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Magnitude, clinical profile and associated factors of childhood and adolescence vitiligo at ALERT Hospital, Addis Ababa, Ethiopia, 2025: Cross-sectional study

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Declaration form

This is to certify that the thesis is prepared by Dr. Bizuayehu Goshime, Magnitude, clinical profile and associated factors of childhood vitiligo at ALERT hospital, Addis Ababa, Ethiopia, 2025: cross sectional study, submitted in partial fulfillment of the requirements of speciality complies with the regulations of the university and meets the accepted standards with respect to originality and quality. This thesis has not been presented for a degree in any other university, and that all sources of materials used for the thesis have been duly acknowledged.

Assurance of principal investigator I, the undersigned agree to accept responsibility for the scientific, ethical and technical conduct of the research project & for provision of required progress report as per terms and condition of the college of health sciences in effect at the time of grant is forwarded as the result of this application.

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Approval

This thesis proposal has been submitted with the approval of the university advisors

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ABBREVIATION/ ACRONYMS

AAU – Addis Ababa University

ALERT – All African Leprosy Rehabilitation Center

ETB – Ethiopian Birr

FMoH – Federal Ministry of Health

G.C. – Gregorian Calendar

NB-UVB – Narrow-Band UVB

OPD – Outpatient Department

SV – Segmental Vitiligo

SPSS – Statistical Package for Social Science

NSV – Non-segmental Vitiligo

TBSA – Total body surface area

USA – United States of America

ABSTRACT

Background: *Vitiligo is a chronic autoimmune depigmenting disorder that significantly impacts quality of life, especially in children and adolescents. Although studies from other regions indicate varying prevalence and clinical patterns, there is scarce data on the epidemiology and clinical profile of childhood vitiligo in Ethiopia, particularly from tertiary referral centers.*

Objective: *To assess the magnitude, clinical profile, and associated factors of childhood and adolescent vitiligo at ALERT Hospital, Addis Ababa, Ethiopia.*

Methods: *A hospital-based cross-sectional study was conducted from May to October 2025. All children under 18 years diagnosed with vitiligo were consecutively enrolled. Data on socio-demographics, clinical features, family history, and treatment were collected using a structured questionnaire. Descriptive statistics were computed using SPSS version 27.*

Results: *Among 1,694 pediatric dermatology patients, 61 were diagnosed with vitiligo, giving a prevalence of 3.6%. The mean age was 9.28 ± 3.80 years, with a female predominance (65.6%). The duration of vitiligo at presentation ranged from 1 to 84 months, with a mean of 25.61 ± 20.51 months. Vitiligo vulgaris (44.3%) was the most common subtype, followed by mucosal vitiligo (29.5%). The head and neck region was the most frequent initial site (45.9%). (14.7%) had a positive family history, and trauma was most common (8.2%) precipitating factor. Familial atopy was reported in 6.6% of cases.*

Conclusion: *Vitiligo constituted a significant proportion (3.6%) of pediatric dermatology cases, highlighting its relative frequency in children. It mainly affected school-aged children, with a female predominance. Delayed presentation was common, indicating possible barriers to early care. Vitiligo vulgaris was the most prevalent subtype, and the head and neck were the most commonly involved initial sites. The presence of family history, trauma, and familial atopy suggests a role of genetic and environmental factors. Early diagnosis and appropriate management are crucial to limit disease progression and psychosocial impact, underscoring the need for heightened clinical awareness and tailored management strategies for childhood vitiligo in Ethiopia.*

Keywords: Vitiligo, childhood, adolescents, prevalence, ALERT Hospital, Ethiopia.

1 INTRODUCTION

1.1 Background

Vitiligo is a depigmenting skin disorder characterized by selective destruction of melanocytes, resulting in loss of skin pigmentation. Clinically, it presents as well-defined, nonscaly, chalky-white amelanotic macules and may also involve loss of hair color due to the inability to maintain pigmentation in affected areas [1-4].

The type of vitiligo that affects children is a more specific form of vitiligo which is commonly accompanied with a higher level of segmental patterns. It is more prevalent in girls and has been linked to increased rate of premature graying in the family of the affected children. Moreover, in such cases the background of autoimmune and /or endocrine diseases is very high most of the time [35].

Vitiligo is a depigmenting disorder that is most common worldwide. It has a prevalence rate of 0.06-2.28 percent in the general population all over the world [10, 11]. Its prevalence in the world is approximated to be between 0.5 and 2 per cent, but in India they have been reported to be as high as 8.8 per cent [12]. The pooled prevalence of vitiligo of 82 studies on populations or communities in a meta-analysis conducted in 2016 and 22 studies in hospitals gave a prevalence of 0.2 and 1.8, respectively. It was revealed that the condition was quite prevalent in Africa and female patients [13].

Vitiligo normally begins at childhood age or even during young adulthood with approximately half of the cases manifesting before the age of 20 [1-4]. Nevertheless, there is less published data on childhood vitiligo epidemiology in the world [7]. Different population-wide studies have investigated the incidence of vitiligo among children and adolescents across the world, and they have stated that the incidence levels are between 0-2.16% [10]. The largest studies concluded that vitiligo occurred among 0.04% of the Brazilian schoolchildren (n=9,955) [14], 0.17 to 2.16% among the Indian schoolchildren (n=12,481 and n=12,586, respectively) [15].

Vitiligo can occur at any age in life such as the neonatal and childhood. Childhood vitiligo is not defined by sex preference. Nevertheless, the Co'te D'Ivoire and India studies show that females were more prevalent [26, 28-32]. In the literature review on Jordan, Korea, and China, the proportion of males and females is equal [33, 35, 36].

The retrospective study of 17,967 medical records of children aged 0-18 years referring to the Italian Dermatological Centre in Mekele, Ethiopia during January 2005 and December 2009 showed that vitiligo was found to be 3.4 percent of the cases [16]. Among 1,869 children aged below 15 years with a fresh diagnosis of a skin disease at the dermatology outpatient clinic of Wolaita Sodo Teaching and referral hospital in the south of Ethiopia, 3.6 % of the children were diagnosed with vitiligo [17].

Vitiligo is complexly inherited and it is not subject to the normal Mendelian genetics. It is multifactorial and polygenic, with many genes and environmental factors being involved. Vitiligo is available in most cases in a sporadic manner but approximately one-fifth of the patients have reported at least one first degree relative with vitiligo. Also, the concordance rate of vitiligo in identical twins is 23 only, which implies that genetics are not an entirely satisfactory explanation of the presence of the disease [1-3, 20, 21]. Even though there is no certainty about the exact cause of vitiligo, it is assumed that the condition is caused because of a selective destruction of melanocytes, which causes less pigmentation of the affected skin, hair and/or mucous membranes. The melaninocyte precursors reside in the hair follicle bulge and the mature pigment-producing melanocytes are located in the lower part of the epidermis and hair matrix. It is characterized by loss of functional melanocytes and the underlying causes are possibly metabolic abnormalities, oxidative stress, inflammatory mediators, cell detachment and autoimmune responses. The contribution of each process is still controversial. The most common opinion is that the first stage is an inherent problem in melanocytes, which results in an oxidative stress, local inflammation, and the immune system activation. This induces melanocyte-specific cytotoxic reactions in genetically predisposed individuals. It may be caused by either immune attack or cell degeneration and detachment that leads to the progressive loss of melanocytes [1-3, 22].

Historically, non-segmental and segmental vitiligo were believed to be different since their clinical patterns are different and the former theories preferred neuronal involvement or somatic mosaicism as the pathogenesis of segmental vitiligo. There is, however, recent data to indicate that there is an overlapping inflammatory pathogenesis between the two forms. Disease is initiated by several stages where a reaction to external or internal injury is triggered by the release of pro-inflammatory cytokines and neuropeptides, which is then followed by the dilation of vascular and immune response [3].

Vitiligo normally appears in the form of well-circumscribed, whitist spots or groups of spots surrounded by normally pigmented skin. These lesions come in round, oval and irregular shapes and vary in sizes of a few millimeters up to a few centimeters. The vitiligo patches may be in any part of the body, although they are mostly located in the face, the back of hands and feet, fingers, elbows, knees, shins, armpits, and around the anogenital region. The condition is likely to develop in regions which are typically hyperpigmented or those that have undergone repeated trauma, friction or pressure [1, 2].

Vitiligo, 2011 An international agreement has been reached to classify vitiligo into two primary clinical presentations; vitiligo/non-segmental vitiligo (NSV) and segmental vitiligo (SV). The conditions of vitiligo and NSV can be described as different, typically multifocal, subtypes of the disease that are distinctly separate to SV. In NSV, the depigmented patches and macules are different in size ranging between a few centimeters to a number of centimeters round, and they often involve both sides of the body with a predilection towards symmetrical distribution. NSV tends to develop with time, both in terms of distribution and extent, and this disease tends to develop as local patches of white hair on the scalp or, seldom, on other areas of the body that bear hair. One of the crucial decisions of the consensus was the differentiation between SV and other forms of vitiligo due to its prognostic significance, in the first place. The percentage of NSV is much higher than that of SV [4].

NSV has various subtypes; generalized, acrofacial, universal, mucosal, and mixed vitiligo. It also includes such rare types as vitiligo punctata and hypochromic vitiligo (or vitiligo minor). The most frequent subtypes are generalized and acrofacial vitiligo [4].

Segmental vitiligo (SV) is a special clinical variant of vitiligo, which is confined on one side of the body. Mono-SV is the most frequent form, with one or more depigmented macules on one part of one side of the body, and usually does not cross the midplane. Several segmental lesions may be observed in cases of uncommonities, either unilateral or bilateral along the body, and these may happen together or in dissimilar periods of time. Early depigmentation of the hair follicles (leukotrichia) is another common feature of SV in the affected regions [2, 4, 5].

The so-called isomorphic response or the Koebner phenomenon is the emergence of skin diseases in areas of skin damage. This is observed to result in vitiligo in places like the neck, elbows, and ankles as a result of repeated mechanical trauma or friction, other physical injury (such as scratching, chronic pressure or cuts), and also allergic or irritant reactions to contact [4, 18, 20]. It may be noticed both in segmental vitiligo (SV) and non-segmental vitiligo (NSV) in children, but is more common in the latter [24].

Leukotrichia can also be associated with vitiligo given that it entails melanocyte reservoir of the hair follicles. This may result in scattered whitening of the hair, foci of whitening of hair (poliosis), or even total depigmentation of the scalp hair. Leukotrichia may manifest in other body parts with hair like in regions of vitiligo, but may also be observed in regions that appear normal [19]. It is more common in SV [24].

There are many primary autoimmune disorders that are related to vitiligo. Some of them are: autoimmune thyroid disorder, type 1 diabetes mellitus, Addison disease, alopecia areata, atopic dermatitis, chronic urticaria, halo nevi, hypoparathyroidism, ichthyosis, pernicious anemia, psoriasis, systemic lupus erythematosus, inflammatory bowel diseases and premature canitis [1, 20, 23-25]. Autoimmune diseases with vitiligo are found only in children having no segmental vitiligo (NSV). The most typical associated disease observed in patients of vitiligo is thyroiditis particularly hypothyroidism but not hyperthyroidism. Thyroiditis is common in adults with vitiligo (approximately 30 percent) as opposed to approximately 10 percent of the general population [25]. An Indian study has shown that a percentage of 1.3 of children having vitiligo have related autoimmune disorders [32].

Diagnosis of vitiligo is not usually a complicated task; which is done clinically through the observation of non-pigment, non-scaled areas with sharp edges in regions such as the area around body openings, lips, fingertips, toes, penis, and segmental patterns, and places where friction occurs. Typically, no lab tests are needed to diagnose vitiligo and skin biopsies or other tests are done to eliminate other causes [1-3, 37].

Vitiligo continues to be a major dermatological problem. Another important thing to do when treating vitiligo is to realize that it is not merely a cosmetic problem and safe and effective treatments are possible [2, 3]. These interventions include phototherapy, systemic and topical immunosuppressants, as well as surgery.

The management of vitiligo varies with a number of factors among which there are the type of the disease, the extent, distribution of the disease, activity plus the age and the type of skin of the patient, the effects on quality of life and the motivation to treat the disease. Face, neck, trunk, and middle extremity are usually more responsive to treatment whereas lips and extremities are less receptive. Repigmentation typically starts in the form of a perifollicular or along the periphery of the lesions. The effectiveness of it is determined only after 2-3 months of treatment. The most used method in the treatment of vitiligo is UV light-based therapy which is known to improve the results when used along with other forms of treatment [2, 38].

