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**ATTITUDES TOWARDS NUTRITIONAL SUPPLEMENT USE AMONGST ADULT
GYMNASIUM USERS IN JOHANNESBURG NORTH**

by

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A dissertation submitted in fulfilment of the requirements for the degree of

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OF
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March 2016

DECLARATION

I declare that this thesis is my own, unaided work. It is being submitted for the degree of Master of Philosophy in Sport Science at the University of Johannesburg. It has not been submitted before for any degree or examination in any other university. The turn-it-in report for plagiarism is attached in APPENDIX 5.

Xavier Trevor Mc Creanor

Date



Commissioner of Oaths

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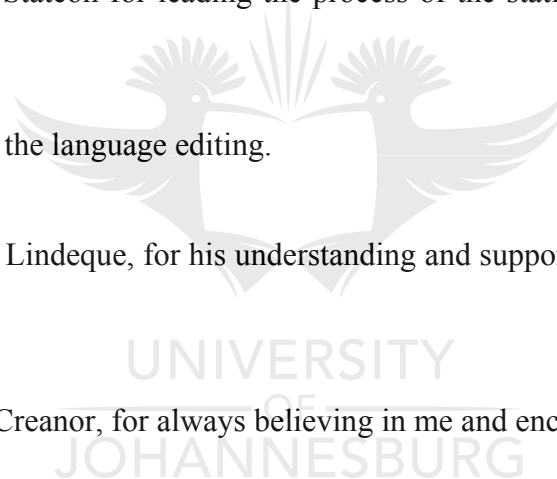
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ABSTRACT

Nutritional supplements refer to any supplementary product ingested to increase the nutritional content of a normal diet to either fill a need or presumed deficiency. The Medicines Control Council (MCC) of South Africa is a statutory body that regulates the performance of clinical trials and registration of medicines. The MCC is responsible for ensuring that all clinical trials of both non-registered medicines and new indications of registered medicines comply with the necessary requirements for safety, quality and efficiency. However, there is currently no regulatory framework enforced by the MCC with regards to supplements in South Africa. A great health concern thus arises with the popularity and the usage of nutritional supplements.

The aim of the study was to determine if gymnasium users in Johannesburg North use nutritional supplements and also to ascertain the attitudes of gymnasium users towards nutritional supplements. The study determines where gymnasium users obtain their information and education regarding supplements. In addition, the researcher gathered information regarding the average monthly expenditure on supplements by Johannesburg's gymnasium users. A theory of attitudes, namely the functionalist theory by the psychologist Daniel Katz, views that attitudes are determined by the functions they serve for us. People grasp on to given attitudes because these attitudes help them attain their basic goals and needs. This theory was used as a guideline to determine that attitude plays a role in the use of nutritional supplements.

The study design is a cross-sectional quantitative study using a self-administered questionnaire (Annexure X). The sample consisted of 364 (205 male and 159 female) gymnasium participants aged between 19 and 49 years old. The participants attended gymnasiums two or more times a week at any of the five selected gymnasiums within the Johannesburg North region.

Noticeable findings amongst the demographics of the gymnasium users include the growth of African (Black) gymnasium users in public gymnasiums. Further findings show that gymnasium users are aware of the increase in nutritional supplement use in public gymnasiums. The majority of gymnasium users make use of nutritional supplements

themselves, and more than half of the gymnasium users started using nutritional supplements at the age of 13 years old. Nutritional supplements cost gymnasium users between R500.00 and R1500.00 per month. It was also found that mass media and peers place pressure on gymnasium users to make use of nutritional supplements. The main reason why male participants go to gymnasiums is to build muscle and for females the main reason is to lose weight.

Gymnasium users make use of protein, carbohydrates, caffeine, vitamin and Omega 3, Phedra-cut, branched-chain amino acids (BCAA), conjugated linoleic acid (CLA) and L-glutamine supplements. Gymnasium users are informed of prohibited supplements but need to be educated on the usage of popular nutritional supplements. Participants are not aware of the mislabelling and health concerns regarding the usage of nutritional supplements, which is a great health concern because most gymnasium users do not read the nutritional value, benefits and side effects on the labels before they use the nutritional supplements.

Most gymnasium users make use of nutritional supplements and are unaware of the health risks involved in it. Educational and awareness campaigns need to be implemented to assist gymnasium users to make more informed decisions regarding supplement usage.

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CHAPTER 1

INTRODUCTION, PROBLEM STATEMENT, AIM, DESIGN AND SCOPE

1.8 Introduction

Great concern has arisen in the South African health industry regarding unregulated nutritional supplementation in sport. While manufacturers use marketing to promote the value of supplements towards good health, while, the consumer's focus lies more in awareness, education and the improvement of health (Gabriels, Lambert & Smith, 2012). Moreover, a study conducted by Block, Jensen, Norkus, Dalvi, Wong, McManus and Hudes (2007) found that users who consumed a wide collection of nutritional supplements on a daily basis were more prone to have optimal concentrations of chronic disease-related biomarkers, and less prone to suboptimal nutrient concentrations, high blood pressure and diabetes as compared to non-nutritional supplement users.

Muller and Krawinkel (2005) state that the use of nutritional supplements is on the increase worldwide, predominantly in western countries. Furthermore they state that although non-vitamin and non-mineral supplements are also increasing in popularity, the patterns of use for these supplements are not well known. Di Masi, Hansen and Grabowski (2003) found that Americans spend \$20.3 billion on dietary supplements, which included nutritional supplements, in 2003. Evans, Ndetan, Perko, Williams and Walker (2012), in study to determine the money spent per month on nutritional supplements by gymnasium users as well as their attitudes and knowledge towards the usage of nutritional supplements, reported that the sport nutrition market is growing immensely, estimating its worth at \$23 billion.

In a study based in South Africa, Van der Merwe and Grobbelaar (2004) analysed over-the-counter nutritional supplements bought from 14 different retailers in Bloemfontein, South Africa. The researchers tested these supplements for testosterone and nandrolone pro-hormones, various ephedrine and caffeine. Eighteen (60%) contained non-prohibited supplements, yet twelve of the supplements tested positive for numerous prohibited substances. These tainted supplements pose a major concern for the health of their users, including the possibility of allergy to banned substances. The results of this study showed that 7% of the supplements were mislabelled and that premeditated doping through

nutritional supplement use is a reality for the South African gymnasium users who use these nutritional supplements.

A similar international study shows that an unregulated nutritional supplement industry is not a health concern in South Africa only; it poses an international health risk. In their study, Geyer, Parr, Mareck, Reinhart, Schrader and Schanzer (2004) tested 634 non-hormonal nutritional supplements purchased in 13 countries from 215 suppliers. Out of the 634 samples analysed, 14.8% contained banned substances not declared on the label. For South Africa users, such use of these supplements is in contravention of the standards upheld by the South African Institute for Drug Free Sport (SAIDS), an organisation that promotes participation in sport that is free from the use of prohibited performance enhancing substances or methods that insincerely enhance performance. Impermissible doping practices are contradictory to the principles of fair play and medical ethics and to the welfare of the health and well-being of sportspersons in South Africa (SAIDS Annual Report, 2014).

With regards to complementary and alternative medicines use, research conducted by Barnes, Bloom and Nahin (2008) found that 4 out of 10 adults had used such medicine therapy over a 12 month testing period. The most commonly used therapies were non-vitamin and non-mineral products, natural products and deep breathing exercises. A study on multivitamin-multimineral supplements done by Rock (2007) reported that 52% of adults reported taking a dietary supplement in the past month and 35% reported consistent use of a multivitamin-multimineral product. Such supplement usage was surveyed in another study among a sample of persons who exercised regularly at a New York gymnasium. The findings of this study proved that a majority (84.7%) took supplements via ethical means. Many consumed multivitamins (45%), protein shakes (42%), vitamin C (34.7%) and vitamin E (23%) at least five times per week (Morrison, Gizis & Shorter, 2004). No such survey studies have been undertaken within the current South African context.

1.9 Problem statement

The health and safety of supplement users is of great concern. It seems that there is a need for a regulatory framework in the nutritional supplementation industry in South Africa and internationally, as failure to implement such a framework could lead to primary and secondary health issues of those who make use of supplements. Formulating such a

framework would require taking into account adult gymnasium users' attitudes towards nutritional supplements. However, there has been very little research done in this area. This research study thus focusses on adult (18 to 49 years old) gymnasium users' perception and use of nutritional substances. The results of this study show that gymnasium participants are using nutritional supplements, highlighting their current knowledge and understanding regarding these supplements. Using the results of this study, awareness campaigns can be used to educate gymnasium participants on the use of popular nutritional supplements, including the possible associated health risks. This research will inform the gymnasium population of the effects and costs of nutritional supplement usage.

1.10 Aim, objectives and hypothesis

1.10.1 Aim

The aim of the research was to investigate the use of nutritional supplements by commercial gymnasium patrons in the Johannesburg North region.

1.3.2 Objectives

Based on the aim stated above, the following objectives were identified for this study:

- To determine if gymnasium users use nutritional supplements.
- To ascertain why gymnasium users use nutritional supplements.
- To determine the current knowledge of these supplements among gymnasium users and establish where these users obtain their information and education regarding supplements.
- To gather information on the average expenditure by the Johannesburg North gymnasium users on supplements.

1.11 Hypothesis

The hypothesis of the study was that most gymnasium users use some form of nutritional supplement and are unaware of the associated health risks.

1.5 Definition of terms and abbreviations

1.5.1 Attitudes

Attitude can be defined as “a psychological tendency that is articulated by evaluating a particular entity with some degree of favour or disfavour”. The crucial features of attitudes – namely, tendency, attitude object (or entity) and evaluation – are encompassed in this definition. We can distinguish between evaluative responses that express attitudes and the inner tendency that is attitude (Eagly & Chaiken, 2007).

1.5.2 Medicines Control Council (MCC)

Gabriels et al. (2012) state that the Medicines Control Council (MCC) of South Africa is a statutory body that regulates the performance of clinical trials and registration of medicines. The MCC is responsible for ensuring that all clinical trials, both of non-registered medicines and new indications of registered medicines, comply with the necessary requirements for safety, quality and efficiency.

1.5.3 Nutritional supplements (NS)

Any product that is taken orally that contains a “dietary ingredient” intended to supplement a diet is classified as a nutritional supplement. The “dietary ingredients” in these supplements include vitamins, minerals, herbs or other botanicals, amino acids and substances such as enzymes, organ tissues, glandular and metabolites (Gabriels, Lambert & Smith, 2012). In a study by Froiland, Koszewski, Hingst and Kopecky (2004), the researchers requested participants to give their own definition of supplements. Thirty four (34) percent responded with: A nutritional supplement is a product that helps increase performance, strength and muscle tone and improve recovery. Some of the participants also defined nutritional supplements as: a multivitamin, something that to some degree improves wellbeing, supplementary nutrition added to the diet, pills and anything except food that helps the user increase or lose weight.

1.5.4 Muscle dysmorphia (bigorexia)

An emerging condition called “muscle dysmorphia” is a condition that primarily effect males. One of the key symptoms of muscle dysmorphia is the individual’s obsession with being inadequately muscular. Individuals suffering from muscle dysmorphia will often squander unnecessary amounts of money on nutritional supplements, spend hours in the gymnasium, develop abnormal eating patterns or even consider doping (Phillip & Mosley, 2008).

1.5.5 Anorexia nervosa

Behaviour characterised by long-lasting food avoidance, which is resistant to change, is the core pathological behaviour of anorexia nervosa. This avoidance includes restriction in the range and amount of food consumed. Anorexia nervosa results in clinically low body weight (Hildebrandt, Grotzinger, Reddan, Greif, Levy, Goodman & Schiller 2015). Furthermore, anorexia nervosa can cause further disorders in the mental and physical development of young adolescents and, in life-threatening cases, even led to death (Babic-Zielinska, Wadolowska & Tomaszewski, 2013).

1.5.6 Creatine

Creatine is a naturally occurring nutrient that can be obtained in foods such as meat and fish. Consuming this nutrient in substance form can increase the amount of stored creatine in muscle tissue. Immediate effects on maximum strength and power are observable on consuming creatine in substance form. This nutrient allows for more high-intensity workouts and high levels of creatine can increase skeletal muscle (Mueller & Hingst, 2013).

1.5.7 Protein

Protein can be defined as large biological molecules, or macromolecules, consisting of one or more long chains of amino acid residues. Protein can be found in milk in the form of whey and casein proteins. Protein can also be found in eggs. Consuming protein in substance form can help to increase muscle mass by building new tissues in the body, also improving strength and power. In addition, protein enhances and strengthens the immune system (Mueller & Hingst, 2013).

1.5.8 Caffeine

Caffeine is a chemical compound found in over 60 species of plants, including coffee beans, tea leaves, cocoa beans, gaurana and kola nuts. Caffeine can improve cognitive ability, including concentration, reaction time, focus and tactical decision making. Consuming caffeine can also enhance endurance in exercise performance (Mueller & Hingst, 2013).

1.5.9 Carbohydrates

Carbohydrates can be defined as sacchharides (sugar) and starch compounds found naturally in foods such as fruits, vegetables, dairy, legumes and grains. They are also found in sport drinks, energy bars and energy gels. Carbohydrates consumed in substance form can increase endurance and improve recovery time (Mueller & Hingst, 2013).

1.5.10 Doping

Any substance used unethically by adults to help improve physical performance or physical appearance that is on the World Anti-Doping Agency's list of banned substances results in doping. Anabolic steroids are the most frequently used performance enhancement supplements. Individuals who use anabolic steroids without a doctor's prescription are at risk for health problems such as productive issues, heart disease and premature death. Other side effects include aggression, mood disturbance and depression (Dodge & Jaccard, 2006).

1.5.11 World Anti-Doping Agency (WADA)

The World Anti-Doping Agency (WADA) is the leader in the fight against doping in sport in the world. WADA is responsible for producing an annually updated list of banned substances (Gradidge, Constantinou & Coopoo, 2010). It also publishes an annual prohibited list based on South African brand names (World Anti-Doping Agency Budget, 2014).

1.5.12 South African Institute for Drug-Free Sport (SAIDS)

South Africa also has its own doping control agency. The South African Institute for Drug-Free Sport (SAIDS) has contributed significantly to the advocacy, monitoring, testing and education of athletes with regards to prohibited substances, as defined and designated by the International Olympic Committee (Coopoo & Mandjra, 2002).

1.5.13 Functionalist theory

Daniel Katz designed a theory of attitudes known as the functionalist theory. This theory is based on the premise that attitudes are determined by the functions they serve. In other words, people adopt a given attitude because this attitude helps them attain a basic goal or need. Fiske et al. (2010) state that there are four types of psychological functions in the functionalist theory: instrumental, knowledge, value-expressive and ego-defensive.

1.5.14 Gateway theory

This theory proposes that when an individual uses a less addictive or dangerous drug (such as dagga), he/she predisposes him/herself to using a more addictive or dangerous drug (such as cocaine). Similarly, when an individual uses nutritional supplements, he/she may then be likely to take steroids.

1.6 Structure of thesis

Chapter two provides a literature study that focuses on the functionalist theory designed by Daniel Katz, body image and the use of nutritional supplements, supplement use on health, unethical use of supplements and the impact of media and social expectations on the individual.

Chapter three is the research methodology, which includes the study design, site of study, study population testing procedures, planning of the investigation, ethical considerations and the statistical analysis.

Chapter four discloses the results captured in different data sets. This information was gathered from the responses obtained from questionnaires completed by 365 gymnasium participants from gymnasiums in the Johannesburg North region.

Chapter five includes a discussion of the results and conclusion to the study. Reasons as to why gymnasium users use nutritional supplements are offered and the costs of nutritional supplement usage are looked at. Recommendations are made for further research.

1.7 Summary

Limited research on the attitudes amongst gymnasium users towards nutritional supplements, both in South Africa and internationally, has been done. Furthermore, there has been great concern over the lack of a medical regulatory board, as the indiscriminate use of unregulated substances could lead to primary and secondary health issues in gymnasium users who make use of these supplements. This study was conducted in order to critically investigate and analyse the attitudes of adult gymnasium users in the Johannesburg North region towards nutritional supplements, establish what supplements the participants use and the amount of money spent on these nutritional supplements and find out if the participants are aware of the health risks involved.

To summarise, this chapter provided an introduction to the study and discussed the purpose of the study, stated the problem, aims and objectives and defined the terms and abbreviations used. In the following chapter, a literature study, which focusses on the functionalist theory, will be provided. Body image and use of nutritional supplements, the effects of supplement use on health, unethical use of supplements and the impact of media and social expectations on the individual will also be addressed.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter explores the conceptual framework and literature relevant to this study. In the literature review, adult gymnasium users' attitudes towards nutritional supplement usage are addressed, as are factors that contribute to nutritional supplement use in the non-athletic gymnasium user. The theoretical framework of this study focusses on Daniel Katz's functionalist theory. The four types of psychological attitudes, known as instrumental, knowledge, value-expressive and ego-defensive are discussed. As the focus of this section is mainly on why attitudes change, various studies are reviewed to determine how attitudes affect an individual's values and beliefs.

External influences will also be addressed in order to ascertain the impact of the media and society on an individual and to establish what roles these external influences have on nutritional supplement usage. To this end, literature was reviewed to determine what the "ideal" male and female bodies are. The term reverse anorexia is discussed in line with the various measures people resort to acquire the "ideal" body. An argument on body-image discrepancy and social influences among Indian boys in South Africa follows to prove that body image is one of the reasons teenagers use banned supplements.

In addition, the term doping is elaborated upon, arguing that this is one of the great lengths people will go to gain a competitive advantage in gymnasiums, or even to obtain the "ideal" body. As such, the roles and functions of the World Anti-Doping Agency (WADA) and the South African Drug-Free Sport (SAIDS) are investigated, demonstrating that doping is both a problem in South Africa and internationally.

A large portion of this chapter is dedicated to various health issues and the use of nutritional supplements. The literature review will show that some of the reasons why consumers consume nutritional supplements are to help with health problems such as colds, stress, cancer and heart attacks and to increase their energy. Because of their increasing usage in this regard, natural products are defined and the dangers involved in consuming some of these products are investigated. Next, the importance of distributing accurate information

regarding supplement recommended dosages, health warnings and mislabelling are reviewed. The lack of regulatory measures reading the nutritional supplement industries – both nationally and internationally – are discussed. To this end, a well-known pharmacy in South Africa's quality assurance programme is analysed. Lastly, the average gymnasium user's expenditure on nutritional supplements, nationally and internationally, is investigated in this review project.

2.2 Theoretical framework: Daniel Katz's functionalist theory and attitudes towards nutritional supplements

Attitude can be perceived as a favourable or unfavourable evaluative reaction toward something or someone, showed in one's beliefs, moods or intended behaviour (Fiske, Gilbert & Lindzey, 2010). Fiske et al. (2010) divide attitudes into three components, namely cognitive, affective and behavioural attitudes. Cognitive attitudes can be defined as our thoughts, beliefs and ideas about something. When a human being embraces an attitude, the cognitive attitude often results in labelling, for example, healthy older people use a particular form of supplement. Affective attitudes involve the feelings or emotions that an idea evokes, for example, fear of not being healthy or sympathy for overweight people. Behavioural attitudes can be described as a tendency or disposition to react in certain ways towards something, for example, one might want to use supplements to enhance health. The importance here regarding attitude is on the tendency to react, not the actual acting; what we mean and what we do may be different.

