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**ORIGINAL ARTICLE**

# Infra-orbital Hyper-pigmentation (Dark Circles) A Study of its Prevalence, Etiology and its Association with Other Dermatological Symptoms among Young Adults

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## ABSTRACT

**Background:** Nowadays, dark circles are among the most important issues facing society. Understanding dark circles is crucial for managing them since they give the eyes a worn-out, aged, and sad appearance.

**Objective:** The objective of this study was to determine the Prevalence of dark Circles its Etiology and its Association with Other dermatological symptoms among young Adults.

**Material and method:** The current cross-sectional study was carried out at PGMIQ/ BMC Hospital Quetta from November 2022 to April 2023 after taking permission from the ethical board of the institute. The research was carried out on the college students**.** Participants between the ages of 17 and 25 who provided informed consent were included in the study. A Questionnaire was shared among the participants which had three sub-sections, demographic data, perceived psychological stress, and dermatological questions, Questionnaire on Perceived Stress Scale (PSSQ).Version 24 of SPSS was used to evaluate the data. The standard deviation and mean are used to tabulate all statistical data. Statistical significance is defined as a P-value of less than 0.05 (P = < 0.05).

**Results:** A total of 375 individuals were included in this study out of which females were 285(76%) and males were 24%. Among the study participants the prevalence of Infra-orbital- hyper-pigmentation was 300(80%). We assessed a lot of habits that were related to the rate of infra-orbital hyperpigmentation and showed that using cosmetics, sunscreen, face wash, and having a lot of psychological stress, were all substantially correlated with the degree of dark circle. On the other hand, the amount of infra-orbital hyperpigmentation was independent to daily sun exposure, sleep duration, eye cream use, smoking, fluid intake, and face therapies**.** We used the SSCQ (self-reported skin complaint questionnaire) to assess various dermatological skin issues and correlate the degree of IOHP with them. The two most common skin conditions among the individuals were acne or pimples (65%) and oily skin (70%).Oily skin, & pimples / acne (p = 0.005) were shown to be significantly correlated.

**Conclusion:** The current study concluded that the prevalence of infraorbital orbital hyperpigmentation is high among adults. Various factors, including the use of face wash, sunscreen, cosmetics, high psychological stress, and certain dermatological factors like oily skin and acne, were found to be significantly associated to it prevalence.

**Keyword:** Infra-orbital Hyper-pigmentation; Dark Circles; Prevalence; Etiology; Young Adults

## INTRODUCTION

To keep skin healthy and avoid skin disorders, skin care is essential.[1] Maintaining good condition of the skin can also assist shield against adverse effects from the sun, wind, and pollution.[2]The physical appearance of skin may also be enhanced by taking care of it, appearing fresh and youthful. All age groups experience skin issues, however some age groups are more susceptible to specific skin disorders than others.[1]According to a research, South Asia has the most recent cases of dermatology. A lack of socioeconomic status is one of several variables that greatly affect the burden of dermatological conditions. Consequently, Pakistani healthcare is particularly susceptible to the burden of dermatological illnesses due to its limited resources.[3]Infra-orbital hyperpigmentation, or dark circles, is one of the most prevalent skincare issues in modern society. One characteristic of dark circles is the existence of bilateral uniform pigmentation.[4]Concerns about dark circles are widespread, particularly in women aged 16 to 25 (up to 47.50%). Treatment for dark circles is very subjective since the causes differ from person to person owing to a variety of external and endogenous variables.[5] The development of IOHP or dark circles has been linked to several physiological causes, including thinning of the periorbital skin, bigger or more numerous capillaries, hyperpigmentation, and a propensity for orbital vessels expand. These three elements offer compelling evidence for the emergence of infra-orbital dark circles.[6] The underlying blood vessels can be seen more clearly due to the skin surrounding the eyes being thinner. An increase in the synthesis of melanin, a physiological skin pigment, or inflammation and fluid buildup in the region might make this worse.[2] Furthermore, we are aware that dark circles are a typical ageing symptom since the skin around our eyes becomes thinner and more brittle as we age due to the loss of collagen and elastin fibres.[7] Melanin concentrations and oxygen haemoglobin ratios are two of the primary chromophores found in human skin that control skin pigmentation.[5] The study found that the black circle region had a poor haemoglobin oxygen ratio and significant melanin accumulation.[1] Three categories of dark circles exist: vascular, high pigmented, and intended dark circles.[2] One of the main cosmetic issues that has been identified is dark circles.[8-9] This study is to find out the incidence of IOHP in our culture, pinpoint possible etiological variables, and figure out a correlation between IOHP and other dermatological symptoms, particularly in young adults.

