# Vitiligo-epidemiological study of 4134 patients at the National Center for Vitiligo and Psoriasis in Central Saudi Arabia

*Ahmed Alissa,* MD, FRCP, *Abdulla Al Eisa,* FRCP(C), FAAP, *Rozeena Huma,* MBBS, MPH, *Sajeev Mulekar,* MD.

## ABSTRACT

**الأهداف:** تقييم الأنماط السريرية لمرض البهاق، والمظهر الوبائي الذي يتميز به، بالإضافة إلى تحديد مدى وعي المرضى السعوديين بهذه المشكلة.

**الطريقة:** شملت هذه الدراسة الاسترجاعية المرضى الذين ثبتت إصابتهم بالبهاق، والذين كانوا يراجعون المركز الوطني لأمراض الصدفية والبهاق، الرياض، المملكة العربية السعودية. لقد قمنا بمراجعة سجلات المرضى الذين دخلوا إلى المركز خلال الفترة من أغسطس 2002م إلى أغسطس 2006م.

**النتائج:** شملت الدراسة 4134 حالة حيث كانت نسبة الإناث 53%، وكان متوسط العمر الذي بدأ فيه البهاق 17.4 عاماً. لقد كان البهاق المعمم من أكثر أنواع البهاق انتشاراً حيث بلغت نسبة الإصابة 42.3%، كما لم تُصب 90.5 من الحالات بأي من أمراض المناعة الذاتية. لقد كان تاريخ الإصابة بالمرض بين أفراد الأسرة إيجابياً لدى 42.8% من الحالات، وأصيب 29% بإزالة التصبغ في مواضع متعددة، و68.2% بإزالة التصبغ في أماكن مكشوفة. ولم يكن 1912 مريضاً (42.2%) على دراية بأسباب المرض، كما لم يكن 2682 مريض (64.9%) على دراية بالعوامل التي تزيد من تفاقم المرض. لقد اعتبر 15.1% من المرضى القلق من العوامل التي تزيد من تفاقم المشكلة، واعتبر 45.8% من المرضى العلاجات العشبية فعالة.

**خاتمة:** أثبتت الدراسة مدى انتشار البهاق المعمم بين المرضى السعوديين، كما أن نسبة انتشار المرض تعد عالية بين الإناث والطلبة الصغار في السن الذين ظهر لديهم المرض في سن مبكرة. ونحن بحاجة إلى اكتشاف العوامل الجينية المرتبطة بهذا المرض، وعمل مجموعة من الاختبارات وذلك بسبب ارتفاع ظهور المرض في الأسرة سابقاً، وتدني مصاحبة ذلك لأمراض المناعة الذاتية.

**Objectives:** To assess the clinical patterns, epidemiological profile of vitiligo, and its awareness among Saudi nationals.

**Methods:** A retrospective study was conducted among Saudi nationals with a confirmed diagnosis of vitiligo presenting to the National Center for Vitiligo and Psoriasis, Riyadh, Saudi Arabia, from August 2002 to August 2006 using a retrospective questionnaire based on the history and medical records of patients.

**Results:** Of the 4134 cases, 53.5% were females. The mean age of onset of vitiligo was 17.4 years. Vitiligo vulgaris was the most common type in 42.3% of cases, 90.5% had no associated autoimmune conditions. The family history was positive in 42.8%. Twenty-nine percent developed depigmentation on multiple sites, and 68.2% over exposed areas. Nearly 1912 (46.2%) were not aware of its cause, and 2682 (64.9%) were unaware of aggravating factors. Stress as an aggravating factor was considered by 15.1%. Herbal treatments were considered very effective by 45.8%.

**Conclusion:** Vitiligo is affecting Saudi women more than men with an early age of onset. Vitiligo vulgaris being the most prevalent form with a high rate of positive family history and low rate of associated autoimmune diseases. Knowledge of genetic and environmental factors affecting vitiligo is poorly conveyed and explored.

