



St. PAUL' S HOSPITAL MILLENNIUM MEDICAL COLLEGE
DEPARTMENT OF DERMATOVENEREOLOGY

**PREVALENCE OF MELASMA AND ITS ASSOCIATED
FACTORS AMONG ADULT PATIENTS ATTENDING
DERMATOVENEREOLOGY OUTPATIENT DEPARTMENT OF
SPHMMC, ADDIS ABABA, ETHIOPIA, 2025**

INVESTIGATOR: BINIYAM GASHAW (MD)

**A THESIS TO BE SUBMITTED TO THE DEPARTMENT OF
DERMATOVENEREOLOGY IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE CERTIFICATE OF SPECIALTY IN
DERMATOVENEROLOGY**

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ACKNOWLEDGMENT

I would like to thank almighty God for giving me the strength and wisdom throughout my work. Then I would like to acknowledge my advisors Dr. Hanan Sergeta and Mr. Belayneh Lulseged for giving me their invaluable time in reviewing and commenting both the proposal and the thesis. Next my acknowledgment goes to the school of Dermatovenereology and SPHMMC for giving me the chance to conduct my research on the current topic and for their financial support. I am also grateful and want to acknowledge the participants who voluntarily participated in this study and also the data collectors. At last I would like to thank my friends and colleagues for their continuous support.

ABSTRACT

Background: Melasma is one of the most encountered dermatoses in dermatology clinics. It is a challenging chronic, recurrent condition associated with hyperpigmentation. Melasma affects all races and both genders, but is more prevalent in population with darker skin types and females. Little is known about the spectrum of pigmentary disorders in Ethiopia.

Objective: - To assess Prevalence of melasma and its associated factors among adult patients attending dermatovenereology outpatient department of SPHMMC, Addis Ababa, Ethiopia, from July 2024 – December 2024

Methodology: Institution based cross-sectional study design was conducted from July 2024 – December 2024. The total sample size of the study was 293 patients attending SPHMMC Dermatovenereology out Patient department. A systematic random sampling technique was used to select study populations. Socio-demographic and related data were collected by using structured interview-based questionnaire. After cleaning the data, it was entered to Kobocollect version 2024.1.3 for entry and exported to Statistical Package for Social Sciences (SPSS) version 25 for analysis. Descriptive statistics were summarized using frequency, mean, and standard deviation and presented in tables and figures. Binary Logistic regression analysis was used to identify factors associated with melasma. Findings were presented using 95% CI of Crude Odds Ratios (COR) and Adjusted Odds Ratios (AOR). P-value less than 0.05 was considered as statistically significant.

Results: The find of the study found that the prevalence of melasma were 13% (95%CI=9, 17). The determinant factor of melasma were age of 41-50 years compared to age of 18-30 years (AOR=5.3, 95%CI=1.58, 17.56), sunscreen usage (AOR=9.2, 95%CI=3.36, 25.42), history of oral contraceptive (AOR=2.6, 95%CI=1.01, 60.49) and family history of melasma (AOR=2.6, 95%CI=1.89, 6.33).

Conclusion: In this study a significant proportion of participants developed melasma (13%). middle age (41-50 years), sunscreen usage, oral contraceptive and family history of melasma were the predictive factor for developing melasma.

Acronyms and Abbreviations

HQ	-----	Hydroquinone
HRT	-----	Hormone replacement therapy
OCP	-----	Oral contraceptive pill
OPD	-----	Out patient department
SPHMMC	-----	Saint Paul Hospital Millennium Medical College
SPSS	-----	Statistical Package for Social Sciences
St	-----	Saint
TXA	-----	Tranexamic acid
UVA	-----	Ultraviolet A
UVB	-----	Ultraviolet B
VL	-----	visible light

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1. INTRODUCTION

1.1 Background

Melasma is an acquired, hyperpigmentation which presents with light to dark brown macules on the face and occasionally on the neck and forearms. It is derived from the Greek word “melas” meaning black, which refers to its brownish clinical presentation[1].

The prevalence is high in individuals of Asian, Latin American, and Hispanic origin[1]. It affects millions of individuals worldwide which is mostly observed in the facial area of darker-complexioned individuals (Fitzpatrick skin types IV– VI) exposed to intense ultraviolet (UV) radiation and shorter wavelengths of visible light (VL). At least 90% of those affected are women. It is characterized by symmetrically oriented hyperpigmented macules and patches which is divided into different subtypes based on the distribution pattern as centrofacial (the most common), malar, and mandibular patterns[2].

Multiple factors have been incriminated in the causation of melasma which includes genetic factors, solar radiation, hormonal factors, drugs, and others[1].

There is no curative treatment yet available for melasma. Avoiding the underlying causes which may be induced by oral contraceptive pills, pregnancy or photosensitizing drugs has a better outcome. Melasma fades with aging, and it disappears in most women after menopause, although extrafacial melasma can persist longer. Photoprotection by using a broad-spectrum sunscreen against UVB, UVA, and blue-violet visible light is essential for successful treatment, which helps to improve pigmentation and prevent relapse and initial disease occurrence in high-risk individuals. Topical therapies are the mainstay of treatment in which hydroquinone and triple combination cream (0.05% tretinoin with 4% HQ and 0.01% fluocinolone acetonide) are the preferred modalities. Other topical treatment options include Azelaic Acid, Niacinamide, Cysteamine, Thiamidol, Ascorbic acid, Kojic acid, Glycolic acid and Tranexamic acid. Systemic treatment options include TXA, Pycnogenol, Polypodium leucatomos and Glutathione. There are also procedures as an option like Microneedling, Lasers and light-based technologies, Intradermotherapy with TXA and Platelet-Rich Plasma and Dermabrasion. Despite having multiple options of treatment, the lesions are not cleared completely in most patients and recurrences are frequent[3].

1.2 Statement of the Problem

Melasma has been observed to be one of the commonest dermatoses across all world countries[4]. It is a benign yet psychologically debilitating skin condition that is prevalent among women of darker phenotypes, and particularly in Asian women. This potentially preventable condition can lead to skin discoloration that is hard to treat and can frequently recur[5].

Epidemiological studies have reported higher prevalence of melasma in Indian, Pakistani, Middle Eastern, East Asian (Japanese, Korean, and Chinese), and Mediterranean-African populations. In Southeast Asian populations, the reported prevalence rate is as high as 40%. Melasma often brings negative psychosocial implications to patients and lowers their quality of life. Patients frequently experience shame, low self-esteem, lack of pleasure, dissatisfaction, and lack of social motivation[6].

The incidence of melasma is increasing around the world, while curative treatments are not available[7]. Though melasma is a common skin condition in Ethiopia, only a few epidemiological studies on clinical pattern of skin diseases were done which were collected by a retrospective method which has limitation in assessing the exact prevalence of the disease. So my study will assess melasma specifically regarding its prevalence and associated factors by using a institution- based cross-sectional method and will also try to describe the association of melasma with oral contraceptives (OCP), family history and sun exposure and will try to see whether the association is significant or not and it will be an input for further research for the stakeholders and patients to advise on family planning practices.

1.3 Significance of the Study

Although melasma does not usually cause physical debilitation, many patients report experiencing depression, and decreased quality of life making it an important condition to characterize and educate both healthcare providers and patients. Although there is much research dedicated to finding treatments for melasma, reoccurrence is common and in order to maximize the quality of life, prevention is the most efficient method to consider for high-risk individuals[5]

In Ethiopia little is known about the exact prevalence of the disease and only few treatment options are accessible and affordable. The longer duration of treatment will challenge patients.

This study will alarm both the physician and patients to emphasize on listening patients concern, to discuss about the nature of the disease, treatment modalities and adherence, advise to avoid triggering factors. This research will also be an input for SPHMMC, policy makers and Ministry of Health to avail different types of medication considering its burden on the productivity of the population, develop standard guideline or criteria to diagnose, assess severity, impact on quality of life and treatment modality in resource poor setup. It will also aid the government to take steps to conduct extensive social campaign, use available social media and other means of communication to increase public awareness about the disease course and awareness about the availability of treatment. As it is also the first study in SPHMMC and in the country too, it will provide a baseline data for the future researches. After assessing its prevalence with this study, it will create a door for doing a population study as most of these patients may not visit health centers and its exact prevalence could be much higher.

2. LITERATURE REVIEW

Melasma is a common acquired disorder characterized by symmetric, hyperpigmented patches with an irregular outline, occurring most commonly on the face followed by the forearms. It is most prevalent among young to middle-aged women and its exact pathogenesis is unknown. It has a negative impact on quality of life[4].

