



**PREVALENCE OF VITILIGO AND ASSOCIATED FACTORS AMONG PATIENTS
ATTENDING DERMATOLOGY OUTPATIENT DEPARTMENT (OPD) AT**

ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

**A THESIS SUBMITTED TO ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL
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Contents

Acknowledgement.....	i
acronym.....	ii
Abstract.....	iii
1. Introduction.....	1
1.1 Background.....	1-2
1.2 Statement of the problem.....	3
1.3 significance of study.....	4
2. literature review.....	5-8
2.1 conceptual frame work.....	9
3. Objectives.....	10
3.1 General objective.....	10
3.2 Specific objectives.....	10
4. Methods.....	11
4.1 Study area and study period.....	11
114.2 Study design.....	11
4.3 Source Population.....	11
4.4 Study population.....	11
4.5 Inclusion criteria for the samples.....	11
4.6 Exclusion criteria.....	11
4.7 Sample Size determination.....	12-13
4.8 Sampling procedure.....	14
4.9 Study variables	14
4.10 Operational Definitions.....	15
4.11 Data collection methods and tools.....	16
4.12 Data Quality control.....	16
4.13 Data processing and analysis.....	16
4.14 Ethical consideration.....	17
4.15 dissemination of result.....	17

5 Results

5.1	Socio-Demographic Characteristics of Participants.....	19-22
5.2	5.2 Prevalence of Vitiligo among patients attending dermatology OPD.....	22-26
5.3	Factors associated with vitiligo.....	26-28
6.	Discussion.....	29-30
7.	Strength of the study.....	31.
8.	Conclusion.....	32
9.	References.....	33-35
10.	ANNEXES.....	36-39

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Acronyms

FMOH: Federal Ministry of Health

SPHMMC: St Paul hospital medical millennium college

NB- UVB: Narrow-Band UVB

OPD: Outpatient Department

TBSA: Total Body Surface Area

VGICC : Vitiligo Global Issues Consensus Conference

Abstract

Background: Vitiligo is skin disease having a major impact on the quality of life of the patient suffering from it. The substantial disfigurement associated with vitiligo can cause serious emotional stress for the patient, which necessitates treatment. The total number of people suffering from vitiligo is estimated to be around 65-95 million people worldwide and little known about Vitiligo in Ethiopia.

Objective: To determine the prevalence and associated factors of vitiligo among patients attending dermatology outpatient department at SPHMMC from July2024- December 2024.

Method: The study utilized an institutional-based cross-sectional study design conducted among patients visiting dermatology OPD at St. Paul's Hospital millennium medical college in Addis Ababa in 2024. The sample size for the study was determined using single proportion and double population formulas. Systemic random sampling was employed with the proportional allocation of sample sizes. Every fifth patient was selected and interviewed until the required sample size was achieved.

Results: The prevalence of confirmed vitiligo among the study patients was 9.6%. The most common type observed was vitiligo vulgaris (60.9%) of cases. Lesions were primarily located on the head and neck (34.8%). About 58.8% of patients were female, and the age distribution showed a large portion over 44 years old (29.6%). The mean age was 32.4 years. 10 (4.2%) patients reported a family history of vitiligo, and 43.5% had comorbidities, including diabetes and hypertension. The logistic regression analyses revealed patients having a family history of vitiligo were 15.6 times more likely to have the vitiligo (AOR: 15.6; 95% CI: 2.92-83.57) than those who had no. besides, patients having comorbidities were 3.3 times higher to have vitiligo (AOR: 3.3; 95% CI: 1.13-9.46) than those who had not.

Conclusion: The prevalence of vitiligo was relatively higher. The family history of vitiligo and comorbidities are significant predictors of vitiligo. Therefore, awareness creation among persons with family history about the condition, including its causes, symptoms and available treatment options. Future research should aim to clarify the relationship between vitiligo and different comorbidities in different population.

Key words: skin, vitiligo, chronic disease, st Paul

1) Introduction

1.1 Background

Vitiligo is a chronic acquired discoloration of the skin with an estimated prevalence of 1-2% worldwide [1]. This condition is largely asymptomatic but may rarely be accompanied by itching or burning sensation mainly prior to onset of the lesions [2]. The age of vitiligo onset is usually in childhood or early adulthood with peak incidence in the second and third decade of life [3].

The sharp contrast between depigmented lesions and pigmented skin makes vitiligo more cosmetically disfiguring and therefore unacceptable to many African societies [4]. Patients with vitiligo experience a profound effect on psychosocial development and poor quality of life [5-7]. Vitiligo is classified into focal, segmental, acrofacial, generalised and universal according to distribution of the lesions [8].

Classification proposed by Taieb and Picardo, 2010; was used as a working template for the VGICC classifies vitiligo, as segmental, non-segmental, mixed and unclassified [9]. Segmental vitiligo, characterized by unilateral, localized distribution of vitiligo lesions, more often has rapid onset and stabilization with early hair follicle involvement [10]. Non segmental vitiligo, characterized by bilateral distribution of vitiligo lesions on the body, more frequently has progressive onset with multiple flare-ups, later hair follicle involvement, and an unpredictable course [11, 12].

Additionally, universal vitiligo is characterized as the most extensive form of the disease and generally occurs in adulthood [13]. ‘Universalis’ is generally used when depigmentation is virtually universal (80– 90% of TBSA), but some pigmentation may be still present [13]. Usually, vitiligo universal is preceded by generalized vitiligo that gradually evolves to complete or near complete depigmentation of the skin and hair. On the other hand, focal vitiligo is characterized as a small isolated patch that does not fit a segmental distribution, and which has not evolved into vitiligo/NSV after a period of at least 2 years [14].

Mixed vitiligo is characterized as the absence of depigmented areas in a segmental distribution at birth and in the first year of life [15]. In addition, acrofacial vitiligo, is

characterized usually to occur on limited sites of face, head, hands, and feet and a distinctive feature is depigmentation of the distal fingers and facial orifices [16]

Although many theories have been put forth to explain the loss of epidermal melanocytes, vitiligo is a multifactorial polygenic disorder with a complex pathogenesis [18]. Genetic, immunological, biochemical (oxidative stress), and neurogenic factors may interact to contribute to its development [19]. According to a few epidemiological studies, one-third of vitiligo patients are believed to have a family history of the vitiligo disease. This suggests that hereditary factors play a significant role in the development of the vitiligo disease. This idea is supported by a number of genetic susceptibility studies [8, 18, 20].

