



Assessing of the Risk Factor & Determine Epidemiology of Acne Vulgaris in Tertiary Care Teaching Hospital

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Acne vulgaris remains one of the commonest diseases to afflict humanity, with over 90% of males and 80% of females affected by the age of 21 years.

Objectives: The aim of this study was to assessing the specific risk factors, determine the epidemiology and etiology of Acne Vulgaris.

Methodology: It is a cross-sectional observational study conducted for a period of six month in the department of dermatology, Dhiraj General Hospital, Vadodara. Patients who were diagnosed with acne vulgaris and fulfilled the inclusion criteria were enrolled in the study. Data was collected by filling the patient medical record sheet.

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Result: Total 300 patients were included in the study. Out of which 38.67% males and 61.33% females were found affected by Acne Vulgaris. The mean age group affected were found to be 21.77 ± 4.06 years. When compared their social habits, patients consumed more caffeine (49.67%) than alcohol (24.67%), smoking (15.33%) and tobacco (5.67%). 32.33% patients also had history of seborrheic dermatitis. Using GAGS scale, we found 94% patients suffered from moderate Acne condition while 6% suffered from severe Acne condition.

Conclusion: Acne Vulgaris was predominantly found in females in adolescence and in males in adulthood. The severity was found more in males than females. The common site for Acne Vulgaris was found to be face while comedones and papules were the common types of lesions. Stress was found to be one of the major aggravating factors for severity of Acne Vulgaris.

Keywords: Acne Vulgaris; epidemiology; dermatology.

1. INTRODUCTION

In today's era, Acne Vulgaris (AV) is found to be one of the commonest diseases [1], more than 80% of females and 90% of males afflicted by the age of 21 years. [2] Almost 85% of adolescents suffers when they undergo maximum psychological, physical and social changes. [3] AV is defined as a long-term chronic condition that occurs when hair follicles become clogged with oil and dead skin cells [4]. AV usually initiates in adolescence, reaches its peak at the age of 14 to 19 years and usually resolves by mid-twenties. AV appears earlier in females than in males, which may result from their earlier onset of puberty. Males are more prone to the most severe forms of AV, whereas, females have more persistency [5]. Severity of Acne Vulgaris varies markedly from one individual to another depending upon the various factors that are involved [6-9]. Acne Vulgaris may destroy beauty as it may result in lifetime scars. Psychological development is often significant. The patient develops reduced self-esteem and career-prospects, caused by perceived damage [7,10]. Acne is characterized by areas of blackheads, whiteheads, and greasy skin [11]. In girls, the pilo-sebaceous duct becomes constricted between the days 15 and 20 of their menstrual cycle and this blockage leads to premenstrual acne [12]. In a study conducted by Stoll et al, [13] it was found that there was an overall 44% prevalence of premenstrual flare [14]. The conclusion of this study showed a mean reduction in the non-inflammatory and inflammatory lesions count during the postmenstrual period. [15] In general, food items were considered as causes and/or aggravating factors of acne. In a study conducted by Poli et al., chocolates were considered to worsen acne by 62% and snacks such as fatty foods were thought to exacerbate acne by 45% [16]. Another Study conducted by

Al-Hoqail concluded that 79% of acne was related to unhealthy diet [17]. Seasonal variation for occurrence of acne was also observed in a study [18]. Smokers have more prone to get severe acne vulgaris [19]. A study carried out in Malaysia in 2009 on secondary school adolescents, found that the prevalence of facial acne among the adolescents was 67.5%, increased with increasing age and was more common among males (71.1%) than females (64.6%). It is also believed that worsening of acne can be co-related with increased anxiety, depression symptoms and impact on patients' lifestyle [20-22]. However, the relationship between emotional distress and worsening of acne, as well as the relationship between the quality of life and severity of acne are poorly understood and remains a controversial topic [23,24]. By this study we would like to identify a possible risk factor in each acne vulgaris patient. We would also be able to identify the common risk factors prevalent in the local population. Moreover, we can highlight the specific risk factors as per age and gender in a local population. By this study, we would also counsel the patient regarding proper use of topical and oral medications for the management of acne vulgaris. This would help us to achieve our medication adherence and ultimately better therapeutic outcome.

