

RESEARCH NOTE

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# Proportion Of vitiligo and associated factors among patients visiting dermatology opd in tibebe ghion specialized hospital and addisalem primary hospital, bahirdar city, Ethiopia,2023

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## Abstract

**Objective** This study aimed to determine the prevalence of vitiligo and associated factors among patients visiting the dermatologic outpatient departments at Tibebe Ghion Specialized Hospital and Addisalem Primary Hospitals, Bahir Dar, Ethiopia, from September 15 to November 15, 2023.

**Results** Among the 460 patients studied, 243 (52.8%) were female, with the majority (28.9%) aged between 25 and 34 years. The overall prevalence of vitiligo was found to be 7.4% (34 patients). Significant predictors of vitiligo included rural residence (AOR: 3.18; 95% CI: 1.10–9.18), family history of vitiligo (AOR: 2.20; 95% CI: 2.16–4.76), and aggravating factors such as trauma (AOR: 1.08; 95% CI: 1.01–2.08). The highest prevalence was observed in the 14–24 age group. These findings suggest the importance of awareness campaigns focusing on the causes, symptoms, and treatments of vitiligo, particularly among young adults in rural areas.

**Keywords** Chronic, Disease, Ethiopia, Bahr dar, Skin, Vitiligo

## Background

White spots, that are caused by a selective loss of melanocytes. Keratinocyte-produced cytokines are partially responsible for the survival and functionality of melanocytes in this intimate interaction. The loss of a functional melanocytes is the source of vitiligo, which is an acquired pigmentary skin disorder characterized by white

(depigmented) patches on the skin. It affects both sexes equally and can manifest at any age. It could also result in hair and eye lightening [1]. White spots appear on the skin due to this chronic illness, which mostly affects the hands and face. Rarely is it accompanied by bodily symptoms like itching. Although it can happen at any age, the disease usually first manifests in childhood or early adulthood, usually between the ages of 10 and 30 [2].

Vitiligo is disfiguring in all races but is particularly more pronounced in dark-skinned individuals due to the stark contrast between the affected and unaffected skin [3]. The pathogenesis of vitiligo is multifactorial and not fully understood, potentially involving mechanisms such

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as autoimmunity, intrinsic defects in melanocytes, and oxidative stress [4].

The autoimmune responses that lead to vitiligo may be initiated by reactive oxygen species (ROS), generated by various factors, indicating a disruption in melanocyte redox balance and weakened antioxidant defenses. This oxidative stress causes melanocytes to produce autoantigens or damage-associated molecular patterns (DAMPs), which activate both innate and adaptive immune responses. Consequently, this inflammatory cascade results in melanocyte dysfunction and eventual cell death [4].

The development of the disease may be influenced by infectious organisms, Koebner's phenomenon (KP), psychological factors such as stress and personality traits, and environmental factors. Koebner's phenomenon, or the "isomorphic response of Koebner," refers to the appearance of new lesions of a skin condition at sites of mechanical trauma. The incidence of KP ranges between 21% and 64% and has been reported to be associated with vitiligo [5].

Vitiligo has been reported in association with various endocrinopathies and other autoimmune disorders [6]. Vitiligo's disfigurement significantly impacts the patient's psychological well-being. Depending on its extent and distribution, vitiligo is classified as either localized or generalized. Generalized vitiligo is characterized by symmetrical depigmented patches across the body. A less common form is segmental vitiligo, which presents as asymmetrical, focal, or dermatomal depigmented patches or macules [7]. Current treatments for vitiligo are challenging, expensive, and often produce unsatisfactory outcomes. The disease typically progresses slowly, with the rate of progression varying based on the patient's skin condition and triggering factors like stress levels [7]. The highest reported global prevalence of vitiligo is 8.8%, as observed in a single skin institute in Delhi, India [8]. According to a study done in the USA, 1.38% of participants self-reported having vitiligo [9]. Furthermore, it occurs infrequently in Asian countries, especially in Korea. Between 2009 and 2011, the yearly incidence of vitiligo was approximately 0.13% [10], and 0.19% of people in China had vitiligo [11]. In our continent Africa, the prevalence is low with ranges of 0.9% in Benin [5] to 13.15% in Ethiopia [12] respectively. The pooled prevalence from 82 population- or community-based studies was 0.2% (95% CI: 0.1–0.2%), while the prevalence from 22 hospital-based studies was 1.8% (95% CI: 1.4–2.1%), according to a 2016 meta-analysis evaluating the prevalence of vitiligo across 103 studies carried out in different nations [13]. Brazil and Korea had a minor female predominance with M: F of 1:1.38 [14] and 1:1.31 [10] respectively. Another element linked to vitiligo is family history. According to an Egyptian study, vitiligo ran in

