

Weight loss behaviours in Asia: A mini-review of evidence-based strategies and the risks of unsafe practices

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ABSTRACT

Being a complex chronic condition, obesity has become a major global public health challenge. Its prevalence is observed to increase across all age groups and regions, particularly in developing countries. This mini review aims to synthesise current evidence on behaviours of weight loss by outlining the evidence-based strategies, also the unsafe and harmful practices for weight management. Literature searches were conducted using several databases, including PubMed, Google Scholar, and ScienceDirect, with articles limited to those published between 2019 and 2025 to ensure the inclusion of recent and up-to-date evidence. Effective weight loss strategies include dietary modifications, intake of supplements, an increase in physical activities and pharmacological approaches. Several practices may pose harm when used inappropriately, including the safety concerns of anti-obesity medications, unsupervised bariatric surgery, and the use of adulterated supplements, laxatives, and diuretics, although some of these approaches may be appropriate when performed under proper medical supervision. Findings from this review concluded that there is a critical need to improve public awareness, enhance regulation, and involvement of healthcare professionals in guiding individuals towards safe and sustainable weight management practices.

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1. INTRODUCTION

Obesity is characterized by the abnormal or excessive build-up of body fat, which can pose a threat to one's health (World Health Organization [WHO], 2024). The World Health Organization (2024) stated the most frequent way to diagnose it is by using the body mass index (BMI), with a BMI of 30 or higher being labelled as obese. Since the 1990s, this issue has become a worldwide health problem, with increasing prevalence rates affecting both children and adults. Increased consumption of high-calorie meals and decreased physical activity are linked to an increase in obesity; these factors are frequently impacted by urbanization and changes in lifestyle (WHO, 2024). Preventive measures should focus on encouraging healthy eating habits and regular physical activity (WHO, 2024). Therefore, improving the surrounding environment can make it easier for individuals to adopt a healthier lifestyle and subsequently help to prevent obesity.

Rather than being solely a lifestyle problem, today, obesity is recognized as a complicated chronic condition due to multiple possible reasons that require medical intervention and preventive interventions (De Lorenzo et al., 2020). According to Dhurandhar (2022), obesity is caused by more than just overeating; it also entails intricate disturbances in the management of energy intake. It is not just a question of calorie intake versus expenditure because there are several physiological factors at play, including hormone abnormalities linked to hunger and fullness. The illness is made worse by the combination of environmental factors such as low physical activity and foods high in energy and genetic predispositions (Lin & Li, 2021).

Meanwhile, Freire (2020) stated that the main reason for obesity is a discrepancy in energy intake and energy expenditure, which is influenced by various factors such as biological, genetic, and psychosocial. Research indicates that a weight loss of 5% to 10% in 6 months is needed to lower risk factors for comorbidities and to achieve significant health benefits like a decrease in blood glucose, triacylglycerols, and blood pressure (Freire, 2020). In order to effectively address obesity, it is important to manage both inner physiological causes and external lifestyle impacts. Controlling these variables is essential for both long-term preventative plans and treatment.

As stated in the Ministry of Health Malaysia (2023) Clinical Practice Guidelines (CPG): Management of Obesity, Second Edition, obesity is a chronic disease with different symptoms. Obesity occurs when the amount of adipose tissue exceeds normal fat mass. It is associated with multiple diseases that cause early mortality. Research by Sarma et al. (2021) shows that overweight or obesity compromises health and increases risks of new illnesses. Therefore, treatment, support, and follow-up care of their clients must be early and individualized, as with any other chronic condition.

Overweight and obesity are associated with increased risks of various forms of cancers and such chronic diseases as diabetes mellitus type 2, hypertension, hypercholesterolemia, metabolic disorders, arthritis, and sleep apnoea (Al-Abed, 2021). A study done by Hu et al. (2024) stated that obesity contributes to chronic disease risks and deteriorates physical, psychological, and quality of life and general well-being (Hu et al., 2024). Obesity brings out prejudice and discrimination in the workplaces as well as the health facilities that treat the clients (von Humboldt, 2022). Moreover, its cost implications in the provision of medical care and treatment of obesity-related diseases and deaths add

up; more so, those affected are at a higher risk of developing many cancers that can be seen in the prevalence around the globe, Asia, and Malaysia (Mohajan & Mohajan, 2023).

