**The advertising of nutritional supplements in South African women’s magazines: descriptive survey**

***Background.*** Nutritional supplements are increasingly being advertised in South Africa and these advertisements frequently contain health claims.

***Aim.*** To determine the extent to which health claims are made in advertisements of nutritional supplements, and to describe the appropriateness of the research cited within advertisements in support of health claims.

***Design.***  Descriptive survey.

***Methods.*** We identified the five women’s magazines registered in South Africa with the highest circulation figures. Issues of these magazines were obtained during the period September 2010 to August 2011. We used pre-specified eligibility criteria to identify eligible advertisements and determined the percentage of nutritional supplements for which health claims were made. We also determined the percentage of these supplements for which research was cited in support of the claims, and described the level and appropriateness of the cited research.

***Results.*** The following magazines were studied: Cosmopolitan, Finesse, Move!, Rooi Rose and Sarie. We identified 486 eligible advertisements which referred to 158 nutritional supplements. Of these, 137 (86.7%) made health claims and 9/137 (6.6%) cited research to support their claims. The cited research was judged to be largely inappropriate based on study design and/or the characteristics of the study.

***Conclusions.*** South Africans should be wary of advertisements making claims for the health benefits and safety of nutritional supplements. Regulation of the advertising of nutritional supplements is urgently needed.

**Background**

Advertising of nutritional supplements with health claims is becoming increasingly common in South Africa. References to research included in these advertisements may lend credence to certain claims and promote marketing of these products. Yet cited research contained in advertisements may not always be appropriate, sufficient or valid for the products being advertised.(1,2,3)

Nutritional supplements are inadequately regulated in South Africa. Such regulation is meant to be provided for either by the Medicines and Related Substances Act (Act 101 of 1965)(4) or the Foodstuffs, Cosmetics and Disinfectants Act (Act 54 of 1972)(5). However, there is an ongoing debate about which Act is applicable, and a final decision about this is still pending. While the Advertising Standards Authority, an industry body, can in some cases, intervene in the case of misleading claims to prevent further advertising of a product in the media, they cannot prevent the sale of these products or stop misleading advertising in areas where they have no jurisdiction. Passing of the new food labelling and advertising legislation in South Africa in March 2010 was a welcome development, but this legislation currently only covers health claims on food packaging and not those related to nutritional supplements. Furthermore, the Medicines Control Council has published draft regulations for the regulation of complementary and alternative medicines in August 2011(6), but it does not contain any criteria for determining efficacy and safety of nutritional supplements per se.

By contrast, regulation of nutrition and health claims for both food and nutritional supplements and advertising thereof has been in place in the European Union (EU) since 2007.(7) In the EU a health claim is defined as “any claim that states, suggests or implies that a relationship exists between a food category, a food or one of its constituents and health”. EU regulations, more specifically, refer to a ‘reduction of disease risk claim’ as “any health claim that states, suggests or implies that the consumption of a food category, a food or one of its constituents significantly reduces a risk factor in the development of a human disease”. Furthermore, the European Food Safety Authority (EFSA) has specified wording for claims that are allowed on packaging of relevant food and nutritional supplements.(7) In the United States of America (USA) the Nutrition Labeling and Education Act (NLEA) of 1990 requires that health claims on food and nutritional supplements be made only with the approval of the Food and Drug Administration (FDA).(8)

Our study sought to provide information on health claims made in nutritional supplement advertisements in South Africa. We sampled the top five South African women’s magazines over a one year period documenting the number of nutritional supplements covered, what percentage of these adverts contained health claims, and of these what percentage cited research. Finally, we assessed the evidence level and appropriateness of cited research.

**Methods**

**Selection of study sample**

We contacted the Audit Bureau of Circulations of South Africa in July 2010 to identify the five registered women’s magazines with the highest circulation figures. Four of these magazines are published monthly and one weekly. For the period September 2010 to August 2011 we purchased every issue of the monthly magazines and the first issue in each month of the weekly magazine (60 issues in total).