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*From the Dermatology National Center for Vitiligo and Psoriasis (Alissa, Mulekar, Huma), and Dermatology Derma Clinic (Al Eisa), Riyadh, Kingdom of Saudi Arabia.*

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*Address correspondence and reprint request to: Dr. Rozeena Huma, Center for Clinical Studies and Empirical Ethics, Department of Research Center, King Faisal Specialist Hospital & Research Center, PO Box 3354, MBC-03, Riyadh 11211, Kingdom of Saudi Arabia. Tel. +966 (1) 4647272 Ext 31624. Fax. +966 (1) 4424971. E-mail: rhmalik67@hotmail.com*

Vitiligo, a chronic pigmentary disorder of the skin affects less than 1% of the population worldwide.[1] Although not life threatening, vitiligo may considerably influence a patient's health-related quality of life and psychological well being.[2] The most notable symptom of vitiligo is depigmentation of patches of skin occurring on the extremities.[3,4] When skin lesions occur, they are most prominent on the face, hands, and wrists.[3,4] Depigmentation is particularly noticeable around body orifices, such as the mouth, eyes, nostrils, genitalia, and umbilicus.[3,4] In non-segmental vitiligo (NSV), there is usually some form of symmetry in the location of the patches of depigmentation. Vitiligo where little pigmented skin remains is referred to as vitiligo universalis. Non-segmental vitiligo can occur at any age, unlike segmental vitiligo, which is far more prevalent in teenage years.[3] Classes of NSV include: 1) Generalized vitiligo: the most common pattern, wide and randomly distributed areas of depigmentation.[5] 2) Universal vitiligo: depigmentation encompasses most of the body.[6] 3) Focal vitiligo: one or a few scattered macules in one area, most common in children.[7] 4) Acrofacial vitiligo: fingers and periorificial areas.[5] 5) Mucosal vitiligo: depigmentation of only the mucous membranes.[6] Segmental vitiligo (SV) differs in appearance, etiology, and prevalence from associated illnesses. It tends to affect areas of skin that are associated with dorsal roots from the spine. It spreads much more rapidly than NSV and without treatment it is much more stable/static in course and not associated with auto-immune diseases.[3] Vitiligo vulgaris is bilaterally symmetrical scattered macules, while acrofacial is bilaterally symmetrical macules distributed on distal parts of the extremities and face, including fingertips and lips. Usually, patients have poor knowledge of causative factors of vitiligo, associated diseases, and available treatment options. There is a paucity of data on the epidemiological patterns of vitiligo in the ethnic Saudi population. The aim of this study was to evaluate various epidemiological parameters of vitiligo, such as age and gender distribution, age of onset, type of vitiligo, relationship with pregnancy, familial occurrence, and so forth in the ethnic Saudi population. The second aim was to explore the co-existence of autoimmune disorders, and to assess the patterns of vitiligo and knowledge of the patients regarding its causes and associations, and choice of treatments available in this community. Vitiligo can be managed more comprehensively and optimistically after gaining such insights. This baseline information can be used to design preventive and curative strategies particularly for this community, which might modify the whole course of the disease in this region.

**Methods.** This descriptive, retrospective study was conducted between August 2002 and August 2006 at the National Center for Vitiligo and Psoriasis, Riyadh, Saudi Arabia. The medical records of 4134 confirmed vitiligo patients who attended the dermatology outpatient department during this specified time were included in the study. All non-Saudi patients and those with skin disorders like Nevus depigmentosus, Albinism, discoid lupus, post laser depigmentation were excluded. All the demographic data were retrieved from the patient's medical history sheet/medical charts, which included age, gender, occupation, age of onset of vitiligo, initial site of onset, duration of the disease, family history, food, and drug allergies, and associated conditions. The type of vitiligo was recorded based on the clinical diagnosis of the physician. The precise distribution of lesions was recorded, and cases were classified accordingly into 6 groups according to the standard working classification of clinical types of vitiligo. A questionnaire was designed in Arabic and English languages to assess the patient's knowledge of the causation, associations, and available treatment of vitiligo. A pilot study was conducted on 45 patients to validate the questionnaire and modifications were made according to the study needs. All the 3 principal investigators validated the results. The questionnaire included questions regarding history of similar disease in their family, do they know the cause of vitiligo, is there any curative treatment of vitiligo, and whether herbal medicines are effective or not? Patients were asked regarding the aggravating and relieving factors for their vitiligo. A list of all possible responses was added to the questionnaire and all questionnaires were completed by the physicians themselves. The expected outcome variables were to have types of vitiligo and other associated autoimmune disorders. Questions were aimed to assess knowledge and opinions regarding the cause, aggravating, and relieving factors of vitiligo, views of herbal treatments, and knowledge of available curative treatments. All the possible responses were provided in the questionnaire.