2.1 Prevalence of melasma

The exact prevalence of melasma is not known due to underreporting of the disease as most of the patients do not go to a health center due to the asymptomatic nature and lack of population studies. It has been found to be more common in Hispanics, Asians, and African Americans than in Caucasian populations[8].

Worldwide, there are differences in the prevalence of melasma, ranging from 1% in the general population to 9–50% among communities at high risk[4]. A prevalence of 2.9% was observed in the Arab population in Saudi Arabia[9] compared to a 13.4 - 15.5% prevalence in Arabs residing in America[10]. A study done in rural Nepal showed a point prevalence of 6.8% with female predominance (87%)[11]. On a population study of Latino women in the Dallas– Fort Worth area, the prevalence of melasma was found to be 8.8% which was most representative than the studies done at general or dermatology clinics[12].

In a cross-sectional descriptive study conducted in 2019 in South Africa in the public sector, pigmentary disorders are in the top 5 skin conditions seen, with melasma being third among the pigmentary disorders having a prevalence of 0.6%[13]. In a 2015 study in the same province but in the private sector, the prevalence of melasma was 4%[14].

A retrospective study done in 1998 in Kazanchis health center in Ethiopia demonstrated a 1.5% prevalence[15]. A study done on Pattern of Skin Disease Among Clients Attending Dermatologic Clinic at Finote Selam Hospital showed pigmentary disorders as the second commonest skin problems next to eczema, with melasma accounting for a 1.6% prevalence rate being second amongst the pigmentary disorders[16]. on a Cross-Sectional Study from debreberhan among Primary School children, a point prevalence of 2.5% was found[17].

2.2 Associated factors of melasma

2.2.1 Socio-demographic factors

A study done in India showed that mean age was 38.02 years. The mean age of onset was 34.57. Females account for 85% of the cases. The bulk of patients had intermediate skin phototypes, with skin types IV (48.3%) and V (40.7%) making up the majority. 65.2% of people reported lesion's first onset on their cheeks, followed by the nose (27%), forehead (22.8%), upper lip (8.4%), and chin (8.4%). A higher proportion of patients (42.8%) had malar melasma[18].

According to a Brazilian study, 97.5% of patients were female. The mean age at which the symptoms appeared was 29.8 years, and they persisted for 10.3 years on average. 74% of patients had melasma in the malar region at the time of initial manifestation[19].

The age of onset of melasma in male patients is variable, ranging from 18 to 72 years, with the average age of onset being 30.7 years[8].

In the study done by Sarkar et al, 200 patients were screened and 20.5% were men. Their ages ranged from 19 to 53 years with mean age showed no significant difference between men (33.5 years) and women (31.5 years). 58.5% of the patients were outdoor workers. Clinical patterns were malar in 61%, centrofacial in 29.3% and mandibular in 9.7%. Among women, the centrofacial pattern was the most common[20].

In a study done by Handel et al, The mean age was 38 years and age of onset was 27 years[21].

The mean age of patients with melasma was 33.45 years, ranging from 14 to 54 years. There was female preponderance with a female to male ratio of approximately 4:1. The mean age of onset was 29.99 years. Centrofacial was the most common pattern (55.44%) observed in this study [19].

2.2.2 Physiologic Factors

The clinical emergence of melasma may depend on an interplay between hormonal and environmental factors within genetically susceptible individuals[6]. Primary risk factors for developing melasma are female hormone variations and chronic exposure to ultraviolet

radiation. Some other risk factors include genetics, chronic drug intake, and pollution[5]. Cosmetics (mustard oil, soaps, shaving creams, aftershave, and perfumes), photosensitizing drugs, food items, thyroid diseases, hepatopathies, ovarian tumors, parasitic infestations, and stressful events are also found to be some other risk factors[8].

Melasma is largely caused by variations in female sex hormones, such as elevated or lowered levels of estrogen and/or progesterone, which can be brought on by OCPs, hormone replacement therapy, or pregnancy. For patients with extra-facial melasma and those with a family history of melasma, the impact of female hormone therapy on the disease's progression is negligible[5]. A cross-sectional study on 400 pregnant women in Tehran showed the prevalence of melasma was 15.8%. It has been reported that 8–34% of the women taking OCPs or HRT develop melasma. A report presented spontaneous improvements in patients with melasma after switching from a combined OCP to a hormone-releasing intrauterine device[6]. In a study done in India, 5.4% of the patients reported having previously used OCPs. Of the participants, 34.6% claimed that their melasma began after pregnancy, while 15.2% reported that it began during pregnancy. Of those, 59.2% reported that it began in the second trimester. Melasma began in 75.1% of patients prior to menopause and in 10.3% after menopause[18]. Pregnancy was found to be a major triggering factor accounting for 42% of the cases, followed by sunlight exposure (26%) and OCP use (10%) by another study[21].

In a majority of studies on men with melasma, sun exposure was documented as the main cause. In women, hormonal factors, such as pregnancy, OCPs, hormonal therapy, and mild ovarian dysfunction, are considered to be some of the most common etiological factors in the development of melasma. Extra- facial melasma (arms, neck, sternal regions, and back) occurs mainly among elderly, menopausal women, and might be associated with hormone replacement therapy[8].

The aetiological factors identified in males were: sun- exposure in 20 (48.8%), mustard oil usage in 18 (43.9%), family history in 16 (37%), chronic illnesses in 5 (12.2%) and phenytoin in 3 (7.3%); of these sun-exposure and family history were statistically significant when compared with those for women. Laboratory investigations revealed anemia in five (12.2%), giardiasis in two (4.9%), increased leuteinizing hormone (LH) and low testosterone in four (9.7%) men[20].

UVA, UVB and VL are also the main triggering factors for initial onset and relapse of melasma by inducing skin hyperpigmentation in individuals with darker skin types. The most common site of facial occurrence is the zygomatic region, followed by supralabial, frontal, nasal, temporal, mental, and mandibular areas[21]. UV and visible light both promote melanin synthesis, activate tyrosinase activity, contribute to skin photoaging, and lead to pigmentation. pigmentation often diminishes during the winter and increases during the summer or intense sun exposure[6]. Another study done in 120 melasma patients showed that all patients reported moderate to chronic photo exposure as an aggravating factor for melasma. 52.17% of females experienced exacerbation of melasma during pregnancy. Only 16.3% female patients took OCPs[22]. Duration of sun exposure and cooking heat/occupational heat exposure was significantly associated with severity of melasma[18]. The patients' most common stated triggers were UVA/UVB exposure (44.4%) followed by pregnancy (24.2%) according to the brazilian study[19].

There is also a potential genetic component to the onset of melasma. In a global survey of 324 women, 48% of the individuals have a family history of melasma; among those with a positive history, 97% were in first-degree relatives. patients with darker skin (Fitzpatrick skin type IV–VI) have a strong Family history than those with Fitzpatrick skin type II and type III[6]. A positive family history was obtained in 20% of the cases in a study of India[18]. In the above Brazilian study, Melasma ran in the family for 64% of the patients. Compared to patients without a family history of melasma, these patients had a younger age of onset[5]. Handel et al also reported a strong association of melasma with family history (61% of cases versus 13.2% of controls)[21].

Studies also found that melasma patients have higher rate of thyroid disorders, especially during pregnancy and in patients undergoing OCP. Both hypo- and hyperthyroidism, in particular 25.3% of the melasma patients had abnormal T3, 22.7% had abnormal T4, and 34.8% had abnormal TSH levels. However, further studies are needed to detect the cause-effect relationship and to recommend baseline investigations[23]. According to the above Indian study, 0.9% of participants had a history of polycystic ovarian disease, while 7.5% of patients had a history of hypothyroidism[18].

Pollutants in the form of airborne particulate matter and polycyclic aromatic hydrocarbons are said to produce reactive oxygen species, causing skin hyperpigmentation. Southeast Asia and the Indian subcontinent are among the most polluted geographic areas, which may be the reason for melasma and hyperpigmentation to be the highest in those regions[5].

