



**ADDIS ABABA UNIVERSITY  
COLLEGE OF HEALTH SCIENCES  
SCHOOL OF MEDICINE**

**MAGNITUDE AND CLINICAL PATTERN OF VITILIGO AT ALERT CENTER  
ADDIS ABABA ETHIOPIA**

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## Acronyms

- **A.A:** Addis Ababa
- **AAU:** Addis Ababa University
- **ALERT:** All African Leprosy Rehabilitation and Training center
- **E.C:** Ethiopian Calendar
- **FMOH:** Federal Ministry of Health
- **G.C:** Gregorian Calendar
- **NB- UVB:** Narrow-Band UVB
- **OPD:** Outpatient Department
- **SV :**Segmental Vitiligo
- **NSVT:**Non Segmental Vitiligo
- **TBSA:** Total Body Surface Area

## **Abstract**

*Background:* Vitiligo is an acquired, idiopathic, and worldwide common depigmentation disorder with an estimated prevalence from 0.5 to 2%. The total number of people suffering from vitiligo is estimated at around 65-95 million people worldwide and little known about Vitiligo in Ethiopia

*Objective:* To determine the magnitude and clinical pattern of vitiligo in ALERT hospital

*Methodology:* A retrospective cross-sectional descriptive study of medical records of patients diagnosed with vitiligo was conducted from January 2019 to December 2020

*Results:* The Hospital magnitude of vitiligo was found to be 2.8 % and there was a slight female preponderance with 529(48.8%) males and 554(51.2) females, giving a male to female ratio of 1: 1.05. The commonest clinical form of vitiligo was vitiligo Vulgaris type 50(33.3%) followed by focal vitiligo 40 (26.7%), acrofacial vitiligo 19 (12.7%), mucosal 21(14%) The most common site of the presentation was combination face& neck+trunk+limb 51(34%), head and neck 32 (21.3%), periorificia+distal finger 20 (13.3%), followed by the mucosa 17(11.3%).

*Conclusions* vitiligo on the skin of color is usually a very striking disease .our findings that the pattern of vitiligo is similar to that reported from the other parts world.

# 1. Introduction

## 1.1 Background

Vitiligo is an acquired, idiopathic, and common depigmentation disorder of the skin that has an estimated prevalence of 0.5–2% of the population worldwide [1]. The clinically characteristic symptoms of vitiligo are pale or milk-white macules or patches due to the selective destruction of melanocytes. They occur on the skin in different parts of the body sometimes also on the mucous membrane. Males and females are equally affected, although women and girls often seek consultation more frequently, possibly due to the greater negative social impact than for men and boys [2, 3]. In an institutional-based cross-sectional study conducted in conveniently selected dermatologic clinics of Mekelle city, Ethiopia, of the 403 randomly selected dermatological patients who presented in the year 2017 to 2019, the prevalence of vitiligo was 13.15% [26].

Multiple mechanisms have been proposed for melanocyte destruction in vitiligo. These include genetic, autoimmune responses, oxidative stress, generation of inflammatory mediators, and melanocyte detachment mechanisms. None of these proposed theories are in themselves sufficient to explain the different vitiligo phenotypes, and the overall contribution of each of these processes is still under debate, although there is recently consensus on the autoimmune nature of vitiligo [6,32,33,34,35]. NSV and SV were believed to have distinct underlying pathogenetic mechanisms due to their different clinical presentations, with the neuronal hypothesis or somatic mosaicism favored for the segmental form [4].

In 2011, an international consensus classified vitiligo into two major forms: nonsegmental vitiligo (NSV) and segmental vitiligo (SV) [5]. The term vitiligo was defined to designate all forms of NSV (including acrofacial, mucosal, generalized, universal, mixed, and rare variants). Distinguishing SV from other types of vitiligo was one of the most important decisions of the consensus, primarily because of its prognostic implications. “Mixed vitiligo” in which SV and NSV coexist in one patient, is classified as a subgroup of NSV. Generalized and acrofacial vitiligo is the most common subtypes.

The diagnosis of vitiligo is generally straightforward, made clinically based upon the finding of acquired, amelanotic, nonscaly; chalky-white macules with distinct margins in a typical distribution: periorificial, lips, and tips of distal extremities, penis, segmental, and areas of friction [2, 6,7]. The diagnosis of vitiligo does not usually require confirmatory laboratory tests. A skin biopsy or other tests are not necessary except to exclude other disorders.

The treatment of vitiligo is still one of the most difficult dermatological challenges. An important step in the management of vitiligo is to first acknowledge that it is not merely a cosmetic disease and that there are safe and effective treatments available [8]. These treatments include phototherapy, topical and systemic immunosuppressant, and surgical techniques, which together may help in halting the disease, stabilizing depigmented lesions, and stimulating repigmentation [9,10]. The face, neck, trunk, and mid-extremities respond best to therapy, while the lips and distal extremities are more resistant [11]. Repigmentation appears initially in a perifollicular pattern or at the periphery of the lesions. Treatment for at least 2–3 months is needed to determine the efficacy of treatment. UV light-based therapy is the most common treatment for vitiligo and, when combined with additional therapy, is associated with an improved outcome [10].