We screened each magazine issue to identify all potentially eligible advertisements and used the following pre-specified eligibility criteria to finalise the sample: an advertisement specifying or naming at least one supplement intended for oral consumption in humans; the supplement could be in any form (e.g. tablet, capsule, gel, powder, liquid) as long as it contained at least a vitamin, mineral, herb (or other botanical), amino acid, carbohydrate or fatty acid; it could not be a functional food.

**Data extraction**

We designed and piloted a 22-question data extraction form including a mixture of closed and open ended questions to collect specific data from the included advertisements. The form comprised different sections namely general (product and manufacturer name, contact details, month(s) and magazine(s) in which the advertisement(s) was published); quotes (health claims, referrals to research or statistics, persuasive remarks, and anecdotes or recommendations); and target users (adults or children). We also determined the level of evidence cited using the Oxford University’s Centre for Evidence-based Medicine tool.(9) Finally we assessed the appropriateness (or directness) of cited research by describing the types of study participants, types of interventions, types of controls and types of outcome measures (primary outcomes) after reading the cited full text article(s). The criteria used to assess the level and appropriateness of cited research is displayed in Table 1. We completed one data extraction form per nutritional supplement using information from all relevant advertisements for a specific product during the course of the year.

**Table 1. Levels of evidence for health claims and criteria for appropriateness**

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|  | **Level** | **Study design** |
| 1 | Systematic review of RCT\*s: **first prize evidence for health claims on effectiveness** |
| 2 | Individual RCT\* (with narrow confidence interval): **gold standard for primary research on effectiveness** |
| 3 | Systematic review of cohort studies |
| 4 | Individual cohort study (and low quality RCT\*, e.g. <80% follow-up) |
| 5 | ’Outcomes’ research; Ecological studies |
| 6 | Systematic review of case-control or cross-sectional studies |
| 7 | Individual case-control or cross-sectional study |
| 8 | Case series (and poor quality cohort and case-control studies, and uncontrolled studies) |
| 9 | Expert opinion; Animal research; Laboratory studies |
| 10 | None of the above |
| **Appropriate study design:** Ideally systematic reviews of RCT\*s; otherwise RCT\*s.  **Appropriate participants:** Humans diagnosed with the specific outcome of interest where eligibility criteria were reasonable and reported baseline characteristics per group are similar to the product’s target market.  **Appropriate intervention:** The product being advertised (preferably as a whole, otherwise evidence is needed for all ingredients) where the dose and frequency of use are similar to the product instructions. There may have been a co-intervention as long as it was also given to the control group.  **Appropriate control:** Standard treatment or placebo.  **Appropriate primary outcomes:** Patient-important clinical outcomes. | | |

\*RCT = randomised controlled trial

**Analysing data**

Data were summarized in a diagram, bar chart, and a table. We grouped the nutritional supplements’ health claims into various categories (e.g. weight loss and toning, immune system and energy, cardiovascular health, joint and cartilage) according to the broader health area to which the main (or first) health claim applies.

**Ethics**

As the data source of this project is advertisements that are in public domain, the Health Research Ethics Committee of Stellenbosch University provided ethical review exemption (N11/10/306).

**Results**

The magazines in our study are, in alphabetical order, Cosmopolitan, Finesse, Move!, Rooi Rose and Sarie. Finesse magazine has a mainly ‘Christian’ readership, while the rest are secular publications. We identified 486 eligible advertisements referring to 158 different nutritional supplements. Figure 1 displays the number of nutritional supplement advertisements by month and magazine. This figure also provides a breakdown of the target market for each magazine in terms of language and socio-economic status (SES). There were no eligible advertisements in Move! and almost all advertisements (96.7%) come from the three Afrikaans language magazines. No differences in the proportion of eligible advertisements were found across the four seasons of the year.

486 advertisements referred to 158 nutritional supplements

Spring (27.2%)

Sept n=33

Oct n=50

Nov n=49

Summer (22.2%)

Dec n=37

Jan n=30

Feb n=41

Winter (22.0%)

Jun n=46

Jul n=30

Aug n=31

Autumn (28.6%)

Mar n=28

Apr n=21

May n=90

Cosmopolitan

English, middle to upper SES

n=16 (3.3%)

Finesse

Afrikaans, middle to upper SES

n=137 (28.2%)

Move!

