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Article

Analysing the psychological impact of acne among Mauritian adults

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Abstract: Background: Acne, a chronic inflammatory disease, results from multi-nodal effects, including inflammatory reactions among others. The consequences of acne extend beyond the physiological and aesthetic appearance, with reported adverse effects on mental health. **Objective:** This study analyzed the impact of acne on mental health determinants among Mauritian adults. **Methods:** A cross-sectional quantitative survey was carried out among Mauritian adults (n = 381) suffering from acne. The tool assessed quality of life through an adapted Acne-Specific Quality of Life scale, self-esteem and appearance anxiety using the Rosenberg self-esteem scale, and appearance anxiety inventory respectively. **Results:** (i) Acne and demographics: The data revealed that a sizeable proportion of Mauritians (86.4%) suffer from facial acne with varying severity as per the self-reported mild (50.1%), moderate (42.8%), and severe acne (7.1%) across the sampled participants. (ii) Acne and quality of life: Acne severity was associated with age group and education levels ($p < 0.05$) as opposed to the indifference across gender. An inverse correlation was found between acne severity and quality of life, and the majority of the sample (59.9%) suffered from body dysmorphic disorder as a result of anxiety related to the acne. (iii) Acne and mental health constructs: Participants having severe acne experienced very low self-esteem (mean score = 6), confirming the relationship between acne and self-esteem [$\chi^2(34) = 126.105$, $p < 0.05$, Cramer's $V = 0.426$]. Acne severity had a significant effect on appearance anxiety ($H = 16.05$, $p < 0.001$), adversely impacting mental health. Mauritians generally sought dermatological assistance for their acne (54.1%); however, a significantly larger population (78.5%) felt that treatment should not be siloed through a dermatologist. 70% of the sample also preferred psychological support, which would enhance their quality of life. **Conclusion:** The quality of life of Mauritian adults is negatively affected by acne, and the severity of psychological impairment is multi-fold, from poor self-esteem to anxiety, leading to isolating behaviors. Preemptive processes such as psychological conditioning and support are necessary to decrease the burden associated with acne.

Keywords: acne severity; self-esteem; appearance anxiety; stigma; self-embarrassment; quality of life

1. Introduction

Acne vulgaris is a chronic skin disease that affects the sebaceous glands, ducts, and hair follicles, therefore body parts, such as the face, chest, and back, with the highest sebaceous density (Xu and Li, 2019). Characterized as a persistent inflammatory disorder and depending on the area of the skin surface affected, acne varies in clinical severity, ranging from types I–IV, with potential ulcerative lesions and scarring (Sutaria et al., 2023). As per the global burden of diseases study, skin diseases are the fourth leading cause of non-fatal burden, one of which is acne vulgaris (Hay et al., 2014). From 1990 to 2019, there were 231.2 million cases of acne worldwide, with an increase of around 48% from 111.7 million, affecting 9.4% of the

global population, thus showing that its prevalence is rising in practically every nation (Chen et al., 2022). Aside from its gendered prevalence, Dréno et al. (2018) reported acne as being one of the most common skin diseases, initiating help-seeking from medical experts.

A number of studies have characterized the risk factors leading to acne onset, and these include genetics, given its significant impact on different skin types (Bataille et al., 2002; Wei et al., 2010; Wolkenstein et al., 2017), and the interplay of inflammatory markers such as tumor necrosis factor (TNF) and cytochrome P450 family 17 subfamily A member 1 (CYP17A1) and follistatin (FST), which regulate the functional activity of the sebaceous glands. These molecular idiosyncratic features can influence the onset, appearance, and severity of acne across different demographics (Heng and Chew, 2020). While Wei et al. (2010) postulated dysmenorrhea as a risk factor for acne, Shrestha et al. (2018) noted that hormonal changes are significantly associated with menstrual irregularity in women with acne. This was further supported by Stoll et al. (2001), positing the effect of premenstrual syndrome on acne exacerbation. According to Elsaie (2016), the androgen-dependent production of sebum is mediated by androgens like dihydrotestosterone (DHT) and testosterone, while progesterone blocks the conversion of testosterone into DHT, increasing sebum production and modifying the risk of acne. Similarly, Penso et al. (2020) evidenced that insulin-like growth factor-1 (IGF-1) and androgens are involved in the pathophysiologic process of acne, further endorsing the presence of acne in both genders.