the family for 32.27% of children, 7.32% of teenagers, and 5.71% of adults [15]. Comparably, a study conducted in Nigeria found little female predominance with a male-to-female ratio was 1:1.3 [16].

**Objective** This study aimed to determine the prevalence of vitiligo, and factors associated among patients visiting the dermatologic outpatient department at Tibebe Ghion Specialized Hospital and Addisalem Primary Hospitals Bahir Dar from September 15 to November 15, 2023, Bahir Dar, Ethiopia.

## Methods

### Study area and period

The study utilized an institutional-based cross-sectional study design conducted among patients visiting dermatology OPD at Tibebe Ghion Specialized and Addisalem Primary Hospital in Bahdar, 2023. These two sites were selected due to their large patient population with dermatologic cases seen. The sample size for the study on vitiligo prevalence was determined using single proportion and double population formulas. For the first objective, a sample size of 300 patients was calculated using the single proportion formula with a 10% contingency for a non-response rate. For the second objective, a final sample size of 460 patients was determined based on significantly associated variables from previous studies. Systemic random sampling was employed at Tibebe Ghion Specialized Hospital and Addisalem Primary Hospital, with the proportional allocation of sample sizes. The sampling interval was calculated based on the total number of patients seen over the study period. Participants were selected using a lottery method from the sampling interval, with every third patient interviewed until the required sample size was achieved.

### Eligibility criteria

#### Inclusion criteria

All patients visiting dermatology OPD at TGS and Addis Alem primary hospital from September 15 to November 15, 2023.

#### Exclusion criteria

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

### Study variables

**Dependent variable** Vitiligo.

**Independent variables** includes Age, Sex, Marital status, Place of residency, Occupation and Educational status. Disease related factors; Clinical type of vitiligo, Age of onset, Duration of lesion since the first visit Physical factors; Family history of vitiligo, Precipitating factors

medical factors; Medical, Autoimmune, or systemic disorders diabetes mellitus, anemia, leukemia, asthma, and hypertension.

### Operational definition

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

**Trauma:** nonlife treating superficial injury to the skin resulting from accidentally in daily activities First degree

Relative: Father, Mother, Sister, Brother.

Second degree relative: Aunt, Uncle, Nephew, Cousin, Grandmother and Grandfather.

**Aggravating factors:** Any condition that makes the occurrence of vitiligo worse.

### Data collection tools, techniques, data management, and analysis

Data was collected by using an interviewer-administered questionnaire of the Amharic version that has been translated from the English version. The data was collected by two Dermatovenereology residents. To ensure the quality of the questionnaire pretest was done on 23 patients at Felege Hiwot Comprehensive Specialized Hospital Dermatology OPD for accuracy and the necessary adjustments were made. The one-day training was

given to data collectors and supervisors on the selection procedure of study participants, the purpose of the study, on the steps how they can give the necessary information to the participants when they start data collection. The data collectors informed the study participants about how they could fill in the necessary information and their contribution to participation in the study. The supervisor and principal investigator supervised and checked the completeness and quality of data daily. After data collection, questionnaires were reviewed and checked for completeness and the necessary feedback was offered. Data were collected using a questionnaire specifically developed and adapted for our research objectives (see questionnaire 1). Then the data obtained from the study population was entered, cleaned, and analyzed. Data was entered, cleaned, and analyzed using the SPSS version 26 package. Descriptive statistics was implemented for Data analysis and the results are presented using Tables, Graphs, and charts. Binary logistic regression was used to check the association of independent variables with the dependent variable. The variables found to have an association with the dependent variable at  $p$ -value  $< 0.25$  were entered into the multivariable analysis.  $P$ value  $\leq 0.05$  was considered statistically significant.