2. METHODOLOGY

This was a prospective observational cross-sectional study conducted for a period of six month in the department of Dermatology, Dhiraj General Hospital, Vadodara. Patients who were diagnosed with acne vulgaris and fulfilled the inclusion criteria were enrolled in the study after explaining the patients about the details of the study. All the relevant data (patient demographics, detailed history, general physical examination, cutaneous examination,

lab tests and details of prescribed medications) was obtained from the patients' medical records and through counselling the patients who visited the Out- Patient Department (OPD) or In-Patient Department (IPD) of Dermatology of Dhiraj General Hospital. The Cardiff acne disability index (CADi) scale was used to calculate the patients' QOL (Quality of life). Based on the Global acne grading system (GAGS) scale, the severity of Acne Vulgaris has been calculated. Since stress is one of the major factors, the patients' stress level was calculated using stress coping resource inventory scale. After the data collection, all the data were exported to statistical software for statistical analysis. Descriptive statistic used for data. Graphical representative was used for better understanding of data. P value of ≤ 0.05 was considered as significant.

3. RESULTS

In our study, out of 300 patients who were diagnosed with acne vulgaris; we noticed that there were a greater number of female patients (61.33%, N=184) compared to the male patients (38.67%, N=116). Considering the marital status, most of the patients were unmarried (85%, N=255) and only few patients were married (15%, N=45). In our study, age of patients was within a range of 18 to 40 years with mean age of 21.77 ± 4.08 years. While in male population, mean age was found to be 21.22 ± 3.46 years and in female population, it was found to be 21.77 ± 4.08 years.

In our study population, many patients had various habits in which there were caffeine consumption (49.67%, N=149), alcohol

consumption (24.67%, N=74), smoking (15.33%, N=46) and tobacco consumption (5.67%, N=17). In our sample population 97 patients (32.33%) had family history of acne vulgaris and 108 patients (36%) had medical history of seborrheic dermatitis.

Using CADi scale, we found that 65% (N=195) patients felt aggressive and frustrated as result of acne vulgaris while others were categorized into social interference (56.67%, N=170), avoidance of public changing (17.33%, N=52), patient psychological state (73.33%, N=220), subjective assessment of acne vulgaris (86.67%, N=260).

Using GAGS scale, we found the acne severity in our study population. As per that, 282 Acne Vulgaris conditions were identified as moderate (94%) while the others were severe (6%). Among these, 110 male patients (94.83%) and 172 female patients (93.48%) had moderate acne condition while 6 male (5.17%) and 12 female (6.52%) patients had severe acne condition. P value obtained for this was 0.631. In all 300 patients, face was the common site of acne lesion (100%) followed by back (26.67%, N=80), chest (20.67%, N=62), arms (16.33%, N=49) and neck (5%, N=15). The common type of acne lesions identified were comedones (89.67%, N=269) and papules (84.67%, N=254) followed by nodules (40%, N=120) and pustules (38.33%, N=115). The most common therapeutic approaches, we identified were the topical application of alovera (25.67%) and multani mitti (11%). The majority of patients in our study group were only following the prescribed medications.

