International Journal of Rural Development, Environment and Health Research
[Vol-8, Issue-1, Jan-Mar, 2024]
Issue DOI: https://dx.doi.org/10.22161/ijreh.8.1
ISSN: 2456-8678 ©2023 IJREH Journal

Role of Daily life style and Medication in Prevention and treatment of obesity

Rambabu Kumar*, Rajesh Kumar, Ajeet Pal Singh, Amar Pal Singh, Prachi Sharma

Department of B. Pharmacy. St. Soldier institute of pharmacy, Lidhran campus, Behind NIT, (R.E.C.). Jalandhar-Amritsar Bypass NH-1 . Jalandhar-144011, Punjab, India.
*Address for correspondence
Department of B. Pharmacy. St. Soldier institute of pharmacy, Lidhran campus, Behind NIT, (R.E.C.). Jalandhar-Amritsar Bypass NH-1 . Jalandhar-144011,Punjab, India. Email:- rambabukumarshemra@gmail.com

Received: 13 Jan 2024; Received in revised form: 10 Mar 2024; Accepted: 21 Mar 2024; Available online: 31 Mar 2024

Abstract**—** *The rising prevalence of overweight and obesity underscores the need for enhanced intervention strategies to tackle this significant public health issue. Increases in energy expenditure through exercise and other physical activity may be a crucial component of effective interventions to enhance initial weight loss and prevent weight regain. achieve these outcomes, it is recommended to engage in appropriate levels of exercise and physical activity, with 60 to 90 minutes per day being the recommended duration. Epidemiological surveys in England reveal that obesity is prevalent, defined as a body mass index (BMI) of greater than 30 kg/m2. This study is the first to report the prevalence of general obesity and abdominal obesity in the adult population of Spain, based on weight, height, and waist circumference measurements. Diet, smoking, and physical activity are significant lifestyle factors that can significantly impact body weight and fat accumulation. The PREDIMED study, a randomized dietary primary prevention trial conducted in Spain, assessed the relationship between lifestyle and obesity risk. A study assessed 7,000 high-cardiovascular risk subjects, determining a healthy lifestyle pattern (HLP) based on Mediterranean diet adherence, moderate alcohol consumption, daily physical activity of 200kcal/day, and non-smoking.*

Keywords**— Overweight and Obesity Prevalence, Physical Activity Intervention, Epidemiological Surveys, Lifestyle Factors Impact, Healthy Lifestyle Pattern (HLP)**

I. INTRODUCTION

Overweight and obesity in childhood and adolescence is a global issue that is notably increasing in developing countries. Overweight and obesity rates have been increasing in recent decades, with body mass index (BMI) values above 25.0 kg/m2 and 30.0 kg/m2 kg/m2. The management of excess body fat is a significant health concern of our time. Global obesity prevalence has nearly tripled since 1975, with over two-thirds of the US population experiencing excess body weight, and 20% of adolescents having obesity Over one-third of adults and 20% of adolescents are obese, as per related links. The Obesity Medicine Association (OMA) established and maintained an online "Obesity Algorithm" since 2013, which includes educational slides and eBooks, and is reviewed and approved annually The OMACPS, derived from the 2021 OMA Adult Obesity Algorithm, is a series of OMACPSs designed to assist clinicians in the care of patients with obesity. Regular exercise is widely recognized for its beneficial effects on physical fitness, including increased aerobic capacity and muscle strength, which are crucial for a physically active life and overall health. Regular exercise plays a crucial role in managing adults with overweight obesity, as physical fitness generally slows down in this group compared to those without obesity.

Obesity is a multifaceted chronic condition that increases the likelihood of long-term health issues and

decreases lifespan. Healthcare providers in income-educated countries must understand the global impact of obesity, as 40% of women in 2016 were overweight and 15% had obesity. The Italian National Healthcare System prioritizes addressing the high prevalence and persistence of pediatric obesity as a primary health goal, Obesity in children and worsens in adulthood, making prevention and treatment of pediatric obesity key strategic goals to reduce morbidity, mortality, and healthcare costs. Obesity is a chronic disease affecting children's physical and mental health, particularly in low-income countries, requiring systemic treatment to prevent complications and manage existing ones.

Understanding childhood obesity programs necessitates developing methods to comprehend not only the effectiveness of the given intervention but also its effectiveness, its suitability, and its conditions. The Brazilian Association for the Study of Obesity and Metabolic Syndrome (ABESO) Nutrition Department, collaborating with dietitians from research and clinical fields, has prepared a Position Statement on weight loss strategies. Weight loss is crucial for reducing comorbidities and T2D, but other treatments, except for bariatric surgery, have not been as effective as they are limited to a small number of patients. Obesity sufferers often face stigmatization and psychological harm due to the assumption that they don't adopt a healthy lifestyle, even by healthcare professionals. Metabolomics is a scientific field that involves the analysis of intracellular and intercellular metabolites using both qualitative and quantitative methods. It uses two main approaches: non-targeted metabolite profiling which is a comprehensive analysis without further knowledge of the features, and targeted metabolite which focuses on quantitative measurement of variations in metabolites involved in metabolic pathways, such as amino acids and their derivatives, based on their biological roles. Body weight and its variants such as obesity depends on the balance or the imbalance between energy intake and expenditures. Despite evidence of weight bias in important areas of living, the authors noted many gaps in research regarding the nature and extent of weight stigma in various settings, the lack of science on emotional and physical health consequences of weight bias, and the paucity of interventions to reduce negative stigma.

However, some of these studies a rebased only on self-reports and may thus provide biased estimates of the prevalence of obesity in the general population. This review offers a unique perspective on obesity, focusing on the patient's subjective experience of being overweight, using health-related quality of life (HRQL) instruments to assess weight reduction interventions. The obesity epidemic is a global health concern, with public health believing it can be explained by changes in diet and physical activity, This article reviews scientific literature on factors contributing to obesity in children and adults, aiming to inform future scientific investigations and public health practices aimed at preventing obesity. This study aims to identify risk factors contributing to rapid increase in adolescent obesity in Ahmedabad, an economically, industrially, and culturally fast-growing city in India, to prevent and control this issue. Relevant research in this field is minimal. The young generation is increasingly consuming fast food with minimal physical activity, often leading to negative impacts on their nutritional status and health. Students' tendency to consume junk food is primarily driven by availability, low price, television advertising, diversity, attractiveness, and lack of parental awareness. This lifestyle, particularly among high school girls, is not appropriate and contributes to increasing obesity and overweight prevalence among adolescents.

Obesity affects various systems, including the heart, vascular, respiratory, musculoskeletal, and skin, leading to increased sweating, infections, and symptomatic heartburn and urinary incontinence. Leanetal's study on 14,000 Dutch men and women found significant health outcomes influenced by BMI, including worsening respiratory systems, low back pain, and poor quality of life. Obesity is a significant adverse effect, with body image dissatisfaction and binge eating disorder being more common among the obese. Factors such as genetics, cultural obsession with thinness, and discrimination contribute to the psychological burden of obesity. Four studies found significant improvements in quality of life after surgical weight loss, with weight loss ranging from 6kg to 30kg resulting in better outcomes. However, the literature is limited by surgical samples.

Obesity and type -2 diabetes mellitus.

Diabetes mellitus (DM) risk increases with obesity degree and duration, and with more central or visceral fat distribution, which increases the degree of sulin resistance associated with obesity. The hallmarks of metabolic syndrome include sulin resistance and increased visceral fat, which are risk factors for developing diabetes and cardiovascular disease.

Diabetes affects over 69 million people globally, with numbers expected to rise to 140 million by 2040, with nearly half undiagnosed Asian Indians have the highest incidence of e-diabetes and diabetes among major ethnic groups, with e conversion from pre-diabetes to diabetes occurring more pidily in this population.

