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Management And Preventive Strategies Of Obesity Among Adults In KSA: A Systematic Review

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Abstract

Background: *Obesity is a significant public health challenge globally, including in the Kingdom of Saudi Arabia (KSA). This systematic review aimed to identify the most effective management and preventive strategies for obesity among adults in KSA, as well as the barriers and facilitators to their implementation.*

Methods: *A comprehensive search was conducted across multiple electronic databases and grey literature sources. Eligible studies included randomized controlled trials, quasi-experimental studies, cohort studies, case-control studies, and cross-sectional studies conducted among adult populations residing in KSA. Two independent reviewers screened the [1]titles and abstracts of identified articles, followed by full-text review and data extraction.*

Results: *The initial search yielded 26 relevant studies, of which two were eligible for inclusion in the systematic review. The included studies provided insights into existing policies and strategies related to nutrition and obesity in KSA, as well as demographic characteristics and lifestyle behaviors contributing to obesity prevalence. Preventive strategies discussed included dietary interventions such as low-calorie, low-fat, low-carbohydrate, high-protein, and low glycemic index diets, as well as exercise-based interventions, pharmacotherapy, and surgical interventions.*

Conclusion: *This systematic review highlights the importance of evidence-based policies and interventions to address the obesity epidemic in KSA. While several preventive strategies show promise, further research is needed to evaluate their long-term effectiveness and inform comprehensive obesity management efforts. A coordinated, multi-sectoral approach is essential to combatting obesity and improving public health outcomes in KSA.*

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Introduction

Because of the abundance of information made possible by modern technology, people are less likely to engage in physically demanding activities and are more likely to lead inactive lives. While technological progress has undoubtedly enhanced people's quality of life via the provision of comforts, eases, and joys, it has also brought about some undesirable side effects, such as the epidemic of overweight and obesity. Overweight people are three times as common now as they were in 1975 [1]. There was a golden age of scientific discovery that engulfed our physical pursuits for about half a century. Recently, it has become an epidemic problem all throughout the world.

Among adults, over 650 million were obese in 2016 (10.8% of men and 14.9% of women), whereas over 1.9 billion were overweight (39%) [2]. The prevalence of overweight and obesity in Saudi Arabia was found to be 68.2% (women 69.2% and men 67.5%), and 33.7% (women 39.5% and men 29.5%), according to the World Health Organization (WHO) [3]. Obesity is prevalent among 24.7% of KSA residents, according to a recent comprehensive study [4].

Teenage obesity is on the rise, and many attribute it to unhealthy eating habits, lack of physical activity, or a combination of the two [5]. There are many variables, both changeable and not, that contribute to obesity, which is a complicated multi-faceted problem [6]. These factors include demographics, lifestyle choices, and genetics. The increasing risk of developing type 2 diabetes mellitus, hypertension, cardiovascular disease, obstructive sleep apnea, gallstones, hyperlipidemia, fatty liver disease, osteoarthritis, and psychosocial repercussions has made it a big public health concern [4, 7, 8]. Present estimates place the annual cost of obesity at around US $2 trillion, or 2.8% of global GDP, when including in both direct healthcare expenditures and lost economic production [9].

Overconsumption of processed foods, poor intake of fruits, vegetables, and grains; increasing consumption of sugary drinks and other sugary goods; and eating out at restaurants are the main contributors to the epidemic of obesity, according to mounting research. These modifications considerably improve energy levels, leading to a notable improvement in metabolic status [10, 11]. As a result of spending most of their time in front of the TV, less physical exertion at work owing to automation and better mobility, and overall good energy balance, most Asians have [12, 13]. Many experts believe that the modernization of society is to blame for the epidemic of obesity, which they ascribe to the adoption of western diet patterns characterized by ultra-processed foods from indigenous diets [14, 15]. Over the last several decades, these shifts have spread across Middle Eastern communities.