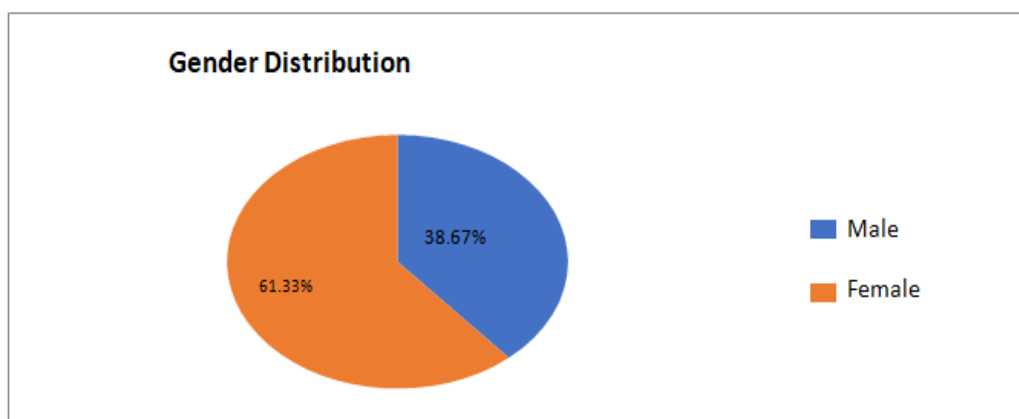


Fig. 1. Gender distribution among acne patients

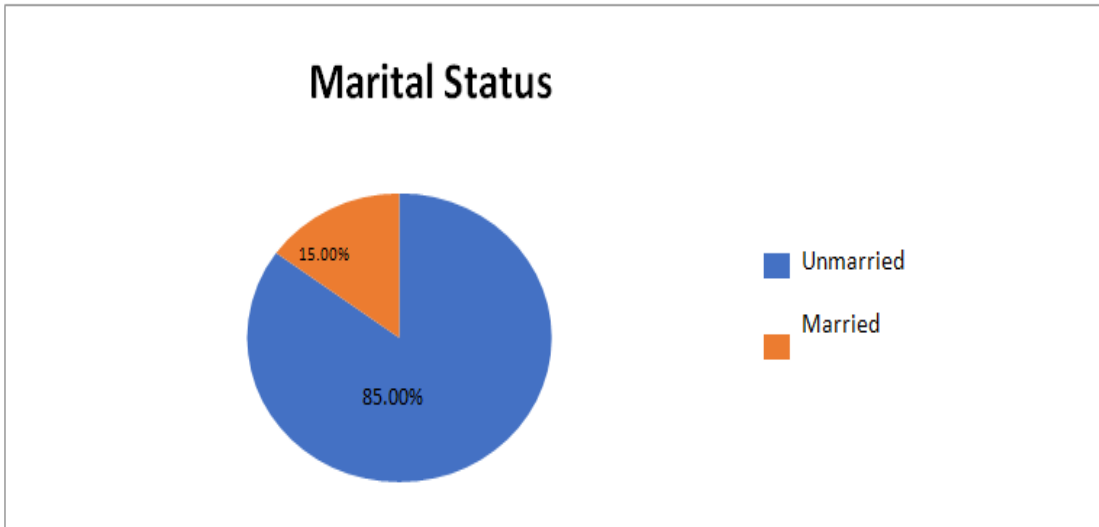


Fig. 2. Marital status among Acne patients

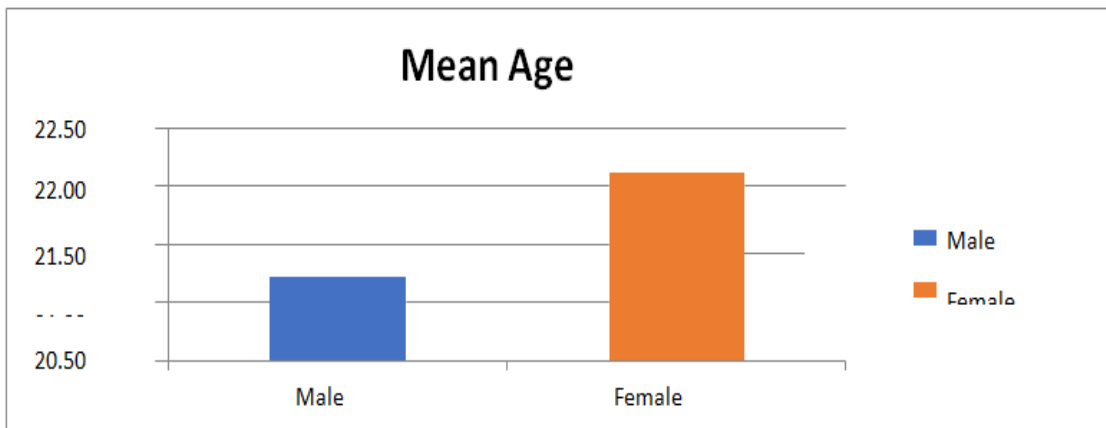


Fig. 3. Mean Age among Acne patient

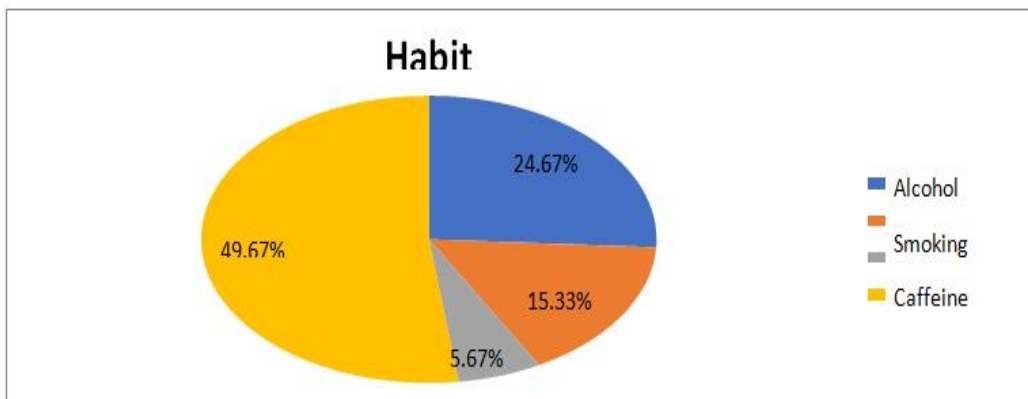


Fig. 4. Social history among Acne patients

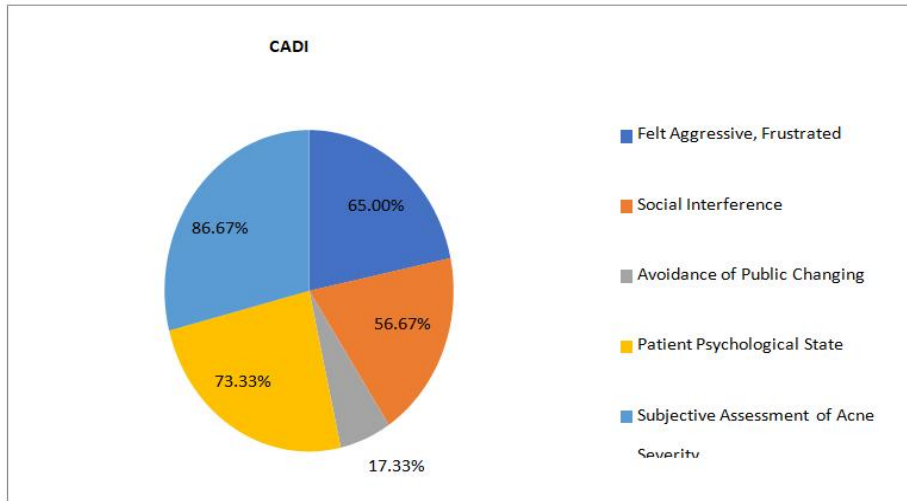


Fig. 5. Cardiff Acne disability index

Table 1. Severity of Acne among patients

Acne Severity	N	%
Moderate	282	94.00%
Severe	18	6.00%
Total	300	100.00%

Table 2. Acne severity based on gender among patients

Acne Severity	Male	%	Female	%	P value
Moderate	110	94.83%	172	93.48%	
Severe	6	5.17%	12	6.52%	
Total	116	100.00%	184	100.00%	0.631

Table 3. Patient's perspective of treating acne

Therapeutic approaches carried out by patients	N	%
Nil	163	54.33%
Alovera	77	25.67%
Milk	03	1.00%
Multani mitti	33	11.00%
Gram flour	04	1.33%
Clean up	01	0.33%
Boro plus	01	0.33%
Dettol Soap	01	0.33%
Glycerin	02	0.67%
Tomato juice	03	1.00%
Face wash	03	1.00%
Butter	01	0.33%
Neem	02	0.67%
Curd	01	0.33%
Clean & clear face wash	01	0.33%
Scrub	01	0.33%
Turmeric	03	1.00%
Total	300	100.00%

Table 4. Stress level among Acne patients

Gender	Mean Stress Level	SD	P value
Male	2.84	0.45	0.548
Female	2.81	0.45	
Total	2.82	0.43	