## Results

### Sociodemographic and baseline characteristics

Of the total study subjects, more than half of the participants were females 243(52.8%). Around 133(28.9%) of the patients aged between 25 and 34 years, most of the respondents were urban residents 370(80.4%), half of the respondents were single 255 (55.4%), 151 (32.8%) students and 146(31.7%) with an educational status of higher education and above. (Table 1)

### Prevalence of vitiligo

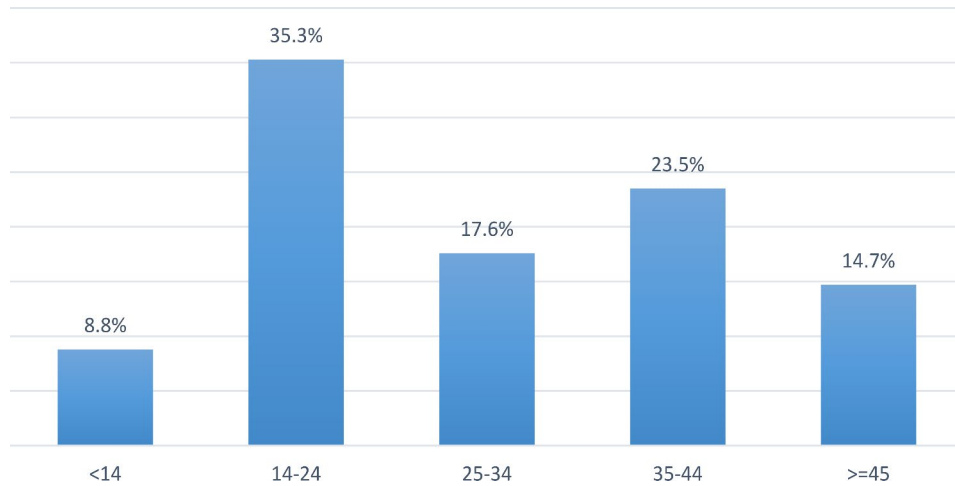
The prevalence of vitiligo among the total study participants was 34(7.4%). The distribution of vitiligo was similar in males and females 17 (50%) in each giving a male to female ratio of 1:1. From the total 34 patients, the prevalence is high in the age group of 14–24 years (35.3%) followed by age group 35–44 years (23.5%). (Fig. 1)

### Disease related conditions

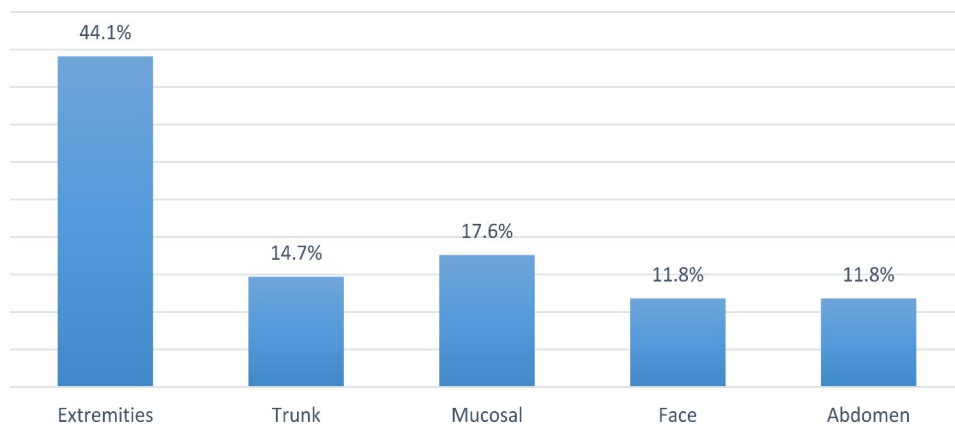
The commonest site of initial onset of skin change was at the upper and lower extremities 15(44.1%) followed by the mucosal area 6 (17.6%). Of all 34 patients who have vitiligo 17 (50%) were diagnosed with generalized vitiligo, 9 (26.5%) with focal vitiligo, and the rest 7 (23.5%) with Mucosal, Acrofacial, and Segmental Vitiligo. Among the patients, 8 (23.5%) had a sign of Pruritus. Duration of the disease at the time of presentation varied from less than one year up to three years. (Figs. 2 and 3)