Dense sugar content in junk foods can lead to dental cavities and type 2 diabetes mellitus. Short-term adverse effects include lack of energy due to lack of essential nutrients and feeling weakened. These foods are high on the glycaemic index, causing a quick rise in blood sugar but also falling quickly, leading to hunger. High sugar levels put metabolism under stress, causing the pancreas to secrete insulin to prevent dangerous spikes. Fast food and junk food lack adequate protein and carbohydrates, causing blood sugar levels to drop suddenly after eating, leading to a grumpy, fatigued feeling and a craving for sugar. Carbonated soft drinks contain methylglyoxal (MG), which is associated with human carbonyl stress. Fried and processed food contain high amounts of trans fats, saturated fats, and ox cholesterol, which may be lethal to heart health. India has over 69 million people with Type 2 Diabetes (T2DM), with numbers expected to rise to 140 million by 2040. Asian Indians have one of the highest incidence rates of e-diabetes and diabetes among major ethnic groups. The prevalence of diabetes has significantly increased in the past four decades, with the latest studies showing a tenfold increase. The Center for Cardiometabolic Risk Reduction in South Asia (RRS) study found that the overall prevalence of diabetes in three major cities was 22.8% in Chennai, 25.2% in Delhi, and 16.3% in Karachi. The prevalence of diabetes varies based on location and socio-economic strata. Over12% of US adults have diabetes, projected to rise to 21-33% by 205040. Risk increases with body weight, with morbidity increasing over 14 years in nurses. Behaviour therapy is a valuable addition to weight loss and maintenance treatment, focusing on self-control of eating habits. Programs aim to eliminate improper eating behaviors, including watching TV, eating too rapidly, and not being hungry. Self-help groups, such as weight watchers and Nutri-System, offer diet, education, and self-monitoring programs.

Diagnosis.

The diagnostic criteria for defining overweight, obesity, and severe obesity are as follows: *The definition of overweight and obesity is determined by the percentile of the weight-to-length ratio or body mass index, based on age.* The World Health Organization's 2006 reference curves are used to diagnose overweight and obesity in children up to 24 months. The Body Mass Index (BMI) is used after 2 years, with reference systems from the WHO2006 system up to 5 years and the WHO2007 system thereafter. The recommendation to use the WHO standard is based on its sensitivity in identifying overweight and obese children and adolescents during Italy's pediatric obesity epidemic. The authors conducted a comprehensive search of scientific literature on obesity, focusing on nutrition therapy, from January 1946 to August 2022. They consulted randomized controlled trials, systematic reviews, and meta-analyses from high-impact journals, reading the full article to gather information and conducting a critical analysis. This summary reviews current research on metabolomics's application in understanding the dynamics of metabolic processes involved in human obesity. The study uses the body mass index (BMI) to identify and evaluate overweight and obesity in population-based studies. It uses the World Health Organisation's four classes of increasing severity, based on the concept of graded risk: normal (BMI 18.5-24.9 kg/m2), pre-obese/overweight (25.0-29.9 kg/m2), and obese (BMI ≥ 30.0 kg/m2) The study conducted a systematic MEDLINE search in February 2008 using PubMed, focusing on human studies between January 1, 1990, and the start of the search. The search was limited to the date of publication, subjects' age, and search words included in the title or abstract. The APA guidelines did not address childhood obesity assessment, while the CAN recommendations did not offer guidance beyond growth monitoring, while all other guidelines provided some level of recommendation Specialty referrals are recommended for children with co-morbidities, psychological distress, disordered eating, or family problems, with benefits including improved adherence, fewer hospitalizations, and improved patient outcomes. Five obesity HRQL instruments were identified in literature, categorized by patient and health professional, and providing significant information on quality-of-life issues in obesity.

Role of daily life style.

The United States' recent dietary guidelines emphasize the significance of exercise and physical activity in managing body weight and reducing the risk of chronic diseases. Regardless of body weight and weight control goals, this level of activity should be recommended for

all individuals to improve health and reduce the risk of chronic diseases. The literature review conducted by Donnelly et al. explores resistance exercise as a potential intervention strategy for weight control. Resistance exercise does not seem to offer significant advantages over other forms of exercise in long-term studies, indicating a need for further research in this area. Wingetal49 compared a 16-week weight loss intervention for NIDDM, comparing behaviour modification and nutrition education groups. Results showed significant differences in weight loss at 12 months. A four-month behavioral program analyzed two diet types (calorie restriction vs. calorie and fat restriction) in participants with NIDDDM or a family history of NIDDDM. Before surgery, a surgeon or a surgeon collected patient characteristics, medical history, and weight, defining pulmonary, cardiovascular, and cardiac diseases. Obesity is a complex condition influenced by genetic, environmental, and psychosocial factors, affecting energy intake and expenditure. Although genetic differences are significant, the rise in obesity prevalence is largely due to behavioral and environmental changes resulting from technological advancements. Behaviour therapy is a valuable addition to weight loss and maintenance treatment, focusing on self-control of eating habits. Programs aim to eliminate improper eating behaviors, including watching TV, eating too rapidly, and not being hungry. Self-help groups, such as weight watchers and Nutri-System, offer diet, education, and self-monitoring programs. The guidelines recommend the use of behaviour change strategies, including psychological intervention, general counseling, and treatment delivery by trained professionals, including goal setting, self-monitoring, stimulus control, and problem-solving. Obesity impacts daily functioning and quality of life through general health perceptions in various HRQL domains. A study involving 312 participants found obesity significantly affects perceived health status. The obesity epidemic is affecting many populations, with a prevalence of over eight percent in any world population. Information on the frequency of body weight and pain is self-reported at eight and eight, while the frequency of abdominal weight is unknown.

Prevention of obesity.

The National Program for Control of Cancer, Diabetes, Cardiovascular Disease and Stroke (NPCDCS) was launched in India in 2010 and strengthened in 2013-2014. A program for adolescent health, Rasht Riya Kishor Swasthya Karyakram (RKSK), was launched in 2014 to improve nutrition, mental health, and prevent NCDs. The impact of these programs is yet to be researched. Nongovernmental organizations led initiatives like the "Medical Education for Children/Adolescents for Realistic Prevention of Obesity and Diabetes and for Healthy Aging" (MARG), which focused on nutrition and physical activity in school children. The project resulted in better lifestyle practices, decreased waisthip ratio, better insulin sensitivity, and lower high-sensitivity C-reactive protein levels. More innovation and research are needed in this area and expanded public health programs for school children. Three studies examining the prevention of obesity in the community met the criteria for inclusion. The Stanford Five-City Project aimed to evaluate the effectiveness of community-wide health education on risk factors for cardiovascular disease among adolescents. The study compared six years of a multi-media education program targeting 12-74-year-olds in two cities, with no intervention in two reference cities, and only a few initiatives targeted the obesity population. The study found that at 12 months post-treatment, the mean weight regain was 1.2kg, with variable weight changes. Couples treatment groups showed superior weight loss management. The study found significant weight loss across all treatment groups, with women achieving greater weight loss in both groups involving the husband, but no statistically significant differences were observed. The study analyzed patients' outcomes, including length of stay, blood loss, operating time, postoperative complications, and hospital morbidity, using a modified classification system for objective interpretation. Complications are graded based on severity, with Grade I being minor and self-limiting, Grade II requiring specific treatment, Grade III requiring invasive procedures, Grade IV involving residual disability, and Grade V indicating death.

Next-generation Antimicrobial Resistance (AOMs) must address safety concerns, assessing toxicity risks through specific mechanisms of action or independently safe adjuvant agents. AOM development strategies must reflect human diversity, as initial studies are influenced by commercial considerations, under-representing specific patient populations. Clinical studies are typically focused on large, common-severity middle-aged patients. Patients with extreme obesity, multiple comorbidities, and younger individuals need special attention for safety and efficacy. Certain AOMs may hold promise in special circumstances when carefully managed by specialists.

Many agents designed to decrease food intake failed in clinical trials due to insufficient cardiovascular safety. Common reasons include species-related differences and the lack of preclinical models that reliably predict human cardiovascular safety. Animal models are less capable of predicting drug-induced PPH and valvulopathy in humans. Cardiovascular outcome trials like the SELECT trial are needed to evaluate cardiovascular safety and potential cardiovascular risk reduction in patients with obesity without major cardiovascular risk factors[1]. Obesity often leads to a lack of the same preventive measures as those without obesity, which can be particularly concerning for certain cancer types. The APRIOR Obesity Medicine Association Clinical Practice Statement provides guidance on addressing potential obesity bias in healthcare settings, including people-first language, waiting room furniture, medical equipment, and devices. Advocating for effective obesity care requires improving healthcare providers' education and allocating resources for effective behavioral, pharmacologic, and surgical treatments. Access to obesity care in Canada faces barriers like lack of interdisciplinary management programs, long wait times, and high treatment costs. Canadians facing obesity struggle with long wait times for bariatric surgery and weight-loss products, often promoting unrealistic and unsustainable goals, contributing to rising levels of severe obesity in the country. Family and social structure significantly influence obesity, with family-centered care promoting better health outcomes in pediatrics and weight optimization interventions being more effective when couples engage in programs together. Obesity prevalence in Europe is estimated to be 1520% of the population, with men and women at 1020% and 15-25% respectively. The rate has increased to 22% in children, 26% in men, and 31% in women. Obesity and related diseases, such as type 2 diabetes, are also increasing in the Asia-Pacific region. Current BMI values may underestimate the risk in Asians due to their higher likelihood of abdominal obesity. A waist-to-height ratio could be a more accurate assessment method, as used by Hsieh and colleagues to determine metabolic risk in Japanese men and women. Obesity is multifactorial, requiring prevention interventions to modify environmental and social factors, involving health professionals in healthy food education and physical activity promotion. Primary prevention actions, starting from prenatal care, involve family counseling services and spread at individual, family, and community levels to address socio-economic and ethnic minority inequalities.