Also, vitiligo is known to occur with many autoimmune diseases, and there are many reports of its association with Type 1 diabetes mellitus unlike its association with Type 2 diabetes mellitus [21]. Additionally, autoimmune conditions like thyroid issues and pernicious anemia are frequently linked to vitiligo. Melanocyte antibodies have been discovered in vitiligo patients, and their prevalence associated with disease activity [22]. During treatment of vitiligo, digital photographs, extent of vitiligo, quality of life and level of psychological distress should ideally be evaluated and recorded every 3-4 months.

In a clinical setting, treatment response at 3- 4 months is usually an indicator to continue treatment [23, 24]. There is no cure for vitiligo, treatment strategies aim to arrest the disease, achieve repigmentation and prevent relapse [25]. However, Pharmacological, physical and depigmentation treatment options for vitiligo, used as monotherapy or in combination [26].

Globally, the prevalence of vitiligo is low. It is estimated to be 1-2% worldwide and the rates varying geographically [27]. However, a study conducted in selected dermatologic clinics of Mekelle city, northern Ethiopia revealed that the prevalence of vitiligo was 13.2% [28]. Compared to global prevalence, the prevalence of vitiligo in Ethiopia is high. Therefore, it is crucial to look into new vitiligo associated factors because the disease is multifaceted. Additionally, further studies aimed at determining the prevalence of vitiligo and associated factors are crucial, especially for middle, and low-income nations like Ethiopia where the disease is little understood and has a negative impact on patients' health outcomes.

1.2 Statement of the problem

Vitiligo is a common skin disease having a major impact on the quality of life of the patient suffering from it. The substantial disfigurement associate with vitiligo can cause serious emotional stress for the patient, which necessitates treatment. Yet its burden is poorly established.

The total number of people suffering from vitiligo is estimated at around 65-95 million people worldwide and little is known about the prevalence and associated factors of Vitiligo in Ethiopia [29]. A study done in India revealed that the prevalence of vitiligo was found to be 8.8% [15]. Besides, another study done in Mexico showed that the prevalence of vitiligo was found to be 2.6-4% [30]. Furthermore, a study done on southeast Nigeria showed, the incidence of vitiligo was found to be 5.8% [36].

A few studies have been done in Ethiopia about vitiligo. Among these a clinical – epidemiological profile and treatment pattern of Vitiligo in the selected dermatologic clinic of Mekelle city Northern Ethiopia conducted from 2017 to 2019 revealed that the prevalence of vitiligo was found to be 13.15% [28].

Besides, a research done on prevalence of vitiligo and associated factors among patients attending Ayder referral teaching Hospital, major precipitating factor was physical trauma (46.2%). Alopecia areata was the most common autoimmune disorder observed (33.3%) [31].

However, this study concentrated only on Tigray region that did not show, the possible contribution of ethnic differences, backgrounds of the population residing in different geographic regions with varying environmental conditions that could be main factors to the wide variation in the prevalence of vitiligo. A similar unpublished research has done at alert hospital, Addis Ababa, focused only on prevalence of vitiligo and did not determine associated factors. Therefore, the purpose of this study assess the prevalence of vitiligo and associated factors on all patients attending Dermatology OPD at SPHMMC.

1.3 Significance of the study

The magnitude of vitiligo and its impact on the quality of life is not known at the national level and more specifically at Addis Ababa. SPHMMC is one of the largest referral centers in the country located in Addis Ababa. This study aimed to provide information on burden of vitiligo and risk factors that play a role in the incidence of vitiligo and to evaluate the relationship between risk factors and clinical type vitiligo. It will also alarm policymakers and will serve as an entry point for other researchers since there was insufficient research on the area.

2. Literature review

Vitiligo is a chronic skin condition associated with a loss of pigmentation in the epidermis. Worldwide many people affected by Vitiligo and the visibility of the lesions is perceived as blemishing and troublesome. Accordingly, there is a high level of psychological anxiety as well as of patient needs for treatment [32]. In spite of this, there has been little attention to the disease in identifying its prevalence and associated factors. Vitiligo is a disease characterized by white spots appearing that occurs in 10–15% of the autoimmune disease patients [33].

The Vitiligo Research Center reports that just over 1 percent of people in the United States were diagnosed with the disorder in 2022 [34]. Although vitiligo affects all people equally regardless of race, the condition is more visible in people with darker skin, which can make it a greater burden for the Vitiligo can be especially stressful for people of color because the white lesions tend to be more noticeable on darker skin tones [35]. If the lesions are on sensitive areas such as the face or if they are widespread, it can impact a person's sense of racial or ethnic identity [36].

Many studies revealed that the psychological devastation that is inflicted by vitiligo [24, 37]. The seminal study by Porter et al documented the negative impact of vitiligo on patients' self-esteem. The authors reported that patients who had lower self-esteem coped poorly with the disease, but patients with higher self-esteem coped better. Subsequent global studies have consistently reported the negative impact of vitiligo on patients' self-esteem and quality of life. Vitiligo causes isolation, stigmatization, loss of self-esteem, depression, and self-consciousness [36].

Although vitiligo does not develop differently in people of different races, there are some differences that people of color may experience related to access to care and stigma [35]. First, people of color can experience various disparities within the healthcare system [35]. Lack of or limited medical insurance, longer commutes to access quality medical treatment, and bias among healthcare providers are only a few factors that create these gaps. In addition, vitiligo treatment typically requires specialty care from a dermatologist, which may require additional referrals. This can make it even more challenging for individuals with limited access to healthcare to get treatment.

The American Academy of Dermatology Association recommends that people with vitiligo stay out of the sun and wear sunscreen to prevent burning the areas that have lost pigment. Exposure to the sun can also cause the condition to spread, even in people of color. It is crucial for people with darker skin to wear sunscreen and stay in shaded areas when outside in the sun.

Most of the studies on vitiligo focus on the prevalence of comorbidity of people affected from vitiligo [22]. Studies remarking on dermatologic comorbidity mostly suggest association of vitiligo with atopic dermatitis, alopecia areata and psoriasis [38-40]. A study from South Korea revealed a prevalence of 0.12% to 0.13% over a three year period in a population of people admitted to hospitals [37]. In a population-based cohort study from China the overall prevalence of vitiligo was 0.56% (0.71% in men vs 0.45% in women) and increased with age [22].

Also a findings of a pilot study focused on literature review revealed that more than fifty studies describing the prevalence of vitiligo in a range between 0.06% and 2.28% [41]. The population-based study conducted in France by Richard et al, in which a prevalence of 0.46% was reported, also lies in this range [42].