The functionalist theory proposed by Katz is a theory of attitudes, which views attitudes as determined by the functions they serve. In other words, people adopt given attitudes because these attitudes help them attain their basic goals and needs. Fiske et al. (2010) elaborate on the four types of psychological functions that attitudes meet, as distinguished by Katz. The four types of psychological attitudes are:

A. Instrumental – we develop positive attitudes towards things that reward us. We want to maximise rewards and minimise consequences. In terms of this study, we favour certain supplementation companies. When its prices are low, we favour a certain company, without keeping health risks in mind (i.e. buying not necessarily the best quality brand). We are more

likely to change our attitudes if doing so allows us to fulfil our goals or avoid undesirable consequences.

B. Knowledge – attitudes provide us with an eloquent, organised atmosphere and supply us with ideals of evaluation. In life we pursue some degree of order, clarity and solidity in our personal frame of reference.

C. Value-expressive – basic values are expressed that reinforce self-image. If, for example, we are brought up conservatively, we embrace conservative beliefs and values. We may have a self-image that varies from an enlightened traditional or a confrontational radical, and we cultivate attitudes that we believe indicate our core value.

D. Ego-defensive – some attitudes serve to guard us from recognising basic truths about ourselves or the punitive realities of life. These attitudes serve as defence mechanisms. In a book written by O’Keefe, the writer uses the example of a person that might have a positive attitude towards engaging in exercise and have positive normative beliefs about the exercise, but might not try to exercise regularly because the person believes that s/he is incapable of exercising regularly (not fit enough, requires specialised equipment and so forth).

In addition, the Katz's functionalist theory offers an explanation as to why attitudes change. According to Katz, an attitude changes when it no longer achieves its function, and the individual feels obstructed or unfulfilled. That is, according to Katz, attitude change is attained not so much by altering a person's information or awareness about an object, but rather by altering the person's primary motivational and personality needs. For example, one's attitude may change towards people that do not use nutritional supplementation because one starts using nutritional supplementation oneself. O’Keefe (2004) states that attitude change is one of the most important aspects in the decision making process. All sort of decisions, such as what brand to support, what product to buy or where to buy supplements are basically subject to change in attitude.

Precious research has been conducted on attitudes and nutritional supplements, using various theories. Singhammer (2012), for example, did research on attitudes towards performance enhancing supplements and methods and found that the more than 60% of the participants in the study were opposed to banned supplements and methods that enhanced performance. Relative positive attitudes towards banned supplements and methods that represent innovative areas peaked among young adults. Furthermore, men showed a favourable attitude towards the use of supplements. Donovan, Egger, Kapernickn and Mendoza (2002)

conducted research on a conceptual framework for achieving performance enhancing supplements compliance in sport. Their study showed that an athlete's beliefs and values are known to influence whether or not an athlete will use banned supplements. Backhouse, Whitiker and Petroczi (2011) explain that, according to the theory of reasoned action, planned behaviours can be influenced by one's attitude. Attitude can influence one's behaviour through the mediator of intention.

Research conducted by Coopoo (2000) found that athletes are preoccupied with body image. After data collection via a questionnaire, results showed that athletes sourced information on supplements for sport from magazines, sporting organisations, doctors, pharmacists and books. Furthermore, it was found that athletes generally had poor knowledge of classifications of banned supplements. These findings are worrying in that they portray a general concern among athletes with body image, leading to the question of what makes them so aware of body image. The finding of these studies all show that attitudes and perceptions of gymnasium participants regarding supplement use are directly affected by pressure from peers, media and society to succeed and reach set goals.

2.3 The impact of the media and society

Advertising nutritional supplements with health claims is an increasing phenomenon in South Africa. To market these products, producers and marketers claim credibility through appealing to certain health claims. Yet research shows that claims made in these advertisements may not always be sufficient, appropriate or valid for the products being advertised. Furthermore, because individuals often gain their information regarding nutritional supplements from advertisements, as well as doctors, family and friends, it is vital that information about supplements in advertisements should be accurate and correct (Schoonees, Young & Volmink, 2013).

In fact, physical and mental health at large is influenced by mass media in the form of messages and images. Advertising in the form of magazines, news, television, internet and such is used by advertising companies to sell their products and services. Magazines sell supplements using the appeal of the "ideal" bodies in their advertisements; news shows depict winners of a world cup with a supplement sponsor's branding in the background; exercise programs during primetime in the morning are televised with supplement advertisements in the commercial breaks and many websites on the internet are used as

advertising platforms for nutritional supplements and their health claims. It is not a new phenomenon that media has an influence on how individuals make decisions and judgements regarding their own and others' health-related behaviours. In fact, negative advertisement also plays a role. For example, cigarettes and alcohol are associated with entertainment, thus the viewer will believe that in order to entertain, one will need to make use of these products (Schmidt & Brown, 2002).

The impact of media on reasons for using supplements has been researched in collegiate athletes. Because sport is exceptionally popular, watched and supported by thousands of people, high profile athletes who have been caught using prohibited supplements have been documented in the media, which may have influenced many younger viewers' decisions to use banned supplements. The media televises college football games with stadiums seating close to 100,000 people (Atkinson, 2011), testifying both to the popularity of the sport and the pressure on athletes to perform.

South Africa too is home to world-class sporting facilities capable of accommodating thousands of spectators, including the Newlands grounds in Cape Town, Wanderers cricket grounds in Johannesburg or the Ellis Park stadium, with a capacity of 100,000 spectators (South African Info, 2014). Rugby, cricket and soccer are televised weekly from these stadiums. For example, a massive cumulative total of 34 074 497 South African rugby fans have tuned into the 100 matches played up to round 15 of the Super Rugby in 2011; 99 matches had been played with a total of 28 658 402 viewers. While only one game less had been played in 2014, the difference of 5 416 095 is a significant gap and therefore a great increase in viewership as compared to 2014 (Rugby talk/Popularity of Rugby, 2014).

The marketing and advertisement of supplements during these games might lead to the assumption by viewers that the players or athletes make use of these supplements. Some gymnasium participants may believe that the only way to get to that level of competition is to use supplements. Atkinson (2011) stated that media influences athletes to do well. Gymnasium participants may see professional athletes using supplements, and they may believe it is acceptable to use and may have more lenient attitudes towards performance enhancing supplements. In fact, Breivik et al. reported that the use of supplements can be directly linked to societal ideals. Values such as performance, individualism and scientific and technological processes seem to be driving forces of social processes in modern society.

The emphasis on illness and health has increased significantly, especially in the sport and fitness industry, with the focus on technologies to improve and generate a healthy image.

In a modern Western Culture, image and appearance plays a key role in supplement use, as these products are used by young men to boost self-confidence and improve body image. Well trained, slim bodies are portrayed in commercial advertisements as the “ideal body”. Atkinson (2011) reported that only 8% of the general population were “very satisfied” with their own bodies appearance, and 17.3% were “a little dissatisfied”.

Although parents and physicians have an influence on the decision making process of an individual’s use/non-use of supplements and attitudes towards the use of supplements, data also shows that media is consistently cited as an influence on use/non-use, which is a cause for great concern among health professionals (Perko, Bartee, Dunn, Wang & Eddy, 2000). In Schmidt and Brown’s (2002) study on mass media’s effect, they argue that this effect may be “intended” (for example, where health educators develop health campaigns) or “unintended” (where viewers adopt unhealthy behaviours). The following table (Table 2.1) gives examples of potential effects of the mass media on personal and public health.

Table 2.1: Potential effects of the mass media on personal and public health

Personal-level health effects		
Intended	Positive	Entertainment-Education: More people seek medical advice before using supplements after seeing the health risks involved in taking supplements without consulting a doctor
	Negative	Marketing: Unhealthy products, such as caffeine; advertisements directed at young people. Can increase the intake of these products
Unintended	Positive	Risk perception: News increases awareness of safe use of nutritional supplements Agenda-settings: News of medical breakthroughs inform consumers
	Negative	Displacement: More media use, less physical activity, greater body weight Modelling: Adolescent girls try to attain media’s thin body standard

Public-level health effects		
Intended	Positive	Media advocacy campaign: Gets sexist supplements billboards removed from urban neighbourhoods
	Negative	Advertising leverage: Supplement industry's advertising clout reduces editorial content regarding health risks involved
Unintended	Positive	Agenda-setting/framing: Dis-Chem Pharmacies comprehensive quality assurance programme might lead to more testing of nutritional products (South, 2014)
	Negative	Budget priorities: Media coverage increases funding for war on drugs at expense of other health and social issues

More than half of the people residing in the United States reported that they were exposed to nutritional supplement via advertisements, including print and internet ads, infomercials and other advertising materials (Starr, 2015).

2.4 Body image and the use of nutritional supplements

The “ideal” female body is correlated with weight by the media; an unrealistically thin female body is portrayed as the “ideal” female body. This portrayal leads to dissatisfaction with appearance among both adolescent girls and adult women. In trying to obtain an “ideal” body, these girls and women may be at risk of an eating disorder known as anorexia nervosa. One of the key features of this eating disorder is weight loss. A sufferer of anorexia nervosa may have less than 85 percent body weight than what is expected in terms of their height and age. A person suffering from anorexia nervosa will also struggle to attain or maintain the expected weight. The criterion for this expected weight refers to “minimally normal” weight, suggesting a range of weight (minimum to maximum weight) that is regarded as optimal weight. Anorexia nervosa is characterised by weight below that of the minimum optimal weight, calculated via Quetelet’s body mass index (BMI) prediction. BMI is calculated by dividing the weight in kilograms by the height in meters squared ($BMI = \text{kg/m}^2$).

A person suffering from anorexia nervosa normally achieves weight loss through the reduction of food intake or by the use of appetite suppressants. Furthermore, anorexia nervosa can be characterised by either restricting of eating or by binge eating/purging (Baumann, 2007). Hartmann, Thomas, Greenberg, Rosenfield and Wilhelm (2014) state that the main cause of anorexia nervosa and body dysmorphic disorder stems from negative body image i.e. the thinner the sufferers become, the fatter they perceive themselves to be (Canaday, 1981). Weight loss supplements can also be used to attain the ideal body image.

The following diagram (Figure 2.1) illustrates the criteria for the diagnoses of anorexia nervosa.

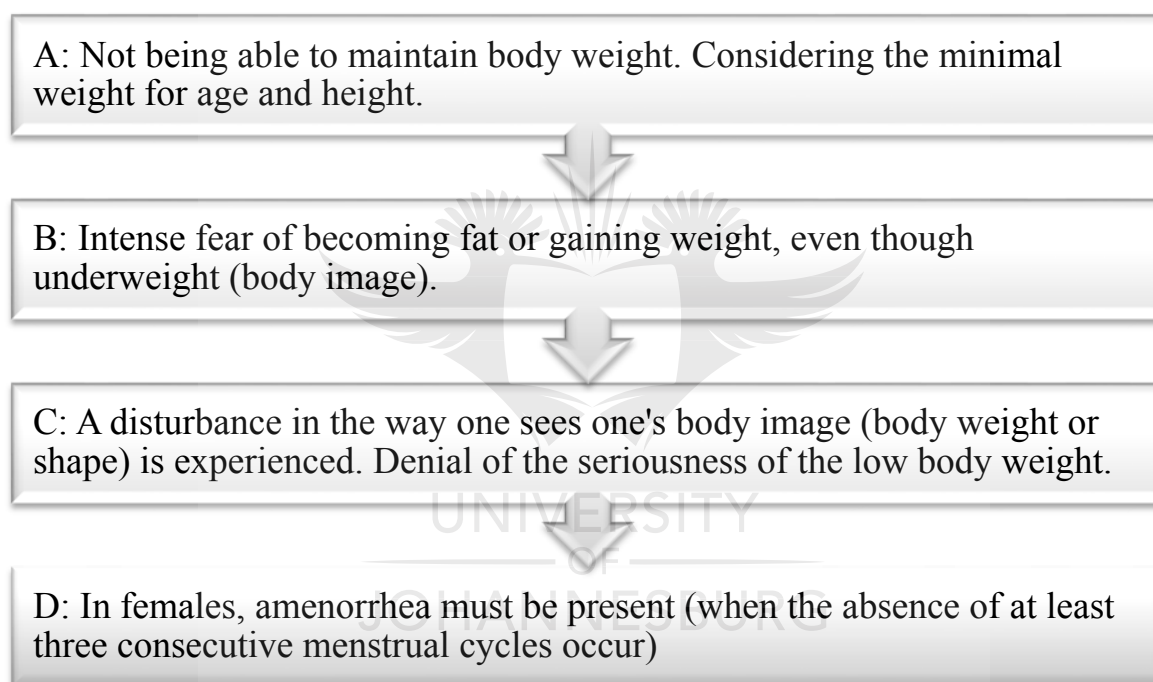


Figure 2.1: Criteria for the diagnoses of anorexia nervosa (Baumann 2007:175-181).

The diagnoses of anorexia nervosa can only be made by a medical practitioner, who usually refers the patient to a specialist after the patient is evaluated for any other general medical conditions (Baumann 2007:175-181).

The opposite of anorexia nervosa can be defined as muscle dysmorphic disorder or reverse anorexia, another disorder pertaining to achieving the “ideal” body. Reverse anorexia is a syndrome that is mentioned in a study conducted by Hatoum and Belle (2004). It is defined as a disorder in which normal to overweight men perceive themselves as too small. These

men will go to great lengths to achieve the perfect body, using methods such as vigorous body building and consuming banned supplements. These extreme measures are taken by these men in pursuit of the “ideal” male body image, which is created by the media, to become more muscular (Hatoum & Belle, 2004). In a study conducted by Manuel and Heckman (2010), it was found that athletes make use of supplements to stimulate the growth of muscles and after intense exercise to lessen the time needed for their recovery process. In Mosley’s (2009) study regarding muscle dysmorphia, the researcher argues that many young men are dissatisfied with their appearance; they tend to want a rather larger and more muscular body as opposed to a slimmer and smaller body in the case of females. However, men that were muscular still believed that they appeared weak and small.

A study conducted by Brevik, Hanstad and Holland (2009) on “A comparison between elite athletes and the general population” found that females were more inclined towards body modification techniques whereas males preferred performance enhancement – they were more focused on the increase of strength and endurance. The study also recorded that, for women, there is a growing number of body modification techniques available to alter appearance of the body.

A study concerning the use of performance enhancing supplements by Atkinson (2011) has shown that gymnasium users take supplements because of pressures to perform at a high level as well as a desire to improve body image and to do well. It was also found that print media is used to feature adverts and articles that represent an “ideal” body shape rather than healthy diets. In support of Brevik, Hanstad and Holland’s (2009) study discussed above, Hatoum and Belle (2004) state that women often experience body dissatisfaction, particularly, the aspiration to be thinner. This dissatisfaction is associated with risky eating disorders and supplement usage. Men’s concern with their bodies is more often related to being under muscular, also leading to dangerous attitudes and behaviours towards supplement usage. For example, a study conducted at the University of KwaZulu-Natal in Durban investigated the relationship between body-image discrepancy and social influences among Indian teenagers in South Africa. This study found that many boys desired “six-pack” abs like Bollywood actors. Furthermore, the researcher believed that this is one of the reasons Indian teenagers use illegal steroids (Fitzgibbon, Blackman & Avellone, 2000).

There is a gap in research as to why adult gymnasium participants use supplements. A possible reason can be that there is a desire to have “six-pack” abs as seen on television and

in the media. A previous study has found that one of the most important motivations for the use of supplements amongst adults in general is to increase muscle mass, strength and enhance physical appearance (Cohen, Collins, Darkes & Gwartney, 2007). This desire is not a new phenomenon; since the late 1980's prohibited supplements have been used by sport participants, with the key goal to gain muscle size and strength (Johnson, Jay, Shoup & Rickert, 1989). It has been reported that many individuals, from elite sport participants to recreational body builders, make use of prohibited supplements (Lambert, Titlestad & Schweltnus, 1998). A paper by Cohen and colleagues (2007) found that the average user of anabolic steroids is 29 years old and banned supplements are mainly used by adults. Cohen and colleagues (2007) also found in this study on banned supplements that these adults were not active in organised sport; it may be presumed for the purposes of this study that these adults may be average gymnasium users.

Further research needs to be done to investigate the efficacy of these these supplements. Although some users of nutritional or banned supplements may show a perceived or actual improvement in their results, this change may be caused by a phenomenon commonly called the placebo effect. According to research done by Weight et al. (1988), there is no indication that physical performance can be enhanced by the consumption of certain vitamin supplements.

2.5 Doping

Any supplements used by gymnasium participants that reportedly improve performance and is found on the list of banned substances can be identified as a performance enhancing supplement (WADA Annual History, 2014). This annually updated list of banned substances is made available by the World Anti-Doping Agency (WADA). South Africa also makes a contribution as a custodian of doping control in this country. The South African Institute for Drug-Free Sport (SAIDS) has contributed significantly to the advocacy, monitoring testing and education of athletes with regard to prohibited substance (Coopoo & Mandjra, 2002). Doping is regarded as a form of cheating, where athletes use substances that are on this prohibited list, predominantly for gaining a competitive edge over their competitors (Gradidge, Coopoo & Constantinou, 2010). Several surveys have revealed statistics that suggest that the use of performance enhancing supplements has increased substantially over the past 50 years (O'Connor & Adams, 2008).

One of the more popular supplements used is androgenic-anabolic steroids (AAS). Hartgens and Kuipers (2004) describe AAS as synthetic derivatives of the male hormone testosterone. They can exert strong effects on the human body, which may be beneficial for gymnasium performance. AAS are extensively used by sport contestants, who are focused on the improvement of their muscle size and strength. Hartgens and Kuipers (2004) also found that it is common for body builders to make use of AAS. Other studies regarding the use of AAS amongst participants have often been done in North America, but the problem has become international. Recent studies conducted in South Africa show that the use of AAS is evident in sport participants, bodybuilders and adolescents. A study, “Prevalence of androgenic anabolic steroid use in adolescents in two regions of South Africa”, conducted by Lambert, Titlestad and Schweltnus (1998) has proven that AAS were mainly taken by bodybuilders and a vast percentage of weight lifters, showing a certain prevailing attitude towards performance enhancing drugs by bodybuilders. However, many nutritional supplements contain doping substances other than AAS, which are often declared on the labels. Fat burners or activating agents that contain high caffeine and/or ephedrine levels are just some of the nutritional supplement available over the counter as nutritional supplements (Geyer, Parr, Koehler, Mareck, Schanzer & Thevis, 2008)

2.6 Nutritional supplement usage and health

Any product that is taken orally that contains a “dietary ingredient” intended to supplement a diet is classified as a nutritional supplement. The “dietary ingredients” in these supplements include vitamins, minerals, herbs or other botanicals, amino acids and substances such as enzymes, organ tissues, glandular and metabolites (Gabriels, Lambert & Smith, 2012). Consumers of nutritional supplements have reported a variety of reasons for taking these nutritional supplements, including decreasing their vulnerability to health problems such as colds, stress, cancer and heart attacks, as well as to increase their energy. However, the connection between health status and nutritional supplement use remains unclear for most nutritional supplements (Froiland, Koszewski, Hingst & Kopecky, 2000).