For patients with vitiligo involving <5% percent of the total body surface area (TBSA), we suggest topical corticosteroids as initial therapy. Topical calcineurin inhibitors are preferred to topical corticosteroids for body areas at increased risk of atrophy. Targeted phototherapy is an option for patients with limited vitiligo who do not respond to topical therapies. For patients with vitiligo involving >, 5% percent of the TBSA phototherapy with NB-UVB. Topical corticosteroids or topical calcineurin inhibitors may be intermittently used in combination with NB-UVB phototherapy. Surgical therapies involving the autologous transplantation of healthy melanocytes in depigmented areas are an option for patients with localized, recalcitrant vitiligo and patients with segmental vitiligo. Depigmentation of residual pigmented areas with mono benzyl ether of hydroquinone (monobenzone) can be considered for patients with extensive recalcitrant vitiligo that does not respond to repigmentation regimens and for those with extensive vitiligo who do not desire to undergo repigmentation treatments.

Patients with vitiligo often have several psychological problems, such as depression, anxiety, and shame which can result in low self-esteem and social isolation [13, 14]. One recent meta-analysis found that a range of psychological outcomes is common in people with vitiligo including depression and anxiety [15]. Vitiligo has negative impacts on sexual life. Vitiligo patients report not receiving enough support from their physicians, friends, and family [16, 17] Patients with vitiligo experience discrimination as many people are scared or uncomfortable with others who have vitiligo.



## 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 associated with vitiligo can cause serious emotional stress for the patient, which necessitates treatment. 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 clinical pattern of Vitiligo in Ethiopia.

Despite different treatment modality most of the therapeutic options are time-consuming and require long-term follow-up, most of the interventions in the management option are not accessible in Ethiopia. A few studies have been done in our country about vitiligo, among this, Clinical –Epidemiological Profile and Treatment pattern of Vitiligo in the selected dermatologic clinic of Mekelle city Northern Ethiopia, 2017-19 by Afewerki Geberemeskel Tsadik, however, this paper has concentrated only on Tigray region. This research work determined a magnitude and clinical pattern of vitiligo specifically at the AA since ALERT referral hospital is the center of excellence as well as the referral hospital for dermatology cases in the country.

### **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 A. A ALERT hospital in Ethiopia, which is the largest dermatology referral center in the country.

This study will provide the clinicoepidemiologic profile of vitiligo. It will alarm policymakers and clinicians to give deserved attention to newer and emerging treatment modalities of vitiligo. This study will serve as an entry point for other researchers since there was insufficient research on the area.

## 2. Literature review

Vitiligo is a relatively common dermatologic finding and one that has been observed since ancient times. The term vitiligo is thought to come from the Greek vitelius (calf), and thereby to connote the resemblance of the white spots of vitiligo to white patches on a calf [25, 26]

A review by Christan Kruger & et.al of the worldwide prevalence of vitiligo done in 2012 Conclude that the worldwide prevalence of vitiligo ranges between 0.5- 2%. [18]

In the metropolitan region of Sao Paulo, a retrospective cross-sectional study was conducted to assess the clinical and epidemiological profile of 669 patients with vitiligo from January 2001 to May 2006. There was a predominance of females (62.2%) and adult age group (62.5%), with higher prevalence peaks between the second and third decades of life (18.3% and 16.9%, respectively). The most frequent phototype in the skin was III (49.9%). Lesions began on the face most commonly in children and adolescents (32.6%) and the elderly (23.3%), and on hands in adults (24.0%). There was a higher prevalence of segmental vitiligo in children and adolescents (36.4%), compared with adults (11.3%) and the elderly (6.7%), and vitiligo with stable evolution was proportionately more frequent in childhood and adolescents (46.2%) than in adults (32.5%) and *elderly* (36.7%) [20]

In Northeast China, a comprehensive survey of vitiligo patients using a predesigned questionnaire was conducted from November 2015 to November 2016. the questionnaire consisted of two sections related to vitiligo, including sociodemographic data and clinical information. A total of 983 vitiligo patients answered the questionnaire. The rates of female and male patients were comparable. The investigated patients were mostly young and middle-aged. Most patients suffered from vitiligo in childhood or young adulthood. Vitiligo Vulgaris was the most common type of vitiligo in the clinic and 53.0% of patients were categorized as body surface area (BSA) of 10% or less. In response to the latest treatment, 43.6% of patients achieved a good response (completely stopped or almost disappeared). More patients at the active stage showed good responses than the patients at the stable stage ( $\chi^2 = 7.866$ ,  $P < 0.05$ ). Chronic comorbid condition(s) were observed in 12.6% of patients with BSA of more than 10%, whereas those were seen in 6.0% of patients with BSA of 10% or less ( $\chi^2 = 12.969$ ,  $P < 0.05$ ). In conclusion, active vitiligo seems to respond better than stable vitiligo, and complications with other autoimmune diseases are more frequently observed in severe patients than mild patients. [19]