The Ethics Committee of the National Center of Vitiligo and Psoriasis approved the study. Informed verbal consent was taken from all the patients as no interventions were involved. Confidentiality of the data was assured, and all the identifiable variables were removed. Data were secured and placed in the locked cabinet with the principal investigator. Double data validation was carried out by manual checking of 2 investigators against the medical charts and database of the center.

A descriptive analysis was carried out to assess the characteristics of the sample using the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA) version 13.0. The result are presented as absolute numbers and percentage.

**Results.** Of the 4134 vitiligo patients who attended the facility during the study period, 1943 (47%) were males, and 2191 (53%) were females. The mean age at which vitiligo started was 17.6 years (0.4-71.0 years). Duration of the disease at the time of presentation varied, with a mean duration of 7.9 years. Most of the patients were young, 2005 (48.5%) belonging to the age group of 31-45 years, and 1461 (35.3%) to the age group of 15-30 years. Only 12 (0.3%) patients were from the youngest age group of 1-10 years. Almost 2351 (56.9%) of the patients were single, while 1783 (43.1%) were married. Most of the patients were students 1569 (42.3%), while 1001 (27%) of patients were from different professions, 469 (11.3%) being housewives. Almost 1771 (42.8%) of the patients had a positive family history of vitiligo, and 0.6% were not sure of the presence of vitiligo in their families. The various clinical types of vitiligo observed in these patients are depicted in **Table 1**. The most common type of vitiligo was vitiligo vulgaris, followed by acrofacial, focal, acral, universal, and SV in that order. Vitiligo vulgaris was more common in females than males, while the acrofacial type was more common in males than in females (**Table 1**). Among all, 90.5% had no history of any other associated autoimmune disease. In 389 (9.5%) cases, premature graying of hairs, hypothyroidism, diabetes, and other diseases were observed along with vitiligo (**Table 2**). Halo nevi was seen only in 2 cases. Sixty-eight percent (2823) developed vitiligo over exposed areas of the body, while in 31.8% it appeared over covered areas with no difference in appearance among males and females .The most common sites of onset were face, neck, trunk, upper and lower eyelids together in 16.8% (696) of the cases, the rest of the combinations are depicted in **Table 3**. Among all, 1191 (28.8%) of the patients had depigmentation on multiple sites. While 696 (16.8%) had all the 5 areas of involvement, and 549 (13.3%) had it on face and neck only. Trunk only was involved in 84 (2%) of the cases (**Table 3**). Most of the vitiligo cases (93.8%, 3881) were not allergic to any medication or food. Only 3.2% (134) had various drug allergies. Almost 1912 (46.2%) of the patients had no knowledge of the causes of vitiligo. Stress and fear were considered a cause by 1112 (26.8%) of the cases, while 512 (12.4%) of the patients considered all the factors listed in the questionnaire as causes of vitiligo. Only 178 (4.3%) knew that loss of pigment cells was a cause of vitiligo. Most of the patients 2764 (66.9%) reported "yes there is a curative therapy for vitiligo," while 24.1% were not sure of the availability of any curative treatment, and 370 (9%) reported that there is "no curative therapy for it." Sixty-six percent of patients believed that vitiligo

**Table 1 -** Various types of vitiligo observed at the National Center for Vitiligo and Psoriasis, Riyadh, Saudi Arabia from August 2002 to August 2006.

| Type of vitiligo (ICD-9 code 709.01) | Males n (%) | Females n (%) | Total n (%) |
|---|---|---|---|
| Vitiligo vulgaris | 758 (18.3) | 990 (23.9) | **1748 (42.2)** |
| Acrofacial vitiligo | 538 (13.1) | 454 (10.9) | **992 (24.0)** |
| Focal vitiligo | 233 (2.0) | 254 ( 6.1) | **487 (11.8)** |
| Acral vitiligo | 191 (4.6) | 154 (3.7) | **345 (8.3)** |
| Universal vitiligo | 89 (2.1) | 167 (4.1) | **256 (6.2)** |
| Segmental vitiligo | 93 (4.6) | 137 (6.2) | **230 (5.5)** |
| Mixed type | 19 (1.0) | 25 (1.1) | **44 (1.1)** |
| Other types | 20 (1.0) | 10 ( 0.4) | **30 (0.6)** |
| Halo nevus | 2 (0.0) | 0 | **2 (0.0)** |
| **Total** | **1943 (47.0)** | **2191 (53.0)** | **4134 (100)** |

