The Nutritional Behavior and Physical Activity of Individuals Associated with the Metabolic Syndrome from Reviews

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ABSTRACT

Nutritional behavior and physical activity are associated with the health status of the individuals. the review demonstrates the studies that have been done with the evidence related to the link between nutritional behavior and physical activity with the risk of metabolic syndrome among individuals which causes serious non-communicable diseases mostly Diabetes Mellitus and cardiovascular diseases. the management and control of the burden of metabolic syndrome and increase of the incidence have been discussed. the epidemiological studies have been determined the epidemic of obesity as the main reason for metabolic syndrome that is connected with nutritional behavior and physical activity. the review aims to understand the reasons and risk factors of metabolic syndrome worldwide along with the controlling of risk factors of non-communicable diseases also raising the awareness of the individuals to perform physical activities and maintaining a healthy weight by altering nutritional behavior and lifestyle.

KEY WORDS: NUTRITIONAL BEHAVIOR, PHYSICAL ACTIVITY, METABOLIC SYNDROME, NON-COMMUNICABLE DISEASES.

INTRODUCTION

Nutrition and nutritional behavior are associated with the food choice and lifestyle of individuals that have an important role in developing or preventing a metabolic disorder, many studies have been discussed and focused on the relationship between nutritional behavior and the development of the metabolic disorder. Many intervention programs have been set to work on reduction of the metabolic syndrome by changing the nutritional behavior of individuals (Nouriyengejeh et al., 2020).

Physical activity is a part of the lifestyle of the individuals which has an important role in improving health, concerning many studies, the physical activities recommended for a healthy life and a method of therapy for reduction of the

metabolic syndrome as well as increased risk of type 2 diabetes and cardiovascular diseases, a regular physical activity protect individuals from developing diseases and sedentary lifestyle especially among teens and adults (Platat et al., 2006).

Metabolic syndrome is one of the most communal types of metabolic disorder the increase in the prevalence of obesity is the outcome of this disorder and the disorder has been defined in several ways, in the upcoming future, a new description may be relevant globally. The pathophysiology of the metabolic syndrome is mostly caused by insulin resistance and the implication of the excessive instability of fatty acids, the state of pro-inflammatory may also be a cause of this syndrome. Individuals with this syndrome are at increased risk for type 2 diabetes, stroke, and cardiovascular diseases, and therapeutic consideration is recommended to be applied to decrease the risk of the syndrome (Eckel et al., 2005).

The objective of this review study is to summarize the studies and main important critical points to demonstrate the association of nutritional behavior and physical activity of the individuals and on metabolic syndrome and the

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management of both factors to prevent and lower the disorder of metabolic syndrome.

An Overview about Nutritional Behavior and Metabolic Syndrome: The main objectives of nutrition science and clinical nutrition are to design and modify the nutritional behavior of individuals by providing nutritional recommendations to treat as well as prevent metabolic disorders among populations. Precision nutrition can detect more applicable and dynamic recommendations depending on the many interrelated parameters of the external and internal environment of individuals during life (Toro et al., 2017). Nutrition behavior is related to dietary intake, which is associated with the quality and quantity of food consumption of individuals. An unhealthy diet has been linked to metabolic syndrome which is a metabolic disorder that begins mostly with overweight and obese individuals that increases the risk of type 2 diabetes, stroke, and cardiovascular diseases (Spronk et al., 2014).

Nutrition education programs have been applied in many studies, some studies have been shown that nutrition programs have an effective result in changing the nutritional behavior of individuals by educating individuals on how to choose healthy foods and awareness of the risk of an unhealthy diet on health that has been resulted in the reduction of metabolic syndrome (Peralta et al., 2016). The studies have suggested that nutrition behavior and health behavior, as well as lifestyle modification, is the first suitable step of intervention of metabolic syndrome, researchers observed that the diagnosed with the metabolic syndrome of healthy behavior individuals have been at the lower risk compared with the bad healthy behavior individuals (Oh et al., 2009). The sedentary lifestyle of individuals also affects the nutritional status of individuals that leads to more calorie intake and inactive behavior which causes many health issues due to the increase in the number of overweight and obese individuals which is a factor of developing metabolic syndrome that is the main cause of increasing the risk of type 2 diabetes and cardiovascular diseases worldwide (Hadi and Karim, 2021).

Epidemiology of Metabolic Syndrome: Epidemiological studies have been observed a high number of Metabolic syndrome of prevalence of Childhood in the USA, South American countries, and the middle east. A high percentage diagnosis of obese and overweight individuals has been detected worldwide, the metabolic syndrome is observed to develop more in children and adults due to the association with puberty changes of hormonal and body weight (Reisinger et al., 2021). The cohort studies have been revealed the prevalence of metabolic syndrome with different definitions that mention the increase of prevalence of metabolic syndrome associated with age and variation of gender as well as ethnicity (Kahn et al., 2005).