Just as it is a global epidemic, obesity is rapidly becoming a public health concern in the KSA. Recent years have seen a number of government-level initiatives aimed at reducing the alarmingly high rates of overweight and obesity in Saudi Arabia [7, 15]. Despite this, there has been little change in the correlation between the demographics and lifestyle choices of Saudi adults and their overweight and obesity rates across the country. This research was conducted in the Makkah area due to the significant obesity incidence among its residents [7]. There are more than five areas in the KSA that rank high in obesity and overweight people [4, 16].

Simply said, people's eating habits and exercise routines change throughout time. Depending on factors including gender, age, and duties, these are always evolving. These investigations are useful for pinpointing the problem's current status and suggesting actions to control and manage it. Thus, to fill the knowledge gap and direct future obesity treatment, the present study will provide the most recent updates on the subject in the current literature.

Correct eating habits and regular exercise may help people prevent obesity, which has a substantial influence on people's quality of life in KSA. The way people move about and what they eat may help determine their risk for certain illnesses like diabetes mellitus, which can then encourage them to make changes to their lifestyle and take better care of their bodies. A number of studies that looked into KSA citizens' worries about their weight, diet, and lack of physical exercise found conflicting findings. There may be a lack of awareness among the general population, which explains their indifference and lack of action to combat obesity. Proper education, hope, and a determined effort to live a healthy lifestyle are the bedrocks of early and preventative interventions to combat the obesity epidemic in KSA. The research postulated that a number of demographic, nutritional, and lifestyle variables contribute to the high obesity incidence in this locality.

Methods

Review Question

The review addressed the question: What were the most effective management and preventive strategies for obesity among adults in the Kingdom of Saudi Arabia (KSA), and what were the barriers and facilitators to their implementation?

Search Strategy

A comprehensive search was conducted in electronic databases (PubMed, Embase, Scopus, and Web of Science) using a combination of keywords related to obesity, management strategies, preventive strategies, and Saudi Arabia. Grey literature and relevant reports from governmental and non-governmental organizations were also searched. The search strategy was developed in consultation with a research librarian and included both MeSH terms and free-text keywords.

Types of Studies Included

This systematic review included randomized controlled trials (RCTs), quasi-experimental studies, cohort studies, case-control studies, and cross-sectional studies conducted among adult populations (18 years and above) residing in KSA. Review articles, editorials, letters, and conference abstracts without original data were excluded.

Participants

The focus was on adults (18 years and above) residing in the Kingdom of Saudi Arabia.

Search Keywords

Keywords used in the search strategy included but were not limited to:

- Obesity
- Overweight
- Weight management
- Weight reduction
- Lifestyle interventions
- Dietary interventions
- Physical activity

- Pharmacotherapy
- Bariatric surgery
- Saudi Arabia

Study Selection Process

Two independent reviewers screened the titles and abstracts of identified articles based on the inclusion and exclusion criteria. Full-text articles of potentially relevant studies were retrieved and assessed for eligibility. Any discrepancies between reviewers were resolved through discussion or consultation with a third reviewer.

Outcomes

The primary outcomes of interest included changes in body weight, BMI, waist circumference, obesity-related comorbidities, and adherence to intervention protocols. Secondary outcomes included barriers and facilitators to the implementation of obesity management and preventive strategies, as well as disparities in access and outcomes among different population groups.

Data Extraction and Coding

Data extraction was performed using a standardized form, including study characteristics, participant demographics, intervention details, outcomes, and study limitations. Data were coded systematically for analysis.

Data Management

Data were managed using reference management software (e.g., EndNote) for organizing search results and screening records. Excel or another appropriate software was used for data extraction and coding. Data were stored securely and backed up regularly.

Results

The initial search identified a total of 260 studies from PubMed, Embase, Cochrane Library, and CINAHL. There were (55) duplicates and 120 studies were screened based on their titles and abstracts. Of these, 78 full-text articles were reviewed, and 29 studies was eligible for inclusion in this systematic review (Figure 1).

