, calcium, Zinc, iodine and others. Fortification of food staples with iron, Vitamin a, iodine and other micronutrients is the most cost effective and sustainable strategy. Some of the fortified products available in the market include flour, chocolate drinks like MILO and Nesquick, milk and milk products, breakfast cereals, salt. According to a Unicef report (1998) salt iodization reaches 1.5 billion consumers worldwide since 1990 and this is a demonstration of how successful fortification programs can be.

Food fortification is an old process where foods have been fortified to replace nutrients thought to be lost during processing. Other foods are fortified with added nutrients needed by the body to stave off the progression of disease associated with aging or enhance physical performance (Zinc, 2002). The main reason companies fortify their products, according to a ministry of health study include; Protection against diseases especially for infants, and the elderly, Improve nutritional value, where the fortified food acts as part of a balanced diet. To maintain or improve the nutritional quality of individual foods commonly eaten by a specific community or target group and to promote good body growth and development. Foods are also fortified in order to give energy and revitalize lost energy and to replace nutrients thought to be lost during processing.

### 2.7.1 Global Perspective on Fortification

The market trends indicate that food and health market growth rate in Europe is 15- 20% per annum. In terms of new product development, healthier food is the most important trend in Europe. This has led to functional foods to extend into all major food categories.

In the United States, consumer demand for new foods and changes in eating habits and food safety risks are affecting the food processing industry. To address the need for nutritious foods and compete for consumer acceptance many are exploring new food processing methods (Zinc, 2002). The American Academy of Pediatricians Committee on nutrition has strongly advocated for iron fortification of infants formula since 1969. The consumer quest for health is having a great impact on the food marketer. Many countries have had fortification of basic foods made mandatory; Guatemala for example passed a law in 1975 mandating that sugar be fortified with Vitamin A.

### 2.7.2 Food Fortification from a Marketer's Perspective

The marketers' role in the fortification process is to ensure that fortified foods are appropriately labeled. They should also enhance dissemination of this information regarding the use of fortified products, by specific communities and other target groups. This information should be consistent with the labeling requirements stipulated in the national regulations and standards. The marketer should also find out the changing consumer needs and by liaising with the health department help in working out a proper fortification strategy that meets the nutritional requirements.

The findings of a study done in Philippines on awareness and usage of fortified products (Sario, 2002) showed that the awareness was low but usage high. This meant that the consumers were using the products but were not aware of their differences with other products. The study recommended that marketers should have massive communication campaigns on fortified products in order to raise public awareness on health benefits form fortified foods hence create effective consumer demand for fortified products. According to the President of Consumer League, which is an American consumer representative group, the industry has not helped consumers understand what fortification is and what its not. This has led to consumer confusion of whether it's a marketing issue or a health issue, hence the many misconceptions about fortified products (Linda, 2003).

## 2.8 Constraints in Fortification

Food fortification is a complex undertaking that requires government and industry to commit to working together as partners. Fortification succeeds when producers are involved from the start in formulating regulation and in resolving the marketing and technical issues. Effective legislation helps to define the roles of all participants. Without such a framework the strategy will be venerable to weak implementation and possible failure even at marketing efforts.

This calls for legislation that is enforced and supported by policies. The nutrition and health ministry needs to work with producers to explain the importance of fortification and to provide technical assistance. According to the journal of Natural products research and Innovation, fortified foods are enriched with vitamins and minerals up to 100% of the Daily Recommended Intake for that nutrient. These foods are Often mandated by law to be fortified to a level that replaces nutrients lost during processing. The claims of fortification have to be substantiated by good scientific criteria (Mulry, 2002).

A prominent consumer organization in Washington D.C, Center for Science In Public Interest (CSPI), published a report decrying fortified foods and noted that if governments do not require functional ingredients to be proven effective and safe before they are added to foods and if claims are not substantiated then dubious fortified foods may increase. They argued that a scientific base for these products combined with good marketing leads to acceptance by consumers for various types of products Scott (1996).

The cost of fortifying products is very high, in a study carried out in Philippines it emerged that it was so expensive to fortify margarine that only one multinational company carried through with it successfully (Linda, 2003). The law can help remove price advantage enjoyed by non-fortified products. The start up cost of equipment and training can be high. The government through subsidizing the cost of fortificants can protect fortifiers competitive position in the market place.

CHAPTER THREE

# RESEARCH METHODOLOGY

The research design for this study was descriptive. This design has been used successfully in the past in other studies on perception. Mukiri (2001), Masinde (1986), and Ndegwa (1998).

## 3.1. Population of the Study

The population for this study consisted of all residents in the middle and upper income class, who live in Nairobi. Those who don't reside in Nairobi or were on visit were excluded from the study. In drawing the sampling frame, the researcher adopted the classification used by Mburu (2001), in which he classified Nairobi consumers in terms of their social economic classes. He identified a short list (See Appendix 2) of the middle class estates in Nairobi in consultation with the Central Bureau of Statistics. He used Information about consumers' expenditure shares by income groups and broad expenditure categories drawn from the Economic Survey 2001 pg 189, that gave the incomes for various groups and how they spend their incomes, in coming up with the list of the middle income estates by considering how much they spend on rent and housing per annum.

## 3.2 Sample Design

A sample of 100 consumers was selected using multistage sampling method. This was done in two stages, where in the first stage ten residential estates were selected from the list at random. In the second stage ten consumers were selected randomly from each of these ten estates. Where houses were numbered, every kth house was picked after a random start. This was however determined by the size of the estate. Where houses were not numbered, judgment was used, but in a careful manner to ensure that respondents were not picked from a concentrated area. The researcher ensured a reasonable gender mix was interviewed.

## 3.3 Data Collection Method

The researcher used primary data collected. The data collection instrument was a semi-structured questionnaire (See Appendix 1), which was administered through drop and pick later method. The questionnaire had two sections, A and B. A was an introductory part and consisted of questions about the respondents' profile, while section B consisted questions on factors influencing consumer perception of fortified products. Cooper (1979), and Omondi (1999), used this type of questionnaire successfully in studies similar to this one. The respondents for this study were mainly the heads of the households in each home. Either the father or the mother was interviewed but not both of them. In households for single people the owner of the household was interviewed.

## 3.4 Data Analysis

Due to the nature of this study, simple data analysis techniques were used. Mean scores were used to measure and summarize data about perceptions. These were used because of their ease of understanding and preciseness. Factor analysis was done to identity and to determine the main factors that influence perceptions of fortified products. This was done using SPSS.

Factor analysis was applied to likert type scaled responses to questions about the perception in order to identify the major characteristics or factors considered to be important by respondents. This technique was the most appropriate since it applies an advanced form of correlation analysis to responses to a large number of statements to identify those, which are similar, and to identify one or more sets of three or more statements, which result in highly correlated responses. If the response to a set of three or more statements is highly correlated its then believed that the statement measure some factor which is common to all of them.

