

The Effect of Smoking on Facial Aging Among Females in Saudi Arabia

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Abstract

Background: Cigarettes smoking has been shown by several studies to be one of the significant causes of facial aging and wrinkling. Smoking also worsen the scores for upper eyelid skin redundancy, lower lid bags, malar bags, nasolabial folds, upper and lower lip wrinkles. The prevalence rate of smoking in Saudi Arabia ranges from 2.4-52.3% in the past two decades. Up to date, there is no study in Saudi Arabia regarding smoking and facial aging and so the aim of this study is to investigate the relationship between smoking and facial aging among females in Saudi Arabia.

Methods: Analytical cross-sectional comparative study consisting of 107 female participants aged 30-60 years old was performed. A questionnaire was used to obtain a comprehensive medical and lifestyle histories. Also, clinical examination of the peri-oral and peri-orbital regions in relaxed and smiling positions was also charted using the Fitzpatrick scale.

Results: 52.3% of the individuals surveyed were either smokers or past smokers with a mean smoking duration of 12.6 years. While there was no significant difference between the smoking status and its relation to the grade of peri-oral and peri-orbital wrinkles, it was noted that the length of smoking in years was correlated with advanced skin aging scores with higher peri-oral and peri-orbital wrinkles.

Conclusion: The sample size is not sufficient to establish the comparison between smokers and nonsmokers in relation to facial aging, the length of smoking in years showed a statistical significant difference in correlation to peri-oral and peri-orbital wrinkles.

Keywords: Aging; Females; Smoking; Wrinkles

Background

Smoking is one of the most dangerous habits for health and human life. It causes unfavorable skin changes and intensifies the course of many skin diseases. Additionally, it quickens the natural process of skin aging. The resultant skin damage is irreversible, and further damage can be avoided by cessation of smoking [1]. As well, smoking has well known serious complications like

carcinogenic effect and lead to the development of cardiovascular and chronic obstructive pulmonary disease [2]. Moreover, it results in a disturbed microcirculation and consequent delayed wound healing [3].

Some individuals appear older than their actual age. The main cause of this phenomenon however, is still unclear. Several studies show that smoking cigarettes is one of the significant causes of facial aging and wrinkling [4, 5, 6]. The overall literature indicates that those who smoke have a higher risk of developing premature facial wrinkling as compared to those who do not smoke [7]. Smoking also worsen the scores for upper eyelid skin redundancy, lower lid bags, malar bags, nasolabial folds, upper lip wrinkles, lower lip vermilion wrinkles [8].

The prevalence rate of smoking in Saudi Arabia ranges from 2.4-52.3% in the past two decades [9]. Up to date, there is no study in Saudi Arabia regarding smoking and facial aging. Accordingly, this study aimed at investigating the relationship between smoking and facial aging among females in Saudi Arabia. This could also serve as a motivation for people to quit smoking, especially females.

Objectives

The main purpose of the study was to investigate the relationship between smoking and aging process among women and to increase the awareness of the public toward the various harmful and unpleasant effects of smoking and motivate participants to quit.

Methods

Analytical cross-sectional comparative study consisting of 107 female participants aged 30-60 years old. Among those patients, half of them were either smokers, or past smokers, and the rest were nonsmokers. Samples were collected from coffee shops, restaurants where smoking is permitted, smoking

cessation clinics, dental clinics, relatives and colleagues interested in joining the study.

A questionnaire was used to obtain a comprehensive medical and lifestyle histories. Also, clinical examination of the peri-oral and peri-orbital regions in relaxed and smiling positions was also charted using the Fitzpatrick scale [Table 1] and classification of nasolabial folds and marionette grooves [10] [Table2].

Additionally, an educational pamphlet was distributed to increase the awareness of the public toward the effect of smoking on skin aging and motivate participants to quit.

Results

A total of 107 women with a mean age of 43.3 years old were surveyed and examined. Many of them were housewives (43.0%). Among the participants, 56 participants (52.3%) were either smokers or past smokers. Overall, smokers smoked for a mean of 12.6 years. Smoking pattern showed that 24% of the smokers use cigarette and 21.5% use shisha.

In respect of sun exposure per week, 57 participants (53.3%) reported sun exposure of less than one hour, 27 participants (25.2%) reported sun exposure between one to two hours, and only 23 participants (21.5%) reported sun exposure of four hours and more weekly. However the relation of sun exposure to the grades of peri-oral and peri-orbital wrinkles was not statistically significant, (P =0.201 and 0.426 respectively).

Only 15% of the participants reported the use of sun block or sunscreen creams regularly and 13.2% others reported sun tanning. However, the use of sun block or sunscreen creams in relation to peri-oral and per-orbital wrinkles in this study showed no significant difference. Moreover, 13.2% of the participants experienced significant weight loss (10-15 kg) excluding pregnancy.