Topical corticosteroids should be used as the first resort among patients with vitiligo covering less than 5% of the total body surface area (TBSA). Topical calcineurin inhibitor is however preferred in areas at a greater risk of atrophy. Otherwise, when the topical treatment is not effective in the case of limited vitiligo, targeted phototherapy may be proposed. Narrowband UVB (NB-UVB) phototherapy is recommended to individuals with vitiligo on over 5 percent of TBSA. Topical corticosteroids/topical calcineurin inhibitors can also intermittently be used together with NB-UVB phototherapy. Patients with localized and persistent vitiligo, as well as segmental vitiligo, should receive surgical treatments including the autologous transplantation of healthy melanocytes to depigmented regions. In severe and unresponsive cases of vitiligo in patients or when they do not want to undergo repigmentation therapy, depigmentation of remaining pigmented regions using monobenzyl ether of hydroquinone (monobenzale) can be done.

Childhood chronic disease may have a major impact on the health related quality of life (HRQL) of the child [39]. The period of childhood and adolescence in particular is characterized by a high rate of psychological, social development and emotional vulnerability. Sad experiences in this time may affect the growth of childhood and the life of adulthood [40, 42]. The ability to make friends off the family and romantic relationships are critical milestones of developmental success in adapting to adult life. Various mental issues have been associated with vitiligo patients like depression, anxiety, and shame that may lead to low self-worth and social seclusion [41].

1.2 Statement of the problem

Childhood vitiligo has great effects on the quality of life of the affected people as it causes serious disfigurement and results in severe emotional stress that needs to be treated. Very little has been known about its clinical profile and other related factors in Africa. In general, the world is estimated to have a prevalence of 0.5-2% but rates up to 8.8 have been recorded in India. Published data on the epidemiology of childhood vitiligo in the world is limited. High speed of psychological and social maturation and emotional instability are typical features of childhood, and adolescence in particular. The bad experiences that one undergoes at this age can affect the development of the children as well as the adult life.

This study had the aim of determine the epidemiological and clinical profile of childhood vitiligo in Ethiopia because there is minimal information on the chronic disease in sub-Saharan Africa, and specifically in Ethiopia. The paper was concerned with the prevalence and clinical progression of childhood vitiligo in the ALERT referral hospital in AA; considered the center of excellence and the primary hospital of referral in Ethiopia in terms of cases of dermatology.

1.3 Significance of the study

There is a lack of information regarding the magnitude and clinical picture of childhood vitiligo, as well as its effect on the quality of life at the National level and at ALERT hospital specifically in Addis Ababa, Ethiopia, which is the largest dermatology referral center in the country. The research may also be employed as a preliminary source data when other researchers come up with their research.

2 LITERATURE REVIEW

2.1 Literature on Epidemiology of childhood vitiligo

Vitiligo or Leukoderma is a comparatively widespread skin condition that is observed since the ancient times. It is assumed that the name vitiligo originated in the Greek language and was called Vitelius meaning calf. This relation implies that the white spots that are related to vitiligo are similar to the white patches in a calf [8, 9].

Vitiligo is a common and permanent autoimmune disease that is characterized by the destruction of pigmentation on skin and hair, which occurs in 0.5-2.0 of the population across the world. An overview of more than 50 studies on the worldwide prevalence of vitiligo in children, adolescents and adults that included all the pertinent articles and publications in the contemporary and old literature of vitiligo prevalence and the prevalence of various skin disorder in the general population and the prevalence of vitiligo in groups not characterized by clinical status indicated that the vitiligo prevalence rates were 0.06 percent to 2.28 percent in the general population and 0 percent to 2.16 percent in children. The results suggest that the distribution of vitiligo globally is the same in both children and adults. As a result, all over the world vitiligo is prevalent between 0.5 to 2 percent [10].

Depending on the factors such as the skin tone, cultural differences, geographical differences in the awareness of the disease, the stigma surrounding the disease, the healthcare system, and the treatment available, the burden of vitiligo may vary. There is limited information regarding the burden and management of vitiligo in Africa, the Middle East and Latin America. The literature searches were carried out in these areas through PubMed terms vitiligo to identify the related literature materials addressing the prevalence and burden of the disease, quality of life, psychosocial impact, and disease management published between 2011 and 2021. Vitiligo has been found to have a reported prevalence between 0.18 and 5.3 in Africa and the Middle East and also between 0.04 and 0.57 in Latin America [43].

In June 2022, a systematic review and meta-analysis study was conducted on the global clinicoepidemiological trend of childhood vitiligo, including the patients below 18 years of age. According to meta-analysis data, women are more likely than men to be affected by vitiligo but the ratio is 1.3:1 but found that there is a significant association between the female predominance

of childhood vitiligo and geographical locality with a lower ratio observed in Asia and Europe than in Africa (p=0.03) [44].

A systematic review and meta-analysis study examined the global clinicoepidemiological trends of childhood vitiligo amongst patients below the age of 18 years in the research in June 2022. The most prevalent forms of non-segmental vitiligo referred to were vulgaris (42.49%), focal (27.21%), and acrofacial (17.8%). The ratio of the non-segmental and segmental vitiligo was 4.6:1. Africa (one study, estimated at 11.56, 95% CI [?]0.98 to 24.10) and America (two studies, estimated at 3.02, 95% CI 1.54 to 4.50), respectively, were the highest and the lowest in the ratios respectively. The commonest sites of the first lesions include extremities (57.69%), head/neck (46.78%), and trunk (15.62%). It was observed that 687 (25.47%) and 461 (18.52) patients had kobner phenomena and leukotrichia, respectively. The systematic review showed that stress and trauma are typical precipitating factors (positive family history was found in 657 patients (estimated at 16.88, 95% CI 13.37 to 20.39) and country-specific, 13.91% in Asia (11 studies) and 27.01% in Europe (two studies)). The most prevalent cutaneous associations with childhood vitiligo were halo nevus (6.59%), atopic and allergic diastasis (6.11%), premature canities (4.97%), and alopecia areata (1.08%). The most common systemic associations were anemia (5.84%) and thyroid disorders (5.19) (Table 2). The most prevalent precipitating factors in patients with childhood vitiligo were stress (27.41, 95% CI 7.57 to 47.24) and trauma (5.62, 95% CI 4.20 to 7.03) [44].

Eighty Korean children with vitiligo whose diagnosis was either made by clinical or histopathologic examination were evaluated at the Vitiligo Clinic of Ewha Woman's University Tongdaemun Hospital in Seoul Korea. There were 80 children of which 39 (48.8) were male and 41 (51.2) female. The vitiligo children were presented to the clinic with an average age of 7.9 years, average onset of the disease of 5.6 years [35].

The children who participated in the study were those presented to the outpatient department of Dermatology, Karak Teaching Hospital, a referral hospital of southern Jordan, and 2,000 children were analysed over a period of 2 years in order to define the clinical and epidemiologic description of childhood vitiligo. Among the 71 children, who were identified as having vitiligo, 38 (53.5) were males and 33(46.5) were females making the male to female nearly equal at 1:1. The average age of onset was 6.8 years [33].

A prospective study was carried out in the Farwaniya Hospital, Kuwait, and studied 88 children at the age of 12 years and below. Out of the 612 new diagnosed patients with vitiligo, 88 of them were children, which constitute 14.4 percent of the total number. These were 38 (43.2) boys and 50 (56.8) girls. The highest proportion which is 51 percent was diagnosed with vitiligo in the age between 8 and 12 years, and nearly the same number of children were diagnosed between the ages of 0 and 8 years. Mean time of onset was 6.2 years [34].

The study was a cross-sectional, prospective, descriptive study of clinical profile of childhood vitiligo done between March 2021 and February 2023 in a tertiary care center, eastern India. It involved all patients under the age of 14 who had vitiligo. Among pediatric patients younger than 14 years, out of 72 patients diagnosed with vitiligo and visited the Dermatology OPD within the scope of the study, 33 patients (45.8% of the total) were male and 39 (54.2% of the total) were female, which is 1:1.2. The age of onset of the majority of patients (37, or 51%) was 5-9 years, and the mean age of onset was 7.8 years. The average disease length of time was 1.2 years, with most of the patients (38) lasting over one-year disease-length [28].

The study was a cross-sectional study during the period between October 2017 and August 2019 in the Department of Dermatology, Venereology, and Leprosy (DVL) within Shadan Institute of Medical Sciences (a tertiary care center), located in Hyderabad, Telangana, India. A total of 50 children with ages ranging between 3 and 14 years were involved in the study. The majority of the study population fell within the age range 9-11 years whereas the average age of onset was 9 years. Majority of them had attended 1 st -5 th grade (primary school) and were living in cities. Most of them were middle socio-economic status [29].

A survey of the initial 100 patients under 18 years of age with vitiligo who were presented at the Pediatric Dermatology Clinic of the Victoria Hospital, Bangalore Medical College, India, during the period between April 2013 and December 2013 revealed that 55 percent were females (55 patients) and 45 percent were males (45 patients). The mean onset age was 8.92 years with the range of 1 day to 16 years. The period of the disease was between 2 months and 8 years with a mean period of 1.36 years [30].

The study was carried out during the period between June, 2017 and June, 2018 at the University Teaching Hospital of Treichville, the largest dermatology center in Abidjan, Cote d' Ivoire with the view of examining the epidemiological and clinical profile of childhood vitiligo in children below 16 years. In the study period 2 245 children were studied, vitiligo was found in 40 children (19 boys and 21 girls), which led to the prevalence rate of 1.78. Majority of this age group of children (62.5) fell under the age group of 9-15 years. The age of the median during the consultation was 10 with a range of 5-15. The development of vitiligo started after the age of 3 in 70 percent of the cases. Median age of onset of vitiligo was 7 years ranging between 2.3 and 10 years and extremes were 1 month and 15 years [26].

The study was carried out as a cross-sectional study with a follow-up duration of 1 year on a group of clinically diagnosed patients with vitiligo who had been registered at outpatient dermatology clinics in Ain Shams University and Kobry Al Qubba Military Hospitals, Egypt between August 2018 and January 2019. The participants in the study were divided into three groups, namely, Group I (children) of less than 12 years old, Group II (adolescents) of 12-18 year-old and Group III (adults) of 18-30 year-old. The participants of the study were 220 children and 123 adolescents. The average age of children with vitiligo was 6.18 years (6 months to 12 years), and the average time of the disease onset at the manifestation was 2.12 years (1 month to 11 years). It was mainly among the females than among the male accounting to 59.1% (n -130) [27].

2.2 Literature review on clinical features and associated features of childhood vitiligo

A cross-sectional study was carried on eighty children aged between 8 months and 12 years in Korea who had been previously diagnosed with vitiligo either through clinical examination or histopathologic analysis at the Vitiligo Clinic of Ewha Woman's University Tongdaemun Hospital in Seoul, Korea. The majority of such children developed it on the head and neck (58.8%), then the trunk (26.3%), and then the lower limbs (11.3%). Vitiligo had a higher family history in children compared to adults but the difference was not significant. Halo nevi were not detected in any of the 80 children with vitiligo and the 2 children who had halo nevi had non-segmental vitiligo. The children reported a family history of vitiligo (13.8 percent). Gender did not show

much difference regarding family history, the presence of segmental vitiligo, or related diseases [35].

In children at the outpatient Department of Dermatology, Karak Teaching Hospital, a southern Jordan referral hospital, a study of 2,000 successive children during a 2-year follow-up period was done to provide a clinical and epidemiologic description of childhood vitiligo. Sixty-seven patients had non-segmental vitiligo (92.9%), and 4 patients had segmental vitiligo (6%). 13 patients had leukotrichia (white patches of hair with scalp vitiligo) (18.3%). There was no universal vitiligo amongst patients. The cases of segmental vitiligo were the abdomen and chest in 4 patients (6%). The head and neck (35.8) were the most common locations of involvement, followed by the lower limbs (24.6), upper limbs (22.4), trunk (16.2), and the genital area (3). Two cases (3%), were related to autoimmune skin disorders, and in n 12 cases (16%), vitiligo was observed at the locations of previous dermatological traumas, and in some cases, it was linear in nature. Nine cases (12.6%) out of the first-degree relatives (the parents, siblings) and two cases (3) of vitiligo out of second-degree relatives (the grandparents, the uncles, aunts) were found in family history. A family history of autoimmune disorders has shown that eight patients (11.2) had first-degree family members with non-insulin-dependent diabetes mellitus and one patient had a positive family history of hypothyroidism. Vitiligo was progressed in all patients [33].