Froiland et al. (2000) emphasise that consumers of nutritional supplements need to be conscious that unnecessary use of vitamin-mineral supplements may produce unwanted effects. Moreover, nutritional supplements are typically used without medical advice, and precise indications for use of nutritional supplements are lacking. Combining two or more

supplements might lead to adverse effects or even overdose if consumers set their own dosage regimen. Mottram (2005) states that the excessive usage of vitamins, for example, can be deadly. This assertion applies predominantly to the fat-soluble vitamins (A, D, E and K), which are stored in the body and can therefore accumulate. Toxic effects can occur when taking water-soluble vitamins (B and C) in excess. Protein and amino acid supplements are often used by gymnasium users, predominantly where muscle development is of major importance. Protein is a vital component in a balanced diet but there is no experimental proof to show that protein supplements improve metabolic activity or lead to augmented muscle mass. In addition, excessive consumption of protein supplements can have toxic effects and lead to greater health problems. There is thus great concern among researchers regarding consumers' health when consumers use nutritional supplements without consulting a medical practitioner. Morton, MacLaren, Cable, Campbell, Evans, Bongers and Drust's (2007) research proved that, contrary to the intention of many supplement users, impaired performance can be a result of manipulating one's diet by inducing metabolic acidosis, dropping carbohydrate intake or increasing protein and fat intake.

Part of the problem is that among supplement users, there is a generally held view that all "natural" products are, by definition, free of toxic side effects. However, consumers must remember that that in the early days of pharmacological science all drugs were derived from animal and plant sources and that many of these derivatives are amongst the greatest toxic chemicals known to man. Some nutritional supplements thus have potential to harm. In addition, manufacturers make overstated claims regarding ergogenic properties of their products. Such claims are seldom substantiated by sound scientific statistics in peer reviewed journals (Mottram, 2005).

Relevant to this study, Bianco, Mammina, Paoli, Bellafiore, Battaglia, Caramazza and Jemni's (2011) research found that gymnasium supplement users were not aware of recommendations for supplement intake. In addition, they state that it is tremendously important to distribute accurate information on the supplements, mainly in fitness centres, so that gymnasium users can attain their objectives while suffering fewer primary and secondary health risks. Gymnasium users should be made aware of the findings that support the beliefs that athletes consuming a well-balanced diet do not require mineral or vitamin supplements and taking nutritional supplements are taken in overdose may cause toxic side effects (Weight, Noakes, Labadarios, Graves, Jacobs and Berman, 1988). In fact, in a later study

conducted by Phillips (2004), it is cited that there is still no evidence to suggest that supplements are mandatory for muscle growth or strength gain.

Furthermore, as indicated above, many supplements contain substances not declared on the label. Geyer et al. (2003) confirmed that 110 supplements from the international market contained substances like caffeine that were not listed in the ingredients. Two of the products tested also contained substances like pseudoephedrine and methyl-ephedrine, which were also not indicated on the labels. Ivanova, Ivanov, Pankova, Atanasov, Obreshkova and Petkova (2015) state that this mislabelling takes place on a large scale. Supplements such as vitamins, amino acids and vitamins can contain AAS not stated on the labels of the products, which is cause for concern. Inadequate observation and quality control of nutritional supplements is a reality and can result from production companies not following Good Manufacturing Practices (GMP).

Gabriels, Lambert, Smith, Wiesner and Hiss (2015) did research on melamine contaminated nutritional supplements. One of the additives to some nutritional supplements is “Scrap Melamine”. During the China melamine crisis in 2008, it was reported that 294 000 infants were diagnosed with calculi and urinary tract stones associated with milk contaminated with melamine. At least 6 deaths were recorded due to these melamine contaminated supplements. In long term use, humans might be at risk of urolithiasis formation in exposure to low levels of melamine. In their study, Gabriels et al. (2015) proved that 47% of products tested (n=138) tested positive for melamine. A further 82% of South African produced products (n=27) tested positive. Lastly, of all products (n=50) imported into South Africa, 58% tested positive for melomine. Again, these findings suggest that the nutritional supplement sector should be reformed.

The following table is a summary of nutritional supplements, including their definitions, performance benefits and related health concerns (Mueller & Hingst, 2013).

Table 2.2: The common nutritional supplements used by gymnasium users

NUTRITIONAL SUPPLEMENT	WHAT IS IT?	PERFORMANCE BENEFIT	HEALTH CONCERNS
Branched-Chain amino acids (BCAA)	Amino acid having aliphatic side-chains with a branch (a carbon atom bound to more than two other carbon atoms).	<ul style="list-style-type: none"> - Stimulates protein synthesis. - Increases the rate of protein synthesis. - Increases the cell's capacity for protein synthesis. 	<ul style="list-style-type: none"> - Hypoglycemia. - If taken with alcohol, liver problems may occur that can cause brain damage.
Caffeine	Chemical compound found in over 60 species of plants, including coffee beans, tea leaves, cocoa beans, gaurana and kola nuts.	<ul style="list-style-type: none"> - Better cognitive ability, including concentration, reaction time, focus, and tactical decision making. - Improved endurance in exercise performance. 	In excessive use: <ul style="list-style-type: none"> - Dehydration. - Increased heart rate. - Impaired fine motor control. - Sleeplessness. - Diarrhoea.
Carbohydrate (CHO) supplementation	<ul style="list-style-type: none"> - Sacchharides (sugar) and starch found naturally in foods such as fruits, vegetables, dairy, legumes and grains. - Also found in sport drinks, energy bars and energy gels. 	<ul style="list-style-type: none"> - Increased endurance. - Improved recovery time. 	In excessive use: <ul style="list-style-type: none"> - Bloating. - Nausea. - Cramping. - Diarrhoea.
CLA (Conjugated linoleic acid)	A family of at least 28 isomers of linoleic acid found mostly in the meat and dairy products derived from ruminants.	<ul style="list-style-type: none"> - Increases metabolic rate. - Decreases abdominal fat. - Enhances muscle growth. - Lowers insulin resistance. - 	<ul style="list-style-type: none"> - Hyperglycaemia. - HDL cholesterol.

Creatine (Creatine monohydrate)	<ul style="list-style-type: none"> - Naturally occurring nutrient that can be obtained in the diet from meat and fish. - Consuming creatine in substance form can increase the content of stored creatine in muscle tissue. 	<ul style="list-style-type: none"> - Immediate effects on maximum strength and power. - Allows for more high-intensity workouts. - Increases skeletal muscle. 	<ul style="list-style-type: none"> - Altered renal function. - Elevated muscle and liver enzymes. - Muscle cramping.
Omega-3 fatty acids	<p>Polyunsaturated fats can be found naturally in such foods as nuts and seeds and their accompanying oils as well as fatty fish.</p>	<ul style="list-style-type: none"> - Quicker recovery. - Used in treatment of inflammation. - Improves cognitive parameters. - Increases blood and oxygen flow to working muscles. - Increases ability to burn fat and energy. 	<p>In excessive use:</p> <ul style="list-style-type: none"> - Indigestion and gas.
L-Glutamine	<p>Amino acid found in the body, predominantly synthesized and stored in the muscles.</p>	<ul style="list-style-type: none"> - Improves immune response and recovery times during training cycles. - Improves recovery time from sport-orientated trauma. 	<ul style="list-style-type: none"> - Constipation. - Bloating.
Phaedra-cut thermo genic aid	<ul style="list-style-type: none"> - Consists of a synergistic blend of botanical ingredients. - Encapsulated form of premium, highly concentrated natural capsicum extract, Capsimax. 	<ul style="list-style-type: none"> - Aids weight control. - Thermo genic action. 	<ul style="list-style-type: none"> - Dehydration. - Constipation. - Nausea.

Protein supplementation	Large biological molecules, or macromolecules, consisting of one or more long chains of amino acid residues. Protein can be found in milk in the form of whey and casein proteins. Protein can also be found in eggs.	<ul style="list-style-type: none"> - Increases muscle mass by building new tissues in the body. - Enhances and strengthens the immune system - Improves strength and power. 	<p>In excessive use:</p> <ul style="list-style-type: none"> - Dehydration. - Muscle cramps. - Thermoregulation.
Vitamin supplementation	Here, vitamins B12, C, D and E – all found in a variety of foods and by nature.	<ul style="list-style-type: none"> - Plays important role in the body as regulator during metabolism, which may influence several of the physical courses of action necessary for sport performance. - B-Complex vitamins help with carbohydrate and fat processing for the production of energy. 	<p>In excess use:</p> <ul style="list-style-type: none"> - Damage to the liver.

2.7 The regulation and expenditure regarding nutritional supplement

It is not a new occurrence that nutritional supplement use is an extensive and accepted practice of professional athletes and people who attend commercial gymnasiums in South Africa. However, little is known about the supplement industry's lack of regulatory measures and the impact that these supplements may have on the user's health (Gabriels, Lambert, Smith & Hiss, 2011). In March 2010, South Africa welcomed a promulgation of the new food labeling and advertising legislation. Unfortunately, this legislation does not relate to the nutritional supplement industry; rather, it applies to health claims on food packaging. There is thus still a lack of regulation of health and nutritional claims regarding nutritional supplements in South Africa (Schoonees, Young & Volmink, 2013). Gabriels (2012) states that in order to protect fair trade, encourage innovation and to protect the consumer there

should be a regulatory framework of nutritional supplements that is similar in temperament to the Health and Safety Act. However, there is an ongoing debate under which Act nutritional supplements should be categorised: the Foodstuffs, Cosmetics and Disinfectants Act (Act 54 of 1972) or the Medicines and Related Substances Act (Act 101 of 1965) (Schoonees, Young & Volmink, 2013). In the meantime, the MCC (2014) has implemented a policy that has relevance to nutritional supplements. This policy states that if the specific scheduled complementary medicine or active ingredients that have an established identity and tradition of use, determined or known, are not declared on the label, or when claims are made and are not clearly substantiated by peer-review scientific processes, a legal challenge could result (Gabriel, 2012).

In addition, a well-known pharmacy in South-Africa (Dis-Chem Pharmacies) has designed a comprehensive quality assurance programme. This program is partnered with HFL Sport Science Laboratories, a division of the Laboratory of the Government Chemist Group Limited, and aims to test the nutrition and food products sold in Dis-Chem stores (South, 2014). This programme demonstrates an acknowledgement for the need for regulation of supplements in this industry.

A nutritional supplement management system needs to be created to ensure that appropriate legislation and regulation are formulated and enforced on a sustainable basis, in line with the Consumer Protection Act (CPA) 68 of 2008 (Gabriels, 2012). In a study conducted by Le Maitre and colleagues (1997), the researchers emphasize section 29 of the CPA, which states that all parties concerned, including the producer, importer, distributor, retailer or service provider, must not market any goods or services in a manner that is reasonably likely to imply a false or misleading representation that is misleading/fraudulent or deceptive in any way. Gabriels et al. (2015) emphasise the fact that any insufficiencies in the regulation of the nutritional supplement industry may result in great primary and secondary health risks for the consumer as the nutritional supplements may be contaminated. Gabriels and fellow researchers (2015) state that reformation of the nutritional supplement sector is needed and should: (i) identify the problem at hand (problem identification), (ii) take the safety of consumers in consideration by bettering products, (iii) implement a redefined, more meaningful and implementable regulation and (iv) establish control over the sector, nationally as well as internationally, through trained officials.

In the USA, health claims regarding nutritional supplementation are subject to approval by the US Food and Drug Administration (FDA) and the nutritional supplementation industry is regulated by the Nutritional Labeling and Education Act of 1990 (Scoonees, Young & Volmink, 2013). However, Star (2015) reported that the health of the US public is at risk due to the oversight by the government regulation regarding the safety, quality, advertising and marketing of nutritional supplements. Star reports in his study named “Too Little, Too Late: Ineffective Regulation of Dietary Supplements in the United States” that research on nutritional supplements is questionable and that the quality of ingredients cannot be ensured.

These claims are worrying, as Americans spent as much as \$1.3 to \$1.7 billion on vitamin and mineral supplements annually in the year 2000. These supplements are ranked the third largest over-the-counter drug category, used most commonly by white people and those with higher income and education – a finding common to other studies (Froiland, Koszewski, Hingst & Kopecky, 2000). In later research conducted by Jiang (2009), it is recorded that more than 115 million Americans consume nutritional supplements daily and that the sales of nutritional supplements has increased to \$19 billion a year. These nutritional supplements might also be seen as an appealing, alternative, cost effective way to save money in less fortunate communities with no access to stronger prescription drugs, increasing the market for these supplements. The latest available studies report that Global Industry Analyst Inc. indicates that it is anticipated that the nutritional supplement market will reach US\$ 93.15 billion by the end of the year 2015. This market did not suffer any downfall during the worldwide recession of 2008 to 2009; rather it showed steady growth (Gabriels et al. 2015).

2.8 Summary

This chapter discussed Katz’s functionalist theory as a theoretical framework for this study, including the four psychological functions. Thereafter, the impact of the media and society of the individual were discussed in order to establish the influence they have on nutritional supplement use and people’s perceptions towards nutritional supplement use and the potential effects on health. Next, literature regarding body image and the use of nutritional supplements was reviewed to ascertain what the “ideal” male and female bodies portrayed by media are, as well as the extreme measures to which people will go to attain this “ideal” body image. A discussion regarding anorexia nervosa and muscle dysmorphia followed to establish if body image has an influence on these medical conditions. Next, research regarding doping

was discussed to emphasize some of the great lengths people will go to achieve the “ideal” body.

This chapter also reviewed the influence that nutritional supplements has on one’s health (health concerns) and the reasons why people take nutritional supplements. The issue of mislabelling supplements was looked at, as was contaminated nutritional supplements. Thereafter, the performance benefits of nutritional supplements were investigated. Lastly, literature was reviewed to establish if there is regulation of any kind of nutritional supplements, nationally and internationally. The following chapter addresses the research methodology of the study.



CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

An overview of the research methodology is provided in this chapter, including the research design, methods, procedures and sampling used in this study. Using a quantitative cross-sectional design, the research focused on gathering descriptive data via a self-administered questionnaire. The questionnaire was administered to 370 gymnasium users training in one of 5 randomly selected gymnasiums in the Johannesburg North region. The sample represents the Johannesburg North population. This chapter also elaborates on the ethical procedures followed by the researcher to ensure that participants remained informed at all times and that anonymity was guaranteed throughout the study. Lastly, an overview of the data analysis procedure is provided, to inform the reader how the statistics were collected, analysed and represented.

3.2 Research design

A research design is a blueprint or a plan of how the researcher plans to conduct his research (Calmeyer, De Kok, Hardy, Rogers & Taljaard, 2001). The actual study design is a quantitative cross-sectional design. Graziano and Raulin (2000) describe the quantitative-descriptive (survey) design as one of a quantitative nature, requiring questionnaires as the data collection method. Quantitative methodology is used to quantify relationships between variables. Descriptive data regarding usage statistics, average spend on nutritional supplementation and the attitude of young adult gymnasium participants was thus collected. Furthermore, variables of interest among the sample were noted and the relationships between them were determined. Ultimately, the data provided information about nutritional supplements as well as banned substances. A self-administered questionnaire (Appendix C), which had been adapted from a study that investigated doping in South African athletes was used in this study. The questionnaire was validated by professionals practicing in the fields of biokinetics, exercise sciences and sports medicine and is reliable and valid (Gradidge, 2010).

3.3 Site of study

This study was conducted in the Johannesburg North region across 5 randomly selected reputable gymnasiums. The following figure indicates which Johannesburg North region gymnasium users train mostly in the greater Johannesburg region.

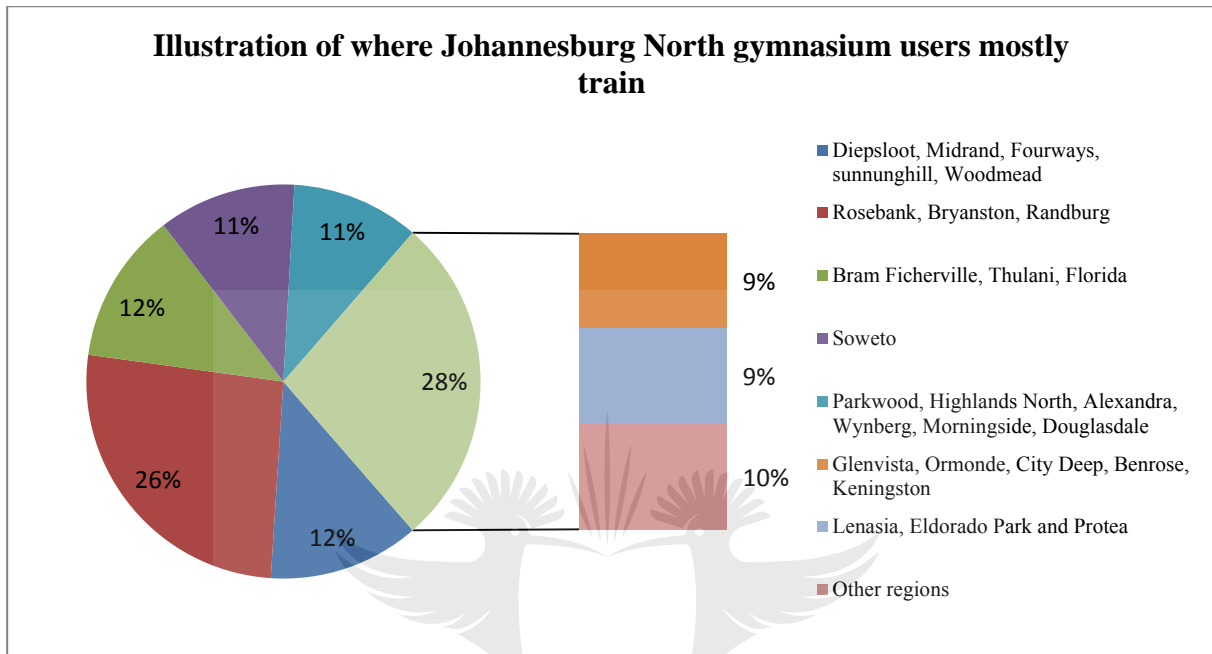


Figure 3.1: Illustration of where Johannesburg North users mostly train

Rosebank, Bryanston and Randburg (26%) are some of the most popular regions where Johannesburg North gymnasium users train. The second most popular regions in the Johannesburg North area are Diepsloot, Midrand, Fourways, Sunninghill and Woodmead. The least popular regions are Glenvista, Ormonde, City Deep, Benrose, Kennington, Lenasia, Eldorado Park and Protea (18%).

3.4 Study population

A larger group from which a sample is taken can be defined as the population of the study (Thomas, Nelson & Silverman, 2011: 101). This study focused on adult gymnasium participants. According to Erikson's (1998) stages of human development, an adult is generally considered as one who is between the ages of 18 to 49. Male and female participants will be included in this study.

3.4.1 Sampling

A sample can be defined as the separation of a population, done in order to set boundaries on the study unit. The population includes the individuals that possess the relevant information needed to offer answers to the problem stated (Thomas, Nelson & Silverman, 2001). In this study, the sample consisted of 205 male and 159 female gymnasium participants aged between 18-49 years old, who attend a gymnasium two or more times a week in the Johannesburg North region. The total population of gymnasium users is about 1 million participants. The selection of sample was computed from Sekaran (1992).