## 4.1 Perception of Fortified and Non-Fortified Products

The first objective sought to determine whether consumer perceptions regarding fortified products is different from their perception of non-fortified products. The data for this was collected on a five point scale where 1 = No extent at all and 5 = Very great extent

Not at all was given a score of one and Very great extent was given a score of five. Mean scores were then calculated. The interpretation was done based on the intensity of the mean scores, and the higher the mean score the greater the perception and the lower the mean score the lower the perception. The results for this are presented in Table 1 below.

**Table 1: Consumer perception of Fortified Products**

| Attributes | Fortified | | Non fortified | |
|---|---|---|---|---|
| | Mean | Std. Deviation | Mean | Std. Deviation |
| Nutritious | 4.19 | 1.02 | 3.73 | 1.16 |
| Are good for bone developments | 4.12 | 0.97 | 3.62 | 1.3 |
| Contributes towards a balanced diet | 4.1 | 0.94 | 3.58 | 1.32 |
| Have vitamins | 4.03 | 0.98 | 3.58 | 1.22 |
| Healthy food | 3.91 | 1.03 | 3.58 | 1.37 |
| For the weak people | 3.9 | 1.4 | 3.5 | 1.3 |
| Good for HIV/AIDS patients | 3.9 | 1.19 | 3.5 | 1.33 |
| For children | 3.82 | 1.22 | 3.49 | 1.33 |
| Improve immunity to diseases | 3.78 | 1.19 | 3.46 | 1.35 |
| Are supplements for vitamins | 3.73 | 1.09 | 3.44 | 1.31 |
| For those in physically demanding jobs | 3.72 | 1.16 | 3.33 | 1.35 |
| Enrich our blood with lost nutrients | 3.7 | 1.1 | 3.32 | 1.39 |
| For pregnant and nursing mothers | 3.69 | 1.12 | 3.32 | 1.51 |
| For sick people | 3.67 | 1.27 | 3.3 | 1.39 |
| Have minerals | 3.66 | 1.09 | 3.28 | 1.45 |
| Genuine claim of the nutritional value | 3.59 | 1.18 | 3.24 | 1.49 |
| Are for Sports people | 3.54 | 1.17 | 3.19 | 1.51 |
| Most of the nutrients not in natural form | 3.5 | 1.33 | 3.18 | 1.47 |
| For body builders | 3.49 | 1.24 | 3.16 | 1.64 |
| Expensive | 3.43 | 1.33 | 3.16 | 1.54 |
| Do not have the natural flavors | 3.42 | 1.27 | 3.14 | 1.49 |
| Contain chemicals | 3.38 | 1.35 | 3.14 | 1.42 |
| Have flavors | 3.37 | 1.32 | 3.14 | 1.36 |
| They are good value for money | 3.3 | 1.34 | 3.1 | 1.46 |
| Are fattening | 3.23 | 1.41 | 3.08 | 1.56 |
| Are sugary/sweet | 3.11 | 1.28 | 3.06 | 1.46 |
| .Are sometimes expired | 3.09 | 1.4 | 3.06 | 1.44 |
| Have been over processed | 3.07 | 1.42 | 3.01 | 1.48 |

Fortified products were perceived to be nutritious, good for bone development and to contribute towards a healthy diet. They were also considered to possess minerals and vitamins to a greeter extent. Non- fortified products were also considered to be nutritious, good for bone development and to be healthy foods but to a lesser extent since the mean score for these factors were lower than for the fortified products. This indicates that there is a difference between the two products with fortified products being perceived to be more nutritious and healthy.

**Factor analysis on perception of fortified products**

Factor analysis was done on the data in table 1 above to determine the factors that are common to fortified foods. These factors were then grouped together in their order of importance. The mean scores in table 1 were then applied of these factors to determine the most important ones in determining perception of fortified products. Table 2 below presents the factor analysis

**Table 2:Factor Analysis on Perception of Fortified Products**

| Variables | Eigen values | % of Variance | Communality |
|---|---|---|---|
| V1 | 8.60 | 30.719 | 0.679 |
| V2 | 3.77 | 13.479 | 0.652 |
| V3 | 1.83 | 6.552 | 0.703 |
| V4 | 1.53 | 5.463 | 0.668 |
| V5 | 1.33 | 4.752 | 0.668 |
| V6 | 1.17 | 4.165 | 0.615 |
| V7 | 1.13 | 4.027 | 0.724 |
| V8 | 0.96 | 3.444 | 0.722 |
| V9 | 0.86 | 3.07 | 0.746 |
| V10 | 0.76 | 2.715 | 0.679 |
| V11 | 0.73 | 2.6 | 0.732 |
| V12 | 0.61 | 2.159 | 0.723 |
| V13 | 0.59 | 2.108 | 0.735 |
| V14 | 0.54 | 1.93 | 0.738 |
| V15 | 0.42 | 1.508 | 0.726 |
| V16 | 0.41 | 1.477 | 0.587 |
| V17 | 0.36 | 1.292 | 0.717 |
| V18 | 0.36 | 1.27 | 0.64 |
| V19 | 0.33 | 1.178 | 0.626 |

| | | | |
|---|---|---|---|
| V20 | 0.30 | 1.066 | 0.665 |
| V21 | 0.26 | 0.91 | 0.676 |
| V22 | 0.24 | 0.859 | 0.731 |
| V23 | 0.22 | 0.774 | 0.626 |
| V24 | 0.21 | 0.756 | 0.687 |
| V25 | 0.17 | 0.59 | 0.834 |
| V26 | 0.12 | 0.443 | 0.725 |
| V27 | 0.11 | 0.379 | 0.691 |
| V28 | 0.09 | 0.315 | 0.649 |

The eigenvalue or latent root is simply the extracted variance of the variable; we note that the values of the sum of squares (eigenvalues) falls off from the first factor. This is because in factor analysis the maximum amount of variance is extracted by each factor in turn starting with the first factor. For example, challenge 1, accounts for 36% of the total variance challenge 2 accounts for 18% while challenge 3 accounts for 15% of the total variance. The communality of a variable is the variance it shares in common with the other variables. If the communality of a variable is too low, we might feel it doesn't contribute enough to warrant inclusion in the factor analysis. In table 2 above each of the variable is significantly contributing in explaining part of the total variance. V25 and V19 are the most important variables as they are contributing to 83% and 75% in the factor analysis. The least contributing variables are V6 (61%) and V16, which is contributing to 59%.

Since the loading of a variable on a factor represents the correlation between the variable and the factor concerned, within any challenge we are interested in those variables with high loadings. For example 0.83 has the highest loading in V11 followed by 0.73 in V1 and they are loading heavily in Factor 1, V7 and V20 are loading heavily in Factor2, V25 load in Factor 3 with 0.87, V13 loads to Factor 4 with 0.83, Factor 5 has V27 with 0.76, Factor 6 has V21 with 0.73 while Factor 7 has V3 with 0.79.

