Association between smoking and facial wrinkling in relation with age and sex

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Abstract

There are many risk factors that accentuate wrinkling like age, sex, occupation. Smoking is a preventable risk factor of facial wrinkles formation. To test the assumption whether skin wrinkling is significantly associated with age, sex and smoking or not? A cross-sectional study was conducted in Department of Dermatology and Venereology in Baghdad teaching hospital in period from April 2011 through March 2012 on (106) respondents, Socio-demographic information and full dermatological examination was done. Facial wrinkles were examined and measured according to wrinkles score in the group. Then we simplify these score into: superficial, (I, II), medium (III, IV) and deep wrinkles (V, VI). Smoking habit was more frequent in males than females which was ststistically highly significant (P=0.001). Middle and deep wrinkles are more frequent among males while shallow wrinkles are more among females which was highly significant (P<0.001). Shallow wrinkles only appeared in second and third decades of life while middle and deep wrinkles been more frequent in forth decade of life and above which also highly significant (P<0.001). Shallow wrinkles are mostly among non smokers while middle and deep wrinkles more among smokers and ex-smokers (P<0.001). The present work had confirmed a positive association between wrinkling score and the frequency of smoking habit.

Keywords: Facial wrinkling, smoking.

Introduction

Skin ageing can be divided into intrinsic or chronological ageing and extrinsic ageing.[1] Upon ageing, the capacity to repair DNA decreases.[2] Intrinsic or chronological ageing presents as fine, shallow lines and sagging of skin in all body areas, as the elasticity of skin decreases, whereas extrinsic ageing or photoageing is seen predominantly in the face and the dorsal sides of the hands. Both intrinsic and extrinsic ageing occur on sun-exposed sites.[3,4,5,6] Skin wrinkling becomes evident gradually over age, especially in the sun-exposed areas, such as the face. Actual wrinkle formation is thought to be due to the combined effects of structural changes in ageing skin, gravitational forces and the effects of facial muscle contractions, which enable facial expressions.[7] Skin thickness remains quite constant between 10 to 70 years of age, after which a marked decrease in skin thickness occurs.[8,9] Skin atrophy is common in the sun-protected skin of the elderly and in grossly sundamaged skin regions, whereas mildly or moderately photoaged skin is thickened.[10,11] In ageing skin, collagen fibres become thicker and less soluble.[12] Along with increasing age dermal elastic fibres become thicker and fragmented and oxytalan fibres appear fragmented and shortened.[13] Disintegration of elastic fibres is already seen in a minority of fibres between the ages of 30 and 70 years, but the changes become more profound and widespread after the age of 70.[14] As a result of the decreased number of elastic fibres in aged skin, the elastic recovery of skin decreases in the elderly.[15] Ageing decreases skin function and causes clinical changes such as wrinkling, color changes (yellowish, patches, pigmentation), and a loss of elasticity.[16] Four types of skin depressions can be defined according to their depth: folds, permanent wrinkles, reducible wrinkles and skin micro-relief.[17] Wrinkles are the expression of the accumulation of modifications at different levels of the skin. Development of so-called fine wrinkles begins to take place in the thirties, reaching a peak in the fifties, while deep wrinkles increase in the fifties. [18-21] Tobacco smoke is another external factor that can potentially affect skin. Previous studies have shown increased wrinkling in smokers compared to non-smokers, and the risk increased further when smoking is combined with excessive sun exposure.[22-26] Alterations in the elastic tissue of smokers have been reported in both sun-protected skin[27] and sun-exposed skin, [28] but the overall histology and metabolism of the skin of smokers compared to non-smokers are not well documented.[27,28] According to an American survey, nearly one fourth of smokers believe that most or some smokers would quit if they knew that smoking increases facial ageing and wrinkling.[29] The information of the adverse effects of smoking on skin should be addressed especially at adolescents, since 90 % of smokers begin to smoke during adolescence.[30,31] The prevalence of premature wrinkling has been found to be independently associated with sun exposure and pack-years of smoking.[24, 25, 26, 32, 33] The first reports indicating increased wrinkling in smokers appeared in the seventies and eighties.[22, 23] In the more recent studies, possible confounding factors, such as age and sun exposure, have been accounted for.[24, 25, 26, 32, 33] Heavy cigarette smokers were 4.7 times more likely to be wrinkled than non-smokers, and for those with a history of abundant sun exposure, the risk for excessive wrinkling was increased 3.1-fold.[24] After controlling for age, sun exposure and body mass index, the relative risk of moderate or severe wrinkling for current smokers in comparison with never-smokers was 2.3 among men and 3.1 among women. The risk for wrinkling was also increased in women who were former smokers.[25] The possible association of the amount of facial wrinkling in smokers with systemic side effects of smoking, such as stroke, has also been evaluated. Smokers were assigned significantly higher wrinkle scores than nonsmokers, but the degree of facial wrinkling did not correlate with the