3.4.2 Selection and recruitment of participants

A systematic convenience sampling method was selected. The researcher personally selected every third person entering the door of the gymnasium to train in each of the 5 randomly selected gymnasiums to administer the questionnaire to. The researcher strived to achieve a stratified sample based on age and activities participated in (this assisted the researcher in making reasonable correlations between these groups during the analysis phase of the study). The researcher distributed information sheets, which included a brief description of the study to the participants. The researcher was available during the completion of the questionnaire to answer any questions.

3.4.3 Inclusion and exclusion criteria

- The participants must be aged between 18-49 years old
- Participants can be male or female
- Participants must train two or more times a week
- Participants should be asymptomatic

The average age of the current gymnasium user was 26 years old. From the research, it is evident that most gymnasium users training in the Johannesburg North area are aged between 24 and 28 years. The youngest participant questioned was 19 years old and the oldest participant was 49 years old. The gender ratio was 205 (56%) male athletes and 159 (44%) female gymnasium users. Additional information that interconnects with the biographical data is the highest level of education completed by gymnasium users. Participants were asked

which of three levels of education they had completed: university or college or equivalent, intermediate (between secondary level and university) or secondary school (grade 12).

3.5 Measuring tools or instruments

As early as 1951, it was specified what measurement involves (Stevens, 1951). It requires the researcher to assign numbers, in terms of fixed rules, done in order to reflect differences between individuals or objects. Haysamen (1994) quoted Stevens' (1951) research, adding that the differences between them can be reflected as characteristics or attributes. However, emphasis must be placed on the characteristics of the individuals or objects and focus should not be on the individual itself. In line with the above, a self-administered questionnaire was utilised, ensuring that pragmatic data was organised and presented logically. A questionnaire is defined in the *New Dictionary of Social Work* (1995) as "a set of questions on a form which is completed by the respondent in respect of a research project".

This study made use of the Gradidge 2010 Questionnaire. The respondents were requested to complete open and closed ended questions regarding nutritional supplements. Validity and reliability was established for the questionnaire in a South African context (Gradidge et al., 2010). Bostwick and Kyte (1981) describes a valid measuring instrument as one that does what it is intended to do, measures what it is supposed to measure and provides scores where variances imitate the true differences of the variables being measured. A valid measuring instrument thus will not give random or constant errors. Bostwick and Kyte (1981) elaborate on reliability. According to these researchers, reliability can be referred to as the degree to which autonomous administration of the same or similar instruments provide comparable results under analogous conditions. The questionnaire was amended to fall into the category of young adult participants before administered.

The questionnaire consists of the following sections (Appendix 3).

3.5.1. Section 1: Background information

In this section, information regarding the participants' demographic information was collected. Questions 1.1 to 1.5 enquire about participants' age, highest level of education, what region participants train in and their ethnic group.

3.5.2. Section 2: General information

This section obtained information regarding the general attitudes of the participants towards nutritional supplement use among gymnasium users. Data was gathered on the participants' sources of information on supplements in sport. Lastly, this section asked if participants made use of a personal trainer and what their reasons for training at a gymnasium are.

3.5.3. Section 3: Use of supplements

These questions elicited responses from participants regarding their expenditure on nutritional supplements, why they use supplements and when they started using supplements.

3.5.4. Section 4: Use of nutritional supplements

Section 4 investigated what nutritional supplements the participants' use regularly. It also gained more information regarding their perception of labelling information.

3.5.5. Section 5: Attitudes towards supplements in gymnasiums

Section 5 determined what the participants' attitudes towards nutritional supplements are.

3.5.6. Section 6: Suggestions to help address problem of using performance enhancing supplements

The participants who believe that the use of performance enhancing supplements in gymnasiums is a problem were invited to suggest some ways to help solve the problem.

3.6 Data collection methods

Each individual received a letter with information (Appendix 2) on the study. This letter emphasised the participant's anonymity and right to refrain from participation. The researcher also gave out an information letter to each participant informing them of the type of study (Appendix 1). Questionnaires were administered by hand – the researcher travelled around the Johannesburg North region to conduct this research. The researcher collected all the data required for this study personally. The researcher made use of the SPSS Statistics Software Package for statistical analysis.

3.7. Ethical considerations

There are three foundational ethical principles applicable to the ethics of human subjects that the researcher needed to take into consideration when conducting this research. Houser (2012), Schmidt and Brown (2009) and Polit and Beck (2008) classify these three principles as beneficence, respect for human dignity and justice. The principles proposed by Dhai and Mc Qoid-Masson (2011) were followed throughout the course of the research project. These principles are autonomy, beneficence, non-maleficence and justice.

3.7.1 Principle of respect for autonomy

The principle of respect for autonomy can be defined by key elements such as the right to self-determination and the right to full disclosure. In line with this principle, participants will receive an information sheet before answering the questionnaire (Appendix 1). Participation in this study is voluntary. The research proposal will be submitted to the Faculty of Health Sciences for ethical clearance. The relevant ethical considerations will be adhered to throughout this study.

3.7.2 Principle of non-maleficence

The researcher will ensure that complete confidentiality of information and privacy is guaranteed to all participants that take part in this study. Participants will remain anonymous; questionnaires will be numbered instead.

3.7.3 Principle of beneficence

The purpose of the study, the practical procedures of data gathering and the processes of production and dissemination of results will be explained to the participants. Prior to completing the questionnaire, participants will be requested to read and sign the informed consent form (Appendix 2). The researcher will avoid, prevent or minimise harm (i.e. maleficence) by refraining from exposing the participants to needless discomfort during the study.

3.7.4 Principle of justice

This principle includes the right to fair treatment. Participants may withdraw from the study at any time without any prejudice. The study will be conducted with utmost honesty and integrity.

The research proposal was submitted to the Faculty of Health Sciences for ethical clearance. The following ethical considerations were fulfilled throughout this study.

- Participants received an information sheet before answering the questionnaire (Appendix 1).
- Complete confidentiality was guaranteed to all participants who take part in this study. Participants remained anonymous and questionnaires were numbered.
- The purpose of the study, the practical procedures of data gathering and the processes of production and dissemination of results were explained to the participants.
- Prior to completing the questionnaire participants were requested to read and sign the informed consent form (Appendix 2).

- Participants had the option to withdraw from the study at any time without any prejudice.

3.8 Data analysis

In the quantitative paradigm, data analysis can be referred to as the process where the analyst breaks data down into constituent parts to test the research hypothesis and to answer the research questions. Because the research questions proposed cannot be answered by the data analysis process on its own, data needs to be interpreted. As raw data cannot be explained, the researcher first needs to describe and analyse the data and then arrive at conclusions. In other words, in order to obtain answers to research questions, the researcher needs to thoroughly analyse the data by ordering, categorising, manipulating and summarising the data. Simply put, data needs to be reduced to an interpretable form in order to draw conclusions (Kerlinger, 1986).

Data was manually transcribed into Microsoft Excel and the transcription was independently validated. Data was then summarised using descriptive statistics. A computerized statistical package, SPSS, was used as a tool for analysis. Descriptive and inferential statistics were applied to analyse the data. Means, frequencies, percentages and standard deviations were compared where relevant. Comparison of groups was done using inferential statistics, where significance between groups was determined using the Pearson Chi-squared (χ^2) test for incidence data and Student's t-test for comparison of means. The level of significance was set at $p \leq 0.05$. Kerlinger (1986) explains that the manipulation and summarisation of numerical data and comparison of results gained with coincidental expectation is the key purpose of statistics.

CHAPTER 4

RESULTS OF NUTRITIONAL SUPPLEMENTS SURVEY

4.1 Introduction

The aim of the research was to evaluate the use of nutritional supplements among commercial gymnasium patrons in the Johannesburg North region. This chapter presents the analysis of the results that were gathered by means of questionnaires. The questions were formulated to determine if gymnasium users use nutritional supplements, to ascertain why gymnasium users use nutritional supplements, to determine the current knowledge of and where gymnasium users obtain their information and education regarding supplements and to gather information on the average expenditure of the Johannesburg's gymnasium users on supplements. Results of the data collected are presented as demographics, general information, use of supplements and attitudes towards nutritional supplements in gymnasiums.

In this presentation of results, demographic information is dealt with first, including the age and gender specification of participants, their highest level of education completed, where participants train most often and the ethnicity of the participants. Next, general information is dealt with, including the answers to questions such as: *Do you feel that the numbers of uses of nutritional supplements in gymnasiums are rising? Do you believe there is pressure placed on gymnasium users to use nutritional supplements? Are you aware of any supplements that are prohibited by the World-Anti-Doping Agency?* This section also deals with where gymnasium users receive their information regarding nutritional supplements, the main reasons why participants attend gymnasiums and information regarding the use of personal trainers.

Thirdly, information regarding the use of supplements is presented, including usage patterns, such as when last participants used nutritional supplements, the age at when they started using nutritional supplements and the main reasons why they use nutritional supplements. The results on data collected regarding average expenditure on nutritional supplements by gymnasium users and what types of supplements gymnasium users use regularly are presented next. Also included in this section are the findings pertaining to whether or not gymnasium users read the nutritional value and benefits and side effects of labels before they

use the supplements. Finally, the findings regarding gymnasium users' attitudes towards supplements in gymnasiums are presented. This section deals with data collected from questions regarding participants' attitudes, and was measured on a 4-point Likert scale ranging from 1=strongly disagree to 4=strongly agree with the significant level set at $p < 0.05$.

4.2 Demographics

This section presents the demographic information of the participants. Demographics include age frequencies of participants, gender specification of participants, highest level of education completed, where in Johannesburg respondents train most often and the ethnicity of the participants.

4.2.1 Age frequency of participants

The average age of the current gymnasium user in the Johannesburg North region was 26.8 years old. From the research, it is evident that most gymnasium users training in the Johannesburg North area were aged between 24 and 28 years. The youngest participant questioned was 19 years old and the oldest participant 49 years old. The following diagram (Figure 4.1) contains the age percentages of the participants recoded into groups.

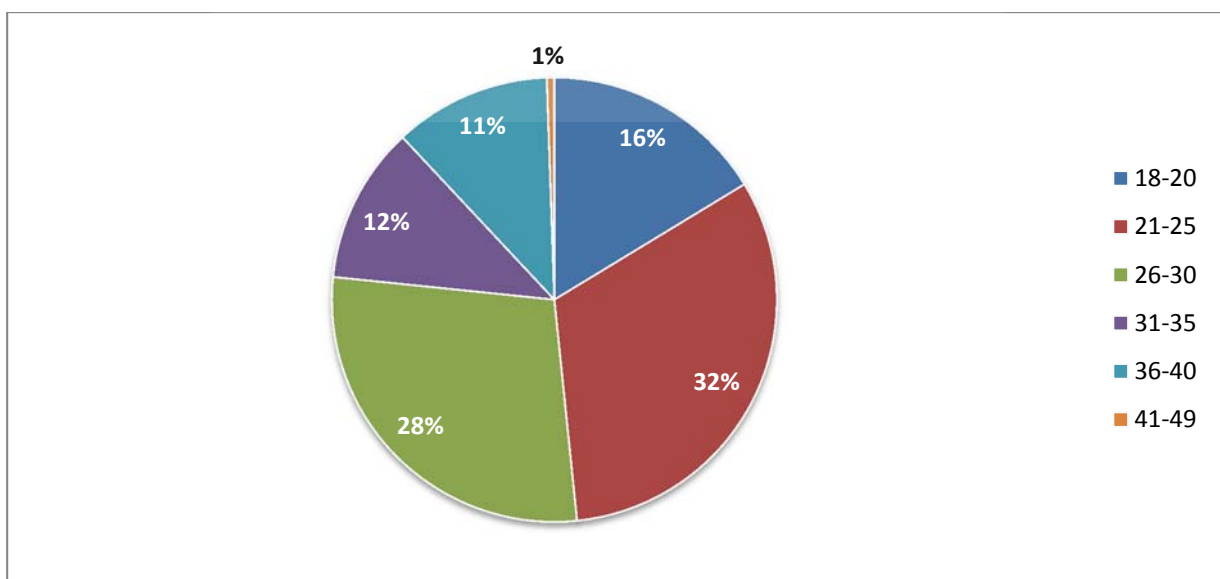


Figure 4.1: Age of participants

Figure 4.1 illustrates that the majority of participants (32%) are aged between the ages of 21 to 25 years old. Participants aged between 26 to 30 years old makes up the second biggest age group of the population tested (28%). Participants aged between 40 and 49 years old made up 12% of the sample size used in this research project.

4.2.3 Gender specification of participants

From the sample size of 364 participants selected, 205 (56.3%) of the participants were males and 159 (43.7) were females. The following diagram (Figure 4.2) demonstrates the number of participants according to gender.

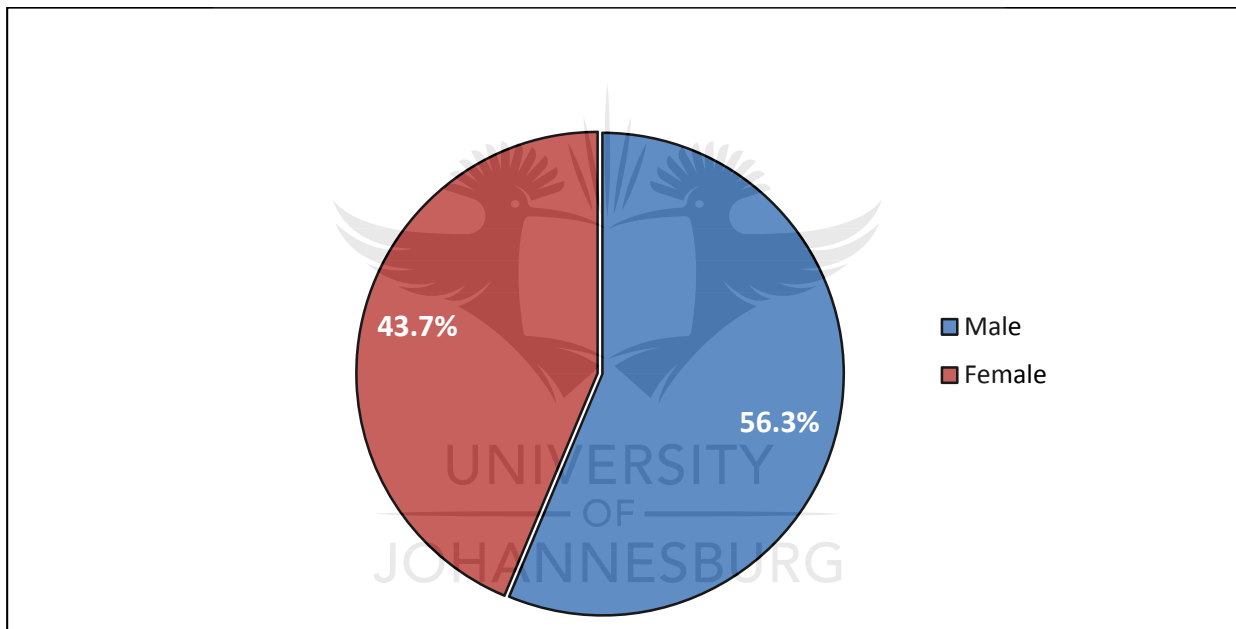


Figure 4.2: Participants according to gender (n=364)

All of the participants included in Figure 4.2 are adult gymnasium users. A systematic convenience sample was selected, as the total population of gymnasium users is about 1 million participants. The selection of the sample was computed from Sekaran (1992).

4.2.4 Highest level of education completed by gymnasium users in Johannesburg North

Additional information that interconnects with the demographical data is the highest level of education completed by gymnasium users. Participants were asked which of three levels of education they had completed: university or college or equivalent, intermediate (between

secondary level and university) and secondary school (grade 12). Figure 4.3 provides a graph that indicates the various levels of education completed by participants.

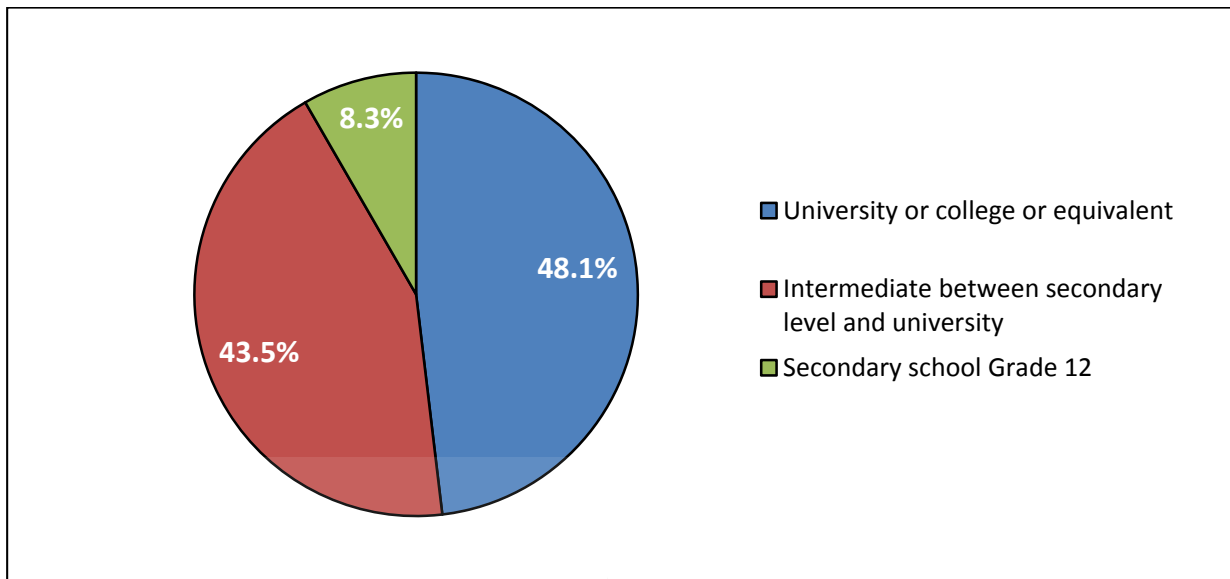


Figure 4.3: Highest level of education completed by participants (n=372)

A large number of gymnasium users in the Johannesburg North region had completed a university or college level degree or course (48.1%). Another large number (43.5%) had completed intermediate level education and only a small number (8.3%) had only completed secondary schooling.



4.2.5 Where in Johannesburg respondents train most often

The participants were asked to indicate where they mostly trained in the Johannesburg area. The following diagram (Figure 4.4) indicates the areas in the Johannesburg included on the questionnaire, with the 3 least popular areas combined.