In a cross-sectional study done in Moshi Tanzania to assess the clinicoepidemiologic profile of vitiligo in 2012, the male to female ratio was 1:1.8 and the median age 24 years (range 3 to 87). The mean age at disease onset was 26.2 years (SD 19.5). The types of vitiligo observed were as follows: vitiligo Vulgaris (50.8%) focal non-segmental (23%) and acrofacial (12.3%). Positive family history was noted in about 10% of the population studied. The commonest sites of initial onset were head and neck (41.8) and lower limbs (18.0%). The median body surface area affected was 6% (range 1 to 90%). Autoimmune diseases were noted in 17.2% of the patients. Atopic dermatitis (9.8%) was the most common associated disease. Vitiligo affects all ages with more females affected. Vitiligo Vulgaris is the commonest type and few patients have first-degree relatives with vitiligo.[36]

A 2016 meta-analysis showed the prevalence of vitiligo from 82 population- or community-based studies were 0.2% (95%CI: 0.1%–0.2%) and from 22 hospital-based studies was 1.8% (95%CI: 1.4%–2.1%). A relatively high prevalence of vitiligo was found in Africa areas and female patients. For population- or community-based studies, the prevalence has maintained at a low level in recent 20 years and it has increased with age gradually. For hospital-based studies, the prevalence has shown a decreased trend from the 60s till now or from young to old [25].

In Ethiopia, an institutional-based cross-sectional study was conducted in conveniently selected dermatologic clinics of Mekelle city. A two-phased study was conducted, in which the first was to determine the prevalence of vitiligo while the second phase was to describe the clinical-epidemiological profile and treatment pattern of vitiligo. 403 randomly selected dermatological patients were included in the first phase study. In second phase study included vitiligo cases from the first phase study and additional vitiligo cases found in the prospective study. Of the 403 randomly selected dermatological patients who presented in the year 2017 to 2019, the prevalence of vitiligo was 13.15%. Of the 79 cases with vitiligo, nearly two-thirds (50, 63.3%) were males with five years as the median age at onset of the disease. Positive family history of vitiligo was recorded in about one-third (25, 31.6%) of the cases. Limbs (48, 44.5%) followed by the head and neck (26, 24%) were the most commonly affected parts of the body at the onset of the disease. The most prevalent clinical form of vitiligo was Vulgaris (39.2%) followed by the focal type (26.6%). Emotional upset (24, 33.8%) and physical traumas (23, 32.4%) were the frequently reported triggering factors of vitiligo. Three-fourths (75.5%) of the cases had prescriptions of topical corticosteroids, and 24.5% of them had prescriptions of sunscreen lotion. In general, the prevalence of vitiligo was found to be high; the clinicoepidemiological profile of

vitiligo in Ethiopia was similar to that found globally. However, treatment options for vitiligo were very limited in Ethiopia [26].

In another facility-based cross-sectional study conducted among 423 adults aged 14 years and above in Ayder referral hospital from July to September 2014, the prevalence of vitiligo was found to be 9.4%. and the mean age at onset of the disease was found to be  $27.37 \pm 12.91$  years. Among 405 patients 11 (2.7%) of the patients had a family history of vitiligo. Lower limbs (28.9%) followed by head and neck (21.1%) were the initially most affected parts. The major precipitating factor was found to be physical trauma (46.2%). Alopecia areata was the most common autoimmune disorder observed (33.3%) [37].

### **3. Objective**

#### **General objective**

To determine the magnitude and clinical pattern of vitiligo among patients attending the dermatology outpatient department at the ALERT center

#### **Specific objective**

- To explore the demographics of patients with vitiligo
- To identify the magnitude of different clinical patterns of vitiligo

## **4. Methods and Materials**

### **4.1 Study area and period**

ALERT center is located in southwest Addis Ababa, Ethiopia. ALERT's activities focus on rehabilitation of leprosy patients, training programs for leprosy personnel from around the world, and leprosy control. It also encompasses the Armauer Hansen Research Institute, founded in 1970, specializing in leprosy research. The hospital currently provides a wide range of services in various departments including dermatology, emergency services, gynecology and obstetrics, pediatrics, HIV care, orthopedics, and plastic surgery. 600-700 patients are treated daily in the year 2011/2012. 63,038 new patients were treated at the OPD of the dermatology clinic.

This study was conducted at ALERT center dermatology clinics from April - August 2021.

### **4.2 Study design**

A hospital-based retrospective cross-sectional descriptive study was conducted.