The incidence of vitiligo in the a study conducted in India was found to be 2.64%[43]. Also, the incidence of vitiligo reported in other studies is 2.9% by Sehgal [44] and 2.5% by Handa and Kaur [45].

However, many of the studies were not identify factors that cause for the occurrence of vitiligo that will provide a clue by this study. Only a study conducted in northern Ethiopia was tried to identified factors associated with vitiligo [31]. This study revealed that respondents who were residing in rural area residence type were more affected by vitiligo than urban residence (AOR=3.881; 95%CI=1.56, 9.69) with p- value 0.004 and participants who had history of vitiligo in their family were more likely affected by vitiligo than those who had not history of vitiligo in their family (AOR=5.3; 95%CI=1.11, 24.99) with P- value 0.036 [31].

Additionally, patients who had associated disease for vitiligo had higher risk for developing vitiligo than those who had not associated diseases (AOR=11.495%CI=2.8, 46.83) with P- value 0.001 and respondent who had triggering factors had 16.03 times higher chance to develop vitiligo than those who had not triggering factors (AOR=16.03; 95%CI=4.18,63.6) with P- value 0.0001 [31].

In total, the data on the population-based epidemiology of vitiligo show large variations, which may depend on different populations and ethnicities, observed but also on different evaluation methods used. In addition to these cross-national specificities, there are also potential selection mechanisms at the national level that influence the observed prevalence.

In Germany, data resulting from physician consultations are a widely used population-based data source. In case of vitiligo, however, many patients after years of frustrating treatment attempts do not seek medical attention, which might lead to an underestimation of the true prevalence [46]. Vitiligo equally affects males and females as well as all different races. Vitiligo has various onset-age, distribution pattern and progression course.

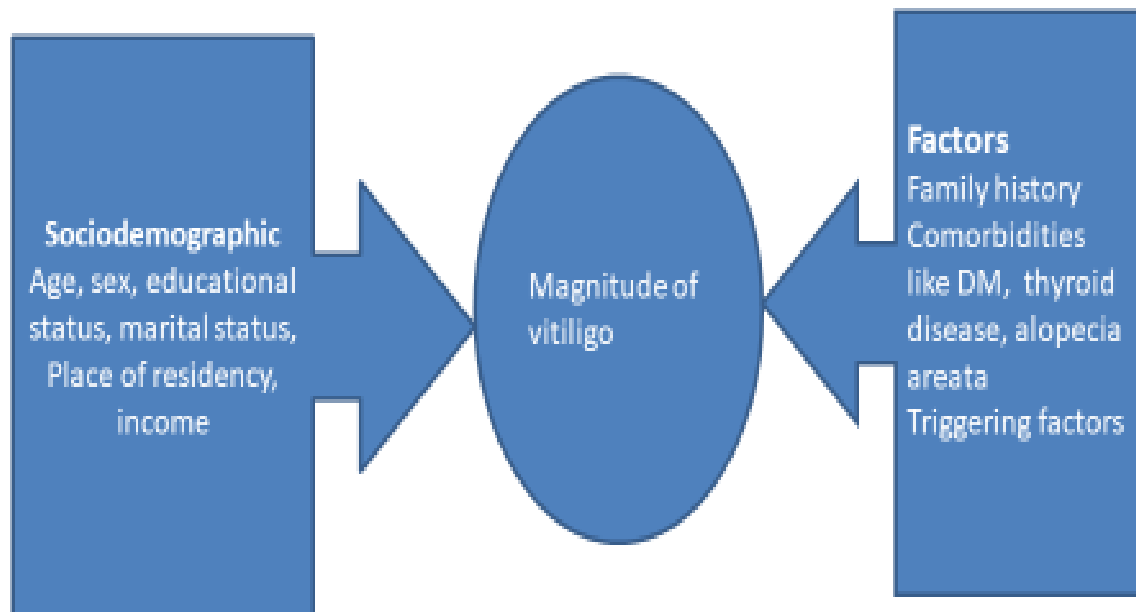
Vitiligo is the most prevalent cutaneous pigmentary disorder. Its prevalence reaches 0.5–2 %, worldwide. The mean age of onset is about 20 years and in 95 % of cases are under the age of 40 [47-49].

The significance of emotional and psychological difficulties has recently been highlighted. Therefore, vitiligo could be considered as a psychosomatic disorder, which means physical and psychological factors concomitantly are involved in appearance, progression, relapse and remission of vitiligo. Vitiligo imposes a large burden on patients' lives, and many patients suffer from shame and embarrassment, low self-confidence, and social isolation [50, 51]. Wrong social beliefs exacerbate the problems of vitiligo patients. As in women, vitiligo may end in divorce and some people believe it is God's punishment for the sins. For a study done In India revealed that sometimes vitiligo is considered as white leprosy, which has a significant stigma[52].

Although vitiligo has a remarkable impact on quality of life (QOL) and brings social stigma, most of the studies on this aspect of vitiligo are based on general cutaneous or non-cutaneous quality of life indexes, such as Dermatology Life Quality Index (DLQI), Skindex-26, and SF-36 [52, 53]. It should be noted that vitiligo is usually asymptomatic, so its effect on quality of life is much more related to psychological problems, such as lack of self-confidence, unpleasant body images, unsuccessful social relationships, and lower quality of marital relations [54, 55], than the exclusive physical issues. It has been shown that patients with vitiligo are at risk of higher social discrimination and stigma.

Despite no adequate study, a single study conducted in Ethiopia revealed that out of the 403 randomly selected dermatological patients who presented in the year 2017 to 2019, the prevalence of vitiligo was 13.15% [28]. This revealed that the prevalence of vitiligo in Ethiopia is very high and alarming. Therefore, assessing its prevalence and associated factors is essential.

Conceptual frame work



3) Objectives

3.1 General objective

To determine the prevalence of vitiligo and associated factors among patients

Attending dermatology OPD at Saint Paul's Millennium Medical College (SPMMC),

From January 2023 to June 2024.

3.2 Specific objectives

- To determine prevalence of vitiligo among patients attending dermatology OPD at Saint Paul's Millennium Medical College in Addis Ababa
- To identify factors associated to vitiligo among patients attending dermatology OPD at Saint Paul's Millennium Medical College in Addis Ababa

4) Methods

4.1 Study area and study period

The study was conducted at St. Paul's hospital millennium medical college, on patients attending dermatology OPD from July 2024- December 2024. SPHMMC is located in Gullele sub city in Addis Ababa, Ethiopia. The SPHMMC Dermatovenerology department has a total of six OPDs and one minor operation room. The major services of the department are providing both preventive and curative services as outpatient. There is also additional dermatopathology and dermatosurgery services provided by sub specialist Doctors [56].