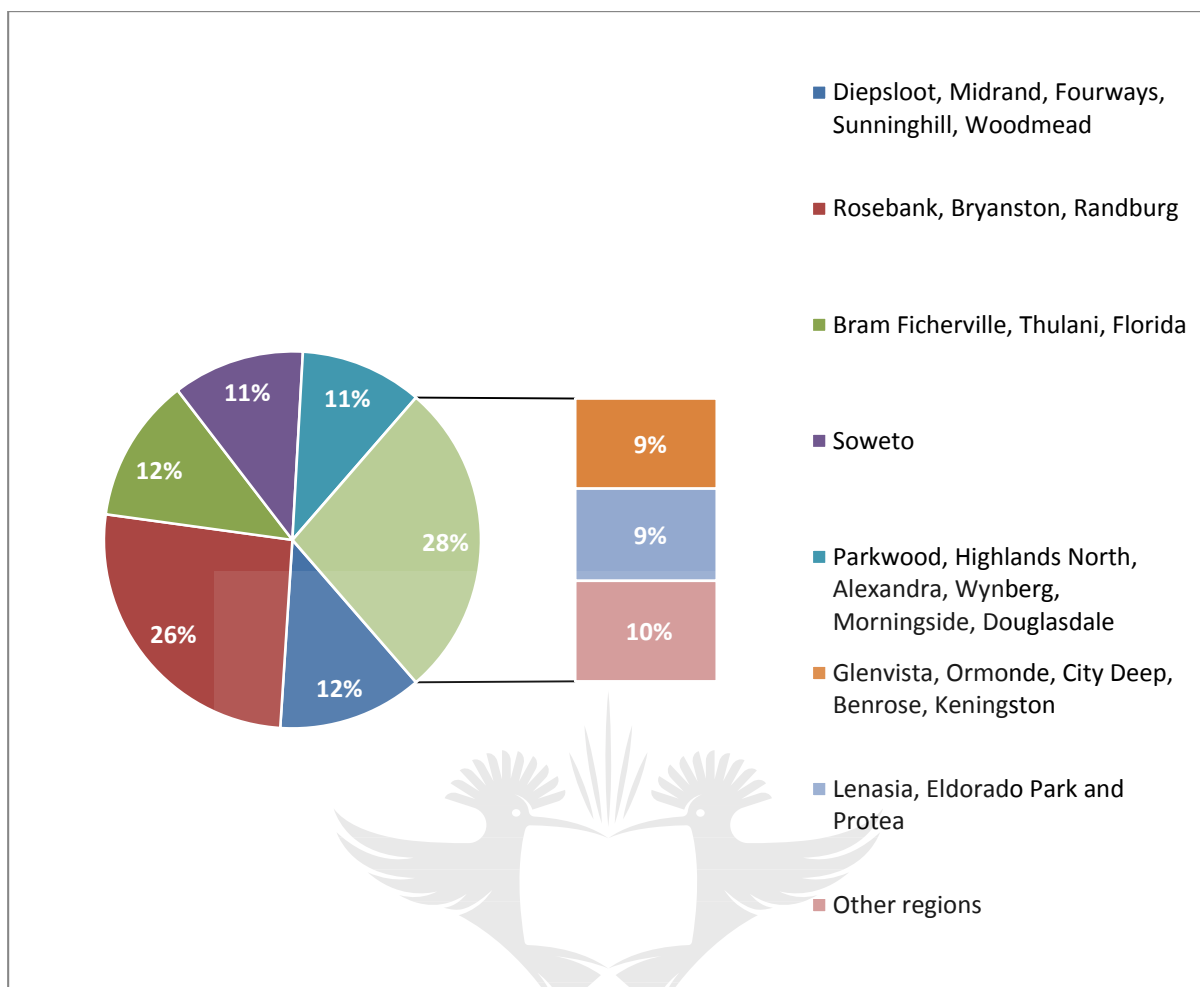


Figure 4.4: Where in Johannesburg respondents train most often.

The answers to this multi-level response question show that most participants (26%) train in the Rosebank, Bryanston and Randburg areas. The least popular areas indicated were Parkwood, Highlands North, Alexandra, Wynberg, Glenvista, Ormonde, City Deep, Benrose and Kensington which all added up to (18%) of the participants responses.

4.2.6 The ethnicity of participants

Ethnicity of the participants is presented by dividing the participants into three ethnical groups in Table 4.1: Caucasian (White), African (Black) and Indian, Coloured or other.

Table 4.1: Ethnicity of participants

Ethnicity	Frequency	Percent
Caucasian (White)	165	44
African (Black)	125	33
Indian, Coloured or Other	84	23
Total	374	100.0

The ethnicity of the participants given in the table above (Table 4.1). Of the research sample (n=374), 165 (44%) of the participants were Caucasian (white). African (Black) participants in the testing sample numbered 125 (34%), while Indian, Coloured and Other participants constituted 84 (23%) of the participants.

4.3 General information

This section presents data regarding the general perception of gymnasium users towards nutritional supplements. General information presented in this section includes the participants' usage patterns of nutritional supplements, pressures placed on gymnasium users to use supplements, knowledge and use of prohibited supplements, the participants' sources of information regarding nutritional supplements, their reasons for attending gymnasiums and use of personal trainers.

4.3.1 The 3 general questions regarding supplements

The participants were asked to answer the following general questions regarding nutritional supplements:

- Do you feel that the number of uses of nutritional supplements in gymnasiums is rising?
- Do you believe there is pressure placed on gymnasium users to use nutritional supplements?
- Are you aware of any supplements that are prohibited by the World Anti-Doping Agency?

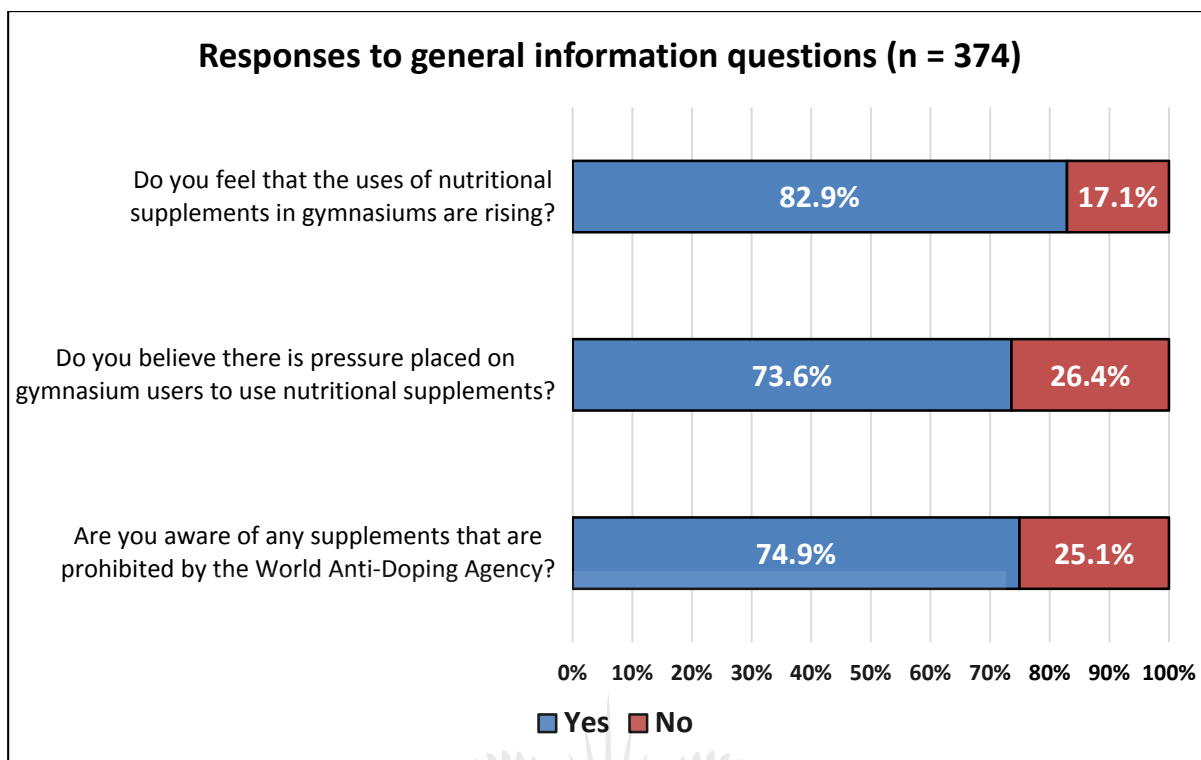


Figure 4.5: Participants responses to general information questions regarding nutritional supplements (n=374).

Figure 4.5 illustrates that 82.9% of the Johannesburg North gymnasium users feel that the number of uses of nutritional supplements in gymnasiums is rising. Only 17.1% indicated that they do not feel this to be the case.

Of the sample tested (n=374), 73.6% of the participants believe that there is pressure placed on gymnasium users to use nutritional supplements. Twenty six point four percent indicated that they do not believe that there is pressure placed on gymnasium users to use nutritional supplements.

A minority indicated that they are not aware of any supplements that are prohibited by the World Anti-Doping Agency, whereas the majority (74.9%) indicated that they are aware of supplements that are prohibited by the Word Anti-Doping Agency.

4.3.2 Johannesburg North gymnasium users' sources of information of gymnasium users regarding nutritional supplements

Data presented in this section pertains to information regarding nutritional supplements. Participants had to choose from sources listed below, depicted in Table 4.2. This multiple level response question afforded the participants the opportunity to choose more than one source in indicating where they get their information from regarding nutritional supplements.

Table 4.2: Gymnasium users' sources of information regarding nutritional supplements.

Source	n	Yes (%)	No (%)
Internet (n = 370)	370	278 (75%)	92 (25%)
Pharmacist (n = 371)	371	249 (67%)	122 (33%)
Books (n = 370)	370	245 (66%)	125 (34%)
Personal Trainer (n = 372)	372	220 (59%)	152 (41%)
Newspapers (n = 372)	372	220 (59%)	152 (41%)
Magazines (n = 372)	372	211 (57%)	161 (43%)
Friend/Training Partner (n = 373)	373	180 (48%)	193 (52%)
Journals (n = 370)	370	175 (47%)	195 (53%)
Representative from a supplement company (n = 370)	370	172 (47%)	198 (54%)
Information brochures (n = 369)	369	165 (45%)	204 (55%)
Parent (n = 371)	371	139 (38%)	232 (63%)
Sibling (n = 370)	370	137 (37%)	233 (63%)
Physician (n = 371)	371	135 (36%)	236 (64%)
Biokineticist (n = 371)	371	127 (34%)	244 (66%)

Table 4.2 indicates that the main source of information regarding nutritional supplements is the internet. The majority, 278 (75%), of the sample (n=370) receive their information from the internet. Other major sources of information are pharmacists (249; 67%) (n= 371), books (245; 66%) (n=370) and personal trainers (220; 59%) (n=372). The least indicated sources of information are parents (139; 38%) (n=371), siblings (137; 37%) (n=370) and physicians (135; 36%) (n=371). Only 127 (34%) of 371 participants indicated that their main source information came from biokineticists.

4.3.3 Main reasons for going to the gymnasium

In this multiple response question, participants were asked why they went to gymnasiums. They were asked to select either “main”, “sometimes” or “never” for each given reason.

These reasons include muscle gain, staying healthy, cross-fit training, body conditioning, weight loss, sport specific training, swimming, spiritual reasons and aerobic exercise.

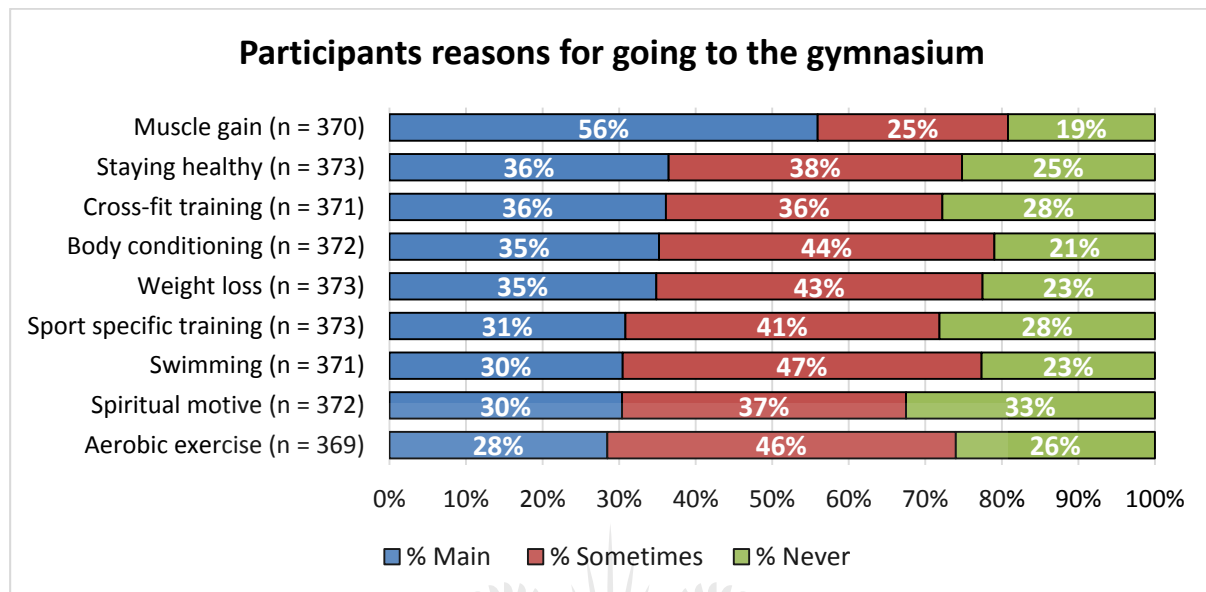


Figure 4.6: Reasons for going to the gym by sample size.

Figure 4.6 illustrates that the majority of gymnasium users indicated that the main reason they attend gymnasiums is to gain muscle 56% (of n=370). Only 19% (of n=370) indicated that they never attended gymnasium to gain muscle. Next, 36% of the sample (n=373) indicated that their main reason for attending gymnasium is to stay healthy; only 25% percent indicated that they never attend gymnasiums to stay healthy. Cross-fix training was, long with staying healthy, the second most popular reason (36%) for attending gymnasium; 28% never attend gymnasiums for this reason. Next, 35% (of n=372) indicated that their main reason for attending gymnasium is for body conditioning, while another 35% indicated that their main reason for attending gymnasiums is to lose weight. A minority (21% and 23% respectively) indicated that they never go gymnasium for purposes of body conditioning or weight loss. Of the sample tested (n=373), 41% percent sometimes, 31% mainly and 28% never attend gymnasiums for sport specific training. Forty seven percent of the sample tested (n=371) indicated that they sometimes attend gymnasiums to swim, 23% never attend the gymnasium to swim and a third (30%) indicated that the main reason they go to the gymnasium is to swim. Of the sample tested (n=372), 37% sometimes, 30% mainly and 23% never attend gymnasiums for spiritual motives. Finally, 46% of the sample (n=369) sometimes attend gymnasiums for aerobic exercises, 26% never and, for 28%, the main reason for attending gymnasium is for aerobic exercises. Data regarding the reasons why

gymnasium users attend gymnasiums by gender will be illustrated in the next table (Table 4.3).

In the table below (Table 4.3), the reasons why gymnasium users attend gymnasium are illustrated by gender.

Table 4.3 Reasons gymnasium users attend gymnasium by gender.

Sport	Gender	Main	Sometimes	Never
Muscle gain	Male	54%	32%	14%
	Female	57%	17%	26%
Weight loss	Male	25%	50%	25%
	Female	48%	32%	20%
Swimming	Male	24%	51%	25%
	Female	39%	41%	20%
Body conditioning	Male	29%	50%	21%
	Female	43%	35%	22%
Aerobic exercise	Male	17%	53%	30%
	Female	44%	34%	22%
Sport-specific training	Male	25%	44%	32%
	Female	40%	36%	24%
Spiritual motive	Male	24%	37%	39%
	Female	39%	36%	25%
Staying healthy	Male	28%	40%	32%
	Female	47%	36%	17%
Cross-fit training	Male	33%	39%	28%
	Female	40%	32%	28%

Table 4.3 shows that the main reason for male (54%) and female (57%) participants to go to gymnasiums are to gain muscle. Fifty percent of males indicated that they sometimes go to the gymnasium to lose weight, while 48% of females indicated that their main reason for attending gymnasiums is to lose weight. Twenty nine percent of males indicated that the main reason they attend gymnasiums is for swimming, while this is 39% of female

participants' main reason. Forty percent of females' main reason for attending gymnasiums is for sport specific training, while 44% of males indicated that they sometimes attend gymnasiums for sport specific training. Thirty nine percent of males indicated that they never attend gymnasiums for spiritual motives, while the same percentage of females indicated that they always attend gymnasiums for spiritual motives. Forty seven percent of females always attend gymnasiums to stay healthy and 40% of males sometimes attend gymnasiums to stay healthy. Seventeen percent of females indicated that they never attend gymnasiums for health purposes. Forty percent of female participants' main reason for attending gymnasium is for cross-fit training and 39% of males sometimes attend gymnasiums for cross-fit training.

4.3.4 Use of a personal trainer

Participants were asked if they had ever made use of a personal trainer. Participants' responses indicated that 50.1% made use of a personal trainer, as opposed to 49.9% who have never made use of a personal trainer in the gymnasium.

4.4 Use of supplements

This section presents data regarding the use of supplements by participants. This information includes usage patterns, age when participants started using supplements, reasons participants use supplements, their average expenditure on supplements, what type of supplements they use and whether or not the participants read about the value, benefits and side effects on the labels before use.

4.4.1 Use of nutritional supplements in the past year (12 months)

In this section, participants were asked to indicate if they had used nutritional supplements in the past year (12 months). Fifty six percent (n=338) of the participants indicated that they had used nutritional supplements in the past year, while 44% indicated that they had not.

4.4.2 Age participants started using nutritional supplements

The following figure (Figure 4.7) illustrates the age at which participants started using nutritional supplements. Age groups were coded as 10-12 years, 13-18 and over 18 years old.

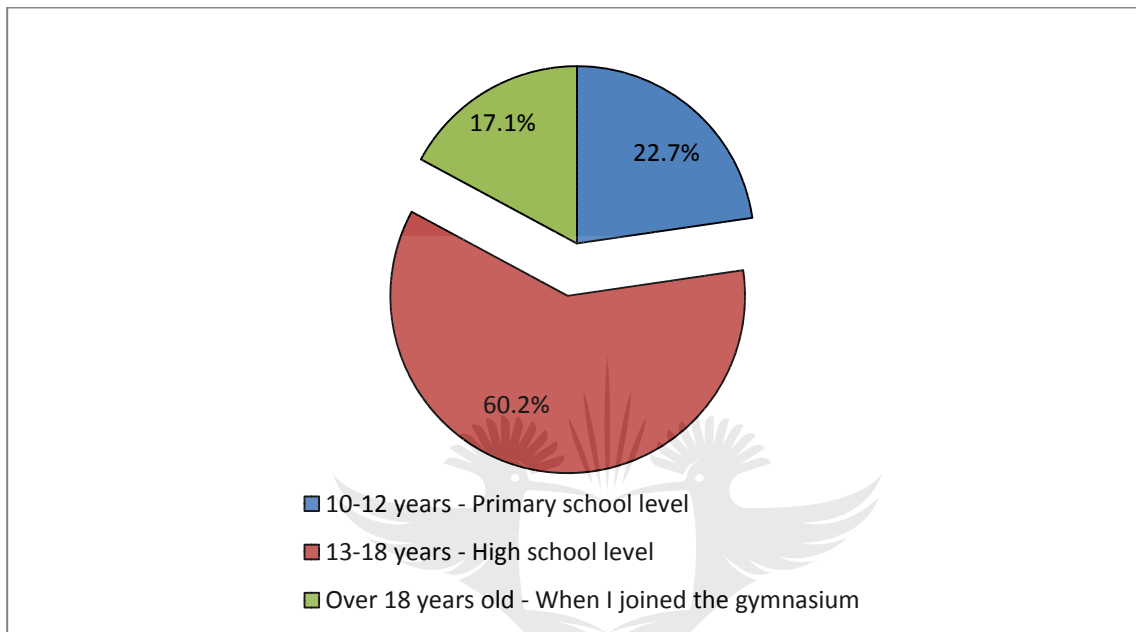


Figure 4.7: Age participants began using nutritional supplements.