occurrence of adverse cardiovascular events in either smokers or non-smokers.[34] In several studies, a significantly increased risk of wrinkling has been associated with pack years of smoking.[24, 26, 33]Heavy smokers with a high level of sun exposure have an even greater risk for acquiring wrinkles, the relative risk being 11-12 times higher than that of non-smokers.[24,26] Contradictory results were published by O`Hare *et al*. in 1999, who had three dermatologists concluded that, despite the significant correlation between smoking and facial wrinkling, the role of smoking as a cause of wrinkles is of minor importance. [35] This study was well arranged and controlled, and the authors criticized some earlier studies, e.g. those performed by Daniell in 1971 and by Model in 1985, for their lack of blinding techniques. [35] A recent multicentre epidemiological study also indicated that smoking has only a minor effect on photoageing in women and no significant effect in men.[36] It seems that, despite the strong body of evidence that smoking increases the risk for premature wrinkling, [24, 25, 26, 32, 33] UV-radiation outweighs the effects of smoking on skin ageing.[35, 36] An American survey of public awareness of the association between smoking and skin ageing, [29] indicated that never smokers and former smokers were more likely to be aware of the effects of smoking on physical appearance than current smokers. An interesting finding was that nearly one fourth of smokers believed that most or some smokers would quit if they knew that smoking increases facial ageing and wrinkling.[29]The authors emphasized the health educational importance of these results and pointed out the unique opportunity of dermatologists to take part in cancer prevention and smoking cessation.[29]
Objective : Is to assess the association between wrinkling severity of facial skin and age, sex and smoking habit.

Patients and methods

This is a retrospective study design that had been carried out in Department of Dermatology and Venereology Baghdad Teaching Hospital from April 2011 through March 2012. It included 106 respondents their ages ranged between (18-75) years with a mean ±SD of 44.31 ±16.38, who were (55) males and (51) females. Socio-demographic information was taken from each respondent. It includes:

1- Age, sex, residency.
2- Smoking habit was considered positive when there was active or passive smoking habits of 3 cigarettes per day for six months and above.[25]
Facial wrinkling was classified and measured according to wrinkle score. Table(1)[22]. This grading had also been simplified by making (Grade I-II) as shallow, (Grade III- IV); medium, and grade (V-VI) as deep wrinkles.
Each subject's face wrinkles were examined closely while the subject was sitting with facial muscles relaxed in a well-illuminated room. The crow's foot area lateral to the outer cauthus of each eye was examined closely on both sides. Adjacent areas, including the forehead and cheeks were inspected.
Wrinkles were examined for depth, length, and numbers by using specific materials called "Alginate impression" .
Other skin characteristics such as color, keratosis, atrophy, and pigmentation were ignored in this classification. Although the perioral and posterior nuchal areas were also inspected changes observed here were not used in assigning a wrinkle score.[22]
Statistical analysis was done by using: Chi-square (χ^2) test of significance which is used to assess the relation between sex of respondents and their smoking habit, sex of respondents and their facial wrinkle scoring, age groups and wrinkle scoring severity, wrinkle scoring severity of respondents and the level of significance at $P<0.05$.

Table (1):- Wrinkle score.[22]

Grade	Skin appearance
I	Essentially unwrinkled. Two or three shallow wrinkles usually less than 1 1/2 cm in length may be present in each crow's foot area.
II	Several wrinkles, each of which may be 3 cm long. The number of significant wrinkles on each side may be between two and six.
III	Several prominent wrinkles on each side, 3 to 4 cm long many smaller wrinkles may be present as well. Increased wrinkling may be present in the forehead skin, but little wrinkling in the cheek areas.
IV	Wrinkles extend from the crow's foot area superiorly and inferiorly, usually 5 cm or more if wrinkles are of unusual depth, they may be 4 cm long. Wrinkles extend over the cheek areas (zygomatic ridge). Men in this grade frequently exhibit prominent wrinkling of forehead and posterior nuchal region.
V	Wrinkles extend from crow's foot area and are prominent over the cheeks and forehead.
VI	Profound wrinkling extending over most of the face.

