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ARTICLE

Use and perceived effectiveness of complementary medicines for weight loss in adult women

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Objectives: Complementary medicines (CMs) that are formulated to facilitate weight loss are a popular and widely available treatment option, particularly among women. There is limited research regarding their use in the South African context. The aim of this study was to gather information on the use and perceived effectiveness of CMs for weight loss among adult women.
Design: A quantitative, descriptive survey design was used.
Setting: Johannesburg, South Africa.
Subjects: A purposive sample of women over the age of 18 years who had used CMs for weight loss within the past five years were recruited from health stores and a university campus healthcare centre.
Outcome measures: Data were obtained through a self-administered 29-item, paper-and-pen questionnaire. Responses were descriptively analysed using cross-tabulation, multiple response analysis and frequency tables.
Results: Data from 160 questionnaires were analysed and the results demonstrated that a wide variety of CM products are used for weight loss, with branded combination products, green tea, *Garcinia cambogia* and conjugated linoleic acid being the most popular. Most participants also adopted lifestyle interventions such as exercise and calorie restriction during their weight loss attempt. While minor side effects were experienced by over half of the participants, the majority were satisfied with their product choice as well as the amount of weight that they lost.
Conclusion: Most participants perceived their CM weight loss product of choice to be effective. However, other concomitant weight-loss strategies that were employed may have been responsible for these results. Despite their popularity, there is only very limited research surrounding the safety and efficacy of these weight-loss products, with most studies being conducted on single constituents rather than whole formulations as sold on the market. Healthcare providers should encourage the disclosure of the use of CM weight-loss products to ensure safe and effective patient care and mitigate the potential risks associated with their inappropriate use.

Keywords: complementary medicine, obesity, overweight, perception, weight loss, women

Background

The prevalence of overweight and obesity is increasing worldwide and poses a major public health problem. Approximately 68% of South African women are considered to be overweight or obese.[1] Estimates of body fat are commonly determined using body mass index (BMI), waist circumference or waist–hip ratio measurements, skin callipers or bioelectric impedance machines, and these measures provide relevant information in a clinical setting.[2] An individual with a BMI of 25.0–29.9 kg/m^2 is considered overweight and a BMI above 30.0 kg/m^2 is considered obese.[3] Magnetic resonance imaging and magnetic resonance spectroscopy can more accurately determine fat accumulation in subcutaneous and visceral adipose tissues, organs and muscles but these imaging techniques are more costly.[4] Conventional treatment for weight loss includes reducing energy intake, increasing physical activity and addressing any contributing lifestyle, social and psychological factors. Anti-obesity medications may be applied as an adjuvant and, in more extreme cases, surgical intervention is considered; these interventions are not without risks or adverse effects.[5,6] It has been noted in South Africa that women are more likely to be impacted by body image concerns and therefore more likely than males to utilise weight-loss strategies .[7]

In 2013, amendments to the Medicines and Related Substance Act, 1965 (Act 101 of 1965) allowed for the establishment of the Complementary Medicines category, otherwise known as Category D; both CMs and health supplements are recognised in this category. The term 'complementary medicine' (CM) refers to any substance of natural origin (e.g. plants, fungi, algae, seaweeds, etc.) that is used in the diagnosis, treatment, maintenance and prevention of disease; is used as a health supplement; or, is utilised in the following disciplines: aromatherapy, Ayurveda, homeopathy, traditional Chinese medicine, Unani Tibb and Western herbal medicine. Homeopathic remedies, herbal medicines and essential oils are classified as CMs. A 'health supplement' on the other hand relates to any substance used to complement health, supplement the diet, or for its nutritional effect. Probiotics, prebiotics, vitamins, minerals, amino acids, fatty acids, carotenoids, bioflavonoids and enzymes are all examples of health supplements.[8] For the purposes of this article, reference to CMs will also include health supplements.