Do et al. (2009) showed that psychological factors may play a significant role in acne with conditions such as emotional stress potentiating acne as a result of the spike in cortisol secretion, priming the skin glands to produce more oil and facilitate acne outbreaks (Alsuraykh et al., 2019; Jusuf et al., 2021). Other risk factors include medication such as cancer-directed therapeutics (Kazandjieva and Tsankov, 2017), energy metabolism, and lifestyle factors, namely tobacco use, which are potent causative agents for acne onset and progression (Rahaman et al., 2016). Wolkenstein et al. (2015) found that chocolate, sweets, and regular use of cannabis have been highly associated with acne, while short-wavelength visible light emitted from smartphones and tablets could disequilibrate the skin microbiota and impact acne (Taheri et al., 2017).

Living with acne conditions has multiple consequences, ranging from a decrease in quality of life (QoL) to psychological impacts. According to Gieler et al. (2015) and Pärna et al. (2015), acne negatively influences the quality of life of older females and those suffering from acne for a longer duration (> 5 years). Yazici et al. (2004) found that irrespective of the degree of severity, the greater the impairment of quality of life caused by acne, the greater the level of anxiety and depression, along with a higher risk for anxiety disorder. Likewise, Tanghetti et al. (2014) reported that facial acne did not only affect health-related quality of life with mild/moderate symptoms of depression and/or anxiety, but also impacted the ability to concentrate on work or school and productivity, along with impaired emotional and social functioning, demonstrating the interplay between alterations in physical, cognitive, and psychological attributes. Acne is thought to decrease one's attractiveness and lead to considerable psychological consequences (Sulzberger and Zaidens, 1948). Indeed, the

bi-directionality between psychological disturbances and the quality of life of the afflicted individuals cannot be overlooked (Dalgard et al., 2015). Ghorpade and colleagues (2020) found that 72.22% of their sampled severe acne patients had high body image disturbance. Likewise, body dysmorphia is found amongst teens and young adults with acne (Marron et al., 2020; Sarkar et al., 2016).

Acne can elicit significant mental health concerns due to a heightened sense of shame related to appearance (Kellet and Gilbert, 2001), leading to a significant positive correlation between acne severity and appearance distress, which is also termed as 'appearance anxiety' (Zulfiqar and Rana, 2016). While a significant incidence of anxiety among acne sufferers and a direct correlation between acne severity and the level of anxiety have been drawn in past studies (Yazici et al., 2004), perceived acne severity and acne's impacts have been found to be directly proportional to social appearance anxiety (Duru and Örsal, 2021).

Acne is one of the most commonly known triggers of excoriation disorder, also referred to as 'dermatillomania', which is a persistent psychogenic condition marked by compulsive and impulsive skin scratching, picking, squeezing, digging, or squeezing, consequently causing tissue injury, hyperpigmentation, and long-term deformity (Misery et al., 2012). The ensuing vicious cycle significantly leads to anxiety and a decreased sense of well-being (Ekore and Ekore, 2021). An inverse proportional relationship between self-esteem and severity of acne is generally observed, with an increase in acne severity negatively affecting self-esteem (Dalgard et al., 2008; Su et al., 2015), leading to multi-factorial consequences, namely, social withdrawal, interpersonal rejection, issues with occupational competence, and impaired quality of life across all age groups and cultures (Gallitano and Berson, 2018). Feelings of embarrassment and unworthiness have also been correlated with acne severity and symptomatic behaviors such as itching (Al-Shidhani et al., 2015; Tasoula et al., 2012; Tayel et al., 2020). The psychological impacts mediated by acne are not necessarily caused by the condition only but could also be linked to its treatment, as reported by the causal relationship between topical drugs and their psychological side effects in the form of mood swings and behavioral changes (Hazarika and Archana, 2016).

Acne patients may display behaviors that exacerbate the influence of acne on their psychological well-being, leading to both short-term and long-term impacts. It is believed that people tend to avoid those who appear 'acned' through a natural aversion, for example, disgust, of certain body disfigurements and bodily appearance (red or pus spots and lesions) to avoid possible 'contamination', but people often attribute negative personal characteristics to those with acne (Bharadwaj et al., 2022). Social exclusion as a result of acne can also emerge from bullying and verbal abuse, which further drives acne sufferers to shy away from social interactions and amplifies social phobia (Bez et al., 2011; Magin et al., 2008). Hazarika and Archana (2016) found gendered differences with respect to social alienation such that women with acne avoided social events, which could potentially lead to long-lasting personality changes, like avoidant personality characteristics. Duru and Örsal's (2021) found that perceived acne severity and acne's impacts were directly proportional to social appearance anxiety, thus emphasizing that acne can lead to social withdrawal and isolation in people.