**Table 2 -** Associated conditions/autoimmune disorders observed in vitiligo patients.

| Associated conditions | Frequency (%) |
|---|---|
| Premature graying of hairs | 132 (3.2) |
| Hypothyroidism | 74 (1.8) |
| Diabetes mellitus | 70 (1.7) |
| Hypertension | 31 (0.7) |
| Psoriasis | 23 (0.6) |
| Alopecia areata | 22 (0.5) |
| Atopic dermatitis | 22 (0.5) |
| Thyroiditis | 8 (0.3) |
| Pernicious anemia | 4 (0.1) |
| Systemic lupus erythematosus | 3 (0.1) |
| None of the above | 3745 (90.5) |
| **Total** | **4134 (100.0)** |

**Table 3 -** Main body areas involved in vitiligo.

| Main areas involved in vitiligo | Frequency n (%) |
|---|---|
| Face and neck, trunk, upper and lower eye | 696 (16.8) |
| Face and neck only | 549 (13.3) |
| Face and neck, upper and lower eye lid | 507 (12.3) |
| Upper eye, lower eye lid | 397 (9.6) |
| Trunk, upper and lower eye lid | 230 (5.6) |
| Face and neck,trunk,upper and lower eye, genitalia | 198 (4.8) |
| Lower eye lid | 179 (4.3) |
| Upper eye lid | 103 (2.5) |
| Trunk | 84 (2.0) |
| Other various combinations | 1191 (28.8) |
| ***Where did the first patch appeared*** | |
| Exposed areas | 2823 (68.2) |
| Un-exposed areas | 1311 (31.8) |
| **Total** | **4134 (100.0)** |

was curable, which shows the positive attitude of most of the patients. Herbal medicines were considered effective by 45.9% (1893), while 21.8% (904) were not sure about the herbal treatment's effectiveness. Almost 44.5% (1840) were very optimistic about the positive outcome of their treatment and were willing to pay until complete cure. When asked regarding what makes their vitiligo better, 1840 (44.5%) said after treatment it is better, while 1689 (40.9%) responded that nothing makes it better. Two thousand six hundred and eighty-two (64.8%) patients responded that they don't know what aggravates their vitiligo, while 625 (15.1%) said it is the stress that makes their vitiligo worse. Both stress and fear were thought to increase vitiligo by 410 (9.9%). For females it was fear and stress, while for males sun exposure was among the major aggravating factor for vitiligo (**Table 4**).

**Discussion.** Vitiligo is an acquired hypomelanotic disorder of the skin resulting from loss of functional melaocytes.[6] In 50% of the cases, the condition begins before the age of 20 years.[7] More women than men are referred with vitiligo, although the incidence of this disorder is not believed to be gender linked. Familial cases of vitiligo are common, indicating a hereditary factor, between 6-38% of vitiligo patients have family history of the disease.[8] To date, the exact prevalence of vitiligo in the Saudi population is unknown, although there are various regional studies on its incidence and frequency of occurrence. A few regional studies have been carried out to explore its incidence. Vitiligo shows regional variations in Saudi Arabia, its incidence rate ranges between 0.7-7%, the highest reported for Najran, and the lowest for Makah region.[9] The reported incidence of vitiligo in Riyadh is 2.6%, and it was more

**Table 4 -** Various studied parameters of 4134 confirmed vitiligo patients who attended the dermatology outpatient department at the National Center for Vitiligo and Psoriasis, Riyadh, Saudi Arabia.