Obesity is a chronic medical condition that continues to increase globally, causing significant health issues. Effective control of obesity requires strategies to prevent overweight individuals, progression to obesity, weight regain, and further worsening of established conditions. Prevention involves primary, secondary, and tertiary levels, with primary prevention aiming to decrease new cases, secondary prevention to lower established cases, and tertiary prevention to stabilize or reduce disability associated with the disorder. For multifactorial conditions like coronary heart disease, primary prevention involves national programs to control blood cholesterol levels, secondary prevention reduces CHD risk in those with elevated cholesterol levels, and tertiary action prevents re-infarction in those with previous heart attacks. However, this classification system results in confusion and ambiguity. The US Institute of Medicine has proposed an alternative classification system, dividing prevention efforts into universal, selective, and indicated levels. This system aims to address the increasing prevalence of obesity and improve overall health outcomes.

Types of prevention.

- *Prevention is based on behaviour.*

Lifestyle-based interventions can significantly impact functional behaviors and BMI, with best results in school settings and children 6-12 years old, but further studies are needed for adolescents. Food intake is influenced by intrinsic and extrinsic factors, which interact in a complex manner. Metabolic demands influence the desire to eat, and the human body regulates food intake to maintain energy balance. Appetite control involves neural circuits like the hypothalamus, mesolimbic system, and frontal lobe, which can become dysregulated, leading to excessive food intake and weight gain. Eating habits are influenced by various factors, including physical, economic, social, and cultural environments. In Brazil, socioeconomic factors strongly influence choices, with increased income affecting food choices. Food availability and placement also play a role, with ultraprocessed and high energy density foods increasing calorie intake and risk of chronic diseases. Food architecture also influences choices. Exposure to different diet compositions and eating habits in the first years of life occurs in the home environment, where family provides reference standards. Environmental

conditions and social experiences continuously impact eating behavior, with decisions being influenced by both individual and group factors.

- *The family involvement is strongly recommended, as per the guidelines provided in the LOEIII-A.*

Preventive interventions involving the whole family are recommended for their effectiveness and longevity, compared to child-centered interventions, particularly targeting specific behaviors like eating fruits and vegetables.

- *Diet.*

Early rapid weight gain increases the risk of obesity in childhood. Prevention in infants focuses on quality, quantity, and timing of food intake. Four studies by et. examined the effects of dietary interventions on obesity and risk factors, focusing on metabolites associated with inflammation and oxidative stress.The study examined the impact of a very low-carbohydrate diet (VLCD) on obese individuals, revealing increased levels of FAs, AAs, and carboxylic acids in their serum. After 8 weeks, they exhibited metabolic shifts and specific alterations. Sugary drinks are prevalent in urban areas, and their consumption can decrease the size of subsequent meals. Artificial sweeteners were initially thought to prevent this problem, but cheating the regulatory system is harmful. Artificial sweet taste can cause endocrine responses to be inappropriate, leading to early glycemic imbalances. This can result in more lipogenic alternate meals, which is a consequence of the regulatory system's punishment for these attempts. Adolescence is a period of rapid physical growth, hormonal changes, and emotional changes, making it a vulnerable period. It involves increased demand for calories and nutrients, lifestyle changes, and a drive for individuation. Adolescence can be divided into three stages: early, middle, and late. Poor nutrition during these stages can negatively impact cognitive development, learning abilities, and school performance. Junk food, unhealthy fats, and soft drinks can also contribute to health issues.

Adolescence is characterized by heavy demands of calories and proteins, with increased appetite and a tendency to consume more carbohydrate foods. Nutritionists, doctors, and health advocates often educate people about junk food and encourage balanced diets with a high proportion of healthy food. A study of American teenagers found a link between the length of time young people spent on television and the quality of their eating in later life. Teenagers who watched more than five hours of television a day ate more junk food in adult life than those who watched less. The study published in the International Journal of Behavioral Nutrition and Physical Activity shows that young adults who watched more than five hours of television as teenagers had a 10% higher calorie intake than those who had spent less than two hours a day in front of the box. Poor diets can slow growth, decay new teeth, promote obesity, and sow seeds of infirmity and debilitating disease, ultimately leading to incurable disease. An empty calorie food is a high-calorie, calorie-rich food that lacks essential nutrients like vitamins, minerals, amino acids, and fiber. Junk food, an informal term, refers to foods with little or no nutritional value but unhealthy ingredients. Adolescence is a transitional period between childhood and adulthood, characterized by dramatic changes in physical, emotional, and cognitive functions. Adolescents need the highest nutritional requirements across their life span, and practicing healthy eating habits is crucial to meet their nutritional needs. Human obesity is not attributed to a defect in metabolic mechanisms controlling energy expenditure. Longitudinal studies of Pima Indians show that the risk of 10kg weight gain is sevenfold higher in those in the lowest tertile of relative resting metabolic rate (RMR) compared to those in the highest tertile. However, this only predicts 40% of the weight gain. No association has been observed between RMR and 10-year weight gain in a Dutch population, and results from other studies question the validity of this association. Cross-cultural studies show a sevenfold increased risk of overweight in those with a physical activity level ratio of <1.8. In developed countries, low levels of physical activity are linked to obesity, with low levels of exercise leading to weight loss and increased leisure time. Skenderetale's study evaluated the benefits of diet and exercise as weight loss interventions, finding significant differences between groups but regaining some weight at the one-year follow-up. The study reveals that most adolescent girls are vegetarian (66.25%), and over half consume four or more meals per day. Skipping meals is common (66.25%), with breakfast, lunch, and dinner being the most common. Factors contributing to meal skipping include lack of time (54.71%), companionship (22.5%), and meal not being tasty (13.20%). Most subjects consume in between meals, which is a cause of unwanted obesity.

Mustards also consume junk foods (60.37%) as a replacement for meal skipping. About 47% consume junk

food twice a week, while 30 and 21.25% consume it thrice and once a week. The study also shows that junk food and snacks are preferred by a majority of adolescent girls. Potato chips are the most preferred junk food item, followed by kachori, a deep-fried Indian snack. Chocolate is the most liked sweet item among adolescent girls.

Climate consumption is highest among overweight and obese adolescents, with 91.25% consuming carbonated drinks. Tea consumption is highest at 81%, coffee consumption at 53.75%, and tea consumption at 32%. Overall, the study highlights the importance of a balanced diet for adolescents.

- *Duration of sleeping*

The document emphasizes the importance of promoting adequate sleep duration and quality in infants, children, and adolescents. Short sleep duration increases risk of obesity, with studies showing doubled risk in children with lower sleep duration. Recommendations include optimal sleep duration and turning off screens 30 minutes before bedtime. Obstructive sleep apnea, daytime sleepiness, and cardiovascular disease affect 1-4% of working men and women globally, with higher rates in minority populations and children with tonsilar hypertrophy. Obesity is a significant association with OSA, with weight gain and loss affecting its severity. A 10% weight gain increases the likelihood of developing sleep-disordered breathing, while a 10% weight loss decreases the apnea hypopnea index. About 10-15% of obese patients may develop obesity-hypoventilation syndrome (OHS), which is not yet fully understood. Other potential explanations include genetic variations in ventilatory responses, metabolic effects of obesity on respiratory control, and comorbid cardiovascular or metabolic events. Current management strategies for OSA and OHS include weight loss, anorexiant drugs, and surgically induced weight loss. Sleep plays a crucial role in energy homeostasis, modulating a major component of the neuroendocrine control of appetite Various behavioral models, such as operant conditioning, Pavlovian conditioning, psychoanalysis, cognitive behavioral therapy, and the transtheoretical approach, have been used to modify eating habits and achieve weight loss. The most successful models include self-monitoring and stimulus control. The operant conditioning model involves recording behavior related to activity and food intake, with rewards for small, sustainable changes. Pavlovian or classical conditioning emphasizes changing association patterns between stimuli. A statistical analysis of weight-reducing organizations suggests reducing caloric intake, aided by financial incentives and supportive group pressures, as the basis for weight loss success. However, between 1999-2000 and 2001-2002, no significant changes were observed in the prevalence of overweight, obesity, or extreme obesity among adults or children aged 6-19 years. A multidisciplinary weight management program based on the Transtheoretical Model was applied in a 6-month clinic-based program, resulting in significant decreases in weight, percentage body fat, BMI, total cholesterol, LDLC, total caloric intake, and energy intake from dietary fat. Cognitive-behavioral treatment can help overweight adolescents cope with the social stigma of being overweight, enhance self-esteem, and reduce dissatisfaction with body image.