### **4.3 Study population**

All medical records of the patients with vitiligo diagnosed at ALERT Hospital, Dermatology clinics between January 2019 and December 2020

### **4.4 Inclusion criteria**

All new cases of vitiligo patient medical records were diagnosed at ALERT hospital between January 2019 and December 2020

### **4.5 Exclusion criteria**

Incomplete medical records

### **4.6 Study Variables**

#### **Dependent Variable**

The magnitude and clinical pattern of vitiligo.

#### **Independent variable**

Age, sex, duration of the lesions, and site

## 4.7 Sampling method and sample size

All new vitiligo patients medical records were included for assessing the magnitude of vitiligo. To assess the clinical pattern the sample size was calculated using single population formula

$$N = \frac{(Z^2) P (1-P)}{D^2}$$

Where

N= the required sample size

Z = 1.96 standard score for the 95% confidence interval

P = 0.13 A study done in mekelle northern Ethiopia showed the prevalence of vitiligo found to be 13%

D =0.05 Margin of error

$$N = \frac{(1.96)^2 \times 0.13 \times (1-0.13)}{(0.05)^2} = 150$$

## 8 Operational definition

*Vitiligo*: is circumscribed de-pigmented skin disorder, characterized by milky-white patches/macules without the scale of different sizes and shapes

*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 the segmental pattern)

*Segmental vitiligo*: Unilateral macules in a dermatomal. (One or more lesions localized in the unilateral pattern)

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

*Generalized vitiligo*(vitiligo Vulgaris): Depigmented patches are widely and usually symmetrically distributed. ( symmetrical distribution of lesions affecting many parts of the body)

*Universal vitiligo:* Depigmented macules and patches over most of the body (de-pigmentation involved in more than 80% of the body) *Mucosal vitiligo:* Involvement of the mucus membrane sites only

## **4.9 Data collection and analysis**

We reviewed the medical records of vitiligo patients who attended the dermatology outpatient clinic of ALERT Hospital from April- August 2020. We developed a data collection form to facilitate the collection of relevant clinical data on sex, age of vitiligo onset. The data were entered and analyzed using a statistical package for the social sciences version 25.

## **4.10 Data quality assurance**

Data extractions from medical records of the patients were performed by the trained dermatovenereology residents. The data were checked manually to assess whether all the available information was properly collected and recorded. Before processing, the collected data were checked for completeness.

## **4.11 Ethical Consideration**

Ethical clearance was obtained from the dermatology department research committee medical college of Addis Ababa University and was taken to ALERT hospital administrators. Accordingly, a permission letter was secured from the medical director. Anonymity and confidentiality of the patient information were kept private. The name of the patients was not included in the data collection format and their card number was not included in the analysis.

## **4.12 Dissemination plan**

The result of the study will be submitted to the AAU department of dermatovenerology, ALERT hospital, and other stakeholders. Copy of the article will be placed in the library of the College of Health Sciences, AAU for future reference.

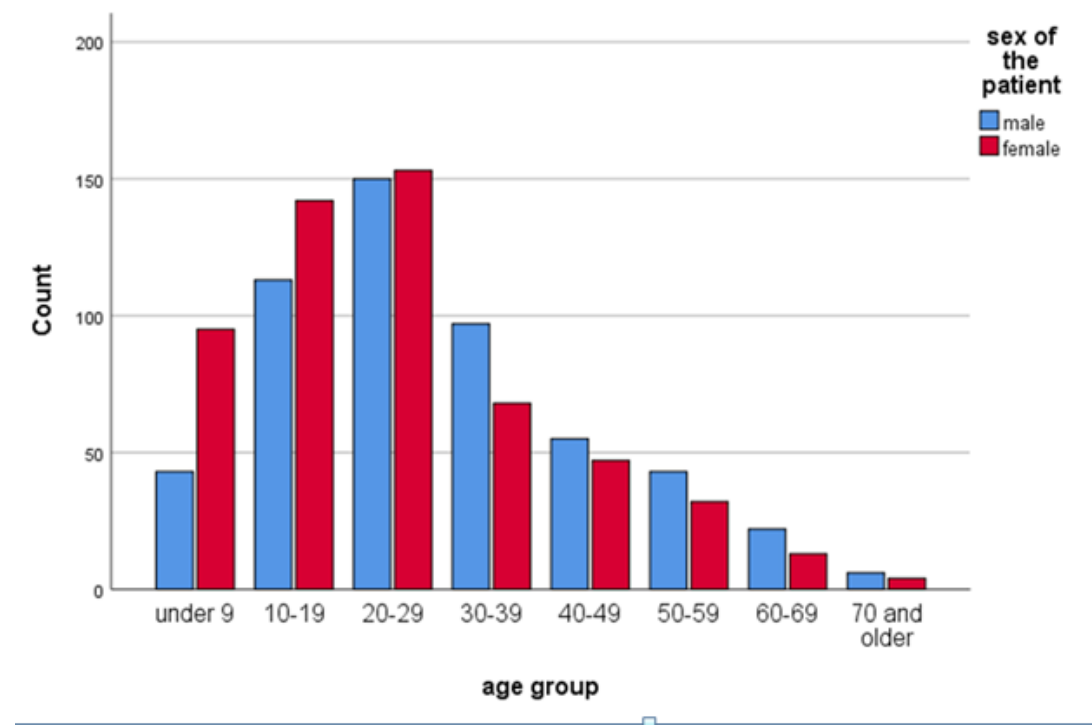
## 5. Results

### 5.1 Epidemiological profile of vitiligo

A total of 37,972 new patients were visited the dermatologic OPD of ALERT center from January 2019 to December 2020, among these 1080 were new vitiligo cases.