English, lower to middle SES

n=0 (0%)

Rooi Rose

Afrikaans, middle to upper SES

N=202 (41.5%)

Sarie

Afrikaans, middle to upper SES

n=131 (27.0%)

**Figure 1. Number of nutritional supplement advertisements by month and magazine for the period September 2010 to August 2011.**

Health claims were made for 137 (86.7%) of the 158 nutritional supplements identified covering a wide range of conditions (Figure 2). Most common were claims relating to weight loss and body toning (22.6%) and the immune system and energy boosting (13.9%). In Table 2 we present illustrative quotes from the three categories with the highest number of health claims, as well as for the categories ‘multiple conditions’ and ‘acne’.

**Figure 2. Range of health claims that appeared in the included advertisements.**

**Table 2. Selected health claim quotes for the specified categories.**

|  |
| --- |
| **Weight loss and toning**   * Slender Max Glucoslim: “slim down and feel immediately satisfied by this stimulant-free solution that is clinically proven to work”.\* * Ultima1 and Ultima BurnXpress: “with Ultima1 and BurnXpress you have the perfect weight loss combination to not only lose weight fast – but keep it off forever”. * Organo-Slim: “Organo-Slim works by normalizing your blood sugar levels so that you have a reduced craving for sweets. This makes it much easier to eat healthily because you lose your appetite for junk food. It also reduces the absorption of calories and helps your tummy to work regularly”.\* |
| **Immune system & energy**   * vita-thion®: “vita-thion® is the only registered supplement in South Africa that gives you sustainable energy because it contains ATP”.\* * Solal ALL YOU NEED™ Teens: “contain high dosages of vitamins, minerals and herb extracts that decreases stress and enhance brain function. It also contains probiotics and antioxidants for a stronger immune system and spirulina for detox".\* |
| **Mental health**   * Vital Ginkgo Biloba: “survive exams and think on your feet with this wonder herb. Ginkgo biloba is widely used in Western Medicine as an aid for poor memory and concentration”. * Solal Theanine: “help the brain to relax and enhance brain wave function which enhances sleep”.\* |
| **Multiple conditions**   * Essies Tea: “prevent the buildup of excess fat in veins, the heart, kidneys and liver; regulate cholesterol by converting sugar and fat into energy; neutralize acids, absorb toxins in the intestines and eliminate both; prevent and slow down the formation of tumours; remove heavy metals around joints to reduce inflammation and stiffness".\* |
| **Acne**   * Clear Skin B5: “it shrinks the pores, reduces the functioning of oil glands and heals the colour and texture of your skin. It provides sufficient coenzyme A which regulates hormones and breaks down oil on the skin. Clinical research showed that it is just as effective as Accutane/Roaccutane, but without the side effects of Accutane. As a 100% natural product it is safe and much more effective than any other antibiotic for acne on the market today”.\* |

\*We translated these quotes from Afrikaans to English.

Only nine (6.6%) of the 137 nutritional supplement adverts with health claims cited research. Table 1 shows the level of research evidence and displays information about study characteristics. Seven out of the 15 (46.7%) citations were judged to be inappropriate in terms of study design because they are laboratory studies, expert opinion (websites and a product monograph referring to a textbook), a package insert and an uncontrolled trial. No systematic reviews were cited. Most of the cited RCTs had small sample sizes and a long list of exclusion criteria which may affect generalisability of the study findings. Antistax® is the only product whose direct efficacy was tested in a RCT; the other cited studies only investigated the efficacy of specific ingredients or their association with certain outcomes but did not study the product as a whole. The longest intervention period was 12 weeks which is not sufficient to make conclusions about long-term benefits or safety. All controlled trials cited were placebo-controlled.