Treatment of obesity:- Medication.

Weight loss medications are suitable for those overweight or obese, as they reduce energy intake, increase energy output, or decrease nutrient absorption. Diet, exercise, and lifestyle changes are the foundation for weight loss, and drugs cannot replace them. There are three types of medications: suppressing appetite, altering nutrient absorption, and increasing energy expenditure. Two FDA-approved medications for long-term obesity management are sibutramine and orlistat. Individualized care plans for adults with obesity should address root causes, support behavioral change, and include adjunctive therapies like psychological, pharmacologic, and surgical interventions. Adopting a healthy, balanced eating pattern and regular physical activity can help individuals lose weight and improve cardiometabolic parameters. However, long-term caloric intake is necessary for weight loss and maintenance.

A personalized, personalized eating pattern that meets individual values and preferences, while meeting nutritional needs and treatment goals, is crucial for managing health and weigh. Nutrition recommendations for adults should be personalized to meet individual values, preferences, and treatment goals. Medical nutrition therapy should be provided by a registered dietitian to improve weight outcomes, waist circumference, glycemic control, established lipid, and blood pressure targets. For those with obesity and impaired glucose tolerance (prediabetes) or type 2 diabetes, intensive behavioral interventions targeting a 5%-75% weight loss can improve glycemic control, blood pressure, and blood lipid targets. These interventions

can reduce the incidence of type 2 diabetes, microvascular complications, and cardiovascular and all-cause mortality. For those with obesity and type 2 diabetes, intensive lifestyle interventions targeting a 7%-15% weight loss can increase remission of type 2 diabetes and reduce the incidence of nephropathy, obstructive sleep apnea, and depression. A nondieting approach can improve quality of life, psychological outcomes, cardiovascular outcomes, body weight, physical activity, cogntive restraint, and eating behaviors. The goal of LOEI-A is to gradually reduce BMI through lifestyle changes, focusing on maintaining a healthy weight-to-height ratio, reducing excess weight, and promoting good mental health The BMI standard deviations score is the best indicator of weight loss, but other indicators like waist circumference and waist/height ratio can also be considered. Four guidelines recommend tailored treatment to family preferences, cultural values, and needs, with SIGN recommending participation only for ready families. CAN advises clear communication about program effectiveness.

Four guidelines emphasize MDT of health professionals, five specify multicomponent interventions, and group treatment format with family involvement for long-term success, while individual sessions have mixed results. The guidelines recommend frequent contact between child/adolescent and family, multiple sessions, and reviews over weeks to years, with intensive weight management programs being most effective in young people. WHO, NICE, and SPAIN guidelines recommend nutrition counseling for parents, recommending balanced diets, avoiding restrictive diets, and promoting healthy comfort behaviors to reduce emotional regulation. Sixteen guidelines reviewed recommended bariatric surgery in adolescents with obesity, requiring specialized medical treatment, patient care infrastructure, and adherence to healthy diet and activity habits. Seven guidelines address risks associated with obesity treatment, including stigmatization, family conflict, psychological issues, exercise, nutrient deficiency, and long-term tolerability, with limited evidence on long-term benefits or harms.

- *Innovative treatment approach.*

Knowledge about glucose homeostasis, hunger, satiety, energy expenditure, and eating behavior has led to innovative treatment approaches for polygenic obesity and obesity syndromes. The principle of unimolecular polypharmacology was developed to address the limited efficacy of single-hormone targeting approaches in treating polygenic obesity, as studies in rodent models show combination therapies can achieve superior metabolic improvements. The development of a dual agonist, GLP1 and glucagon, was initially unintuitive due to their anti-diabetic effects. However, glucagon has additional functions, such as inhibiting lipid synthesis and stimulating lipolysis. A rationally designed dual GLP1 and glucagon receptor agonist normalized glucose tolerance and improved obesity in mice. Tirzepatide, a dual glucose-dependent insulinotropic polypeptide and GLP1 receptor agonist, has received FDA approval for treating adults with Type 2 Diabetes and obesity. Monogenic obesity has not been studied using in vivo editing, but in mice with leptin-deficient genes, adenoviral CRISPR system injection restored leptin production and food intake inhibition. Further preclinical studies are needed for clinical application.

Weight stigma is prevalent among overweight and obese patients, with 53% reporting inappropriate comments from doctors about their weight. Doctors are the second most common source of stigma, with 69% of women experiencing it once and 52% on multiple occasions. Other health professionals, such as nurses, dietitians, and mental health professionals, also experience stigma. Studies show that over 70% of patients feel doctors do not understand the difficulty of being overweight. Stigma barriers to cancer screenings may reduce excess body weight and cancer mortality, but studies outside the US show no association between BMI and preventive services use. Dietary guidelines in the US emphasize exercise and physical activity for managing weight and reducing chronic disease risk, with moderate intensity activity recommended for all individuals.

Resistance exercise has been studied as a potential weight control strategy, but few studies have examined its long-term impact on weight loss, suggesting a need for further research. Childhood obesity is most effective when reducing sedentary behavior in children, with parental involvement uncertain. Future research should explore these trends and larger sample sizes. The review discusses the effectiveness of group and individual therapy in weight loss, but lacks evidence for long-term effectiveness. Future research should explore cue avoidance, daily weight tracking, behavioral therapy, and extended intervention periods.

- *Possible mechanism.*

Obesity is influenced by various hormones, genetic components, and secreted factors. Some affect long-term energy intake control, like leptin and neuropeptide Y, while others impact short-term energy intake, like ghrelin, insulin, and cholecystokinin. This summary explores the role of these factors in obesity development.

- *INSULIN.*

  Insulin is an anabolic hormone that directs energy storage and utilization in adipocytes. Insulin resistance leads to increased insulin secretion from pancreatic beta cells. Abdominal obesity is linked to insulin resistance and type 2 diabetes. Central obesity causes greater impairments. Other hormones, such as leptin and adiponectin, may increase insulin sensitivity, while TNF-α and resistin facilitate insulin resistance. Further research is needed to understand the role of insulin, insulin sensitivity, and insulin control in obesity etiology. Insulin, secreted by pancreatic β cells, is correlated with body weight and adipose mass, contributing to obesity. High levels result in reduced food intake and hyperglycemia.

- *LEPTIN.*

  Leptin, a cytokine produced by adipocytes, controls food intake by activating hypothalamic receptors. It informs the brain about fat store levels and activates the Janus kinase/signal transducers and activators of transcription pathway upon binding to its receptor. Leptin induces the synthesis of αmelanocyte stimulating hormone (αMSH) from prohormone proopiomelanocortin, which binds to the hypothalamic arcuate nucleus. Leptin, a hormone secreted by white adipose tissue, promotes satiety and energy expenditure by stimulating proopiomelanocortin and inhibiting neuropeptideY/Agouti-related peptide neurons. Native amylin has been used in treating obesity, but its clinical application has been limited by physical aggregates related to pancreatic islet death. Primitives, a rat-based synthetic analogue of amylin, has been developed for use in patients with Type 1 and 2 Diabetes. Other amylin analogues with improved pharmacokinetics are being considered as AOMs, with Amylin agonists being particularly useful for weight loss in combination with other agents. Dual-acting amylin and calcitonin receptor agonists (DACRAs) have been developed as potential AOMs.