Many individuals turn to CMs for weight loss, as they are perceived to be safer, more cost-effective and produce fewer side effects when compared with conventional weight-loss medications.[9] This opinion remains, despite the relative dearth of research on the efficacy, safety and potential side effects of the various CMs currently in use.[10] One cross-sectional study found that weight-loss strategies are commonly employed among South African female university students, with various

over-the-counter herbal preparations being the most popular.[11] In South Africa, there are currently limited data regarding how these weight-loss products are being used and whether consumers perceive these products to be effective. Owing to the limited available research, the aim of this study was to gather information on the use and perceived effectiveness of CM weight-loss products among adult women in Johannesburg, South Africa.

Methods

This research study utilised a quantitative descriptive survey design. Women over the age of 18 years who had made use of CMs for weight loss in the past five years were recruited by means of purposive sampling via advertisements, word-of-mouth and through a face-to-face approach at various health shops located in the Johannesburg area, as well as at a healthcare centre located on a local university campus. The advertisements consisted of posters placed at these locations, detailing the study, and providing the contact details of the researcher. Those who were unable to complete the self-administered questionnaire in English or unable to recall the details of their most recent weight-loss attempt using CM were excluded from participating. A total of 200 questionnaires were distributed. The sample size was calculated with a 95% confidence interval and a margin of error of 5%, which is considered acceptable for survey studies.[12] A minimum of 132 completed questionnaires were required for analysis.

The questionnaire was adapted from surveys used in other similar studies.[13–15] The 29-item pen-and-paper questionnaire was divided into sections: a demographic profile, questions relating to their personal use of CMs for weight loss, and perceptions of the effectiveness of these weight-loss products. A pilot study was conducted with 10 respondents prior to commencement of the actual study, in order to refine the instrument and enhance reliability and validity. No changes were made as all the questions were deemed clear, and the results from the pilot study were not utilised in the final analysis. Consenting participants completed the questionnaire in a private area within the health shop or health centre, which took them approximately 15–20 minutes. Completed questionnaires were placed in an envelope and sealed, to ensure anonymity of the data. The data from the questionnaires were analysed using SPSS version 26 software (IBM Corp, Armonk, NY, USA);[16] cross-tabulation, multiple response analysis and frequency tables are presented.

Ethical clearance to conduct this study was obtained from the University of Johannesburg's Faculty of Health Sciences Research Ethics Committee (REC-01-53-2017). Potential participants were provided with an information leaflet detailing the study. Participation was voluntary and written informed consent was obtained. No identifiable data were requested on the questionnaire, thus ensuring confidentiality of the participant and anonymity of the data. Completed questionnaires were placed in a secure location and captured data were stored in a password-protected computer, to which only the researchers had access, ensuring confidentiality.

Results

Participants were recruited from two health shops in the Johannesburg area and from a unversity campus healthcare centre located in Johannesburg. A total of 160 questionnaires were completed and declared evaluable; this made for a response rate of 80%.

Demographics and background

The majority of participants in the study were found to be between 18 and 29 years of age ($n = 64$; 40%), had received some form of higher education ($n = 153$; 63.1%), and did not have an underlying chronic disease ($n = 106$; 66.3%) (Table 1). Other participants, however, reported chronic conditions including history of a previous stroke ($n = 19$; 11.9%), hyperthyroidism ($n = 13$; 8.1%), high cholesterol ($n = 11$; 6.9%) and asthma ($n = 10$; 6.3%), and 8.2% ($n = 13$) of participants used prescription medication. Most participants reported between one and four prior attempts at achieving weight loss with CM products ($n = 89$; 55.6%), or that they were constantly trying to lose weight ($n = 49$; 30.6%). Expenditure on CM weight-loss products varied, with the majority ($n = 68$; 42.5%) spending on average between R 200 and R 499 a month.