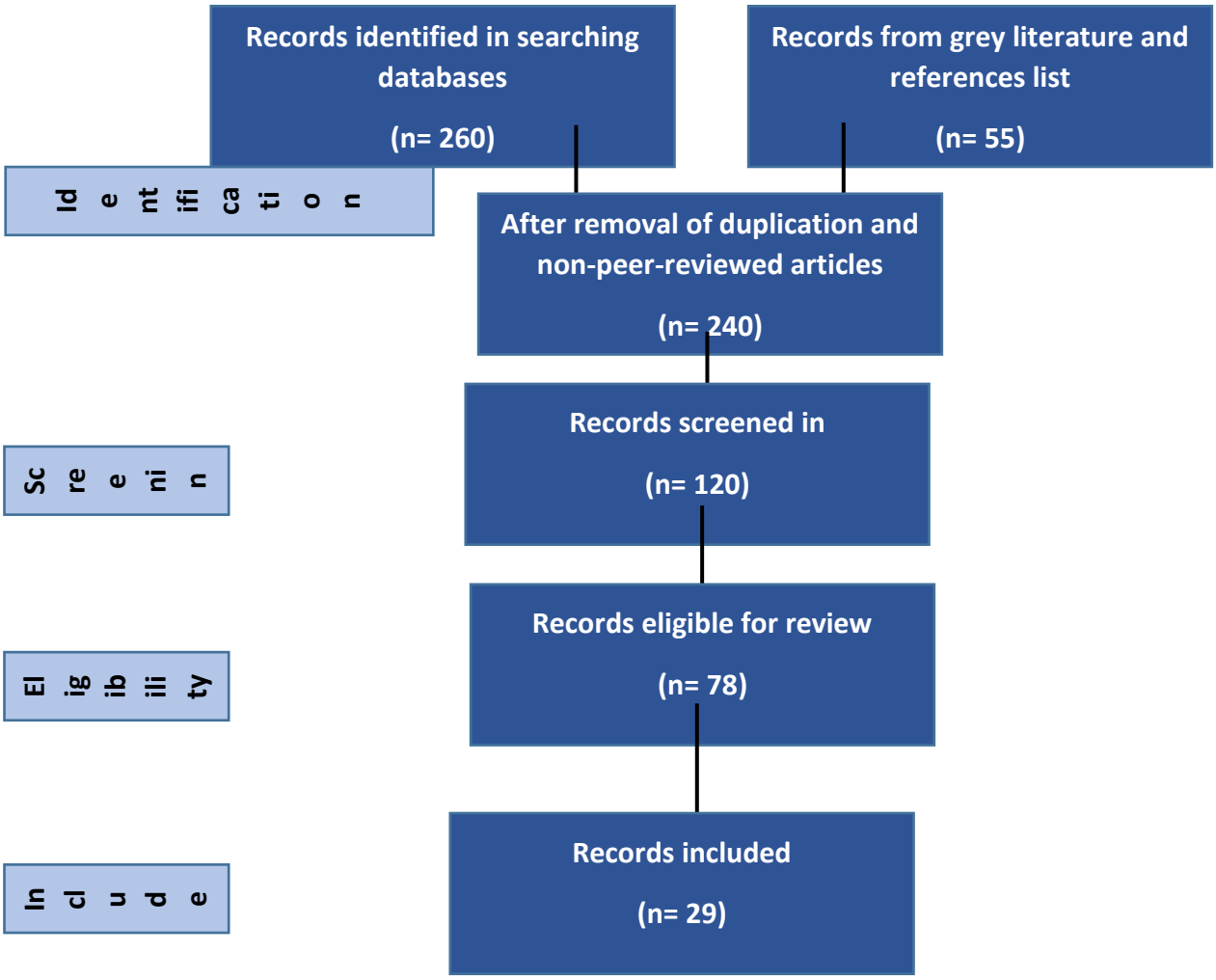

Figure 1: Flow chart of selection process

This study [17] examines the existing policies and strategies in Saudi Arabia pertaining to nutrition and obesity, as well as those in other countries, taking into account the various stakeholder groups and the available evidence. It mentions initiatives such as the Saudi Center for Disease Control Obesity Strategy 2020–30. There is still a need to monitor and evaluate current interventions and analyze evidence on further policies that Saudi Arabia may explore, despite the fact that numerous measures have already been implemented there. Addressing the obesity epidemic will require multi-sectoral and multi-component policies. Saudi Arabia has taken innovative nutrition-related policies to the forefront, including the largest sugar-sweetened beverage tax in the world (at fifty percent) and mandatory calorie menu labeling. It is yet unknown whether and to what degree these encouraging measures are beneficial due to the paucity of research evaluating their efficacy and impact [17].

All participants' demographic characteristics, levels of physical activity, sedentary behaviors, and dietary habits were assessed using a standardized questionnaire called the Arab Teens Lifestyle Study (ATLS). The poll drew 2,115 participants, 1,238 of whom were female and 877 of whom were male (or 41.5% of the total). An alarmingly large percentage of the population was either overweight (32.8%) or obese (23%; 23.1% of men and 24.2% of women

fell into this category). Overweight folks drank more sugary beverages, and those who were already overweight didn't eat nearly enough veggies, either raw or cooked. People who were overweight ate fast food at least three times a week, including items like burgers, sausage, pizza, and Arabic shawarma. For lean persons, the mean (SD) number of practice walking days was 2.51 (2.05), but for obese ones, it was 1.3 (1.87) ($p < 0.001$). Jogging, moderate-to high-intensity exercise, dance, and strength training were all more common among those with normal body mass indexes compared to those with obesity. In men, the chances of being obese rose with age (OR: 