The majority of participants (60%) questioned (n=216) indicated that they started using nutritional supplements between the ages of 13 to 18 years old (high school level). The minority of participants (18%) questioned (n=216) were over 18 years old (when they joined the gymnasium).

4.4.3 The main reasons Johannesburg North gymnasium users use nutritional supplements

The following table (Table 4.4) presents the main reasons participants make use of nutritional supplements. Participants had to indicate “yes” or “no” in response to the following: to be healthier, to assist me in the coping with the stresses of muscle gains in the gymnasium, to help the way I perform in the gymnasium, to help me reach my personal goals, to help to reduce food cravings in order to decrease my body weight and because I feel pressured by my peers.

Table 4.4 : Main reasons participants make use of nutritional supplements.

Reason	n	Yes (%)	No (%)
To be healthier (n = 219)	219	180 (82%)	39 (18%)
Assists me in coping with the stresses of muscle gains in the gymnasium (n = 221)	221	174 (79%)	47 (21%)
Helps to improve the way I perform in the gymnasium (n = 220)	220	160 (73%)	60 (27%)
Help me reach my personal goals (n = 220)	220	153 (70%)	67 (31%)
Helps to reduce food craving in order to decrease my body weight (n = 221)	221	136 (62%)	85 (39%)
I feel pressured by my peers (n = 220)	220	118 (54%)	102 (46%)

Of the sample tested (n=219), 82% of the participants indicated that they made use of nutritional supplements in order to stay healthy. Eighty nine percent of the participants (n=221) indicated that they make use of nutritional supplements to assist them in coping with the stresses of muscle gains in the gymnasium. Another 54% of the participants (n=220) questioned indicated that they use nutritional supplements because they feel pressured by their peers.

4.4.4 Average expenditure by Johannesburg North gymnasium users

Data represented in this section indicates how much Johannesburg North gymnasium users spend on supplements per month. Amounts were coded in rands into 0 - 500, 500 - 1000, 1000 - 1500, 1500 - 2000, 2000 - 2500, 2500 - 3000 and >3000.

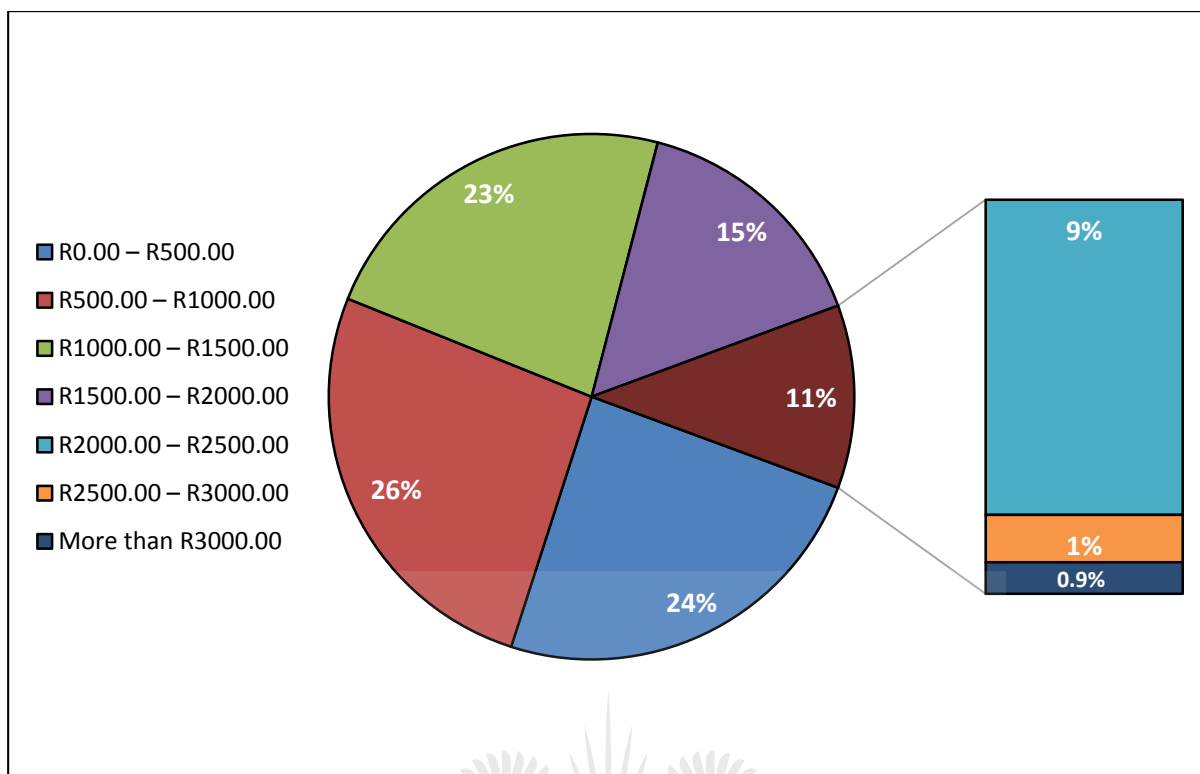


Figure 4.8: Illustration of how much money Johannesburg North gymnasium users spend on supplements per month (n=222).

The greatest percentage of participants (26%) of the sample questioned (n=222) indicated that they spend between R500.00 to R1000.00 per month on nutritional supplements. Twenty four percent indicated that they spend between R2000.00 and R2500.00 per month, followed by 23%, who spend between R1000.00 and R1500.00 per month on nutritional supplements. Only 9% indicated that they spend between R2000.00 and R3000.00 per month. Less than one percent (0.9%) indicated that they spend more than R3000.00 per month on nutritional supplements.

4.4.5 Nutritional supplements used regularly by gymnasium users

This section indicates the type of supplements participants used. Participants had to select either “yes” or “no” in response to this multiple choice response question. Participants had to indicate if they make use of the following supplements: protein, carbohydrate supplements, vitamins, creatine, caffeine, fish oil, CLA (weight loss supplements), Phedra-cut Thermogenic aid, BCAA (branched-chain amino acids) and L-glutamine.

Table 4.5: Nutritional supplements used regularly by gymnasium users in the Johannesburg North region.

Supplement	n	Yes (%)	No (%)
Protein supplements (e.g. Whey protein) (n = 366)	366	308 (84%)	58 (16%)
Carbohydrate supplements (e.g. Energade, Powerade) (n = 367)	367	265 (72%)	102 (28%)
Vitamins (A, B, B12, C, D and E) (n = 365)	365	258 (71%)	107 (29%)
Creatine supplements (e.g. Creatine Monohydrate) (n = 367)	367	247 (67%)	120 (33%)
Caffeine (e.g. Redbull, Guarana) (n = 367)	367	217 (59%)	150 (41%)
Fish oil (e.g. Omega 3 tablets) (n = 365)	365	136 (37%)	229 (63%)
CLA (Conjugated linoleic acid) weight loss supplements (n = 366)	366	132 (36%)	234 (64%)
Phedra-cut Thermogenic aid (n = 365)	365	128 (35%)	237 (65%)
Branched-chain amino acids (BCAA) (n = 366)	366	126 (34%)	240 (66%)
L-Glutamine (n = 365)	365	120 (33%)	245 (67%)

Table 4.5 illustrates that a total of 308 (84%) of participants (n=366) use protein supplements (e.g. Whey protein). This finding implies that the majority of Johannesburg North gymnasium users make use protein supplements regularly. Two hundred and sixty five participants (72%) indicated that they use carbohydrate supplements (e.g. Energade, Powerade) followed by 258 (71%) who use vitamins (A, B, B12, C, D and E) regularly. More than half, 247 (67%), of the participants make use of creatine supplements (e.g. creatine monohydrate), while 217 (59%) of the sample tested indicated that they make use of caffeine (e.g. Redbull, Guarana) regularly. Less than half, 136 (37%), of the participants make use of fish oil (e.g. Omega 3 tablets), while only 132 (36%) of the participants that indicated that they make use of L-glutamine.

4.4.6 Reading the nutritional value, benefits and side effects on the labels before using supplements

In this section, participants were requested to indicate on a scale – “always”, “sometimes” or “never” – how frequently they read the nutritional value, benefits and side effects on labels before they use supplements.

Table 4.6: The frequency with which Johannesburg North gymnasium users read the nutritional value, benefits and side effects of labels before they use the supplements.

	Frequency	Percent
Always	149	41
Sometimes	174	48
Never	39	11
Total	362	100.0

Table 4.6 shows the frequencies and percentages of gymnasium users that always, sometimes or never read the nutritional value, benefits, and side effects of labels before they use supplements. A total of 149 (41%) of gymnasium users indicated that they “always” read the nutritional value, benefits and side effects of labels before they use supplements. The majority of the gymnasium users 174 (48%) “sometimes” read the nutritional value, benefits and side effects of labels before they use the supplements, followed by the minority 39 (11%) of gymnasium users that “never” read the nutritional value, benefits and side effects of labels before they use the supplements.

4.5 Johannesburg North gymnasium user’s attitudes towards supplements in gymnasiums

In this section participants were requested to indicate on a 4 point Likert scale whether they “strongly agree”, “agree”, “disagree” or “strongly disagree” with the following statements: there is a problem with nutritional supplement use in my gymnasium; gymnasiums should offer educational programmes for gymnasium users on the use of supplements in gymnasiums; the use of performance enhancing supplements and nutritional supplements has risen in the last five years; many of my friends think it is acceptable to use nutritional supplements; I think gymnasium participants who want to reach their goals have to use performance enhancing supplements sometimes; I would never consider using supplements; I am sometimes tempted to use performance enhancing supplements; there are too many gym users using supplements in my gymnasium to enhance their performance; I think it is always wrong to use nutritional supplements for gym purposes; the use of nutritional supplements by gymnasium users has not been reported on enough in the media; If I do not take nutritional supplements, I will not be able to succeed because everyone else does; and I do not think it is fair to use performance enhancing supplements.

Table 4.7: The attitudes of Johannesburg North gymnasium users towards supplement use (Mean (Standard deviation))

Statement	N	\bar{x} (SD)	% Strongly agree	% Agree	% Disagree	% Strongly disagree	Sum % SA & A
There is a problem with nutritional supplement use in my gymnasium (n = 370)	370	1.71 (1.01)	60%	21%	10%	10%	80%
Gymnasiums should offer educational programmes for gymnasium users on the use of supplements in gymnasiums (n = 371)	371	1.99 (0.83)	28%	53%	12%	8%	81%
The use of performance enhancing supplements and nutritional supplements has risen in the last five years (n = 371)	371	2.13 (0.89)	26%	43%	23%	8%	69%
Many of my friends think it is acceptable to use nutritional supplements (n = 367)	367	2.28 (0.95)	24%	36%	29%	11%	60%
I think gymnasium participants who want to reach their goals have to use performance enhancing supplements sometimes (n = 372)	372	2.38 (1.01)	23%	32%	29%	16%	55%

I would never consider the use of supplementation (n = 372)	372	2.20 (0.88)	23%	42%	27%	9%	65%
I am sometimes tempted to use performance enhancing supplements (n = 365)	365	2.32 (0.95)	22%	36%	29%	12%	58%
There are too many gym users using supplements in my gymnasium to enhance their performance (n = 372)	372	2.12 (0.82)	22%	51%	20%	7%	73%
I think it is always wrong to use nutritional supplements for gym purposes (n = 372)	372	2.37 (0.98)	22%	34%	30%	14%	55%
The use of nutritional supplements by gymnasium users has not been reported on enough in the media (n = 372)	372	2.17 (0.86)	21%	48%	22%	8%	70%
If I do not take nutritional supplements, I will not be able to succeed because everyone else does (n = 369)	369	2.37 (0.97)	21%	35%	29%	14%	56%
I do not think it is fair to use performance enhancing supplements (n = 370)	370	2.41 (0.99)	21%	34%	29%	16%	55%

* Significant at $p < 0.05$. All items are measured on a 4-point Likert scale ranging from 1=strongly disagree, to 4=strongly agree.

Table 4.7 indicates that 60% of the participants (n = 370) reported that they “strongly agree” that “there is a problem with nutritional supplement use in my gymnasium”; only 10% reported that they “strongly disagree” “that there is a problem of nutritional supplement use in my gymnasium” (\bar{x} =1.71; SD=1.01). Eighty one percent of gymnasium users (n = 371) indicated that they “strongly agree” or “agree” that “gymnasiums should offer educational programmes for gymnasium users on the use of supplements in gymnasiums”. The minority (8%) indicated that they “strongly disagree” with the statement that “gymnasium should offer educational programmes for gymnasium users on the use of supplements in gymnasiums” (\bar{x} =1.99; SD=0.83). The majority (43%) of participants (n = 371) reported that they “agree” that “the use of performance enhancing supplements and nutritional supplements has risen in the last five years”, 23% “disagree”, followed by 8% who “strongly disagree” with the statement this statement (\bar{x} =2.13; SD=0.89). Sixty percent of the participants (n = 367) indicated that they “strongly agree” or “agree” that “many of my friends think it is acceptable to use nutritional supplements”; only 11% of the participants indicated that they “strongly disagree” with this statement (\bar{x} =2.28; SD=0.95). Nearly a third (32%) of the participants (n = 372) indicated that they “agree” that “they think gymnasium participants who want to reach their goals have to use performance enhancing supplements sometimes”, followed by a slower lower number (29%) who indicated that they “disagree” that “they think gymnasium participants who wants to reach their goals have to use performance enhancing supplements sometimes”. The minority (16%) indicated that they “strongly disagree” with this statement (\bar{x} =2.38; SD=1.01). Forty two percent of the participants (n = 372) “agree” with the statement that “they would never consider the use of supplementation”; 27% indicated that they “disagree” and that “they would never consider the use of supplementation” (\bar{x} =2.38; SD=1.01). More than half (58%) of the participants (n = 365) indicated that they “strongly agree” or “agree” with the statement “I am sometimes tempted to use performance enhancing supplements”, followed by 29% who “disagree”, and only 12% who “strongly disagree” (\bar{x} =2.32; SD=0.95).

Most (73%) of the participants (n = 372) indicated that “there are too many gym users using supplements in my gymnasium to enhance their performance”; only 12% “strongly disagree” (\bar{x} =2.12; SD=0.82). Thirty four percent of the participants (n = 372) “agree” with the statement “I think it is always wrong to use nutritional supplements for gym purposes” and only 14% “strongly disagree” (\bar{x} =2.37; SD=0.98). The majority (70%) of the participants (n = 372) “strongly agree” or “agree” that “the use of nutritional supplements by gymnasium

users has not been reported on enough in the media”; the minority (8%) “strongly disagree” ($\bar{x}=2.17$; $SD=0.86$). Thirty five percent of the participants ($n = 369$) indicated that they “agree” with the statement of “if I do not take nutritional supplements, I will not be able to succeed because everyone else does”, followed by 29% who “disagree” ($\bar{x}=2.37$; $SD=0.97$). Sixteen percent of the participants ($n = 370$) indicated that they “strongly disagree” with the statement of “I do not think it is fair to use performance enhancing supplements”; just over a third (34%) “agree” and 21% “strongly agree” ($\bar{x}=2.41$; $SD=0.99$). In the next chapter the findings will be discussed to determine the outcomes of the study. Recommendations will also be made.



CHAPTER 5

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter will discuss the findings presented in the previous chapter. Conclusions will be drawn and recommendations will be made for future research. The aim of the study was to investigate the usage of nutritional supplements among commercial gymnasium patrons in Johannesburg North region. The findings of the research questions will be discussed individually and measured against the aim and objectives to determine the outcomes of the study. The main objectives of the study are:

- To determine if gymnasium users use nutritional supplements.
- To ascertain why gymnasium users use nutritional supplements.
- To determine the current knowledge of these supplements among gymnasium users and establish where these users obtain their information and education regarding supplements.
- To gather information on the average expenditure by the Johannesburg North gymnasium users on supplements.
- To determine the attitudes and awareness regarding nutritional supplements among gymnasium users.

Recommendations will then be made based on the information gathered in this study. These recommendations aim to help other researchers with future studies. Finally, the limitations of this study will also be discussed and considered.

5.2 Discussion

5.2.1 Demographics and expenditure on nutritional supplements by gymnasium users

Firstly, expenditure on nutritional supplements will be addressed. The over expenditure on supplements amongst gymnasium users comes as no surprise, as this market is expanding and growing globally. The nutritional supplement market did not only remain strong through the recession of 2008 to 2009, but in fact showed tremendous growth. In the USA, a previous study has found that Americans average expenditure in 2015 was of US\$93.15 (Gabriels et al. 2015). In this study based in South Africa, it was found that 24% of gymnasium users spend between R0.00 and R500.00 per month, 49% spend between R500.00 and R1500.00 per month and a further 27% spends R1500.00 to more than R3000.00 per month on nutritional supplements. This result shows that there is a definite market for nutritional supplements because many gymnasium users support this growing market. This finding also achieves the objective regarding average expenditure on nutritional supplements by gymnasium users in Johannesburg North region.

It is also apparent that gymnasium users are under the impression that in order for them to reach their goals, they have to use performance enhancing supplements and thus spend money on buying them. These participants adopt one of the four attitudes described by Fiske et al. (2010). This type of psychological attitude is “instrumental”; it is a positive attitude developed by gymnasium users towards something that rewards them. Gymnasium users see people with their desired “body image” and, often without considering the consequences, they go to great lengths to achieve these goals. This finding can be explained by Katz’s theory that we want to maximise rewards. Gymnasium users will thus resort to over expenditure to reach their goals and to maximise their rewards.

The majority of the gymnasium users attending gymnasiums in the Johannesburg North’s region are aged between 24 to 28 years old. These participants are mostly qualified, working class people who can afford to train in the wealthier areas. It is of great concern that most of the gymnasium users (60%) started using nutritional supplements at a young age, between 13 and 18 years old. Another 23 % of the gymnasium users started using nutritional supplements

even earlier, between 10 and 12 years old. This finding could perhaps be attributed to pressure from coaches and parents to excel at school sport. In addition, many parents may believe that their children are not eating well enough and need nutritional supplements to perform at their best. Parents also often rely on coaches for guidance or information regarding nutritional supplement (Van der Walt, 2015). Coaches were also identified as one of the suppliers of nutritional supplements. In one study, coaches defended this practice, arguing that this method is the only way they can build a relationship of trust with their athletes (Van der Walt, 2015).

Great pressure is thus placed on children at a young age to perform better and to use nutritional supplements. A study conducted by Atkinson (2011) proves that high profile athletes have been documented in the media, caught using prohibited supplements, and this influences younger viewers who aspire to become high profile athletes themselves. This media exposure may influence children to believe that they too should use nutritional supplement to reach that level of play. In fact, only 17% of the gymnasium users started using nutritional supplements when they were 18 or older, when they joined the gymnasium. However, children using nutritional supplements at a young age are at risk of being predisposed to using more serious supplements. Hildebrand, Harty and Langenbacher (2012) call this tendency the gateway theory.