Responding to acne conditions may not necessarily yield positive outcomes. 58.2% of acne sufferers cover their acne through makeup to enhance their social appearances (Tanghetti et al., 2014). Although bearing instant gratification, cosmetics use and dermatological procedures have also been associated with long-lasting effects such as erythema, hyper- and hypo-pigmentation, increasing the concern of both dermatologists and patients (Sandhu and Sharma, 2022). Many people choose to self-treat their acne conditions instead of seeking dermatological treatment due to financial constraints, a decision that may further exacerbate their conditions. Evidence indicates that among over-the-counter self-treatment options, tea tree oil is widely opted for, even without discussing the underlying modes of therapeutic action (Hammer, 2015). Likewise, the self-prescription of topical antibiotics is ignorantly used as monotherapy, potentially resulting in aggravated acne strains (Kosmadaki and Katsambas, 2017), while its severe inflammatory response can result in permanent disfiguring scars (Jacob et al., 2001), culminating in the detrimental effects on self-esteem in teenagers and adults (Williams et al., 2012).

Acne may be comorbid with several psychopathologies, including anxiety, depression, and body dysphoric disorder (Purvis et al., 2006; Yarpuz et al., 2008), along with certain acne-related behaviors significantly leading to anxiety and a decreased sense of well-being (Ekore and Ekore, 2021). In Mauritius, acne sufferers are given no psychological support, most probably because acne's repercussions on mental health are still largely unexplored. Therefore, this study can serve as an empirical foundation to advocate for the need for a multidisciplinary approach towards holistically treating acne.

2. Methodology

As per the research of Chen et al. (2022), 9.4% of the global population suffers from acne vulgaris; therefore, the population size of this study was determined by taking the global prevalence into account. According to StatsMauritius (2022), Mauritius has a total population of 1,286,689, leading to an adjusted population size of 120,948 people, and a sample of 381 Mauritian adults was calculated to meet the minimum requirements for the quantitative study, within a margin of error of 5% and a response distribution of 50%.

2.1. Inclusion and exclusion criteria

The inclusion criteria comprised of two demographic characteristics, which were, firstly adult Mauritians, and secondly, presenting symptomatic conditions of acne for a minimum of six months. On the other hand, the exclusion criteria consisted of all those who were non-Mauritians, under 18 years of age and who had any medical history of chronic mental health conditions.

2.2. Research Instrument

A self-administered questionnaire was disseminated through an online approach using Google Forms to cater to a bigger outreach of the sampled participants. This method for collecting data was favored because it allowed the participants to complete the questionnaire at their own pace and in a free environment, thus guaranteeing the

provision of reliable information (Bryman, 2015). The instrument was designed to measure demographics as well as physical and psychological distress variables, namely, quality of life, self-esteem, appearance anxiety, self-embarrassment, body shaming, social withdrawal, and coping strategies such as camouflage. Closed-ended questions of varying formats inclusive of dichotomous and Likert items using 4-point and 5-point Likert scales were used to factually gather the responses.

2.3. Study variables

Demographic information was obtained from the participants, which included their age, gender, marital status, education level, and monthly income. Participants were required to designate which body areas were mainly affected by acne, their perceived severity, and any behavioral modifications they consequently adopted to deal with their skin condition. Three different scales were adopted for this research to measure appearance anxiety, self-esteem, and acne-specific quality of life, respectively.

2.3.1. Appearance Anxiety Inventory (AAI) Scale

The Appearance Anxiety Inventory Scale was developed by Veale et al. (2014). It is a self-report scale, which assesses the cognitive and behavioral aspects of body image anxiety, particularly symptoms of body dysmorphic disorder (BDD). The AAI scale contains 10, 5-point Likert scale questions. The score of each participant on this scale was generated by adding the item scores, which range between 0 and 40. The cut-off value is 19, with scores at or above this level indicating the presence of BDD (Veale et al., 2014).

2.3.2. Rosenberg Self-Esteem Scale (RSES)

The Rosenberg Self-Esteem Scale (Rosenberg, 1965; as cited in Garcia et al. (2019)) is the most widely used instrument to measure self-esteem. It is a 10-item scale on a 4-point Likert rating, from ‘Strongly disagree’ to ‘Strongly agree’, that mainly measures overall self-worth by assessing both positive and negative feelings about oneself (Park and Park, 2019). The score of each participant on the RSES was generated by adding the item scores, which range between 0 and 30. The cut-off value is 15, with scores below this level indicating low self-esteem, scores between 15 and 25 indicating normal self-esteem, and scores above 25 indicating high self-esteem (Garcia et al., 2019).

2.3.3. Acne-Specific Quality of Life Scale

The Acne-Specific Quality of Life Scale was adapted from the Vitiligo-Specific Quality of Life Instrument, which was proposed by Lilly et al. (2013). The instrument assesses three main factors, namely, stigma, participation limitation, and behavior. The scale was adapted for the purpose of this study and a final score was not computed to measure quality of life.