The prospective study was done on 88 children who were aged below 12 years and were studied in Farwaniya Hospital in Kuwait. This analysis revealed that the most prevalent was vitiligo vulgaris which occurred in 47.7 percent among the patients and then came focal vitiligo (26 percent) and acrofacial vitiligo (15.6 percent). The three cases of mucosal vitiligo were all in girls, and this involved the mucosal part of the vulva. Out of the seven cases of segmental vitiligo five cases were of the face. The head and neck (28.4) gave the highest percentage of onset, followed by the trunk and limbs. The proportion of vitiligo in first- and second-degree relatives was reported in 24 patients that constitutes 27.3% of the total patients. Three patients were found to be positive with antithyroid antibodies but they were not found to exhibit any symptoms of thyroid disease. Universal vitiligo was found in one patient with insulin-dependent diabetes mellitus [34].

The clinical profile of childhood vitiligo was studied using a cross-sectional, prospective, descriptive study. It involved all patients under the age of 14 years with a diagnosis of vitiligo

during a span of March 2021 to February 2023 in one of the tertiary care centers located in eastern India. The researchers concluded that vitiligo vulgaris (34 patients, 47.2%), focal vitiligo (24 patients, 33.3%), segmental vitiligo (9 patients, 12.5%), mucosal vitiligo (3 patients, 4.2%), and acrofacial vitiligo (2 patients, 2.8%), were the most prevalent patterns of vitiligo. There were no vitilito universal children. Sixty-one percent of the patients were bilaterally involved whereas 39% were unilaterally involved. The commonest first site was the head and neck (28 patients, 38.9%), lower limb (19 patients, 26.3%), upper limbs (14 patients, 19.4%), trunk (8 patients, 11.1), and mucosal (3 patients, 4.1). The patients who had oral mucosa involvement were 2.8% and those with genital involvement 1.4%. Reported prevalence rate of vitiligo in the first and second-degree relatives was 2.7%. Associated abnormalities were mostly Koebner phenomenon (26.4%), leukotrichia (11.1%), atopic dermatitis (6.9%), alopecia areata (4.2%), halo nevus (2.7%), and the antithyroid antibody (1.4) in a single patient [28].

The study was a cross-sectional one done between October 2017 and August 2019 in the Department of Dermatology, Venereology, and Leprosy (DVL) of Shadan Institute of Medical Sciences which is a tertiary care center in Hyderabad, Telangana, India. Vitiligo vulgaris, which characterized 46% of the cases, was the most frequent type of vitiligo, then focal vitiligo (36), mucosal vitiligo (8), and acrofacial vitiligo (6). Segmental vitiligo was only seen in 4% of the patients. The lower limbs were the most affected with 42 percent of the cases followed by the face (26 percent), upper limbs (14 percent) and scalp (6 percent). Mucosal involvement was observed in 12 percent of the cases, 8 percent of oral mucosa and 4 percent of the genital involvement was seen in the study population. The most prevalent form of the condition was leukotrichia (24 percent) with Koebner phenomenon (18 percent), atopic dermatitis (14 percent), halo nevi (4 percent) and alopecia areata (2 percent) being the other prevalent conditions among the study population. Only 4% of cases were positive in terms of family history. The average age of onset was 6 years that is less compared to general population [29].

According to a study carried out on the initial 100 patients under 18 years with vitiligo who presented at the Pediatric Dermatology Clinic of Victoria Hospital, Bangalore Medical College, India, between April 2013 and December 2013, the most common type was vitiligo vulgaris, as 46% of the patients had the disease. This was then succeeded by focal vitiligo (36), mucosal vitiligo (8), acrofacial vitiligo (7), and segmental vitiligo (3). The lip-tip pattern was found in 2 patients

out of 7 of the 7 patients who had acro-facial vitiligo. None of the patients missed out on areas affected by vitiligo with lower limbs (62%), face (46%), upper limbs (30%), scalp (25%), and mucosal sites (18%) being the most frequent locations. Of individuals who suffer mucosal site, 13 patients suffered oral mucosal site, and 5 suffered genital site. Eight of the patients experienced isolated mucosal involvement, and 10 experienced mucosal and other sites involvement. There was no universal presentation of any of the patients. The study categorized vitiligo into segmental and non-segmental with only 3% of patients having segmental vitiligo and 97% having non-segmental vitiligo. A similar percentage of 25% of patients had leukotrichia and 21% had a positive Koebner. The family history of vitiligo was positive in 14 percent of the patients where 5 patients had vitiligo in their first-degree relatives. The autoimmune associations were found in 17 percent of patients. The vitiligo had a cutaneous association of atopic dermatitis in 13% of the patients, alopecia areata in 1% and halo nevi in 3%. One patient had hypothyroidism which is considered systemic with vitiligo. Vitiligo was familial in 7% of the patients with hypothyroidism and atopical dermatitis. Children with a familial association had an earlier mean age of onset at 6.8 years, compared to 9.26 years in children without a familial association [30].

The study was a cross-sectional study carried out at the University Teaching Hospital of Treichville, which is the largest dermatology center in Cote d'Ivoire, between June 2017 and June 2018, whose aim was to evaluate epidemiological and clinical profile of childhood vitiligo in children below the age of 16. Atopic dermatitis (17.5%), diabetes (10%), and autoimmune disease (2.5) were the personal medical history of the children. Concerning family history, the prevalent were diabetes (37.5), early-onset cancer (30), vitiligo (17.5), autoimmune diseases (7.5), and dysthyroidism (5). The most common one was non-segmental vitiligo (47.5%), segmental vitiligo (42.5%), and mixed vitiligo (10%). Face (32.5%) and lower limbs (32.5) were the primary areas of vitiligo lesions. In the case of segmental vitiligo, the face was the most affected site (55.6%). Segmental vitiligo and facial involvement were found to have a statistically significant association (odds ratio=5.3; $P<0.05$). Segmental vitiligo was also more commonly found in children who were younger than 4 (47.1%), and there was a significant relationship between vitiligo and children in the age group ($P=0.03$). Most frequently, the legs had non-segmental vitiligo (34.8%). Both types of segmental and non-segmental vitiligo had a medium age presentation in both sexes, in the study

(P=0.19). The phenomenon described by Koebner was observed in 12.5% of the patients and it was also significantly correlated with non-segmental vitiligo (P=0.04) [26].

It was a cross-sectional study of clinically diagnosed patients with vitiligo who were contacted in the outpatient dermatology clinics of Ain Shams University and Kobry Al Qubba Military Hospitals in Egypt during August 2018 to January 2019. Much more frequent were non-segmental vitiligo (NSV) (89.1%) as opposed to segmental vitiligo (SV) (10.9%). In children (42.7) and adolescents (38%), non-segmental vitiligo (NSV) had the highest onset on the face. Sixty two seventy-nine percent of children and 7.32 percent of adolescents reported having family history of vitiligo. Active vitiligo was the most common in children with 86.4 percent having new lesions or an increase in lesion size in the last year, which was followed by adolescents (76 percent). Segmental and focal vitiligo were also found to be highly probable to be seen in children than adolescents and adults. The highest user of vitiligo was the face (42.7%), lower limbs (36%), trunk (10%), upper limbs (6%0 respectively [27].

2.3 Conceptual framework

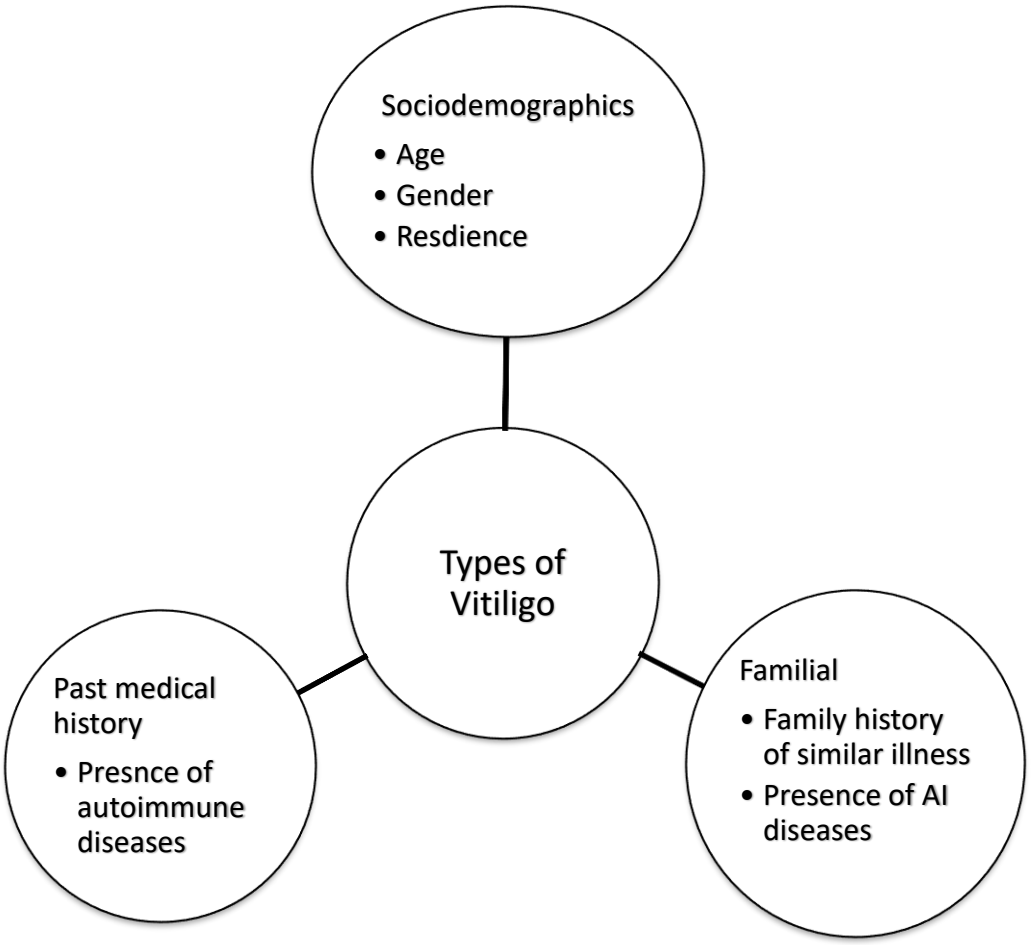

Figure 1: Conceptual framework about clinical profile and associated factors of childhood and adolescence vitiligo, at ALERT Hospital, Addis Ababa, Ethiopia

3 OBJECTIVES

3.1 General objective

- To assess the magnitude, clinical profile and associated factors of childhood and adolescence vitiligo, at ALERT Hospital, Addis Ababa, Ethiopia between May 2025 and October 2025 GC.

3.2 Specific objectives

- To establish the magnitude, and epidemiological profile of childhood and adolescence vitiligo
- To assess the clinical profile of childhood and adolescence vitiligo
- To determine associated features with childhood and adolescence vitiligo

4 METHODS AND MATERIALS

4.1 Study area

The research took place in ALERT hospital. It is found in a place locally referred to as Zenebework, Kolfe Keraniyo sub city of Addis Ababa. It had first been founded as a treatment facility of Hansen disease (leprosy) and is dedicated to the leprosy patients rehabilitation, training of the leprosy staffs worldwide and the control of leprosy. The hospital is the primary dermatologic center in the country that serves as the referral dermatology institute in and around Addis Ababa though it also provides specialized care in the area of internal medicine, orthopedics, physiotherapy, reconstructive and plastic surgery and ophthalmology.

4.2 Study period

The study was conducted from May to October 2025 G.C. in Addis Ababa, Ethiopia.

4.3 Study design

A hospital based cross sectional study design was conducted at ALERT Dermatology unit.

4.4 Source population

All dermatology patients visiting ALERT Pediatric Dermatology unit.

4.5 Study population

All children under 18 years old with vitiligo diagnosed by a Dermatologist and dermatology residents, visiting ALERT Dermatology unit during study period.

4.6 Eligibility criteria

4.6.1 Inclusion criteria

- All children with vitiligo aged less than 18 visiting dermatology unit at ALERT hospital from May to October 2025 G.C.

4.6.2 Exclusion criteria

- Children with whom parental permission could not be obtained.
- Children who are already enrolled in the study and return for follow up visits throughout the study period.