**Table 3. Level of evidence of cited research and appropriateness for health claims.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Nutritional supplement** | **Health claim category** | **Level of evidence** | **Sample size** | **Study characteristics** |
| **Antistax®**  **Ingredient:** 1 tablet contains 360 mg Antistax®.  **Instructions:** 1 tablet daily before breakfast which may be increased to 2 tablets daily. | Chronic venous insufficiency (CVI) | RCT\* | 260 | **Participants:** Men and women (25 to 75 years) with stage 1 to 2 chronic venous insufficiency in Germany. Long list exclusion criteria such as insulin-dependent diabetics; those with renal failure, liver disease, peripheral arterial disease, malignancies, neuropathies, hyper- or hypocalcemia, decompensated heart pump failure, edema not related to CVI; drug or alcohol abuse; patients requiring acute specific treatment for venous disorders. Baseline characteristics per group were reported for age, gender, weight, height and body mass index.  **Intervention 1:** Antistax® 360 mg daily for 12 weeks.  **Intervention 2:** Antistax® 720 mg daily for 12 weeks.  **Control:** Placebo.  **Outcome:** Change in lower leg volume. |
| **Ensure**  Meal replacement containing numerous vitamins, minerals and fructo-oligosaccharides (FOS). 100 ml provides 420 kilojoules, 3.72 g protein, 3.27 g fat, 13.42 g carbohydrates and 1.01 g FOS. | Immune system & energy | Expert opinion | - | - |
| **eye q™**  **Ingredients:** 2 capsules contain 800 mg fish oil omega-3 (which gives 186 mg EPA# and 58 mg DHA##), 200 mg evening primrose oil omega-6 (which gives 20 mg GLA¤), and 3.6 mg natural vitamin E).  **Instructions:** 6 capsules daily with food for the first 12 weeks and 2 capsules daily thereafter. | School performance (part of category called ‘other’) | RCT\* | 117 | **Participants:** Mainstream school children (5 to 12 years) with developmental coordination disorder in the United Kingdom. Eligibility criteria excluded children with epilepsy, diabetes, depression and chronic fatigue syndrome. Baseline characteristics per group not reported.  **Intervention:** Supplement containing 732 mg omega-3, 60 mg omega-6 and 9.6 mg vitamin E for 3 months.  **Control:** Placebo.  **Outcomes:** Change in motor function, reading and spelling, and teacher-rated attention deficit hyperactivity disorder related symptoms. |
| **HeartChoice™ Optimal with CoQ10**  **Ingredients:** 1 capsule contains 150 mg coenzyme Q10, 15 mg resveratrol and 15 mg magnesium.  **Instructions:** 1 capsule daily. | Cardiovascular health | Expert opinion  Package insert  Expert opinion  Cross-sectional study | -  -  -  -  98 | -  -  -  -  **Participants:** Hispanic and African-American women of which 50 were pre-menopausal and 48 post-menopausal (15 on hormone replacement therapy). Baseline characteristics per group provided for age, weight, ♠LDL and ‡HDL cholesterol, total cholesterol and triglyceride levels.  **Exposures:** Natural menopause and hormone replacement therapy.  **Outcome:** Serum levels of coenzyme Q10. |
| **Nativa Hormonal Complex**  **Ingredients:** 160 mg piceae pollen/pollen-pistil extract and 7.85 mg vitamin E.  **Instructions:** 2 tablets daily for 3 months; thereafter the dosage can be adjusted to individual needs. | Menopausal symptoms  (part of category called ‘other’) | Uncontrolled trial | 417 | **Participants:** Menopausal women in France with menopausal symptoms; not on medication. Eligibility criteria excluded people with hot flushes and/or night sweats not associated with the menopause. Baseline characteristics reported for age, weight, height and body mass index.  **Intervention:** Sérélys® to provide daily 10 mg vitamin E, 80 mg pollen extract (GC Fem), and 240 mg cytoplasmic pollen and pistil extracts (PI 82) for 84 days.  **Outcome:** Descriptively assessed hot flush occurrence, irritability, fatigue and quality of life. |