4.2 Study design

Health facility based cross sectional study was conducted from July 2024- December 2024.

4.3 Source Population

All patients who visited dermatology OPD at Saint Paul's Hospital Millennium Medical College were the sources population.

4.4 Study population

All selected patients attending dermatology OPD in Saint Paul's Millennium Medical College hospital during the study period and who fulfill the inclusion criteria.

4.5 Inclusion criteria for the samples

All patients attending dermatology OPD in Saint Paul's Millennium Medical College from July 2024 - December 2024

4.6 Exclusion criteria

Patients with hearing problems and mental illnesses were excluded.

Patients who seek follow-up care and return multiple times during the study period were also excluded.

4.7 Sample Size determination

The sample size was calculated using a single and two-population proportion formula to determine adequate sample size for vitiligo patients and to identify for factors associated with Vitiligo. To determine the sample size using the single proportion formula the study used the following assumptions.

A/ sample size using the single proportion formula: with the assumption of 95% confidence level ($Z \alpha/2$), acceptable margin of error 0.05 (d), and the existing prevalence of Vitiligo disease

(P) is 13.15 % from research done at mekelle; for the non-response rate, 10% contingency was also considered. Accordingly, the required sample is 192.

$$n = \frac{(Z^2) * P(1-P)}{d^2}$$

Where,

n = the calculated sample size,

z = standard score corresponding to 95% CI,

p = the assumed prevalence of Vitiligo from previous research (13.15%),

d= expected difference between population value and estimated value (5%)

$$\text{Then, } n = \frac{(1.96)^2 * 0.13(1-0.13)}{(0.05)^2}, n = 174 + 18 = 192$$

Therefore, the sample size (n) for this study will be = 192

B/ Sample size for the associated factors using the two proportion formula: the sample size was calculated using epi info statcalc software. Prevalence of vitiligo among patients with no vitiligo history among family members (controls or unexposed) [31].

- ❖ Power = 80%
- ❖ 95% Confidence interval
- ❖ Ratio [r] = 1: 1

Table 1 Summary of sample size calculation for associated factors with vitiligo

Variables as exposure	Assumptions					Sample size
	OR	P	ratio	power	CI	
Family history	3.66	17.6%	1:1	80%	95%	218
Triggering factor	33	64	1:1	80%	95%	24

OR: odds ratio; P: proportion of non-adherence; CI: confidence interval

Since the largest of all the calculated sample sizes is 218, it was used as the final sample size.

Adding 10% for nonresponse rate, the final sample size was 240

4.8 Sampling procedure

Systematic sampling method was used to select the study participants. To determine sampling interval, population size divided by the desired sample size $K = N/n$

Where: N = total number of patients seen (1200 patient in 6 month)

n = final sample of the study which is 240

K = sampling interval

Every Five patients who came to the dermatology OPDs according to their visit included in the sample

4.9 Study variables

4.9.1 Dependent/outcome variable: vitiligo status

4.9.2 Independent variables:

Sociodemographic characteristics: Age, sex, education level, marital status,
Residence type, income, occupation.

Triggering factors: trauma, emotional stress, foot wear, family history of having vitiligo

Associated comorbidities: thyroid disease, diabetes mellitus, anemia, Poliosis, alopecia areata,
Melanoma, psoriasis

4.10 Operational Definitions

Vitiligo: is circumscribed de-pigmented skin disorder, characterized by milky white

Focal vitiligo: Usually a solitary macule or a few scattered macules in one area, most commonly in the distribution of the trigeminal nerve, although the neck and trunk are also Commonly involved (One or more macules in one area but not in segmental pattern) [57].

Segmental vitiligo: Unilateral macules in a dermatomal. (One or more lesions localized in unilateral [58].

Acrofacial vitiligo: Depigmentation of the distal fingers and periorificial areas. (Macules localized on face and distal extremities) [59].

Generalized vitiligo (vitiligo vulgaris): Depigmented patches are widely and usually symmetrically distributed. (Symmetrical distribution of lesions affecting many parts of body) [16].

Universal vitiligo: Depigmented macules and patches over most of the body (de-pigmentation involved In more than 80% of the body) [16].

Mucosal vitiligo: Involvement of the mucus membrane sites only [60]. patches/macules without scale of different sizes and shapes [31].

First degree: father, mother, sister, brother

Second degree: aunt, uncle, cousin, nephew

Aggravating factor: any condition that makes the occurrence of vitiligo worse

Trauma: non-life threatening superficial injury to skin resulting from accidentally from daily

Activities

4.11 Data collection methods and tools

Data was collected through interviewer administered structured questionnaire in English and Amharic through Google forms which is developed after thoroughly reviewing previous relevant literatures. All the patients with dermatological manifestation were given appropriate treatment.

4.12 Data Quality control

Training was given to data collectors. To ensure the validity and reliability of the data collection tool, pre-test was done on 5% of the total sample size 1 week before the actual data collection and the questionnaire was checked for its clarity, understand ability and simplicity and it was modified as needed. The filled questionnaire was checked for its completeness by the investigator to assure the quality of data. The investigator was responsible for supportive supervision on the spot and on reviewing all filled questionnaires on daily basis. Multicollinearity was assessed using linear regression for continuous variables (, income) and there was no multicollinearity between the above variables.

4.13 Data processing and analysis

Data was entered and analyzed using SPSS version 26. Data analysis included descriptive statistics, including frequency and percentage. Binary logistic regression was used to see association between dependent and independent variables. Crude and adjusted odds ratios (AOR) were reported with a 95% confidence level. Those variables with p-value of ≤ 0.25 on bivariate analysis were considered for multivariable analysis to determine associations of each variable. The variables with p-value of < 0.05 on multivariable logistic regression were reported to have significant association with vitiligo.

4.14 Ethical consideration

The proposal was submitted to SPHMMC, department of Dermatovernology. Ethical clearance was obtained from the institutional review board (IRB) of SPHMMC. Written informed consent was obtained from each study participant before the administration of the questionnaire. Additionally, assent was obtained from the guardians—typically the mother or father—for patients under 18 years of age. This process involved explaining the study's purpose, procedures, and any potential risks or benefits to the guardians, ensuring they fully understood the information. All the participants were provided information about the purpose of the study and that the personal information of study participants will be kept entirely anonymous, and confidentiality was assured throughout the study period. The right not to participate in the study without any consequences was provided.