4.7 Sampling size and sampling technique

4.7.1 Sample Size Determination

The sample size for this study was determined based on the expected prevalence of childhood vitiligo derived from previous local studies. According to a retrospective review conducted at the Italian Dermatological Centre in Mekelle, Ethiopia, the prevalence of vitiligo among pediatric dermatology patients was 3.4% (Marrone et al., 2012).

Based on the average annual pediatric dermatology attendance at ALERT Hospital, an estimated 1,694 children were projected to visit the dermatology unit during the six-month study period.

Using the 3.4% prevalence, the expected number of vitiligo cases was calculated as:

$$\text{Expected cases} = 1694 \times 0.034 \approx 58$$

To account for potential non-response or incomplete records, 10% was added:

$$58 \times 1.10 \approx 64 \text{ cases}$$

Thus, 64 eligible cases were anticipated. All eligible patients meeting the inclusion criteria during the study period were enrolled consecutively.

4.7.2 Sampling Technique

A consecutive sampling method was employed. All children under 18 years of age diagnosed with vitiligo by a dermatologist at the ALERT Hospital Dermatology Unit between May and October 2025 were included in the study. This approach ensured that every eligible case presenting within the specified timeframe was enrolled, minimizing selection bias and providing a representative sample of childhood vitiligo patients attending this tertiary referral center.

4.8 Study variables

4.8.1 Dependent Variable

- Clinical type of vitiligo

4.8.2 Independent variables

- Sociodemographic: age, sex, residency
- Personal medical history: diabetes, thyroid disease, alopecia areata, atopic dermatitis
- Family medical history: vitiligo, thyroid disease, diabetes

4.9 Operational definitions

- **Pediatric ag**e: in Ethiopia, pediatric age is generally defined in line with WHO which is less than 18 years of age.
- **Vitiligo:** Circumscribed depigmented skin disorder, characterized by milky-white patches/macules without the scale of different sizes and shapes diagnosed by a dermatologist or a dermatology resident[1-4].
- **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) [2, 4, 5].
- **Segmental vitiligo:** Unilateral macules in a dermatomal. (One or more lesions localized in the unilateral pattern) [2, 4, 5].
- **Acrofacial vitiligo:** Depigmentation of the distal fingers and periorificial areas. (Macules localized on face and distal extremities) [2].
- **Universal vitiligo:** Depigmented macules and patches over most of the body (de-pigmentation involved in more than 80% of the body) [2, 4].
- **Vitiligo vulgaris:** Depigmented widely distributed patches and are usually symmetrically distributed (symmetrical distribution of lesions affecting many parts of the body) [2].
- **Mucosal vitiligo:** Involvement of the mucous membrane sites only [2, 4].
- **Mixed vitiligo:** Characterized by the presence of both segmental vitiligo (SV) and non-segmental vitiligo (NSV) [2, 4].

- **Relative**
    - First degree relative: Mother, Father, Sister, Brother
    - Second degree relative: Aunt, Uncle, Nephew, Cousin, Grandmother and Grandfather.

4.10 Data collection tools and procedures

Vitiligo patients who presented to ALERT center dermatology unit was selected to receive ethical clearance after which the unit was chosen as per the inclusion and exclusion criteria. The treating physician diagnosed at the outpatient department (OPD). The data collection checklist was structured in order to check on the patients. The questionnaire was made after reading various literatures and making appropriate adjustments to suit the population study. The questionnaire was designed in English and translated to Amharic and interview conducted using Amharic language.

4.10 Data quality assurance

A series of mechanisms were used to curb significant spheres of bias in order to assure the quality of data collection of the study object. The data collectors and supervisor were trained on the objectivity and relevancy of the study, the process of collecting the relevant information, data collection technique and entire contents of a checklist. Five percent of the sample size was pretested to determine the questionnaire. Based on the nature of gaps after the pretesting was necessary to make the required modification in the questionnaire. Close supervision was made on the data collection process and completeness was done immediately after the survey and questionnaire was administered; every paper was examined with respect to completeness and consistency.

4.11 Data processing and analysis

Coding and clearing and Data entering were done with the help of statistical analysis SPSS (Statistical Package to social science) version 27. Frequency distributions were used to show results of frequencies, descriptive results were shown in tables and charts. A cross-tabulation was performed between the independent and dependent variables to examine their association in a descriptive manner.

4.12 Ethical considerations

Institutional Review Board (IRB) of Addis Ababa University (AAU) received ethical clearance letters before data were collected. A letter of support by the Ethical Committee of Dermatovenereology Department was provided to ALERT center. The study participants were informed about the importance of their participation in the study before the data is collected through written informed consent. Data was only used to obtain information that was used to conduct this research and the confidentiality of all the participants was maintained.

4.13 Dissemination plan

The study results were also submitted to AAU, Department of Dermatovenereology and also to scientific journals to be possibly published.

5 RESULTS

5.1 Socio-Demographic Characteristics of the Respondents

There were 61 children and adolescents with vitiligo that were included in the study. The socio-demographic profile of the participants is as given below.

The respondents were of age between 2 and 17 years old with an average age of 9.28 ± 3.80. The gender distribution was dominated by the female gender with 40 (65.6%) female participants in comparison to 21 (34.4%) male participants resulting in a female to male ratio of a ratio of about 1.9:1.

In terms of geographic distribution, most of the participants 39 (63.9%) lived in Addis Ababa with 19 (31.1) in the Oromia region. Smaller shares were transferred to Sidama 2 (3.3%), and South Central 1 (1.6%). It is important to note that this geographic distribution is the most appropriate measure of the catchment area of ALERT Hospital as one of the national referral facilities, and it is not founded on purposive sampling; all the eligible patients who came to the hospital in the course of the study were accepted in the study in a sequential fashion without regard to their region of origin.

Table 5-1: Socio-Demographic Characteristics of the Respondents

Descriptive Statistics							
		N	Range	Minimum	Maximum	Mean	Std. Deviation
Age		61	15.00	2.00	17.00	9.2787	3.79970
Valid N (list wise)		61					
Gender							
		Frequency		Percent	Valid Percent		Cumulative Percent
Valid	Male	21		34.4	34.4		34.4
	Female	40		65.6	65.6		100.0
	Total	61		100.0	100.0		

Region					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Addis Ababa	39	63.9	63.9	63.9
	Oromiya	19	31.1	31.1	95.1
	Sidama	2	3.3	3.3	98.4
	South Central	1	1.6	1.6	100.0
	Total	61	100.0	100.0	

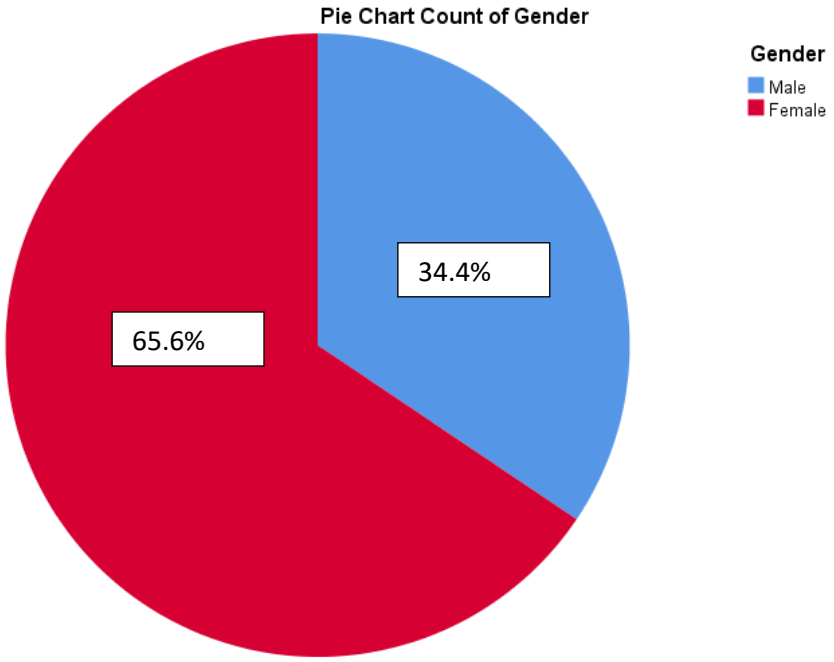

Figure 2: Shows the female predominance (65.6%) in the study

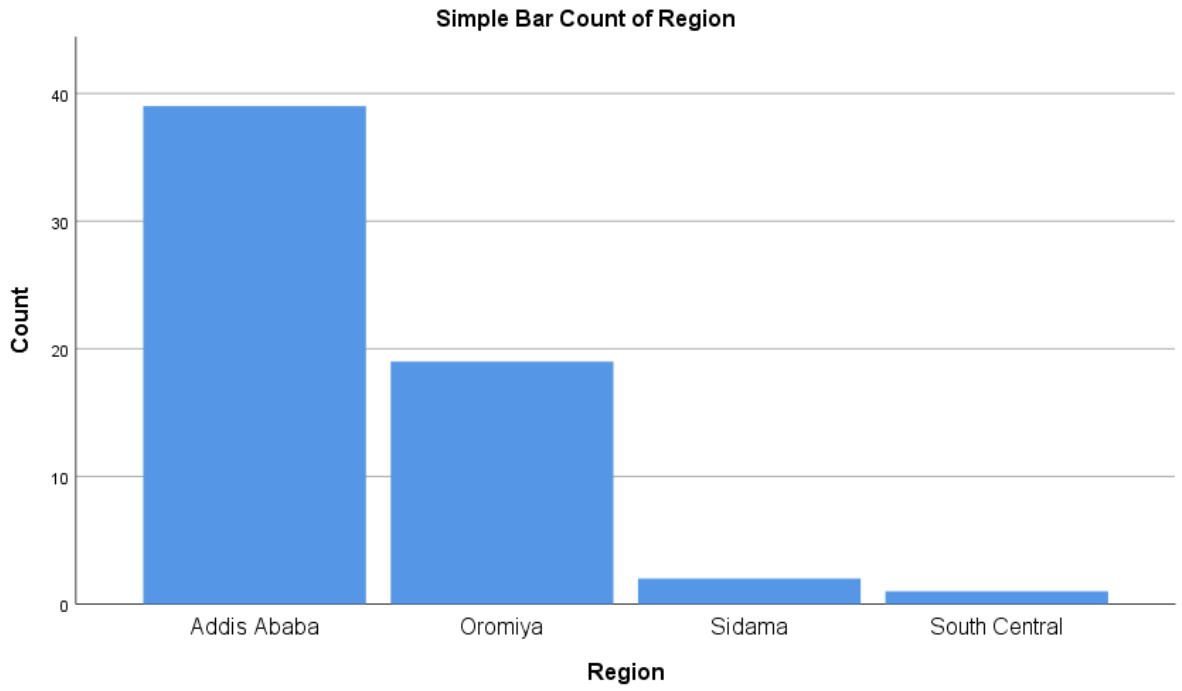

Figure 3: Shows the bar graph of the regions of the respondents

5.2 Clinical Profile of Childhood and Adolescent Vitiligo

This section describes the clinical features of vitiligo of the study participants. It contains information about disease subtypes, anatomical distribution, and length, family trends, precipitating factors, comorbid conditions and modalities of treatment. Its findings are introduced to bring an overall picture of the occurrence of the disease in this group of pediatrics and adolescents who were taken to a tertiary dermatology referral center in Ethiopia.

Table 5-2 has the vitiligo subtypes distribution of the study participants. The most prevalent clinical type was vitiligo vulgaris that was found to affect 27 patients (44.3%), then mucosal vitiligo was found to affect 18 patients (29.5%). Segmental vitiligo was noted in 8 (13.1%) patients and focal and acrofacial vitiligo were less common, comprising 6.6% and 4.9% of the cases respectively. There were only mixed vitiligo in one patient (1.6%).