The gateway theory proposes that when one use a less serious drug (such as dagga), one may be tempted to use more serious drugs (such as cocaine). Gymnasium users might use nutritional supplements as a gateway to more serious supplements like prohibited supplements or steroids. Numerous previous studies have shown that nutritional supplements have been linked to steroid use and steroid use tends to co-occur with the use of nutritional supplements (Dodge & Jaccard, 2006; Lucidi, Zelli, Mallia, Grano, Russo & Violani, 2008; Mazanov, Petroczi, Bingham & Holloway 2008). One can assume that children that make use of nutritional supplements are therefore more likely to use steroids at a later stage. Backhouse et al. (2013) confirm this hypothesis in their study, stating that past use of nutritional supplements like creatine has shown to be influencing factors for forming a behavioural intention to use steroids.

In terms of education, most of the participants in this study have completed a university or tertiary level course of degree. In a study investigating supplement use in a gymnasium in

Iran it was also recorded that most gymnasium users had university or college level education (Saeedi, Nasir, Hazizi, Vefa & Foroushani, 2013). The fact that the majority of the gymnasium users have a university or college education might be linked to the fact that they can afford to pay gymnasium fees – because of their education, they may fall into a higher level income group.

Gymnasium users in the Johannesburg North region train mostly in the Rosebank, Bryanston and Randburg areas. One reason why gymnasium users are more likely to train in such as compared with areas such as Parkwood, Highlands North, Alexandra, Wynberg, Glenvista, Ormonde, City Deep, Benrose and Kensington is the difference in the financial class of the areas. The trend seems to be that wealthier areas have more gymnasiums and cross-fit clubs, with more gymnasium users. One can argue that only the wealthy can afford to pay these club fees. Further research needs to be conducted to elaborate on the expenditure on club fees in South Africa.

Forty four percent of gymnasium users training in the Johannesburg north area are Caucasian (White), followed by 33% African (Black) gymnasium users. Twenty three percent of the gymnasium users were Indian, Coloured or another ethnicity. In a related study conducted by Coopoo and Manjra (2004), the researchers compared gender demographics between 1998 and 2002, discovered an increase in black athlete participation. They reported that there was a growth from 9% to 20% in the 4 years. If compared to this study where the African (Black) population is 33%, one can say that there is a constant growth in the participation of black athletes in sports and gymnasiums.

In the following section, the nutritional supplement use patterns of gymnasium users in the Johannesburg North region will be discussed to accomplish the aim of the study, achieve its objectives and prove the hypothesis to be true.

5.2.2 Usage patterns of nutritional supplements among gymnasium users in the Johannesburg North region

Eighty three percent of gymnasium users feel that supplement use in public gymnasiums is on the increase. It is further assumed that the gymnasium goers have some knowledge of these supplements. In a recent study conducted by Palacin-Arce, Monteagudo, Beas-Jimenez, Olea

Serano and Mariscal-Arcas (2015), it is reported that there is a constant growth in the use of nutritional supplements. This tendency towards using nutritional supplements is reflected in the current study, as more than half of the gymnasium users in the Johannesburg North region are tempted to use performance enhancing supplements. One reason could be because that they see others who make use of performance enhancing supplements achieve their goals. Participants might also be frustrated with the fact that they do not see results as quickly as people who make use of performance enhancing supplements.

Seventy four percent of the gymnasium users feel that there is pressure placed on them to use nutritional supplements. This finding answers one of the studies objectives – why gymnasium users make use of nutritional supplements. It may be assumed that the 74% of gymnasium users who consume nutritional supplements do so owing to the external pressure placed on them. More than 60% of the gymnasium users' friends think that it is acceptable to use nutritional supplements. This pressure has a great impact on the attitude of participants towards the use of nutritional supplements. Fiske et al. (2010) explains that attitude can be perceived as a favourable or unfavourable evaluation reaction towards someone or something, or moods, showed in one's beliefs or intended behaviour. The friends that make use of nutritional supplements thus might encourage the participants to form an acceptable and positive attitude towards nutritional supplements, leading to gymnasium users thinking that it is acceptable to use nutritional supplements.

In fact, more than half of the gymnasium users use nutritional supplements due to pressure from their peers. However, sixty five percent of the gymnasium users indicated that they are opposed to the use of supplementation. This finding was surprising, because if one looks at the answers to the other questions posed, one assume that this percentage would be much lower. Yet correlating research also shows that more than 60% of gymnasium users are opposed to banned supplements and methods that enhanced performance but still use them (Singhammer, 2012). So, one could argue that gymnasium users make use of some sort of supplement even though they are against the use of such supplements. The following section discusses where gymnasium users receive their information regarding nutritional supplements.

Seventy five percent of the gymnasium users receive their information regarding nutritional supplements from the internet and 67% receive their information from pharmacists. However, it must be noted that participants could mistake a supplement representative in a pharmacy

for a pharmacist. Nevertheless, pharmacists play a big role in the distribution of information regarding nutritional supplements. In a similar study, it is shown that pharmacists were the main source of supplying and giving advice on nutritional supplements (Van der Walt, 2015). This finding could point to the fact that gymnasium users do not seek medical guidance from a professional doctor because nutritional supplements do not fall under the prescribed medicine category. One can then assume that most nutritional supplement users consume nutritional supplements without consulting their doctors.

A further 66% of gymnasium users gather their information from books and 57% from magazines. Books and magazines are not as popular a source of information as they were in previous years, as the internet plays a bigger role. In a study conducted by Capoo and Jakoet (2000), the two major sources of information 16 years ago were magazines and books. However, with the world moving into a more technological era, one can argue that another reason as to why the internet is taking over as a source of information is the ease of access it offers.

It comes as no surprise that more than half of gymnasium users have used nutritional supplements in the past year, with vitamin and mineral supplements ranked as the third largest over-the-counter supplement category (Froiland, Koszewski, Highs and Kopecky, 2000). This finding is not particular to South Africa, as in United States more than half the adult population (114 million people) consume nutritional supplements (Cohen, 2009). Thus gymnasium users not only nationally but also internationally consume nutritional supplements. This finding thus verifies that the hypothesis is true – most gymnasium users use some form of nutritional supplements. However, most of these gymnasium users are unaware of the health risks.

Seventy three percent of the gymnasium users use nutritional supplements because it helps them improve the way they perform in the gymnasium. Gymnasium users also use supplements to help them gain energy and strength before they go to the gymnasium or assist with a faster recovery after a hard training session. This type of usage is called a pre/post-workout supplement and can include supplements like caffeine and Phedra-cut Thermogenic aid, which the nutritional supplement industries claim helps with more energy and strength in the pre-workout phase. Branched-chain amino acids (BCAA) are used by gymnasium users after intense exercise to help with recovery and to simulate muscle growth. This practice is of great concern as BCAA have been reported to be the cause of amyotrophic lateral sclerosis

(ALS) among American football players. Nutritional supplement users are not aware of the fact that when they use BCAA as a recovery supplement, they are predisposing themselves to a neuromuscular disease (Manuel & Heckman, 2010).

5.2.3 Body image and the use of nutritional supplements in public gymnasiums

From the data gathered in this study, there is a clear indication that the majority of the male gymnasium users associate a healthy body as a more muscular body. It is likely that some men suffer from muscle dysmorphia, also known as reverse anorexia, where normal to overweight males perceive themselves as too small. In fact, 56% of gymnasium users' main reason for attending gymnasiums is to gain muscle. In a study conducted by Hatoum and Belle (2004), the researchers state that men's dissatisfaction with their bodies is associated with being under muscular. In addition, male gymnasium users' main reason for using nutritional supplements is to assist them in coping with the stresses of muscle training in the gymnasium. A vast percentage of gymnasium users that are attending gymnasiums use some form of supplement to maintain or gain muscle mass. In this study, it was also found that 70% of gymnasium users use nutritional supplements to help them reach their personal goals. One can thus argue if a male gymnasium user perceives themselves as too small, they make use nutritional supplement combined with going to the gymnasium to achieve their goal – here, obtain their desired body. In a similar study, Martin and Govender (2011) did research in KwaZulu-Natal and found that television and media place pressure on Indian boys to have “six-pack” abs, as seen amongst Bollywood actors, leading them taking nutritional supplements and illegal supplements to achieve their desired body image. Television and media thus appear to place unnecessary pressures on the South-African population to use nutritional supplements by portraying unrealistic bodies.

Furthermore, Tucker (2105) states that consumers are being negatively influence by the marketing of nutritional supplements. Nutritional supplements are being marketed on a large scale with only one aim in mind: financial gain. More than 50% of gymnasium users in this study believe that they cannot succeed if they do not take nutritional supplements and that they are being influenced in this opinion by mass media. This finding is similar to that of another study, where it was found that physical and mental health is influenced daily by mass media in the form of messages and images. Media sells nutritional supplements by using the

“ideal body” in their advertisements, making gymnasium users believe that their goal to acquire the “ideal body” is not achievable unless they make use of nutritional supplements (Schmidt & Brown, 2002). Seventy percent of the gymnasium users agree that the use of nutritional supplements has not been reported on enough in the media even though the practice of advertising nutritional supplements with health claims is increasing in South-Africa. However, rather than reporting on usage patterns in gymnasium of nutritional supplements, the media focuses more on high performance athletes or athletes with the “ideal body” image.

Hatoum and Belle (2004) further state that many females experience body dissatisfaction and aspire to be thinner. This previous study’s finding explains another noticeable finding in this study: 80% of female gymnasium users attend gymnasiums to lose weight and more than 75% do so for body conditioning. They most likely do so because of the ideal body image that is portrayed by the mass media, an unrealistically thin female body (Baumann, 2007:175-181). Furthermore, 62% of these women use nutritional supplements to reduce food cravings. However, female gymnasium users are also more health conscious when it comes to attending gymnasiums than men. It is of great concern that only 25% of the male gymnasium users attend gymnasiums to stay healthy, as compared with the 48% of female gymnasium users. This finding is of great concern, as health is one of our basic needs. The following section elaborates on the health concerns that arise in public gymnasium when it comes to the usage of nutritional supplements.

5.2.4 Health concerns regarding the use of nutritional supplements among gymnasium users

On one hand, this study shows that most gymnasium users use some form of nutritional supplement and are unaware of the health risks. The main reason is that the generally held view of gymnasium users is that all “natural supplements” are, by definition, free of toxic side effects. But what the gymnasium users are unaware of is that animal and plant sources are also used to make the utmost toxic chemicals known to man (Mottram, 2005). Gabriels et al. (2015) state that performance enhancing supplements may cause great primary and secondary health risks as these supplements may be contaminated. On the other hand, more than half of the gymnasium users came to the conclusion that it is unfair towards them that they should achieve their goals slower than the gymnasium users that make use of performance enhancing supplements, using this reason to consume nutritional supplements. A large percentage of these gymnasium users are aware of the health risk involved in using

performance enhancing supplements, yet still make use of them. The following section elaborates on what types of nutritional supplements are being consumed by gymnasium users.

Eighty four percent of gymnasium users make use of protein supplements. Mottram (2005) emphasises that the excessive consumption of protein shakes produces toxic effects and can lead to greater health concerns. However, the usage of protein in the form of a powder is not a new phenomenon; protein in the form of a nutritional supplement was already developed in 1930. The pharmacist Eugene Schiff developed a method of processing whey from milk for human consumption. It was said in 1954 at the World Weightlifting Championships that protein powder is the secret weapon for athletes to build muscle. In order to develop bone, muscles, hair, skin and other tissues, one must consume the RDA for protein, which is 0.8 g/kg of body weight for the average person. However the RDA can be different when it comes to gymnasium users who use the gymnasiums regularly for strength training. The RDA for these gymnasium users increases to 1.2 to 1.7 g/kg of body weight. Protein above these recommendations lead to gymnasium users jeopardising their performance instead of enhancing it (Meuller & Hingst, 2013). If gymnasium users consume correctly, according to the RDA as a pre-workout, it can lessen protein breakdown, lessen muscle breakdown and improve protein balance. If they consume protein as a post-workout within the RDA, it is proven that they are stimulating protein synthesis and helping in restoring muscle glycogen (Morifuji, Kanda, Koga, Kawanaka & Higuchi (2010). Side effects such as dehydration, muscle cramps and thermoregulation occurs with the over usage of protein powder. Impaired performance has also been noted when athletes manipulate their diets by replacing protein foods with protein powder (Morton et al., 2007).

Seventy two percent of gymnasium users make use of carbohydrate supplements (e.g. Energade and Powerade). Caffeine (59%) also falls in the energy drink category (e.g. Redbull and Guarana). Other studies confirm the popularity of these drinks, indicating that energy drinks like Red Bull and Power Play are consumed by more than 70% of people in South Africa (Analytix, 2012). Yet it is of concern that gymnasium users do not know that excessive consumption of these energy drinks can cause symptoms such as dehydration, increased heart rate, sleeplessness, diarrhoea, nausea and cramping (Mueller & Hingst, 2013). These warnings and side effects are not labelled on these products. In addition, Geyer et al. (2003) state that nutritional supplements contain ingredients that are not declared on the label and which lead to health risks. Scientists also found stimulants such as

methylphenethylamine in nine nutritional supplements tested. This stimulant is used as a pre-workout supplement by gymnasium users to boost their performance. However, it causes adverse effects and has not been tested on humans. This supplement is marketed as a “natural”, without it being tested for safety. Although supplements containing methylphenethylamine were withdrawn from the market, they still remain widely available (Cohen, 2014).

More than seventy percent of gymnasium users make use of vitamins regularly. These vitamins include vitamin A, B, B12, C, D and E. Another supplement that falls in this category is fish oil, better known as Omega 3 tablets. Thirty seven percent of gymnasium users in the Johannesburg North region make use of these Omega 3 tablets. What these consumers do not know is that early research has indicated that no physical performance can be enhanced by certain vitamin supplements (Weight et al., 1988). So consumers might consume these vitamins to boost physical performance but in actual fact gain no physical performing advantage. One can argue that if there is a perceived improvement, it is more of a placebo effect taking place. Researchers did a meta-analysis of the role of nutritional supplements focusing on the effects of placebo treatments. The research was based on 334 findings from 37 studies and found that the placebo effect does play an important role. To best evaluate the treatment effects, placebo groups must be added to studies regarding nutritional supplements as previous findings have shown that there is a significant placebo effect accounting for a big portion of the effect size (Thomas et al., 2015).

Fewer gymnasium users (36%) make use of CLA (conjugated linoleic acid) or weight loss supplements. CLA is used to improve body composition by lowering fat mass and increasing fat-free mass. It has been proven that CLA produces a slow decrease in fat mass (Whigham, Watras & Schoeller, 2007). These researchers also indicated that there are health concerns when higher intake of CLA occurs. These health risks include increase in liver size and insulin resistance. Still, gymnasium users use CLA without consulting their doctor first (Meuller & Hingst, 2013).

Thirty four percent of gymnasium users make use of branched-chain amino acids (BCAA). BCAA consist of the amino acids isoleucine, leucine and valine. The human body does not produce these three amino acids; they must be consumed through protein rich foods or in form of supplementation. BCAA accounts for 35% of the amino acids established in muscle proteins. They help to prevent muscle breakdown in the body. BCAAs used before and after

exercise does produce performance benefits, especially in endurance sport (Shimomura, Inaguma, Watanabe, Yamamoto, Maramatsu, Bajotto & Mawatari, 2010). Research has also proved positive that BCAA can limit muscle wasting and provides benefits when high-quality proteins are consumed (Bajotto, Sato, Kitaura, & Shimomura, 2011). Seventy three percent of the gymnasium users in this study use nutritional supplements because they helps them improve the way they perform in the gymnasium, including BCAA. However, as indicated above (section 5.2.2) BCAA have been reported to be the cause of amyotrophic lateral sclerosis (ALS) among American football players; a fact that consumers are not aware of. Consumers should be informed of all side effects that products might have before they consume any products.

It was also found that 33% of gymnasium users make use of L-Glutamine. L-Glutamine is the most copious amino acid found in the human body and is stored in the muscles. L-Glutamine is an essential part of a gymnasiums user's health and recovery. However, the body does produce enough L-Glutamine without needing to consume it in the form of supplementation. L-Glutamine as supplementation is only necessary for high performance athletes to assist them when they experience symptoms of overtraining or burnout, fatigue, poor performance and frequent illness. Side effects such as bloating, constipation and nausea have been reported in the usage of L-Glutamine (Mueller & Hingst, 2013). When taking into consideration that the body does produce enough L-Glutamine on its own, one must question if the usage of L-Glutamine by gymnasium users is necessary.

The reason why the last four supplements are consumed less than the others could be that that they are new to the market, or that the consumer does not know what the supplements are used for. Marketing companies often confuse consumers with misleading statements that claim that their products are the best on the market and that consumers must use their products in order to achieve personal goals. Consumers find it then difficult to make informed decisions regarding the consumption of nutritional supplements (Mullins, 2015). Part of the information that the consumer should have, but usually does not, is information regarding any side effects or health risks associated with a nutritional supplement. In the following section, a discussion will follow regarding the health concerns involved in mislabelling of nutritional supplements.

The nutritional supplement industries lack of regulatory measures leads to a negative impact on consumers' health. Fifty nine percent of the gymnasium users in public gymnasiums do

not read the nutritional value, benefits and side effects on the labels before they use nutritional supplements. This neglect is a great health concern, as gymnasium users are therefore using products, which have side effects they are unaware of. Another great health concern pertains to the fact that some studies have shown that mislabelling of nutritional supplements occurs. In this case, consumers are at risk, regardless of if they read the labels or not before they use the supplements. An older study conducted by Par et al. (2003) confirmed that 110 supplements from the international market contained substances not declared on the label. In a more recent study conducted by Ivanova et al. (2015) it is proven that mislabelling is still taking place on a large scale. Lack of quality control and inadequate observation of the nutritional supplement industry is a reality, with production companies selling products that are mislabelled.

Eighty two percent of gymnasium users use nutritional supplements to be healthier, regardless of the health concerns involved in the use of these nutritional supplements. This finding proves that there is either gap in the participants' knowledge regarding nutritional supplements or there is a need for an attitude change towards nutritional supplements. Attitude can change, according to Katz, when it no longer assists its function. Gymnasium users may thus change their attitudes towards nutritional supplements if they are aware of the health risks involved in consuming these supplements (Fiske et al. 2010). O'Keefe (2004) explains that attitude change is important. In addition, one can claim that nutritional supplement industries' success is subject to consumers' change in attitude.

5.2.5 Attitudes and awareness regarding nutritional supplements among gymnasium users

Eighty percent of gymnasium users agree that there is a problem with nutritional supplement use in public gymnasiums. This finding indicates that gymnasium users are aware of the problem and show a negative attitude but, in order to attain their goals, they change their attitude towards the use of nutritional supplement in public gymnasiums. If we correlate Fiske et al. (2010) with this statement, we can say that gymnasium users' attitude determine if they use nutritional supplements. In this study, the psychological view on attitudes holds that attitudes are determined by the functions they serve for us. People have given attitudes because these attitudes help them reach their basic goals and needs. Health is one of these basic goals and needs, but although people might accept that there is a problem with

nutritional supplements in gymnasium, they continue to use nutritional supplements because they think that it reflects a healthy lifestyle choice.

In fact, more than 70% of gymnasium users show a negative attitude towards the usage of supplements to enhance their gymnasium performance. Although this percentage is high, most gymnasium users still use performance enhancing supplements. Katz (1960) explains that attitudes can be divided into three components, namely affective, behavioural and cognitive. These attitudes are affective, as gymnasium users fear not being able to achieve goals, thus changing their attitude towards using performance enhancing supplements, even though they know that they are opposed to the idea. In addition, behavioural attitudes can be described as a tendency or disposition to react in certain ways towards something. The focus is on the tendency to react, not the actual acting. So although gymnasium users say that they are opposed to the idea of using performance enhancing supplements, they still use them. Lastly, cognitive attitudes can be divined as our thoughts, beliefs and ideas about something. But these attitudes may steer gymnasium users in the wrong direction, as these ideas are not necessary always the most health conscious.