4.15 Dissemination of results

The result of the study will be submitted to the SPHMMC Dermatovenorology department, and department Of public health. If possible, the findings will be presented in different seminars, meetings and Workshops and may be published in scientific journals.

5) Results

5.1 Socio-Demographic Characteristics of Participants

A total of 240 individuals participated in this study. Of these more than half 141 (58.8%) patients, were female while 99 (41.3%) were male. The age distribution of participants varied, with the largest proportion consisting of 71 individuals (29.6%) aged 44 years or older. Additionally, there were 53 participants (22.1%) who were under 14 years old, and 45 participants (18.8%) aged between 14 and 24 years.

Furthermore, 15.4% of patients were aged between 25 and 34 years, while 14.2% fell within the 35 to 44 age range. The mean age of the participants was 32.4 years, with a standard deviation of 20.2 years, reflecting a wide age range. Regarding educational status, 22 participants (10.1%) were classified as illiterate, being unable to read and write at a basic level. The largest group consisted of those who had completed Grades 1 to 8, amounting to 84 participants (38.5%). Additionally, 46 participants (21.1%) had completed Grades 9 to 12, and 66 participants (30.3%) had attained a diploma or higher.

The marital status of participants also varied, with 76 individuals (38.2%) being single and 96 participants (48.2%) married. A smaller segment included 19 participants (9.5%) who were divorced or separated, 8 participants (4%) who were widowed.

In terms of occupation, the participants engaged in a range of activities. Only 4 participants (1.8%) were farmers, while 33 (15.1%) worked in government positions and 47 (21.7%) were employed in the private sector. A significant portion, 84 participants (38.5%), were students, and 33 (15.1%) identified as housewives. Additionally, 14 participants (6.4%) were daily laborers, and 3 participants (1.4%) have no work.

The type of residence indicated a strong urban presence, with 212 participants (88.3%) living in urban areas, compared to 28 participants (11.7%) residing in rural settings. The average monthly income of participants was assessed, revealing that 143 individuals (59.6%) earned below the mean of 5975.9 Ethiopian Birr, while 97 participants (40.4%) earned above this threshold. The mean income was reported at 5975.9 Ethiopian Birr; with a standard deviation of 4771.6 Ethiopian Birr (Table 1), average monthly income of children and adolescents was taken as household income after taking ascent.

Table 1: Socio-demographic characteristics of participants attending dermatology OPD at SPHMMC from July2024-december2024

Study variables	Category	Frequency	Percentage
Gender of participants	Male	99	41.2
	Female	141	58.8
Age of participants	<14 Years	53	22.1
	14-24 years	45	18.8
	25-34 years	37	15.4
	35-44 years	34	14.2
	>44 years	71	29.6
Mean age of participants	32.4 with Std. Deviation 20.2		
Educational status	Unable to read and write (illiterate)	22	10.1
	Grade 1–8	84	38.5
	Grade 9- 12	46	21.1
	Diploma and above	66	30.3
Marital status	Single	76	38.2
	Married	96	48.2
	Divorced/Separated	19	9.5
	Widowed	8	4
Occupation	Farmer	4	1.8
	Governmental	33	15.1
	Private	47	21.7
	daily labor	14	6.4
	Student	84	38.5
	Housewife	33	15.1
	no work	3	1.4
Type of residence	Urban	212	88.3
	Rural	28	11.7
Average monthly income in Ethiopian Birr	< 5975.9 Ethiopian birr (Below mean)	143	59.6
	>5975.9 Ethiopian birr (above mean)	97	40.4
Mean of income in Ethiopian Birr	5975.9 with Std. Deviation 4771.6		

Table 2: **Magnitude and distribution of vitiligo with socio demographic factors for Participants attending dermatology OPD at SPHMMC from July2024-december2024**

variables		Diagnosis			
		With vitiligo		No vitiligo	
		Count	%	Count	%
AGE	<14 Years	6	11.3%	47	88.7%
	14-24 years	3	6.7%	42	93.3%
	25-34 years	1	2.7%	36	97.3%
	35-44 years	3	8.8%	31	91.2%
	>44 years	10	14.1%	61	85.9%
Sex	male	7	7.1%	92	92.9%
	female	16	11.3%	125	88.7%
Educational status	read and write (illiterate)	7	31.8%	15	68.2%
	Grade 1–8	7	8.3%	77	91.7%
	Grade 9- 12	4	8.7%	42	91.3%
	Diploma and above	5	7.6%	61	92.4%
Marital status	Single	8	10.5%	68	89.5%
	Married	11	11.5%	85	88.5%
	Divorced/Separated	3	15.8%	16	84.2%
	widowed	1	12.5%	7	87.5%
Occupation	Farmer	1	25%	3	75%
	governmental	2	6.1%	31	93.9%
	private	3	6.4%	44	93.6%
	daily labor	1	7.1%	13	92.9%

	student	8	9.5%	76	93.6%
	housewife	7	21.2%	26	78.8%
	Others (no work, retired. children.)	2	8%	23	92%
Residence	urban	18	9%	194	91%
	rural	5	17.9%	23	82.1%
Income category	< 5975.9 Ethiopian birr (<mean)	15	10.5%	128	89.5%
	>5975.9 Ethiopian birr (above mean)	8	9.3%	89	90.7%

5.2 Prevalence of Vitiligo among patients attending dermatology OPD

Among the participants, only 23 individuals (9.6%) had confirmed vitiligo, while a significant majority, 217 participants (90.4%), did not have the condition. The types of vitiligo observed were predominantly vitiligo vulgaris, which was present in 13 participants (56.52%). Other types included focal vitiligo 3(13.0%%), acrofacial vitiligo 4(17.39) , and mucosal vitiligo 2(8.7%), and segmental vitiligo 1 participant(4.35%). The distribution of vitiligo lesions were varied by site. The head and neck were the most affected areas, with 8 participants (34.8%). Other sites included the trunk (5 participants or 21.7%), chest and abdomen (5 participants or 21.7%), upper and lower extremities (2 participants or 8.7%), lips (2 participants or 8.7%), and genital area (1 participant or 4.3%).

When examining the duration of follow-up, 20 participants (87.0%) reported having fewer than 2 follow-up visits, while only 3 participants (13.0%) had 2 or more visits. In terms of skin lesions, 9 participants (39.1%) exhibited signs of lesions, while 14participants (60.9%) did not. A family history of vitiligo was reported by 10 participants (4.2%), with the majority, 230 participants (95.8%), having no family history. Among those with a family history, 7 participants (70.0%) had first-degree relatives affected, while 3 participants (30.0%) had second-degree relatives.