As stress is one of the known risk factors for occurrence of Acne Vulgaris, we have calculated a value of stress for each patient by using stress coping resources inventory: a self-assessment. The value for mean stress level obtained was 2.82 ± 0.43 . The overall value of stress level was found to be higher in male patients. As exposure of different air pollutants is a known factor for causing Acne Vulgaris, we have conducted a patient counseling regarding identification of significant exposure of Air pollutants among Acne patients. From this, we observed that most of the patients (39%) had significant, chronic exposure of various air pollutants which might be one of the factors for causing Acne Vulgaris. Among diet related factors, the consumption of dairy products, oily foods and junk foods are known risk factors for causing Acne Vulgaris as well as worsening the Acne condition. Among our study population, most of the patients were having high-moderate intake of dairy products (12%, 59%), oily food (78%) and junk food (27%, 59%). Regarding the nature of skin, in our sample population; 169 patients (56.30%) had oily skin and 87 patients (29%) had dry skin. We have found 55 patients (18.30%) who had sensitive skin for different skin infections and allergic reactions. As irregular menstruation is one of the common causes for occurrence of Acne Vulgaris in female population, we conducted patient counseling for menstruation and observed that out of 184 female patients came with Acne Vulgaris, the majority (46%) had regular menstrual history while a few female patients (15.33%) had irregular menstrual history which might be one of the risk factors for causing Acne Vulgaris.

