Research Article

Metabolic Syndrome and Its Association with the Quality of life in adults Globally - A Systematic Review

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Abstract

Background: Metabolic syndrome comprises complex health conditions. It is a risk factor of increased cardiovascular problems and it is becoming prevalent globally. To ensure proper management and treatment of metabolic syndrome, it is very important to understand its effect on various aspects of patients' lives. The aim of this systematic review is to find out the effects of MS on the quality of life (QoL) of affected individuals, involving physical, mental, and psychosocial aspects of life.

Methods: This systematic review was conducted by following PRISMA guidelines and PubMed and Google Scholar were searched for articles published between 2005 and 2023. Inclusion criteria included observational and clinical studies in English, involving the studies on adults with a large sample size, focusing on the association between MS and QoL.

Results: Initially 1009 articles were screened, out of the screened articles 15 met the inclusion criteria. The majority of these studies were observational. The findings indicated that MS was associated with lower overall health-related QoL scores, impaired physical health, and poor mental health. High blood pressure and abdominal obesity, core components of MS, were linked to reduced QoL. Moreover, gender-specific patterns indicated a more significant impact on females. Age was found to affect the relationship between MS and QoL, with some age groups showing different effects. Psychosocial factors, including stress and a sedentary lifestyle, were found to influence QoL in MS patients.

Conclusion: This systematic review highlights the deleterious impact of MS on individuals' QoL, including physical, mental, and social dimensions. It emphasizes the need for effective management to deal with the diverse effects of MS on affected individuals and highlights the importance of psychological well-being in the management of MS. Further longitudinal studies are required to establish causal relationships and better understand the precise impact of various factors on QoL in MS patients.

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Introduction

Metabolic syndrome (MS) refers to a complex set of co-existing health conditions including insulin resistance, atherogenic dyslipidemia, visceral adiposity and hypertension, and is associated with high occurrence of cardiovascular morbidities1. Multiple efforts have been made to define MS, with some variations. The NCEP ATP III definition is commonly used worldwide, which states that three out of these five criteria must be met for metabolic syndrome; waist circumference over 35 inches (women) or 40 inches (men), blood pressure more than 135/85 mmHg, fasting HDL less than 50 mg/dl (women) or 40 mg/dl (men), fasting blood glucose levels over 100 mg/dl and fasting triglyceride levels over 150 mg/dl[2].

Studies have shown that the prevalence of metabolic syndrome has been increasing in adults all over the world for the last few decades.[3] It is a significant worldwide issue which, even after several lifestyle and dietary modifications, has been seen to deteriorate the quality of life of people suffering from it;[4,5] however this has not been widely investigated, and the studies present are very diverse.

Previously, none of the studies jumped into the intricate association of metabolic syndrome with different aspects of health-related to quality of life. This systematic review

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is an effort to bring them together in one place. In this review, we explored the effect of MS in different aspects of life of the patients; i.e. mental[6], physical[7] and social[8]. Not only will this facilitate further research on the topic, but it will also help physicians determine better pharmacological therapies and lifestyle modifications for the patients.

Materials And Methods

Study Design:

A Systematic review was conducted. Systematic reviews are articles that integrate information from various research articles about a particular subject to synthesize data and assert the significance of results and are a great means to stay updated with recent developments as well as use them as guidelines in medical practice. The review was conducted by the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) guidelines.

Search Strategy:

Two databases (PubMed and Google Scholar) were used for conducting this review. The keywords like "Metabolic Syndrome", "risk factors" "quality of life" and relevant entry terms are involved in searching the database. The strategy used for Pubmed was (("Metabolic Syndrome"[Mesh]) AND "Risk Factors"[Mesh]) AND "Quality of Life"[Mesh] The arcticles between the time frame of 2005 and 2023 were searched for this review. For the search stream on Google Scholar, the results on the first 20 pages were selected for screening. All authors independently searched the databases.

Study Selection:-

Inclusion Criteria:

In this review, we selected articles on the basis of pre-specified inclusion criteria. All types of observational (cross-sectional, cohort and longitudinal studies) and clinical studies (RCTS) focusing on the association of metabolic syndrome with quality of life were included. Studies published in the English language and relevant studies on human beings were added to the included category. Studies should be on adults and studies should have a large sample size.