**Table 1** Socio-demographic characteristics of the participants attending dermatology OPD, at TGSH and Addis Alem primary hospital from September 15 to November 15, 2023

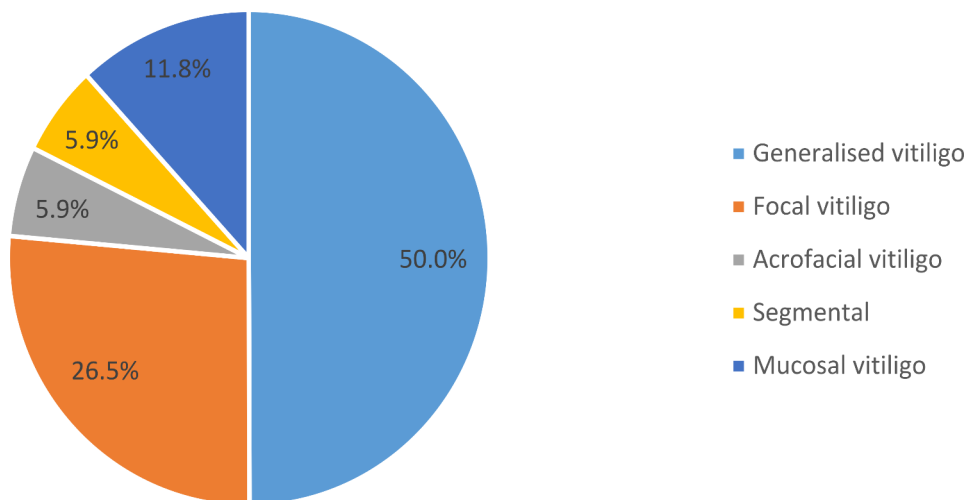
Variables	Frequency	Percentage
Sex		
Male	217	47.2
Female	243	52.8
Age		
< 14	46	10
14–24	126	27.4
25–34	133	28.9
35–44	81	17.6
>= 45	74	16.1
Residence		
Urban	370	80.4
Rural	90	19.6
Marital status		
Married	205	44.6
Single	255	55.4
Occupation		
Farmer	40	8.7
Civil servant	126	27.4
Private worker	143	31.1
Student	151	32.8
Educational status		
Cannot read or write	76	16.5
Primary school	121	26.3
Secondary school	117	25.4
Higher education and above	146	31.7



**Fig. 1** Prevalence of vitiligo based on age of participants attending dermatology OPD, at TGSH and Addis Alem primary hospital from September 15 to November 15, 2023



**Fig. 2** Site of initial onset of skin change among participants attending dermatology OPD, at TGSH and Addis Alem primary hospital from September 15 to November 15, 2023



**Fig. 3** Type of vitiligo among participants attending dermatology OPD, at TGSH and Addis Alem primary hospital from September 15 to November 15, 2023

**Table 2** Disease related conditions among participants attending dermatology OPD, at TGSH and Addis Alem primary hospital from September 15 to November 15, 2023

Variable	Frequency	Percent
Age during diagnosis		
< 10	4	11.8
10–20	12	35.3
21–30	8	23.5
31–40	5	14.7
41–50	3	8.8
51–60	2	5.9
Did the skin problem had a sign		
Yes	8	23.5
No	26	76.5
Family history of vitiligo		
Yes	6	17.6
No	28	82.4
Type of family member		
First degree relative	4	66.6
Second degree relative	2	33.4
Is there any aggravating factor		
Yes	11	32.4
No	23	67.6
Type of aggravating factor		
Small trauma to skin	7	20.6
Stress	2	5.9
Plastic shoe	2	5.9
Duration of follow up		
< 1year	28	82.4
2–3 years	6	17.6

A family history of vitiligo was found in 6 (17.6%) of patients. Family history in first-degree relatives was 66.6% and in second-degree relatives, 33.4%. Of the total cases 11(32.4%) of them identified aggravating factors. The major aggravating factor was skin trauma 7(63.6%) followed by stress 2 (18.2%) and wearing plastic shoes 2 (18.2%). (Table 2)