Table 1: Demographic and background profile of participants

Factor	*n*	%
Age (years) ($n = 160$):		
18–29	64	40.0
30–39	52	32.5
40 +	44	27.5
Level of education ($n = 160$):		
Matric certificate	52	32.5
Diploma	45	28.0
Bachelor's degree	23	14.4
Master's degree	18	11.3
Honour's degree	15	9.4
PhD	0	0
I have not finished high school	7	4.4
Underlying chronic disease ($n = 194$):		
None	106	66.3
Diabetes mellitus type 2	1	0.6
Heart disease	2	1.3
Hypertension	8	5.0
Gall bladder disease	2	1.3
Non-alcoholic fatty liver disease	3	1.9
High cholesterol	11	6.9
Asthma	10	6.3
Hypothyroidism	13	8.1
Hyperthyroidism	1	0.6
Previous stroke	19	11.9
Other	18	11.3
Use of prescription medication ($n = 159$):		
Yes	13	8.2
No	146	91.8
Number of weight-loss attempts using CMs ($n = 160$):		
1–4 attempts	89	55.6
More than 4 attempts	22	13.8
I am constantly trying to lose weight	49	30.6
Monthly expenditure on CM products ($n = 160$):		
Less than R 200	41	25.6
R 200–R 499	68	42.5
R 500–R 999	28	17.5
R 1 000–R 1 499	16	10.0
R 1 500 or more	7	4.4

Table 2: CM weight loss products used

CM product ($n = 166$)	*n*	%
Brand A product	31	18.6
Brand B product	24	14.4
Green tea (*Camellia sinensis)*	23	13.8
Garcinia cambogia	18	10.8
Conjugated linoleic acid	17	10.2
Brand C product	7	4.2
Hoodia gordonii	6	3.6
Homeopathic	5	3.0
Chromium picolinate	4	2.4
Other	44	26.4

CM weight-loss products used

Participants were asked to name the CM product they had most recently used, and over 40 different products were identified. The most popular ones mentioned are shown in Table 2.

Most recent weight-loss attempt using CMs

Table 3 provides further information regarding the use of CMs for the most recent weight-loss attempt, including awareness of side effects, compliance with dosage, use of concurrent conventional weight-loss treatment, lifestyle changes that were made, the amount of weight lost and satisfaction with the results. The majority of participants made use of a single CM product and no other treatment ($n = 113$; 71.1%), were compliant with the dosage instructions ($n = 138$, 86.3%) and were aware of possible side effects of the product ($n = 98$; 62.0%). In addition, lifestyle changes were also commonly employed, with regular exercise ($n = 108$; 67.5%) and calorie restriction ($n = 72$; 45%) being the most popular. Actual weight loss results varied, with most reporting a noticeable difference within an eight-week period ($n = 94$; 64.4%), and around two-thirds of the respondents were satisfied with the amount of weight they lost. With regard to overall product satisfaction, which included aspects such as perceived effectiveness, the presence of adverse effects and the cost of the product, 60.0% ($n = 96$) of participants were satisfied.

Adverse effects

Around half of the participants ($n = 82$; 51.2%) experienced side effects from taking CM products for weight loss. The most commonly experienced symptoms included: nausea ($n = 27$; 16.9%), dizziness ($n = 23$; 14.4%) and palpitations ($n = 23$; 14.4%) (Table 4).

Sources of weight-loss product information

Table 5 depicts the sources of information participants utilised to find out about their chosen CM weight-loss product. In the surveyed sample, the CM products were mostly recommended by family and friends ($n = 80$; 50.0%); however, a quarter of participants responded to advertisements ($n = 39$; 24.4%) or received advice from a healthcare consultant ($n = 29$; 18.1%). With regard to obtaining information on the safety and efficacy of their CM product, participants consulted various sources, once again largely relying on family or friends ($n = 53$; 34.4%), and the internet ($n = 39$; 24.4%), while 21.9% ($n = 35$) of participants did not obtain any safety information before using the product.

Overall perceived effectiveness of CMs for weight loss

Overall, the majority of participants agreed or strongly agreed that CM products worked well for weight loss, either on their own or in combination with exercise and dietary changes, and reported that they would use them again in the future (Figure 1).