Results

The present work showed that males are more frequent smokers than females and the difference was statistically significant (P=0.001).Table (2). Regarding sex, the distribution of wrinkling in studied group was more frequent among males. The difference was highly significant (P<0,001). Table (3). The skin wrinkling in its middle and deep grades were more common in male group compared to female group, where shallow wrinkling was common among them. Still wrinkling in older age groups were more seen compared to younger age which were statistically highly significant(p<0,001). Wrinkling became deeper as age group been older. Table (4). Wrinkling severity was increased in both smokers and ex-smokers while 90% of shallow wrinkles were among non-smokers compared to only 10% among both smokers and ex-smokers; the difference was statistically highly significant (P<0.001). Table (5).

Table (2):-Frequency of smoking habit in relation with sex of respondents.

			sex of respondent		
			male	**female**	**Total**
smoking habit of respondents	**Smoker**	Count	12	1	13
		% within smoking habit	**92.3%**	**7.7%**	100.0%
		% within sex	**21.8%**	2.0%	12.3%
		% of Total	11.3%	.9%	12.3%
	Non smoker	Count	32	46	78
		% within smoking habit	**41.0%**	**59.0%**	100.0%

		% within sex	**58.2%**	90.2%	73.6%
		% of Total	30.2%	43.4%	73.6%
	Ex-smoker	Count	11	4	15
		% within smoking habit	**73.3%**	**26.7%**	100.0%
		% within sex	**20.0%**	7.8%	14.2%
		% of Total	10.4%	3.8%	14.2%
Total		Count	55	51	106
		% within smoking habit	51.9%	48.1%	100.0%
		% within sex	100.0%	100.0%	100.0%
		% of Total	51.9%	48.1%	100.0%

χ^2 = 14.958 df=2 Pvalue = 0.001 (HS)• •(HS)= highly significant.

Table (3) :- Frequency of facial wrinkle score in relation with sex of respondents.

			Sex of Respondent		
			male	female	Total
Wrinkling score of skin	**Shallow**	Count	27	45	72
		% within wrinkling score	37.5%	62.5%	100.0%
		% within sex	49.1%	88.2%	67.9%
		% of Total	25.5%	42.5%	67.9%
	Medium	Count	9	4	13
		% within wrinkling score	69.2%	30.8%	100.0%
		% within sex	16.4%	7.8%	12.3%
		% of Total	8.5%	3.8%	12.3%
	Deep	Count	19	2	21
		% within wrinkling score	90.5%	9.5%	100.0%
		% within sex	34.5%	3.9%	19.8%
		% of Total	17.9%	1.9%	19.8%
Total		Count	55	51	106
		% within wrinkling score	51.9%	48.1%	100.0%
		% within sex	100.0%	100.0%	100.0%
		% of Total	51.9%	48.1%	100.0%

χ^2 = 20.063, df = 2, Pvalue < 0.001 (HS) •(HS)= highly significant.

Table (4):- Distribution of wrinkling score of facial skin according to age group of respondents.

			Wrinkling score of skin			Total
			shallow	**medium**	**deep**	
Age groups	**20-**	Count	25	0	0	25
		% within age group	**100.0%**	.0%	.0%	100.0%
		% within wrinkling score of skin	34.7%	.0%	.0%	23.6%
		% of Total	23.6%	.0%	.0%	23.6%

	30-	Count	10	0	0	10
		% within age group	**100.0%**	.0%	.0%	100.0%
		% within wrinkling score of skin	13.9%	.0%	.0%	9.4%
		% of Total	9.4%	.0%	.0%	9.4%
	40-	Count	20	5	3	28
		% within age group	**71.4%**	**17.9%**	10.7%	100.0%
		% within wrinkling score of skin	27.8%	38.5%	14.3%	26.4%
		% of Total	18.9%	4.7%	2.8%	26.4%
	50-	Count	8	5	7	20
		% within age group	40.0%	**25.0%**	**35.0%**	100.0%
		% within wrinkling score of skin	11.1%	38.5%	33.3%	18.9%
		% of Total	7.5%	4.7%	6.6%	18.9%
	60-	Count	7	2	7	16
		% within age group	43.8%	12.5%	**43.8%**	100.0%
		% within wrinkling score of skin	9.7%	15.4%	33.3%	15.1%
		% of Total	6.6%	1.9%	6.6%	15.1%
	70-	Count	2	1	4	7
		% within age group	28.6%	14.3%	57.1%	100.0%
		% within wrinkling score of skin	2.8%	7.7%	19.0%	6.6%
		% of Total	1.9%	.9%	3.8%	6.6%
Total		*Count*	72	13	21	106
		% within age group	67.9%	12.3%	19.8%	100.0%
		% within wrinkling score	100.0%	100.0%	100.0%	100.0%
		% of Total	67.9%	12.3%	19.8%	100.0%

χ^2 = 38.281, df = 10, Pvalue < 0.001 (HS).