| Studied parameters | Total n (%) | | Males n (%) | | Females n ((%) | |
|---|---|---|---|---|---|---|
| *Positive family history?* | | | | | | |
| 1. Yes | **1771** | **(42.8)** | 761 | (43.0) | 1010 | (57.0) |
| 2. No | **2337** | **(56.5)** | 1148 | (49.1) | 1189 | (50.9) |
| 3. Not sure | **26** | **(0.7)** | 12 | (46.2) | 14 | (53.8) |
| **Total** | **4134** | **(100.0)** | **1921** | **(46.4)** | **2213** | **(53.5)** |
| *What do you think is the cause of vitiligo?* | | | | | | |
| 1. I don't know | **1912** | **(46.2)** | 917 | (69.9) | 995 | (52.0) |
| 2. Stress and fear | **1112** | **(26.8)** | 477 | (42.9) | 635 | (57.1) |
| 3. All 6 reasons mentioned | **512** | **(12.4)** | 134 | (26.2) | 378 | (73.8) |
| 4. Hereditary | **206** | **(5.0)** | 90 | (43.7) | 116 | (56.3) |
| 5. Loss of pigment cells | **178** | **(4.3)** | 85 | (47.8) | 93 | (52.2) |
| 6. Vitamin deficiency | **111** | **(2.7)** | 49 | (44.1) | 62 | (55.9) |
| 7. Food | **103** | **(2.5)** | 65 | (63.1) | 38 | (36.9) |
| **Total** | **4134** | **(100.0)** | **1817** | **(47.3)** | **2317** | **(52.7)** |
| *Do you think there is curative therapy for vitiligo?* | | | | | | |
| 1. Yes | **2764** | **(66.9)** | 1307 | (47.3) | 1457 | (52.7) |
| 2. Not sure | **1000** | **(24.1)** | 512 | (51.2) | 488 | (48.8) |
| 3. No | **370** | **(9.0)** | 127 | (34.3) | 243 | (65.7) |
| **Total** | **4134** | **(100.0)** | **1946** | **(47.1)** | **2188** | **(53.0)** |
| *Do you think that herbal medicines are effective?* | | | | | | |
| 1. Yes very effective | **1893** | **(45.9)** | 920 | (48.6) | 973 | (51.4) |
| 2. Not effective | **1337** | **(32.3)** | 587 | (43.9) | 750 | (56.1) |
| 3. Not sure | **904** | **(21.8)** | 434 | (48.0) | 470 | (52.0) |
| **Total** | **4134** | **(100.0)** | **1941** | **(47.0)** | **2193** | **(53.0)** |
| *What makes your vitiligo better?* | | | | | | |
| 1. Treatments | **1840** | **(44.5)** | 817 | (44.4) | 1023 | (58.4) |
| 2. Nothing | **1689** | **(40.9)** | 832 | (49.3) | 857 | (50.7) |
| 3. All measures together | **375** | **(9.0)** | 171 | (45.6) | 204 | (54.4) |
| 4. Spontaneous recovery | **151** | **(3.7)** | 82 | (54.3) | 69 | (45.7) |
| 5. Stress relief | **79** | **(1.9)** | 36 | (45.6) | 43 | (54.4) |
| **Total** | **4134** | **(100.0)** | **1938** | **(46.8)** | **2196** | **(53.2)** |
| *What makes your vitiligo worse?* | | | | | | |
| 1. Do not know | **2682** | **(64.9)** | 1312 | (48.9) | 1370 | (51.1) |
| 2. Stress | **625** | **(15.1)** | 260 | (41.6) | 365 | (58.4) |
| 3. Stress and fear | **410** | **(9.9)** | 120 | (29.3) | 290 | (70.7) |
| 4. Fear | **158** | **(3.6)** | 58 | (36.7) | 100 | (63.3) |
| 5. Other | **144** | **(3.3)** | 120 | (83.3) | 124 | (86.1) |
| 6. Food | **54** | **(1.3)** | 29 | (53.7) | 25 | (46.3) |
| 7. Sun exposure | **44** | **(1.1)** | 27 | (61.4) | 17 | (38.6) |
| 8. Drugs | **17** | **(0.8)** | 5 | (29.4) | 12 | (70.6) |
| **Total** | **4134** | **(100.0)** | **1931** | **(44.3)** | **2303** | **(55.7)** |