Table 3: Most recent weight-loss attempt using CM products

Factor	*n*	%
Awareness of possible side effects ($n = 158$):		
Yes	98	62.0
No	60	38.0
Compliance with dosage ($n = 160$):		
Yes	138	86.3
No	22	13.7
Choice of treatment ($n = 159$):		
I use/d only one complementary weight loss product	113	71.1
I use/d more than one complementary weight loss product	27	17.0
I use/d a combination of complementary and prescription weight-loss medicines	19	11.9
Concurrent lifestyle changes ($n = 261$):		
Regular exercise	108	67.5
Decreased food intake	72	45.0
Food substitutes (e.g. meal replacement shakes or bars)	33	20.6
Fasting	13	8.1
None	13	8.1
Laxatives and diuretics	8	5.0
Other	14	8.8
Amount of weight lost ($n = 158$):		
0 kg	13	8.2
1–4 kg	62	39.2
4–7 kg	25	15.8
7–10 kg	18	11.4
10–15 kg	5	3.2
More than 15 kg	8	5.1
Unsure	27	17.1
Time taken to notice weight loss ($n = 146$):		
Between 2 and 8 weeks	94	64.4
Less than 2 weeks	21	14.4
Between 8 weeks and 3 months	19	13.0
Between 3 and 6 months	8	5.5
More than 6 months	4	2.7
Maintenance of weight loss ($n = 159$):		
Yes, some of it	68	42.8
No	32	20.1
Yes, all of it	26	16.4
I am currently still using the weight-loss product	22	13.8
Not applicable	11	6.9
Satisfaction with weight loss ($n = 151$):		
Yes	98	64.9
No	53	35.1
Product satisfaction ($n = 160$):		
Yes	96	60.0
Unsure	38	23.8
No	26	16.2

Discussion

This research study accumulated data from 160 women on the use and perceived effectiveness of CM products for weight loss. The demographic data in this study showed the typical CM

Table 4: Adverse effects experienced

Adverse effect ($n = 160$)	*n*	%
None	78	48.8
Nausea	27	16.9
Dizziness	23	14.4
Palpitations	23	14.4
Anxiety	16	10.0
Diarrhoea	14	8.8
Excessive sweating	14	8.8
Excessive urination	11	6.9
Constipation	8	5.0
Confusion	5	3.1
Vomiting	4	2.5
Other	12	7.5

weight-loss product user to be between the ages of 18 and 29 years and educated. The majority of participants reported feeling satisfied with the amount of weight they lost from using their CM weight-loss product of choice. As many women also implemented other weight-loss control strategies such as calorie restriction and exercise while using these CM products, it is unclear whether the weight loss can be attributed to these products or not. In South Africa, women have been shown to have a higher frequency of weight-loss attempts than men,[7] and this is in keeping with international trends, where women are more likely to attempt weight loss for appearance reasons.[17] One cross-sectional survey study on 6 411 participants showed that a large percentage of South Africans with a high BMI had a distorted body image, tending to underestimate their actual size, and were dissatisfied with their appearance. Despite the desire to lose weight, only 12.1% of overweight and 10.1% of obese respondents reported attempting to lose weight, mainly through adjusting calorie intake and increasing physical activity.[18] The study by Senekal *et al*.[11] reported that weight-loss methods used amongst South African women are varied and in some cases may be extreme, including self-induced vomiting and the use of laxatives. The desire for weight loss may also be motivated by the negative stigmatisation placed on overweight or obese women.[19] Increases in these social pressures to achieve an 'ideal' body weight may have a direct effect on the prevalence of use of CMs as part of a weight loss attempt.[20]

Table 5: Sources of information

	How the chosen CM product was found ($n = 160$)		Information regarding safety/ efficacy of product ($n = 160$)	
Factor	***n***	**%**	***n***	**%**
Advertisement	39	24.4	–	–
CM healthcare Professional	16	10.0	21	13.1
Family and friends	80	50.0	53	34.3
General practitioner	–	–	9	5.6
Health consultant	29	18.1	33	20.6
Internet	28	17.5	39	24.4
No source	–	–	35	21.9
Pharmacist	13	8.1	14	8.8
Other	14	8.8	14	8.8