**Factors associated with vitiligo**

In the bivariate analysis, Residence, Educational status, Occupation, Family history of vitiligo, and Aggravating factors were associated with vitiligo at  $P < 0.25$ . In multivariable logistic regression three variables, i.e. Residence, Family history of vitiligo, and Aggravating factors remained significantly associated with Vitiligo at  $p < 0.05$ . Rural residents were 3 times more likely to be affected by vitiligo than urban residents (AOR: 3.18; 1.10–9.18). Participants with a family history of vitiligo had 2 times more chance of being affected (AOR: 2.20; 2.16–4.76). In addition, patients with aggravating factors have a great chance of being affected by vitiligo (AOR: 1.08; 1.01–2.08). (Table 3)

**Table 3** Factors associated with vitiligo among participants attending dermatology OPD, at TGSH and Addis Alem primary hospital from September 15 to November 15, 2023

Variable	Vitiligo		COR (95% CI)	AOR (95% CI)
	Yes	No		
Sex				
Male	17	200	1	
Female	17	226	0.88 (0.44–1.78)	
Age				
<=24	15	157	1	
25–34	6	127	1.04 (0.24–4.57)	
35–44	8	73	0.69 (0.23–2.04)	
>=45	5	69	1.53 (0.45–5.21)	
Residence				
Urban	17	353	1	
Rural	17	73	0.21 (0.10–0.42)	3.18 (1.10–9.18) *
Marital status				
Single	15	215	1	
Married	19	211	0.57 (0.07–4.53)	
Occupation				
Farmer	10	30	1	
Private worker	9	136	1.83 (0.71–4.73)	
Student	15	138	0.28 (0.11–0.71)	
Educational status				
Can't read and write	7	69	1	
Primary education	12	109	0.32 (0.11–0.94)	
Secondary education	10	107	0.37 (0.13–1.14)	
Higher education and above	5	141	0.35 (0.11–1.14)	
Family history of vitiligo				
Yes	6	23	3.75 (1.41–9.97)	2.20 (2.16–4.76) *
No	28	403	1	
Aggravating factors				
Yes	11	6	0.03 (0.01–0.08)	1.08 (1.01–2.08) *
No	23	420	1	

Note: \* statistically significant

**Discussion**

In our study the prevalence of vitiligo is high 34 (7.4%) with 95%CI (1.90, 1.95), This is comparable to a study done in Ayder Referral Hospital Mekelle, Ethiopia (9.4%) [1]. The finding is higher than reports from a study done in developing countries like Benin (0.9%) [5] and Nigeria (3.2%) [17]. However, lower than a similar study conducted in Mekelle, Ethiopia with a prevalence of 13.15% [7]. This difference might arise due to varying ethnic backgrounds and environmental conditions in the region.

Based on our study the highest prevalence of vitiligo was observed in the age group of 14–24 years, accounting for 35.3% of the total cases, followed by the age group of 35–44 years, which accounted for 23.5%. This finding varies from the findings from a Meta-analysis done in

Korea with the highest distribution at the age above 60 years [10].

Based on the finding, 50% of the patients had generalized vitiligo, while 26.5% had focal vitiligo. This finding is consistent with the finding from India in which 64.9% of patients had generalized vitiligo [11]. The difference might be due to factors, such as genetic predisposition, environmental triggers, and differences in patient referral patterns. Based on the finding, 50% of the patients had generalized vitiligo, while 26.5% had focal vitiligo. In addition, a study conducted in Turkey found that 54.5% of patients had generalized vitiligo, while 45.5% had focal vitiligo [18].

We found that rural residents were 3 times more likely to develop vitiligo compared to urban residents (AOR: 3.18; 1.10–9.18). This is in line with the study conducted in Ayder referral hospital showing rural residents have 3 times increased risk than urban residents (AOR=3.88,95%CI=1.56,9.69) [1]. This finding is also in line with a study conducted in Nigeria where the prevalence of vitiligo was higher in rural areas compared to urban area [17]. The reasons for this might include increased exposure to environmental triggers such as sunlight, dust, trauma and pollution, as well as limited access to healthcare services in rural areas.