- *GHRELIN.*

  Ghrelin, a growth hormone secretagogue, is highly concentrated in the stomach and increases with fasting, stimulating feeding. However, it has been reported to decrease in human obesity. The effect of ghrelin on weight is likely due to central antagonism of leptin and other anorectic cytokines, possibly through increased expression of hypothalamic neuropeptide Y. Ghrelin also regulates growth hormone secretion, but further research is needed to clarify their relationship. Ghrelin, a hormone that reaches highest plasma levels during fasting and immediately before meals, is synthesized by cells in the gastrointestinal tract and activates the sympathetic nerves. Ghrelin stimulates appetite, growth hormone release, and may be associated with obesity and short stature. Its role in obesity is unclear, but administration in cancer patients may increase energy intake. Ghrelin, a peptide hormone secreted from gastric fundus cells, stimulates food intake and promotes adiposity by inhibiting insulin secretion. Strategies to treat obesity include suppressing circulating hormones and antagonizing signaling at the growth hormone secretagogue receptor (GHSR). Studies in rodents show decreased body weight and food intake in neutralization of acyl-ghrelin, while Prader-Willi syndrome patients show increased acyl-ghrelin levels. However, ghrelin is a potential target for obesity treatment due to its elevated concentrations in lean individuals and anorexia.

- *NEUROPEPTIDE Y.*

  Neuropeptide Y, a potent stimulator of food intake, is closely related to impaired leptin function and its effects on energy intake. Leptin, when functioning properly, modulates neuropeptide Y's expression, controlling excess food consumption. Neuropeptide Y and leptin interact with other regulatory peptides, possibly in an unexplained manner. A recent study found that obese hypertensive and diabetic patients

have the highest plasma neuropeptide Y levels. NPY/AgRP neurons, found in the arcuatenucleus, regulate energy homeostasis and are key controllers of appetite and fat tissue expansion. Negative energy balance can lead to food intake and energy expenditure. Peptide tyrosine (PYY) is a member of the NPY family, co-secreted from intestinal L cells as PYY136. It is cleaved by DPPIV to its active form, PYY336, a high-affinity agonist at the NPY receptor type 2 (Y2R). This receptor is highly expressed in parasympathetic and sympathetic neurons, as well as in the CNS. PYY336 decreases food intake and body weight in rodents and humans, partly through its ability to silence Npy neurons and indirectly activate Pomp neurons. It also affects memory, learning, central information processing, and behavioral response to dopamine-stimulating drugs.

- *CORTISOL.*

  studied 50-nine healthy pre-menopausal women, examining cortisol levels and subsequent eating habits, highlighting its powerful metabolic effects.

- *AMYLIN.*

  Amylin, expressed in the lateral hypothalamus, reduces energy intake, increases energy expenditure, and influences satiety, leading to anorexic effects and prompted mylin-based pharmacotherapy. A therapeutic peptide vaccine and CYT009GhrQb vaccine have been developed to decrease acyl ghrelin, a circulating signal that increases hunger and activates hypothalamic AGRP neurons. However, these approaches have not shown long-term benefits on body weight or food intake. Despite these efforts, no clinically validated AOM candidate has been found. Further investigation is needed to understand the potential of ghrelin in appetite.

Role of genetic in obesity.

Genetic predisposition to obesity is a significant factor in weight gain. Studies have shown that increased caloric intake can lead to weight gain in identical twins, with similar patterns within pairs. A study in the New England Journal of Medicine found that BMI class was closely related to biological parents in adopted adults. Polygenic susceptibility to weight gain is also evident in the Pima Indians of Arizona, who have a high prevalence rate of obesity. However, there is variability in their overall response to high calorie intake. The central nervous system controls calorie intake and energy expenditure, which are influenced by genetic predisposition and environmental factors. The environment has been a significant contributor to the rise in obesity prevalence in recent years. Studies have shown that Pima Indians living in Arizona have a higher rate of obesity, while those in Mexico have lower BMI. Changes in the amount and quality of food in the diet and the level of energy expenditure in terms of physical activity have contributed to the obesity epidemic. The redundancy and easy accessibility to high-calorie diets, such as soft drinks, alcoholic beverages, and fast food, are crucial factors. In Britain, fat intake has increased by over 50% over the past 50 years, while energy expenditure in physical activity has decreased due to less manual jobs and the widespread use of cars. The point of purchase effect also plays a role in the obesity epidemic, as people are more likely to make impulsive decisions about food.

II. RESULT

The study involved 237 participants, with 55.2% females and 44.8% males. The majority were aged 17-19, with a mean age of 18.8+0.96 years. The majority were Hindu, from a nuclear family, and had no family history of obesity. The majority were in the upper middle socioeconomic status. The majority were in the normal range, with 117 (49.4%) in the normal range, 34.6% overweight/obese I&II, and 16.0% underweight. The study reviewed studies on obesity prevalence in Europe, focusing on specific regions and age ranges. The IASO's International Obesity Taskforce (IOTF) database does not list references and does not provide information on sample sizes or sampling methods. Most studies were restricted to specific regions or age ranges, resulting in potential overestimation or underestimation of obesity prevalence in these countries. France was the only country with data only available based on self- .In the central, eastern, and southern regions of Europe, prevalence rates are higher than in the western or northern regions. This geographic pattern can be

explained by different socioeconomic conditions, lifestyle, and nutritional factors. The prevalence of obesity in Spain and Italy is high, and recent discussions about urbanization and globalization of lifestyle factors have had a negative impact on the traditional Mediterranean diet.

Alternative factors contributing to growing BMI include dietary patterns and lifestyle changes. A large European prospective cohort found that dietary intake accounted for less than 1% of variance in BMI in Spanish subjects, while all dietary and nondietary variables accounted for 21% and 6.7% of variance in BMI among women and men, respectively . The study analyzed the demographic characteristics of high school girls in Quom city in 2017, with a response rate of 99.7%. The age range was 15-18 years, and the prevalence of underweight and overweight was 23.2% and 11.4%, respectively. However, 65.4% of the girls had normal BMI. The most common chronic diseases were asthma, hypothyroidism, and heart problems. The study population had varying educational levels, marital status, major fields, mother's job, education level, and income level per month. The results showed a high consumption prevalence of junk foods, with a mean of 15.77 years, a BMI of 20.85 kg/m2, and moderate to severe physical activity of 25.13 minutes.

This review analyzed obesity and overweight prevalence in urban and rural areas, revealing mixed gender and age groups, and data from various demographic and socioeconomic settings The study found that 82% of children in India are urban poor, with 18% from affluent segments. Overweight prevalence is high, with most children from urban centers. The National Health Survey (NFHS-4) revealed that socioeconomically disadvantaged states (Harkhand, Bihar, Madhya Pradesh, and Haryana) have a higher rate of poverty compared to other socioeconomically disadvantaged states (Punjab Chandigarh), goa, Delhi, Andhra Pradesh, Telangana, Uttar Pradesh, and other states. Urban and rural populations in major states (Chandīgarh, Aharashtra, Tamilnadu , and utarakhand) showed higher poverty rates in Chandīgarh and West Harkhand. The CD actor's surveillance showed that poverty in other states is higher. The 2004 Global Database on Body Mass Index revealed a worldwide prevalence of overweight and obesity, with prevalence ranging from less than 15% in Eritrea to over 50% in the USA, Seychelles, New Zealand, and Australia. Developed countries had higher prevalence of overweight and obesity, with Japan having the highest prevalence at 23.2% and Indonesia having the highest at 13.4%. The growing obesity problem requires individual countries to develop strategies, with population-based approaches being suggested. Singapore's "Fit and Trim" programmer has led to a drop in obesity prevalence from 16.6% in 1992 to 14.6% in 2000 among children aged 11 to 12 and from 15.5% in 1992 to 13.1% in 2000 among students aged 15 to 16 years old. However, there is a lack of proven population-based interventions. Comparing prevalence in obesity requires caution due to differences in survey sampling methods, sample sizes, age range, data quality, and national programs.

The study analyzed 51 unique studies from 18,177 records, excluding 16,311 due to inclusion criteria or lack of BMI measurement The study found that children in the intervention group had a smaller BMI increase and lower weight compared to the comparison group, with uncertainty limits exceeding the 50% threshold. The study reveals that 40% of the population is male and 59% female, with 30% of the population aged 10-15 years. The majority consume junk food, with 39% consuming fast food, 27% snacking, 21% candies, and 12% soft drinks. 89% of the population is aware of the chemicals in junk food, and 44% eat once a week. 70% believe they are active enough even after consuming junk food, and 41% agree that it reduces physical activity. The majority agree that physical inactivity leads to obesity, and 71% agree to control junk food consumption. The study found that high adherence to the MedD and lower WC were associated with lower risk for general and abdominal obesity. The study found that healthier behaviors, adherence to the MedD, and moderate alcohol consumption were inversely associated with obesity and abdominal obesity, with alcohol intake being a significant factor..