4. DISCUSSION

Acne Vulgaris is a common condition among adolescents is more prone to develop acne [25] Hospital based Studies, conducted in Asian population showed that AV constituted about 11.2% and 19.6% of the total new patients attending their hospitals, respectively [26,27]. Presently study was conducted for the clinical profile of the patients suffering from Acne Vulgaris and determining the risk factors that

may play an important role in developing or worsening of Acne Vulgaris. According to the study conducted by Al-Ameer and Al-Akloby, a total of 225 patients suffering from Acne Vulgaris were included in their study, where the age at presentation was 19.2 ± 3 years for males and 18.4 ± 4.2 years for females [26]. A study conducted by Kane et al, [28] noted that the mean age at presentation was found to be 25.58 years. Similarly, in our study the mean age group getting affected from Acne Vulgaris (21.77 years (SD \pm 4.1 (85%, N=255) and only few patients were married (15%, N=45). These observations confirm the reports of the study conducted by Al-Ammer et al, [26] who also noticed that female is affected more by Acne Vulgaris. However, according to a study conducted by Adityan et al, [29] the report showed a larger population of males affected by acne vulgaris. There are certain factors that affect the population selection, for e.g., some males don't feel that their acne needs treatment, and are not willing to take leave to visit hospital for acne treatment. On the other hand, the larger population of female patients may be explained by the need of females for their skin care, as they are obsessed about their looks. In adolescence, males were more prone to severe grades of Acne Vulgaris than females who are affected mainly in adulthood [25, 27, 30]. In our study too, we observed that about 10.34% of male patients (N=116) suffered from Grade IV acne as compared to 2.71% of female patients (N=184). Acne may persist into adulthood (Adult Acne), age group that suffers from adult acne is 31-40 years, where male patients in this age group were (2.58%, N=3) found to be lower than that of female patients (9.78%, N=18). Adult acne in male population may be a result of untreated acne in their adolescent years, higher stress levels or due to other risk factors such as smoking. However, in female patients, adult acne may result from their menopause, as it causes a hormonal imbalance which may result in acne. Stress is also an aggravating factor in female population. In accordance to studies conducted earlier, it was found in our study that the adult population was more prone to having severe grade of the disease [31-33] An interesting observation was made in our

study, that the male patients (10.35%, N=12) had grade IV acne, whereas only few females (2.17%, N=5) had grade IV acne, thus showing that male population is more prone to developing more severe type of the disease. The earlier onset of clinical acne in girls than in boys is presumed to be due to the reason of early onset of puberty in girls than in boys. However, in our study there was no significant difference between the age at presentation and Acne Vulgaris in both the sexes. Acne vulgaris occurs in sites that are rich in pilo-sebaceous units i.e., Face, chest, back, arms and neck. [25] According to our study, we found that the face was the most common site for the occurrence of acne (100%), back was involved in 26.67%, and followed by chest (20.67%), arms (16.33%) and neck (5%). The primary and the pathognomy lesion of acne vulgaris is a comedone, which may be open or closed. [34] A study conducted by Kilkenny et al, and Cunliffe et al, reported that the comedones were the most common type of lesions present. In comparison to this study, the most common type of lesion present in our study was also found to be comedones (89.67%) followed by papules (84.67%). [31,35] In our study, we graded the severity of Acne Vulgaris using a simple grading system i.e., GAGS, which showed that a total of 190 patients (63.33%) had grade II acne vulgaris, 92 patients (30.67%) had grade III acne vulgaris and 18 patients (6%) had grade IV acne vulgaris. Similar findings were noted by the study conducted by Kane et al. [28] It is well established that seborrhea plays an important role in the pathogenesis of Acne Vulgaris and Seborrheic Dermatitis. In both the diseases, the lipid composition of sebum is characterized by a high triglyceride level. [36] In a Spanish study, involving 2159 patients suffering from seborrheic dermatitis, Acne Vulgaris was found to be the most common concomitant disease as seen in 35% of the patients. [37] However, seborrheic dermatitis was found to be the most common disease associated with Acne Vulgaris, as it was seen in 36% of the patient population. Although acne is not an inherited condition, there exists a genetic predisposition to developing acne. In our study, 32.33% (N=97) patients had a positive family history of acne vulgaris; 64.70% patients of grade IV acne vulgaris had a positive family history of acne. A study conducted by Cunliffe and Gollnick, reported that 40% of their sample had a family history of acne vulgaris, [35] similar results were observed by a study conducted by Kubota et al, [38] where 56.8% of their sample had a family