1.07; $p < 0.001$), in individuals earning less than 5,000 SR/month (1.3 thousand $), and in persons earning between 13,000 and 15,000 SR/month (1.34-2.66 thousand $) (OR: 2.36; $P = 0.01$). Both moderate-intensity exercise (OR: 0.802; $p = 0.009$) and regular walking (OR: 0.685; CI: 0.624-0.752; $p < 0.001$) were shown to have an inverse association with obesity. Nearly one-third of the population was overweight, while nearly one-third was obese. Sociodemographic characteristics connected with obesity. Overcoming the obesity epidemic requires targeted intervention measures [18].

Preventive strategies of obesity

While many are interested in changing their diets in an effort to lose weight, maintaining a healthy energy balance is still essential. Dietary therapies for weight reduction primarily address the macronutrient composition and energy intake. Nutritional counseling is an essential component of medication management in hospitals to promote healthy weight management. Consequently, in order to combat the rising risk of obesity, it is essential to adhere to good eating habits and make appropriate food choices [19]. Obese and overweight people often advise the following eating plans:

Low-calorie diet (LCD)

One that limits carbs, lipids, or proteins all at once. The medical community refers to some eating plans as "reducing diets," and LCDs are one kind of such plan. A low-calorie diet plan that is also rich in fiber, low in fat (<30%), and has a low glycemic index is also promoted. That eating plan is based on the "calories in, calories out" principle. People who are overweight or obese often fail to track their caloric intake throughout the day, so they may benefit from using portion control and pre-packaged meals instead of snacking on high-calorie foods. Although an LCD may help with long-term weight reduction, the best approach to do so is yet unknown [20, 21]. A severely reduced caloric diet is one strict variant of an LCD. It promotes a daily caloric intake of fewer than 800 and requires therapeutic monitoring. This diet is an option for those who are very fat, but it is difficult to stick to and may not be healthy for most people [22].

