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SKIN DISEASE RELATED TO METABOLIC SYNDROME IN WOMEN: A SYSTEMATIC REVIEW

Yeyen Jani Sari Dabukke*

*Faculty of Medicine, University of Methodist, Indonesia

***Corresponding Author:**
newyeyendabukke@gmail.com

Abstract

Objective: *The metabolic syndrome" (MetS) refers to a group of clinical conditions that include abdominal obesity, hypertension, insulin resistance, and cholesterol. There was evidence that MetS is associated with a number of cutaneous disorders. This study aimed to review the correlation between metabolic syndrome and skin disease systematically.*

Materials and methods: *A systematic search strategy was conducted across several electronic reference databases (PubMed, Cochrane Library, ProQuest) and included articles published between 2019–2023. Duplicate publications, review articles, and incomplete articles were excluded.*

Results: *Database search yielded 294 articles, which were systematically eliminated, leaving 6 relevant articles. Analyzed articles showed the association between diabetes mellitus and hidradenitis suppurativa.*

Conclusion: *Studies found a close connection between several cutaneous illnesses and MetS. Individuals who exhibit these conditions, which are indicators of MetS, should be questioned and, if necessary, tested for the condition.*

Keyword: *skin disorder; metabolic syndrome; mucocutaneous*

INTRODUCTION

The term "metabolic syndrome" (MetS), also referred to as "syndrome X" or "insulin resistance syndrome," refers to a group of clinical conditions that include abdominal obesity, hypertension, insulin resistance, and cholesterol. MetS is thought to affect one-fourth to one-third of the world's population and is linked to high rates of illness and death.[1] The pathogenesis of MetS, which ultimately adds to insulin resistance and the end inflammatory cascade leading to Type 2 diabetes and cardiovascular disease, is primarily triggered by obesity. The exponential rise in obesity rates around the globe in recent years has made MetS more and more important. Although it is not a dermatological diagnostic, there is evidence that MetS is associated with a number of cutaneous disorders.[2,3]

Comorbidities linked with MetS and the processes underlying these correlations, such as skin disease, have drawn continued attention. Skin diseases can develop as a consequence of any pathophysiologic malfunction, such as insulin resistance (IR), which causes changes in metabolism.[4] A lot of research has shown the connection between sex hormones and MetS networks. The bidirectional connection between sex hormones and obesity has been proven in numerous studies. Obesity causes the persistent inflammation linked to MetS. This study aimed to review the correlation between skin disorder and metabolic syndrome systematically in woman.

Methods

This study was a systematic review, with a systematic literature search on the PubMed, Cochrane Database of Systematic Reviews, Google Scholar, and Directory of Open Access Journals (DOAJ) databases. The search was conducted in English, using keywords related association between skin disorder and metabolic syndrome in woman, including *skin disorder, metabolic syndrome, and woman*. The search was performed with a combination of some or all of these keywords, both in the title and abstract of the article. Search is limited to publications in the period February 2019 to February 2023.

Study designs included in this study were before-and-after studies with or without controls, retrospective and prospective cohort studies, interrupted time series analysis, and randomized controlled trials. Studies on interventions in both adult and pediatric patients were included if there were complete data on pediatric patients. Literature review articles, case series, letters, notes, conference abstracts, and conference articles were excluded. Data were extracted using a standardized table that includes the name of the authors, year of publication, study design, study setting, number of subjects, the treatment used, and the key findings of each study. After searching and filtering articles based on search keywords, article analysis was done manually by considering the title's and abstract's relevance. Articles that meet the inclusion and exclusion criteria that are unclear will be analyzed further by reading the full text of the article and entering the relevant information in the data extraction table. The results obtained in the included studies will be compared with those of other systematic reviews and literature.

Result

Study Selection

A systematic search was carried out and yielded 294 articles (Fig. 1). A total of 185 articles remained, after rechecking and excluding duplicated articles. A total of 34 articles were eligible for this study. Then, after a comprehensive review of the full-text articles, the remaining 6 articles were included in this study. The database search results are described in Table 1 and Figure 1. The summary of each included study is described in Table 2.