The majority of the participants (66.3%) in this study did not have any underlying chronic conditions and only 8.2% reported using prescription medications. These findings correlate with results obtained from Amariles *et al*.,[14] whereby 61.2% of the participants using weight-loss products reported having no known pathologies. The concomitant use of conventional medicines and CMs is reportedly common and carries potential risks for the development of serious interactions and adverse effects, particularly in relation to herbal medicines and health supplements. Consumers with underlying medical conditions who take prescription medications need to be particularly judicious when selecting CM weight-loss products, and it is the responsibility of both patients and their healthcare providers to address these risks.[21] Studies have shown that many patients do not seek advice from their medical doctor regarding the use of CMs and often may not disclose their use; this can be mitigated through the encouragement of patient-centred communication by healthcare providers.[22,23] A systematic review and meta-analysis on disclosure of CM use to medical providers revealed that patients are more likely to disclose the use of CMs if they believe that their healthcare providers are supportive of CM use and could offer advice regarding CMs.[21]

The results of this study showed that a wide variety of CMs are used to facilitate weight loss, including various proprietary combination products, herbs such as *Camellia sinensis* and *Garcinia cambogia,* and conjugated linoleic acid (CLA). Brand A is a health supplement manufacturer that markets herbal and dietary supplements for a wide range of health conditions, including several products that support weight loss. The constituents of the weight loss products vary, and formulations may contain proteins, fibre, vitamins, minerals and selected herbs. Protein enriched supplements are suggested to improve feelings of satiety and promote retention of lean body mass in dieters, and there is some evidence to suggest that high protein products may be beneficial for weight loss.[24] Bulk laxatives present in the shakes include guar gum and psyllium husk, which are a soluble type of fibre. Although the efficacy of bulk laxatives for weight loss is not proven, they have been shown to reduce the absorption of lipids, cholesterol, and carbohydrates in the gastrointestinal tract, as well as provide a sensation of fullness, thereby potentially reducing calorie intake. The benefits of fibre supplements appear to be dependent on the type of fibre they contain,[25] and it is important to note that certain types of fibre may affect the absorption of nutrients and orally administered medications.[9] Brand B also offer a variety of weight loss products, including herbal formulas, shakes and "fat burners". One of the principal constituents in the "fat burners" is *Camellia sinensis*, and the shakes contain a mixture of protein, fibre, prebiotics, vitamins, minerals, and *Garcinia cambogia* amongst other ingredients. These products are promoted to enhance weight loss in various ways, such as to enhance metabolic rate, improve digestion, act as a laxative and diuretic, and assist with appetite control and fat metabolism. Rigorous clinical studies evaluating the safety and efficacy of proprietary formulations for weight loss are limited.

Garcinia cambogia and its main active constituent, hydroxycitric acid, are a popular ingredient found in many CM weight-loss products and have been extensively studied in relation to weight control. Hydroxycitric acid influences weight loss through appetite suppression via serotonin level regulation and metabolic modifications that promote energy expenditure.[26] A review article by Fassina *et al*.[27] showed that, although