III. DISCUSSION

This study investigates the prevalence of overweight and obesity in India, revealing that it did not significantly increase or decrease over the past few decades. This study evaluates the prevalence of overweight in the Indian subcontinent, finding large variation between rural and urban settings, with higher prevalence among affluent urban children. Targeting parents and children together for weight loss showed significant benefits compared to children alone at five-year follow-up. Further research is needed to determine the most

effective interventions. Mycological studies show weight regain begins by 69 months, regardless of treatment. Further research should explore long-term patterns of weight loss, maintenance, and regaining. This systematic review and meta-analysis found that various training modalities, including aerobic, resistance, combined aerobic and resistance, and high-intensity interval training, improve cardiorespiratory fitness and muscle strength.

The review systematically analyzed international clinical practice guidelines for obesity treatment in children and adolescents, assessing quality, recommendations, and the importance of education and training for healthcare professionals. Digital delivery of childhood obesity interventions lacks high-quality evidence for treatment effect or cost-effectiveness. Improved differentiation, engagement, and addressing co-morbidities are needed for future guidelines. This meta-analysis uses a taxonomy approach to identify components of early childhood obesity interventions, including moderators, and found that engaging caregivers, providing education, and addressing habits improved outcomes. This paper examines the cumulative effect of environmental factors on obesity, highlighting the common cause of poverty. Preventive therapists should consider this, but it requires socio-economic and political solutions. By identifying obesogenic factors coexisting with poverty, resources can be focused on addressing these issues. The effectiveness of this approach varies by country, but urban planning can be implemented to avoid obesity and promote anti-obesity conditions. Understanding these mechanisms can improve community socioeconomic intervention strategies. The WHO-MONICA study found varying prevalence patterns in Europe, with a range of 7% in Swedish men to 45% in Lithuanian women. In the US, prevalence were comparable to those in Europe, with 29% in white men and 50% in black women. Similar trends have been reported in the Chinese population, with the prevalence of obesity decreasing over the past decade. Based on these worldwide trends, it is safe to assume that obesity in Europe is approaching epidemic proportions. However, some populations, like the Japanese, do not follow this trend.

A study found that 65% of participants are physically active, with 20% not. They believe that inactivity is due to junk food consumption, which can lead to physical illness. Similar studies have found that 45% agree that junk food reduces physical activity and increases the risk of obesity. 60% of participants agreed to control junk food consumption, while 20% disagreed. Health concerns were strongly expressed as a factor causing obesity. The study found no significant relationship between junk foods and body mass index (BMI), which is consistent with previous studies. However, with increasing fast food consumption, BMI also increases. The study also found that a high percentage of girls reported good self-reported health (SRH) and self-reported physical and mental health (SRF), which are associated with cardiovascular diseases, visual impairment, and psychological disorders. The study also found that girls who consumed homemade sandwiches had higher BMI, but obesity/overweight was not related to other junk foods. The study suggests that adolescents' consumption of high-sugar, salt, and calorie diets can lead to early cardiovascular diseases.

The study found that low physical activity levels among medical students can be attributed to their long sitting lifestyles. However, 83.0% of the subjects were involved in physical activity for 4-7 days per week, with walking and jogging being the most common types of exercise. Overweight/obesity was almost similar in those involved in physical activity, but high BMI was associated with less activity. Family history of obesity was significantly associated with overweight/obesity, suggesting the importance of involving family, school/college, and local community in long-term behavioral modification strategies. Increased frequency of junk food eating was also associated with obesity, while fruits and vegetables play a crucial role in improving general health. However, the study is cross-sectional and needs to be confirmed by larger sample metacentric studies. A study of elderly Mediterranean population found that a healthy lifestyle, including moderate alcohol consumption, daily physical activity, and non-smoking, is inversely associated with lower general and abdominal obesity prevalence. Around 39% of the adult population in Spain is overweight, with 23% having obesity. The ERICA study found that the prevalence of obesity is similar to 37.6% in the European Health Interview Survey in Spain (EHISE). The prevalence of obesity is higher in the National Health Survey (NRICA) than the HISE, with a higher prevalence in the NRICA survey. The prevalence of obesity is higher in the USA, Europe, and the UK.

IV. CONCLUSION

Obesity is a significant public health concern, necessitating the implementation of effective strategies to combat its significant disability and premature deaths. This review identifies potential effective interventions for obesity management, including family therapy, sedentary behavior reduction, community-based education, behavioral, pharmaceutical, surgical, and long-term follow-up strategies Obesity in the United States has increased three-fold from 1990 to 2000, affecting various health issues such as type 2 diabetes, hypertension, coronary heart disease, gallbladder disease, osteoarthritis, and certain cancers. The economic costs of obesity are estimated to be 5-7% of total healthcare costs, requiring preventative techniques and treatment. Historically, obesity was thought to be due to an imbalance between energy intake and expenditure. However, recent research suggests genetic, physiological, and behavioral factors also play a significant role. Further research is needed on genetic and hormonal aspects, long-term weight maintenance studies, and the effects of obesity in sports. Global obesity rates have significantly increased in recent decades, posing a growing health and financial burden, with obesity linked to increased mortality, complications, and potential economic downturn.

Pharmacological management of obesity has faced numerous failures due to the limited translational value of animal models and patient heterogeneity. Long-term, large-scale clinical trials are expensive and difficult to justify. Recent results with semifluid and tirzepatide, which reported weight loss over 10%, inspire confidence for the future. Setmelanotide and leptin have proven successful in obesity management of individuals with congenital deficiency in genes of the leptinergic-melanocortinergic pathway. Further research targeting other monogenetic forms of the disease and additive pharmacology in broader populations is needed. Obesity is a prevalent chronic disease affecting many adults globally, yet only a small fraction have access to treatment. An updated guideline aims to improve access and care by recognizing long-term treatment needs. Reducing weight bias, understanding obesity's root causes, and promoting patient-centered behavioral interventions are crucial. More effort is needed to close knowledge gaps through obesity research, education, prevention, and treatment.

Obesity prevalence is influenced by various factors, including genetics, environmental factors, socioeconomic practices, and psychological factors. Public health interventions have not significantly reduced obesity prevalence. Future research should focus on interprofessional care, understanding the root causes of obesity, and finding effective health optimization interventions. Longitudinal research is also needed to better understand the drivers of risk and morbidity over a life course.

V. ACKNOWLEDGEMENT

The author expresses gratitude to all contributors in the obesity field for their continuous efforts in identifying causes, consequences, and potential solutions to this complex condition. Thanks to st. Soldier institute of pharmacy department.

REFERENCES

[1] D. Müller TD, Blucher M, Tschöp MH, Demarches RD. Anti-obesity drug discovery: advances and challenges. Nat Rev Drug Discov.. 2022 Mar;21(3):201-223. Doi: 10.1038/s41573-021-00337-8. Epub 2021 Nov 23. PMID: 34815532; PMCID: PMC8609996. https://pubmed.ncbi.nlm.nih.gov/34815532/ .