Table (5):- wrinkling score of skin in relation with smoking habit of respondents.

			smoking habit of respondents			
			smoker	**non smoker**	**ex smoker**	**Total**
wrinkling score of skin	**shallow**	Count	4	65	3	72
		% within wrinkling score	5.6%	90.3%	4.2%	100.0%
		% within smoking habit	30.8%	**83.3%**	**20.0%**	67.9%
		% of Total	3.8%	61.3%	2.8%	67.9%
	medium	Count	3	6	4	13
		% within wrinkling score	23.1%	46.2%	30.8%	100.0%
		% within smoking habit	**23.1%**	**7.7%**	**26.7%**	12.3%
		% of Total	2.8%	5.7%	3.8%	12.3%
	deep	Count	6	7	8	21
		% within wrinkling score	28.6%	33.3%	38.1%	100.0%
		% within smoking habit	**46.2%**	**9.0%**	**53.3%**	19.8%
		% of Total	5.7%	6.6%	7.5%	19.8%
Total		Count	13	78	15	106
		% within wrinkling score	12.3%	73.6%	14.2%	100.0%
		% within smoking habit	100.0%	100.0%	100.0%	100.0%

			smoking habit of respondents			
			smoker	**non smoker**	**ex smoker**	**Total**
wrinkling score of skin	**shallow**	Count	4	65	3	72
		% within wrinkling score	5.6%	90.3%	4.2%	100.0%
		% within smoking habit	30.8%	**83.3%**	**20.0%**	67.9%
		% of Total	3.8%	61.3%	2.8%	67.9%
	medium	Count	3	6	4	13
		% within wrinkling score	23.1%	46.2%	30.8%	100.0%
		% within smoking habit	**23.1%**	**7.7%**	**26.7%**	12.3%
		% of Total	2.8%	5.7%	3.8%	12.3%
	deep	Count	6	7	8	21
		% within wrinkling score	28.6%	33.3%	38.1%	100.0%
		% within smoking habit	**46.2%**	**9.0%**	**53.3%**	19.8%
		% of Total	5.7%	6.6%	7.5%	19.8%
Total		Count	13	78	15	106
		% within wrinkling score	12.3%	73.6%	14.2%	100.0%
		% within smoking habit	100.0%	100.0%	100.0%	100.0%
		% of Total	12.3%	73.6%	14.2%	100.0%

χ^2 = 32.232, df= 4, Pvalue < 0.001 (HS)

Discussion

Skin wrinkling is an appearance problem specially among women and a lot spent annually to treat or at least hide these wrinkles from the face, so it is important to know the relationship between the wrinkles formation and preventable risk factors (as smoking) for better deal with this health problem. There are many risk factors associated with skin wrinkling, but the commonest are; aging, sunlight exposure and smoking.[24, 26, 33] In the present work we will discuss the smoking habit, age and sex in relation to facial wrinkling in association with other risk factors. Smoking is still more frequent among males than females as appeared in the present study. Shallow wrinkles were more frequent among females but more higher grades of wrinkle scores were appeare increasingly among males, that may be either due to; the effect of smoking habit which obviously more frequent among males, endogeneous male factors or outdoor works as a male practice that makes male skin more suseptable to be wrinkled than females. The study showed that wrinkles became deeper in the face of the person as becoming older. During second and third decades of age there was only shallow wrinkles and no any medium or deep ones, but during forth and fifth decades of age the medium score winkles became the most frequent and the deep score more frequent in fifth decade of age. Sixth decade and older showed that deep facial wrinkling was the most frequent and shallow wrinkles retarded to the least frequent. In other words, as the age been older as the wrinkles became deeper.

Vast majority of whom had shallow wrinkles were non smokers, but the percentage of middle and deep winkles increase among smokers and ex-smokers which made the picture of association between smoking and severity of facial wrinkles more clear. However the present work had shown that smoking increases the wrinkling score as in previous studies. [24, 25, 26, 32, 33]

In conclusion age,sex and smoking had significant positive association with severity of facial wrinkles.

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