Table 5-2: Shows the frequency of each type of vitiligo in the respondents

Type of Vitiligo					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Segmental	8	13.1	13.1	13.1
	Mucosal	18	29.5	29.5	42.6
	Vulgaris	27	44.3	44.3	86.9
	Acrofacial	3	4.9	4.9	91.8
	Focal	4	6.6	6.6	98.4
	Mixed	1	1.6	1.6	100.0
	Total	61	100.0	100.0	

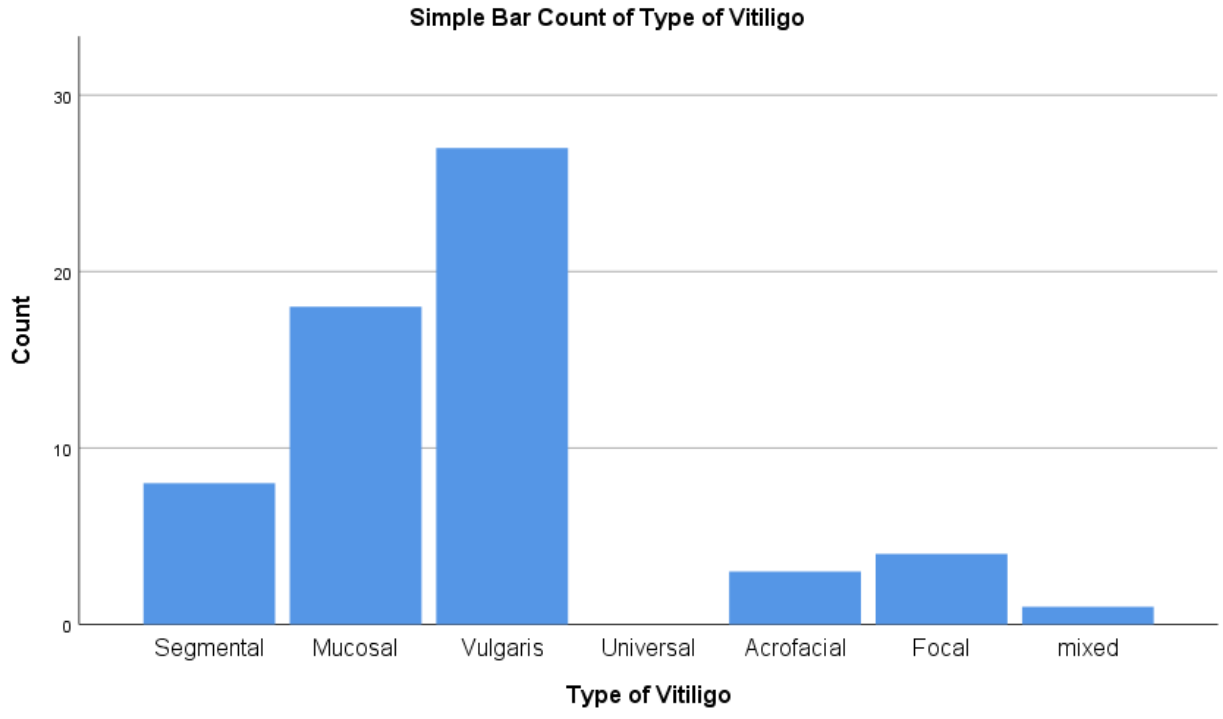

Figure 4: Illustrates the distribution of vitiligo subtypes, highlighting vulgaris as the most common type (44.3%).

The original locations of vitiligo lesions are summed up in table 5-3. Onset of the condition was most common in the head and neck area (28, 45.9% reported), then the genital area (11, 18.0% reported) and, lastly, the trunk 10(16.4% reported). Mucosal and limb involvement during the onset were less common, with 8 (13.1%) and 4 (6.6%) patients, respectively.

Table 5-3: Shows the frequency of Initial sites where the vitiligo started in the respondents

Initial site where the vitiligo started					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Head and Neck	28	45.9	45.9	45.9
	Trunk	10	16.4	16.4	62.3
	Mucosal	8	13.1	13.1	75.4
	Genital	11	18.0	18.0	93.4
	Limbs	4	6.6	6.6	100.0
	Total	61	100.0	100.0	

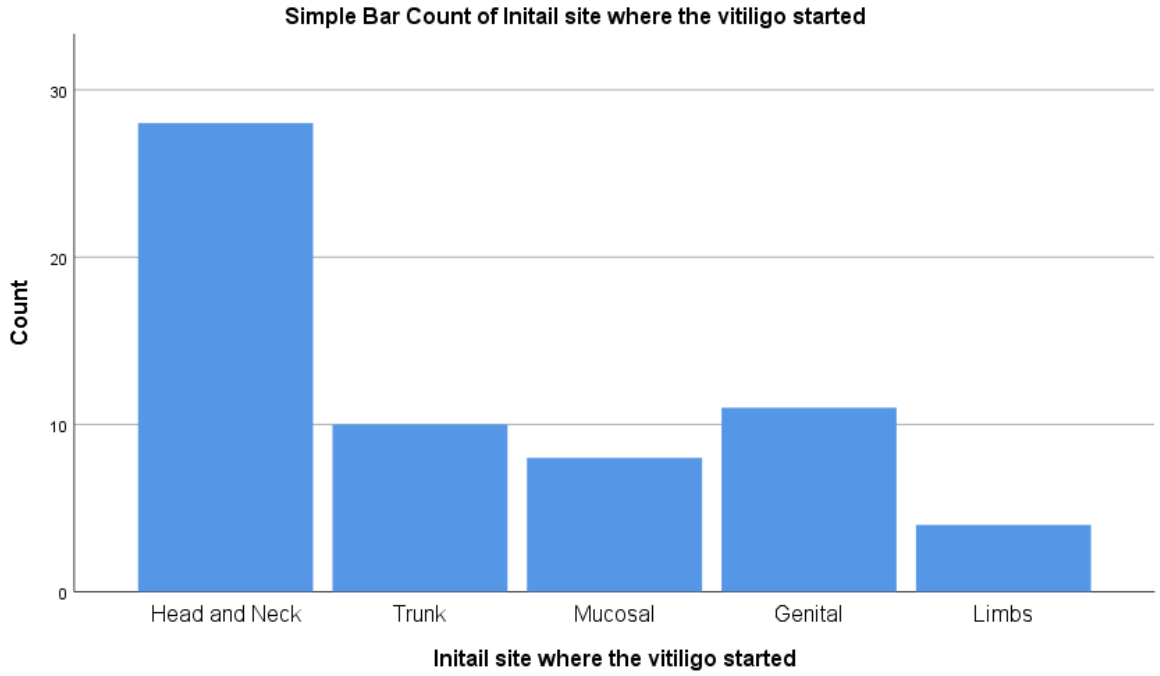

Figure 5: Demonstrates that the head and neck region was the most frequent initial site (45.9%)

Table 5-4 shows the distribution of the vitiligo lesions on the occasion of the study representing one-site and multi-site cases. Involvement of the head and neck with the limbs was the most frequent (13 patients, 21.3%). One-fifth (18.0%) of the patients had isolated genital involvement, and 9 individuals had head, neck, limb, and trunk involvement (14.8%). Head and neck, trunk and mucosal lesions single site each occupied 11.5%, 9.8% and 11.5% categories, respectively. Patterns with less frequency were head and neck with trunk (4.9%), head and neck with mucosal sites (6.6%), and isolated limbs (1.6%). This distribution suggests that the multi-site disease progression is likely in a significant number of patients.

Table 5-4: Shows the frequency of current sites of the vitiligo in the respondents

Current site of the vitiligo					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Head and Neck	7	11.5	11.5	11.5
	Trunk	6	9.8	9.8	21.3
	Mucosal	7	11.5	11.5	32.8
	Genital	11	18.0	18.0	50.8
	Limbs	1	1.6	1.6	52.5
	Head and Neck, Trunk	3	4.9	4.9	57.4
	Head and Neck, Mucosal	4	6.6	6.6	63.9
	Head and Neck, Limbs	13	21.3	21.3	85.2
	Head and Neck, Limbs, Trunk	9	14.8	14.8	100.0
	Total	61	100.0	100.0	

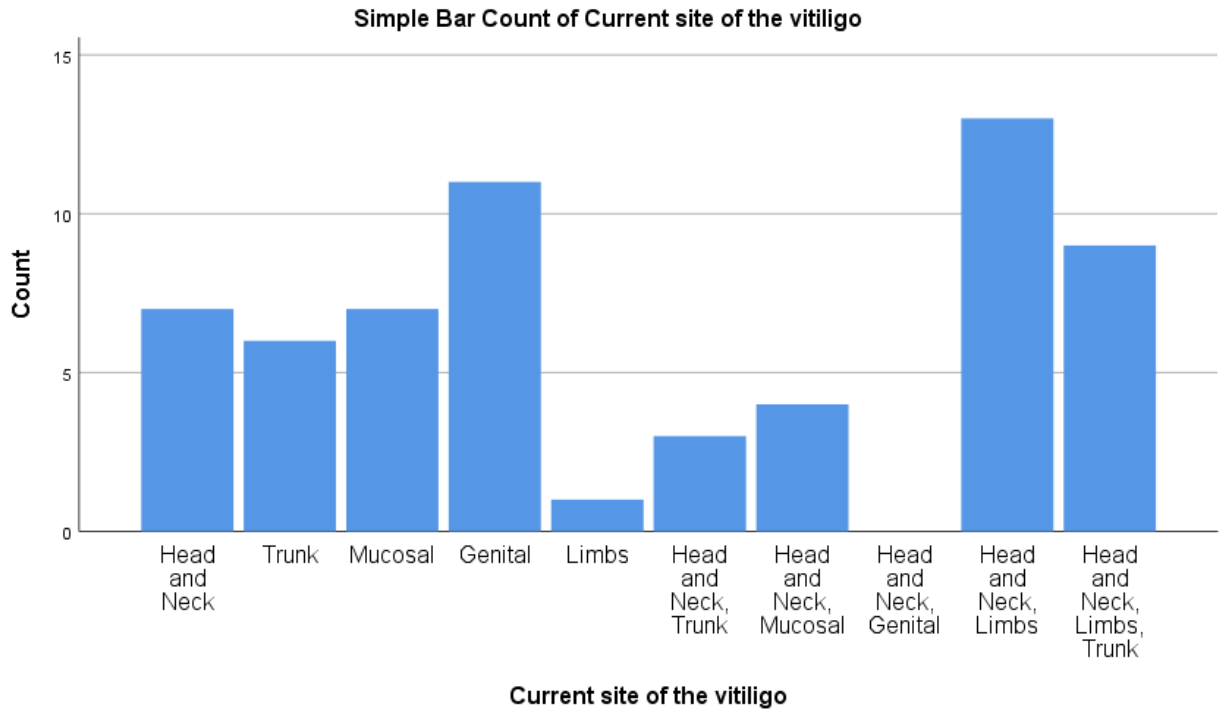

Figure 6: Presents the distribution of current lesion sites, highlighting that multi-site involvement, particularly combining the head, neck, and limbs-was common (21.3%).

Table 5-5 is a family history of vitiligo in the study participants. Most of the patients, 53 (86.9%), said that no family history of vitiligo. Nine patients (14.7 %) had a positive family history. First-degree relatives were affected in 5 cases (8.2%): two involved the mother (3.3%), one involved the father (1.6%), and 2 involved sister (3.3%). Second-degree relatives were affected in 4 cases (6.5%), including grandfathers in three cases (4.9%), and an aunt with a cousin in one case (1.6%). This implies that family aggregation of vitiligo when there is an occurrence tends to be of first more than second degree relative within this particular cohort.

Table 5-5: Shows the frequency of family history of vitiligo for respondents

Family history of vitiligo					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mother	2	3.3	3.3	3.3
	Father	1	1.6	1.6	4.9
	Sister	2	3.3	3.3	8.2
	Aunt & cousin	1	1.6	1.6	9.8
	Grandfather	3	4.9	4.9	14.7
	None	52	85.3	85.3	100.0
	Total	61	100.0	100.0	

The precipitating factors associated with vitiligo that were reported by the patients before the development of vitiligo are summarized in Table 5-6. The overwhelming majority (90.2 %) 55 patients said they could not identify a triggering factor. Out of the patients who did report a precipitating event, the most frequent one was trauma, which was mentioned by 5 patients (8.2%), followed by emotional stress, mentioned by 1 patient (1.6%). These results indicate that during most childhood and adolescent patients, vitiligo occurs without an apparent external precipitant.