Comorbidities were present in 10 participants (43.5%), whereas 13 participants (56.5%) reported no comorbidities. The types of comorbidities included diabetes mellitus (8 participants or 34.8%), hypertension (10 participants or 43.5%), and other conditions like thyroid disease, alopecia areata, and leukotrichia. Trigger factors for vitiligo were seen in 7 patients which includes trauma, reported by 5 participants (71.4%), and emotional upset, reported by 2 participants (28.6%). The duration of skin lesion since first visit was also evaluated and around 8 participants (34.8%) have less than 1 year, 7 participants had between two and three year time, and 4 participants (17.4%) showed more than 5 years duration. participants with 4-5 year duration of illness are 4 around (17.4%).

Regarding cigarette smoking, 204 participants (97.6%) reported never smoking, while 2 (1.0%) smoked occasionally and 3 (1.4%) had quit. Alcohol consumption patterns varied, with 85 participants (40.7%) never drinking, 108 (51.7%) drinking occasionally, 11 (5.3%) drinking daily, and 5 (2.4%) having stopped.

Only 29 participants (12.1%) reported using sunscreen, while the majority, 211 participants (87.9%), did not. Among those who used sunscreen, 6 participants (20.7%) applied it to their face and hands, while 22 participants (75.9%) used it solely on their face. This detailed overview of the prevalence of vitiligo and related conditions highlights the complexities of the patient population, including variations in type, site, as well as lifestyle choices that may affect their dermatological health (Table 3).

Table 3: Disease related conditions among participants Attending Dermatology OPD at SPHMMC from July2024-December 2024 (n=240)

Study variables	Category	Frequency	Percentage (%)
Having confirmed Vitiligo	Yes	23	9.6
	No	217	90.4
Type of vitiligo	Vitiligo vulgaris	13	56.52
	Focal vitiligo	3	13.0
	Acrofacial vitiligo	4	17.39
	Mucosal	2	8.7
	Segmental	1	4.35
Site of vitiligo	upper and lower extremity	2	8.7
	head and neck	8	34.8
	Trunk	5	21.7
	chest and abdomen	5	21.7
	Lip	2	8.7
Duration of follow up in number	Genital	1	4.3
	< 2 times	20	87.0
Duration of skin lesion	≥ 2 times	3	13.0
	<1 year	8	34.8
	2-3 years	7	30.4
	4-5 years	4	17.4
	>5 years	4	17.4
Having family history of vitiligo	Yes	10	4.2
	No	230	95.8
Degree of Family member	first degree	7	70.0
	2nd degree	3	30.0
Having comorbidity	Yes	10	43.5
	No	13	56.5
Type of comorbidity	thyroid disease	1	4.3
	diabetes mellitus	8	34.8
	alopecia areata	1	4.3
	Leukotrichia	3	13.0
	Hypertension	10	43.5
Trigger factors	Yes	7	30.4
	No	16	69.6
Type of triggering factor	Trauma	5	71.4
	Emotional upset	2	28.6
	Chemicals	0	
Did the skin lesion has sign	Yes	9	39.1
	No	14	60.9

Study variables	Category	Frequency	Percentage (%)
Cigarette smoking	Never	204	97.6
	Occasionally	2	1.0
	Stopped	3	1.4
Drinking alcohol	Never	85	40.7
	Occasionally	108	51.7
	Daily	11	5.3
	Stopped	5	2.4
Using sun screen	Yes	29	12.1
	No	211	87.9
Part of body using the sun screen	Exposed parts	1	3.4
	face and hand	6	20.7
	face only	22	75.9

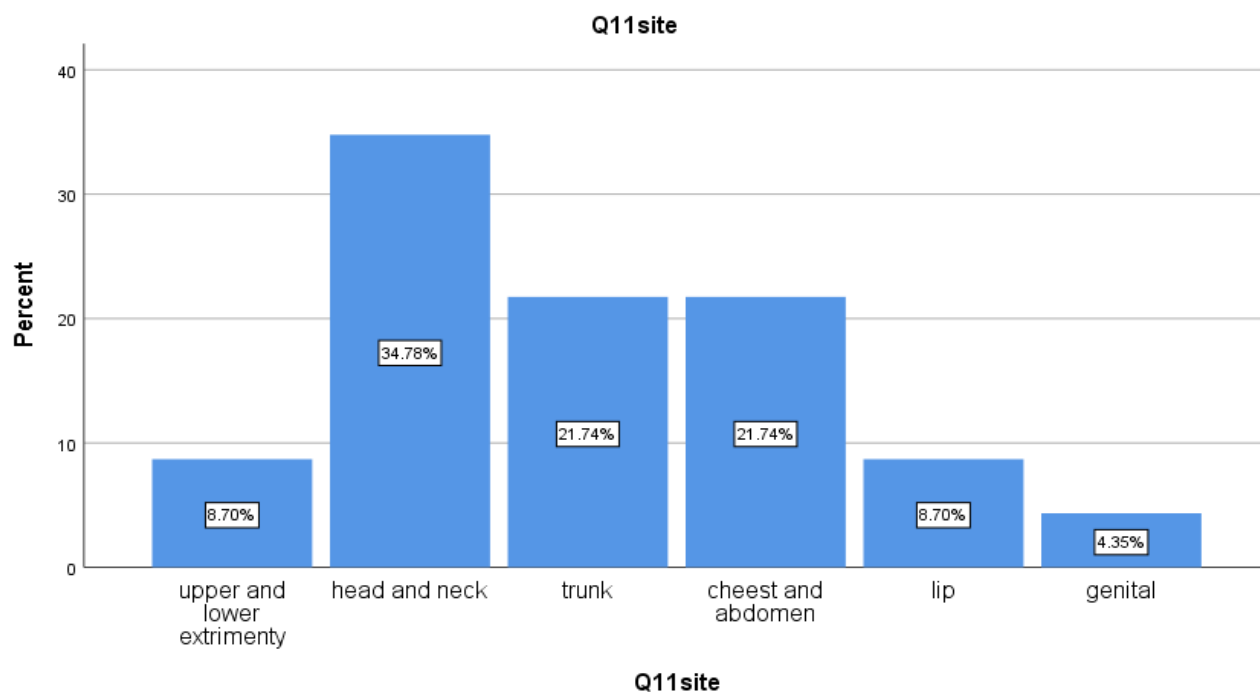


Fig. 1 site of vitiligo lesion of participants attending dermatology OPD, at SPHMMC from July 2024 to December, 2024