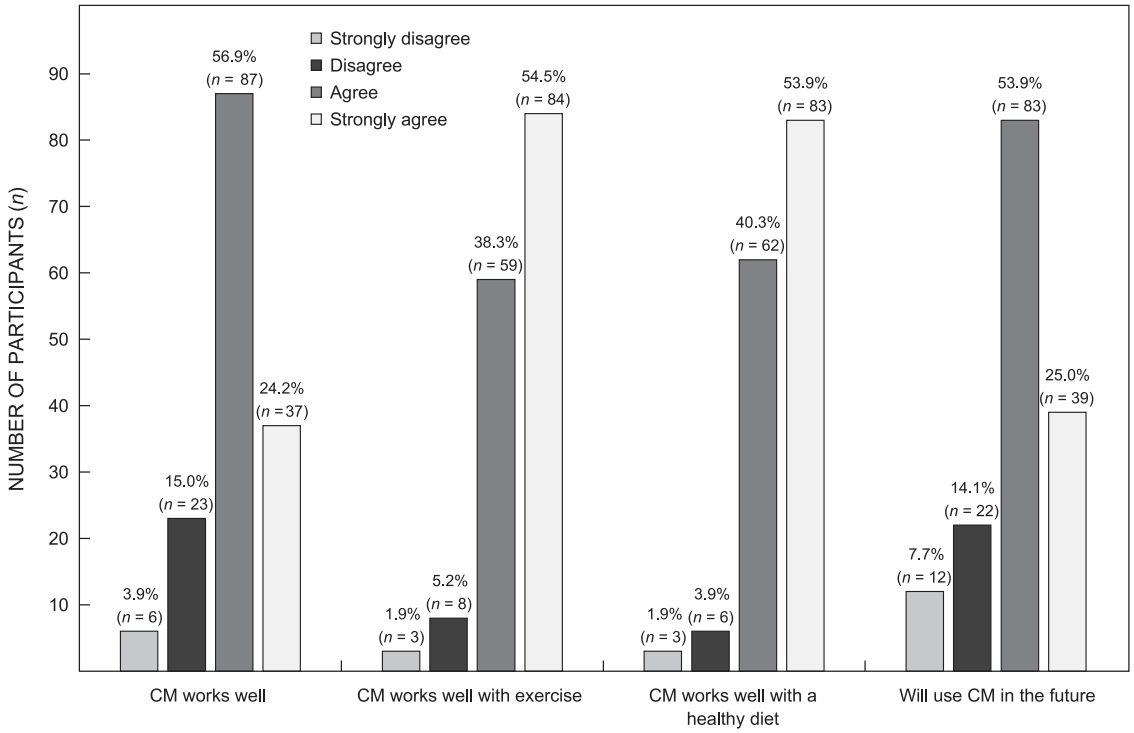

Figure 1: Overall perceived effectiveness of CM products for weight loss.

the evidence is contradictory, various studies have produced positive findings of promoting weight loss by suppressing the appetite and enhancing lipogenesis, as well as lowering cholesterol and glucose levels. The results of these studies are difficult to compare as they are heterogeneous in their methodologies (i.e. population groups tested, dosages given and duration of treatment), therefore the exact amount of weight loss that can be expected to be achieved is difficult to quantify. While *Garcinia cambogia* supplements appear to be safe in the vast majority of these studies, adverse effects have been reported, with the most significant being the potential for hepatotoxicity.[27] *Garcinia cambogia* might interact with anti-diabetic drugs, antidepressants and CYP2B6 substrate drugs, including antimalarials, antivirals, analgesics, anticonvulsants and antitumour medications.[28] Further investigations are therefore needed to evaluate the effectiveness and safety of this supplement for weight loss.

Camellia sinensis tea leaves are consumed worldwide and can be classified according to their degree of fermentation as green tea (unfermented), oolong tea (semi-fermented) and black tea (fermented). The predominant constituents of green tea include caffeine, theobromine, theophylline and polyphenols, and most notably the catechin epigallocatechin-3-gallate (EGCG). Numerous clinical studies have evaluated the anti-obesity activity of green tea and EGCG with mixed results. While a small number of studies show clinical benefits in reducing weight similar to pharmacological preparations (> 5 kg), the majority of research shows little clinical benefit from green tea consumption, with average weight loss of < 2 kg achieved.[29,30] EGCG together with caffeine is suggested to produce anti-obesity effects via inhibition of catechol O-methyl transferase and phosphodiesterase.[9] Meta-analysis suggests that catechins and caffeine work synergistically to produce weight-loss effects, as opposed to the result of caffeine alone or decaffeinated green tea products.[31] Green tea use may be associated with various unwanted effects, predominantly gastrointestinal disturbances, but the majority of adverse effects and drug interactions associated with green tea are related to its caffeine content, which may result in insomnia, restlessness, anxiety and cardiovascular effects.[9,32] There is also evidence of dose-dependent hepatotoxicity occurring, with the use of large bolus doses of concentrated green tea supplements with a high catechin content.[32]