Realizing these growing health, social and economic burdens of obesity, it is pertinent to identify safe and effective approaches for weight management. Weight loss can be achieved through various strategies, including lifestyle modifications such as dietary changes and physical activity, pharmacological treatments, as well as the use of dietary supplements and other weight management products, some of which may lack sufficient evidence for safety and effectiveness. Increasing concerns regarding the use of unsafe, unproven, or inappropriate weight management practices have highlighted the need for clearer evaluation of available approaches. Therefore, this review aims to examine evidence-based strategies as well as the harmful impact of unsafe practices related to weight management. This study is an effort to provide clear guidance for individuals living with obesity.

2. LITERATURE SEARCH

The searches were conducted using several databases that include PubMed, Google Scholar and Science Direct. The search articles were restricted to include only those articles published from 2019 to 2025 to ensure current and updated references are included. The search utilizes the use of Boolean operators with the following search terms; prevalence of overweight and obesity, dietary strategies, dietary modifications, weight loss strategies, weight loss practices, unsafe weight loss practices, anti-obesity drugs, and adulterated herbal supplements. Various type of studies was selected based on relevance to the scope of the review. This includes; original research articles, review papers, and clinical guidelines were included to provide broad overview of the current evidence.

3. PREVALENCE OF OBESITY

A study done by Blüher (2019) stated that, in the past 50 years, obesity has become increasingly common worldwide, reaching levels close to a pandemic. Obesity presents a major public health threat due to its strong association with various health conditions such as type 2 diabetes mellitus, fatty liver disease, hypertension, myocardial infarction, stroke, dementia, osteoarthritis, obstructive sleep apnea, and several cancers. These circumstances also decrease the average lifespan and overall well-being. Moreover, obesity is associated with societal disadvantages, lack of employment opportunities, and decreased economic output, leading to added financial burdens on the community (Blüher, 2019).

Obesity is a non-communicable disease that has emerged as a major global public health concern, affecting a large proportion of the population worldwide. The World Health Organization (WHO, 2024) reported that in 2022, approximately one in eight individuals globally were living with obesity. Since 1990, the prevalence of obesity among adults has more than doubled, with an estimated 2.5 billion adults classified as overweight, including about 890 million who were obese. In the same year, around 43% of adults were reported to be overweight, while 16% were living with obesity (WHO, 2024). Consistent with these findings, a recent systematic review by Santamaria et al. (2025) also described a rapid worldwide increase in overweight and obesity, estimating that about 2.5 billion adults and more than 390 million children and adolescents are affected globally.

As specifically for Asia, Gao et al. (2021) mentioned that the three places that occupied the lowest rate of obesity in 1980 were the South East Asian, Western Pacific and African regions which were as low as 0.4% in Vietnam and less than 2% in nine other countries including: Bangladesh 0.6%, China 0.6%, Ethiopia 1.2%, Indonesia 1.4%, Myanmar 1.5%, Nigeria 1.7%, India 1.7%, Japan 1.8%, and South Korea 1.9%. By 2015, however, only one country still had an obesity prevalence below 2%, which is Vietnam with only 1.6%. The robust rising trend is expected to persist in developing nations, which are home to two-thirds of the global obesity population. Li et al. (2021) stated that obesity has also increased steadily in the China Pacific region by multiplying nearly 9 times in the last 35 years; it started from 0.6% in 1980 to 5.3% in 2015. Nevertheless, 1.5% of the Chinese population is classified as underweight rather than overweight or obese. Notwithstanding, it may be obvious that the net figure of grossly obese Chinese people is among the lowest in the world. It was also observed that while the relationship between these risk factors and obesity is similar for both men and women, the impact differs significantly. Several factors were confirmed as significant for women, including lifestyle and dietary factors, which seemed to be most influential for the differences between urban and rural residents and the same factors that seemed to be equally influential for men as socioeconomic status (Gao et al., 2021).

A study done by Misra et al. (2019) stated that the prevalence of obesity in South and Southeast Asia is expected to double from 2010 to 2030 (Misra et al., 2019). Childhood obesity had also reached the same level by that year. The increasing rate of child obesity, which is climbing rapidly along with the rates of adults in the area, could impact 45 million children in South and Southeast Asia who are over 5 years old. National prevalence data probably do not accurately reflect the extent of the issue, as individuals of Asian heritage may face obesity-related physiological changes at lower BMI levels compared to other groups (Misra et al., 2019).

Ariaratnam et al. (2020) in their study revealed that the level of obesity among elderly respondents was observed to be higher among females, those who reside in urban areas, and Indians. One-third of the elderly with non-communicable disease, hypertension (33.1%) and diabetes (38.8%) were also obese. Out of the elderly who were obese, the majority (89.8%) were found to have at least one non-communicable disease. Meanwhile, among smokers, 16.8% of them were found to be obese.