history of acne vulgaris. This data proves that there may be a genetic predisposition to developing acne vulgaris, and that further detailed studies are needed to be performed to identify the genes that are responsible for occurrence of acne vulgaris in the offspring of the patients suffering from the disease. The relationship between acne and smoking remains a controversial topic. In the studies conducted by Mills et al, [39] & Rombouts et al, [40] showed that the incidence for acne vulgaris in smokers was significantly lower than the non-smokers. In contrast to this, studies conducted by Schafer et al, [41] and Chuh et al, [42] noted that smoking had little to no correlation with the incidence of acne. In our study we noted that, patients who were smokers had more moderate grade of acne vulgaris (50%, N=23), whereas patients who were non-smokers had lower moderate grade of acne vulgaris (27.16%, N=69). This data shows that smokers are more prone to developing moderate grade of acne vulgaris than non-smokers. Since, the total number of smoker's population is small (N=46), deriving a valid conclusion from this amount of data is difficult. Different processes such as impaired vasoreactivity, relative ascorbic acid deficiency, impaired collagen synthesis and impaired wound healing may play an important role in the underlying pathogenesis for the association between smoking and development of acne vulgaris. [34] On the one hand, the American Academy of Dermatology published recommendations in 2007 suggesting that caloric restriction has no benefit in the treatment of acne and that there is insufficient evidence to link the consumption of certain food and occurrence of acne. [43] On the other hand, there are studies that suggests that there is a rather close relationship between diet and acne. [44,45] Recent studies have shown evidence about how diet may directly or indirectly influence the pathogenesis of acne, [46,47] but further evaluations are needed to be performed to show the correlation between diet and acne. In accordance to the above-mentioned data, we noted in our study, that patients who consumed daily oily food developed more moderate-severe (grade III and grade IV) acne (34.37%), whereas patients who consumed less oily food developed moderate- severe acne (43.28%). Patients who consumed junk food (fatty foods, chocolates, carbonated beverages, etc.) on a daily basis developed moderate-severe acne (40.24%), whereas patients consuming junk food on 2-4 days a week developed acne (37.25%), and patients who consumed junk

food on weekly basis developed acne (32.8%). In our study, it was noted that there is no correlation between consumption of oily food and developing of acne. Thus, more data will be needed to build proper correlation between occurrence of acne vulgaris and consumption of oily food. Thus, more evidence will be needed to properly identify the correlation between type of diet and acne. In studies conducted by Holmes et al, [44] and Danvy et al, [45] it was reported that patients who consumed 2-3 glasses of milk per day, developed more severe grade of acne in comparison to patients who consumed 0-1 glass of milk per day. However, in our study it was noted that 37.5% of patients who consumed 2-3 glasses of milk per day developed grade III acne, whereas those patients who consumed 0-1 glass of milk per day (17.04) developed grade III acne and about 10.23% developed grade IV acne. The data of our study contradicts the data provided by the previous studies, as those patients with mild to moderate milk consumption had developed moderate to severe acne, whereas those patients with high milk consumption only developed moderate acne. Thus, further detailed studies will be needed to create a link between dairy product consumption and acne. A study conducted by Jean et al, [48] reported that due to increased pollution, the total number of visits for acne vulgaris were increased in the span of 2 years. Thus, this study provides an indirect link between acne and air pollution. In our study, it was noted that patients exposed to pollution for longer duration of time had more severe acne. History of rubbing of skin around acne was noted in 158 (52.7%) of patients, and Scratching over acne in 118 (39.3%) of patients. [47] In a study conducted by Reich et al, [49] It was noted that 50% of the patients had a history of rubbing and scratching over the area of acne, and in another study conducted by Lim et al, [50] it was reported that about 70% of the patients had a history of rubbing and scratching over the area of acne. History of plucking of acne was noted in 151 (50.3%) patients and it was more common in female 84 (28%) as compared with male 67 (22.3%) patients. However, a study conducted by Panday et al, [51] it was reported that more male patients had a history of plucking of acne as compared to female patients. Thus, there exists a correlation between rubbings, scratching and plucking of acne with worsening of the disease, as upon plucking, the skin gets damaged and a severe inflammatory response may be mediated which can exacerbate the condition. Thus, the