| **Procydin®**  **Ingredients:** 70 mg proanthocyanidin (from grape seed extract), 30 mg calcium ascorbate, 30 mg bioflavonoids and 15 mg vitamin E.  **Instructions:** Adults weighing <70 kg should take 3 capsules simultaneously in the morning for 3 days, then 2 capsules daily for 5 days, thereafter 1 capsule daily; whereas adults weighing ≥70 kg should take 3 capsules simultaneously in the morning for 5 days, thereafter 2 capsules daily. | Multiple disorders | RCT\* | 27 | **Participants:** Men and women (25 to 80 years) with metabolic syndrome in America. Eligibility criteria excluded smokers and those with clinical evidence of coronary heart artery, pulmonary, gastrointestinal or renal disease. Baseline characteristics reported per group for age, gender, waist circumference, body mass index, glucose and insulin levels as well as for ♠LDL cholesterol levels.  **Intervention 1:** Grape seed extract 300 mg/day for 4 weeks.  **Intervention 2:** Grape seed extract 150 mg/day for 4 weeks.  **Control:** Placebo.  **Outcome:** Mean daytime systolic and diastolic blood pressure. |
| **Promato**  **Ingredients:** 10 mg lycopene and 150 mg ellagic acid.  **Instructions:** 1 capsule daily after meals. | Breast protection (but their second health claim in the included advertisements is on prostate health) | Laboratory study  RCT\*  Analytic cohort study | -  40  47 365 | -  **Participants:** Histologically proven benign prostate hyperplasia in men in Germany; free of prostate cancer and serum prostate specific antigen levels of > 4 μg/l. Eligibility criteria excluded people with liver and kidney diseases, inflammatory diseases of the urogenital tract, chronic inflammatory bowel disease, prostate malignancies, on testosterone treatment and having fat malabsorption or maldigestion. Baseline characteristics per group reported for age, height, weight, body mass index, energy intake, dietary lycopene intake, glucose levels, total cholesterol and ♠LDL cholesterol levels, and for total testosterone and free testosterone levels.  **Intervention:** Lycopene 15 mg/day for 6 months.  **Control:** Placebo.  **Outcome:** Serum prostate specific antigen levels.  **Participants:** Men with professional jobs in America (40 to 75 years) without any cancer at baseline.  **Exposure:** Total lycopene intake where high levels of intake were compared to the lowest level of intake.  **Outcome:** Incidence of prostate cancer after being followed up for 12 years. |
| **Prozen**  **Ingredients:** 100 mg L-theanine as Suntheanine®.  **Instructions:** 1 to 2 tablets daily after a meal as needed to a maximum of 6 daily in divided dosages. | Stress & anxiety | Cross-over trial (unclear whether randomised or not; only available in the form of a congress abstract) | 22 | **Participants:** Men in Japan (average age 27); 12/22 were daytime workers  **Intervention:** Suntheanine® (pure L-theanine) 200 mg for 6 days, 1 hour before bedtime.  **Control:** Placebo.  **Outcome:** Sleep performance measured by interviews upon awakening. |
| **Solal Irvingia Plus™ Fat Burner**  **Ingredients:** 150 mg Irvingia extract, 150 mg bile acids, 8 mg zinc and 200 μg chromium polynicotinate.  **Instructions:** 1 to 2 capsules twice a day on an empty stomach. | Weight loss & toning | Laboratory study (in mice)  RCT\* | -  120 | -  **Participants:** Overweight men and women with a body mass index between 26 and 40 kg/m2 in Cameroon.  **Intervention:** 150 mg *Irvingia gabonesis* extract (IGOB131) 30 to 60 minutes before lunch and dinner for 10 weeks.  **Control:** Placebo.  **Outcome:** Body weight (kg). |