Based on our finding participants with a family history of vitiligo had 2.02 times increased risk of developing vitiligo (AOR: 2.20; 2.16–4.76). This finding is similar to a study conducted in Ayder referral hospital, Ethiopia where respondents who have a similar history of vitiligo in the family have a 6.05 times more chance of being affected by Vitiligo [1]. In addition, we found that patients who experienced aggravating factors, such as stress or physical injury, were more likely to develop vitiligo (AOR:1.08; 1.01–2.08) additionally, in our study of 11 vitiligo patients, we identified physical trauma as the most common aggravating factor (7 patients), followed by emotional stress (2 patients) and plastic shoe wear (2 patients). These findings suggest that both physical and psychological factors, along with certain environmental exposures, may contribute to the worsening of vitiligo. It is consistent with the Mekelle study, the precipitating factors were noticed in 13 (3.2%) patients. Physical trauma/injury and emotional upset are the most common precipitating factors 6 (46.2%) and 4(30.8%) respectively [1]. This finding is also consistent with a study conducted in the United States that found 60% of patients with vitiligo reported experiencing stress before the onset of their symptoms [9]. This may be due to most of the people in this area working outdoors and being easily prone to trauma also majority of people are economically dependent due to this emotional upset being more common.

## Limitation

Some limitations include the scarcity of previous research studies in the area and the political instability, which may have reduced the number of patients able to visit the health facility.

## Conclusion

The prevalence of vitiligo in patients seen at the hospitals was found to be 7.4%, indicating that approximately 1 in every 14 patients had vitiligo. Generalized vitiligo emerged as the most common type, while residence, family history of vitiligo, and aggravating factors remained significant predictors of the condition. Considering these findings, it is recommended that the regional health bureau assign professional personnel to properly diagnose and treat vitiligo cases. Furthermore, targeted efforts are needed at Tibebe Ghion Specialized Hospital and Addisalem Primary Hospital to increase awareness and provide health education, particularly among young adults aged 14–24 years, about vitiligo, its causes, symptoms, precipitating factors, and treatment options. Additionally, future research should focus on exploring the role of aggravating factors in the development and progression of vitiligo.

## Abbreviations

DAMPs	Damage-Associated Molecular Patterns
DM	Diabetes Mellitus
KP	Koebner's phenomenon
OPD	Outpatient Department
PI	Principal Investigator
QOF	Quality of Life
ROS	Reactive oxygen species
SPSS	Statistical Package for Social Science Studies
TGSH	Tibebe Ghion Specialized Hospital
USA	United States of America

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s13104-024-06938-x>.

Supplementary Material 1

## Author contributions

GK conceived, designed and wrote the manuscript the study and AT wrote and edited the manuscript manuscript text formulated the study design and dataquality check performed statistical analysis YA, EA, and RGH contributed to the literature review.

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No grant from a public, private, or nonprofit organization was given for this research.

## Data availability

The corresponding author can provide the datasets used and analyzed in this study upon reasonable request.

## Declarations

### Ethics approval and consent to participate

Ethical clearance for this study was obtained from the Ethical Review Board of Bahir Dar University, College of Medicine and Health Science. The relevant offices within Tibebe Ghion Specialized Hospital and Addisalem Primary Hospital were informed through official letters (version 799/2023/003). Strict confidentiality was maintained throughout the study by using non-identifiable data and restricting access to authorized personnel only. The study was conducted in full compliance with institutional and national guidelines, ensuring that the research did not impact participants or compromise patient confidentiality and quality of care. The research design posed no additional risks or repercussions for the participants. Informed consent was obtained from all human participants involved in the study. Participants were fully informed about the study's objectives, procedures, and their rights. Given the community's literacy levels, verbal consent was deemed appropriate and approved by the Ethical Review Board. For participants under the age of 16, informed consent was obtained from their parents or legal guardians. This process adhered to the principles of the Declaration of Helsinki, ensuring respect for participants and protection of their rights. All necessary declarations related to human ethics and consent to participate have been included in this manuscript as per the submission guidelines.

### Consent for publication

Not relevant.

### Competing interests

The authors declare no competing interests.

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