Low-fat diet

The main goal of a low-fat diet is to reduce the consumption of fat to 20-25% of total calories in order to preserve the heart. Since the 1950s, doctors have recommended a diet low in fat. More than twice as many calories are contained in fat as in proteins and carbs, per gram. A 15% drop in cholesterol levels is possible with a 20% cutback in fat consumption, especially saturated fats [21,23]. When the percentage of calories coming from fat is 15% or less, we say that the diet is very-low-fat. A very low-fat diet may be filled with fruits, vegetables, whole grains, and diet items that are low in fat or don't include any fat at all. Because of the potential for reduced intake of critical fatty acids, this diet is not recommended for use with younger children. From whether or not a very low-fat diet is sustainable in the long run to whether or not it adequately absorbs fat-soluble vitamins and whether or not it causes malnutrition, many

concerns remain unsolved [24]. There is little data on the long-term clinically significant weight reduction effects of this diet, despite the fact that it has a positive effect on cardiovascular outcomes [25].

Low-carbohydrate diet

There have been claims that it may help you lose weight quickly. Dietary habits of contemporary people are undergoing a paradigm change and historical transformation. They tend to eat foods that are high in energy. Carbohydrates made up 35% of ancient diet, mostly in the form of fruits and vegetables, with just 2% to 3% coming from honey. Glycogen utilization, insulin secretion, and lipolysis are all positively impacted by a low-carbohydrate diet [26-28]. A daily caloric intake of 200–800 kcal is typical among very low-carbohydrate diets. They should only be administered under the supervision of qualified medical professionals and are often not advised due to the risks connected with them. Fast food, especially fast food that is highly processed and has a lot of sugar and carbs, is rapidly replacing the traditional diet of wheat, dates, and vegetables in nations that are part of the Gulf Cooperative Council, according to research by Donnelly et al. [29]. Their carbohydrate consumption was mostly from white bread, pasta (including spaghetti, macaroni, noodles, and grit), snack items (including potato chips, popcorn, and chocolates), cakes, pastries, and sweet pies [29]. People who eat a lot of carbohydrates are supposedly more likely to die prematurely and have heart problems. Consequently, these people may benefit from reducing their carbohydrate consumption, especially of white bread and rice [30].

High-protein diet (HPD)

Maintaining lean body mass is one of the primary goals of a high-protein diet (HPD). As an added bonus, this eating plan keeps the weight off after you lose it. Dietary thermogenesis and an enhanced resting metabolism are two mechanisms by which a high-protein diet increases caloric expenditure. Hormones that promote fullness, such as glucagon-like peptide-1 (GLP-1), cholecystokinin, and peptide tyrosine-tyrosine, are secreted in response to an HPD. Ghrelin is an orexigenic hormone, and it inhibits its secretion as well. Metabolism of glucose and ketones are stimulated by this eating plan. As a result, several hypotheses have been advanced to explain how HPD causes obesity to subside [31]. Ad libitum or energy-controlled designs with a high-protein diet promote fat reduction. There is evidence that people with type 2 diabetes may regulate their glucose and HbA1c levels by replacing carbohydrate-rich foods with proteins [32].

Low glycemic index (GI) diet

It is a method for measuring the spikes in blood sugar that occur after eating. The production of lipogenic enzymes, visceral fat, and weight gain may be induced by foods that are high in glycemic index (GI). As an example, lentils consistently have a low GI. Their ability to gradually release glucose into the circulation improves insulin sensitivity and reduces glucose swings because it stimulates a slower and more constant release of insulin. Eating meals with a low glycemic index may help curb your appetite. Consequently, low GI diets are associated with greater weight loss in obese persons than high GI diets. Due to the reduced need for dietary limitation, as long as low-GI carbs are ingested, compliance with a low-GI diet will be greater than with any other diet [33–35].

Effective dietary treatments for weight reduction have been supported by a mountain of scientific research. To stop the rising rates of obesity in Saudi Arabia, there has to be a coordinated effort across many sectors to change people's eating habits.

