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Prevalence of Metabolic Syndrome in Vitiligo: A Cross-sectional Study

Manisha Koirala[1], Rushma Shrestha[2], Anupama Karki[3], Goma Dhami[4]

[1,4]Dermatologist, Department of Dermatology & Venereology, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal
[2,3]Professor, Department of Dermatology & Venereology, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal

ABSTRACT

Introduction Vitiligo is a common acquired hypomelanotic disorder of the skin and is characterized by depigmented macules and patches that can appear anywhere on the skin. In pathogenesis, the researchers have suggested an interplay of multiple factors such as genetic, neural, oxidant-antioxidant, biochemical, minerals, and autoimmune processes in the induction of vitiligo. Metabolic syndrome (MetS), also known as Syndrome X is a pathological condition typically characterized by the combination of various interrelated metabolic disorders that include abdominal obesity, impaired glucose tolerance, dyslipidemia, and hypertension. The linkage of skin diseases and MetS is due to ongoing chronic inflammation due to elevated pro-inflammatory cytokines, imbalance between reactive oxygen species and antioxidants, and hormonal abnormalities mostly insulin resistance.

Methodology This cross-sectional study included patients diagnosed with vitiligo and above 16 years of age. All the patients were sent for analysis of fasting lipid profile and fasting blood glucose level. The waist circumference was measured at the mid-point between the lower border of the rib cage and the iliac crest with a flexible inch tape. The blood pressure was taken in a sitting posture after 10 minutes of rest. The data was collected using a preformed proforma.

Results Of the 70 patients, the majority (N=38) were male. The mean age was 37 years with a range from 16 to 79 years. The mean age of male patients was 39.87 ± 17.24 years and female patients was 33.59 ± 13.58 years. The most common clinical type of vitiligo was generalized vitiligo (48.6%) followed by focal (18.6%) and segmental (15.7%). The metabolic syndrome was present in 26 patients (37.1%). The patient with generalized vitiligo had maximum prevalence (n=10) followed by acrofacial vitiligo (n=6).

Conclusion This study found a high prevalence of metabolic syndrome and its components in patients with vitiligo. Therefore, vitiligo patients need to be screened for metabolic syndrome to prevent unforeseen complications.

Keywords: Metabolic syndrome, Syndrome X, Vitiligo.

Introduction

Vitiligo is derived from Latin “vitium” meaning fault or “vitelius” meaning spotted calf and it is an acquired, depigmenting, idiopathic disease resulting from the progressive loss of dihydroxy-phenyl alanine positive melanocytes in the basal layer of epidermis and is clinically characterized by

milky-white sharply demarcated macules or patches.[1,2] The exact pathogenesis of vitiligo is unknown, but researchers have suggested that an interplay of multiple factors such as genetic, neural, oxidant-antioxidant, biochemical, minerals, and autoimmune processes might induce vitiligo.[2,3]
Metabolic syndrome (MetS), also known as Syndrome X is a pathological condition typically characterized by the combination of various inter-related metabolic disorders that include abdominal obesity, impaired glucose tolerance, dyslipidemia and hypertension.[4]
MetS is an increasing health problem that affects approximately one-quarter of the world's adult population and has been attributed to or is in association with various dermatological diseases.[5] The linkage of skin diseases and MetS is due to ongoing chronic inflammation due to elevated pro-inflammatory cytokines, imbalance between reactive oxygen species and antioxidants, and hormonal abnormalities mostly insulin resistance.[6] The aim of this study is to evaluate the prevalence of MetS in patients with Vitiligo.