**Rotation of Factors**

The initial factor matrix is arrived as a result of applying a procedure to extract orthogonal challenges from the correlation matrix. But since direct methods do not provide the most illuminating picture concerning the interrelationships between the set of variables, it is advisable to re-arrange the challenges to reduce some of the ambiguities. This process is known as rotation. The method of rotation used, which is common, is the Varimax with Kaiser Normalization. The extraction method was by Principal component analysis. After it was applied we obtained the following revised factors:

**Table 3: Rotated Component Matrix**

| Variables | Attributes | Factors | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| V1 | For the weak people | **0.73** | 0.34 | -0.08 | -0.06 | 0.00 | 0.11 | -0.05 |
| V2 | Have flavors | 0.35 | 0.06 | 0.06 | 0.20 | -0.01 | 0.28 | **0.63** |
| V3 | Expensive | -0.05 | 0.04 | -0.01 | 0.04 | 0.28 | 0.03 | **0.79** |
| V4 | Have vitamins | 0.43 | 0.23 | **0.60** | -0.05 | 0.22 | -0.12 | 0.06 |
| V5 | Are good for bone developments | **0.49** | 0.28 | 0.48 | -0.22 | 0.15 | -0.12 | 0.20 |
| V6 | Nutritious | 0.29 | **0.60** | 0.26 | -0.22 | 0.25 | -0.02 | 0.02 |
| V7 | Contributes towards a balanced diet | 0.34 | **0.75** | 0.17 | 0.02 | 0.10 | -0.09 | -0.04 |
| V8 | For sick people | **0.71** | 0.36 | 0.06 | 0.20 | -0.05 | 0.17 | -0.15 |
| V9 | Genuine claim of the nutritional value | **0.63** | 0.41 | 0.13 | -0.02 | 0.19 | -0.07 | 0.34 |
| V10 | For pregnant and nursing mothers | **0.66** | 0.38 | 0.20 | 0.00 | 0.13 | 0.04 | 0.21 |
| V11 | For those in physically demanding jobs | **0.83** | 0.05 | 0.11 | 0.01 | 0.13 | 0.03 | 0.05 |
| V12 | For body builders | **0.69** | 0.03 | 0.26 | 0.23 | 0.28 | -0.19 | 0.10 |
| V13 | Have been over processed | -0.04 | -0.01 | 0.00 | **0.83** | 0.09 | 0.18 | 0.09 |
| V14 | For children | 0.12 | **0.66** | 0.23 | 0.25 | -0.02 | -0.37 | 0.20 |
| V15 | Good for HIV/AIDS patients | 0.36 | **0.58** | 0.17 | 0.26 | 0.20 | -0.36 | 0.00 |
| V16 | Are for Sports people | **0.50** | 0.07 | 0.37 | 0.35 | 0.27 | -0.01 | -0.01 |
| V17 | Contain chemicals | 0.15 | -0.11 | 0.15 | **0.75** | 0.10 | 0.27 | 0.14 |
| V18 | Healthy food | 0.43 | **0.66** | 0.05 | -0.07 | -0.11 | 0.02 | 0.03 |
| V19 | Most of the nutrients not in natural form | 0.23 | -0.17 | 0.16 | 0.24 | 0.13 | **0.64** | 0.20 |
| V20 | Improve immunity to diseases | 0.04 | **0.74** | 0.19 | -0.15 | 0.05 | 0.22 | 0.03 |
| V21 | Do not have the natural flavors | -0.03 | 0.04 | 0.05 | 0.37 | 0.05 | **0.73** | 0.01 |
| V22 | Are sugary/sweet | -0.15 | 0.12 | -0.04 | 0.19 | **0.52** | 0.57 | 0.25 |
| V23 | Are sometimes expired | 0.13 | 0.03 | -0.16 | 0.48 | **0.51** | 0.29 | -0.07 |
| V24 | have minerals | 0.01 | 0.41 | **0.65** | 0.22 | -0.06 | 0.20 | 0.02 |
| V25 | Are supplements for vitamins | 0.12 | 0.20 | **0.87** | 0.06 | 0.05 | 0.11 | -0.01 |
| V26 | Enrich our blood with lost nutrients | 0.18 | **0.46** | 0.42 | -0.16 | 0.43 | -0.08 | -0.31 |
| V27 | They are good value for money | 0.17 | 0.17 | 0.17 | 0.04 | **0.76** | 0.04 | 0.14 |
| V28 | Are fattening | 0.28 | -0.06 | 0.09 | 0.21 | **0.63** | 0.11 | 0.32 |

When the factors have been combined using factor analysis the following factors were clustered together in order of importance in influencing perception of fortified products. The table 4 below presents this.

**Table 4: Factors Influencing Perception of Fortified Products**

| | |
|---|---|
| Factor 1<br>**For the health conscious and those in need of healthy foods** | ♦ For the weak people,<br>♦ Are good for bone development,<br>♦ For sick people<br>♦ Genuine claim of the nutritional value<br>♦ For pregnant and nursing mothers<br>♦ For those in physically demanding jobs<br>♦ For body builders<br>♦ Are for Sports people |
| Factor2<br>**Balanced** | ♦ Nutritious<br>♦ Contributes towards a balanced diet<br>♦ For children<br>♦ Good for HIV/AIDS patients<br>♦ Healthy food<br>♦ Improve immunity to diseases<br>♦ Enrich our blood with lost nutrients |
| Factor 3<br>**Have vitamins** | ♦ Have vitamins<br>♦ Have minerals<br>♦ Are supplements for vitamins |
| Factor 4<br>**Not natural** | ♦ Contain chemicals<br>♦ Have been over processed |
| Factor 5<br>**Sugary** | ♦ Are sugary/sweet<br>♦ Are sometimes expired<br>♦ They are good value for money<br>♦ Are fattening |
| Factor 6<br>**Have chemicals** | ♦ Most of the nutrients not in natural form<br>♦ Do not have the natural flavors |
| Factor 7<br>**Cost** | ♦ Have flavors<br>♦ Expensive |

**Source: Research Data**

From this table we can conclude that perception of fortified products is influenced by the nutritional value perceived to be contained in them as the components in factor one indicate. From Table 1 there is also indication that these factors are the ones that influence perception most since they scored higher mean scores in comparison to the other factors. This strongly indicates that fortified products are perceived to be nutritious, healthy, full of vitamins and good for those in need of better nutrition and are sought for these benefits. Factors five, six and seven are the least important from the factor analysis done. This indicates that the perception of fortified products is least influenced by their cost, flavors and not having the nutrients in natural form. Factor four indicates that fortified products are perceived to some extent to contain chemicals and to be over processed during the addition of the extra nutrients as compared to the non-fortified products.