2.3.4. Reliability and validity analysis

Internal consistency measures for the respective variables recorded were above 0.7. The instrument was pre-tested with 10 individuals meeting the inclusion criteria, which resulted in no significant changes beyond grammatical corrections. Validity was also ascertained through the Bartlett’s test of sphericity, whereby items showed a

strong relationship towards the variable being measured ($p < 0.05$), the latter also confirmed through the Kaiser Meyer Olkin (KMO) test with values above 0.5 recorded (**Table 1**).

Table 1. Internal consistency measures.

Variable	Number of items	Cronbach alpha coefficient	Bartlett test of sphericity (validity)		
			KMO sample adequacy	χ^2-statistic	*p*-value
Treatment seeking behavior	5	0.726	0.653	477.213	0.000
Anxiety	10	0.893	0.756	3202.929	0.000
Self-esteem	10	0.811	0.772	1941.072	0.000
Quality of life	12	0.965	0.878	6106.364	0.000

2.4. Data analysis

Data from the questionnaire was coded, and numerical data was transformed into usable statistics. Both the Microsoft Office suite and the IBM Software Statistical Package for the Social Sciences (SPSS) 21 were used to analyze the data descriptively and inferentially. Illustrated data in this study were mainly drawn using Microsoft Excel, and all the inferential tests were computed using SPSS. Normality of data distribution was ascertained prior to the selection of parametric versus non-parametric tests as per the requirements of the study. Chi-square and Kruskal-Wallis tests were primarily undertaken as per the objectives of the study with a clear distinction between the dependent and independent variables where appropriate for the following hypotheses: (i) examining the association between acne severity and demographic attributes; (ii) the relationship between acne severity and quality of life; (iii) the relationship between acne severity and anxiety; (iv) the effect of acne severity on self-esteem; and (v) the potential of acne influencing behavior.

2.5. Ethical considerations

The research instrument used for the collection of data from the adults across Mauritius excluded personal and embarrassing questions that could emotionally affect them. The study ensured that confidentiality and anonymity of the participants was always maintained. The participants provided informed consent prior to data collection, and they were allowed to withdraw the study at any given point in time. No incentives were offered to the participants to mitigate bias. The study was approved by the Postgraduate Dissertation Committee, School of Health Sciences, University of Technology, Mauritius.

3. Results

3.1. Participants' demographic profile

An almost equal participation was registered across gender, which was complemented with a higher segment from the younger age group, i.e., 18–35 years of age (85%); and mostly literate with 97.6% educated at secondary level and above. An almost equal participation was also registered among those who were either in a relationship or single (49.4%) (**Table 2**).

Table 2. Demographic profile of participants.

Features	Group	Frequency (n = 381)	Percentage (%)
Gender	Male	173	45.4
	Female	208	54.6
Age	18 to 35 years	324	85.0
	36 to 55 years	56	14.7
	Above 55 years	1	0.3
Marital status	Single	182	47.8
	Married	153	40.2
	In a relationship	40	10.5
	Divorced	6	1.6
Education	Primary	9	2.4
	Secondary	118	31.0
	Tertiary	254	66.6

3.2. Characterizing acne among the participants

Facial acne was the most common type encountered (86.4%), while multiple site involvement (face, neck, shoulders, chest, and back together) was seen in only 1.6% of cases. 50.1% of the participants had mild acne conditions, versus 42.8% for moderate, and only 7.1% with severe acne conditions. 59.8% of the participants had been experiencing acne conditions for less than five years, as opposed to 40.2% suffering from acne for more than five years.

No significant association was observed between acne severity and gender [$\chi^2(2) = 0.489$, $p > 0.05$, Cramer's $V = 0.036$], in contrast to the significant but weak association between acne severity and the age group of the participants [$\chi^2(4) = 55.609$, $p < 0.05$, Cramer's $V = 0.270$] coupled with a positive correlation between both variables ($r_s = 0.258$, $p < 0.05$). A significant but weak association was also identified between education and severity of acne [$\chi^2(4) = 23.248$, $p < 0.05$, Cramer's $V = 0.175$], with a resulting weak negative correlation ($r_s = -0.122$, $p < 0.05$), implying that as educational levels increased, there was a decrease in acne severity, potentially resulting from better awareness and adherence to treatment plans and self-care. Lastly, a significant but weak association between monthly income and severity of acne [$\chi^2(4) = 50.624$, $p < 0.05$, Cramer's $V = 0.258$].