Exercise-based interventions for obesity

Exercise is a great way to modify your energy expenditure and lose weight. It has a powerful preventive effect on obesity-related complications when done consistently. Physical activity alone does not lead to the same level of weight loss as dietary methods combined with exercise treatments. The current guidelines for weight reduction include exercising for at least 150 minutes per week at a moderate to high level or 75 minutes per week at a severe intensity, and strengthening the main muscle groups twice per week with resistance training. A lot of people put too much emphasis on exercise, and the only way to really see results (such a reduction in body fat) is to work out the big muscles. When people who are overweight or obese exercise, it has many positive effects on their health. These include an increase in basal metabolic rate and peripheral blood flow, better cardiovascular performance and lipid profiles, lower blood pressure and truncal obesity, slower atherosclerosis, reduced risk of cancer, osteoarthritis, type 2 diabetes mellitus, anxiety, and depression. Consequently, patients need to be informed about the incalculable health advantages of exercise [20, 36].

Pharmacotherapy for obesity

There aren't a ton of pharmacological options for keeping the weight off. These are solely meant for those who have a body mass index (BMI) of 30 kg/m2 or more, 27 kg/m2 or lower, or who have other risk factors. Orlistat blocks the action of pancreatic lipase in an irreversible manner. Pancreatic lipases facilitate the absorption of dietary fat by breaking it down into its component parts. The gastrointestinal adverse effects that may develop as a result of using Orlistat include greasy stool, fecal urgency, fecal incontinence, flatulence with discharge, and deficits in fat-soluble vitamins. Hence, while using this medicine, it is recommended that you stick to a low-fat diet [37]. One such analogue is ligandutide, which is short for glucagon-like peptide 1. In response to food consumption, the intestines secrete the incretin hormone glucagon-like peptide 1. It reduces the rate of gastric transit, increases the amount of insulin secreted endogenously in response to food, changes glucose homeostasis, and makes you feel less hungry. Weight loss is possible after 20 weeks of using GLP-1 agonists at levels that are considered clinically meaningful. People who are overweight or obese may benefit from this strategy [20, 38–40]. Lorcaserin and phenteramine/topiramate are two more medications that are suggested for weight reduction. A serotonin agonist, lorcaserin works by reducing hunger in the brain's central nervous system [41]. Inducing weight reduction via enhanced energy use, phenteramine is a sympathomimetic drug. Patients with hypertension should exercise caution while using phenteramine due to its cardiovascular effects [42-43].

Surgical interventions

People who are very overweight and for whom dietary and activity changes have little to no impact are candidates for these procedures. Laparoscopic Roux-en-Y gastric bypass, laparoscopic adjustable gastric banding, laparoscopic sleeve gastrectomy, and duodenal switch are the bariatric operations used to manage obesity. Biliopancreatic diversion and duodenal switch are the least common. Evaluating the patient's metabolic, cardiovascular, psychological, and nutritional details is recommended prior to surgery [44-45]. Although it is a final option for those who are really heavy, surgery is not a magic bullet for obesity.

Discussion

The rising rates of obesity among children, teenagers, and adults in the KSA have added to the worldwide alarm about this health crisis. The results showed that underweight people made up 7.5% of the population, while obese people accounted for 23% and overweight people for 32.8%. Men were more likely to be overweight than women, while women were more likely to be obese [18].

Research from Saudi Arabia, Iraq, and Brazil has shown similar rates of overweight and obesity [4, 46, 47]. In contrast to Saudi Arabia, where the prevalence of underweight people was much greater at 21.7% [4], research in Iraq and Brazil found lower rates, at 1.5% and 3.6%, respectively [46-47]. The incidence of obesity and overweight has been reported to differ in many KSA research [7, 48, 49]. It is possible that the true obesity rate in KSA is higher than what this research found. The young mean age of our research participants (33.5 years) might be a contributing factor. A small number of research have shown that being overweight or obese becomes more common as people become older [50-52]. Obesity influences sex hormone levels, which may lead to infertility in males [53], and it interacts with adipokine and steroid hormones, which can produce polycystic ovarian syndrome in women [54]. Fetuses and embryos are particularly vulnerable to the oxidative stress that obesity causes [55].

Educational efforts aimed at preventing obesity in the area were found to be unsuccessful, according to the study's findings [18]. The healthcare budget is another area hit hard by obesity and its aftereffects. Consequently, there is an urgent need for the health ministry to launch a persistent campaign on social and mass media platforms to address this issue [18].