[2] Cancer and Obesity: An Obesity Medical Association (OMA) Clinical Practice Statement (CPS)2022 Ethan Lazarusa, Harold Edward Baysb,* aDiplomate American Board of Obesity Medicine,Diplomate American Board of Family Medicine, President Obesity Medical Association (2021–2022); Delegate American Medical Association, Clinical Nutrition Center 5995 Greenwood Plaza Blvd, Stem 150, Greenwood Village, CO80111 diplomat of American Board of Obesity Medicine, Medical Director/President Louisville Metabolic and Atherosclerosis Research Center, Clinical Associate Professor/University of Louisville Medical School, 32 https://www.sciencedirect.com/science/article/pii/S2667368122000171

[3] Effect of different types of regular exercise on physical fitness In adults with over weight or obesity: Systematic review and Meta-analyses MareenA. vanBaak, Department of Human Biology, NUTRM School for Nutrition and Translational Research in Metabolism, Maastricht University Medical Centre+, Universiteitssingel50, 6229ER, Maastricht, The Netherlands. Email: mvanbaak@maastrichtObesityReviews.2021;22(S4)e13239.wileyoninelibrary.com/journal/obr1of11https://doi.org/10.1111/obr.13239 available from https://pubmed.ncbi.nlm.nih.gov/27213481/

[4] Obesity in adults:- A clinical guide line Cite as: CMAJ 2020 August 4;192:E875–91. Doi: 10.1503/cmaj.191707.The article is available in French at

www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.191707/-/DC1. CMAJ,Podcasts:authorinterview at

[5] Management of obesity across women's life course: FIGO Best Practice Advice Fiona M. McAuliffe, UCD Perinatal Research Centre School of Medicine, University Colleges Durbin, National Maternity Hospital Dublin, email: fionnuala.mcauliffe@ucdieFunding information Open access funding provided by Iren. https://pubmed.ncbi.nlm.nih.gov/36635081/

[6] Baxter, G. (2023). Towards Carbon Neutral Airport Operations Through the Use of Renewable Energy Sources: The Case of Chhatrapati Shivaji Maharaj and Indira Gandhi International Airports, India. In International Journal of Environment, Agriculture and Biotechnology (Vol. 8, Issue 2, pp. 084–100). https://doi.org/10.22161/ijeab.82.9

[7] Diagnosis, treatment and prevention of Pediatric obesity: consensus position Statement of the Italian Society for Pediatric Endocrine ology and Diabetology And the Italian Society of Pediatrics *Correspondence: giuiana.valero@uniparthenope.it† Int J Gynecol Obstet. 2023;160(Suppl. 1):35–49. Valerio G, Maffeis C, Saggese G, Ambruzzi MA, Balsamo A, Bellone S, Bergamini M, Bernasconi S, Bona G, Calcaterra V, Canali T, Caroli M, Chiarelli F, Corciulo N, Crinò A, Di Bonito P, Di Pietrantonio V, Di Pietro M, Di Sessa A, Diamanti A, Doria M, Fintini D, Franceschi R, Franzese A, Giussani M, Grugni G, Iafusco D, Iughetti L, Lamborghini A, Licenziati MR, Limauro R, Maltoni G, Manco M, Raggiani LM, Marcovecchio L, Marsciani A, Del Giudice EM, Morandi A, Morino G, Moro B, Nobili V, Perrone L, Picca M, Pietrobelli A, Privitera F, Purromuto S, Ragusa L, Ricotti R, Santamaria F, Sartori C, Stilli S, Street ME, Tanas R, Trifiró G, Umano GR, Vania A, Verduci E, Zito E. Diagnosis, treatment and prevention of pediatric obesity: consensus position statement of the Italian Society for Pediatric Endocrinology and Diabetology and the Italian Society of Pediatrics. Ital J Pediatr. 2018 Jul 31;44(1):88. Doi: 10.1186/s13052-018-0525-6. PMID: 30064525; PMCID: PMC606978 https://pubmed.ncbi.nlm.nih.gov/30064525/

[8] Guidelinestreatingchildand,Adolescentobesity:Asystematic,Review,LouiseTully1,NiamhArthurs1,2,CathyWyse1,SarahBrowne3,LucindaCase2,LoisMcCrea2,JeanM.O'Connell4ClodaghS.O'Gorman5,6,SusanM.Smith7,AislingWalsh8FionaWard9andGraceO'Malley1,2*TYPESystematicRevew PUBLSHED12October2022DOI10.3389/fnut2022902865. https://pubmed.ncbi.nlm.nih.gov/36313105/

[9] Childhood Obesity Evidence Base Project: A Comprehensive Examination and Meta-Analysis of a Novel Taxonomy of Intervention Elements to Enhance Weight Status in Children Ages 2 to 5 Years, 2005–2019. CHLDHOOD OBESITY https//10.3389/fnut.2022.902865. September2020Voume16,Supplement2ªMaryAnnLiebert ,Inc DOI:101089/chi20200139 https://pubmed.ncbi.nlm.nih.gov/32936038/

[10] Position statement on nutrition therapy For overweight and obesity: nutrition Department of the Brazilian association For the study of obesity and metabolic Syndrome (ABESO—2022)Pepe et al Diabetology & Metabolic Syndrome (2023) 15:124 https://do.org/10.1186/s13098023010376 https://pubmed.ncbi.nlm.nih.gov/37296485/

[11] Obesity–An Update on the Basic Pathophysiology and Review of Recent Therapeutic Advances Biomolecules 202Biomolecule202, 11,142. https://doi.org/10.3390/biom11101426. https://pubmed.ncbi.nlm.nih.gov/34680059/

[12] Are we close to defining a metabolomic signature of human obesity? A systematic review of metabolomics studies Received: 18 December 2018 / Accepted: 1 June 2019 / Published online: 13 June 2019© The Author(s) 2019. https://doi.org/10.1007/s1130601915533y https://pubmed.ncbi.nlm.nih.gov/31197497/

[13] Dahonan-Cuyacot, J. B., C. Hussin, M., & A. Cordova, N. (2023). Physical Activity and Self-Efficacy on Exercise among Elderly Retired Philippine Army: Basis for Policy-making on Physical Activity Program. In International Journal of Rural Development, Environment and Health Research (Vol. 7, Issue 4, pp. 01–19). AI Publications. https://doi.org/10.22161/ijreh.7.4.1

[14] The promise of new anti-obesity Therapies arising from knowledge Of genetic obesity traits ✉email: ankehinney@Unidue.de https://pubmed.ncbi.nlm.nih.gov/35902734/

[15] Full Title : ENVIRONMENT AND OBESITY Stylianos Nicolaidis Affiliation : Neurobiology des Regulation's du College de France affiliate au CNRS (Retired) Corresponding author : Professor Stylianos Nicolaidis, 84 Blvd du marital Joffre, 92340 Bourg la Refine, France. Snicolaidis33@gmail.com© 2019. This manuscript version is made available under the Elsevier user license https://www.elsevier.com/open-access/userlicense/1.0/ https://www.sciencedirect.com/science/article/pii/S0026049519301398 https://pubmed.ncbi.nlm.nih.gov/31610854/

[16] The Stigma of Obesity: A Review and Update Rebecca M. Puhl1 and Chelsea A. Heuer1 Obesity (2009) 17, 941964 do101038/oby.2008.636 Rudd Center for Food Poky & Obesity, Yale University, New Haven, Connecticut, USA. Correspondence: Rebecca M. Pull (rebecca.puhl@yaleedu)Received 28 August 2008 accepted 21 November 2008 published none 22 January 2009. Do101038/oby2008636OBESITY | VOLUME 17 NUMBER 5 MAY 2009.Obesity (2009) 17, 941964 do101038/oby.2008.636. https://pubmed.ncbi.nlm.nih.gov/19165161/

[17] Obesity prevalence from a European perspective: a systematic Review Anne Burgher*-@charitedepischon@difede;thomasreinhold@charitede;CarolineMApoviancaroline.apovian@bmc.org;AryaMS

harmasharma@ccc.mcmaster.ca. http://www.biomedcentral.com/1471-24 .

[18] Obesity and Quality of Life Robert F. Kushner ,MD and Gary D. Foster, PhD From the Department of Medicine, Northwestern University,Chicago,Illinois; And the Department of Psychiatry, University of Pennsylvania,USA. https://pubmed.ncbi.nlm.nih.gov/11054600/

[19] What is really causing the obesity epidemic? Are view of reviews in children And adults Sharon E.Rossa ,Jennifer I . Flynnba and Ruses R.Pateb ADepartmentofHeathandPhysicalActivity,TheUniversity ofPittsburgh,Pittsburgh,PA,USA;b Department of Exercise Science,The University Of South Carolina, Columbia ,SC,USA To link to this article: http://dx.doi.org/10.1080/02640414.2015.1093650 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3228640/

[20] Obesity among adolescents of Ahmedabad city, Gujarat, India- a community based Cross-sectional study A*breath R Brabant, Umesh N Ooze A*Assistant Professor, Department of Community Medicine, A.J.Institute of Medical Sciences, Mangalore, Karnataka, India, B Associate Professor, AMC MET Medical College, Ahmedabad, Gujarat, India. https://www.biomedscidirect.com/journalfiles/IJBMRF2012498.pdf

[21] Knowledge And Awareness On The Association Between Physical Inactivity, Junk Food Consumption And Obesity Among Adolescent Population – A Survey Based Analysis Kartika Ganesh Mohan raj, Assistant Professor, Department of Anatomy, Sabetha Dental College, Sabetha Institute of Medical and Technical Sciences (SIMATS), Sabetha University, Chennai – 600 077, Tamil Nadu, Chennai Email ID karthikm.sdc@saveetha.com.: http://dx.doi.org/10.19070/23778075-21000385.