Included Articles

Of the 6 included studies, 2 were case-control, 1 was retrospective cohort studies, and 3 were cross-sectional studies.

Populations of Included Articles

A total of 4548 patients were involved in the 5 included studies. The age of the research subjects varied from zero years to more than eighty years. All studies were single-center studies.

Figure 1. Systematic Search

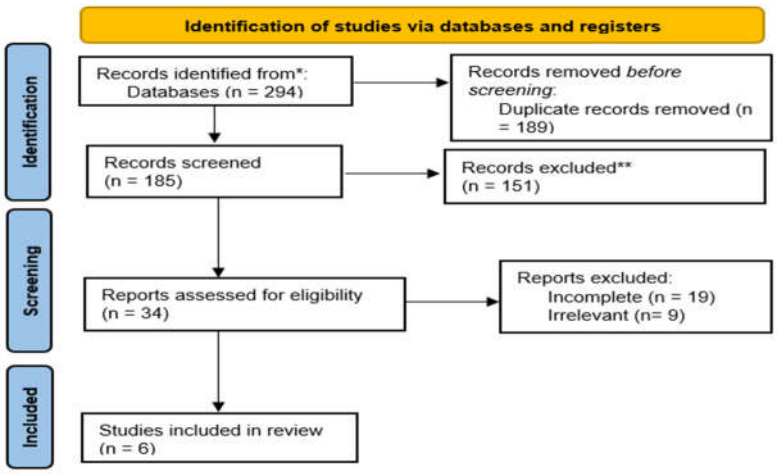

Table 1. Study Characteristics and Finding

Author	Design	Country	Subjects	Disorder	Findings
Ferdinando et al, 2019[5]	Case-control	Brazil	97	Psoriasis	Comparison of MS prevalence in psoriasis patients (49.4%) with controls (35.0%) showed difference with p=0.04; OR=1.8. Patients with psoriasis had higher body mass index, higher systolic blood pressure, lower HDL cholesterol, higher glucose, higher waist circumference and more angina pectoris than controls.
Trong et al, 2019[6]	Cross-sectional	Vietnam	128	Psoriasis	The rate of dyslipidemia in the psoriasis group was significantly higher than in the healthy group (53.9% versus 21.9%, p < 0.001), particularly the triglyceride concentration.
Abdelmawa et al, 2019[7]	Case-control	Egypt	108	Acne vulgaris	Statistically no significant differences between cases and control regarding sociodemographic distribution, blood glucose, and insulin. Nonsignificant differences between AGA and acne groups regarding sociodemographic distribution and duration of the disease. Nonsignificant differences between AGA and acne regarding blood glucose and insulin.
Chandak et al, 2022[8]	Cross-sectional	India	130	Acne vulgaris	There was an increased incidence of abnormal waist circumference, triglyceride, HDL, and fasting blood glucose among the cases (p<0.05). Consequently, an increased occurrence of MetS was observed in the case group (p=0.011).
Shalom et al, 2019[9]	Cross-sectional	Israel	116.816	Atopic dermatitis	AD in the entire group of patients and in the adult patients was associated with a higher prevalence of dyslipidaemia and a lower prevalence of diabetes and metabolic syndrome.
Jorgensen et al, 2021[10]	Retrospective cohort	Denmark	302	Hidradenitis Suppurativa	There were 2.1 conditions on average for each subject. With indications of significant underdiagnosis and undertreatment, 76.5% of people had one or more cardiovascular (CV) conditions, including 36.7% of people with obesity, 9.3% of people with diabetes, 48.4% of people with hypertension, and 57.7% of people with dyslipidemia. Significant indicators of the start of diabetes were P 0.001.