The Hospital magnitude of vitiligo was found to be 2.8 % and there was a slight female preponderance with 529(48.8%) males and 554(51.2) females, giving a male to female ratio of 1: 1.05. The mean age of all patients was 24 years: the youngest patient was 2 months old, and the oldest was 98 years old. The peak age incidence was in the second and third decades of life. Children and adolescents (0-19years old) account for 36.3%, adults (20-59 years old) account for (59.5%), and elderly(>60 years old) account for 4.1% of vitiligo cases.

**Figure 1:** The proportion of patients stratified by sex and age



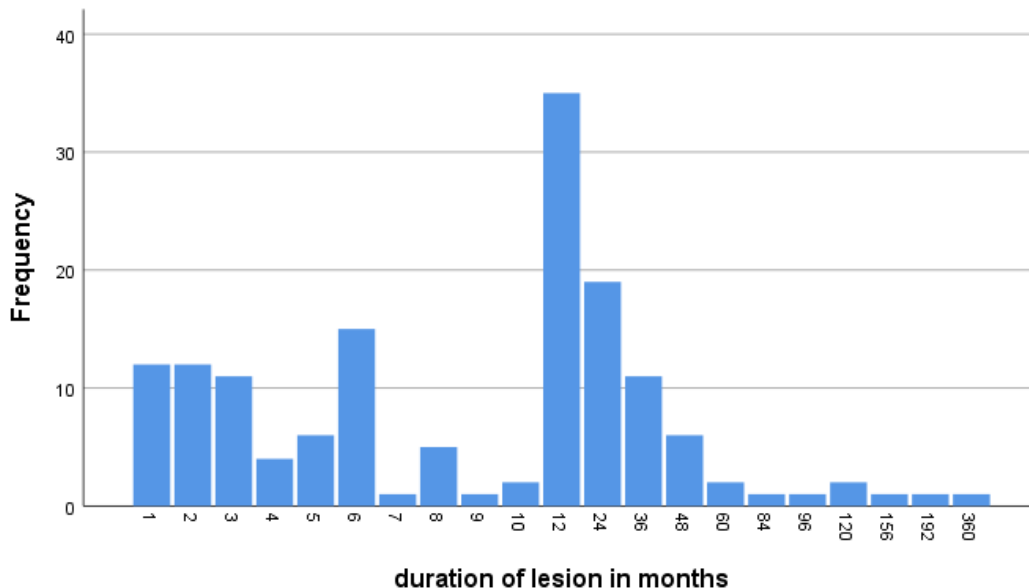
## 5.2 Clinical profile of vitiligo

150 new vitiligo patient medical records were included for assessing the clinical profile of vitiligo.

Duration of the disease at the time of presentation varied from 1 month to 30 years. The mean disease duration was 20 months and the majority of vitiligo cases about 82% were present within two years of disease onset. The commonest clinical form of vitiligo was vitiligo Vulgaris 50(33.3%) followed by focal vitiligo 40 (26.7%), acrofacial vitiligo 19 (12.7%), mucosal vitiligo 21(14%), segmental vitiligo 3 (2%), vitiligo Universalis 1(0.7%), mixed vitiligo 1(0.7%) and others 15(10 %).

The most common site of the presentation was combination face& neck +trunk + limb 51(34%), followed by head and neck 32 (21.3%), periorificial + distal finger 20 (13.3%), the mucosa 17(11.3%), limb 15 (10%), trunk 6(4%), and other 9(6%).

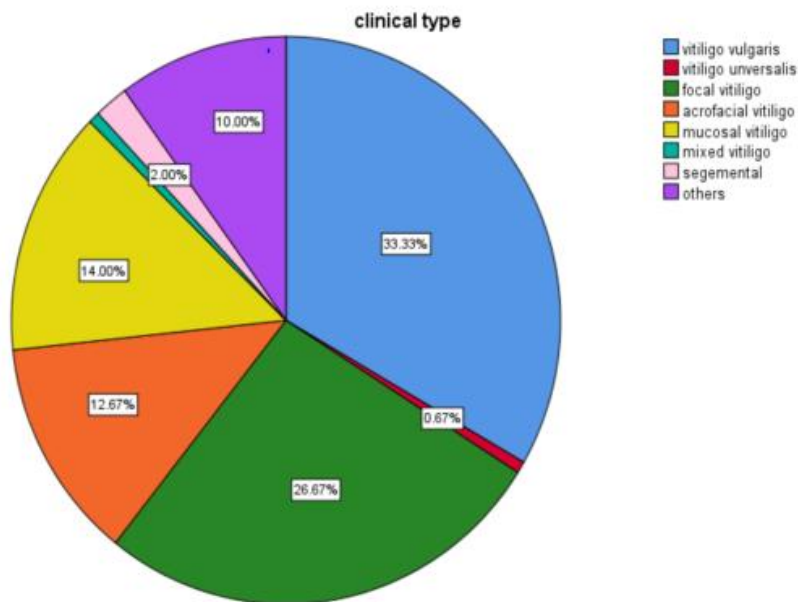
**Figure 2:** Duration of the disease at the time of presentation