Only 19 women suffered from skin disease and 19 others suffered from medication or food allergy. With regard to personal or family history of cancers, 34 participants showed a positive response. The relationship between these findings and peri-oral and peri-orbital wrinkles are illustrated in table 3.

None of the participants exhibited type I Fitzpatrick's classification and the majority of them (30.5%) had type IV Fitzpatrick's classification. The distribution of peri-oral and peri-orbital wrinkles is shown in table 4. Women in postmenopausal state had significantly higher grades of peri-oral and peri-orbital wrinkles as illustrated in table 3.

While there was no significant difference between the smoking status and its relation to the grade of peri-oral and peri-orbital wrinkles [Table 5], it was noted that the length of smoking in years was correlated with advanced skin aging scores with higher peri-oral and peri-orbital wrinkles (P =0.002 and 0.043 respectively). [Table 6]

This study showed a high association between marital status and peri-oral wrinkles (P =0.001), with high grades reported among married women. [Table 7]

Discussion

Although the prevalence rate of smoking among females at different ages is reported to be significantly lower in females than males in Saudi Arabia [9], this study indicates a high prevalence rate (52.3%) among females in Saudi Arabia.

Lei Y et al [11] in 2001 studied the effect of tobacco smoke and ultraviolet exposure on wrinkle formation at the molecular level. In their in-vitro study they assessed the alteration of matrix metalloproteinase-1 (MMP-1) mRNA expression in human fibroblasts. The results indicated that tobacco smoke and ultraviolet exposure cause wrinkle formation. Both factors cause aging in human skin through additive induction of MMP-1 expression.

Another study by Jin Ho et al [12] showed that smoking, sun exposure and female sex are independent risk factors for wrinkling. Chien et al [13] study in 2016 reported the same findings. It also revealed severe perioral wrinkling in smokers as opposed to nonsmokers with statistical significant difference in women but not men. Age appears to play a significant role since males older than 45 years exhibit similar degree of perioral wrinkling regardless of their smoking status.

In our study however, neither sun exposure nor smoking showed significant difference its relation to the grades of peri-oral and peri-orbital wrinkles.

Also, in 2007 D.Doshi et al [4] describe that identical twins with an approximately 52.5 pack-year smoking history showed more severe skin aging than did the nonsmoking twin. Moreover, Emster V et al [5] (1995) and Patricia M. O'Hare et al [6] (1999) revealed that smoking increases the risk of facial wrinkles two to threefold. Koh J et al [14] (2002) also found that current smokers had a higher wrinkles grade than nonsmokers and past smokers.

Table 1: Fitzpatrick scale

| Skin Type | Typical Feature | Reaction to Sun Exposure |
|-----------|-----------------|-------------------------------------|
| I | White | Always burns, never tans |
| II | White | Usually burns, tans with difficulty |
| III | White | Sometimes mild burn, gradually tans |
| IV | Moderate Brown | Rarely burns, tans with ease |
| V | Dark Brown | Very rarely burns, tans very easily |
| VI | Black | Never burns, tans very easily |

Table 2: Classification of Nasolabial Folds and Marionette Grooves

| Grade | Typical Feature |
|-------|---|
| I | Visible folds of animation |
| II | Visible folds at rest |
| III | Visible folds at rest and deepening of folds on animation |
| IV | Deep folds at rest and deeper on animation |
| V | Overhanging folds |

Table 3: The relationship between different findings and peri-oral and peri-orbital wrinkles

| Variable | Grading of peri-oral wrinkles | | | Grading of peri-orbital wrinkles | | |
|---|-------------------------------|------------------|---------|----------------------------------|------------------|---------|
| | Grade I, II, III N=53 | Grade IV, V N=54 | p-value | Grade I, II, III N=37 | Grade IV, V N=70 | p-value |
| Do you suffer from any kind of skin disease? | 9 (17.0%) | 10 (18.5%) | 0.835 | 4 (10.8%) | 15 (21.4%) | 0.172 |
| Do you have a history of medication or food allergy? | 8 (15.1%) | 11 (20.4%) | 0.475 | 6 (16.2%) | 13 (18.6%) | 0.762 |
| Is there a personal or family history of cancers? | 13 (24.5%) | 21 (38.9%) | 0.111 | 10 (27.0%) | 24 (34.3%) | 0.443 |
| Do you have any of your family members (household) who are currently smoking? | 33 (62.3%) | 25 (46.3%) | 0.097 | 22 (59.5%) | 36 (51.4%) | 0.428 |
| Have you reached menopause? | 10 (18.9%) | 25 (46.3%) | 0.002* | 5 (13.5%) | 30 (42.9%) | 0.002* |