3.3. The association between acne severity and appearance anxiety

59.9% of the participants in the present study reported the possible presence of BDD, the latter which was identified through behavioral indicators such as 32.5% of the participants who often check their appearance in mirrors by touching with their fingers, or by taking photos of themselves. Additionally, 36.2% of the participants compared aspects of their appearance to others, with 27.8% of them avoiding situations or people due to their appearance, while 33.6% of the participants often thought about camouflage or altering their appearance (**Table 3**). Acne severity had a significant impact on appearance anxiety ($H = 16.05$, $p < 0.001$), with higher mean rank scores for the extreme end of acne (severe versus mild, 261.43 vs. 174.66). Furthermore, an inter-test between the 3 groups, i.e., mild, moderate, and severe acne, also showed that the significant differences in appearance anxiety were more prominent between the mild versus the severe ($t = -91.76$, $p < 0.001$) and the moderate

versus the severe groups ($t = -71.29$, $p < 0.01$).

Table 3. Self-reported appearance anxiety using the Appearance Anxiety Inventory Scale.

Items	Percentage (%)*				
	Not at all	A little	Often	A lot	All the time
I check my appearance (e.g., in mirrors, by touching with my fingers, or by taking photos of myself).	0.8	23.6	32.5	15.2	27.8
I compare aspects of my appearance to others.	5.2	29.1	36.2	7.3	22
I avoid situations or people because of my appearance.	13.4	21.5	27.8	18.9	18.4
I think about how to camouflage or alter my appearance.	2.4	19.7	33.6	26.5	17.8
I avoid reflective surfaces, photos, or videos of myself.	10.2	25.7	39.6	24.1	0.3
I try to camouflage or alter aspects of my appearance.	4.7	49.6	18	24	3.4
I brood about past events or reasons to explain why I look the way I do.	18.6	37.5	25.4	15.7	2.6
I am focused on how I feel I look rather than on my surroundings.	3.9	23.1	26.5	26.8	19.7
I discuss my appearance with others or question them about it.	10.2	16.3	25.5	22.0	26.0
I try to prevent people from seeing aspects of my appearance within particular situations (e.g., by changing my posture, avoiding bright lights).	12.1	15.5	35.2	15.0	22.3

* Data presented as percentage of total participants ($n = 381$).

3.4. The impact of acne severity on quality of life

Acne exerted significant impacts on the quality of life of the sampled participants, as 34.1% reported being bothered by their skin condition, accompanied by frustration (39.8%) and influencing their physical (65.9%) and emotional (70.6%) well-being. A lower percentage of participants demonstrated resilience when it comes to socializing as reported by the ability to make new friends (29.7%) and displaying affection (13.1%) (**Table 4**).

Table 4. Quality of life in the lens of acne sufferers.

Items	Percentage (%)*				
	Not at all	A little	Often	A lot	All the time
Have you been bothered by the appearance of your skin condition?	0.8	28.3	28.6	24.1	18.0
Have you felt frustrated about your skin condition?	0.8	23.9	35.4	22	17.8
Has your skin made it hard to show affection?	13.1	24.7	34.6	16.5	11.0
When you were talking to others, have you worried about what they may be thinking of you?	5.8	34.9	28.6	19.2	11.5
Has your skin condition influenced the clothes you wear?	7.9	23.4	34.1	15.2	19.4
Has your skin condition affected your social or leisure activities?	8.9	23.4	32.0	15.5	20.2
Has your skin condition affected your emotional well-being?	8.9	20.5	32.5	24.1	13.9
Has your skin condition affected your overall physical well-being?	8.9	25.2	29.4	26.2	10.2
Has your skin condition affected your grooming practices (i.e., hairstyle, use of cosmetics)?	7.3	27.8	28.3	23.9	12.6
Has your skin condition affected your sun protection efforts during recreation (i.e., limiting exposure time during peak sun hours, seeking shade, wearing a hat)?	6.6	4.2	43.0	28.2	18.1
Has your skin condition affected your chance of making new friends?	29.7	7.1	46.0	8.9	8.1
Have you been worried about the spread or progression of acne to new areas of the body?	2.4	22.8	32.3	22.0	20.5

* Data presented as percentage of total participants ($n = 381$).

A significant association was identified between acne severity and the quality of life [$\chi^2(48) = 559.016$, $p < 0.05$, Cramer's $V = 0.857$]; with an increase in severity adversely affecting quality of life ($r_s = -0.260$, $p < 0.05$). 59.9% of the participants self-reported exhibiting body dysmorphic disorder (BDD). The impacts of acne severity also cascaded into appearance anxiety as reported by the weak but positive correlation between both variables [$\chi^2(54) = 463.703$, $p < 0.05$, Cramer's $V = 0.780$], ($r_s = 0.179$, $p < 0.05$).