Site of lesions	Frequency	Percent
Head&neck	32	21.3
Limb	15	10
Trunk	6	4
Mucosa	17	11.3
Periorficial& distal finger	20	13.3
Head&neck +limb+trunk	51	34
Other	9	6
Total	150	100

**Table 1 Distribution of lesions**

**Figure3:clinical types of vitiligo**



## Discussion

Worldwide, the average incidence of vitiligo is estimated to be about 0.5–2% of the general population reviewed by Kruger, C. et al. Although vitiligo occurs worldwide it is known that the reported prevalence of vitiligo is various.

In this study, the magnitude was found to be 2.8% which is higher than Kruger, c. et al report and Zhang, Y.etal (Africa) the report which showed the prevalence of vitiligo from 82 population or community-based studies was 0.2% and from 22 hospital-based studies was 1.8% and Sarma, N.etal(India) report which showed an institutional prevalence of vitiligo 0.89%. But lower than the study done by onunu AN et al Nigerian(3.2% ) and Tadiq, A.G. et al Mekelle, Ethiopia ( 13%).

The slight female's predominance, similar to the various studies done by Sarma, N. et al Indian(1:1.08), Onunu, A.N et al Nigeria(1;1.3), De Barros, J. C Brasil(1:1.6) and Kiprono, s. et al Tanzania(1:1.8), is believed to be the result of women being more sensitive to cosmetic disfigurement and therefore more likely than men to present for treatment. In the study done by Tsadik, A.G. et al males were found to be more affected with a male-female ratio of 1.7;1, and study done by Lin Z et al china the rate of males and females were comparable

The commonest age at presentation of vitiligo in this study was the second and third decade of life(23.5% and 28% respectively). This was similar to a report by Onunu AN et al Nigeria (24.2% and 34.2% respectively), De Barros J.C et al brazil(18.3% and 16.9% respectively), and Zhang, Y et al (African). In this study higher magnitude of female patients in younger age groups (<30 years), while in males, the peak magnitude of the disease was detected later (31–70 years) which was consistent with the study by Kyriakis et al. The magnitude in the 0-19 years age group(36.3%) was higher than that in the >-60 years age group (4.1%). Youngers may occupy a more important position in the family and parents will take them to see a doctor as soon as they find the children condition. In contrast, some elderly patients do not pay greater attention to their appearance and will not see doctors unless necessary.

The commonest clinical form of vitiligo was vitiligo Vulgaris 50(33.3%) which was similar with Lin Z et al china followed by focal vitiligo 40 (26.7%), acrofacial vitiligo 19 (12.7%), mucosal 21(14%) which was similar with the study by Akram, J. et al whereas focal vitiligo was noted to be the common form in studies performed by Onunu.AN et al Nigeria. There was a higher magnitude of nonsegmental vitiligo which is consistent with Sarma, N.et al but De Barros, J.C et al report showed segmental vitiligo was common in children and adolescents (36.4%) compare to adults 11.3% and elderly(6.7%).

### **Limitation**

This study was conducted in an ALERT center, it might not be representative of all vitiligo patients.

### **Conclusion**

In conclusion, until now there has been a lack of information about the epidemiologic and clinical profile of vitiligo in the ALERT center. Our findings that the pattern of vitiligo is similar to that reported from other parts of the world and this study provides a basic result for further studies.

### **Recommendations**

Further researches should be done to determine the national prevalence of vitiligo.