2.3 Conceptual frame work

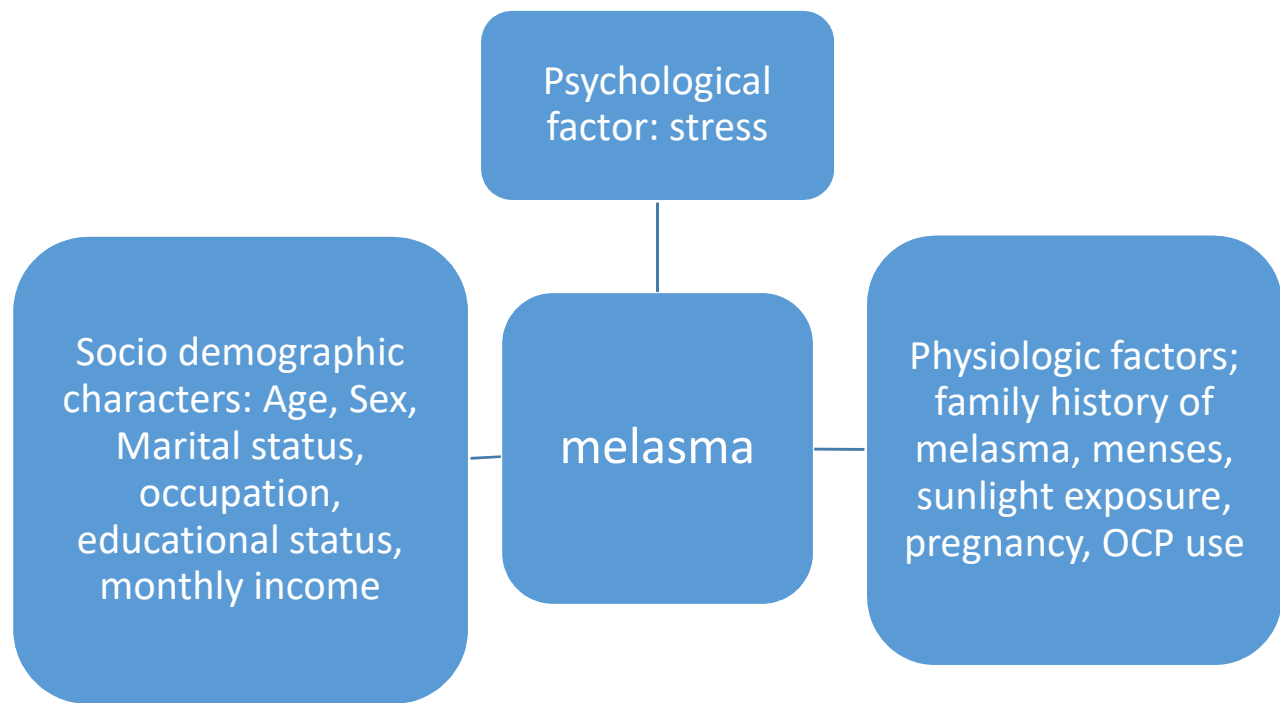


Figure 1 Conceptual framework

3. OBJECTIVES

3.1 General objective:

- ✓ To assess the prevalence and associated factors of melasma among adult patients attending dermatovenereology OPD, SPHMMC, Addis Ababa, Ethiopia.

3.2 Specific objectives:

- ✓ To assess the prevalence of melasma among adult patients attending Dermatovenereology OPD, SPHMMC, Addis Ababa, Ethiopia.
- ✓ To assess associated factors of melasma among adult patients attending Dermatovenereology OPD, SPHMMC, Addis Ababa, Ethiopia.

4. METHODS AND MATERIALS

4.1 Study Area and Period

This study was conducted in dermatovenereology OPD of SPHMMC, which is one of the referral hospitals in Addis Ababa under the Ethiopian Federal Ministry of Health (FMOH). The hospital is located in Gulele subcity in Addis Ababa, which is the capital of Ethiopia. St Paul hospital was established with the intent to help the poor people who could not afford medical expenses. Initially it was located at Autobis Tera. It was inaugurated in 1947, furnished with 250 beds. In 1968/69 new hospital buildings were constructed in the Gulele area, its present site. The hospital had the capacity to admit 400 inpatients and 300 outpatients. During that time the hospital consisted of 9 medical doctors and 18 nurses. Now it is the second largest public hospital in the country. The college has more than 2500 clinical academic and admin staff. The inpatient capacity is 700 beds, more than 1200 outpatient and emergency clients have been visiting the college daily. St Paul receives referrals from around the country. Currently the college is established with the mission to provide comprehensive health care services, teach high quality medical education, meet the needs of the communities and serve through advanced and affordable health care services.

Dermatovenereology Department was established in 2000 E.C. Currently the department has 8 Dermatovenereologists, 1 Dermatologist, 19 Residents and 6 nurses. This study was conducted from July, 2024 – December, 2024.

4.2 Study Design

Hospital based cross sectional study was conducted.

4.3 population

4.3.1 Source Population

All adult patients who visit Dermatovenereology clinic at SPHMMC

4.3.2 Study Population

All adult patients who visited Dermatovenereology clinic at SPHMMC and fulfilled inclusion criteria were selected during the study period.

4.4 Eligibility criteria

4.4.1 Inclusion Criteria

- ✓ All male and female patients attending outpatient department of Dermatovenereology in SPHMMC during the study period, whose Age is ≥ 18 years

4.4.2 Exclusion Criteria

- ✓ Patients who did not give consent for the study
- ✓ Psychological or mental conditions that prohibit understanding of the nature of the study
- ✓ All critically ill patients
- ✓ Patients visiting OPD more than once during the study period

4.5 Sample Size and Sampling Procedure

Sample size was calculated based on a single population proportion formula by using:

$$n = \frac{(Z_{\alpha/2})^2 p(1-p)}{d^2} = 343$$

Where: n = the desired sample size

$Z_{\alpha/2}$ = Z-value for a 95% confidence level which is 1.96

d = the marginal error tolerated degree of confidence 3%=0.03. I used 3% to increase the sample size

P = Prevalence of melasma among Latino women in the Dallas– Fort Worth area which is 8.8% (this study was preferred because it was done among the population which may show the actual prevalence of melasma and also Hispanic race are categorized to have similar prevalence with black race).

Based on the above assumptions a total of **343** patients were required for the study.

Since the total population for this research is less than 10,000, we should use correction formula

$$n_f = \frac{n_o}{1 + \frac{n_o}{N}} = 266$$

Where

n_f = final sample size

n_o = initial sample size which is 343

N = total population which is 1200

With population correction formula, the final sample size (n_f) was **266**.

Taking a 10% non-response rate which is 27, the final sample size became **293**.

The sample size for the associated factors was calculated using two population proportion formula using stat calculator.

S.no	Significant Variables	Confidence level	Power	Prevalence	OR	sample size
1	Family history	95%	80	13.2%	10.4	184
2	Oral contraceptive	95%	80	53%	2.45	182
3	pregnancy	95%	80	79%	3.59	104

The sample sizes obtained in the table are lower than the sample size calculated under first objective of this study. So, the calculated sample size, **n= 293** was used.

4.6 Sampling technique

Systematic random sampling was employed to select representative sample participants from patients attending Dermatovenereology OPD during the study period. An average of 1200 adult patients visited Dermatovenereology OPD in the last 06 months period. The sample size calculated was 293, so the sampling fraction (k) was: $1200/293=4.1$. The first patient to be included in the sample was chosen by lottery method, then every fourth patient was included in the sample.

4.7 Study Variables

4.7.1 Dependent Variable

- Melasma

4.7.2 Independent Variables

- Socio demographic characters: Age, Sex, Marital status, occupation, educational status, monthly income
- Physiologic factors; family history of melasma, menses, sunlight exposure, pregnancy, OCP use
- Psychological factor: stress

4.8 Operational Definitions

The criteria for diagnosis of Melasma will be clinical based on the following and the diagnosis should be made by a Dermatovenereologist or a Dermatovenereology Resident.

- well-demarcated, irregular hyperpigmented patch lesion involving the face, neck, arms and forearms[4]

Clinical subclassification is made by the following terms:

- centrofacial pattern - the forehead, cheeks, nose, upper lip, and chin
- malar pattern - the cheeks and nose
- mandibular pattern - the mandibular ramus or chin[4]

Relatives:

- (i) First-degree relatives include an individual's parents, siblings, and children.
- (ii) Second-degree relatives include an individual's grandparents, grandchildren, uncles, aunts, nephews, nieces, and half-siblings.
- (iii) Third-degree relatives include an individual's great-grandparents, great grandchildren, great uncles/aunts, and first cousins[24].

Thyroid dysfunction – hypothyroidism and hyperthyroidism presenting clinically with signs and symptoms or laboratory abnormal level of TSH, T4, T3

Hyperthyroidism-characterized by Symptoms like Unintentional weight loss, Heat intolerance, sweating, Palpitations, Multiple daily loose stools, Dry skin, Pruritus, Muscle weakness

Hypothyroidism-characterized by symptoms like cold intolerance, constipation, sleep disturbance, easy fatiguability, weight gain

Diagnosed by physician previously or patient presenting with anterior neck swelling and symptoms listed above[25].