However, a study by Chong et al. (2022) stated that, in comparison to 2011 and 2015, there was an increase of 20.1% obesity rate among adult Malaysians, showing an increasing pattern. Malaysians had higher obesity rates than Singapore, Thailand, Indonesia, and China, but lower rates than Brunei. Compared to men, women were substantially more likely to be obese when classified according to gender (Chong et al., 2022). In terms of ethnicity, another study by Chong et al. (2023) which was conducted in Singapore and Malaysia concluded that Malays, Indians, and other indigenous populations (locally referred to as Bumiputera) were more likely to be obese than Chinese, possibly reflecting variations in cultural and food choices among different ethnic groups. In relation to age, individuals aged 50 to 59 were less prone to obesity, while no correlation was detected for those aged 30 to 39 and 40 to 49 when compared to those aged 18 to 29 (Chong et al., 2023).

4. EVIDENCE-BASED STRATEGIES FOR WEIGHT LOSS

A systematic review conducted by Paixão et al. (2020) asserted that successful weight loss plans involve dietary changes, supplement intake, and higher levels of physical activity. In terms of dietary changes, maintaining a calorie deficit, consuming a balanced diet rich in fruits, vegetables, lean meats, and whole grains, or adopting approaches such as intermittent fasting, ketogenic, or Mediterranean diets were identified as effective strategies (Nahar, 2024). This is also tailored with evidence provided in the established guideline, *Clinical Practice Guideline on the Management of Obesity*, where the guideline asserted that the management of obesity requires the creation of a negative energy balance (Ministry of Health Malaysia, 2023). Therefore, dietary interventions should mainly focus on reducing total energy (calorie) intake. Various dietary approaches can be used to lower calorie consumption, with some producing greater reductions than others. In general, the amount of weight loss achieved is related to the extent of the calorie reduction (Ministry of Health Malaysia, 2023).

In terms of physical activity, Jakicic et al. (2019) in their systematic review stated that physical activities including strength training, aerobic exercise, and High-Intensity Interval Training (HIIT), combined with behavioral approaches like goal setting, self-tracking, and cognitive behavioral therapy (CBT), are effective for weight loss. Supplements are usually taken in addition to a well-balanced diet and regular physical activity for maximum effect. These include fiber, *Garcinia Cambogia*, or green tea extract. These various supplements might further influence metabolic rate, suppress appetite, or increase fat burning (Jakicic et al., 2019). These strategies can be categorized as dietary plans, supplement intake, and physical activity programs. Losing weight can fully enhance overall health and quality of life, but it is essential to proceed with caution to prevent any potential risks. Not following safety protocols can result in severe health issues such as malnutrition and metabolic imbalances (Paul et al., 2023).

4.1 Dietary modification

A meta-analysis done by Recchia et al. (2023) aimed to investigate how two lifestyle intervention approaches are effective in reducing visceral fat in overweight and obese adults. This study involved 40 randomized controlled trials involving 2,190 participants. Overall, exercise and caloric restriction were found to reduce visceral fat compared with the controls ($p < 0.001$). Exercise demonstrated a dose-response effect of -0.15 (-0.23 to -0.07); $p < 0.001$ per 1000 calories deficit per week, whereas the effect of caloric restriction was not dose-dependent (ES 0.03 (-0.12 to 0.18); $p = 0.64$). Most of the studies showed a moderate risk of bias (Recchia et al., 2023). Evidence suggested that both increased physical activity and reduced calorie intake play an important role in reducing waist circumference. Weight loss generally occurs when an energy deficit is created, either by increasing energy expenditure or by lowering energy intake (Recchia et al., 2023). However, dietary restriction is often reported to produce greater weight loss compared to exercise alone. Flack et al. (2020) noted that fat loss from exercise may not always be reflected as a reduction in total body weight, as exercise can also increase lean muscle mass. This emphasizes that relying solely on body weight to evaluate the effectiveness of exercise may not give a complete picture. Other measurements such as waist circumference or body composition should also be considered. This is also proven in a study highlighted in an established national guideline (Ministry of Health Malaysia, 2023), where a 6-month structured lifestyle intervention consisting of dietary counseling and a physical activity program, conducted among overweight and obese women from a low socioeconomic community, resulted

in a modest reduction in body weight and visceral fat compared to the control group. However, the intervention group showed a significant increase in skeletal muscle mass (0.13 kg), while the control group experienced a decrease (-0.37 kg), with the difference being statistically significant ($p = 0.033$) over the study period (Ministry of Health Malaysia, 2023).