**Factors considered important in Fortified products**

Factors considered to be important in fortified were sought on a 5 point scale where 5= Very important and 1= Not important at all

Very important was scored as 5 and not important at all was given a score of 1. Mean scores were then calculated and the gap between factors considered to be important in fortified products and factors influencing choice of fortified foods was then calculated and this brought out the mean change, which is the perceived difference this is presented in the table 5 below.

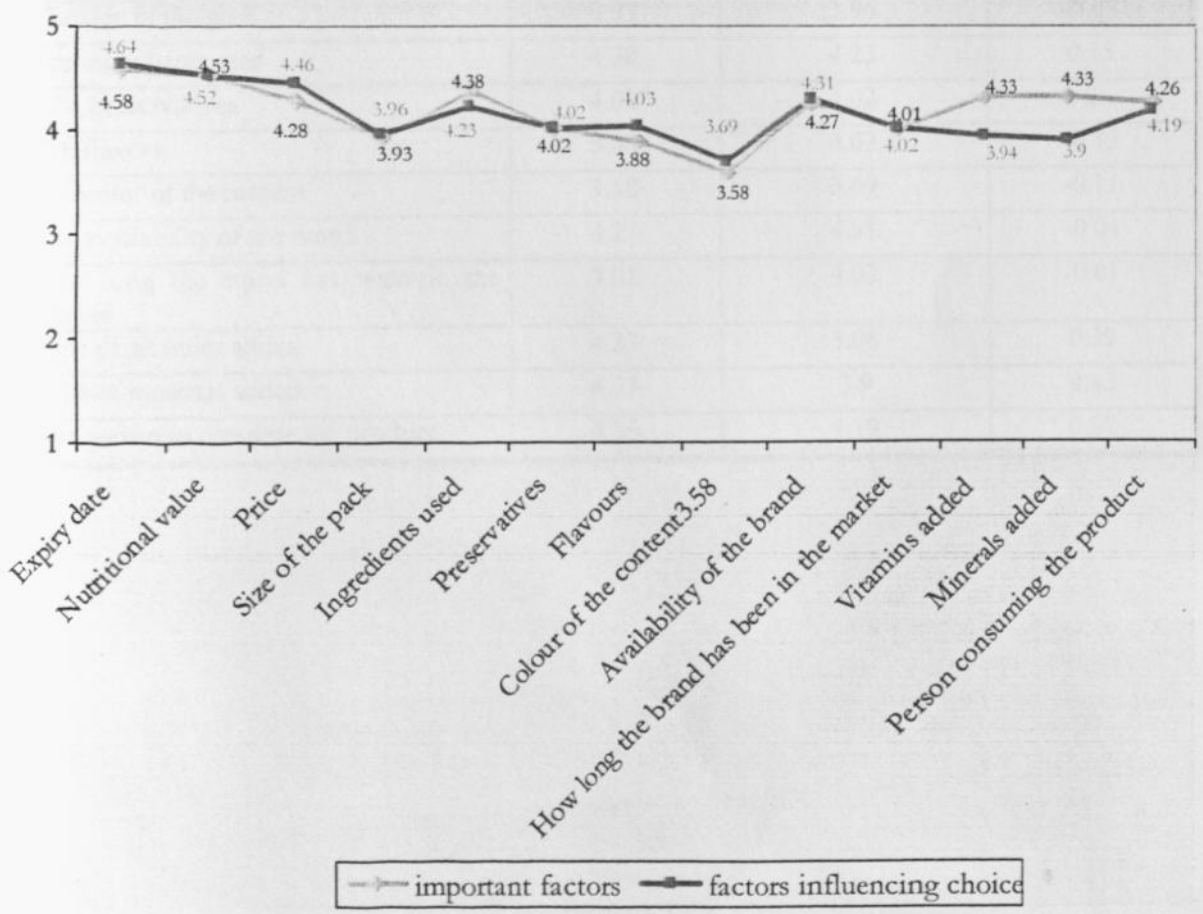
**Table 5: Important factors in fortified products and Factors influencing choice of fortified Products**

| Attributes | Important factors | Factors influencing choice | Gap |
|---|---|---|---|
| Enriched with minerals | 4.12 | 4.23 | -0.11 |
| Enriched with vitamins | 4.28 | 4.23 | 0.05 |
| Protect against diseases | 4.22 | 4.18 | 0.04 |
| Better in nutritional value than most other products | 3.94 | 4.18 | -0.24 |
| Good for body growth and development | 4.11 | 4.24 | -0.13 |
| Recommended by doctors | 3.78 | 4 | -0.22 |
| Form part of a balanced diet | 4.09 | 4.18 | -0.09 |
| Give energy | 4.08 | 4.1 | -0.02 |
| Good for those on diet | 3.6 | 3.78 | -0.18 |

The perceived gap was calculated to determine whether the factors considered to be important in fortified products are also considered to influence the choice. The perception identified by the gap was that the respondents perceive fortified foods as good for body growth and development, good for those on diet and can be used without being recommended by a doctor as important factors. They were also considered to be higher in nutritional value than most other products the fortified foods were perceived as being enriched with vitamins and they protect against diseases. However in influencing the choice of the fortified product to buy or use be enriched with mineral and vitamins, protect against diseases scored highest and had a positive gap meaning they are considered to be the most important factors while choosing the fortified product to use.

These factors considered important in fortified products were then compared with factors that influence choice of vitamin of mineral added foods and the results for this are presented in figure 3 below:

**Fig 3: Factors considered important and factors influencing choice of fortified products**



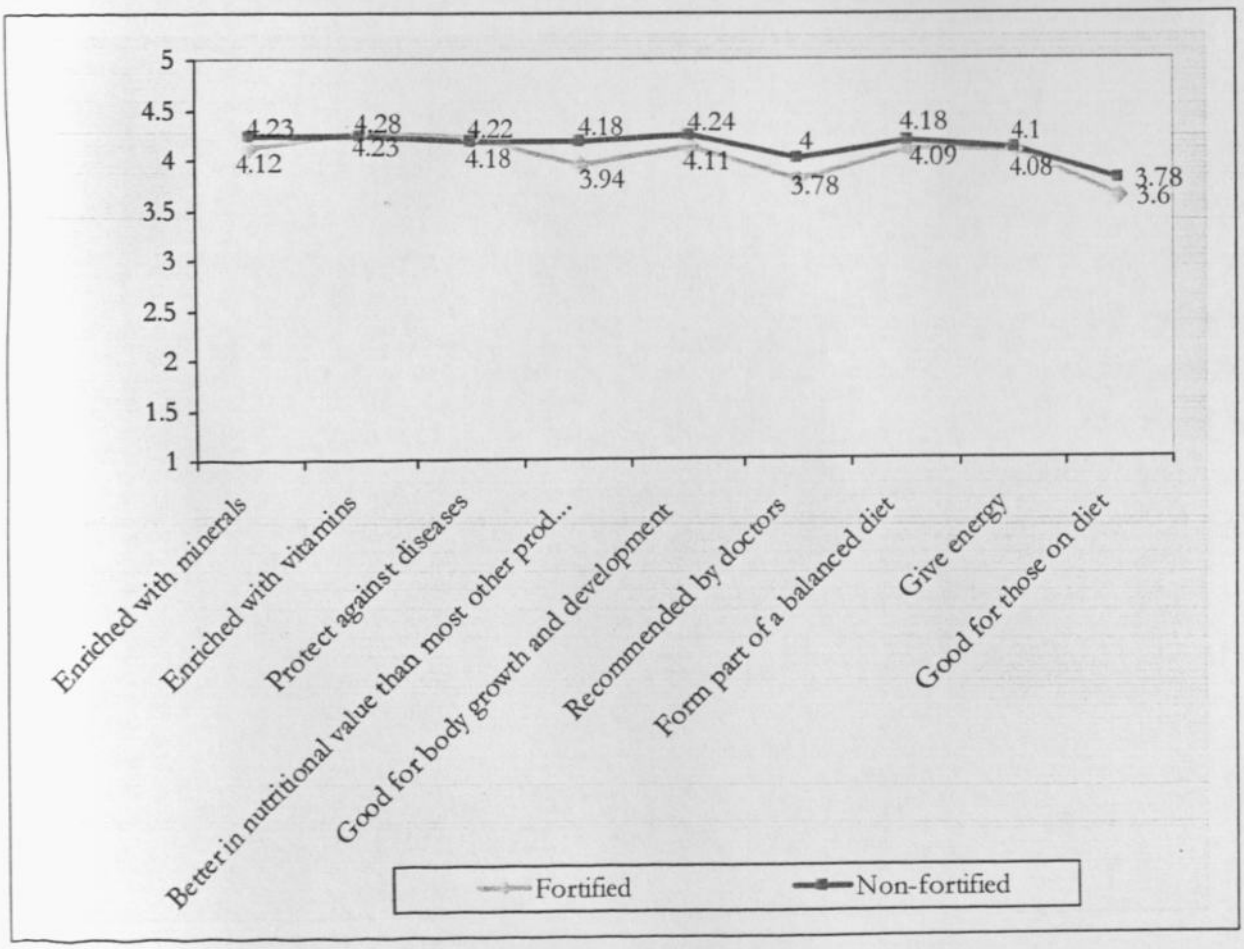
Other factors considered important in influencing the choice of fortified or non-fortified products to buy or take were sought on a five point scale, where 5= very important and 1= not important at all. Very important was scored as 5 and not important at all was given a score of 1. Mean scores were then calculated. The higher the mean score the higher the perception for that factor. The gap for the two products was then calculated to show the perceived difference in factors influencing the choice for the two products. The results are presented in the table 6 below:

**Table 6: Factors influencing choice of fortified and Non- fortified products**

| **Factors influencing choice of Fortified and Non- fortified food or drink to take or buy** | | | |
|---|---|---|---|
| | **Fortified** | **Non-Fortified** | **Gap** |
| The expiry date | 4.58 | 4.64 | -0.06 |
| The nutritional value | 4.53 | 4.52 | 0.01 |
| The price | 4.28 | 4.46 | -0.18 |
| The size of the pack | 3.93 | 3.96 | -0.03 |
| The ingredients used | 4.38 | 4.23 | 0.15 |
| The preservatives | 4.02 | 4.02 | 0 |
| The flavors | 3.88 | 4.03 | -0.15 |
| The color of the content | 3.58 | 3.69 | -0.11 |
| The availability of the brand | 4.27 | 4.31 | -0.04 |
| How long the brand has been in the market | 4.01 | 4.02 | -0.01 |
| Type of vitamins added | 4.33 | 3.94 | 0.39 |
| Type of minerals added | 4.33 | 3.9 | 0.43 |
| The person to consume the product | 4.26 | 4.19 | 0.07 |

The nutritional value, expiry date, ingredients used, types of vitamin and minerals added were scored highest as important factors influencing choice of fortified foods. Flavors, color of content and size of the pack were considered to be of least importance in influencing choice of fortified foods to buy. The expiry date, nutritional value, price and the ingredients used were considered to be the most important factors influencing choice of non-fortified products to buy. The gap for the two was at highest in type of vitamin and minerals added, meaning it is the most important factor influencing choice of fortified products. A graphical presentation of the difference is presented in figure 4 below.

**Fig. 4: Factors influencing choice of fortified and non-fortified products**



The users of fortified products were sought on a five-point scale to determine who was the perceived user of fortified products. Mean scores were then calculated and the results for this are presented in Table 7 below.

**Table 7: Perceived users of Fortified Products**

| Users | Mean |
|---|---|
| Infants | 4.31 |
| Children | 4.28 |
| Young people/teens/youth | 3.97 |
| Women | 4 |
| Men | 3.5 |
| Old people | 4.46 |

**Source: Research Data**

Users of fortified products were perceived to be old people, infants and children. Fortified products were considered least to be for men and women; however, they were considered to a small extent to be for the young people and the youth. From the standard deviations, they are considered to be more for the old and children.

## 4.2 Influence of Education Level on Perception of Fortified Products

The second objective for this study sought to determine the whether the level of education influence perceptions of fortified products. The data for this was collected on a five point scale where 5= Very great extent and 1=No extent at all

Very great extent was given a score of five and no extent at all was given a score of one. Mean scores were then calculated and then cross tabulated with the demographic factor of education level to determine the relationship. The educational influence on perception of fortified products was cross tabulated using the mean scores and table 8 below presents this data.