patients should be properly advised to not rub, scratch over the area of acne, and in no condition should they pluck out the acne. Studies conducted by Sheehan-Dare et al, [52] and Cibula et al,[53] concluded that there is no correlation between severity of acne and clinical markers of androgenicity (i.e., Hirsutism, irregular menstrual cycle) in women. However, although these studies have shown no correlation between acne severity and markers of androgenicity, however, one study conducted by Reingold and Rosenfield, [54] have found an association between acne, hirsutism and menstrual disturbance. In our study, we observed no association between severity of acne vulgaris and markers of androgenicity. In the current study, we found the mean stress level to be 2.82 ± 0.43 using stress coping resources inventory: a self-assessment. In male patients mean stress level was 2.84 ± 0.45 and in female patients it was 2.81 ± 0.45 . And the P value for mean stress level was 0.548. It was reported that there was an increase in acne appearance in relation to stress level. Many studies conducted on the level of stress and its role in acne formation reported that emotional stress acts as an aggravating factor for development of acne. [55, 56] A study conducted by stoll et al, [57] confirmed the association between acne prevalence and degree of stress. CADI helps to assess the quality of life of patients suffering from acne. The subscales include feeling of aggression, frustration, interference with social life, avoidance of public changing facilities and appearance of the skin. In this study, analysis of the subscales showed that the adolescents had particular difficulties in the areas of emotion (felt aggressive, frustrated), social interference/difficulties and psychological state disturbance. A study among teenage Scottish schoolchildren reported that 50% of pupils were emotionally affected by their acne. Twenty percent of pupils were affected in their personal and social lives because of their acne and 10% avoided swimming and other sports because of embarrassment. [58] In this study, 4 patients (1.3%) scored 13 and 3 patients (1%) scored 15, which was equal to severely impaired. It implied that these patients had severe psychological impact due to their facial acne. However, the median score of the CADI was found to be 4, which is low. Thus, it was established that the overall population is mildly affected psychologically. This study shows a moderately strong correlation between CADI score and severity of acne. The impact on QOL

increased with the increase in acne severity. This result is in accordance with previous studies conducted by Kilkenny et al, [31] Walker et al, [58] Motley et al, [59] which also showed good correlation between acne severity and CADI score. This data suggests that the impact of acne on QOL must be considered in management of acne.

5. CONCLUSION

To conclude, our study included 300 patients suffering from acne vulgaris. Female patients outnumbered male patients, and the mean age group getting affected by acne vulgaris was found to be 27.77 years (SD±4.08 years) with onset earlier in females. Male patients suffered from more severe grade of acne vulgaris than compared to female patients of the same age group. Face was most common site for acne and comedones was the most common acne lesion followed by papules. A total of 190 patients had grade II acne vulgaris, 92 patients had grade III acne vulgaris and seventeen patients had grade IV acne vulgaris. Grade IV acne vulgaris was more common in males as compared to females. Seborrheic dermatitis was found to be the most common disease associated with acne vulgaris. A total of 97 patients had a positive history of acne vulgaris, from which, 64% of patients suffering from grade IV acne vulgaris had a positive history of acne vulgaris. About half of the smoker population involved in the study suffered from grade III acne vulgaris. Patients who consumed oily food on a daily basis, had moderate form of acne compared to the patients who consumed less oily food. Occurrence of moderate acne increased with increasing frequency of junk food consumption. No relation between high milk consumption and severity of acne was found. No relation between poor skin hygiene and severity of acne was noted as those with proper face hygiene had more severe acne. Patients with more pollution exposure had more severe acne than not-exposed. Rubbing, itching and/or plucking of acne may exacerbate the condition. Irregular menstrual cycle and hirsutism had no effect on the severity of acne in female patients. Stress was found to be one of the major aggravating factors for severity of acne. CADI is an important tool to identify patients with low QOL. CADI showed that overall population was mildly affected psychologically by acne. However, patients with more severe acne had an impaired QOL.

CONSENT AND ETHICAL APPROVAL

The study was initiated after getting the approval from Sumandeep Vidyapeeth Institutional Ethics Committee (SVIEC NO: SVIEC/ON/Phar/BNPG18/D19003). Informed consent form was taken from patients.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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