4.9 Data collection tool and procedure

Recruitment of participants into the study was done in the Dermatovenereology OPD. The participants who met the inclusion criteria and gave consent to participate in the study were enrolled after signing the consent forms. Three data collectors (Dermatovenereology Residents) were recruited to collect data under the supervision of the principal Investigator. Data were collected using a structured interviewer administered questionnaire prepared by the researcher considering the variables used in the literatures reviewed based on objectives of the study and by doing clinical examination. Questionnaire was also inserted into Electronic based procedure by using a mobile application called kobocollect for data entry by the principal Investigator. The first section of the questionnaire assessed socio-demographic data and further sections assessed factors that may play a role in occurrence of melasma including family history, use of drugs or cosmetic products, stress, sunlight exposure, oral contraceptive use and pregnancy.

4.10 Data Quality Control

To ensure data quality, the questions of structured interview were designed properly and the English version questionnaire was translated in to validated Amharic version and will be used along with the English version of checklist. Training was given to the data collectors for one day about data collection methods, how to take informed consent, how to approach participants and the ethical procedure to follow before the actual data collection. To ensure the validity and reliability of the data collection tool, the questionnaire was pre-tested on 5% of sample size on randomly selected individuals outside the research area and these individuals had not participated in the main study. During the pre-test, the questionnaire was assessed for its clarity of the questions, reliability and sensitivity of the subject matter, and identify any ambiguous or

lengthy questions, and assess the accuracy of responses, estimate time required and some modifications made on the basis of the findings. Daily collected data were sent to the investigator who will check for completeness of the data daily.

During the actual data collection on daily basis, collected information was checked out for the completeness, accuracy and clarity by primary investigator. Possible errors returned to the collectors for correction or were rejected. Data clean up and cross checking was done before analysis.

4.11 Data Analysis

The completed questionnaires were checked for completeness and consistency, then entered into Kobocollect version 2024.1.3 and later exported into SPSS version 25 for analysis.

Descriptive statistics were used to summarize the characteristics of study participants. A bivariate and multivariate logistic regression model was fitted to identify associated factors. First bivariate analysis was run. Then, multivariate logistic regression analysis. Independent variables having a p-value ≤ 0.25 in bivariate analyses were included in the multivariate analyses to control confounders. Adjusted odds ratio (AOR) with the corresponding 95% CI was calculated to show the strength of association. P-value < 0.05 was considered statistically significant. Finally, the results of the findings were presented using text, graphs and tables.

4.12 Ethical consideration

Ethical approval was obtained from Institutional Ethical Review board of SPHMMC and formal permission was offered from the board. Written informed consent was obtained from each participant after explaining the objective of the study in a language they understand. For this, one page of information sheet and consent paper was attached to the cover page of each questionnaire. Confidentiality of the result and privacy of the study population was kept strictly.

5. RESULT

5.1 Sociodemographic characteristics of the study participants

In this study 293 participants were involved making a response rate of 100%. Seventy-one percent of the study participants were female and 37.2% of the participants were in the age group of 18-30 years with the mean and SD of 38.1 ± 14.66 respectively. Fifty-one percent of the study participants were married and 40.3% were an education level of secondary. Forty-three percent of them were employed and 28.3% had a house hold monthly income of 3200-5250.

Table 1 The sociodemographic characteristics of the study participants attending Dermatovenereology outpatient department of SPHMMC, Addis Ababa, Ethiopia, 2024

Variable	Category	frequency	Percent
Sex	Male	85	29
	female	208	71
Age in years	18-30	109	37.2
	31-40	87	29.7
	41-50	46	15.7
	51-60	19	6.5
	>60	32	10.9
Marital status	Single	96	32.8
	Married	178	51.2
	Divorced	16	5.5
	widowed	3	1
Educational status	Can't read and write	15	5.1
	Can read and write	11	3.8
	Primary	60	20.5
	Secondary	118	40.3
	College and above	89	30.4
Occupation	Housewife	73	24.9
	Employee	125	42.7
	Merchant	24	8.2
	Student	22	7.5
	Daily Laborer	15	5.1
	Unemployed	34	11.6
Income	<3200	54	18.4
	3200-5250	83	28.3
	5251-8000	75	25.6
	>8000	81	27.7

5.2 Melasma risk and prevention related characteristics of the study participants

Forty-four percent of the study participants had 2 hours of sun exposure and 11.9% used sunscreen. From those sunscreen users, only 28.6% used it regularly and 40% of them used it after onset of melasma. From those who used sunscreen after melasma onset, 78.6% have seen improvement. Almost eight percent of the study participants had a family history of melasma. From those having affected family, 86.9% were first-degree family. Two percent of the study participants had thyroid disorder and 18.1% had comorbid disease. From those having comorbid disease, hypertension accounts for 54.7% and 58.7% of the participants had mild level of stress.

Table 2 Melasma risk and prevention related characteristics of the study participants

Variable	Category	frequency	Percent
Average duration of daily outdoor Sun exposure due to work or daily activity in hours	1	74	25.3
	2	129	44
	≥ 3	90	30.7
Have you used sunscreen	Yes	35	11.9
	No	258	88.1
Frequency of sunscreen used(n=35)	Occasionally	25	71.4
	Regularity	10	28.6
Time of sunscreen usage for melasma (n=35)	After	14	40
	Before	21	60
If used after melasma, did you see improvement (n=14)	Yes	11	78.6
	No	3	21.4
Family history of melasma	Yes	23	7.8
	No	270	92.2
Types of affected relatives (n=23)	First degree	20	86.9
	Second degree	3	13.1
Types of first degree (n=20)	Mother	13	65
	Sibling	7	35
Thyroid disorder	Yes	6	2
	No	287	98
Types of thyroid disorder	Multinodular goiter	6	100
Comorbidity	Yes	53	18.1
	No	240	81.9
Types of comorbid disease (n=53)	DM	10	18.9
	Dyslipidemia	4	7.5

Level of stress	HTN	29	54.7
	HIV	15	28.3
	Obesity	1	1.9
	Mild stress	172	58.7
	Moderate	118	40.3
	Severe	3	1

5.3 The characteristics of female participants

Nineteen percent of the study participants used oral contraceptive and 51% of those have used it for ≤ 6 month duration. Forty-seven percent of the participants didn't see menses and 1.9% received hormone replacement therapy. Two-third of the study participants had a pregnancy history and from those having pregnancy history, 49.6% had an age of first pregnancy in the age group of 18-24 as shown the table 3 below.

Table 3 The characteristics of female participants

Variable(n=208)	category	Frequency	Percent
Ever used oral contraceptive	Yes	49	23.6
	no	159	76.4
Oral contraceptive in month	≤ 6	25	51
	> 6	24	49
Menopause	Yes	26	12.5
	no	182	87.5
Hormone replacement therapy	Yes	4	1.9
	no	204	98.1
Pregnancy history	Yes	139	66.8
	no	69	33.2
Age first pregnancy (n=139)	< 18	14	10.1
	18-24	69	49.6
	25-34	54	38.8
	≥ 35	2	1.4
Number of pregnancies (n=139)	1	31	22.3
	2-4	91	65.5
	≥ 5	16	12.2
Current pregnancy status	Yes	4	1.9
	No	204	98.1

5.4 Melasma related characteristics of the study participants

In this study the prevalence of melasma was 13% (95%CI=9, 17) as shown in the figure below