Discussion

Psoriasis

A persistent inflammation condition that affects the skin, nails, and joints is psoriasis. The immunopathogenesis of both psoriasis and MetS share persistent inflammation brought on by pro-inflammatory cytokines like IFN-gamma, IL-17, IL-23, and TNF-alpha. Insulin-like growth factor 1 (IGF-1) and chronic Th-1 and Th-17-mediated inflammatory cytokines promote keratinocyte proliferation in psoriasis and play a part in the etiology of diabetes and hyperlipidemia.[11,12] Several investigations have shown a connection between MetS and eczema. Ferdinando et al, found the comparison of MS prevalence in psoriasis patients (49.4%) with controls (35.0%) showed difference with p=0.04; OR=1.8. Patients with psoriasis had higher body mass index, higher systolic blood pressure, lower HDL, cholesterol, higher glucose, higher waist circumference and more angina pectoris than controls.[5]

MetS makes managing psoriasis difficult because, on the one hand, the condition impacts how well psoriasis is treated and, on the other, systemic psoriasis treatments may have detrimental effects on metabolic parameters.[13,14] Patients who are fat and have high blood pressure may experience nephrotoxicity from cyclosporine, whereas dyslipidemia is a recognized side effect of acitretin. In individuals who are fat, diabetic, or alcoholic, methotrexate has been linked to liver cirrhosis. NBUVB found that individuals without MetS improved their PASI significantly more than MetS patients did (P 0.05). Pioglitazone and metformin, on the other hand, have shown progress in PASI along with metabolic metrics. When compared to individuals who weren't taking it, simvastatin caused PASI levels to drop more quickly.[13,15]

Acne vulgaris

Propionibacterium acnes colonization, excessive oil production, changed follicular keratinization, and inflammation all contribute to acne vulgaris, an inflammatory disease affecting the sebaceous glands.[8] Acne and MetS share the same etiology, which is increased molecular target of rapamycin complex 1 activity (mTORC1). Acne vulgaris patients' involved and noninvolved epidermis was discovered to have increased mTORC1 activity. Additionally, it is known that insulin resistance, fat, and T2DM all exhibit increased mTORC1 activation. The incidence of MetS was found to be the same in cases (17%) and controls (9%) in a survey of adult males with acne.[16] However, cases (22%) had a substantially greater incidence of insulin resistance than controls (11%) (P = 0.03). Women's acne has been connected to cholesterol, insulin intolerance, and cane.[8,12]

Abdelmawa et al, found a different result. This study showed that there was no significant differences between cases and control regarding sociodemographic distribution, blood glucose, and insulin. Nonsignificant differences between AGA and acne groups regarding sociodemographic distribution and duration of the disease. Nonsignificant differences between AGA and acne regarding blood glucose and insulin.[7]

Atopic dermatitis

Atopic dermatitis is a recurring, pruritic, chronic skin disease. Shalom et al showed AD in the entire group of patients and in the adult patients was associated with a higher prevalence of dyslipidaemia and a lower prevalence of diabetes and metabolic syndrome. The changed expression of T cell cytokines in both illnesses is one hypothesis that could apply.[9,17]

Hidradenitis suppurativa

A persistent, recurring condition called hidradenitis suppurativa affects the hair cells in intertriginous regions like the axillary, inframammary, and inguinal areas. It manifests as excruciatingly painful recurring nodules, pustules, sinuses, and abscesses that lead to scarring and disfigurement and noticeably lower the patient's quality of life. Although the pathophysiology is unclear, it is hypothesized that it is caused by perifollicular inflammation, which obstructs and bursts hair follicles, causing prolonged inflammation and the ensuing clinical characteristics. Genetics, a dysregulated immune system, nicotine, and weight all play a role.[18,19]

According to a meta-analysis, there is a substantial link between HS and smoking, dyslipidemia, obesity, and MetS. It also noted that the prevalence of HS rises as these risk factors rise.[20] According to some theories, obesity causes an atmosphere that is mildly pro-inflammatory and causes more friction in intertriginous regions (leading to follicular occlusion). The meta-analysis also observed that weight loss can result in the natural resolution of mild disease while also improving the therapy response rate of serious disease. Hypersensitive follicle androgen receptors can result from diabetes mellitus and higher insulin levels, which can worsen HS.[21,22]

Conclusion

It is clear that there is a close connection between several cutaneous illnesses and MetS, a systemic condition. Individuals who exhibit these conditions, which are indicators of MetS, should be questioned and, if necessary, tested for the condition. An early identification of a systemic illness with many symptoms may be aided by this. Additionally, dermatoses react better to therapy if underlying biochemical issues are resolved.

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