## MATERIAL AND METHOD

The current cross-sectional study was carried out at PGMIQ/ BMC Hospital Quetta from November 2022 to April 2023 after taking permission from the ethical board of the institute. The research was carried out on the college students**.** Participants between the ages of 17 and 25 who provided informed consent were included in the study; however, those who were diagnosed with an active metabolic, mental, or dermatological condition or who were taking medication for any condition, as well as those who had incomplete questionnaires or declined to take part, were excluded. Participation in the study was entirely voluntary, and individuals could withdraw at any time during the investigation. A Questionnaire was shared among the participants which had three sub-sections, demographic data, perceived psychological stress, and dermatological questions, Questionnaire on Perceived Stress Scale (PSSQ).[10] The degree to which events in a person's life were rated as stressful during the last month on a 5-point Likert scale under diverse circumstances was assessed using a validated 10-item questionnaire: 0 denotes never, 1 nearly never, 2 occasionally, 3 fairly often, & 4 very often. The PSSC cutoffs were based on percentiles: participants with scores below the 75th percentile were considered to be under mild psychological stress,

while those with scores beyond the 75th percentile were categorized as being under high psychological stress. Self-reported skin complaints questionnaire (SSCQ): Dermatological morbidity is measured on a 4-point Likert scale using a validated self-reported skin questionnaire consisting of 10 items. There were additional enquiries about infraorbital hyperpigmentation (dark circles), with 1 denoting no, 2 denoting yes, a little, 3 denoting yes, quite a lot, and 4 denoting yes, very much. Due to widespread societal concerns, we included two more conditions to the SSCQ: oily skin and greying hair.[5] Those who scored 4 on the SSCQ were classified as having a high rate of dark circles, while those who reported between 1-3 were classified as having no dark circles, who were regarded as a control group. The SSCQ was used to assess the dark circles on the Likert scale. Version 24 of SPSS was used to evaluate the data. The standard deviation and mean are used to tabulate all statistical data. Statistical significance is defined as a P-value of less than 0.05 (P = < 0.05). A chi-square test was used to ascertain the relationship between the rate of IOHP and other related variables as well as dermatological symptoms. Additionally, the frequency of IOHP and other dermatological symptoms were compared using the odds ratio (OR).

## RESULTS

A total of 375 individuals were included in this study out of which females were 285(76%) and males were 90(24%). Among the study participants the prevalence of Infra-orbital- hyper-pigmentation was 300(80%) as presented in figure 1. 55.6 SD 11.4 kg was the mean weight and 21.89 SD 1.63 years was the mean age of the study population. The majority of the individuals were identified to have a BMI within the normal range. We assessed a lot of habits that were related to the rate of infra-orbital hyperpigmentation and showed that using cosmetics (p = 0.003), sunscreen (p = 0.001), face wash (p = 0.001), and having a lot of psychological stress (p= 0.005), were all substantially correlated with the degree of dark circle. On the other hand, the amount of infra-orbital hyperpigmentation was independent to daily sun exposure, sleep duration, eye cream use, smoking, fluid intake, and face therapies as presented in table 1. We used the SSCQ (self-reported skin complaint questionnaire) to assess various dermatological skin issues and correlate the degree of IOHP with them. The two most common skin conditions among the individuals were acne or pimples (65%) and oily skin (70%).Oily skin (value of p equal to 0.02), & pimples / acne (p = 0.005) were shown to be significantly correlated as shown in table 2.