Lastly, it is worth noting that several advertisements used arguments other than research evidence to persuade consumers. Examples include citing Bible verses “…and also that every man should eat and drink and enjoy the good of all his labour, it is the gift of God” (translated from Afrikaans; New King James Version, Ecclesiastes 3:13; Cosmo Slimming Solutions); thanking God for the product “our deepest thanks to the Creator who lets these herbs grow that we may use them” (translated from Afrikaans; Essies Tea); reassuring potential consumers of the product’s efficacy and safety by mentioning that doctors and/or pharmacists endorse the product “prescribed by doctors, recommended by pharmacists” (Solal Technologies); and implying that the product is a necessity “you will have to eat enormous portions of calcium rich foods such as milk, broccoli, salmon and almonds to meet your body’s calcium requirements if Caltrate® Plus is not part of your daily diet” (translated from Afrikaans; Caltrate® Plus).

**Discussion**

Our study found that most nutritional supplement advertisements in popular South African women’s magazines contain health claims relating to the prevention or treatment of a variety of conditions. Research to support these claims was cited in only a small number of advertisements and we judged this research as being largely inappropriate in terms of study design and study characteristics. This is unacceptable as it may mislead the consumer. In addition, several advertisements also contain non-scientific arguments aimed at convincing consumers of the value of a particular supplement.

Advertising of health care products have been studied elsewhere. Othman et al. conducted a systematic review of the quality of pharmaceutical advertisements for prescription products in medical and pharmacy journals.(10) Twenty-four studies conducted in 26 countries were included in the review. The authors found that less than 67% of the claims were supported by a systematic review, meta-analysis or RCT and that most of the advertisements with quantitative information presented effects with relative rather than absolute measures of risk. Dumville et al. investigated advertisements of wound care products.(11) They identified 217 unique advertisements from 40 wound journal issues and 154 from 24 British Medical Journal (BMJ) issues. Eighty-nine percent of wound care journals and 84% from the BMJ advertisements contained at least one product claim. Thirty-five percent of advertisements where claims were made cited at least one study (33% being RCTs) compared to 63% of advertisements from the BMJ (of which 75% were RCTs). These results are consistent with the findings of our study showing that health claims in advertisements aimed at health care professionals are as common as in advertisements aimed at the general public, and that high level evidence from systematic reviews and RCTs are infrequently cited.

Advertisements of nutritional supplements appear to be an important source of revenue for South African women’s magazines and they will therefore continue to be attractive to publishers. However, stricter control over the nature of advertisements, especially those with health claims, is needed. The findings from our study strengthen the case for regulating the nutritional supplement industry. South Africa can learn from the experience in other countries where models of regulation have been adopted with varying success. The way claims are classified and presented on labels in the USA seems to be too complicated and can be misleading to consumers.(8) Establishing criteria for allowable health claims requires support from good research evidence and in the case of interventions this means systematic reviews of RCTs. Furthermore, the responsibility does not only lie with media editors and the government, but also with academics and healthcare practitioners to strengthen the culture of evidence-based health care.

**Study limitations**

Our findings are based on one sample of advertisements from popular women’s magazines and cannot necessarily be extrapolated to all advertisements of nutritional supplements in South Africa. Data extraction was performed by one author, with a second author quality-checking 25% of the data. Although no major discrepancies regarding health claims, quotes and level and appropriateness of evidence were found, it would have been ideal to have data extraction performed independently and in duplicate.

**Conclusions and recommendations**

Advertisements of nutritional supplements in South African women’s magazines are widespread and often contain health claims. The South African consumer should be protected against misleading advertisements.

Urgent measures are needed in South Africa to improve regulation of advertising and sales of nutritional supplements. Further research into the evidence-base supporting health claims in advertisements of nutritional supplements would be helpful. This should ideally involve prioritizing health claims to be investigated and conducting systematic reviews of the relevant nutritional supplements. RCTs of good methodological quality and for which the types of participants, types of interventions and control, and types of outcomes measures were chosen carefully and specified are also needed. Lastly, basic knowledge of the principles of evidence-based health care and nutrition should be promoted in South Africa to help the consumer make informed decisions about disease prevention and self-medication.

**Conflict of interest**

None.

**Sources of support**

Harry Crossley; Effective Health Care Research Consortium.

**Acknowledgements**

We acknowledge Prof R Jobson and Dr H Steinman for helping us understand the context of nutritional supplements in South Africa; Mr. H Lombard for help with understanding relevant legislation; and for Mrs. C Owens for data extraction.

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