More than eighty percent of gymnasium users want gymnasiums to offer educational programmes to help them obtain more information on supplement usage in gymnasiums. This finding shows that there is a need for educational programmes to educate gymnasium user on supplements and their use. One of the psychological attitudes is gathered from knowledge (Fiske et al. 2010), thus it comes as no surprise that participants want to be educated, as participants pursue some degree of order, solidarity and clarity in their personal frame of reference. In addition, 69% of gymnasium users are aware that the usage of supplements is on the increase and this have an impact on their attitude that it is acceptable to make use of nutritional supplements.

Seventy five percent of gymnasium users are aware of the supplements that are prohibited by the World Anti-Doping Agency. Only 25% of gymnasium users need to be informed of this prohibited supplements list. This finding shows that the gymnasium users are aware of prohibited supplement use in public gymnasiums. Moreover, that they do have the knowledge to determine between supplements that are prohibited by the World Anti-Doping Agency and general nutritional supplements. Gymnasium users may also be aware of the supplements that are prohibited by the World Anti-Doping Agency owing to the South African Institute for Drug-Free Sport's (SAIDS) contribution to the advocacy, testing, monitoring and education

of athletes with regard to prohibited substances (Coopoo & Manjra, 2004). These researchers state that there has been a progressive growth in the activities of SAIDS over the years.

Fifty five percent of gymnasium users think that it is wrong to use nutritional supplements for gymnasium purposes, yet some participants will still use nutritional supplements for these purposes. If we look at one of the four types of psychological attitudes, namely value expressive, we see that when basic values are expressed, they reinforce self-image. Therefore, gymnasium users may be brought up to embrace those beliefs and values that state that it is wrong to use nutritional supplement for gymnasium purposes, and so repeat that they still believe this to be true, even while using them..

5.3 Conclusion

Noticeable findings regarding the demographics of the gymnasium users include a growth in the participation of African (Black) athletes in sports and gymnasiums. In addition, the majority of gymnasium users are aged between 24 and 28 years old and are educated people, holding a university qualification or equivalent. For the most part, Johannesburg North's gymnasium users are aware of the increase in nutritional supplement usage in gymnasiums. However, the majority of these gymnasium users make use of nutritional supplements, owing to external pressure, including the media. In fact, forms of mass media appear to place unnecessary pressure on the population of South-Africa to use nutritional supplements. In addition, most gymnasium users who participated in this study make use of nutritional supplements both to help them reach their goals faster and due to internal pressures from their peers. However, gymnasium users are aware of the supplements that are prohibited by the World Anti-Doping Agency so one can say that they are informed. Gymnasium users receive their information regarding nutritional supplements mostly from sources like the internet, pharmacists, books and magazines.

Most gymnasium users' main reason for going to the gymnasium is to gain muscle. The majority of gymnasium users use nutritional supplements to help them maintain or gain muscle mass. Furthermore, most gymnasium users use some form of nutritional supplement to help them improve the way they perform in the gymnasium. For female gymnasium users, the main reason for going to a gymnasium is to lose weight. More than sixty percent of the gymnasium users reported using nutritional supplements to eliminate food cravings. Further

research needs to be done to see if there is a correlation between muscle dysmorphia and muscle gain and anorexia nervosa and weight loss in the gymnasium environment. Media also plays a large role in perpetuating many peoples' desire for a certain body by portraying the ideal male body as muscular and the ideal female body as unrealistically thin.

It is of great concern that more than half of the Johannesburg North gymnasium users started using nutritional supplements at a young age and that more than half of the gymnasium users used supplements in the past year. Without knowing the health risks involved in using nutritional supplements due to ignorance and mislabelling and using substances not prescribed by a medical professional, more than 80% of Johannesburg North gymnasium users nevertheless state that they use nutritional supplements to stay healthy. This finding proves that there is a gap in the knowledge of the participants regarding nutritional supplements. Another great health concern is that more than half of the gymnasium users in the Johannesburg North region do not read the nutritional value, benefits and side effects on the labels before they use the nutritional supplements.

Protein is the supplement customarily used by gymnasium users in the Johannesburg North region. Almost every gymnasium user makes use of protein shakes as part of their gymnasium diet. Although protein is a dynamic component of a balanced diet, there still no experimental proof to show that protein shakes improve metabolic activity or lead to increased muscle mass. Other supplements most frequently used by gymnasium users are carbohydrate supplements, caffeine, vitamin supplements and Omega 3 tablets. The over expenditure on nutritional supplements in South Africa testify to the popularity of these supplements. Most of the gymnasium users in the Johannesburg North region spend between R500.00 and R1500.00 per month on nutritional supplements. Almost 30% of gymnasium users spend R1500.00 to more than R3000.00 per month on nutritional supplements.

5.4 Recommendations

Based on the results of this study, the following recommendations are made. These recommendations may assist with educating gymnasium users about the health risks involved in taking nutritional supplements:

- Gymnasiums and the Department of Health and Safety should be informed of the problem at hand and the health risks involved in the usage of nutritional supplements that have not been clinically tested and approved for human consumption.
- Consumers using nutritional supplements must be informed that they should seek medical advice before they make use of nutritional supplements.
- Manufacturers should be advised that their products must go through clinical testing to prove their safety for human consumption and to eliminate mislabelling.
- The Medicines Control Council should implement a redefined, more meaningful and implementable regulatory framework for nutritional supplements, which should be similar in nature to the Health and Safety Act of the public.
- Educational programs can be implemented at primary school level, as many of the gymnasium users indicated that they started using nutritional supplements at a young age.
- Educational programs can be implemented to educate parents of the great health risks involved in taking nutritional supplements. Parents should be warned against the use of nutritional supplements because of these health risks, as well as the mislabelling that takes place under this unregulated nutritional supplement industry.
- Gymnasium can offer educational classes to gymnasium users that focus on the use of nutritional supplements.
- The World Anti-Doping Agency and the South African Counsel for Drug Free Sport can assist with the implementation of awareness campaigns in public gymnasiums to educate the gymnasium users about the health risks involved in taking prohibited and non-prohibited supplements.

5.5 Limitations

Limitations are always present when it comes to responding to questionnaires. The researcher thus made sure that the effects of limitations such as misunderstanding the content of the question, participants not being truthful and loss of meaning were minimised and that the interpretation of results was honest and truthful.

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APPENDIX 1

Information Sheet



APPENDIX 1 - INFORMATION SHEET

My name is Xavier Trevor Mc Creanor. I am a student at the University of Johannesburg, and am completing my Master's degree in Sport Science. The study that is being conducted aims to establish the usage of nutritional supplements among commercial gymnasium patrons in the Johannesburg North region

This study will be based on data collected through questionnaires completed by the participants. We seek your co-operation in assisting the author to collect data regarding the topic being researched. The research will be supervised by Prof. Y Coopoo, from the Department of Sport and Movement Studies at the University of Johannesburg. The broad ethical considerations for quality research will be followed, including specific ethical guidelines for all research participants. All information is completely confidential and will only be used for research purposes. Participation is completely voluntary and any participant is free to withdraw from the study at any time.

Your assistance and participation will be highly appreciated and can make a meaningful contribution and offer key insights into supplement usage in commercial gymnasiums.

Xavier Mc Creanor

Researcher

November 14

APPENDIX 2

Questionnaire informed consent form



APPENDIX 2 - QUESTIONNAIRE INFORMED CONSENT FORM

Informed Consent

Xavier Trevor Mc Creanor is a student at the University of Johannesburg, and you are hereby cordially invited to volunteer to participate in a research project to determine the attitudes and perceptions towards performance enhancing substance use amongst young adult gymnasium users in Johannesburg North fitness centres.

Completing the questionnaire would take approximately 20 – 30 minutes and you are free to opt out at any time, without consequences of any kind.

The broad ethical considerations for quality research will be followed, including specific ethical guidelines for all research participants in terms of:

1. Aim and objective

To establish the usage of nutritional supplements among commercial gymnasium patrons in the Johannesburg North region.

2. Privacy and confidentiality

All research participants will have their privacy and confidentiality respected at all times. Names and/or positional statements will not appear in any document (e.g. report and/or article) without prior permission from the relevant research participant. You may request access to the report and any other subsequent publication related to this research. There will be no remuneration for your participation.

3. Benefits to be expected

The study will not have immediate benefits to you; however, you would contribute to the broader knowledge in the area of nutritional supplementation. It will also provide content that can be used by the gymnasium supplement users in the Gauteng region.

4. Enquiries and freedom of consent

I have been given the opportunity to ask questions regarding the strategies and/or methodology. I acknowledge that I have read this document in its entirety or that it has been read to me if I have been unable to read it.

I declare that I am partaking by free will and that I have not been coerced to participate in the study.

I thus hereby give my full consent to the results of the study to be published in any research publication with the understanding that it would be on an anonymous basis.

Name and Surname: _____ Signature: _____ Date: _____

Witness: _____ Signature: _____ Date: _____

Researcher: _____ Signature: _____ Date: _____



APPENDIX 3

Questionnaire



APPENDIX 3 - QUESTIONNAIRE

ATTITUDES TOWARDS NUTRITIONAL SUPPLEMENT USE AMONGST YOUNG ADULT GYMNASIUM USERS SURVEY

The questions below have been compiled to investigate attitudes and perceptions towards supplement usage amongst young adult gymnasium users in Gauteng's fitness centres. Your involvement in this survey is voluntary and you may withdraw at any time. Your name must not appear on the questionnaire to ensure confidentiality. Read the questions carefully and answer by placing an 'X' in the blocks provided and, where asked, please write in your answer appropriately. Make sure that you do not communicate with fellow participants when filling in the questionnaire and do not hesitate to ask any questions.

Thank you kindly for your participation in this study.

SECTION 1: BACKGROUND INFORMATION

The questions following will ask background information about you.

1.1 What is your age? _____ Years old

1.2 Please specify your gender?

Male	
Female	

1.3 What is the highest level of education you have completed?

University or college or equivalent	
Intermediate between secondary level and university (e.g. technical training)	
Secondary school Grade 12	

1.4 In what Johannesburg region do you train mostly?

Diepsloot, Midrand, Fourways, Sunninghill, Woodmead	
Rosebank, Bryanston, Randburg	
Bram Fischerville, Thulani, Florida	
Soweto	
Parkwood, Highlands North, Alexandra, Wynberg, Morningside, Douglasdale	
Other regions	

1.5 From what ethnic group are you?

Caucasian (White)	
African (Black)	
Indian, Coloured or Other	

SECTION 2: GENERAL INFORMATION

2.1 Read the questions carefully and answer suitably.

2.1.1 Do you feel that the uses of nutritional supplements in gymnasiums are rising?

Yes	
No	

2.1.2 Do you believe there is pressure placed on gymnasium users to use nutritional supplements?

Yes	
No	

2.1.3 Are you aware of any supplements that are prohibited by the World Anti- Doping Agency?

Yes	
No	

2.2 Do you receive information on the use of nutritional supplements from any of the following sources?

	YES	NO
Pharmacist		
Personal trainer		
Journals		
Friend/training partner		
Physician		
Biokineticist		
Sibling		
Parent		
Information brochures		
Representative from a supplement company		
Magazines		
News papers		
Books		
Internet		
I have not received information		
Other (please specify) _____		

2.3 Kindly rate the degree to which you agree or disagree with the following gymnasium related statement – My reasons for going to the gymnasium.

1 = Main, 2 = Sometimes, 3 = Never (Please circle one number.)

Muscle gain	1	2	3
Weight loss	1	2	3
Swimming	1	2	3
Body conditioning	1	2	3
Aerobic exercise	1	2	3
Sport specific training	1	2	3
Spiritual motive	1	2	3
Staying healthy	1	2	3
Cross-fit training	1	2	3
Other (Please specify) _____			

2.4 Do you make use of or have you ever used a personal trainer?

Yes	
No	

SECTION 3: USE OF SUPPLEMENTS

3.1 In the past year (12 months), have you used nutritional supplements?

Yes → Proceed to question 3.2	
No → Proceed to question 3.6	

3.2 When did you begin using nutritional supplements?

10 – 12 years old – Primary School level	
13 – 18 years – High School level	
Over 18 years old – When I joined the gymnasium	

3.3 What are your reasons for using nutritional supplements?

	YES	NO
Assists me in coping with the stresses of muscle gains in the gymnasium.		
Helps to improve the way I perform in the gymnasium.		
Helps to reduce food craving in order to decrease my body weight.		
I feel pressured by my peers.		
Help me reach my personal goals		
To be more healthy		
Other (please specify) _____		

3.5 On average, how much do you spend on nutritional supplements per month?

R0.00 – R500.00	
R500.00 – R1000.00	
R1000.00 – R1500.00	
R1500.00 – R2000.00	
R2000.00 – R2500.00	
R2500.00 – R3000.00	
More than R3000.00	

3.6 If you DO NOT USE nutritional supplements, what are the main MOTIVATING FACTORS?

	YES	NO
I don't think it is not necessary to take them.		
I am afraid of what it may do to my health.		
It goes against what I believe.		
I don't know what type of nutritional supplements I must use.		
I don't trust the companies that make the nutritional supplements.		
I cannot afford it.		
I am concerned about getting addicted to them.		
I am afraid of getting fake products.		
Other (please specify) _____		

SECTION 4: USE OF NUTRITIONAL SUPPLEMENTS

4.1 What nutritional supplements do you use regularly?

	YES	NO
Creatine supplements (e.g. Creatine monohydrate)		
Protein supplements (e.g. Whey protein)		
Carbohydrate supplements (e.g. Energade, Powerade)		
CLA (Conjugated Linoleic Acid) Weight loss supplements		
Phedra-cut Thermogenic Aid		
Branched-chain amino acids (BCAA)		
L-Glutamine		
Fish oil (e.g. Omega 3 – Tablets)		
Caffeine (e.g. Redbull, Guarana)		
Vitamins (A, B, B12, C, D and E)		
Other (please specify) _____		

4.2 Do you read the nutritional value, benefits and side effects on the labels before you use the supplements? (Please select the most appropriate answer)

Always – My health must come first	
Sometimes – It is save to use if I buy it from the pharmacy	
Never – I trust the manufacturing company that supplies my supplements	
Other (Please specify) _____	

SECTION 5: ATTITUDES TOWARDS SUPPLEMENTS IN GYMNASIUMS

Kindly rate the degree to which you agree or disagree with the following sport related statements.

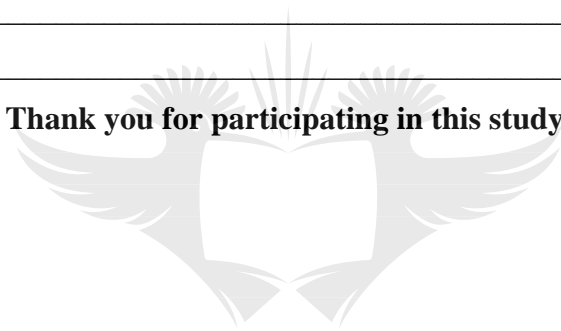
1 = Strongly agree, 2 = Agree, 3 = Disagree, 4 = Strongly disagree (Please circle one number.)

(5.1) There is a problem of nutritional supplement use in my gymnasium.	1	2	3	4
(5.2) Gymnasiums should offer educational programmes for gymnasium users on the use of nutritional supplements in gymnasiums.	1	2	3	4
(5.3) There are too many gym users using nutritional supplements in my gymnasium to enhance their performance.	1	2	3	4
(5.4) The use of nutritional supplements by gymnasium users has not been reported on enough in the media.	1	2	3	4
(5.5) The use of performance enhancing supplements and nutritional supplements has risen in the last five years.	1	2	3	4
(5.6) I would never consider the use of nutritional supplementation.	1	2	3	4
(5.7) I am sometimes tempted to use performance enhancing supplements.	1	2	3	4
(5.8) Many of my friends think it is acceptable to use nutritional supplements.	1	2	3	4
(5.9) If I don't take nutritional supplements, I will not be able to succeed because everyone else does.	1	2	3	4
(5.10) I think it is always wrong to use nutritional supplements for gym purposes.	1	2	3	4
(5.11) I think gymnasium participants who want to reach their goals have to use nutritional supplements sometimes.	1	2	3	4
(5.12) I don't think it is fair to use nutritional supplements	1	2	3	4

SECTION 6: SUGGESTIONS TO HELP ADDRESS THE PROBLEM OF EXCESSIVE USE OF NUTRITIONAL SUPPLEMENTS

If you believe that the excessive use of nutritional supplements in gymnasiums is a problem, can you suggest some ways to help solve the problem?

Thank you for participating in this study!



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APPENDIX 4

Letter for ethical clearance



FACULTY OF HEALTH SCIENCES

RESEARCH ETHICS COMMITTEE

NHREC Registration no: REC-241112-035

REC-01-144-2015

02-March- 2015

TO WHOM IT MAY CONCERN:

STUDENT:

McCREANOR, X

STUDENT NUMBER:

201471975

TITLE OF RESEARCH PROJECT:

"Attitudes Towards Nutritional Supplement Use, amongst Young Adult Gymnasium Users in Johannesburg North"

DEPARTMENT OR PROGRAMME:

SPORT AND MOVEMENT STUDIES

SUPERVISOR: Prof Y Coopoo

CO-SUPERVISOR:

The Faculty Academic Ethics Committee has scrutinised your research proposal and confirm that it complies with the approved ethical standards of the Faculty of Health Sciences; University of Johannesburg.

The AEC would like to extend their best wishes to you with your postgraduate studies.

Yours sincerely,

Prof M Poggenpoel

Chair : Faculty of Health Sciences REC

Tel: 011 559 6686

Email: mariep@uj.ac.za

APPENDIX 5

Letter for plagiarism

Turnitin Originality Report

ATTITUDES TOWARDS NUTRITIONAL SUPPLEMENT USE AMONGST ADULT

GYMNASIUM USERS IN JOHANNESBURG NORTH by Xavier Mc Creanor

From dissertation (BEL 897 Y1 2015 _92796_1)

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< 1% match (publications)

[Gabriels, Gary. "Information on nutritional supplement labels: time for legislation?", South African Journal of Clinical Nutrition/16070658, 20120301](#)

APPENDIX 6

Letter from language editor

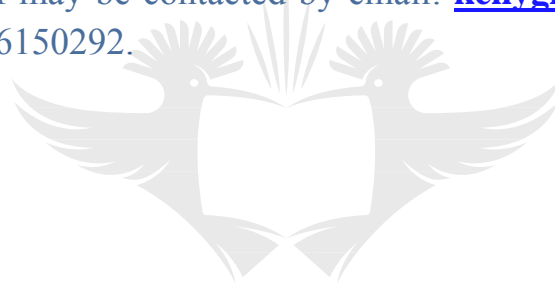
27/02/2016

To whom it may concern,

This letter serves to confirm that the attached document, the MA dissertation by Xavier Mc Creanor, has been edited by a qualified language practitioner. For further verification, I may be contacted by email: kellygilbertson@gmail.com or by cellphone: 0616150292.

Kind regards,

Kelly-Anne Gilbertson



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