Exclusion Criteria:

Studies which did not meet the inclusion criteria were excluded. Reviews, meta-analysis editorials, preclinical, studies on animals and studies with small sample sizes were excluded.

Screening Process:

The result of the first search of databases was 335 articles. After the removal of duplicates, four researchers did the screening process. Two researchers screened titles and abstracts, and exclusion was made according to the criteria mentioned above. Out of four researchers, one reviewed the full text of the remaining articles and the discrepancies were solved by the fourth researcher. After the full-text screening, 15 articles were seen to meet the inclusion criteria and were used for data extraction.

Data Extraction

The following factors were extracted from the included studies authors, year, title, study design, participants, age, objectives, measurement scales, outcomes and limitations.

Results

A total of 299 articles were screened after the removal of duplicates and only 14 articles were included in the final review. The major outcomes that were targeted in our review are Overall HRQoL, poor physical and mental health along age and gender-specific patterns in metabolic syndrome patients.

Study Characteristics

A total of 15 studies were included and mostly are observational studies. Further studies were categorized according to the reporting outcomes in the result section. 2 out of 15 reported the outcome of overall health-related quality of life, 5 reported the effect of metabolic syndrome on physical health, 4 talked about the association of metabolic syndrome with poor mental health however there were only a few studies that reported the outcomes of age and gender-specific association of metabolic syndrome with quality of life. The summary of data extracted from the included studies is given in Table 1.

MetS and Overall HRQoL

The majority of the studies drew comparisons between patients with and without MetS and supported the consistent finding that MetS is associated with lower overall HRQoL scores and these findings were supported by both objective measurements and self-reported assessments. A significant association was found between MetS and impaired HRQoL, as measured by the 15D score and specific affected domains of health included mobility, hearing, breathing, usual activities, discomfort and symptoms, vitality, and sexual activity.[11] This trend was further corroborated by another study that also emphasized the importance of screening for MetS and implementing management programs to enhance HRQoL among at-risk individuals.[21]

MetS Components and Poor Physical Health:

High blood pressure and abdominal obesity are significant components of MetS associated with lower HRQoL9. Particularly, the subscales of role-physical, vitality, and mental health were consistently identified as being adversely affected among individuals with MetS and studies underscored the

importance of addressing these components to improve the well-being of individuals with MetS21. The prevalence of low physical activity is high in MetS patients.[15,20] Patients with metabolic syndrome are at high risk of developing uric acid stones.[16]