[22] Prevalence of junk food consumption, overweight/obesity and self-rated Health and fitness in high school adolescent girls: a cross sectional study in a Deprived area of Qom Prevalence of junk food consumption, overweight/ … Sri Lanka Journal of Child Health, 2019; 48(3): 208-214 Ablaze Mohammadbeigi1Moshiri4Salman Khazaei6. https://sljch.sljol.info/articles/10.4038/sljch.v48i3.8754

[23] Junk Food Eating Habits and Obesity among Medical College Students in Bangalore: A Cross-Sectional Study Veena V1, Sathish Chandra M R1, Shruthi M N1, Shaima I Khan2. https://njcmindia.com/index.php/file/article/view/645 .

[24] Increasing Proclivity for Junk Food among Overweight Adolescent Girls in District Kurukshetra, India Goel S.1 Kaur T.1 and Gupta M.21Department of Home Science, Kurukshetra University, Kurukshetra, Haryana, INDIA 2Department of Home Science, Indira Gandhi National College, Ladwa, Haryana, INDIA Available online at: https://www.isca.in/IJBS/Archive/v2/i3/14.ISCA-IRJBS-2013-026.pdf .

[25] Effects of Junk Food & Beverages on Adolescent's Health –a Review Article. https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://scholom/&ved=2ahUKEwje0YDzpKFAxUH9zgGHQSKA1YQFnoECAUQAQ&usg=AOvVaw0EsBbxLkLeagBX_vue5ltw. www.iosrjournals.org

[26] Is obesity be coming a public health problem in India? Examine the shift from under-to over nutrition Problems overtime https://www.ncbi.nlm.nih.gov .

[27] Prevalence of overweight and obesity among children and adolescents of the Indian subcontinent: ametaanalysis Mohammad EHoque, Suhail AR Doi, Munim Mannan, Kurt Long, Louis WNiessen, and Abdullh A Mamun. by guest on September 11, 2016 http://nutritionreview.soxfordjournals.org/ Downloaded from

[28] Obesity , diabetes, and cardiovascular disease in India :- public health challenges. https://www.researchgate.net/publication/306104677._Obesity_Diabetes_and_Cardiovascular_Diseases_in_India_Public_Health_Challenges

[29] Prevalence of obesity in India: A systematic review ,Rajeev Ahirwar,Prakash Ranjan Mondal*. Https://doi.org/10.1016/j.dsx.2018.08.032 .

[30] Health consequences of obesity.

[31] JJReilly,EMethven,ZCMcDowell,BHacking,DAlexander,L Stewart,CJHKelnarhttps://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://pubmed.ncbi.nlm.nih.gov/12937090/&ved=2ahUKEwiswKPr1ZKFAxVKyDgGHdxACA8QFnoECCAQAQ&usg=AOvVaw2LYaaFkN4O2b1A8w1AzolU.

[32] Review on Epidemic of Obesity.

[33] Serena Low,1 MSc, Mien Chew Chin,1 PhD MSc, Mabel DeurenbergYap,1 https://pubmed.ncbi.nlm.nih.gov/19221672/

[34] Obesity and Women's Health: An Evidence-Based Review.

[35] TeresaKulie,MD,AndrewSlattengren,DO,JackieRedmerMD,MPH,HelenCounts,MD,AnneEglash,MD,andSarinaSchragerMD,MS. On 21 March 2024 by guest. Protected by copyright.http://www.jabfm.org/J Am Board Fam Med: first published as 10.3122/jabfm.2011.01.100076 on 5 January 2011. Downloaded from http://www.jabfm.org/J.

[36] Obesity as a medical problem Peter G. Kopelman St Bartholomew's & The Royal London School of Medicine, Queen Mary & Westfield College, London E1 2AD, UK (email: P.G.Kopelman@mds.qmw.ac.uk) . https://pubmed.ncbi.nlm.nih.gov/10766250/ .

[37] Obesity–a risk factor for postoperative Complication sin general surgery? ElkeE.K.M.Tjeertes1*,SanneS.EHoeks1,SabneS.B.J.C.Beks2,TabitaT.M.Vaentjn1,AntonA.G.M.Hoofwijk

andRobertJanR.JStolker1. (http//Creatvecommons.org/publcdomain/zero/1.0/)

[38] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4520073/#:~:text=Background,index%20and%20survival%20is%20described.

[39] Association between a healthy lifestyle and general obesity and abdominal obesity in RosaLamuela, Raventósb, p, Anelderlypopulationathighcardiovascularrisk☆MònicaBullóa, b, , MarGarcia-Aloya, b, , MiguelA.Martínez-Gonzálezc, , DoloresCorellab, d, , JoanD.Fernández-Ballarta, e, , MiquelFiolb, f, , EnriqueGómez-Graciag, , RamónEstruchb, h, , ManuelOrtega-Calvob, I, , SilviaFranciscoj, , GemmaFlores-Mateob, k, , LluisSerra-Majeml, , XavierPintóm, , María-IsabelCovasb, n, , EmilioRosb, o, , , JordiSalas-Salvadóa, b, ∗. Doi:101016/j.ypmed.201106.008

[40] Prevalence of general and abdominal obesity in the adult population of Spain, 2008–2010:theENRICAstudyor948.2JLGutérrezFisac, PGualarCastillón, LMLeónMuñozAGracian, JRBanegasand FRodríguezArtalejo. https://pubmed.ncbi.nlm.nih.gov/20071471/ .

[41] Treatment and Prevention of Obesity: What is the Role of Exercise?

[42] JohnM. Jakicic, PhD, and Amy D.Otto, PhD, RD, LDN . 17534887, 2006, s1 Downloaded from https://onlinelibrarywileycom/doi/101111/j1753488720061tb00235x, Wiley Online Library on [21/03/2024] See the Terms and Conditions (https//onlinelibrarywileycom/termsandconditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License.

[43] The treatment and prevention of obesity: A systematic review of the literature A-MGlenny, SO'Meara, AMelville, TASheldonandCWilson NHS Centre for Reviews and Dissemination, UniversityofYork, Heslington, York, YO15DD. https://www.academia.edu/1930129/Review_The_treatment_and_prevention_of_obesity_a_systematic_review_of_the_literature

[44] Obesity: Prevalence, Theories, Medical Consequences, Management, and Research Directions Colin Wilborn, Jacqueline Beckham, Bill Campbell, Travis Harvey, Melyn Galbreath, Paul La Bounty, Erika Nassar, Jennifer Wismann , and Richard Kreider. Exercise and Sport Nutrition Laboratory, Baylor University, Waco, TX. Address correspondence toColinWilborn@baylor.edu Received August 8, 2005/Accepted September 28, 2005. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2129146/

[45] Complications of obesity. D. Kinlen, , , D. Cody, and D. O'Shea, , From the , Obesity Immunology Group, Education and Research Centre, St Vincent's University Hospital, University College Dublin, Dublin , Ireland, National Children's Research Centre, Crumlin, Dublin , Ireland, , Department of Diabetes and Endocrinology, Our Lady's Children's Hospital, Crumlin, Dublin , Ireland and Department of Endocrinology, St Columcille's Hospital, Loughlinstown, Co. Dublin, Ireland. Address correspondence to Dr. D. Kinlen, Obesity Immunology Group, Education and Research Centre St Vincent's University Hospital, University College, Dublin, Dublin , Ireland email: davidkinlen@gmail.com. from https://academic.oup.com/qjmed/article/111/7/437/4016386 by guest on 08 March 202432.

[46] The causes of obesity: an in-depth review.Tahir Omer Northampton General Hospital, University of Chester, UK Correspondence: Tahir Omer, Northampton Genera Hospital, University of Chester, UK, Received: June 21, 2020 |Published: Juy 03, 2020 https://www.researchgate.net/publication/342812303_The_causes_of_obesity_an_in-depth_review.

[47] Obesity: An overview on its current perspectives and treatment Options Srinivas Nammi*1, 3, SaisudhaKoka1, KrishnaMChinnala2 and KrishnaMBoini1, 3. http://www.nutritonj.com/content/3/1/3