A review done by Freire (2020) stated that the most famous diets are classified into three types. The initial approach involves adjusting the balance of macronutrients, like reducing carbs, increasing protein, or restricting fats in diets. Although low-carb and high-protein diets can offer temporary advantages, the end results are comparable regardless of the type of diet followed in the long run. The next method involves limiting particular food categories, as observed in eating plans such as Paleo, vegan, and gluten-free diets. These could enhance health and aid in shedding pounds, but they could lead to nutrient deficiencies if not monitored closely.

The third approach is time-restricted eating or intermittent fasting (IF), which has become popular for its possible metabolic advantages. This approach typically involves cycles of eating and fasting (Vasim et al., 2022). There are three primary types of IF: Alternate Day Fasting (ADF), Time-Restricted Eating (TRE), and Periodic Fasting (PF) (Gonciarz et al., 2024). A meta-analysis study proved that among the three forms of IF, ADF was the most effective for weight loss (Elortegui Pascual et al., 2023). IF works by leveraging metabolic changes induced by calorie restriction and fasting periods. When fasting, the body shifts to its metabolic state, which promotes oxidation of fat and ketogenesis (Gonciarz et al., 2024; Vasim et al., 2022). The enhancement of fat loss and muscle preservation is due to an increase in norepinephrine and growth hormone levels (Gonciarz et al., 2024; Vasim et al., 2022). Adhering to IF regularly will influence the body's energy balance, leading to a reduction of weight through reduced calorie intake and improved metabolic pathways (Gonciarz et al., 2024). However, according to the established guideline, weight loss is mainly influenced by the total caloric deficit rather than the duration of fasting. Nevertheless, the effectiveness of intermittent fasting is still unclear, as results from clinical trials, systematic reviews, and meta-analyses have shown inconsistent findings, possibly due to wide variations in study design, population, and intervention methods (Ministry of Health Malaysia, 2023).

Apart from weight reduction, the impact of IF is pivotal on inflammation. Studies highlighted that IF is able to reduce the levels of inflammatory markers such as C-reactive protein and interleukin-6, which are linked with obesity and metabolic disorders (Mulas et al., 2023). By improving these markers, IF may provide additional health benefits beyond weight loss, including potential reductions in cardiovascular disease risk (Cheung et al., 2024). A meta-analysis conducted by Cheung et al. (2024) summarized that from a total of nine randomized controlled trials with 899 Chinese participants, TRE was the most adopted type of IF being implemented (6 out of 9 studies), followed by ADF. The IF intervention group demonstrated significant reductions in body weight, body mass index, body fat mass, low-density lipoprotein cholesterol, triglycerides, and homeostatic model assessment of insulin resistance compared with the control group. A narrative review by Song and Kim (2023) describes several potential mechanisms by which intermittent fasting (IF) may contribute to reduced caloric intake and enhanced fat mobilization. These metabolic adaptations are associated with increased fat oxidation and improved insulin sensitivity. In addition, IF has been linked to reductions in body weight, cardiovascular risk factors, and systemic inflammation, collectively contributing to improved overall health outcomes.

Other methods of dietary modifications such as low fat or carbohydrate diets, where studies comparing low-carbohydrate diets with balanced diets of the same calorie content in overweight and obese

adults reported similar weight loss after 3–6 months (Ministry of Health Malaysia, 2023). This suggests that reducing carbohydrates alone may not provide additional benefit when total calorie intake is kept the same. Meanwhile, another method highlighted was meal replacement; a structured calorie restriction diet that replaced >60% of the total daily energy intake was proven to result in a greater weight loss than conventional food-based low-energy diets (Ministry of Health Malaysia, 2023). Overall, the findings from previous evidence suggest that achieving a negative energy balance remains the most important factor in reducing body weight.

4.2 Supplement intake

The worldwide increase in vitamin, mineral, nutritional, and herbal supplement sales can be attributed to widespread public belief that natural things are automatically harmless (Wierzejska, 2021). The increased popularity of aging knowledge, along with broader product access linked to the shift towards disease prevention and healthy life choices, drives up the consumption of vitamins and food supplements. These products face concerns about user health because consumers both diagnose and medicate themselves through consumption without medical oversight and over extended durations (Figueiredo et al., 2020).

Apart from taking supplements of micronutrients, taking care of gut microbiota is also important for weight loss. This can be seen in a clinical trial study done by Sergeev et al. (2020), which stated that the synbiotic supplement containing four strains of *Bifidobacterium*, *Lactobacillus acidophilus*, and galactooligosaccharides led to a notable rise in the levels of these probiotic genera in the gut following a 3-month trial. *Bifidobacterium* is widely viewed as a helpful part of the microbial population and has also been linked to potential anti-obesity benefits (Sergeev et al., 2020).