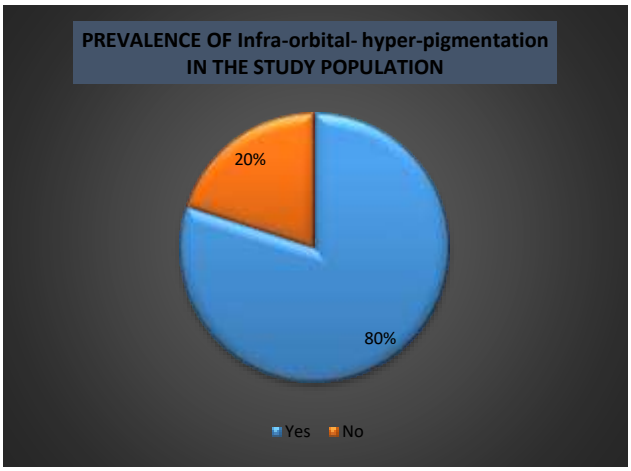


Table 1: The correlation between daily lifestyle parameters and the degree of IOHP (dark circles). Shown as a percentage and a P-value

| Life style factors daily | | % of participants | Percentage of dark circle<br>Percentage of dark circle<br>High %<br>Low% | Value of P |
|---|---|---|---|---|
| Exposure to sun | Below 20 minutes<br>Above 20 minutes | 53<br>47 | 42<br>10<br>38<br>10 | 0.678 |
| Sleeping hours | Less than seven hours<br>More than seven hours | 51<br>49 | 41<br>10<br>38<br>11 | 0.304 |
| Face wash usage | Yes<br>No | 75<br>25 | 63<br>12<br>16<br>9 | 0.001 |
| Sun screen usage | Yes<br>No | 58<br>42 | 38<br>5<br>41<br>16 | 0.001 |
| Eye cream usage | Yes<br>No | 5<br>95 | 5<br>1<br>74<br>20 | 0.107 |
| Cosmetics usage | Yes<br>No | 26<br>74 | 23<br>3<br>56<br>18 | 0.003 |
| Habit of smoking | Yes<br>No | 8<br>92 | 4<br>20<br>60<br>16 | 0.059 |
| Fliud intake | Yes<br>No | 82<br>18 | 14<br>5<br>65<br>16 | 0.193 |
| Facial therapy | Yes<br>No | 20<br>80 | 63<br>16 | 0.542 |

| | | | | |
|---|---|---|---|---|
| | | | 16<br>5 | |
| Stress | Yes<br>No | 16<br>84 | 14<br>2<br>64<br>20 | 0.005 |

P-value ≤0.05 statistically substantial

Table 2: The correlation between the degree of IOHP and dermatological symptoms (dark circles). Shown as a P-value and percentage

| Skin disorder | | Individuals % | Percentage of dark circle<br>High %<br>Low% | Value of P |
|---|---|---|---|---|
| Oily skin | Yes<br>No | 70<br>30 | 58<br>11<br>22<br>9 | 0.02 |
| Hair fall | Yes<br>No | 80<br>20 | 65<br>13<br>15<br>7 | 0.06 |
| Heavy sweating | Yes<br>NO | 40<br>60 | 32<br>8<br>64<br>13 | 0.76 |
| Warts | YES<br>NO | 7<br>93 | 7<br>1<br>72<br>19 | 0.287 |
| Face rashes | Yes<br>No | 16<br>84 | 15<br>2<br>65<br>18 | 0.089 |
| Pimple /acne | Yes<br>No | 65<br>35 | 56<br>11<br>24<br>9 | 0.005 |
| Itchy rashes on hand | Yes<br>No | 18<br>82 | 17<br>2<br>61<br>20 | 0.11 |
| Scaly skin | Yes<br>No | 20<br>80 | 18<br>2<br>62<br>18 | 0.122 |
| Sore rash | Yes<br>No | 26<br>74 | 23<br>5<br>55<br>17 | 0.112 |
| Itchy skin | Yes<br>No | 35<br>65 | 30<br>5<br>50<br>15 | 0.062 |