common in males than females. Our study showed the opposite trend with vitiligo being higher in females than males (53% versus 47%). The vitiligo vulgaris type was more common in females, while the acrofacial, focal, and acral vitiligo was more common in males. In studies by Jarallah[10] and Al-Mutairi,[11] the family history of vitiligo was positive in 12% and 27.3% of patients, compared with 42.8% in our study. Another study by Al-Jabir[12] showed children had a strong family history of vitiligo, and developed the disease at a slightly older age compared with other studies. While in our study group, the average age of onset of vitiligo was 17.4 years. This age of onset is significantly younger than the average age of onset among Caucasian (24.2 years).[13] The factors affecting this early onset in the Saudi population need further exploration, as this particular community might be more genetically susceptible. Many patients with vitiligo experience psychosocial distress and social stigmatization.[14-16] It is known that women with vitiligo experience greater quality of life impairment than their male counter parts.[17] In the Saudi population, psoriasis and vitiligo (2.5% and 2.7%) are considered 2 dermatological disorders mostly affecting the quality of life of patients with these problems. Their social lives, personal relationships, sexual activities, are affected more than men, so they seek treatment earlier than men.[18] The availability of a treatment center in the region exclusively for vitiligo adds to their confidence and early presentation. It is well known that the mean age at onset of vitiligo varies among different geographical regions and ethnic groups.[19] Al Robaee[20] showed a positive family history of vitiligo in 27.5% of first-degree relatives among Saudis. Vitiligo sometimes runs in families. This suggests that some people are born with genes that make them more susceptible to developing vitiligo.[21] Such a high positive family history in first-degree relatives of our study group can be the result of the high rate of parental consanguinity, which is very common in this part of the world. It is shown that 20-40% of the relatives of vitiligo patients also have vitiligo, with the highest risks for children and siblings of the patient.[22] It was observed that women in Saudi Arabia, though covered due to the Purdah (veil) and with less sun exposure compared to their male counterparts, had vitiligo more than in males, with no significant difference in appearance and sites compared to males. Environmental factors such as traumatic skin injury, sunburn, stress, or fear appears to influence whether or not an individual with susceptibility genes will develop vitiligo during their lifetime.[24] Results revealed that stress, fear, and sun exposure was considered main causes of onset and aggravating factors for vitiligo by 26% of the patients. The majority of the young patients were students, so they might have been exposed to these factors more than any other group in our study population. A study by Firoz et al,[24] showed that 62.5% of vitiligo patients who were questioned about the cause of the disease, believed that emotional stress was caused by their vitiligo. It is a well-known fact that persons with vitiligo have a high risk of developing other autoimmune diseases.[25] Recent studies have linked vitiligo with defective autoimmune systems.[26,27] Retrospective studies of vitiligo patients in India[28] and Nigeria[29] found lower frequencies of certain vitiligo-associated autoimmune diseases, most likely due to under-diagnosis of these autoimmune diseases in these populations. The same can be true for our study as 90.6% cases were without any associated autoimmune disease. Either being under diagnosed, or that they were not suffering from any other autoimmune disease along with vitiligo, needs further exploration.

The knowledge of patients in our study group regarding the cause of their disease was very limited. Although most patients were educated, only 5% knew that hereditary/genetic factors play a role in its causation, showing a lack of adequate knowledge conveyed to the patients and community. Herbal treatments are considered the best remedies in many countries of the world, and 45.8% of our Saudi patients also showed their confidence in herbal medications, as they considered them safe with no side effects. They think the current medical treatments for vitiligo are difficult, expensive, often disappointing, and with side effects. Nearly 60% of patients considered their medical treatments effective, and were very optimistic regarding the outcome of the treatment, which shows their confidence in the physicians and the available treatments. An optimistic approach by the doctor, relatives, and the patients of vitiligo are a key factor in making vitiligo treatment successful without failures and remissions.

***Study limitations.*** There were a few limitations to our study, such as being a private setup. Further in depth analysis of genetic factors and other associations of vitiligo were not possible due to limited funds and facilities. The possibility of selection bias was another limitation. The results of this study can provide baseline information on vitiligo, its patterns, and major associations for further studies. Investigators actively involved in the research of genetic associations, and key modifying factors of vitiligo can make use of this preliminary data for their studies. Our study sample effectively represents the whole population of Saudi Arabia as this clinical setup caters to patients from all over the kingdom.

In conclusion, the most prevalent form of vitiligo is vitiligo vulgaris, more common in females than males, and mainly affecting young individuals with majority of the patients presenting with 5 or more

sites of involvement. Stress and sun exposure were the main causative and aggravating factors for vitiligo found in males, while stress and fear were the main factors in females. A positive family history in 42.8% should draw the attention of physicians to this disease, as appropriate counseling, education, and treatment are likely to improve the scenario. These results can be used to develop new treatment strategies keeping in mind trends of this disease in Saudis. Proper knowledge of factors affecting vitiligo should be conveyed to the patients and their relatives. Genetic testing and effective counseling for prevention of this disease should be considered seriously. Considering the psychosocial impact of this disease, and the fact that by modifying causative and aggravating factors we can modify the course of the disease, community based awareness programs should be initiated.

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