It is important to note that the changes in microbes seen in this clinical trial, done by Sergeev et al. (2020), could have a beneficial effect on fermentation in the large intestine. The alterations in microbes seen after synbiotic treatment involved a rise in *Ruminococcus*, a genus that is recognized for its ability to generate butyrate. Butyrate, a short-chain fatty acid (SCFA) that supports colon cell energy and inhibits histone deacetylase, has been connected to cancer prevention effects, offering defence against harmful by-products of a high-protein diet. Recently, SCFAs have also been linked to providing protection against type 1 diabetes. Moreover, *Lactobacillus* and *Bifidobacterium* are linked to beneficial impacts on colonic health and have been connected to a decrease in faecal water genotoxicity, a biomarker for colon cancer, following synbiotic treatment (Sergeev et al., 2020).

The production of vitamins, nutrient metabolism, and food digestion are the main functions of the gut microbiota. According to reports, the gut microbiota changes the fatty acid content of tissues, encourages moderate inflammation, and improves the extraction of energy from food. These processes may link obesity with the gut microbiome (Aoun et al., 2020).

4.3 Physical activities

Different perspectives occurred in a study conducted by Petridou et al. (2019) stating that exercise serves as an essential tool in treating and managing obesity by highlighting that exercise will not only support weight loss but also be able to improve metabolic health and prevent weight regain. Although reducing

calorie intake may yield more immediate weight loss, combining exercise with dietary changes is necessary for maintaining weight loss over the long term (Petridou et al., 2019). Importantly, exercise can reduce visceral fat that is linked to higher health risks more effectively than diet alone, and it improves health outcomes even without significant weight loss (Bellicha et al., 2021). Bellicha et al. (2021) also emphasized that endurance training, such as walking and cycling, is highly effective for reducing body fat due to high energy expenditure. Resistance training, although less efficient in immediate fat loss, plays a crucial role by increasing lean body mass and resting metabolic rate, promoting sustainable weight management. Additionally, HIIT offers a time-efficient approach to fat reduction, though it may not suit individuals with physical limitations. Nevertheless, the study by Petridou et al. (2019) concludes that while exercise alone may not guarantee immediate weight loss, it is indispensable for long-term health and obesity management through its effects on fat reduction, metabolic fitness, and weight stability.

In addition to that, a review conducted by Elagizi et al. (2020) asserted that, even though following the minimum recommendations for aerobic physical activity (150 minutes per week of moderate-intensity or 75 minutes per week of vigorous-intensity), it can enhance cardiovascular health. For instance, inactive patients who were instructed to raise their physical activity levels to 10,000 steps/day or 2,000–4,000 steps/day higher than their usual levels only experienced minor weight loss (< 2 kg) in past research, indicating that simply increasing physical activity is not enough for substantial weight loss. Aerobic exercise programs following public health guidelines usually lead to a small weight loss of around 2 kg. However, greater benefits in reducing heart disease risk factors are seen with significant weight loss of at least 5% of initial body weight (Elagizi et al., 2020).

There are three main types of exercises categorized by the Ministry of Health Malaysia (2023), which include aerobic training, resistance training, and lifestyle physical activity. The first category involves lifestyle physical activity that includes increasing steps per day and using stairs instead of the elevator. The second category involves resistance training such as using dumbbells and bodyweight exercises. Meanwhile the third category is aerobic training such as walking, swimming, cycling and rowing which are grouped as low impact aerobic exercise, while, running and jumping rope are categorized as higher impact aerobic exercise.

No particular type of physical activity, whether aerobic, resistance, or lifestyle-based exercise, has been shown to provide a clear advantage for weight loss. However, available evidence suggests that higher-intensity exercise tends to produce greater weight reduction compared to lower-intensity activity (Ministry of Health Malaysia, 2023).

4.4 Pharmacological approach

The use of pharmacotherapy may be appropriate when weight loss or weight control cannot be achieved with lifestyle changes alone. However, anti-obesity drugs should only be used to support lifestyle interventions, not as a substitute for them (Ministry of Health Malaysia, 2023). At present, there are several medications approved by the United States Food and Drug Administration for obesity, which include: orlistat, phentermine (for not more than 3 months), combining phentermine and topiramate, combining naltrexone and bupropion, high-dose liraglutide (3 mg daily), and high-dose semaglutide (2.4 mg weekly). While there are no randomized controlled trials (RCTs) with head-to-head comparisons of the different anti-obesity agents, phentermine/topiramate and high-dose semaglutide (a type of glucagon-like peptide-1

receptor agonist) at a 2.4 mg weekly dose have resulted in the largest magnitude of weight loss of >10% (Ministry of Health Malaysia, 2023).