Table 5-6: Shows the frequency of precipitating factors causing vitiligo

Precipitating factors					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Emotional	1	1.6	1.6	1.6
	Trauma	5	8.2	8.2	9.8
	None	55	90.2	90.2	100.0
	Total	61	100.0	100.0	

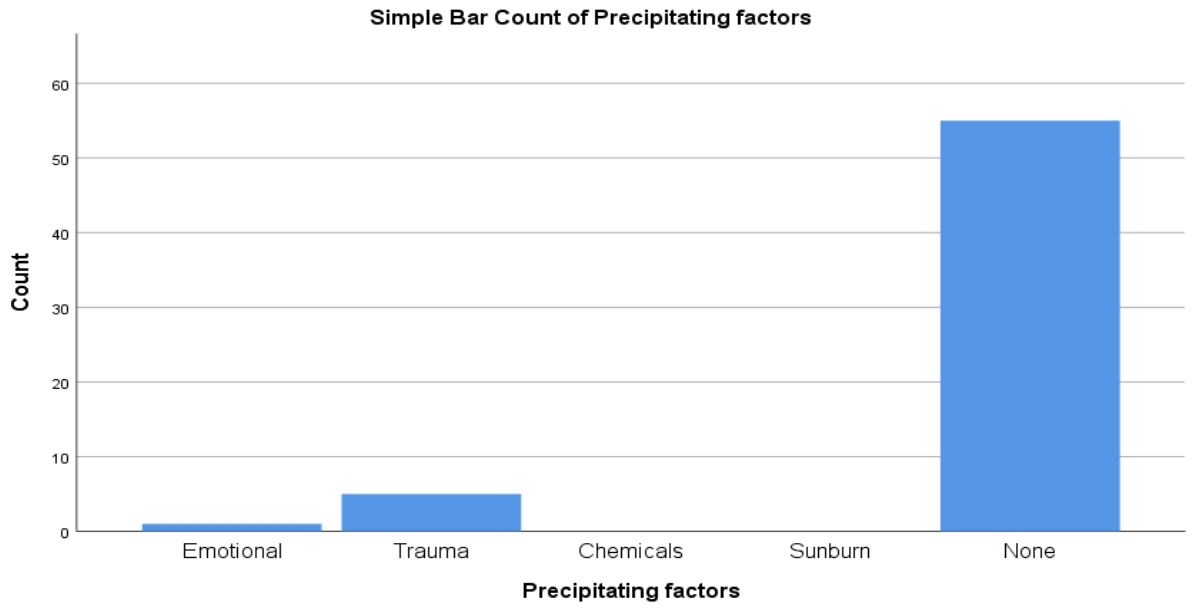

Figure 7: Bar graph of precipitating factors, revealing that the majority of cases (90.2%) had no identifiable trigger.

The frequency of related familial illnesses of the participants of the study is provided in Table 5-7. Most patients 55 (90.2%) did not report any family history of the mentioned associated conditions. In individuals who had a positive family history, atopic disorders (atopic dermatitis) had been found in 4 individuals (6.6%), and familial diabetes occurred in 2 individuals (3.3%). This implies that atopic predilections are the most commonly reported family comorbidity among this group of children and adolescents with vitiligo though it was uncommon.

Table 5-7: Shows the associated family illness factors

Associated family illness					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Family - Diabetes	2	3.3	3.3	3.3
	Family - Atopy	4	6.6	6.6	9.8
	None	55	90.2	90.2	100.0
	Total	61	100.0	100.0	

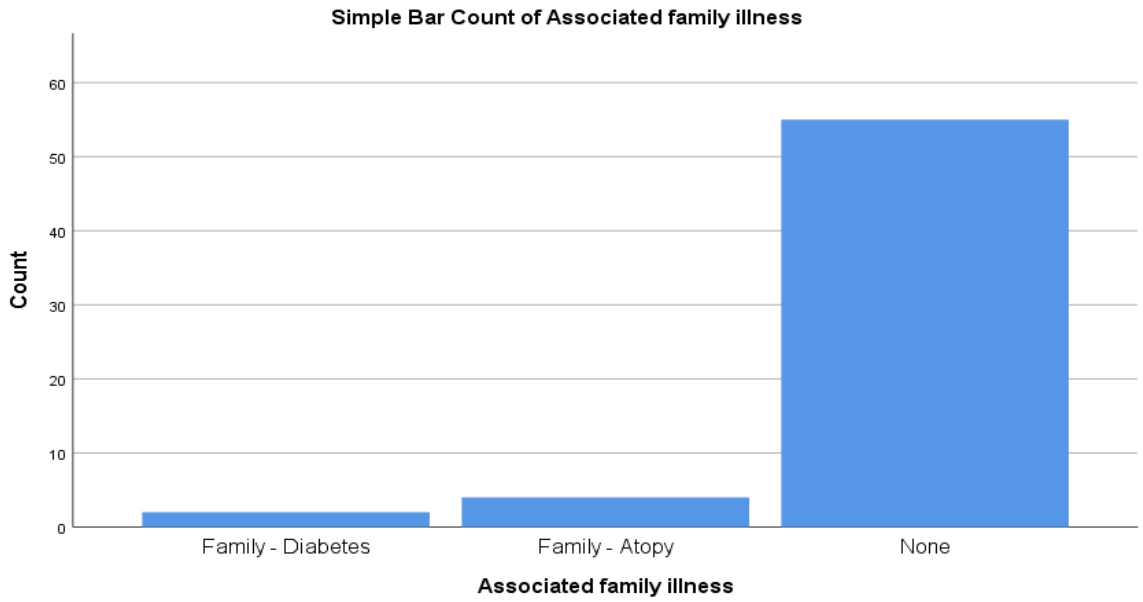

Figure 8: Bar graph displaying associated familial illnesses, with atopy being the most frequently reported comorbidity (6.6%).

Table 5-8 displays the frequency of clinic visits among the participants of the study. Only 28 (45.9 percent) patients who have entered the dermatology unit were seen once within the study time. The percentage of patients who visited three or more times (32.8 percent) was significant, and this may indicate either continued treatment or the disease course. The 13 patients (21.3%) were in attendance twice. This distribution implies different degrees of health care involvement and may imply different disease severity or treatment of the cohort.

Table 5-8: Shows the number of visits for the patients

Number of visits					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 time	28	45.9	45.9	45.9
	2 times	13	21.3	21.3	67.2
	3 or more times	20	32.8	32.8	100.0
	Total	61	100.0	100.0	

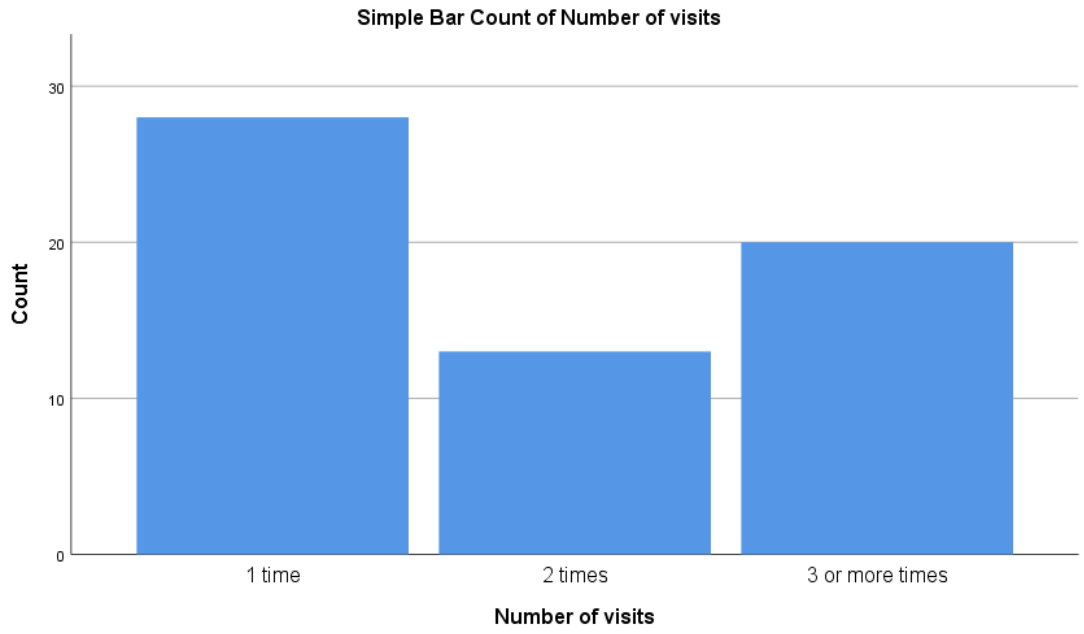

Figure 9: Bar graph of clinic visit frequency, showing nearly half of patients (45.9%) attended only once.

Table 5-9 gives us the period of time in which vitiligo took place up to the period at which the data was collected. The duration of the disease ranged from 1 to 84 months, with a mean duration of 25.61 ± 20.51 months. This considerable difference indicates the difference in the presentation of illnesses and the diagnosis in children and adolescents who come to the clinic. The high range means that the study cohort had both the recent and the long-standing cases.

Table 5-9: Show the duration for the vitiligo till the date of recording

Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Std. Deviation
Duration in months	61	83.00	1.00	84.00	25.6066	20.50957
Valid N (listwise)	61					

The modalities of treatment that are given to the participants of the study are described in Table 5-10. Topical steroid monotherapy was administered to 60 (98.4%) out of the total number of patients (n=60). A single patient (1.6%), who came with unstable vitiligo, was treated with combination of

topical and systemic steroids only. This is an indication of a standardized, conservative mode of treatment that is basically based on the topical corticosteroid in pediatric and adolescent vitiligo in this clinical setting.

Table 5-10: Shows the type of treatment the patients they received

Treatment					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Topical Steroid	60	98.4	98.4	98.4
	Topical Steroid + Systemic Steroid	1	1.6	1.6	100.0
	Total	61	100.0	100.0	

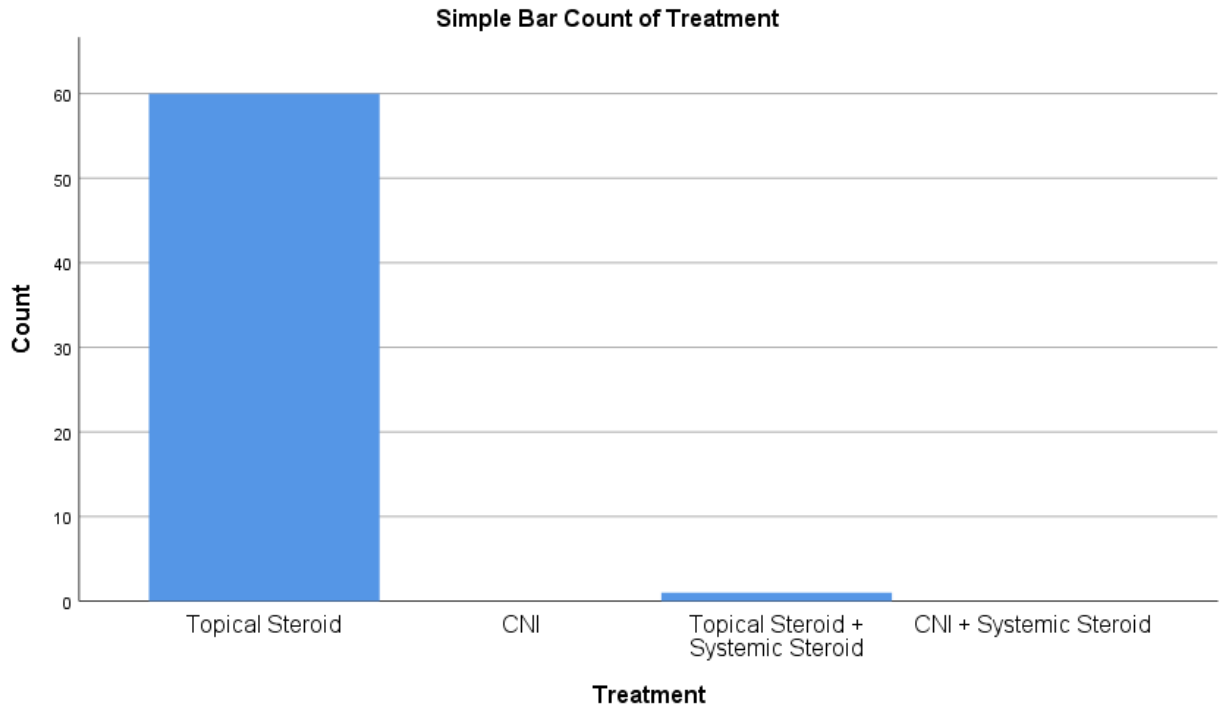

Figure 10: Bar graph of treatment modalities, indicating topical steroid monotherapy was almost universally prescribed (98.4%).