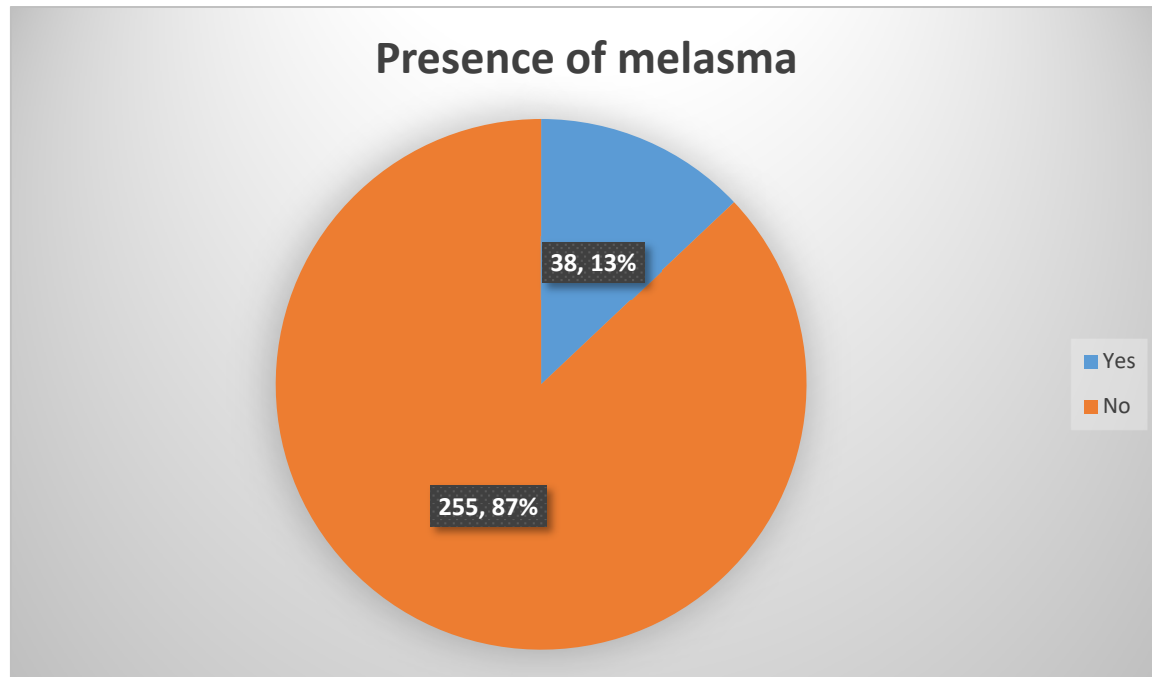


Figure 2 The prevalence of melasma among participants attending Dermatovenereology outpatient department of SPHMMC

From those having melasma, mean age of onset was 34.7 ± 10.1 years, 55.3% were having their age of onset at >30 years and all melasma lesions were in the face with majority having a malar pattern (65.8%).

Twenty-six percent of the participants had itching associated lesion and 50% of them used topical treatment.

Table 4 Melasma related characteristics of the study participants

Variable	Category	frequency	Percent
Have melasma	Yes	38	13
	No	255	87
Age of onset in years (n=38)	≤30	17	44.7
	>30	21	55.3
Site of melasma (n=38)	Face	38	100
Type of facial melasma(n=38)	Centro facial	13	34.2
	Malar	25	65.8
First site onset of the lesion on the face (n=38)	Cheek	26	68.4
	Forehead	5	13.2
	Nose	7	18.4
Any symptom associated with the lesion	Irritation/burning sensation	3	7.9
	Itching	10	26.3

	No	25	65.8
Types of treatment	Topical medication	19	50
	No	19	50
Factor exacerbating melasma	Drug/cosmetics	5	13.2
	Pregnancy	6	15.8
	Stress	6	15.8
	Sunlight exposure	9	23.7
	Thyroid disorder	1	2.6
	None	8	21

5.5 The determinant factors of melasma among the study participants

In this study age, income, sunscreen use, family history, comorbidity, history of oral contraceptive and duration of sun exposure had an association with melasma by bivariate logistic regression. The multivariate logistic regression revealed that the odds of age 41-50 years had 5.3 times higher in melasma patients compared to age of 18-30 years (AOR=5.3, 95%CI=1.58, 17.56). The odds of sunscreen use were 9.2 times higher in melasma patients compared to its opposite compartment (AOR=9.2, 95%CI=3.36, 25.42) and the odds of history of oral contraceptive were 2.6 times higher in melasma compared to its opposite compartment (AOR=2.6, 95%CI=1.01, 60.49). The odds of having family history of melasma were 2.8times higher (AOR=2.6, 95%CI=1.89, 6.33).

Table 5 The bivariate and multivariate association of independent variable with melasma among attending Dermatovenereology outpatient department of SPHMMC, Addis Ababa

Variable	Melasma		p-value	COR with 95%CI	P-value	AOR with 95%CI
	yes	No				
Age in years						
18-30	7	102	1		1	
31-40	13	74	0.057	2.6(0.97, 6.73)	0.066	2.9(0.93, 9.52)
41-50	13	33	0.001	5.7(2.11, 15.59)	0.007	5.3(1.58, 17.56)
51-60	4	15	0.048	3.9(1.01, 14.88)	0.056	6.4(0.96, 30.24)
>60	1	31	0.488	0.47(0.06, 3.97)	0.629	0.52(0.04, 7.36)
Income in birr						
<3200	12	42	0.053	2.6(0.98, 6.89)	0.219	2.1(0.63, 7.29)
3200-5250	13	70	0.271	1.7(0.66, 4.34)	0.657	1.3(0.39, 4.33)
5251-8000	5	70	0.471	0.65(0.20, 2.09)	0.378	0.52(0.12, 2.23)
>8000	8	73	1		1	

Duration of sun exposure in hours						
1	9	65	1		1	
2	13	116	0.646	0.81(0.33, 1.99)	0.857	0.91(0.31, 2.69)
>=3	16	74	0.122	1.6(0.65, 3.77)	0.151	2.3(0.74, 7.03)
Sunscreen used						
Yes	16	19	0.000	9.0(4.08, 20.02)	0.000	9.2(3.36, 25.42)
No	22	236	1		1	
Family history of melisma						
Yes	8	15	0.002	4.3(1.67, 10.91)	0.019	2.8(1.77, 10.01)
No	30	240	1		1	
Comorbidity						
Yes	13	40	0.007	2.8(1.32, 5.92)	0.275	1.8(0.62, 5.48)
No	25	215	1		1	
History oral contraceptive						
Yes	17	32	0.001	3.7(1.74, 7.83)	0.047	2.6(1.77, 10.01)
No	20	139	1		1	

6. DISCUSSION

The finding of this study found that the prevalence of melasma was 13% (n=53). This finding was under the range of world-wide high-risk community (9-50%)[4], Arabs residing in America (13.4 - 15.5%)[10], and those Latino women living in the Dallas-Fort Worth area (8.8%)[12]. The finding of the study is also higher than the study done in Arab population in Saudi Arabia(2.9%)[9], Nepal (6.8%)[11], South Africa (0.6%)[13], Kazanchis health center in Ethiopia (1.5%)[15], Finote Selam Hospital (1.6%)[16], Debreberhan (2.5%)[17]. The difference in melasma prevalence among different study setting may be due to differences in regions with high sun exposure, Ethnic and Genetic Differences, levels of exposure to environmental triggers, and differences in seeking treatment for skin conditions. The other difference may be due to the way studies are designed, varying exposure of different populations to this hormonal influences, and the level of awareness and knowledge among healthcare providers can differ across settings.

The finding of the study also found that 97.4% of the melasma patients were female. This finding was comparable with the study done in India[18] and Brazil[19]. This may be due to hormonal influences, like the use of oral contraceptives, and hormone replacement therapy which can all contribute to the development of melasma. Women may also have a genetic predisposition to melasma. Women may also use certain skincare products or cosmetics more frequently than men, which could affect the development or worsening of melasma.

The odds of having melasma was 5.3 times higher in age group 41-50 years as compared to age group of 18-30 years of age. This finding showed a slightly higher age compared to the studies done in most literatures[18][20] [21], which was in the range of 30-38years. This difference may be due to they came late to seek care after disease onset at which the mean age of onset was 34.

The odds of sunscreen use were 9.2 times higher in melasma patients. This may be due to the majority of them have used it for treatment purpose after developing melasma. Only 12% of participants have used sunscreen, among them forty percent have used it after occurrence of melasma for treatment purpose along with other treatment modalities by physician prescription and only 3.4% have used it regularly which is lower than the Indian study (19.6%)[18]. Dark-skinned people are less adherent to routine sun protection, sunscreen use, and reapplication, although they are more affected by melasma than fair-skinned individuals, thereby hindering

the effectiveness of treatment and also risk for recurrence which may be one of the reasons for the high prevalence of melasma in this population.

The odds of history of oral contraceptive were 2.6 times higher in melasma. This finding was in line with the study done by R. Sarkar[8]. This may be due to the physiological effect of oral contraceptives which typically contain synthetic forms of the hormone's estrogen and progesterone. These hormones can stimulate the melanocytes in the skin. When melanocytes are activated, they produce more melanin, the pigment that gives the skin its color, leading to the characteristic dark patches of melasma.

The odds of having family history of melasma was 2.8times higher in melasma patients. This finding was supported by the study done by Sarkar et al[20]. This study may suggest why family history can be a cause or contributing factor to melasma. Melasma tends to run in families, which suggests that there may be inherited genetic factors that make some people more prone to developing it. These genetic factors might affect how the skin responds to triggers like sun exposure or hormonal changes, both of which are known to play a role in melasma.