**Table 8: Educational Influence on Perception of Fortified Products**

| ATTRIBUTES | MEAN PER LEVEL | | | | |
|---|---|---|---|---|---|
| | Primary | Secondary | College | University | Total |
| 1. For the weak people | 4.25 | 4.06 | 4.31 | 4.13 | 4.19 |
| 2. Have flavors | 4.25 | 3.12 | 3.25 | 2.82 | 3.09 |
| 3. Expensive | 4.25 | 4.06 | 3.38 | 3.95 | 3.78 |
| 4. Have vitamins | 4 | 4.13 | 4.03 | 4 | 4.03 |
| 5. Are good for bone developments | 3.75 | 4.12 | 3.28 | 3.08 | 3.37 |
| 6. Nutritious | 3.5 | 4.19 | 3.81 | 3.89 | 3.9 |
| 7. Contributes towards a balanced diet | 3.75 | 3.69 | 3.63 | 3.13 | 3.43 |
| 8. For sick people | 3.75 | 4.5 | 3.66 | 3.68 | 3.82 |
| 9. Genuine claim of the nutritional value | 4 | 4.19 | 3.5 | 3.26 | 3.54 |
| 10.For pregnant and nursing mothers | 4 | 3.06 | 3.09 | 2.95 | 3.07 |
| 11.For those in physically demanding jobs | 4 | 4.06 | 3.69 | 3.58 | 3.72 |
| 12.For body builders | 4.25 | 3.56 | 3.59 | 3.32 | 3.5 |
| 13.Have been over processed | 4 | 3.63 | 3.37 | 2.87 | 3.23 |
| 14.For children | 4.25 | 3.94 | 3.5 | 3.63 | 3.67 |
| 15.Good for HIV/AIDS patients | 4.25 | 4.13 | 4 | 4.16 | 4.13 |
| 16.Are for Sports people | 4 | 3.5 | 3.19 | 3.42 | 3.38 |
| 17.Contain chemicals | 3.75 | 2.69 | 3.31 | 3.05 | 3.11 |
| 18. Healthy food | 4.25 | 4.19 | 4.19 | 4.03 | 4.12 |
| 19. Most of the nutrients not in natural form | 3.75 | 4.13 | 3.69 | 4.03 | 3.91 |
| 20. Improve immunity to diseases | 4.5 | 3.94 | 3.38 | 3.53 | 3.59 |
| 21.Do not have the natural flavors | 4.25 | 3.62 | 3.31 | 3.34 | 3.42 |
| 22.Are sugary/sweet | 3.5 | 3.94 | 3.78 | 3.55 | 3.7 |
| 23.Are sometimes expired | 4.25 | 3.56 | 3.06 | 3.29 | 3.3 |
| 24.have minerals | 4 | 4.37 | 3.66 | 3.89 | 3.9 |
| 25.Are supplements for vitamins | 4.25 | 4.13 | 3.5 | 3.61 | 3.69 |
| 26.Enrich our blood with lost nutrients | 4.25 | 3.81 | 3.25 | 3.47 | 3.49 |
| 27.They are good value for money | 4.25 | 4 | 3.66 | 3.45 | 3.66 |
| 28. Are fattening | 3.75 | 4.25 | 3.38 | 3.82 | 3.73 |

Table 8 above indicates that the lower the education levels the higher and the more positively the respondents perceived fortified products. The respondents however seem to agree on some characteristics of fortified foods being healthy, have vitamins, good for children, good for HIV positive people and good for the sick. The lower education level respondents perceived the nutritional claim to be genuine with a score of 4 while the respondents with a higher education level giving a score of 3. This indicates that the higher the educational level the lower the perception of fortified products as genuine in nutritional claim. The lower the educational level the higher the perception of fortified products as being expensive, fattening and not good value for money. The differences in perception were however, not very big in terms of al the other factors.

CHAPTER FIVE

# CONCLUSION

This is the last chapter in this report and will include summary discussions and conclusions. It will also include limitations, recommendations for further research and recommendation for policy and practice.

## 5.1 Summary Discussions and Conclusions

This is done in the order of objectives. The first objective sought to determine whether consumer perceptions regarding fortified products differ from their perception of non-fortified products. The results indicate that consumers regard fortified products to be more nutritious, healthy and good for body growth and development. They also regarded them as filled with vitamins and as good supplements for minerals. This differs with their perception of non-fortified products, which were also regarded as nutritious and healthy but only to a smaller extent.

Most respondents considered the claim of added nutritional value to be genuine, however others did not believe in it. The fortified products were perceived to be less fattening, good value for money, and good for those on diet. They were however, perceived not to contain nutrients in their natural form but in an artificial form and were also considered not to have the natural flavors.

Non-fortified products were perceived to contain less artificial components and to contain less chemicals but were regarded lower on the nutritional aspect and on being suitable for those in need of additional nutrients in their bodies for example children, the sick and the pregnant mothers. Overall the fortified products were perceived higher on being good and suitable for every one, being balanced in nutrition and having vitamins and mineral. .

The second objective sought to determine the influence of educational level on perception of fortified products. The results for this indicate that all respondents from all levels of education perceived fortified foods highly in terms of nutritional claim and contributing to good health and balanced diet. The respondents with a lower educational background however, believed more in the claim for nutritional value, but perceived fortified products to be fattening, expensive and not good value for money.

Respondents with higher educational levels on the contrary perceived fortified products to be good value for money and not expensive. They did not however perceive the claim for nutritional value to be genuine though they still thought the fortified foods are more nutritious than the non-fortified products. We could conclude there fore that the higher the educational level the lower the perception of fortified products.

## 5.2 Limitations of the Study

This study encountered the following problems, which should be taken into consideration when generalizing the findings. Ten out of the one hundred questionnaires were not properly filled and others were not filled completely. This could have affected the findings of this study slightly.

The findings for this study are limited to the Nairobi area only, and it would be important to determine if fortified products are perceived differently in other areas especially the rural and peri-urban areas. Due to limitation of resources (time and money), this study could not be carried out in a broader scope, which would have yielded a better picture in this area.

## 5.3 Recommendation for Further Research

Due to time limitation this study concentrated on only educational influence on perception of fortified products. Other studies in the area could be carried out to determine the influence of other demographic variables on perception of fortified products. Further study in this area could be carried out to determine the level and extent of usage of fortified products in the Kenyan market. A comparative study could be done in this area to determine if there is any difference in perception of fortified products for the rural and urban consumers.

## 5.4 Recommendation for Policy and Practice

From the results of this study it has emerged that the perception of fortified products is different from their perception of non- fortified products but only to a very small extent. This puts marketers in a challenging position on how to influence these perceptions to change to a significantly noticeable difference. Most respondents didn't seem to understand the concept of fortification without much explanation to them. This reveals that marketers should embark more on educating consumers about this concept and its benefits in comparison to the non-fortified products if the fortified products are to remain competitive in this market and relevant to the consumers.

This study is more indicative than conclusive, however, its important as a first step in research and analysis in fortification, which is a growing concept in a developing country, like Kenya.