5.3 Magnitude of Childhood and Adolescent Vitiligo

Throughout the six months research period or May to October 2025, 1,694 pediatric patients (age <18 years) reported to dermatology outpatient department of ALERT Hospital. Out of these, 61 were clinically diagnosed to have vitiligo, which generated a period prevalence of 3.6 percent amongst pediatric dermatology patients.

$$Prevalence = \frac{61}{1694} \times 100 = 3.6$$

This prevalence is also similar to the 3.4% obtained as a retrospective study in the Dermatological Centre in Mekelle, (Marrone et al., 2012), however, significantly lower than the 3.6 % obtained as a retrospective study at Wolaita Sodo Teaching and Referral Hospital, in southern Ethiopia (Kelbore et al., 2019). This difference could be due to variation in the study design, population of the patients or regional trends of dermatological diseases.

The prevalence of 3.6% of childhood vitiligo in this tertiary hospital-based population, when considered in the context of the various estimates of prevalence of vitiligo in children and adolescents seeking specialized dermatological attention, highlights the high prevalence of vitiligo in children and adolescents in Ethiopia.

5.4 Distribution of Clinical Characteristics by Selected Variables

Table 5-11 shows the types of vitiligo in three age categories of development. The mucosal vitiligo was most predominant in the middle childhood (6-11 years), which constituted 77.8 percent of all mucosal cases, and none of the mucosal cases occurred in adolescence. The distributions of segmental and vitiligo vulgaris were more equal across all age groups, with segmental vitiligo a bit more prevalent among adolescents (50.0%). Markedly, acrofacial and focal vitiligo were not seen in early childhood (0-5 years) and the mixed vitiligo case was single, and was also seen in the youngest group (age 0-5). The middle childhood age group was the most commonly affected age group in all types of vitiligo (55.7% of the total cases).

*Table 5-11: Type of Vitiligo * Age Crosstabulation*

Type of Vitiligo * Age Crosstabulation						
			Age			Total
			0 to 5 years old(Early childhood)	6 to 11 years old(Middle childhood)	12 to 17 years old(Adolescence)	
Type of Vitiligo	Segmental	Count	1	3	4	8
		% within Type of Vitiligo	12.5%	37.5%	50.0%	100.0%
	Mucosal	Count	4	14	0	18
		% within Type of Vitiligo	22.2%	77.8%	0.0%	100.0%
	Vulgaris	Count	4	13	10	27
		% within Type of Vitiligo	14.8%	48.1%	37.0%	100.0%
	Acrofacial	Count	0	1	2	3
		% within Type of Vitiligo	0.0%	33.3%	66.7%	100.0%
	Focal	Count	0	3	1	4
		% within Type of Vitiligo	0.0%	75.0%	25.0%	100.0%
	Mixed	Count	1	0	0	1
		% within Type of Vitiligo	100.0%	0.0%	0.0%	100.0%
Total		Count	10	34	17	61
		% within Type of Vitiligo	16.4%	55.7%	27.9%	100.0%

Table 5-12 demonstrates the type of vitiligo according to gender. Most of the subtypes were dominated by females, especially, mucosal vitiligo (77.8% female), focal vitiligo (100% female), and mixed vitiligo (100% female). The gender distribution in vitiligo vulgaris was almost equal (48.1% male, 51.9% female), and segmental and acrofacial ones were also predominantly female (62.5% and 66.7% female, respectively). In general, females constituted 65.6% of the entire group

of the study, indicating a general female prevalence of childhood and adolescent vitiligo in this location.

*Table 5-12: Type of Vitiligo * Gender Crosstabulation*

Type of Vitiligo * Gender Crosstabulation					
			Gender		Total
			Male	Female	
Type of Vitiligo	Segmental	Count	3	5	8
		% within Type of Vitiligo	37.5%	62.5%	100.0%
	Mucosal	Count	4	14	18
		% within Type of Vitiligo	22.2%	77.8%	100.0%
	Vulgaris	Count	13	14	27
		% within Type of Vitiligo	48.1%	51.9%	100.0%
	Acrofacial	Count	1	2	3
		% within Type of Vitiligo	33.3%	66.7%	100.0%
	Focal	Count	0	4	4
		% within Type of Vitiligo	0.0%	100.0%	100.0%
	Mixed	Count	0	1	1
		% within Type of Vitiligo	0.0%	100.0%	100.0%
Total		Count	21	40	61
		% within Type of Vitiligo	34.4%	65.6%	100.0%

Table 5-13 shows the occurrence of the different forms of vitiligo by geography. Most of the cases in all the subtypes of vitiligo were in Addis Ababa with 55.6% being the highest in vulgaris and 100% in focal and mixed vitiligo. Oromiya also made significant contributions of 40.7 and 27.8 percent. to the cases of vulgaris and mucosal, respectively but South Central and Sidama had

figures at a negligible level. Focal and mixed vitiligo was only detected on patients in Addis Ababa. The distribution above presents the referral behavior of ALERT Hospital as a national tertiary care center, where majority of the patients come out of the capital and other areas around the capital.

*Table 5-13: Type of Vitiligo * Region Crosstabulation*

Type of Vitiligo * Region Crosstabulation							
			Region				Total
			Addis Ababa	Oromiya	Sidama	South Central	
Type of Vitiligo	Segmental	Count	6	2	0	0	8
		% within Type of Vitiligo	75.0%	25.0%	0.0%	0.0%	100.0%
	Mucosal	Count	11	5	1	1	18
		% within Type of Vitiligo	61.1%	27.8%	5.6%	5.6%	100.0%
	Vulgaris	Count	15	11	1	0	27
		% within Type of Vitiligo	55.6%	40.7%	3.7%	0.0%	100.0%
	Acrofacial	Count	2	1	0	0	3
		% within Type of Vitiligo	66.7%	33.3%	0.0%	0.0%	100.0%
	Focal	Count	4	0	0	0	4
		% within Type of Vitiligo	100.0%	0.0%	0.0%	0.0%	100.0%
	mixed	Count	1	0	0	0	1
		% within Type of Vitiligo	100.0%	0.0%	0.0%	0.0%	100.0%
Total		Count	39	19	2	1	61

	% within Type of Vitiligo	63.9%	31.1%	3.3%	1.6%	100.0%

Table 5-14 refers to the types of vitiligo that are distributed based on familial history of the disease. Proportions of patients with no history of vitiligo in the family reported by the vast majority of patients in all subtypes were 75.0 percent in segmental vitiligo up to 100 percent in focal and mixed types. Acrofacial vitiligo exhibited the greatest familial aggregation with one-third having maternal history and other third having paternal grandfather history of vitiligo. The paternal grandfather was the only group with a positive family history (25.0%). The patterns indicate that although the family history is not prevalent in general it might be more pertinent in specific subtypes like acrofacial and segmental vitiligo.

*Table 5-14: Type of Vitiligo * Family history of vitiligo Crosstabulation*

Type of Vitiligo * Family history of vitiligo Crosstabulation									
			Family history of vitiligo						Total
			Mother	father	Sister	Aunt & cousin	Grandfather	None	
Type of Vitiligo	Segmental	Count	0	0	0	0	2	6	8
		% within Type of Vitiligo	0.0%	0.0%	0.0%	0.0%	25.0%	75.0%	100.0%
	Mucosal	Count	0	1	0	0	0	17	18
		% within Type of Vitiligo	0.0%	5.6%	0.0%	0.0%	0.0%	94.4%	100.0%
	Vulgaris	Count	1	0	2	1	0	24	27
		% within Type of Vitiligo	3.7%	0.0%	7.4%	3.7%	0.0%	85.2%	100.0%

	Acrofacial	Count	1	0	0	0	1	1	3
		% within Type of Vitiligo	33.3%	0.0%	0.0%	0.0%	33.3%	33.3%	100.0%
	Focal	Count	0	0	0	0	0	4	4
		% within Type of Vitiligo	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
	mixed	Count	0	0	0	0	0	1	1
		% within Type of Vitiligo	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Total		Count	2	1	1	1	3	53	61
		% within Type of Vitiligo	3.3%	1.6%	1.6%	1.6%	4.9%	86.9%	100.0%

The distribution of precipitating factors in the various subtypes of vitiligo is shown in table 5-15. The most frequent cases in all subtypes did not list any identifiable precipitating factor, with 66.7% in acrofacial vitiligo and 100% in segmental, mucosal, focal, and mixed types of the disorder. Only in vulgaris (14.8%) and acrofacial (33.3%) vitiligo, trauma was reported and emotional stress in only one case (3.7%). These results imply that in the majority of subtypes of pediatric vitiligo, identifiable triggers are not common, and in a few cases, where triggers are reported, trauma is the most common.

*Table 5-15: Type of Vitiligo * Precipitating factors Crosstabulation*

Type of Vitiligo * Precipitating factors Crosstabulation						
			Precipitating factors			Total
			Emotional	Trauma	None	
Type of Vitiligo	Segmental	Count	0	0	8	8
		% within Type of Vitiligo	0.0%	0.0%	100.0%	100.0%

	Mucosal	Count	0	0	18	18
		% within Type of Vitiligo	0.0%	0.0%	100.0%	100.0%
	Vulgaris	Count	1	4	22	27
		% within Type of Vitiligo	3.7%	14.8%	81.5%	100.0%
	Acrofacial	Count	0	1	2	3
		% within Type of Vitiligo	0.0%	33.3%	66.7%	100.0%
	Focal	Count	0	0	4	4
		% within Type of Vitiligo	0.0%	0.0%	100.0%	100.0%
	mixed	Count	0	0	1	1
		% within Type of Vitiligo	0.0%	0.0%	100.0%	100.0%
Total		Count	1	5	55	61
		% within Type of Vitiligo	1.6%	8.2%	90.2%	100.0%

Table 5-16 is the distribution of the associated familial illnesses between subtypes of vitiligo. Most patients of all subtypes stated that there was no related family disease with percentages varying between 75.0% in segmental vitiligo and 100% in the acrofacial, focal, and mixed types. Segmental vitiligo recorded the greatest percentage of familial atopy (25.0%), whereas mucosal and vulgaris had low rates of familial diabetes and atopy (each≤5.6%). These results suggest that familial comorbidity is not common in this pediatric vitiligo cohort with atopy being the most commonly reported comorbidity more so when it comes to segmental vitiligo.

*Table 5-16: Type of Vitiligo * Associated family illness Crosstabulation*

Type of Vitiligo * Associated family illness Crosstabulation						
			Associated family illness			Total
			Family - Diabetes	Family – Atopy	None	
Type of Vitiligo	Segmental	Count	0	2	6	8
		% within Type of Vitiligo	0.0%	25.0%	75.0%	100.0%
	Mucosal	Count	1	1	16	18
		% within Type of Vitiligo	5.6%	5.6%	88.9%	100.0%
	Vulgaris	Count	1	1	25	27
		% within Type of Vitiligo	3.7%	3.7%	92.6%	100.0%
	Acrofacial	Count	0	0	3	3
		% within Type of Vitiligo	0.0%	0.0%	100.0%	100.0%
	Focal	Count	0	0	4	4
		% within Type of Vitiligo	0.0%	0.0%	100.0%	100.0%
	mixed	Count	0	0	1	1
		% within Type of Vitiligo	0.0%	0.0%	100.0%	100.0%
Total		Count	2	4	55	61
		% within Type of Vitiligo	3.3%	6.6%	90.2%	100.0%

6 Discussion

The study gives a more recent account of childhood and adolescent vitiligo in a large dermatology referral center in Ethiopia. The magnitude of 3.6% in the hospital-based patients of the pediatric dermatology is comparable to previously reported rates of 3.4% and 3.6% from the Italian Dermatological Centre in Mekelle, and Wolaita Sodo Teaching and Referral Hospital in southern Ethiopia, respectively [16, 17]. It is higher than the prevalence of childhood vitiligo reported in Cote d'Ivoire (1.78%) [26]; this difference could be explained by the regional differences in the burden of dermatological diseases, access to healthcare, sample size. In terms of geographic distribution, most of the participants 39 (63.9%) lived in Addis Ababa with 19 (31.1) in the Oromia region. Smaller shares were transferred to Sidama 2 (3.3%), and South Central 1 (1.6%). This is likely due to greater awareness of childhood vitiligo in Addis Ababa.