4.4.1 Oral phentermine

Oral phentermine, a noradrenergic sympathomimetic amine, was approved by the US FDA in 1959 for short-term use alongside lifestyle interventions in obesity management. It acts on the hypothalamus to increase noradrenaline, stimulating β_2 -adrenergic receptors and suppressing appetite, while also inhibiting monoamine oxidase to enhance serotonin activity and slightly raise basal metabolic rate. Clinical studies show that phentermine leads to meaningful weight loss, with most patients achieving at least 5% reduction in body weight and nearly half achieving 10% or more (Ministry of Health Malaysia, 2023).

4.4.2 Glucagon-Like Peptide-1 (GLP-1) Receptor Agonists

GLP-1 receptor agonists are among the most promising classes of medications for weight management. Drugs like semaglutide and tirzepatide have shown substantial efficacy in clinical trials, leading to average weight losses exceeding 15% when combined with lifestyle modifications (Reid & Bhasin, 2025). The mechanism involves enhancing satiety, reducing appetite, and promoting insulin secretion, which collectively contribute to weight loss and metabolic improvement. A meta-analysis study on six randomized trials conducted by Kommu et al. (2025) also concluded that there is a significant reduction in BMI and waist circumference in the tirzepatide group in comparison to the placebo group. However, while these treatments can yield significant weight loss benefits, they are not without side effects. Tirzepatide was associated with gastrointestinal side effects such as nausea, vomiting, diarrhoea, and constipation (Kommu et al., 2025).

4.4.3 Orlistat

Orlistat remains a standard anti-obesity drug, functioning by inhibiting pancreatic lipase, thereby reducing dietary fat absorption. It is being used as an anti-obesity drug in many countries. A study conducted by Aydin and Onbasi (2021) among 100 Turkish female patients highlighted significant improvement after receiving 120 mg of orlistat, three times a day for 12 weeks. Significant reductions in glycaemic parameters, including fasting blood glucose, HbA1c, and fasting insulin levels, were observed (Aydin & Onbasi, 2021). Positive effects were also found in all cholesterol parameters except high-density lipoprotein cholesterol (Aydin & Onbasi, 2021). While effective, it presents gastrointestinal side effects and potential nutritional deficiencies, emphasizing the importance of patient monitoring during treatment (Nowicki et al., 2022). Notably, safety reviews have highlighted the need for guidelines regarding long-term use, particularly as obesity treatments become increasingly integrated into standard care programs (Tak and Lee (2021)).

Though the efficacy of weight loss pharmacotherapy is evidenced, the safety of these agents can differ across demographics, particularly concerning older populations and those with comorbidities and polypharmacy (Tak and Lee (2021)). Hence, clinical decisions must be made with caution and tailored to individuals. Recommendations also must be made when individuals receive proper advice from healthcare professionals.

5. DANGERS OF UNSAFE WEIGHT LOSS STRATEGIES

Not all weight loss approaches are inherently harmful; however, certain strategies require careful evaluation due to their potential risks when used inappropriately or without proper medical supervision. While some interventions, such as pharmacotherapy and bariatric surgery, are recognized as effective and permissible options for selected individuals, these methods must be performed under appropriate clinical guidance and with careful consideration of their indications, benefits, and possible complications. In addition, the increasing use of unproven supplements, extreme dieting, and other unsafe practices has raised concerns regarding their safety and long-term health effects. Therefore, this section discusses weight loss strategies that may pose harm if misused or undertaken without proper assessment.

5.1 Safety concerns of anti-obesity pharmacotherapy

Losing weight carries concerns even if it is frequently done for cosmetic and health reasons. Reducing weight without the right support might have unanticipated detrimental repercussions on one's physical and mental health. It is critical to be aware of the risks because even modest weight reduction can upset the body's natural equilibrium if not handled appropriately. By addressing the complexity of weight reduction, we can make sure that people seek out healthier and more long-term solutions. This can be seen from a study by Tak and Lee (2021), which mentioned that in recent years, a number of anti-obesity drugs have been taken off the market due to lasting adverse effects, especially concerning the heart. From that time onward, the development of anti-obesity drugs has been centered on ensuring both effectiveness in weight loss and safety for the cardiovascular system. Recently, the Food and Drug Administration (FDA) in the US has authorized new pharmaceutical alternatives that were created with more attention to detail and clarity on both safety and effectiveness. Some examples of these agents include phentermine/topiramate, liraglutide, naltrexone/bupropion, and orlistat (Tak & Lee, 2021).