Conjugated linoleic acid (CLA) is a fatty acid naturally found in meat and dairy products, while CLA supplements sold on the market are typically synthetically produced from safflower oil and usually contain an equal mix of two isomers, 18:2cis-9, trans-11 and 18:2trans-10, cis-12. While animal studies have shown that CLA reduces body fat, studies in humans are less conclusive; these studies do, however, show a beneficial effect of CLA supplementation on bodyweight and adiposity, with relatively few adverse effects.[33] A systematic review and meta-analysis conducted by Namazi *et al.*[34] on 13 clinical trials indicated that CLA supplementation significantly reduces bodyweight (−0.52 kg), BMI (−0.23 kg/m^2) and fat mass (−0.61 kg), and increases lean body mass (0.19 kg) compared with a placebo; these effects were even more pronounced in patients over 44 years old, who used dosages of > 3.4 g per day for more than 12 weeks. Long-term studies of at least 6 months' duration have also shown only a small weight-loss effect size through meta-analysis, with a mean difference of −0.70 kg, indicating uncertain clinical benefit.[35] CLA has been shown to have anticoagulant/anti-platelet activities and should be used with caution in patients using prescription medications with these same effects.[28]

Of particular concern in this study is the finding that only around 60% of participants were aware of the possibility of developing side effects from using CM weight-loss products, and 13.7% admitted to not complying with the dosage instructions. The study also revealed that most participants relied on information from family and friends regarding the safety and efficacy of their product of choice, and around 20% reported

not obtaining any safety information at all. Also important to note is that more than half of the participants reported experiencing adverse effects from these products, most commonly nausea, dizziness and palpitations. While serious adverse effects and toxicity from CMs are rare, potential risks for harm remain for patients who use products of unreliable quality and those who self-prescribe without professional advice and supervision.[21]

Complementary weight-loss products are generally perceived as easily accessible, safe, effective and inexpensive when compared with prescription and other over-the-counter (OTC) medications. This perception was confirmed in a study conducted in the United States on 3 500 dietary supplement users. One-third of the group perceived complementary weight-loss medicines as a safer alternative to prescription and OTC medications, while 50% incorrectly believed that all CM weight-loss products had been approved regarding their safety and efficacy.[15] Consumers require knowledge on the risks, benefits, side effects and potential interactions to allow for informed and effective product choices. Many consumers may mistakenly perceive CMs to be "natural" and therefore safe, however it is advised that one should consult a healthcare professional before use.[8,36]

There is a paucity of well-designed clinical trials evaluating the safety and efficacy of CM weight-loss products, and most studies focus on single active ingredients rather than the final product sold on the market. CM formulations typically contain multiple constituents with the potential to produce a variety of additive, synergistic or antagonistic interactions with each other and within the body, and therefore need to be evaluated appropriately. Another factor to consider is that adulteration of weight-loss supplements with drug products and other chemical substances is common and this can result in toxicity; potential issues of disease exacerbation and drug interactions also need to be considered.[9,37]

The findings in this research study may also lend themselves to the need for an education initiative among medical professionals on well-researched CMs for weight loss. This could enhance patient outcomes and the safe and responsible use of these products.[20] With the rising acceptance and use of CMs, it is imperative that further research be conducted to determine the efficacy and safety of these products available on the market, and to note that further regulations may be needed in order to prevent adverse effects, drug interactions and product disappointment.

The main limitations of this research study are the small sample size and limited setting, which was not reflective of the entire South African population. Also, participants recruited from the health stores may have been more biased in their belief and perceived effectiveness of CMs, which may have influenced the results. Future studies should make use of a larger sample that is more representative of the nation.

Conclusion

The outcome of the study demonstrated that, in general, women using CM weight-loss products are adhering to the recommended product use responsibly and perceive CMs to be an effective approach to losing weight. Furthermore, CM weight-loss products may possibly have an adjunctive role to play in weight control strategies, but there is currently limited research in South Africa on how these products are being used, as well as inconclusive evidence on their safety and effectiveness for weight loss. Therefore further research is necessary. Healthcare providers should encourage open communication with their patients regarding the use of CM weight-loss products in order to facilitate improved patient care.

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