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## APPENDIX 1

## RESPONDENTS QUESTIONNAIRE

### SECTION A:

**Name (Optional).....**

**Gender**

1. Male.....( )
2. Female.....( )

**Respondents' Age**

1. 18-24.....( )
2. 25-34.....( )
3. 35-44.....( )
4. 45 +.....( )

**Marital Status**

1. Single.....( )
2. Married.....( )

**Highest level of education**

1. Primary..... ( )
2. Secondary..... ( )
3. College.....( )
4. University..... .( )

### SECTION B:

Q1. Please indicate (by ticking in the appropriate box), which drinks or foods you are aware of that have **added vitamins and minerals**.

| PRODUCTS | ( ) |
|---|---|
| 1. Blue band | ( ) |
| 2. Ribena | ( ) |
| 3. Milk | ( ) |
| 4. Fermented/Sour porridge | ( ) |
| 5. Rice | ( ) |
| 6. Lucozade | ( ) |
| 7. Fruit juices | ( ) |
| 8. Glucose | ( ) |
| 9. Spaghetti | ( ) |
| 10. Maize flour | ( ) |
| 11. Breakfast Cereals | ( ) |
| 12. Salt | ( ) |
| 13. Milo | ( ) |
| 14. Baby food formulas | ( ) |
| 15. Tea leaves | |

Q2. Please indicate (by ticking in the appropriate box) the extent to which you consider the following factors to be important in the products that **have added vitamins or minerals?** Use a five point scale where **5= Very important**

**1 = Not important at all**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1.Be enriched with minerals | ( ) | ( ) | ( ) | ( ) | ( ) |
| 2.Be enriched with vitamins | ( ) | ( ) | ( ) | ( ) | ( ) |
| 3.Protect against diseases | ( ) | ( ) | ( ) | ( ) | ( ) |
| 4.Better in nutritional value than most other products | ( ) | ( ) | ( ) | ( ) | ( ) |
| 5.Good for body growth and development | ( ) | ( ) | ( ) | ( ) | ( ) |
| 6.Be recommended by doctors | ( ) | ( ) | ( ) | ( ) | ( ) |
| 7.Form part of a balanced diet | ( ) | ( ) | ( ) | ( ) | ( ) |
| 8.Give energy (revitalize lost energy) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 9.Good for those on diet | ( ) | ( ) | ( ) | ( ) | ( ) |

Q3. Please indicate (by ticking in the appropriate box), the extent to which you consider **vitamin or mineral added foods** to be characterized by the following factors. Use a five point scale where

**1= No extent at all**

**5 = very great extent**

| **Factors** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|
| 1. For the weak people | ( ) | ( ) | ( ) | ( ) | ( ) |
| 2. Have flavors | ( ) | ( ) | ( ) | ( ) | ( ) |
| 3. Expensive | ( ) | ( ) | ( ) | ( ) | ( ) |
| 4. Have vitamins | ( ) | ( ) | ( ) | ( ) | ( ) |
| 5. Are good for bone developments | ( ) | ( ) | ( ) | ( ) | ( ) |
| 6. Nutritious | ( ) | ( ) | ( ) | ( ) | ( ) |
| 7. Contributes towards a balanced diet | ( ) | ( ) | ( ) | ( ) | ( ) |
| 8. For sick people | ( ) | ( ) | ( ) | ( ) | ( ) |
| 9. Genuine claim of the nutritional value | ( ) | ( ) | ( ) | ( ) | ( ) |
| 10.For pregnant and nursing mothers | ( ) | ( ) | ( ) | ( ) | ( ) |
| 11.For those in physically demanding jobs | ( ) | ( ) | ( ) | ( ) | ( ) |
| 12.For body builders | ( ) | ( ) | ( ) | ( ) | ( ) |
| 13.Have been over processed | ( ) | ( ) | ( ) | ( ) | ( ) |
| 14.For children | ( ) | ( ) | ( ) | ( ) | ( ) |
| 15.Good for HIV/AIDS patients | ( ) | ( ) | ( ) | ( ) | ( ) |
| 16.Are for Sports people | ( ) | ( ) | ( ) | ( ) | ( ) |
| 17.Contain chemicals | ( ) | ( ) | ( ) | ( ) | ( ) |
| 18. Healthy food | ( ) | ( ) | ( ) | ( ) | ( ) |
| 19. Most of the nutrients not in natural form | ( ) | ( ) | ( ) | ( ) | ( ) |
| 20. Improve immunity to diseases | ( ) | ( ) | ( ) | ( ) | ( ) |
| 21.Do not have the natural flavors | ( ) | ( ) | ( ) | ( ) | ( ) |
| 22.Are sugary/sweet | ( ) | ( ) | ( ) | ( ) | ( ) |
| 23.Are sometimes expired | ( ) | ( ) | ( ) | ( ) | ( ) |
| 24.have minerals | ( ) | ( ) | ( ) | ( ) | ( ) |

| | | | | | |
|---|---|---|---|---|---|
| 25.Are supplements for vitamins | ( ) | ( ) | ( ) | ( ) | ( ) |
| 26.Enrich our blood with lost nutrients | ( ) | ( ) | ( ) | ( ) | ( ) |
| 27.They are good value for money | ( ) | ( ) | ( ) | ( ) | ( ) |
| 28. Are fattening | ( ) | ( ) | ( ) | ( ) | ( ) |

Q4. Please indicate (by ticking in the appropriate box), the extent to which you consider **foods with no added vitamin or minerals** to be characterized by the following factors, on a five point scale where **1= No extent at all**

**5 = Very great extent**

| **Factors** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|
| 1. For the weak people | ( ) | ( ) | ( ) | ( ) | ( ) |
| 2. Have flavors | ( ) | ( ) | ( ) | ( ) | ( ) |
| 3. Expensive | ( ) | ( ) | ( ) | ( ) | ( ) |
| 4. Have vitamins | ( ) | ( ) | ( ) | ( ) | ( ) |
| 5. Are good for bone developments | ( ) | ( ) | ( ) | ( ) | ( ) |
| 6. Nutritious | ( ) | ( ) | ( ) | ( ) | ( ) |
| 7. Contributes towards a balanced diet | ( ) | ( ) | ( ) | ( ) | ( ) |
| 8. For sick people | ( ) | ( ) | ( ) | ( ) | ( ) |
| 9. Genuine claim of the nutritional value | ( ) | ( ) | ( ) | ( ) | ( ) |
| 10.For pregnant and nursing mothers | ( ) | ( ) | ( ) | ( ) | ( ) |
| 11.For those in physically demanding jobs | ( ) | ( ) | ( ) | ( ) | ( ) |
| 12.For body builders | ( ) | ( ) | ( ) | ( ) | ( ) |
| 13.Have been over processed | ( ) | ( ) | ( ) | ( ) | ( ) |
| 14.For children | ( ) | ( ) | ( ) | ( ) | ( ) |
| 15.Good for HIV/AIDS patients | ( ) | ( ) | ( ) | ( ) | ( ) |
| 16.Are for Sports people | ( ) | ( ) | ( ) | ( ) | ( ) |
| 17.Contain chemicals | ( ) | ( ) | ( ) | ( ) | ( ) |
| 18. Healthy food | ( ) | ( ) | ( ) | ( ) | ( ) |
| 19. Most of the nutrients not in natural form | ( ) | ( ) | ( ) | ( ) | ( ) |
| 20. Improve immunity to diseases | ( ) | ( ) | ( ) | ( ) | ( ) |
| 21.Do not have the natural flavors | ( ) | ( ) | ( ) | ( ) | ( ) |
| 22.Are sugary/sweet | ( ) | ( ) | ( ) | ( ) | ( ) |
| 23.Are sometimes expired | ( ) | ( ) | ( ) | ( ) | ( ) |
| 24.have minerals | ( ) | ( ) | ( ) | ( ) | ( ) |
| 25.Are supplements for vitamins | ( ) | ( ) | ( ) | ( ) | ( ) |
| 26.Enrich our blood with lost nutrients | ( ) | ( ) | ( ) | ( ) | ( ) |
| 27.They are good value for money | ( ) | ( ) | ( ) | ( ) | ( ) |
| 28. Are fattening | ( ) | ( ) | ( ) | ( ) | ( ) |

Q5. Please indicate (by ticking in the appropriate box) the extent to which each of the factors below is important in influencing your choice of the **vitamin or mineral added food or drink** to take or buy.