As mentioned by Tak and Lee (2020), anti-obesity drugs utilize various mechanisms of action. Neuropsychiatric control, which is affected by the drugs, can lead to a lower desire to eat, resulting in a reduction in caloric consumption (appetite suppressants). Delaying the emptying of the stomach can lead to patients feeling full for an extended period of time, resulting in reduced consumption that could enhance satiety. Alternative medications may boost caloric expenditure, resulting in weight reduction that will enhance metabolism. On the other hand, reducing the absorption of fats or carbohydrates may result in decreased total caloric consumption and improved absorption modulators. In the end, a novel method aims to reduce adipose tissue and fat synthesis. The aforementioned study discusses the five distinct mechanisms of action found in anti-obesity medications, along with the resulting clinical effects (Tak & Lee, 2020).

A study by Rodgers et al. (2012) claimed that developing therapeutic medicines that can lower body weight by reducing food intake or absorption and/or increasing energy expenditure is a better option compared to surgery. Unfortunately, although being actively pursued for over 50 years, this technique has only had modest results up to this point. Numerous novel medications that were hailed as the solution to the obesity issue were quickly withdrawn due to an intolerable burden of adverse effects (Aschenbrenner, 2020). For instance, lorcaserin, mainly used as a monotherapy, faced rejection in 2010 due to worries regarding tumour growth observed in preclinical studies; however, after resubmission, it gained FDA approval in June 2012, with intentions to sell the drug under the trade name Belviq® (Aschenbrenner, 2020). Likewise, a third medication, Qnexa® (a combination therapy), was initially rejected by the FDA in

2010 due to worries about potential birth defects but received FDA approval upon re-filing in July 2012. This compound is expected to be sold under the brand name Qsymia® (Aschenbrenner, 2020).

5.2 Use of adulterated supplements

The deliberate adulteration of dietary supplements (DS) with synthetic medications is currently on the rise, which poses a severe risk to consumers and a challenge for regulatory bodies (Muschiatti et al., 2020). Adulteration is the intentional inclusion of hidden, unauthorized substances or drugs that may pose harm to the consumers (Muschiatti et al., 2020). The quantity of drugs present in a contaminated product can vary from just one (commonly) to as many as six distinct drug components (uncommon). This can be exacerbated by the marketing of these products as "natural," leading consumers to believe they are healthier and safer than traditional medications (Muschiatti et al., 2020).

An analysis of 96 herbal weight loss products that were collected from the drug market in Bojnurd City, Iran, was conducted by Salahshour et al. (2020). In this study, it was found that 21.8% of the commercial herbal preparations for weight loss contain additives such as caffeine, vitamin E, and Trimethoxyamphetamine (TMA), and are classified as amphetamine analogues. All of these products were traditional handmade ones and were unapproved by the Iran Food and Drug Organization. Despite the fact that no other pharmaceutical impurities including thyroid hormones or antidepressants were identified, the problem of adulteration in weight loss herbs is not an exception. The World Health Organization estimates that between 8% and 15% of all medicines sold globally are fake drugs in terms of their identity or origin. These may contain active or less active ingredients; they may not have adequate or dormant components; the packaging also may be misleading, with the product being made to look different than what it really is (World Health Organization, 2024).

5.3 Unsupervised bariatric surgery

Bariatric surgery is also an option for people with obesity. Kheirvari et al. (2020) stated that surgery carries several risks and disadvantages, where complications from the operation, both during and after, including bleeding, leaks, and infections, can happen. Nutritional deficiencies are frequent and necessitate lifetime supplementation and close monitoring, especially of vitamins B12, D, iron, and calcium. Over time, some patients may not lose enough weight or gain it back, requiring additional procedures or follow-up surgeries. Additionally, long-term digestive health may be impacted. Certain people may experience metabolic problems and illnesses including gastroesophageal reflux disease (GERD). All things considered, bariatric surgery has many benefits, but in order to maintain those advantages and avoid difficulties, meticulous post-operative management is also necessary (Kheirvari et al., 2020).

However, according to a review by Abdul Wahab and le Roux (2022), the authors concluded that for treating obesity, bariatric surgery is the most effective option. Nonetheless, each person's reaction after bariatric surgery varies. Finding patients who might benefit from surgery the most is therefore necessary. Numerous obesity-related problems, including type 2 diabetes, obstructive sleep apnoea, hypertension, dyslipidaemia, cancer, osteoarthritis, and urine incontinence, respond favourably to bariatric surgery. Although it is currently impossible to anticipate how individuals will react to bariatric surgery, there is optimism that genetic markers may soon become accessible (Abdul Wahab & le Roux, 2022).