7. CONCLUSION

In this study a significant proportion of participants have developed melasma (13%). Middle age (41-50 years), sunscreen use, oral contraceptive and family history were the predictive factor for developing melasma.

8. RECOMMENDATION

Melasma is a common skin condition that causes dark, discolored patches, usually on the face. It's triggered by especially women who are using oral contraceptives or family history of melasma. So, in order to prevent or reduce risk of melasma the recommendation will be

- ✓ Birth control pills, especially those with estrogen, can sometimes trigger melasma. If a lady is experiencing melasma while using oral contraceptives, she can consult her healthcare provider about alternatives or ways to manage it.
- ✓ A lady on oral contraceptive or planning to take it should be mindful that changes in hormonal levels can trigger melasma. It's helpful to monitor her skin and consult a doctor if she notices any changes and can also consider alternative means of contraception.
- ✓ Physicians and other stake holders involving in family planning should know the association of oral contraceptive pills with melasma and should try to aware the risks of melasma occurrence while taking these pills to those who needed these pills while providing service.
- ✓ On sun exposure and sunscreen use, it will also aid the physicians and government to take steps to conduct extensive social campaign to increase public awareness about the disease and prevention mechanisms focusing on regular sun screen use, especially for those who have a family history of melasma.
- ✓ Researchers should conduct a population study with an increased sample size and on varying settings considering the prevalence might be higher and the predictive factors might differ in different settings.

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ANNEXES

Annex I. Information sheet English version

Hello, how are you? My name is ----- I am working as a data collector on behalf of Dr. Biniyam Gashaw who is a dermatovenereology Resident in SPHMMC who want to conduct this survey. This information sheet is prepared to explain the Purpose of this research in order to get your willingness to participate in the study. Please take time to read or listen the following information carefully. Ask questions if anything you read or listen is not clear or would like to get more information. Take time to decide whether or not to take part.

The study title: The prevalence of Melasma and its associated factor among adult patients attending dermatovenereology OPD at SPHMMC, Addis Ababa, Ethiopia.

Purpose of the study: This study will seek to assess the prevalence of Melasma and its associated factor among adult patients attending dermatovenereology OPD at SPHMMC, Addis Ababa, Ethiopia as a partial fulfilment of speciality degree in Dermatovenereology.

Procedure: If you are willing to participate in the research, you need to sign the consent form. Then, you will be interviewed and examined by the data collectors and this may take 15-20 minutes.

Benefits: The study does not have direct financial or health care benefit to the participants. But indirectly the results from the study will help the policy makers, practitioners and concerned organizations to formulate strategy for improving treatment and prevention.

Risk: It will take about 15 to 20 minutes of your time otherwise there are no anticipated risk to the participants, does not cause any physical harm, social discrimination or economic loss.

Confidentiality: All information will be kept with extreme confidentiality and shall not be divulged to any unauthorized person. Your identification (name, house number, phone number) will not be recorded on the questionnaire.

Rights to decline: Taking part in the study is voluntary and each participant has right to decline or withdraw at any stage of the research. You will not be denied the right of care for not participating.

For more information and question; here is the contact address of investigator;

Dr. Biniyam Gashaw Tel: 0918525639 Email: biniyamgashawgetnet@gmail.com

Thank you for taking the time to consider this study.

Annex 2 Consent form English Version

I have read or heard what is written in the information sheet and I am willing to participate on the study to be conducted by Dr.Biniyam Gashaw on the prevalence of Melasma and its associated factor among adult patients attending dermatovenereology OPD at SPHMMC, Addis Ababa, Ethiopia. I have understood that my information will be kept confidential and participation to this study is voluntary and I can stop the interview anytime I felt uncomfortable.

I fully consent to participate in this study.

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

Annex 3 Information sheet (Amharic version)

ለተሳታፊዎች ስለጥናቱ መረጃ የሚሰጥ ቅጽ በአማርኛ

ጤና ይስጥልኝ

እኔ.....የቆዳና አባላዘር ህክምና ተማሪ ለሆነው ዶ/ር ቢኒያም ጋሻው በቅደስ ጳውሎስ

ሆስፒታል በማዲያት በሽታ ስፋት እና ተያያዥ ጉዳዮችን ለማወቅ በሚሰራው ጥናት ላይ መረጃ በመስጠሱ ላይ እገኛለው። እርሶም በምናደርገው ጥናት ላይ እንዲሳተፉ ተጋብዘዋል። ይህ ቅጽ የተዘጋጀው መሳተፍ ከመወሰንዎ በፊት ሲሆን ስለጥናቱ መረጃ ለመስጠት ነው። ጊዜ ወስደው ቀጥሎ ያሉትን ሃሳቦች በጥሞና ለማዳመጥ ይዘጋጁ። ግልጽ ያልሆነ ነገር ካለ ጥያቄ መጠየቅ ይችላሉ። ትንሽ ጊዜ ወስደው በጥናቱ መሳተፍ መቻል ወይም አለመቻልዎን ያሳውቁን። ፍቃደኛ ከሆኑ ከዚህ ቀጥሎ የሚኖረውን የተስማሚነት ቅጽ መፈረም ይኖርብዎታል።

የጥናቱ ርዕስ : በአዲስ አበባ ውስጥ በሚገኘው በቅዱስ ጳውሎስ ሆስፒታል የቆዳ ክፍል የማዲያት በሽታ ስፋት እና ተያያዥ ጉዳዮችን ለማወቅ

የጥናቱ ዓላማ : በአዲስ አበባ ውስጥ በሚገኘው በቅዱስ ጳውሎስ ሆስፒታል የቆዳ ክፍል የማዲያት በሽታ ስፋት እና ተያያዥ ጉዳዮችን መገምገም

የጥናቱ አካሄድ : በጥናቱ ላይ ለመሳተፍ ፍቃደኛ ከሆኑ የስምምነት ቅጽ ላይ ይፈርሙና 15 ደቂቃ የሚፈጅ ቃለመጠይቅ ያደርጋሉ። በተጨማሪም ሰውነቶ ላይ ማዲያት መኖር አለመኖሩን በመረጃ ሰብሳቢው ይጣራል።

የጥናቱ ጥቅም : በዚህ ጥናት በመሳተፍዎ ክፍያ ወይም ሌላ አይነት ቀጥተኛ ጥቅም አያገኙም፤ ነገር ግን የጥናቱ ውጤታማነትና አላማ መሳካት ታላቅ ጠቀሜታ አለው። በመጨረሻም ከዚህ ጥናት የሚገኘው ውጤት በማዲያት በሽታ ላይ ባለሙያዎች በማስረጃ የተደገፈ እቅድ ለማቀድና አገልግሎቱን የሚሰጡ የጤና ባለሙያዎች ጥራት ላለው አገልግሎት ተጨማሪ የመረጃ ግብዓት ሆኖ ያገለግላል። እንዲሁም ወደፊት ከዚህ ተመሳሳይ ጥናት የሚያደርጉ ምሁራን ጥልቅ ጥናት ለማድረግ የሚያስችል መረጃ ይሆናል።

ከጥናቱ ጋር ሊኖር የሚችል ጉዳት : በዚህ ጥናት ላይ በመሳተፍዎ ችግር ይፈጠራል ወይም ጉዳት አለው ብለን የምንሰጋው ነገር የለም። ነገርን ከጊዜዎት ላይ 15-20 ደቂቃ ይወስድብዎታል። በዚህ ጥናት ላይ አለመሳተፍ በሚያገኙት አገልግሎት ላይ የሚያደርሰው ጉዳት የለም።

ሚስጢራዊነት : ይህ ክእለት የሚሰበሰበው መረጃ ሚስጢራዊነቱ የተጠበቀ ነው። በጥናቱ ላይ የእርስዎን አድራሻም ሆነ ስምና ስልክ የማንጠቅስ መሆኑን እንገልጻለን።

በጥናቱ ያለመሳተፍ ወይም አቋርጦ የመውጣት መብት : በዚህ ጥናት ላይ መሳተፍ በፍጹም ፍቃደኝነት ላይ የተመሠረተ ነው። ስለሆነም ያለመሳተፍ ሙሉ መብት አለዎት። እንዲሁም በመጠይቁ መሳተፍ ከጀመሩ በኋላ አንዳንድ ጥያቄዎችን አለመመለስም ሆነ ሙሉ ለሙሉ ማቋረጥ ይችላሉ።