Methodology

This hospital-based cross sectional observational study was conducted in the Department of Dermatology and Venerology of the National Academy of Medical Sciences, Bir Hospital from November 2021 to June 2022. The ethical clearance from the Institutional Review Board (IRB) of National Academy of Medical Sciences (NAMS) was secured before commencing the study. The patients with Vitiligo aged more than 16 were included and patients who were pregnant or lactating or with psychiatric illness were excluded from the study. Based on history and clinical examination, Vitiligo was diagnosed by the dermatologist. The patients were explained about the purpose of the study and the methods used.. Pertinent data was collected and recorded in a predesigned data collection form given in proforma. The waist circumference was measured at the midpoint between the lower border of the rib cage and the iliac crest by using a flexible inch tape.[7] Blood pressure of the patients was taken in right arm in sitting position after 10 minutes of rest. All the patients were sent for analysis of fasting lipid profile (total cholesterol, HDL, LDL and triglycerides) and fasting blood glucose level. All patients with Vitiligo were managed in the department of Dermatology with regular follow up and patients diagnosed as metabolic syndrome were referred to the department of Endocrinology, Bir hospital for further management of Metabolic syndrome.

Operational Definition

Metabolic syndrome is defined as presence of three or more components of SAM-NCEP (South Asian Modified National Cholesterol Education Program) Criteria for MetS which includes

1. Waist circumference ≥90 cm in men or ≥80 cm in women,
2. Blood pressure ≥130/85 mmHg or receiving drug therapy for hypertension
3. Fasting triglyceride (TG) level ≥150 mg/dl or receiving drug therapy for hypertriglyceridemia
4. Fasting high-density lipoprotein cholesterol (HDL) level <40 mg/dl in men or <50 mg/dl in women or receiving drug therapy for reduced HDL
5. Fasting blood glucose ≥100 mg/dl or receiving drug therapy for hyperglycemia.[8]

Result

In this study, 70 patients with vitiligo were included. Of the 70 patients, 38 (54.3%) were male and 32 (45.7%) were female with male to female ratio of 1.1:1. The mean age of the patients enrolled was 37

years and their age ranged from 16 to 79 years. The mean age of male patients was 39.87 ± 17.24 years and female patients was 33.59 ± 13.58 years. The majority of patients (n=23, 32.9%) were aged between 16 to 25 years of age while only one patient (1.4%) was of more than seventy-five years. The average age of onset of vitiligo was 31.49 years with the minimum age of onset being 10 years and the maximum age of onset 60 years. The mean age of onset in male patients was 32.58 ± 13.16 years while in female patients, it was 30.19 ± 13.77 years (p-value = 0.46).

Out of 70 patients the most common clinical type of vitiligo was generalized vitiligo (48.6%) followed by focal (18.6%) and segmental (15.7%). There were no cases of universal vitiligo.

Prevalence of metabolic syndrome

Metabolic syndrome was present in 26 patients (37.1%). Out of them, 18 were male and 8 were female (p value = 0.054). The gender wise prevalence of metabolic syndrome is tabulated below. (Table 1).

Table 1. Gender-wise prevalence of metabolic syndrome

Gender	Metabolic syndrome				P value
	Yes		No		
	N	%	N	%	
Male	18	25.7	20	28.6	0.054
Female	8	11.4	24	34.3	
Total	26	37.1	44	62.9	

Similarly, the prevalence of metabolic syndrome also varied among different clinical types of vitiligo (Table 2). Patients with generalized vitiligo had maximum prevalence (n=10, 14.3%) followed by acrofacial vitiligo (n=6, 8.6%) while only one (1.4%) with mucosal vitiligo had metabolic syndrome.

Table 2. Prevalence of metabolic syndrome in different types of vitiligo

Clinical type of vitiligo	Metabolic syndrome				P value
	Yes		No		
	N	(%)	N	(%)	
Focal	4	5.7	9	12.9	0.30
Segmental	5	7.1	6	8.5	
Mucosal	1	1.4	2	2.9	
Acrofacial	6	8.6	3	4.3	
Generalized	10	14.3	24	34.3	
Total	26	37.1	44	62.9	

Prevalence of components of metabolic syndrome

The observed difference in prevalence of different components of MetS is described below. The gender wise prevalence of metabolic syndrome and its components is summarized in the Table 3.