The diagnosis of metabolic syndrome can be given to about 30% of people by using most of the different definitions and 35-40% of people can be diagnosed with metabolic syndrome if it is classified with only one definition. The validity of the term of metabolic syndrome is debatable but the risk factors among individuals should be treated to prevent diseases of

cardiovascular and type 2 diabetes mellitus (Day, 2007). The epidemiological study that has been done in the USA about the prevalence of metabolic syndrome among young adults in the US in the year 2011-2012 compared to the study done in the year of 2015-2016 has been observed an increased range of the metabolic syndrome in the USA (Hirode and, 2020). The application of prevention strategies and efforts should be considered such as modification of lifestyle and using medication for proposed of at high-risk subgroups may contribute in decreasing the risk of developing and treating cardiovascular diseases and type 2 diabetes mellitus (Parameshwar et al., 2021).

Nutritional Behavior and Obesity: A systemic review and a meta-analysis study have been addressed the association of overweight - obesity with children and adolescents aged 5 to 19 years and related 14 behavioral and nutritional risk factors have been analyzed. The meta-analysis is based on the behavioral factors related to weight gain in children such as physical inactivity, Sedentary lifestyle, skipping breakfast, insufficient vegetable, and fruit consumption, unhealthy fast food, and consumption of soft drinks (Poorolajal et al., 2020). The burden of obesity is increasing worldwide, due to the two major factors that start with developing technology, first-factor sedentary jobs on computers worldwide and the second factor is the availability of unhealthy foods and ease of delivery with low cost in most of the countries. Obesity has been recognized as the direct outcome of technological advances that are related to the challenges of technological society (Grundy, 2004).

The studies have been observed that fast food consumption was linked to having children with high body mass index BMI and body fat that result from low vegetable consumption and physical inactivity. The closeness of fast-food restaurants to the home or workplace has been associated with the frequency of eating but not associated the BMI or eating fast food (Jeffery et al., 2006). One of the reasons for increasing the rate of obesity has been observed within the increase of portion size of the foods over the past 30 years and long working hours and not eating from home. These types of particular foods are those that contain a high amount of energy density (KJ/g), many studies based on laboratory studies have observed that high energy-dense foods with large portions leading to high-calorie intake, the strategic plan studies, and research can explore plans to be used to control and moderate the influence the food consumption as well as portion size (Ledikwe et al., 2005).

Nutritional Behavior and Diabetes: Nutritional behavior including lifestyle and dietary habits are the factor of developing diabetes diseases in recent years, the studies have been supposed the increase of individuals with diabetes by the year 2030 to 439 million, consumption of the processed foods such as processed meat and cheeses as well as high dense foods are the factor of developing diabetes (Rahati et al., 2014). The functional foods have been observed as the specific health effect that can be consumed as the natural medicine to prevent the development of diabetes also are involved in the therapy process, functional foods have specific actions that some have been validated and some

are under study. Functional foods such as garlic, onion, cinnamon etc. further studies in the future will validate the effect of functional food in the prevention of chronic diseases (Ballali and Lanciati, 2012).

Food insecurity can also negatively affect public health and the development of diabetes, food security has to be managed and controlled, the access to healthy foods and safe foods should be available to manage health and providing a healthy environment for the individuals. Food security and policy should be considered globally to improve public health (Gucciardi et al., 2014). Further studies have been done about nutritional management of nutritional behavior to prevent the development of diabetes. the combination of nutrition therapy within physical activity and optimal glycemic index with the control of metabolic and public support can provide healthy life and maintenance of the quality of life (Tamura et al., 2020). The studies also have been determined the effect of nutritional education on patients with diabetes and the improvement of nutritional behavior has been observed, practices and educational programs have been performed that could change the behavior and knowledge of patients and increase awareness of individuals (Amini et al., 2020).

Nutritional Behavior and Cardiovascular Diseases: The prevention of diseases is based on nutritional behavior factors such as lifestyle, healthy diet as well as physical activity. The theory models such as the health belief model have been used in such studies which is a theoretical framework to educate and raise awareness of healthy nutrition behavior. Unhealthy behavior among adults in universities is a factor of increasing the risk factors of cardiovascular diseases (Rahmati et al., 2015). Health promotion programs have been determined the impact of nutritional behavior regarding high body mass index BMI as a consideration of the high risk of cardiovascular diseases, nutritional behavior, and physical activity have a vital role in the determination of cardiovascular diseases. The new strategies of health promotion should be established to improve individuals' cardiovascular health status to underweight and obese individuals within variety in BMI level (Huang et al., 2014). The studies observed the impact of nutrition education programs on the self-control of individuals' dietary behavior, as well as decrease the metabolic syndrome and risk factors for individuals with cardiovascular diseases. The nutrition education program has been recommended for patients with cardiovascular disease to improve self-control and management of dietary patterns and cardiovascular disease for individuals with cardiovascular diseases (Ju and So, 2008).