Use a five point scale, Where **5 =Very important**

**1 = Not important at all**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1.Be enriched with minerals | ( ) | ( ) | ( ) | ( ) | ( ) |
| 2.Be enriched with vitamins | ( ) | ( ) | ( ) | ( ) | ( ) |
| 3.Protect against diseases | ( ) | ( ) | ( ) | ( ) | ( ) |
| 4.Better in nutritional value than most other products | ( ) | ( ) | ( ) | ( ) | ( ) |
| 5.Good for body growth and development | ( ) | ( ) | ( ) | ( ) | ( ) |
| 6.Be recommended by doctors | ( ) | ( ) | ( ) | ( ) | ( ) |
| 7.Form part of a balanced diet | ( ) | ( ) | ( ) | ( ) | ( ) |
| 8.Give energy (revitalize lost energy) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 9.Good for those on diet | ( ) | ( ) | ( ) | ( ) | ( ) |

Q6. Please indicate (by ticking in the appropriate box), the extent to which you would say products **with added vitamins or minerals** are important to the following users? Use a five point scale,

Where **5 =Very important**

**1 = Not important at all**

| **USERS** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1.Infants | ( ) | ( ) | ( ) | ( ) | ( ) |
| 2.Children | ( ) | ( ) | ( ) | ( ) | ( ) |
| 3.Young people/teens/youth | ( ) | ( ) | ( ) | ( ) | ( ) |
| 4.Women | ( ) | ( ) | ( ) | ( ) | ( ) |
| 5.Men | ( ) | ( ) | ( ) | ( ) | ( ) |
| 6.Old people | ( ) | ( ) | ( ) | ( ) | ( ) |
| Others (Specify) | ( ) | ( ) | ( ) | ( ) | ( ) |

Q7. Please indicate (by ticking in the appropriate box) the extent to which each of the factors below is important in influencing your choice of the **vitamin or mineral added food or drink** to take or buy. Use a five point scale, Where **5 =Very important**

**1 = Not important at all**

| ATTRIBUTES | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. The expiry date | ( ) | ( ) | ( ) | ( ) | ( ) |
| 2. The nutritional value | ( ) | ( ) | ( ) | ( ) | ( ) |
| 3. The price | ( ) | ( ) | ( ) | ( ) | ( ) |
| 4. The size of the pack | ( ) | ( ) | ( ) | ( ) | ( ) |
| 5. The ingredients used | ( ) | ( ) | ( ) | ( ) | ( ) |
| 6. The preservatives | ( ) | ( ) | ( ) | ( ) | ( ) |
| 7. The flavors | ( ) | ( ) | ( ) | ( ) | ( ) |
| 8.The color of the content | ( ) | ( ) | ( ) | ( ) | ( ) |
| 9. The availability of the brand | ( ) | ( ) | ( ) | ( ) | ( ) |
| 10.How long the brand has been in the market | ( ) | ( ) | ( ) | ( ) | ( ) |
| 11. Type of vitamins added | ( ) | ( ) | ( ) | ( ) | ( ) |
| 12. Type of minerals added | ( ) | ( ) | ( ) | ( ) | ( ) |
| 13. The person to consume the product | ( ) | ( ) | ( ) | ( ) | ( ) |

Q8. Please indicate (by ticking in the appropriate box) the extent to which each of the factors below is important in influencing your choice of the food or drink **with no added vitamins or minerals** to take or buy. Use a five-point scale, Where **5 =Very important** **1 = Not important at all**

| ATTRIBUTES | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. The expiry date | ( ) | ( ) | ( ) | ( ) | ( ) |
| 2. The nutritional value | ( ) | ( ) | ( ) | ( ) | ( ) |
| 3. The price | ( ) | ( ) | ( ) | ( ) | ( ) |
| 4. The size of the pack | ( ) | ( ) | ( ) | ( ) | ( ) |
| 5. The ingredients used | ( ) | ( ) | ( ) | ( ) | ( ) |
| 6. The preservatives | ( ) | ( ) | ( ) | ( ) | ( ) |
| 7. The flavors | ( ) | ( ) | ( ) | ( ) | ( ) |
| 8.The color of the content | ( ) | ( ) | ( ) | ( ) | ( ) |
| 9. The availability of the brand | ( ) | ( ) | ( ) | ( ) | ( ) |
| 10.How long the brand has been in the market | ( ) | ( ) | ( ) | ( ) | ( ) |
| 11. Type of vitamins added | ( ) | ( ) | ( ) | ( ) | ( ) |
| 12. Type of minerals added | ( ) | ( ) | ( ) | ( ) | ( ) |
| 13. The person to consume the product | ( ) | ( ) | ( ) | ( ) | ( ) |

Q9. Have you ever used products **with added vitamins or minerals** then stopped? (Tick in the appropriate box).

1. Yes ( )
2. No ( )

Q10. Please indicate below the main reason(s) why you stopped using products **with added vitamins or minerals**?

THANK YOU VERY MUCH.

## APPENDIX 2

# LIST OF MIDDLE CLASS ESTATES IN NAIROBI

Air Port View
Akiba (Langata)
Akiba (South C)
Ayany
Buru Buru Phase 1,2,3,4,5
Donholm
Eastleigh
Embakasi high Rise
Golden Gat
Golf Course
Harambee
Highway Estate Phase 1, 2
High View
Imara Daima
Jamhuri
Kariobangi Civil Servants
Kariokor
Kibera High rise
Komarock Infill B
Komarock Phase 2
Komarock Phase 2 Infill A
Komarock phase 3
Langata Civil servants
Maasai Estate
Madaraka
Magiwa
Mariakania
Mvuli Avenue
Nairobi west
New Pumwani (California)
Ngara
Ngei Phase 2
Ngumo
NSSF Complex (Sololo/Hazina)
Onyonka
Otiende
Outering Estate
Pangani
Park View
Pioneer
Plains View
Pumwani High Rise

Reality (Nairobi South C)
River Bank (south B/Kariba Estate)
Rubia
Saika
Savannah
South Lands Phase 1,2
Sun View
Tena
Thika Road Site Estate
Thome
Ufunguo
Uhuru Gardens
Ushirika
Villa Franca
Woodley (Joseph Kangethe)
Zimmerman