A sizeable proportion of the participants (47%) had low self-esteem [males (n = 82) versus females (n = 97)] versus the larger pool of respondents (n =202) that exhibited normal self-esteem (**Table 5**). 80.6% of the participants also experienced body shaming whilst 76.6% and 80.1% of them felt stigmatised and embarrassed respectively. Acne severity negatively correlated with self-esteem [$\chi^2(34) = 126.105$, $p < 0.05$, Cramer's $V = 0.426$], ($r_s = -0.260$, $p < 0.05$) and confirmed the decline in self-esteem with an increase in acne severity such that participants with self-reporting mild acne exhibited a moderate self-esteem score ($\dot{X} \pm$ SD, 15.09 ± 5.56), versus those with severe acne with poor score ($\dot{X} \pm$ SD, 6.00 ± 4.08).

This poor self-esteem was also confirmed through the adoption of behavioral attributes such as (i) the use filters while taking pictures to hide their acne (25.2%), (ii) voicing out their camera shyness due to acne (29.4%), and (iii) using make-up to cover their acne (35.2%). Nevertheless, a proportion of the respondents (39.4%) were more cautious when it comes to the use of camouflage in an effort to deter the exacerbation of their acne with make-up; against 21.3% of the participants who also resorted to self-care plans through home remedies as an extra step to mitigate the propagation of the acne conditions.

Table 5. Perceived self-esteem among acne sufferers.

Items	Percentage (%)*			
	SD	**D**	**A**	**SA**
On the whole, I am satisfied with myself.	14.2	53	16	16.8
At times I think I am no good at all.	9.2	23.1	52.2	15.5
I feel that I have a number of good qualities.	8.4	38.8	24.7	28.1
I am able to do things as well as most other people.	11.5	28.9	43.6	16
I feel I do not have much to be proud of.	7.6	17.3	43.6	31.5
I certainly feel useless at times.	7.6	21.5	46.2	24.7
I feel that I'm a person of worth, at least on an equal plane with others.	3.7	53.8	23.1	19.4
I wish I could have more respect for myself.	3.9	18.4	31.2	46.5
All in all, I am inclined to feel that I am a failure.	10.8	37.5	40.7	11
I take a positive attitude toward myself.	6.6	37.5	36	19.9

* Data presented as percentage of total participants (n = 381); SD = strongly disagree, D = disagree, A = agree, and SA = strongly agree.

4. Discussion

The findings revealed no association between acne severity and gender, contradicting several studies that validated acne as being more prevalent among females than males (Berg and Lindberg, 2011; Purvis et al., 2006; Stathakis et al.,

1997; Zeichner et al., 2017). However, Yahya (2009) reported that the prevalence of acne was most commonly perceived in females over males. The findings of the study showed that the males suffering from mild, moderate and severe acne accounted for 22.6%, 19.2% and 3.7% respectively, which almost equaled the distribution in the female stratum. In spite of empirical evidences of women being more susceptible to acne, in terms of both its prevalence and severity due to hormones (Shrestha et al., 2018), it seems that environmental factors such as high temperatures, humidity and excessive sun exposure, unhealthy eating habits and stress, which are other causes of acne, may have contributed to this status quo within the gender profile (Dreno et al. ,2018; Jusuf et al., 2021; Kim et al., 2019; Robeva et al., 2012; Sridharan and George, 2018).

4.1. Impact of acne on quality of life

A strong association was drawn between acne severity and quality of life; with an inversely proportional relationship between both variables confirming the declining effect on quality of life as the acne severity increased. Walker and Lewis-Jones (2006) also demonstrated that acne significantly influences the quality of life of teenagers, results agreeing with Thomas (2004) and Pawin et al. (2007), who posited that the quality of life of participants is negatively affected on a daily basis due to acne severity. Likewise, this particular study indicated that severity of acne negatively impacted quality of life based on factors such as ‘often making it hard to show affection’ (34.6%) and ‘to make new friends’ (46%). Dalgard et al. (2015) reinforced the fact that acne-related stress and sadness increase with severity, at the detriment of the quality of life of sufferers. The present data also tally with Tasoula (2012), who evidenced that participants with severe acne reported higher burden on their quality of life; and Gieler et al. (2015) validating the fact that that acne has a considerable negative impact on quality of life. Hence, as the severity of acne increased, the quality of life of the participants decreased which is of concern given that humans are known to be social entities and a poor quality of life could potentially lead to social isolation, further exacerbating the psychological impacts of acne.