P-value ≤0.05 statistically noteworthy

## DISCUSSION

Together, all dermatological disorders were identified as the fourth most common cause of nonfatal disease burden worldwide. Skin illnesses were also more likely to be prevalent in low-socioeconomic countries.[12] Infra-orbital hyperpigmentation (IOHP), is a multifactorial dermatological disorder that affects a person's appearance and sense of self. The management of dermatological complaints is very subjective since they are typically multifactorial.[13] The majority of recent research on the pigmentation surrounding the orbit ignores the fundamental aspects of lifestyle.[14] Therefore, we carried out a research to look at this significant dermatological issue among young adults in our demographic. Determining the prevalence of infraorbital hyperpigmentation, or dark circles, in young people and highlighting the contributing variables to this condition are the main goals of our study, which aims to address a widespread social problem. The cross-sectional research collected data from college students aged 17 to 25 in order to correlate IOHP with other dermatological signs and symptoms, which may aid in treating and relating other dermatological complaints. A modified SSCQ was used to measure dermatological symptoms, particularly the degree of IOHP. Among the study participants the prevalence of Infra-orbital- hyper-pigmentation was 300(80%) . 55.6 SD 11.4 kg was the mean weight and 21.89 SD 1.63 years was the mean age of the study population.. We assessed a lot of habits that were related to the rate of infra-orbital hyperpigmentation and showed that using cosmetics (p = 0.003), sunscreen (p = 0.001), face wash (p = 0.001), and having a lot of psychological stress (p= 0.005), were all substantially correlated with the degree of dark circle. According to previously published research, the incidence of IOHP was 30.76% in the 16–25 age group, with a higher female to male ratio. In contrast, a clinical study carried out in Pakistan revealed that 53% of the same age group had IOHP, but we found a prevalence of 80%. Research has also shown the relationship between IOHP and psychological stress, sleep deprivation, exhaustion, & alcohol and tobacco usage.[14-15] Likewise, we identified a strong correlation between IOHP and psychological stress. Although we did not investigate these aspects, a correlation was discovered among dark circles, strain on the eyes, refractive errors, and eye rubbing. According to some studies, dark circles around the eyes are caused by deoxygenated blood and a rise in the thickness, dilatation, and quantity of capillaries in the surrounding skin.[16-17] Although research has shown that persons

with dark circles, particularly women, have a lower quality of life, our research did not assess the patients' quality of life.[18] We found no statistically significant correlation between the period of sleep and the rate of infraorbital hyperpigmentation, despite prior research demonstrating a high correlation between sleep duration and quality.[14-16] These studies emphasize the value of treating IOHP using a multidisciplinary strategy that takes into account both dermatological or psychological viewpoints. Improving their prognosis, quality of life, and mental health can be achieved by addressing the root causes of IOHP. These studies emphasize the value of treating IOHP using a multidisciplinary strategy that takes into account both dermatological and psychological viewpoints. Improving their prognosis, quality of life, and mental health can be achieved by addressing the root causes of IOHP.[19-20] Although cross-sectional studies offer a current view of a population at a certain point in time, they are inherently limited. Their incapacity to demonstrate a cause effect relationship is one of the main limitations. Second, using a self-report questionnaire raises the possibility of participant bias, which might be mitigated in future research by evaluating the dermatological symptoms clinically. The studies are advised to use standardized measuring instruments to reduce biases, use additional sample strategies to improve representativeness, and interpret relationships cautiously. One of the prevalent dermatological issues in modern society is addressed in our study, which focuses on the young adult demographic that is frequently disregarded in dermatological research. Our research identifies the fundamental lifestyle elements that may contribute to IOHP. Additionally, we found a unique correlation between the rate of IOHP and the other dermatological symptoms that our individuals had. The majority of the modifiable variables associated with fundamental lifestyle factors comprised the probable etiology that we examined. Our research determines how the rate of IOHP can be affected by the usage of dermatological products and other dermatological therapies.

## CONCLUSION

The current study concluded that the prevalence of infraorbital orbital hyperpigmentation is high among adults. various factors, including the use of face wash, sunscreen, cosmetics, high psychological stress, and certain dermatological factors like oily skin and acne, were found to be significantly associated to it prevalence.

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