It is concerning that 41% of males are overweight. Because of the high prevalence of obesity among the overweight, prompt action is required to address this epidemic. A shift in eating habits and the adoption of healthier lifestyles among these people is essential. A lower risk of obesity may be associated with moderate-intensity exercise, such as walking [56].

Findings from the [18] studies corroborate those from the [46, 57-58] studies in showing that women are more likely than males to be obese. There are several factors that contribute to women's higher rates of obesity. These include hormonal shifts and the use of birth control pills, which affect women biologically [59], the lack of physical demand in women's jobs, the increased workload in the home, the reduction in free time, and the imbalance between caloric intake and physical activity [11, 57, 60-61]. Previous research has shown that South Asians are more likely to be overweight if they are female, older, and less active [62].

Reasons for the lack of substantial differences in the intake of fresh fruit, dairy items, and sweets across BMI categories among the present study's participants remain unclear [18]. On the other hand, those who are overweight or obese likely have a heightened awareness of their weight gain and are trying to control their sweets intake; another possibility is that they under-estimated their sweets consumption [18].

There were no statistically significant variations in the majority of lifestyle-related behaviors between lean and overweight/obese women in a prior Saudi research that also employed the ATLS questionnaire [48]. A Saudi poll found that most college students consume soft drinks and energy drinks several times daily, eat fast food every day, and spend three to four hours a day in front of screens [36].

The correlation between food choices and weight is becoming more apparent. Obesity and poor eating habits have been the subject of few research [64–66]. Fast food [64] and sugary drinks [65] were favorably associated with body weight, whereas fruits, vegetables, legumes, and nuts [66] were inversely associated. However, there were only a few studies that found this to be true. Greater adherence to healthy eating habits was associated with a lower incidence of obesity, according to many studies in the general population [67-71].

Several sociodemographic variables were linked to obesity, and the findings of the research showed that fat people were less active [18]. Avoiding sugary beverages and engaging in moderate-intensity physical activity were both protective factors against obesity. Some studies have shown no correlation between demographic and lifestyle factors and overweight or obesity, which contradicts our results [7, 46]. A Brazilian research found that suboptimal eating settings at breakfast and/or supper were associated with sociodemographic factors, including the mother's education level, age range, and gender [72]. The findings from the study [18] are in agreement with other research [46, 73].

The Kingdom of Saudi Arabia has a serious obesity problem that needs immediate action to curb the rising obesity incidence. In order to have a healthy lifestyle, people need to get out of their chairs and move around more. They should also cut out sugary and fatty meals. More sports facilities and walking paths should be set up all throughout the city. It is highly recommended that treatments that have been supported by evidence be used and evaluated [7].

Solutions to the problem of obesity, according to Cattafesta et al. [46], need to be complex, multi-level, and multidisciplinary due to the fact that it stems from a wide range of sources. Programs that raise community knowledge about the dangers of obesity and work to promote healthy eating, appropriate food policy, regular physical exercise, and reduced sedentary behavior are all examples of preventative strategies that might be useful in the fight against obesity [47].

Conclusion

This systematic review synthesizes findings from two eligible studies on obesity management and prevention among adults in the Kingdom of Saudi Arabia (KSA). The identified studies underscore the importance of evidence-based policies and interventions to address the high prevalence of obesity in KSA. While the first study highlights ongoing efforts and initiatives, it emphasizes the necessity for continued monitoring and evaluation to effectively combat the obesity epidemic. The second study reveals alarming rates of overweight and obesity among the KSA population, emphasizing the need for targeted intervention measures. Additionally, the review discusses various preventive strategies, including dietary interventions, exercise-based interventions, pharmacotherapy, and surgical interventions. Despite the promising potential of these approaches, further research is needed to evaluate their long-term efficacy and impact, guiding evidence-based decision-making in obesity management and prevention efforts in KSA.

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