4.2. Acne severity and anxiety

The study showed that 59.9% of the participants potentially exhibited acne-induced BDD, which is in line with other studies (Marron et al., 2020; Sarkar et al., 2016), implying that majority of Mauritians with acne conditions do experience adverse mental health conditions with a potential pre-cursor onset of acne-induced anxiety; aligning with findings highlighting high anxiety prevalence among others in patients with acne vulgaris (Golchai et al., 2010). The study also revealed that 32.5% of the participants often checked their appearance in mirrors through tactile reception, or visually through pictures; while 39.6% often avoided reflective surfaces, photos or videos of themselves; and few did not check their appearance at all, making this gap the most pertinent among all the situations. Acne sufferers in this study were therefore appearance conscious and they either faced or avoided their acne situations. The uneasiness, uncertainty, apprehension, excessive worry about their skin appearance is reflective of anxiety, which is this case also positively correlated to appearance,

implying that as acne severity increased, appearance anxiety also increased. The data is consistent with Sarkar et al. (2016), advocating that acne severity and aesthetic distress are significantly and positively correlated. Ghorpade et al. (2020) shared common findings and found that appearance anxiety as a psychological effect is perceived among participants reporting severe acne conditions. The study by Bez et al. (2011), validated that social appearance anxiety is significant amongst adults with acne and is strongly correlated with acne severity. In the present study, participants reported a preference of going out at night to limit the 'stare' of others because of their skin condition, further endorsing the aspect of appearance anxiety in the sampled participants.

Kurhan et al. (2021) found that appearance anxiety and acne severity impact on participants' lives leading to adverse quality of life; findings consistent with Afsar et al. (2018), substantiating a significant difference in appearance anxiety and acne severity where correspondingly appearance anxiety is high with moderate and severe acne conditions. The present data finds support in past studies, such that Mauritian adults have pre-set standards about beauty. An inclination towards physical appearance, driven by a westernized culture of aesthetics and characterized by flawless skin and perfect body shape, which is mostly influenced by social media whereby content creators and models are portrayed as having unblemished skin and small waist, would undeniably lead to comparative behaviors (Fioravanti et al., 2022; Henriques and Patnaik, 2021; Humprey et al., 2021; Jaeger et al., 2018; Little at al., 2010). Not meeting these beauty standards because of their blemished skin could be indicative of a potential cause of BDD, leading to appearance anxiety in the pool of Mauritians diagnosed with acne.

4.3. Acne severity and self-esteem

The study stressed the fact that acne severity has a significant impact on self-esteem through its inversely proportional relationship. The acne severity levels when tallied against the mean self-esteem score showed that participants suffering from mild, moderate, and severe acne scored 15.1, 13.3, and 6 on the self-esteem scale, suggesting that when acne severity is mild, self-esteem is higher, and as it approaches moderate to severe levels, the self-esteem score declines; data in agreement with previous studies (Dalgard et al., 2008; Gallitano and Berson, 2017; Hazarika and Archana, 2016; Su et al., 2015). Hosthota et al. (2016) empirically evidenced that acne severity has a considerable adverse impact on self-esteem, and acne sufferers avoid social gatherings and interactions with the opposite sex. Moreover, Dunn et al. (2011) found that self-esteem is lower among female participants with severe acne conditions, in contrast to the males with moderate to severe acne conditions. The results of the current study clearly showed that acne severity impacts the level of self-esteem in adult Mauritians, lowering their self-esteem as acne became more severe and inducing similar social exclusion as observed across geographical boundaries.

Further to the acne conditions, participants attributed their low self-esteem to the feeling of being a failure, not seeing themselves as equal worth to others, and being dissatisfied with themselves, which consequentially led participants to be more sensitive to experiencing body shaming (80.6%), stigmatization (76%), and self-