Bariatric surgery is listed as one of the options available based on the established national guideline (Ministry of Health Malaysia, 2023); however, precautions and clinical judgments should be made by healthcare professionals in assisting individuals with obesity for this option. Close medical supervision is required in ensuring patients are not exposed to short-term or long-term health-associated risks.

5.4 Misuse of Pharmacological agents (laxatives, diuretics, and herbal detox washes or enemas)

A study by Elran-Barak et al. (2017) found that, among their 2,295 participants with eating disorders, 25% (n=571) of them use laxatives for weight loss. The authors also concluded that those with anorexia nervosa use laxatives more frequently than those with bulimia nervosa (Elran-Barak et al., 2017). A meta-analysis study by Hall et al. (2024) revealed that the use of nonprescription weight-loss products, including laxatives, was consistently more prevalent among girls than boys. Approximately one in ten adolescent girls reported using such products within the past year and over their lifetime (Hall et al., 2024). The misuse of laxatives is alarming as it consequently leads to several serious health complications, such as severe electrolyte imbalance and gastrointestinal disturbances, which can be life-threatening when left untreated (Johnson, 2022; Lydecker et al., 2021; Singh, 2023). Apart from this, laxative usage is linked to dependency, where users may experience decreased efficacy over time, causing them to increase the dosages and resulting in long-term health issues (Czubaj et al., 2025; Siegmund, 2022).

Similar to laxatives, diuretics are another group of drugs that are often abused for their rapid weight loss effects. Athletes and those involved in sports also opt for diuretics such as furosemide to reduce weight quickly in order to qualify for competitions or fit into desired weight categories (Dunn et al., 2025; Gupta et al., 2021). Gupta et al. (2021) in their study emphasized that the World Anti-Doping Agency has recognized the misuse of these substances and prohibited their usage due to their potential to enhance performance and cause adverse health conditions. Misuse of furosemide or diuretics in general leads to dehydration, renal impairment, and other systemic health problems (Berkovich et al., 2019; Popov et al., 2023). The practice of combining the use of diuretics with other weight-loss approaches which are also harmful further exacerbates the condition (Berkovich et al., 2019; Popov et al., 2023).

Herbal detoxes or enemas are believed to be cleansing and detoxification agents. Studies mentioned that this perception imposes a false sense of health and wellness that leads consumers to potentially engage in harmful practices (Lydecker et al., 2021; Singh, 2023). Some promote their excessive use as they perceive this method will facilitate weight loss. This results in electrolyte disturbances and long-term dependency (Atkins et al., 2023). Additionally, studies indicate that those with eating disorders are likely to adopt these behaviours to achieve an ideal body weight (Atkins et al., 2023; Hall et al., 2024; Szymańska et al., 2023). Various weight-making strategies are commonly adopted in combat sports prior to competition. These approaches include extreme or potentially harmful practices such as the use of laxatives, diet pills, diuretics, enemas, and self-induced vomiting (Barley et al., 2019; Samadi et al., 2019). This abuse is often associated with the pressure of performance and the culture surrounding high-stakes competition (Sy et al., 2021). The psychological impact of these agents is also profound. Kakar et al. (2025) in their study highlighted that the misuse of enemas is linked to bulimia nervosa, where individuals opt for enemas as purging behaviours following their episodes of binge eating.

6. CONCLUSION

Given obesity as a highly prevalent modifiable risk factor in Malaysia, it is important to explore effective strategies for preventing obesity. These strategies can be used by healthcare professionals or policy makers in order to strategize effective interventions among different age populations. This review also highlighted evidence-based strategies that can be implemented for losing weight. Dietary modifications and physical activities are the cornerstone of such strategies, while intake of supplements could also be helpful. Apart from that, the dangers of harmful strategies and their safety concerns were strongly emphasized. These harmful strategies largely contributed by the use of adulterated supplements, laxatives, diuretics or enemas. These agents were being abused for losing weight purposes beyond their intended therapeutic usages, increasing the risk of adverse effects and multiple health complications. Healthcare professionals are urged to actively engage with people with obesity in promoting safe and effective weight management strategies.

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CONFLICT OF INTEREST STATEMENT

The authors declared that they have no conflicts of interest to disclose.

AUTHORS' CONTRIBUTIONS

SNASR: Conceptualization, writing original draft, editing manuscript. **NWZ:** Conceptualization, supervision, review. **AA:** Conceptualization, review. **FFI:** Conceptualization, draft corrections, editing manuscript, supervision.

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