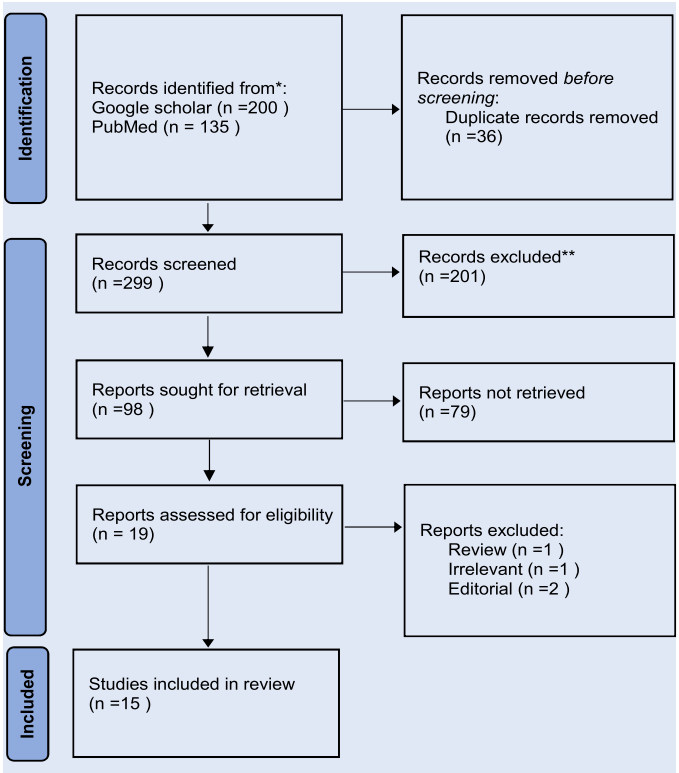
MetS Components and Poor Mental Health

Moreover one of the included studies also reported the significant association between MetS and psychological factors such as depression, anxiety, distress, and lower QoL, supporting the idea that MetS influences not only physical but also mental aspects of HRQoL.[23,17] Moreover, the increased inflammatory conditions in Metabolic syndrome are associated with impaired quality of life and poor mental health.[13] However, it was also reported that poor mental health problems may be associated with the factor of hypertension in metabolic syndrome and directly because of metabolic syndrome.[14]

Gender-Specific Patterns:

Interestingly, gender-specific differences in the impact of MetS on HRQoL were targeted in some studies. MetS was found to be associated with better HRQoL in men, this trend was not observed in women.[10] Additionally, it was suggested that factors like personality scores and quality of life were protective against MetS prevalence, indicating a potential interplay between psychological well-being and MetS risk, particularly among adolescents.[12]

Figure 1: *Prisma Flowchart*



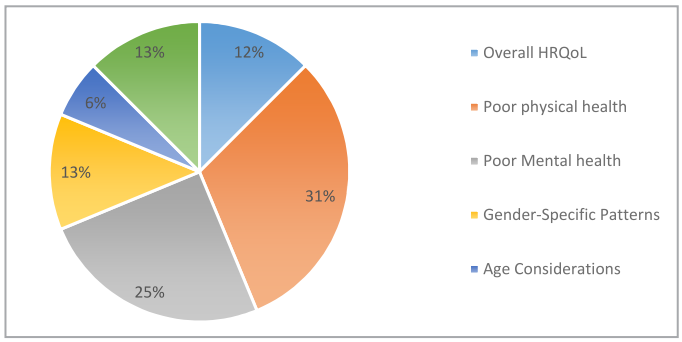
Age Considerations:

Age also appeared to factor in the relationship between MetS and HRQoL. Association between MetS and improved HRQoL was evident only among male participants aged 80 and above.[10] This finding suggests that age-related factors may modulate the impact of MetS on HRQoL outcomes.

Psychosocial and Lifestyle Factors

Psychosocial factors were found to be closely linked with MetS and HRQoL and it was noted that individuals with MetS reported lower physical and social dimensions of HRQoL, with social stress potentially influencing these outcomes indirectly through sedentary lifestyle behaviours.[19] It is very important to address psychological well-being in obesity management, indicating that psychological support should be integrated into weight management programs.[22]

Figure 2: *Pie Chart indicating the number of studies reporting the specific outcome*



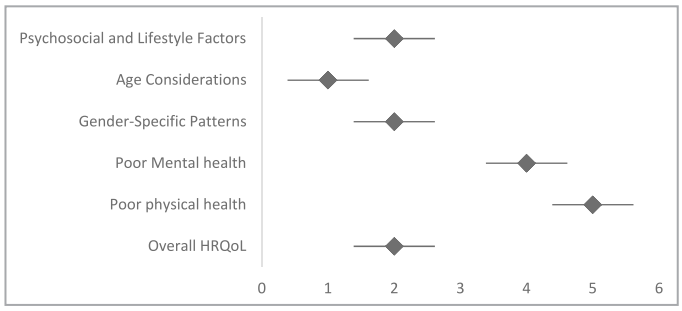


Figure 3: *Forest Plot indicating the number of studies reporting the specific outcome*

Discussion

This systematic review dives into the intricate relationship between metabolic syndrome (MetS) and health-related quality of life (HRQoL), combining findings from diverse studies with varying methodologies and measurement tools. The analysis spans a spectrum of factors, including psychological dimensions, specific MetS components, and the potential influences of age, gender, and psychosocial elements on the MetS-HRQoL nexus. A total of 14 articles have been used and studied in this systematic review to determine the

effect of MetS on these different factors affecting HRQoL.