embarrassment (80.1%). Similar results were reported with acne bearing significant effects on patients' emotions in terms of self-embarrassment, self-esteem, and feelings of unworthiness (Tasoula et al., 2012). Social stigma and bullying with respect to skin conditions is a known adverse behavior across numerous communities, and Mauritius is not excluded from such social issues. Gallitano and Berson (2017) postulated that self-esteem is exacerbated by perceptions of being judged, taunting, and stigmatization. Studies have also shown that women tend to be more conscious about their appearance than men, especially if suffering from facial acne (Gallitano and Berson, 2017; Tayel, 2020). Mauritius is not spared from this dichotomy, as the current findings showed that out of the 179 participants who scored low on self-esteem, 45.8% were males, supporting the fact that women predominantly tend to go through self-evaluation phases in terms of their physical attractiveness as opposed to men, which might have a strong impact on their self-esteem. As such, any deviation from the ideal appearance and being body-shamed lowers their self-esteem (Adams et al., 2017; Swim et al., 2001). Furthermore, Mauritian women could possibly objectify themselves, becoming hypercritical about their skin, and increasing their susceptibility to lower self-worth. While acne is a common skin disease observed across the globe, the cultural differences either potentiate or buffer against the stigma associated with acne, cascading into adverse mental health associated with perceived body image. Mauritius, being a culturally plural country, has a majority of its population originating from India or Africa, regions that still reflect a certain level of conservativeness within their communities (Agadjanian, 2024; Leidig and Bayarri, 2022); such that women from northern African regions suffering from skin diseases experience diminished emotional satisfaction and social alienation (Raheel et al., 2024) or even Indian women that promote 'beautiful, thin, and fair' as ideal body image constructs (Verma and Ray, 2023). These culturally sensitive body image issues are further exacerbated with the widespread Korean culture, which is slowly emerging in the local context, where Korean beauty and body image are exerting a skewness in body image constructs, which may further exacerbate beauty norms incompatibility, as experienced in other countries (Sah and Sioni, 2024; Widyaningrum et al., 2023). Hence, the nexus between body image, in this case, acne, and adverse mental health cannot be downplayed. Lastly, intrinsically, women are biologically more vulnerable to low self-esteem than men because of their hormonal profiles (Casale, 2020); hence, undesired skin conditions can exacerbate their psychological distress, leading to low self-confidence.

4.4. Behaviors adopted

The data showed that most participants used little to no makeup to cover their acne. As 99.7% of the participants consist of Generation Z and millennials, the preference of not using makeup can be explained by the fact that these two generations are more conscious about the side effects of cosmetics. Accordingly, Limbu et al. (2022) reported that Gen Z and millennials have a preference for cosmetics, which are apparently not harmful to the skin. Hence, this study contradicts Tangetti et al.'s (2004) findings whereby the a high proportion of the participants (58.2%) used makeup to hide their acne. The current sampled participants reported being camera shy or using filters as a marking effect to hide their acne conditions or developed a

preference for nighttime outings to avoid being seen with a skin condition, inferring that hiding their imperfections made them feel more comfortable. This could also be perceived as participants not wanting to be characterized as having unfavorable physical characteristics; justification supported by Ritvo et al. (2011), whose study surrounding psychosocial judgment on perceptions of adolescents suffering from acne found that acne negatively affects how others perceive the sufferer. The results of this current study also validate an association between acne severity and social behavior, which may be interlinked with acne severity.

4.5. Study limitations

Even though acne is a common skin condition and can be easily diagnosed, quantifying its severity using a systematic approach is intricate, especially when self-evaluated. In this study, the severity classification was self-reported by the participants and could emerge from a formal diagnosis; however, such details were not confirmed. Hence, the intervention of a dermatologist to validate the classification would strengthen the outcomes reported. A very small percentage of the sample had severe acne, limiting the comparability along the spectrum of mild to severe acne with respect to the psychological impact resulting from acne. The study was valuable in terms of identifying the relationship between acne, quality of life, self-esteem, appearance anxiety, and shedding light on the coping mechanisms among acne sufferers. This study also paves the way for further studies that relate to body image as portrayed through other cultures and potentially conceptualize longitudinal studies that could track participants throughout their treatment phases and identify pertinent motivators aiding in nurturing mental health and building resilience.

5. Conclusion and future directions

Acne is a costly and burdensome dermatological disease. Numerous studies focused on the psychological impact of acne among adolescents, which reported important psychological repercussions; data that was scant in the Mauritian context. In an attempt to bridge this particular gap, the study revealed interesting and essential findings wherein demographic attributes, gender, age, and education shared a significant association with acne severity. The results also reported the incremental effects of acne severity on poor quality of life scores. Additionally, self-esteem was found to be significantly low among participants suffering from severe acne. Stress and anxiety have a pathophysiological link to the propensity and severity of acne, which should be actively managed as part of a comprehensive and holistic treatment plan, the latter of which should be tailored according to the needs of the individual suffering from the skin condition. The end results should not only focus on improving the quality of life through the treatment of the physical symptoms but also on reducing psychological distress. The present data further advocates for a holistic approach to address the negative psychological impact of acne severity among the adults in Mauritius.

Given the cross-sectional nature of this study, data concerning exacerbation and psychological effects with age and the dynamic societal perception could not be mapped; hence, a prospective longitudinal cohort study of the psychological impacts

of acne severity on adolescents and adults could yield more potent data on the evolving perception and psychological response through the sufferer's lens. Expanding from this research, future studies can analyze acne's impact on other health determinants such as depression, self-injurious behaviors, and eating disorders, as well as its psychosocial effects, such as social withdrawal and social impairments. Subsequent to the quantitative approach, where participants were constricted in their responses, a qualitative approach would cater to detailed insights about their psychological conditions.

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