(*) Statistical significant difference

Table 4: Distribution of peri-oral and peri-orbital wrinkles

| Grading | Class | Count (Percentage) |
|----------------------------------|-------|--------------------|
| Grading of peri-oral wrinkles | I | 6 (5.6) |
| | II | 8 (7.5) |
| | III | 39 (36.4) |
| | IV | 47 (43.9) |
| | V | 7 (6.5) |
| | Total | 107 (100) |
| Grading of peri-orbital wrinkles | I | 3 (2.8) |
| | II | 20 (18.7) |
| | III | 14 (13.1) |
| | IV | 58 (54.2) |
| | V | 12 (11.2) |
| | Total | 107 (100) |

Table 5: Smoking status and its relation to the grade of perioral and peri-orbital wrinkles

| Grading | | Smoking status | | |
|----------------------------------|-------------|---|-----------------------------------|----------|
| | | Smoker/Past Smoker Count =56 (Percentage) | Non-Smoker Count =51 (Percentage) | p-values |
| Grading of peri-oral wrinkles | Grade 1,2,3 | 26 (49.1%) | 27 (50.9%) | 0.501 |
| | Grade 4,5 | 30 (55.6%) | 24 (44.4%) | |
| Grading of peri-orbital wrinkles | Grade 1,2,3 | 22 (59.5%) | 15 (40.5%) | 0.283 |
| | Grade 4,5 | 34 (48.6%) | 36 (51.4%) | |

On the contrary, A.Elzen et al [15] conducted a study showed that the smokers group underwent blepharoplasty surgery 3.7 years earlier than the ex-smokers group, and 3.5 years earlier than the never-smokers group. Their study showed no significant difference between the ex-smokers group and the never-smokers group.

This study shows that there is no statistical significant difference between smokers and non-smokers in regards to the grade of peri-

oral and peri-orbital wrinkles. It carries no statistical significance because a three times as big a sample size is needed to establish that. However, the length of smoking in years showed a statistical significant difference in correlation to peri-oral (P =0.002) and peri-orbital (P =0.043) wrinkles.

Females possess a higher risk of developing wrinkles compared to men. Menopause as suggested in this study and other studies [16, 17] support this phenomenon. Youn CS [16] and colleagues found that hormone replacement therapy significantly reduce the incidence of facial wrinkling in women at their postmenopausal stage.

As Erin Wolff et al [17] reported, black menopausal women have significantly fewer wrinkles compared to white menopausal women. They proposed that wrinkling is attributed to chronologic age and skin color more than estrogen deprivation.

Conclusion

The data suggests that the duration of smoking is correlated with an increased risk of skin aging on both the peri-oral and peri-orbital regions. It also showed increased peri-oral and peri-orbital wrinkles among married women. Additionally, menopause is significantly associated with facial wrinkling.

Acknowledgements

Ethics approval and consent to participate

The study design was approved by King Abdulaziz University Faculty of Dentistry institutional review board. All patients were provided with written and informed consent.

Availability of data and materials

Tables on patients' characteristics included in the study.

Authors' contributions

BJ, AB, BA-1 and MF participated in planning the study and analyzing the data. AB, BA-1, BA-2, HF collected, analyzed and interpreted the results. AB, BA-1, HF and RB wrote the manuscript. All authors read and approved the final manuscript.

Table 6: Length of smoking in years and its relation to peri-oral and peri-orbital wrinkles

| | Length of smoking in years | | |
|-----------------------|----------------------------|-------------------|---------|
| | Grade I, II, III | Grade IV, V | p-value |
| peri-oral wrinkles | 9.00 ± 7.6 years | 16.18 ± 8.1 years | 0.002* |
| peri-orbital wrinkles | 9.86 ± 8.2 years | 17.72 ± 8.4 years | 0.043* |

(*) Statistical significant difference

Table 7: Association between marital status and peri-oral and peri-orbital wrinkles

| Grading | | Marital Status | | p-value |
|----------------------------------|------------------|-------------------------------------|---|---------|
| | | Married Count=83 (Percentage) | Single/ Widow/ Divorced Count=24 (Percentage) | |
| Grading of peri-oral wrinkles | Grade I, II, III | 48 (90.6%) | 5 (9.4%) | 0.001* |
| | Grade IV, V | 35 (64.8%) | 19 (35.2%) | |
| Grading of peri-orbital wrinkles | Grade I, II, III | 30 (81.1%) | 7 (18.9%) | 0.353 |
| | Grade IV, V | 53 (75.7%) | 17 (24.3%) | |

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