Studies have shown that a rapid increase has been observed in the prevalence of MetS all over the world,[24] and there is a need to study the effects it has on human lifestyle. The aim of this systematic review was precisely this; to check the adverse effects of MetS on overall health-related quality of life (HRQoL).

When the studies were reviewed, a common result was seen highlighting a strong association between MetS and diminished overall HRQoL scores, based on both objective measurements and self-reported evaluations.[25] Notably, a significant correlation surfaces between MetS and impaired HRQoL, especially within domains involving mobility, hearing, breathing, usual activities, discomfort and symptoms, vitality, and sexual activity. These insights underscore the comprehensive and far-reaching influence of MetS on individuals' overall well-being.

Patients with MetS were seen to show lower levels of physical activity, thus making a connection between MetS and poor physical health. Critical components of MetS, such as high blood pressure and abdominal obesity, emerge as pivotal contributors to compromised physical health states (2-Saklayen). MetS not only affects general physical health but also provides the perfect conditions for other comorbidities[26] e.g. psoriasis, PCOS[27] etc. The consistent adverse impact on physical health shows the need to address these specific components to augment the overall well-being of MetS-affected individuals, considering that poor physical health and inactivity would further worsen some of the symptoms of MetS e.g. obesity.[28]

This systematic review further reveals that the negative effects of MetS extend beyond the realm of physical health to include the mental dimensions of HRQoL. The results show depression, anxiety and distress as consistent correlates of MetS, shedding light on the major relation between this syndrome and overall psychological health. There have been multiple studies showing these problems to be associated with MetS. However, one of the studies also suggested mental health problems as an adverse effect of hypertension; a correlation which needs to be further looked into during newer studies. MetS has also been shown to cause abnormal sleep patterns in patients.[29]

The gender-specific differences in the MetS-HRQoL dynamic identified in select studies showed relatively more worsening of HRQoL in females than in males. Interestingly, in some cases MetS is found to be associated with enhanced HRQoL in men, a trend not replicated among women. Previous studies have also shown that women are already more likely to develop MetS in response to stress and socio-economic problems, and also have more risk of developing cardiovascular risks as a comorbidity than men. Age emerges as another key determinant in this study. The connection between MetS and elevated HRQoL has been observed solely among male participants aged 80 and above. This shows that age-related variables are important modulators in determining the relationship between MetS and HRQoL outcomes in patients. Psychosocial dimensions were also shown to be affected in relation to both MetS and HRQoL. The study shows the link between MetS and lower quality of life in physical and social domains, causing effects similar to social stress, anxiety and even excessive sedentary behaviours. This has also been looked into in previous studies which showed MetS to be causing decreased impulsivity and socially depressive symptoms.[30]

The implications of these findings reverberate through clinical practice and public health initiatives. The consistent adverse impact of MetS on HRQoL shows the need for comprehensive MetS management, including not just medical and pharmacological interventions but also psychosocial support for patients. Early screening for MetS and developing proactive management programs for the patients can potentially show major improvements in HRQoL among individuals at risk.

However, the studies reviewed are not without limitations. The prevalence of cross-sectional designs restricts the establishment of proper cause-and-effect relationships. Long-term effects of MetS on certain factors could also not be covered, due to the lack of cohort study designs. Some studies focus on specific populations, potentially limiting the generalization of findings. Recollection bias, limitations in measurement scales, and confounding factors are also some of the acknowledged constraints.

In conclusion, this systematic review provides a comprehensive picture of the complex relationship between adverse effects of MetS and HRQoL. The consistency of data emphasizes MetS's substantial impact on various dimensions of well-being. However, more studies, longitudinal studies, in particular, are required to establish proper causes and understand the complicated influences of many elements. The findings of this research emphasize the need of a comprehensive approach to the effects of MetS, one that recognizes its wide-ranging impact on the quality of life of individuals affected by it.

Conclusion

Metabolic syndrome affects life of patients in many aspects including physical health, mental health and social life. As per the results of the included studies, metabolic syndrome affects the health-related quality of life of females more as compared to males.

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