ለተጨማሪመረጃ : በዚህ ጥናት ላይ ተጨማሪ መረጃ ከፈለጉ የጥናቱ ባለቤት ለሆኑት ዶ/ር ቢኒያም ጋሻው በስልክ ቁጥር +251918525639 መደወል ወይም በኢ-ሚይል biniyamgashawgetnet@gmail.com

ሊያገኙን ይችላሉ።

ስለዚህ መረጃውን ለመስጠት እና በዚህ ጥናት ተሳታፊ እንዲሆኑልኝ በአክብሮት እጠይቀዎታለሁኝ።

Annex 4 consent form (Amharic version)

የስምምነት ማረጋገጫ ቅጽ

በመረጃ ቅጽ ላይ የተጻፈውን የጥናት ዓላማና መረጃ በሙሉ አንብቤአለው ወይም ተነቦልኛል፤ ተረድቼውማለሁ።

ስለዚህም በቅዱስ ጳውሎስ ሆስፒታል ለማወቅ በተዘጋጀ መጠይቅ ላይ ለመሳተፍ ፈቃደኛ ነኝ።

እኔ የምሰጠው መረጃ በሚስጥር እንደሚጠበቅ እንዲሁም ይህ ጥናት በፍቃደኝነት ላይ የተመሠረተ እንደሆነ እና በማንኛውም ጊዜ መቀጠል ካልፈለኩኝ ማቋረጥ እንደምችል ተረድቻለሁ። ጥናቱ ላይ ባለ መሳተፍ የሚመጣ ጉዳት እንዲሁም በመሳተፍ የማገኘው የተለየ ጥቅም እንደሌለ እረዳለው። ፍቃደኛ መሆኔንም በፊርማዬ አረጋግጣለሁ።

የተሳታፊው ፊርማ----- ቀን-----

የመረጃ ሰብሳቢው ፊርማ-----

Annex 5 Questionnaire (English version)

Prevalence of melasma and its associated factors among adult patients attending dermatovenereology outpatient department of SPHMMC, Addis Ababa, Ethiopia, 2023.

Code -----

Date-----

Annex 5.1 Sociodemographic Status (English form)

1	Sex	Male ☐ Female ☐
2	Age in years	-----
3	Marital status	Single ☐ Married ☐ Divorced ☐ Widowed ☐
4	Educational status	Can't read and write ☐ Can read and write ☐ Primary education (grade 1-8) ☐ Secondary education (grade 9-12) ☐ Tertiary education (diploma and above) ☐
5	Occupation	Farmer ☐ Merchant ☐ Employee ☐ Unemployed ☐ House wife ☐ Student ☐ Daily laborer ☐ Other ☐
6	Monthly family income (ETB)	

Annex 5.2 Clinical data and associated factors (English form)

1	Does the patient have Melasma?	1. Yes 2. No
2	If yes to the above question, how much is the duration in years?	
3	Age of onset	
4	Site of Melasma	1. face 2. neck 3. arm/forearm 4. others, specify
5	If the site is on the face, what is the type?	1.Centofacial 2.Malar 3.Mandibular
6	First site of onset of the lesion on the face	1.forehead 2. cheek 3.nose 4.upperlip 5.chin
7	Any symptom associated with the lesion?	1.No 2. Itching 3.Irritation/burning sensation
8	Did you identify any factor exacerbating your melasma? (more than one choice is possible)	1.sunlight exposure 2.pregnancy 3.COC 4.Stress 5.Drug/Cosmetics 6.Tyroid disorder 7. none 8. if others, specify
9	Are you on any treatment for melasma?	1. No treatment 2. Topical medication 3. Oral medication
10	Average duration of daily outdoor sun exposure due to your work or daily activities (in hours)?	
11	Have you used a sunscreen?	1. yes 2. no
12	If yes to the above question, how frequent have you used it?	1.Regularly 2.Occasionally
13	If yes to the above question, was it before or after occurrence of Melasma?	1.Before 2.After
14	If the answer is after, have you seen any improvement?	1. yes 2. no
15	Family history of Melasma	1. Yes 2. No 3. Do not know

16	If yes to the above question, which relative affected?	a. first degree b. second degree c. third degree
17	If first degree is affected, specify (more than one choice is possible)	1. Mother 2. Father 3. children 4. Sibling
18	Use of drugs?	1. Yes 2. No
19	If yes to the above question, specify the drug?	
20	Thyroid disorder?	1. Yes 2. No
21	If the answer is yes to the above question: a. Type of thyroid disorder b. Medications c. Duration of the disease	
22	Stress? (use the perceived stress scale tool listed at the end)	1. mild stress 2. moderate stress 3. severe stress
23	Comorbidity	1. Yes 2. No
24	If the answer is yes to the above question, specify	1. Dyslipidemia 2. Obesity 3. Hypertension 4. Diabetes mellitus 5. Mental stress 6. HIV If Others, specify
Questions number 26-34 are to be answered by female participants only		
25	History of oral contraceptive use?	1. yes 2. no
26	If yes to the above question, for how long did you use it (in months)	
27	Have you finished seeing menses or not?	1. yes

7		2. no
2 8	Hormone replacement therapy?	1. yes 2. no
2 9	Pregnancy history	1. yes 2. no
3 0	Current pregnancy status	1. yes 2. no
3 1	If yes to the above question, when was the onset if the patient has melasma?	1.first trimester 2.second trimester 3.third trimester
3 2	Age at first pregnancy (in years)	
3 3	No. of pregnancies	

Thank you for your participation.

Perceived Stress Scale (PSS)

It is a classic stress assessment instrument. This tool, while originally developed in 1983, remains a popular choice for helping us understand how different situations affect our feelings and our perceived stress. Don't try to count up the number of times you felt a particular way; rather indicate the alternative that seems like a reasonable estimate.

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. How often have you been upset because of something that happened unexpectedly? 0 1 2
3 4

2. How often have you felt that you were unable to control the important things in your life?
0 1 2 3 4

3. How often have you felt nervous and “stressed”? 0 1 2 3 4

4. How often have you felt confident about your ability to handle your personal problems? 0 1
2 3 4

5. How often have you felt that things were going your way? 0 1 2 3 4

6. How often have you found that you could not cope with all the things that you had to do? 0 1
2 3 4

7. How often have you been able to control irritations in your life? 0 1 2 3 4

8. How often have you felt that you were on top of things? 0 1 2 3 4

9. How often have you been angered because of things that were outside of your control? 0
1 2 3 4

10. How often have you felt difficulties were piling up so high that you could not overcome them? 0 1 2 3 4

Figuring your PSS score: You can determine your PSS score by following these directions: First, reverse your scores for questions 4, 5, 7, & 8. On these 4 questions, change the scores like this: 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0. Now add up your scores for each item to get a total.

Total score is _____.

Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress.

Scores ranging from 0-13 would be considered low stress.

Scores ranging from 14-26 would be considered moderate stress.

Scores ranging from 27-40 would be considered high perceived stress.

Annex 6 Questionnaire (Amharic version)

Annex 6.1 Sociodemographic Status (Amharic form)

1	ፆታ	ወንድ ☐	ሴት ☐
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2	እድሜ	----- አመት
3	የጋብቻ ሁኔታ	ያላገባ/ች ☐ ያገባ/ች ☐ የተፋታ/ች ☐ የሞተበት/ባት ☐
4	የትምህርት ደረጃ	ማንበብና መጻፍ የማይችል ☐ ማንበብና መጻፍ የሚችል ☐ አንደኛ ደረጃ (ክፍል 1-8) ☐ ሁለተኛ ደረጃ (ክፍል 9-12) ☐ ኮሌጅና ከዚያ በላይ ☐
5	ሥራ	ገበሬ ☐ ነጋዴ ☐ ተቀጣሪ ☐ ስራ የሌለው ☐ የቤት እመቤት ☐ ተማሪ ☐ የቀን ሰራተኛ ☐ ሌላ ካለ -----
6	የወር ገቢ(በብር)	

Annex 6.2 Clinical data and associated factors (Amharic form)

1	ታካሚዋ/ው ማድያት አላት/ው?	1. አዎ 2. የለም
2	ማድያት ካለብዎት ምን ያህል አመት ሆነው?	
3	ማድያቱ ሲጀምር እድሜዎት ስንት ነበር?	
4	ማድያቱ ያለበት ቦታ	1.ፊት ላይ 2.አንገት ላይ 3.እጅ 4.ሌላ ካለ ይጥቀሱ