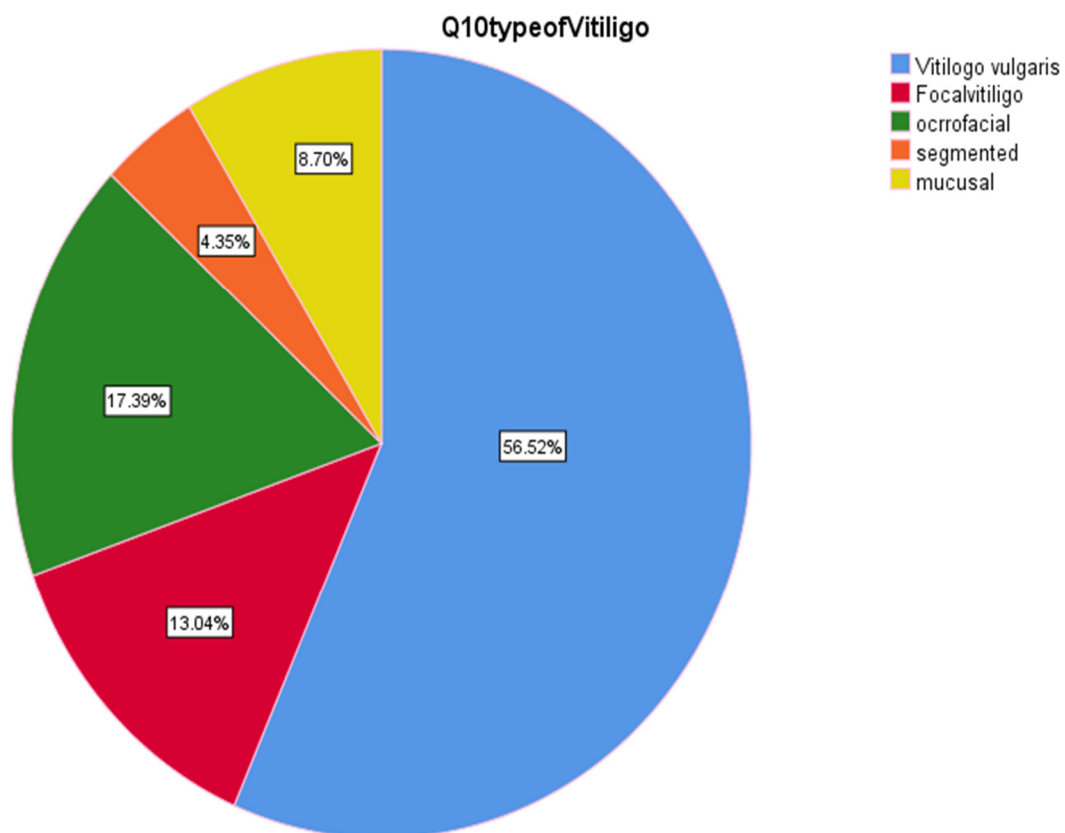


Fig. 2 type of vitiligo lesion of participants attending dermatology OPD, at SPHMMC from July 2024 to December 2024

5.2 Factors associated with vitiligo

Both in the binary and multivariable logistic regression analysis, having a family history of vitiligo and having comorbidity were significantly associated (P-value <0.005) with vitiligo. The multivariable analysis reveals a significant association between having a family history of vitiligo and having comorbidity. The adjusted odds ratio (AOR) is 15.6, with a 95% confidence interval (CI) of (2.92-83.57). This suggests that individuals with a family history of vitiligo have approximately 15.6 times more odds of having vitiligo compared to those without family history of vitiligo.

The presence of comorbidities is also significantly associated with vitiligo. The result indicates that the odd of vitiligo among individuals with comorbidities was about 3.3 times higher (AOR = 3.3; 95% CI: 1.13-9.46) compared to those without comorbidities.

The analysis of alcohol consumption shows varied results. Among those who never drank alcohol, 4 had vitiligo compared to 81 who did not, with a p-value of 0.031. The AOR is 0.24 (95% CI: 0.06-8.74), suggesting a potential protective effect, though the confidence interval is wide, indicating uncertainty. For those who drank alcohol occasionally, 12 participants had vitiligo while 96 did not, with a significant p-value of 0.000. The AOR is 0.027 (95% CI: 0.06-1.61), indicating a much lower likelihood of having vitiligo compared to non-drinkers, although this estimate should be interpreted with caution due to the confidence interval. Among daily drinkers, 6 had vitiligo compared to 5 who did not, with a p-value of 0.174, suggesting no significant association. The AOR is 0.2 (95% CI: 0.14-2.17), but the lack of significance implies that daily alcohol consumption may not have a clear relationship with vitiligo (Table 4).

Table 4: Multivariable logistic regression analysis of Vitiligo with selected predictor variables

Study variables	Category	Having Vitiligo		COR [95% CI]	P-value for COR	P-value for AOR	AOR [95% CI]
		Yes	No				
Family history	Yes	5	5	11.8(3.12-44.52)	0.000	0.001	15.6(2.92-83.57)
	No	18	212	Reference			Reference
Having comorbidity	Yes	10	30	3.9(1.54-9.58)	0.004	0.029	3.3(1.13-9.46)
	No	13	150	Reference			Reference
Drinking alcohol	Never	4	81	0.4(0.12-1.27)	0.120	0.031	0.24(0.06-8.74)
	Occasionally	12	96	0.4(0.09-0.20)	0.000	0.000	0.027(0.06-1.61)
	Daily	6	5	0.2(0.02-2.20)	0.0187	0.174	0.2(0.14-2.17)
	Stopped	1	4	Reference			Reference

6) Discussion

The primary aim of this study was to explore the prevalence and factors associated with vitiligo among patients attending dermatology outpatient departments. This research sought to gain a comprehensive understanding of how vitiligo manifested across various demographic groups and to identify potential risk factors associated with the condition.

In this study, 9.6% of patients were confirmed to have vitiligo. This result was consistent with a cross sectional study conducted among adult patients at Ayder Referral Hospital in Mekelle, Ethiopia, which reported a prevalence of 9.4% [31]. However, this finding was lower than another similar cross sectional study conducted in Mekelle, where the prevalence was found to be 13.15% [61]. Conversely, this result exceeded those from cross sectional study in bahirdar city with reported prevalence of 7.4%. Additionally incidence of vitiligo was also lower in research done at Ibadan, Nigeria, which is around 6%

These discrepancies in prevalence rates could be attributed to various factors, including differences in sample size, demographic characteristics of the study populations, and potential environmental or genetic influences that may have affected the manifestation of vitiligo in different regions.