The link between Physical Activity and Metabolic Syndrome: The studies concerning the relationship between physical activity and metabolic syndrome have observed the epidemic of overweight and obesity among adults as the main cause of metabolic syndrome that lead adults to become more inactive. The physically active lifestyle has been linked with lower metabolic syndrome among adults. The socio-economic status of individuals should be taken into account during intervention plans to manage and prevent metabolic syndrome among adults

(Nguyen et al., 2010). The self-reported physical activities have been associated with the management of metabolic syndrome, concerning the studies the limited data of optimal level of the required period of physical activity to prevent metabolic syndrome have been stated. Moderate physical activity has been recommended to decrease the risk of developing metabolic syndrome as well as pre metabolic syndrome among individuals (kim et al., 2011).

In addition, performing physical activity decreases the probability of emerging metabolic syndrome. The link between levels of physical activity and lower risk of metabolic syndrome is uncertain within old obese individuals but lower risk of metabolic syndrome with physical activity among individuals with the optimum level of physical activity. The dosage of physical activity for the old obese individuals has been suggested to reduce the risk of metabolic syndrome (Xu et al., 2019). Moreover, the studies recommend 30 mins of daily vigorous walking as the major formula of physical activity at the level of community. Brisker physical activity and resistance exercise should also be inspected for additional improvements as well as getting health benefits. In the case of substituting low-intensity physical activity with sedentary activities such as using technologies also has been expected to reduce the risk factors and additional intensive intervention has the advantage of decreasing the metabolic risk factors (Lakka and Laaksonen, 2017).

The researchers observed and suggested the important role of fitness and physical activity in modifying metabolic syndrome. The metabolic syndrome is affected by many types of interventions including physical activity, obesity, and insulin resistance which has been increased in recent years. The physical activity intervention that improves fitness is not expected to regularize insulin resistance, obesity, and lipid disorders while the combined influence of both has been determined to have health outcomes associated with the metabolic syndrome (Myers et al., 2019). Physical activity has been determined as the major therapeutic tool for treating metabolic syndrome that leads to the limitation of drug intake within the patients, the physical activity can be considered as a drug after acceptance by physicians to convince their patients and to motivate the families to the same (Brambilla et al., 2011).

The burden of Metabolic Syndrome: The review studies have been done to examine the variation in the prevalence of metabolic syndrome within the different sociodemographic characteristics such as age, sex, social status, body mass index, and ethnicity to assist in considering the pathogenesis of the metabolic syndrome, as well as the risk factor of this syndrome on cardiovascular diseases (Kolovou et al., 2007). The epidemiological studies have been shown the burden of this syndrome and almost 25% of adult individuals with raised prevalence in elderliness. The existence of any elements of metabolic syndrome will raise the risk of improving metabolic syndrome and non-communicable diseases and lead to an increase in the burden of risks of cardiovascular diseases and diabetes mellitus (Nolan et al., 2017). The risk factors of Metabolic Syndrome: The risk factors of metabolic syndrome among adults can be

controlled and the prevalence of this syndrome can be reduced by preventing or managing the risk factors such as obesity-associated disorders in the united states and other countries, prediabetes, and cardiometabolic disorders (Johnson et al., 2009).

The studies of specific risk factors and incidence of metabolic syndrome have been observed the high incidence rate of this syndrome among adults that is an indicator of incidences and future increases in diabetes as well as cardiovascular diseases, the risk factors should be controlled to reduce the serious health conditions worldwide (Ryu et al., 2007).

Controlling the risk factors of Metabolic Syndrome:

The control of the risk factors of metabolic syndrome has been studied, the modification of lifestyle have a positive result on controlling the risk factors of metabolic syndrome, the nutritional education and implementation programs for lifestyle modification have been applied for 12 weeks, results in the decrease of risk factors of the syndrome and insulin in obese and overweight adults (Monzavi et al., 2006). Additionally, a healthy lifestyle including physical activity and nutritional behavior have a good impact on preventing and delaying the existence of the metabolic syndrome and controlling the risk factors and dedication of a healthy lifestyle among individuals by preventing non-communicable diseases (Perez et al., 2017). Furthermore, childhood obesity has been determined as the critical point of increasing the prevalence of metabolic syndrome, controlling childhood obesity will help future individuals to be protected from this syndrome and epidemics of diabetes and cardiovascular diseases. Management of each risk factor of metabolic syndrome has been determined to prevent the incidence of non-communicable diseases (Pacífico et al., 2011).

CONCLUSION

To sum up, the role of nutritional behavior and physical activity among individuals linked to the increase of incidence of metabolic studies have been discussed, the epidemiological studies have been demonstrated about the metabolic syndrome and risk factor components of metabolic syndrome associated with the nutritional behavior and physical inactivity that increases the risk of incidences of the non-communicable diseases. The impact of nutrition education programs and lifestyle modification awareness among individuals have been determined with the effect of physical activity and the recommended frequency concerning studies have been deliberated to reduce the risk factors of metabolic syndrome and improvement of the health status of individuals. The studies associated with the management and controlling approaches of risk factors of metabolic syndrome have been debated, most reviews have been shown a positive connection between unhealthy lifestyle with an increase of metabolic syndrome, modification of nutritional behavior and lifestyle have been recommended to reduce the incidence of metabolic syndrome among individuals globally.

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