Table 3. Gender wise prevalence of metabolic syndrome and its components

Components	Values	Gender		P value
		Number of Male (%)	Number of Female (%)	

Metabolic Syndrome	Yes	18 (25.7)	8 (11.4)	0.054
	No	20 (28.6)	24 (34.3)	
HDL level	Normal	27 (38.6)	14 (20)	**0.02**
	Low or receiving treatment	11 (15.7)	18 (25.7)	
TG level	Normal	17 (24.3)	23 (32.8)	**0.02**
	High or receiving treatment	21 (30)	9 (12.9)	
Fasting glucose	Normal	23 (32.9)	24 (34.3)	0.19
	High or receiving treatment	15 (21.4)	8 (11.4)	
Blood Pressure	Normal	22 (31.4)	26 (37.1)	**0.03**
	High or receiving treatment	16 (22.9)	6 (8.6)	
Waist circumference	Normal	12 (17.1)	4 (5.7)	**0.05**
	High	26 (37.2)	28 (40)	

Discussion

In our study, majority of the participants (n=38) were male (54.3%) with male to female ratio of 1.1:1.The male preponderance like that in our study was also seen in studies done by Sharma YK et al (66%), Tanacan E et al (53.5%) and Rashed M et al (53.3%).[5,9,10] However the studies done by Sallam M et al (39.2%) and Atas H et al (47.6%) contradict our gender-wise distribution and have found a higher prevalence of vitiligo in females.[11,12]

The mean age of the patients enrolled in this study was 37 years and their age ranged from 16 to 79 years. The mean age of the patients is variable in the published literatures but most of them are comparable with our finding. In the study done by Sallam M et al, the mean age was 32.73 years, 37.04 years in the study done by Tanacan E et al, 40.1 years in the study done by Atas H et al, 43 years in the study done by Rashed et al, and 43.05 years in the study done by Sharma Y et al.[5,9–12]

The patients included in this study had almost all the clinical types of vitiligo. Majority of patients in our study (n=34) with 48.6% had generalized, thirteen had focal (18.6%), eleven had segmental (15.7%), nine had acrofacial (12.9%) and mucosal vitiligo (n=3) with 4.3%. The study done by Sallam M et al also had maximum (69.6%) of participants with generalized vitiligo while just 2.9% had acrofacial and none had mucosal.[11] Similar was the distribution of clinical types in the study done by Atas H et al in which the majority of the patients had generalized vitiligo.[12]

In our study, out of seventy patients with vitiligo, 26 (37.1%) had metabolic syndrome. In the case control study done by Sharma YK et al in India, the metabolic syndrome was seen in 24% of patients with vitiligo compared to just 12% in controls with a p-value of 0.002.[9] Similarly, another case control study done by Tanacan E et al in Egyptian population found a prevalence of metabolic syndrome to be 39.6% in vitiligo patients compared to just 9.1% in control.[5] Likewise, study done by Atas H et al found the prevalence of metabolic syndrome in patients with vitiligo to be 38.1% compared to 21.5% in controls.[12] However, a case control study done by Sallam M et al contradicts with the previous studies with prevalence being 20.6% in cases of vitiligo compared to 30.3% in controls, but the difference was not statistically significant.[11]

Majority of the patients included in this study were male and the prevalence of metabolic syndrome was also more in the male patients compared to female patients (n=18 vs n= 8) with a p value of 0.054. However in a study done by Sharma YK et al and Sallam M et al, female preponderance in prevalence of metabolic syndrome with vitiligo was seen.[9,11]

This study also found difference in prevalence of metabolic syndrome according to the clinical type of vitiligo. Of the twenty-six patients (37.1%) with metabolic syndrome, MetS was prevalent in ten patients with generalized vitiligo (14.3%), six patients with acrofacial vitiligo (8.6%), five patients with segmental vitiligo (7.1%), four patients with focal vitiligo (5.7%), and one patient with mucosal vitiligo (1.4%). However, the difference was not statistically significant (p value 0.30). Similar finding as ours was observed in a study done by Sallam M et al which showed high prevalence of MetS in patients with generalized vitiligo.[11]

Conclusion

This study has found high prevalence of metabolic syndrome and the components of metabolic syndrome in patients with vitiligo. So, the vitiligo patients need to be screened for presence of metabolic syndrome to prevent unforeseen complications.

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