## References

1. Krüger C, Schallreuter KU. A review of the worldwide prevalence of vitiligo in children/adolescents and adults. *Int J Dermatol*. 2012 Oct;51(10):1206–12.
2. Alikhan A, Felsten LM, Daly M, PetronicRosic V. Vitiligo: a comprehensive overview Part I. Introduction, epidemiology, quality of life, diagnosis, differential diagnosis, associations, histopathology, etiology, and work-up. *J Am Acad Dermatol*. 2011 Sep;65(3):473–91.
3. Das SK, Majumder PP, Chakraborty R, Majumdar TK, Haldar B. Studies on vitiligo. I. Epidemiological profile in Calcutta, India. *Genet Epidemiol*. 1985;2(1):71–8
4. Taïeb A, Morice-Picard F, Jouary T, Ezzedine K, Cario-André M, Gauthier Y. Segmental vitiligo as the possible expression of cutaneous somatic mosaicism: implications for common non-segmental vitiligo. *Pigment Cell Melanoma Res*. 2008 Dec;21(6):646–52.
5. Ezzedine K, Lim HW, Suzuki T, Katayama I, Hamzavi I, Lan CC, et al.; Vitiligo Global Issue Consensus Conference Panelists. Revised classification/nomenclature of vitiligo and related issues: the Vitiligo Global Issues Consensus Conference. *Pigment Cell Melanoma Res*. 2012 May;25(3): E1–13
6. Ezzedine K, Eleftheriadou V, Whitton M, van Geel N. Vitiligo. *Lancet*. 2015 Jul;386(9988): 74–84.
7. Ezzedine K, Silverberg N. A Practical Approach to the Diagnosis and Treatment of Vitiligo in Children. *Pediatrics*. 2016 Jul; 138(1):138
8. Ezzedine K, Sheth V, Rodrigues M, Eleftheriadou V, Harris JE, Hamzavi IH, et al.; Vitiligo Working Group. Vitiligo is not a cosmetic disease. *J Am Acad Dermatol*. 2015 Nov;73(5):883–5
9. Rodrigues M, Ezzedine K, Hamzavi I, Pandya AG, Harris JE; Vitiligo Working Group. Current and emerging treatments for vitiligo. *J Am Acad Dermatol*. 2017 Jul; 77(1):17–29.
10. Ezzedine K, Whitton M, Pinart M. Interventions for Vitiligo. *JAMA*. 2016 Oct;316(16): 1708–9.
11. Brazzelli V, Antoninetti M, Palazzini S, Barbagallo T, De Silvestri A, Borroni G. Critical evaluation of the variants influencing the clinical response of vitiligo: a study of 60 cases treated with ultraviolet B narrow-band phototherapy. *J Eur Acad Dermatol Venereol*. 2007 Nov;21(10):1369–74.
12. Gawkrödger DJ, Ormerod AD, Shaw L, Mauri-Sole I, Whitton ME, Watts MJ, et al.; Therapy Guidelines and Audit Subcommittee, British Association of Dermatologists;

Clinical Standards Department, Royal College of Physicians of London; Cochrane Skin Group; Vitiligo Society. Guideline for the diagnosis and management of vitiligo. *Br J Dermatol.* 2008 Nov;159(5):1051–76.

13. Kostopoulou P, Jouary T, Quintard B, Ezzedine K, Marques S, Boutchnei S, et al. Objective vs. subjective factors in the psychological impact of vitiligo: the experience from a French referral center. *Br J Dermatol.* 2009 Jul;161(1):128–33
14. Porter J, Beuf AH, Nordlund JJ, Lerner AB. Psychological reaction to chronic skin disorders: a study of patients with vitiligo. *Gen Hosp Psychiatry.* 1979 Apr;1(1):73–7.
15. Osinubi O, Grainge MJ, Hong L, Ahmed A, Batchelor JM, Grindlay D, et al. The prevalence of psychological comorbidity in people with vitiligo: a systematic review and meta-analysis. *Br J Dermatol.* 2018 Apr;178(4): 863–78.
16. Parsad D, Dogra S, Kanwar AJ. Quality of life in patients with vitiligo. *Health Qual Life Outcomes.* 2003 Oct;1(1):58
17. Sukan M, Maner F. The problems in sexual functions of vitiligo and chronic urticaria patients. *J Sex Marital Ther.* 2007 Jan-Feb; 33(1):55–64.
18. Krüger, C., & Schallreuter, K. U. (2012). A review of the worldwide prevalence of vitiligo in children/adolescents and adults. *International Journal of Dermatology*, 51(10), 1206–1212. <https://doi.org/10.1111/j.1365-4632.2011.05377.x>
19. Lin Z, Tian Y, Bai B, Liu M, Wu Y, Xiao B, Gao XH, Chen HD. A comprehensive survey of vitiligo patients in the northeast of China using a predesigned questionnaire. *J Dermatol.* 2018 Jan;45(1):39-45. DOI: 10.1111/1346-8138.14016. Epub 2017 Sep 22. PMID: 28940447.
20. de Barros JC, Machado Filho CD, Abreu LC, de Barros JA, Paschoal FM, Nomura MT, Marques E, Martins LC. A study of clinical profiles of vitiligo in different ages: an analysis of 669 outpatients. *Int J Dermatol.* 2014 Jul;53(7):842-8. DOI: 10.1111/ijd.12055. Epub 2013 Oct 18. PMID: 24134308.
21. Yamamah, G. A., Emam, H. M., Abdelhamid, M. F., Elsaie, M. L., Shehata, H., Farid, T., ... Taalat, A. A. (2012). Epidemiologic study of dermatologic disorders among children in South Sinai, Egypt. *International Journal of Dermatology*, 51(10), 1180–1185. <https://doi.org/10.1111/j.1365-4632.2012.05475.x>
22. De Barros, J. C., Filho, C. D. A. S. M., Abreu, L. C., de Barros, J. A., Paschoal, F. M., Nomura, M. T., ... Martins, L. C. (2014). A study of clinical profiles of vitiligo in different ages: An analysis of 669 outpatients. *International Journal of Dermatology*, 53(7), 842–848. <https://doi.org/10.1111/ijd.12055>
23. Sarma, N., Chakraborty, S., Poojary, S., Shashi Kumar, B. M., Gupta, L. K., Budamakuntla, L., ... Kaur, T. (2020). A nationwide, multicentric case-control study on