5	ፊት ላይ ከሆነ ያለዉ ባለበት ቦታ አቀማመጥ የትኛውን ይመስላል?	1.መሃል ፊት 2.ጉንጭና አፍንጫ 3.አገጭ
6	ፊት ላይ ከሆነ ያለዉ መጀመሪያ የወጣበት ቦታ	1. ግንባር 2. ጉንጭ 3.አፍንጫ 4.ላይ ከንፈር 5.አገጭ
7	ያለበት ቦታ ላይ ሚስማዎት ነገር አለ ዎይ?	1.የለም 2. ማላከክ 3.ማቃጠል
8	ያባባሱባዎትን ምክንያት ምን ይመስልዎታል? (ከአንድ በላይ መመለስ ይቻላል)	1.የጸሃይ ብርሃን 2.እርግዝና 3.ሚዋጥ የእርግዝና መከላከያ 4.ጭንቀት 5.መድሃኒት 6.የእንቅርት ህመም 7. የለም 8.ሌላ ካለ ይጥቀሱ
9	ታክመዉ ያዉቃሉ?	1. የለም 2. የሚቀባ 3. የሚዋጥ
10	በቀን ውስጥ ለምን ያህል ሰአት የጸሃይ ብርሃን ያገኛዎታል?	
11	የጸሃይ መከላከያ ተጠቅመዉ ያዉቃሉ?	1. አዎ 2. የለም
12	የጸሃይ መከላከያ ተጠቅመዉ ሚያዉቁ ከሆነ አጠቃቀምዎት ምን ይመስላል?	1.ሁሌም ባግባቡ እጠቀማለሁ 2.አልፎ አልፎ እጠቀማለሁ
13	የጸሃይ መከላከያ ተጠቅመዉ ሚያዉቁ ከሆነ መጠቀም የጀመሩት ማድያት ከመከሰቱ በፊት ነዉ ወይስ በኋላ?	1.በፊት 2.በኋላ
14	ማድያት ከመከሰቱ በኋላ ከሆነ፣ የጸሃይ መከላከያ መጠቀም ከጀመሩ	1. አዎ

	በኋላ ለወጥ አይተዉበታል ወይ?	2. የለም
15	ከቤተሰብ ማድያት ያለበት ሰው አለ?	1.አዎ 2.የለም 3. አላዉቅም
16	ያለበት ሰው ካለ የትኛው ደረጃ?	1. አንደኛ ደረጃ 2. ሁለተኛ ደረጃ 3. ሶስተኛ ደረጃ
17	አንደኛ ደረጃ ከሆነ የተጠቃው የትኛው እንደሆነ ይለዩ? (ከአንድ በላይ መመለስ ይቻላል)	1. እናት 2. አባት 3. ሁለቱም 4. ወንድም/እህት
18	የወሰዱት መድሃኒት ነበር ወይ?	1. አዎ 2. የለም
19	ለጥያቄ ቁጥር 18 መልስዎት አዎ ከሆነ፤የመድሃኒቱን ስም ይጥቀሱ?	
20	የእንቅርት ህመም አለብዎት ወይ?	1. አዎ 2. የለም
2 1	የእንቅርት ህመም ከአለብዎት የሚቀጥሉትን ጥያቄዎች ይመልሱ፡ a. የእንቅርት ህመሙ አይነት b. የሚወስዱት መድሃኒት አለ ወይ? c. የጊዜ ቆይታው?	
2 2	የጭንቀቱ ደረጃ? (ከታች የተቀመጠውን መለኪያ ይጠቀሙ)	1.በመጠኑ 2 መካከለኛ 3.ከፍተኛ
23	ተጓዳኝ ህመሞች አሉ ወይ ?	1. አዎ 2. የለም
2 4	ተጓዳኝ ህመሞች ካሉ ይግለጹ	1. የስብ መብዛት 2. ከልክ ያለፈ ወፍረት 3. የደም ግፊት 4. የስኳር በሽታ 5. የአይምሮ ጭንቀት 6. ኤች አይ ቪ ሌላ ካለ ይጠቀሱ

ከጥያቄ ቁጥር 26-34 ያሉት ሴት ተሳታፊዎችን ብቻ ይመለከታሉ		
25	የሚዋጥ የእርግዝና መከላከያ ተጠቅመው ያዉቃሉ?	1. አዎ 2. የለም
26	ተጠቅመው የሚያዉቁ ከሆነ ለምን ያህል ወራት ተጠቀሙ?	
27	የወር አበባ ያያሉ?	1. አዎ 2. የለም
28	የሆርሞን መተኪያ መድሃኒት ወስደው ያዉቃሉ?	1. አዎ 2. የለም
29	እርግዝና አጋጥሞት ያዉቃል?	1. አዎ 2. የለም
30	አሁን ላይ እርግዝና አለዎት?	1. አዎ 2. የለም
31	እርግዝና ካለዎት ማድያቱ መቼ ተከሰተ?	1. አንደኛ ዙር 2. ሁለተኛ ዙር 3. ሶስተኛ ዙር
32	የመጀመሪያ እርግዝና ሲከሰት እድሜዎ ስንት ነበር?	
33	ምን ያህል ጊዜ እርግዝና አጋጥሞታል?	

Perceived Stress Scale (PSS)

በዚህ ሚዛን ውስጥ ያሉት ጥያቄዎች ባለፈው ወር ውስጥ ስለነበሩ ስሜቶችዎ እና ሀሳቦችዎ ይጠይቁዎታል። በእያንዳንዱ ሁኔታ፣ በተወሰነ መንገድ ምን ያህል ጊዜ እንደተሰማዎት ወይም እንዳሰቡ ቁጥሮች ላይ በማክበብ እንዲጠቁሙ ይጠየቃሉ።

0 = በጭራሽ 1 = ፈጽሞ ማለት ይቻላል 2 = አንዳንድ ጊዜ 3 = ብዙ ጊዜ 4 = በጣም ብዙ ጊዜ

1. ባልተጠበቀ ሁኔታ በተፈጠረ ነገር ምን ያህል ተበሳጭተው ነበር? 0 1 2 3 4
2. በህይወትዎ ውስጥ አስፈላጊ የሆኑትን ነገሮች መቆጣጠር እንደማይችሉ ምን ያህል ጊዜ ተሰምቶህ ነበር? 0 1 2 3 4
3. ምን ያህል ጊዜ መረበሽ እና "ጭንቀት" ተሰምቶታል? 0 1 2 3 4
4. የእርስዎን የግል ችግሮች ለመወጣት ስለመቻልዎ ምን ያህል ጊዜ በራስ መተማመን ይሰማዎታል? 0 1 2 3 4
5. ነገሮች በእርስዎ መንገድ እየሄዱ እንደሆነ ምን ያህል ጊዜ ይሰማዎታል? 0 1 2 3 4
6. ማድረግ ያለብዎን ሁሉንም ነገሮች መቋቋም እንዳልቻሉ ምን ያህል ጊዜ ተሰምቶት ነበር? 0 1 2 3 4
7. በህይወትዎ ውስጥ ብስጭቶችን ምን ያህል ጊዜ መቆጣጠር ችለዋል? 0 1 2 3 4
8. በነገሮች ላይ የበላይ እንደሆኑ ምን ያህል ጊዜ ተሰማዎት? 0 1 2 3 4
9. ከቁጥጥርዎ ውጭ በሆኑ ነገሮች ምክንያት ምን ያህል ጊዜ ተቆጥተዋል? 0 1 2 3 4
10. ምን ያህል ጊዜ ችግሮች እየተከመሩ እንደሆነና እነሱን ማሸነፍ እንዳልቻሉ ተሰምቶት ነበር? 0 1 2 3 4

እነዚህን መመሪያዎች በመከተል የእርስዎን የPSS ነጥብ ማወቅ ይችላሉ። በመጀመሪያ ለጥያቄዎች 4፣ 5፣ 7 እና 8 ውጤቶችዎን ይቀይሩ። በእነዚህ 4 ጥያቄዎች ላይ ነጥቦችን እንደዚህ ይቀይሩ፡ 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0. አሁን አጠቃላይ ድምሩን ለማግኘት ለእያንዳንዱ መጠይቅ የተሰጠውን ነጥብ ይደምሩ።

ጠቅላላ ነጥብ _____ ነው።

Declaration

I, the undersigned declare that this thesis is my original work in partial fulfillment of the requirement for the degree of Master of Public Health. I also declare that it has never been presented in this or any other university and that all resources and materials used in the thesis have been duly acknowledged.

Student Name: _____

Signature: _____

Place of submission: _____

Date of submission: _____

This thesis has been submitted with my approval as a College/university advisor.

Approval of Advisors

Advisors Signature Date

Name: 1. _____

2. _____