This study revealed that the predominant type of vitiligo observed was vitiligo vulgaris, which is consistent with findings from other studies [23, 45, 63]. The distribution of lesions was primarily concentrated in the head and neck region, highlighting the visibility of the condition and its potential impact on the psychological well-being of affected individuals.

The distribution of lesions was primarily concentrated in the head and neck region, which is similar with other studies done in India, Tanzania, high lighting the visibility of the condition and its potential impact on the psychological wellbeing of affected individuals. However, lower extremity was commonly involved in studies done at ayder hospital and bahidar.

The multivariable logistic regression analysis reveals a significant association between family history and the likelihood of having vitiligo. Patients with a family history showed a markedly higher odds (AOR = 15.6, 95% CI: 2.92-83.57) compared to those without. This finding is consistent with existing literature that suggests a genetic predisposition to vitiligo, indicating that individuals with affected relatives are significantly more likely to develop the condition [31, 61]. However, a study done Ibadan, Nigeria shows weak association with family history [64]

In addition, the presence of comorbidities also demonstrated a significant relationship with vitiligo (AOR = 3.3, 95% CI: 1.13-9.46). This suggests that individuals with other health conditions are approximately 3.3 times more likely to develop vitiligo. The correlation between vitiligo and various comorbidities, including autoimmune disorders, is well documented, indicating that systemic health issues may have a role in the pathogenesis of vitiligo [22].

This finding emphasizes the need for dermatologists to consider the overall health profile of patients when diagnosing and treating vitiligo.

7) Strength of the study

The study employed a well-defined process for determining sample size, which enhances its statistical power. The identification of family history and comorbidities as significant predictors offers important implications for clinical practice and future research.

7.1) Limitation of the study

While the study included 240 participants, a larger sample size could yield more robust and generalizable results. Furthermore, the cross-sectional design captures data at a single point in time, which restricts the ability to establish causal relationships. Additionally, conducting the research at a single hospital may limit the diversity of the study population and its findings.

8) Conclusion and recommendations

In this study, the prevalence of vitiligo was relatively higher. The multivariable logistic regression analysis highlights the significant roles of family history and comorbidities as predictors of vitiligo.

Therefore, awareness creation among persons with family history about the condition, including its causes, symptoms and available treatment options.

Overall, this analysis underscores the multifactorial nature of vitiligo, reinforcing the importance of comprehensive patient assessments that consider genetic, health, and lifestyle factors.

Therefore, future research should aim to clarify these relationships and explore the underlying mechanisms that contribute to the development of vitiligo in different populations.

FMOH should give great attention to strengthening national skin disease prevention and control service including vitiligo. Awareness creation among persons with family history and comorbidities about vitiligo including its causes, symptoms and available treatment options.

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10) ANNEXES

9.1 Questioner of the study

Section 1: Demographic characteristics of participants

S.no	Study variables	Response and Coding category
Q1	Gender	Male.....1 Female 2
Q2	Age in years	
Q3	Educational status	Unable to write and read....1
		Grade 1–8 2
		Grade 9- 12.....3
		Diploma and above 5
Q4	Marital status	Single.....1 Married 2 Divorced 3 Widowed... 4
Q5	Occupation	Farmer 1 Government employee.....2 Private organization.....3 Daily laborer.....4 Student.....5 House wife.....6 No work 7
Q6	Residence	Urban.....1 Rural....2
Q7	Average monthly income	

Section 2: Frequency distribution shows disease related characteristics of the patients attending OPD,

S.no	Study variables	Response and Coding category
Q8	Having confirmed Vitiligo	Yes.....1 No 2
Q 9	Duration of skin lesion in years	—
Q 10	Clinical type of Vitiligo	Vitiligo vulgaris.....1 Focal vitiligo.....2 Acrofacial vitiligo.....3 Segmental vitiligo 4 Mucosal 5 universal... 6
Q11	Site of vitiligo lesion	limbs.....1 Head and neck.....2 Trunk ...3 Chest and abdomen.....4 Lip.....5 Genital.....6
Q12	Duration of follow up in years ...	
Q13	Did the skin problem has a sign	yes.....1 NO.....2
Q14	Similar problem in the family	Yes.....1 No 2
Q15	Degree of family member	First degree.....1 second degree.....2
Q16	Having comorbidity disease with vitiligo	Yes.....1 No 2

S.no	Study variables	Response and Coding category
Q17	Type of comorbidity disease	Thyroid disorder.....1 Diabetes mellitus.....2 Alopecia areata.....3 Leukotricha.....4 Hypertension....5 Asthma.....6 Other..... 7
Q18	triggering factor	Yes ...1 No.....2
Q19	Type of triggering factor	trauma.....1 emotional upset (stress) 2 foot wear.....3 chemicals... 4
Q20	Do you smoke cigarette's	1Never 3) daily 2Occasionally 4) stopped
Q21	Do you drink alcohol	1Never 3) daily 2Occasionally 4) stopped
Q22	Do you use sunscreen	Yes ...1 NO.....2 If yes
Q23	Which part of your body do you cover by sun screen	1Exposed parts 3) face only 2Face and hand

Annex 2 Ascent and consent form

Annex: Consent form (Age >18 years) English Version

I have read or heard what is written in the information sheet and willing to participate on the Study to be conducted by DR Mulu belay on the prevalence and associated factors of vitiligo attending Outpatient department of Saint Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia 2024. I have understood that my information will be kept confidentially and participation to this study is voluntary and I can stop the interview anytime I felt uncomfortable.

I fully consent to participate in this study.

Participant/s Signature_____ Interviewer signature----- Date-----

Annex: Consent form (Age UNDER 18 years) English Version

I have read or heard what is written in the information sheet and willing to participate on the Study to be Conducted by DR Mulu belay on the prevalence and associated factors of vitiligo attending outpatient Department of Saint Paul Hospital Millennium Medical College, Addis Ababa, Ethiopia 2024.

As parent or guardian, I have understood that my information given on behalf of my child will be kept Confidentially and participation to this study is voluntary and I understood that I can stop the interview Anytime I felt uncomfortable.

I fully consent to participate in this study.

Parent or guardian /Signature_____ Interviewer signature----- Date-----