- vitiligo (MEDEC-V) to elicit the magnitude and correlates. *Indian Journal of Dermatology*, 65(6), 473–482. [https://doi.org/10.4103/ijd.IJD\\_822\\_19](https://doi.org/10.4103/ijd.IJD_822_19)
24. Dlova, N. C., Akintilo, L. O., & Taylor, S. C. (2019). Prevalence of pigmentary disorders: A cross-sectional study in public hospitals in Durban, South Africa. *International Journal of Women's Dermatology*, 5(5), 345–348. <https://doi.org/10.1016/j.ijwd.2019.07.002>
  25. Zhang, Y., Cai, Y., Shi, M., Jiang, S., Cui, S., Wu, Y., ... Chen, H. D. (2016). The prevalence of vitiligo: A meta-analysis. *PLoS ONE*, 11(9). <https://doi.org/10.1371/journal.pone.0163806>
  26. Tsadik, A. G., Legesse, G. F., Desta, D. M., Assefa, B. T., Kidanemariam, H. G., & Gidey, M. T. (2020). Clinical-Epidemiological Profile and Treatment Pattern of Vitiligo in Selected Dermatological Clinics of Mekelle City, Northern Ethiopia. *Dermatology Research and Practice*, 2020. <https://doi.org/10.1155/2020/3625753>
  27. Alain Taïeb, M.D., and Mauro Picardo, M.D.- vitiligo *The New England journal of medicine*
  28. Jane S. Bellet, Neil S. Prose Vitiligo in children: a review of classification, hypotheses of pathogenesis and treatment
  29. Onunu AN, and Kubeyinje EP, Vitiligo in the Nigerian African: a study of 351 patients in Benin City, Nigeria. *Int. J. Dermatol.* 2003; 42:800–802
  30. Akram J, Baroudi A, Aichi T, Houch F, Hamdaoui MH. Profile of vitiligo in the south of Tunisia. *Int. J. Dermatol* 2008; 47:670–674
  31. Kyriakis KP, Palamaras I, Tsele E, Michailides C, Terzoudi S. Case detection rates of vitiligo by gender and age. *Int J Dermatol.* 2009 Mar;48(3):328-9. DOI: 10.1111/j.1365-4632.2009.03770.x. PMID: 19261030.
  32. Picardo M, Dell'Anna ML, Ezzedine K, Hamzavi I, Harris JE, Parsad D, et al. Vitiligo. *Nat Rev Dis Primers.* 2015 Jun;1(1):15011.
  33. Le Poole IC, Das PK, van den Wijngaard RM, Bos JD, Westerhof W. Review of the etiopathomechanism of vitiligo: a convergence theory. *Exp Dermatol.* 1993 Aug;2(4):145– 53
  34. Sandoval-Cruz M, García-Carrasco M, Sánchez-Porrás R, Mendoza-Pinto C, JiménezHernández M, Munguía-Realpozo P, et al. Immunopathogenesis of vitiligo. *Autoimmun Rev.* 2011 Oct;10(12):762–5.
  35. Richmond JM, Frisoli ML, Harris JE. Innate immune mechanisms in vitiligo: danger from within. *Curr Opin Immunol.* 2013 Dec;25(6): 676–82.
  36. Kiprono S, Chalu B. Clinical Epidemiological Profile Of vitiligo: East African Medical Journal. 2012;86(8):278-
  37. Mino EA, kelbore GA. Prevalence of Vitiligo and Associated Factors Among Adult patients Attending Ayder Referral Teaching Hospital Dermatology clinic: *Journal of Health, Medicine and Nursing.* 2018;52:69-78

## ANNEX 1

### Data collection format

#### Part 1 Demographic characteristic

1 .Medical record number

2. Year

3. Age

4. Sex

A. Male

B. Female

5. Address

A. Rural

B Urban

#### Part 2 clinical pattern

##### Duration of lesion

##### Clinical type of vitiligo

A. Vitiligo Vulgaris

B. Vitiligo Universalis

C .Focal vitiligo

D. Acrofacial vitiligo

E. Mucosal vitiligo

F. Segmental vitiligo