The respondents were of age between 2 and 17 years old with an average age of 9.28 ± 3.80. Most of the patients (n=34, 55.7%) in our study belonged to the age group of 6-11 years. This finding is comparable to reports from Eastern India (7.8 years), Kuwait (6.2 years), and Korea (mean age 7.9 years) [28, 34, 35]. When children start socializing, they become self-conscious about vitiligo and sensitive to teasing, prompting them to seek medical help. The duration of the disease ranged from 1 to 84 months, with a mean duration of 25.61 ± 20.51 months, which is higher than Jordan's study (2.4mos)

In line with those reported in Cote d'Ivoire, India, and Kuwait [26, 28, 29, 34], the study revealed a female predominance 40 (65.6%), and a female to male ratio of a ratio of about 1.9:1. This finding contrasts with studies from Jordan, Korea, and China, where the sex distribution is nearly equal [33, 35, 36]. This could be due to the higher prevalence of autoimmune conditions in the female gender, and indirectly due to parents seeking earlier treatment for girls with cosmetically disfiguring patches, as concerns about appearance and related social stigma issues are greater among girls.

The observed clinical profile can be said to agree with and deviate in a significant manner as compared to the global trends. In our study, non-segmental vitiligo was the commonest type of vitiligo accounting for 85.35% which aligns with findings from Kuwait , Jordan , Korea , Eastern India, and others regions [26, 28, 29, 33-35]. Among the subtypes, vitiligo vulgaris was the most

prevalent (44.3%), which aliens with studies done in Eastern India (Vitiligo vulgaris: 47.2%), Ali et al. (46%), Kuwait (47.7%) [28, 29, 34]. In our study vitiligo vulgaris is followed by mucosal vitiligo was found to affect 18 patients (29.5%). Segmental vitiligo was observed in 8 patients (13.1%), while focal and acrofacial vitiligo were less frequent, accounting for 6.6% and 4.9% of cases, respectively. No universal vitiligo case was seen. Nevertheless, the percentage of mucosal vitiligo (29.5%) was considerably higher when compared to reports in Eastern India (4.2%), Ali et al. (8%) and Kuwait (3.4%), where vitiligo vulgaris was typically followed by focal vitiligo [28, 29, 34]. Segmental vitiligo explained 13.1% cases in it as it is common globally among children [4].

Head and neck area was the most initial site (45.9%), which is in agreement with Korea (58.8%), Jordan (35.8%), Kuwait (28.4%), and Eastern India (38.9%) [28, 33-35]. More frequent sun exposure during sports may increase the risk of vitiligo in genetically susceptible individuals by generating excess oxygen free radicals that damage melanocytes.

In our cohort, 9 patients (14.7 %) had a positive family history. First-degree relatives were affected in 5 cases (8.2%): two involved the mother (3.3%), one involved the father (1.6%), and 2 involved sister (3.3%). Second-degree relatives were affected in 4 cases (6.5%), including grandfathers in three cases (4.9%), and an aunt with a cousin in one case (1.6%). This finding is comparable to studies done in Korea and Jordan, where 13.8% and 15.6% of participants, respectively, reported a family history of vitiligo [33, 35]. This is slightly lower than the 16.88% pooled estimate from a recent global meta-analysis, as well as the prevalence reported in and Kuwait (27.3%), but higher than that observed in Eastern India (2.7%) [28, 33, 34].

Five cases (8.2%) mentioned history of vitiligo at sites of previous trauma, and one patient emotional stress (1.6%) as precipitating factor. This differs from Jordan study, in which trauma (16%) mentioned as frequent precipitating factors and also from the global meta-analysis, in which stress (27.41%) and trauma (5.62) were given as frequent precipitating factors [33, 44]. Vulgaris and acrofacial subtypes were the only subtypes that were reported as traumatic in our cohort.

In individuals who had a positive family history, atopic disorders (atopic dermatitis) had been found in 4 individuals (6.6%), and familial diabetes occurred in 2 individuals (3.3%). In Jordan

11.25 of the cases had family history of diabetes mellitus. No autoimmune disorders or other associated diseases were identified in the vitiligo patients themselves.

The almost universal use of topical corticosteroids (98.4) indicates the up-to-date treatment recommendations on limited disease within the pediatric populations [38], yet it also demonstrates the paucity of other treatments, such as phototherapy, among them.

7 LIMITATIONS

This research is limited in a few of ways. Since it is a cross-sectional study in the hospital setting and a tertiary referral center, the study might not be applicable to community settings or primary healthcare facilities. The sample is well sufficient to do a descriptive analysis, but it will not be able to identify associations. The validation of associated conditions by means of laboratory tests was not conducted in the study, as the history was reported.

8 CONCLUSION

The current paper presents the modern information on childhood and adolescent vitiligo in one of the major Ethiopian referral centers. Its magnitude of 3.6% in pediatric dermatology patients, female dominance. Patients were aged 2–17 years (mean 9.28 ± 3.80), and most (55.7%) were in the 6–11-year age group. Vitiligo vulgaris was the most common presentation, with the head and neck being the most frequent initial sites of involvement among children, and 14.7% had a positive family history of vitiligo. Five patients (8.2%) reported vitiligo developing at sites of prior trauma. Among those with a positive family history, atopic dermatitis was present in 4 patients (6.6%), and familial diabetes was reported in 2 patients (3.3%). The findings are relevant to the limited literature on the topic of pediatric vitiligo in sub-Saharan Africa and can be used to establish a better clinical awareness and management of the condition in such contexts.

9 RECOMMENDATIONS

The recommendations to be offered based on the results of the study are as follows:

i. **Clinical Practice:** Extensive analysis is required to cover the evaluation of the disease progress, activity, and possible associations.

ii. **Health System:** Incorporating phototherapy and topical calcineurin inhibitors can expand treatment options beyond just topical corticosteroids. Standardization of pediatric protocols of managing vitiligo would help improve the quality of care.

iii. **Research:** Community- and multicenter-based studies are needed to determine the true prevalence, risk factors, disease progression, treatment outcomes, and quality of life impact of childhood vitiligo in Ethiopia.

iv. **Policy:** National dermatology guidelines need a pediatric specific guideline to address the management of vitiligo. Stigma could be minimized through more awareness programs and early presentation is enhanced.

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11 ANNEXES

Annex I: The Written Consent Form

Informed Consent

You are invited to participate in a study to assess the clinical profile and associated factors of childhood and adolescent vitiligo and its associated factors among clinically diagnosed vitiligo patients visiting Dermatology unit of ALERT Center and I would like to ask few questions.

The information that will be obtained in this survey is only for scientific research without any commercial interests. Your name will not be written on this form and the information you give will never be shared to others. Your participation is voluntary and you are not obligated to answer any question you don't wish to answer**.**

I have read this form or it has been read to me in the language I comprehend and understand all conditions stated above

Are you willing to participate in this study?

1- No (say thank you)

2- Yes (continue interviewing)

I confirmed to participate in the study by my own signature----------

Name of interviewer_____ signature_____

Date of interview (Ethiopian calendar) _____/_____/____

Informed Assent (for less than 12years)

Your child will be invited to participate in a study to assess the clinical profile and associated factors of childhood and adolescent vitiligo and its associated factors among clinically diagnosed vitiligo patients visiting Dermatology unit of ALERT Center and I would like to ask few questions.

The information that will be obtained in this survey is only for scientific research without any commercial interests. Yours and your child name will not be written on this form and the information you give will never be shared to others. Your participation is voluntary and you are not obligated to answer any question you don't wish to answer**.**

I have read this form or it has been read to me in the language I comprehend and understand all conditions stated above

Are you willing to participate in this study?

1- No (say thank you)

2- Yes (continue interviewing)

I confirmed to participate in the study by my own signature----------

Name of interviewer_____ signature_____

Date of interview (Ethiopian calendar) _____/_____/____

Informed Consent In Amharic

ሠላም፣ ዶ/ር ብዙአየሁ እባላለሁ ፣ ለምጽ ክሊኒካዊ መገለጫ አና ተዛማጅ ሁኔታዎች/ ተጓዳኝ ምክንያቶች በልጅነት እና በጉርምስና ወቅት የሚል ጥናት እያካሄድኩ ነው እና አንዳንድ ጥያቄዎች እጠይቆታለሁ፡፡ እርሶ የሚሰጡን መረጃ ሳይንሳዊ ምርምር እንጂ ለሌላ ለምንም ነገር አይውልም፡፡ የእርስዎ ስም ምርምሩ ላይ አይጠቀስም፡፡ የእርስዎ ተሳትፎ ፈቃደኝነቶ ላይ የተመሰረተ ነው እንዲሁም መመለስ ያልፈለጉትን ጥያቄ አለመመለስ ይችላሉ፡፡

ይህንን ፅሁፍ አንብቤዋለሁ ወይም ተነቦልኛል እንዲሁም ሀሳቡን ተረድቼዋሁ፡፡

በጥናቱ ላይ ለመሣተፍ ፍቃደኛ ነዎት?

1. **አይደለሁም** ☐
2. **ፍቃደኛ ነኝ** ☐

ጥናቱ ላይ ለመሣተፍ ፍቃደኛነቴን በፊርማዬ አረጋግጣለሁ _____

የመጠይቅ አድራጊው ስም _____ ፊርማ _____ቀን _____

Informed assent in Amharic (for <12 years)

ሠላም፣ ዶ/ር ብዙአየሁ እባላለሁ ፣ የለምጽ ክሊኒካዊ መገለጫ አና ተዛማጅ ሁኔታዎች/ ተጓዳኝ ምክንያቶች በልጅነት እና በጉርምስና ወቅት የሚል ጥናት እያካሄድኩ ነው እና አንዳንድ ጥያቄዎች እጠይቆታለሁ፡፡ እርሶ የሚሰጡን መረጃ ሳይንሳዊ ምርምር እንጂ ለሌላ ለምንም ነገር አይውልም፡፡ የእርስዎ ስም ምርምሩ ላይ አይጠቀስም፡፡ የእርስዎ ተሳትፎ ፈቃደኝነቶ ላይ የተመሰረተ ነው እንዲሁም መመለስ ያልፈለጉትን ጥያቄ አለመመለስ ይችላሉ፡፡ ይህንን ፅሁፍ አንብቤዋለሁ ወይም ተነቦልኛል እንዲሁም ሀሳቡን ተረድቼዋሁ፡፡

በጥናቱ ላይ ለመሣተፍ ፍቃደኛ ነዎት?

1. **አይደለሁም** ☐
2. **ፍቃደኛ ነኝ** ☐

ጥናቱ ላይ ለመሣተፍ ፍቃደኛነቴን በፊርማዬ አረጋግጣለሁ _____

የመጠይቅ አድራጊው ስም _____ ፊርማ _____ቀን _____

Annex II: Questionnaires in English

A questionnaire prepared to assess the clinicoepidemiologic profile of childhood vitiligo, at ALERT Hospital, Addis Ababa, Ethiopia

Part one: Socio- Demographic Data

Medical record number _____

1. Age in years _____
2. Sex
    A. Male
    B. Female
3. Area of residence
   Region _____

Part two: Clinical characteristics

1. Duration of Vitiligo (months/ years) _____
2. **Initial** site of the lesions
    a. Head and neck
    b. Extremities
    c. Trunk
    d. Genitalia
    e. Mucosa
3. Segmental or non-segmental or Mixed (circle the answer or write)_____
4. If non-segmental
    a. Focal
    b. Vitiligo Vulgaris
    c. Vitiligo Universalis
    d. Acrofacial Vitiligo
    e. Mucosal vitiligo
5. Current Site (if more than site please specify)
    a. Head and neck _____
    b. Mucosal (Genital mucosa, Lips)_____
    c. Genital skin _____
    d. Limbs _____
    e. Trunk _____
6. Family history of vitiligo (circle the specific relative/ write)
    a. Frist degree (Mother, Father, Sister, Brother) _____

b. Second degree (Aunt, Uncle, Nephew, Cousin, Grandmother and Grandfather) _____

7. Precipitating factors
    a. Physical trauma
    b. Chemicals
    c. Sunburn
8. Findings
    a. Kobner phenomenon
    b. Leukotrichia
9. Presence of associated illness Yes_____ No_____
10. If the answer is yes for question 9, which illness
    a. Thyroid disease
    b. Diabetes
    c. Alopecia areata
    d. Atopy
    e. Anemia
    f. Halo nevus
    g. Other, specify _____
11. Family history of medical illnesses
    a. Vitiligo
    b. Diabetes
    c. Autoimmune thyroid diseases
    d. Other, specify _____
12. Number of vistsits
    a. 2 and less
    b. 3 and more
13. Medications
    a. Topical Corticosteroids
    b. Topical Calcineurine inhibitors
    c. Topical with systemic steroid