Acne-Related Quality of Life Among Female Adults of Different Races/Ethnicities

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ABSTRACT:

Background: Acne impairs quality of life, but its effect on different races/ethnicities is unclear. This study evaluated racial/ethnic differences in acne-related quality of life and psychological symptoms among female adults.

Methods: A Web-based survey was conducted with U.S. female adults (25–45 years old) with facial acne (≥25 visible lesions). Outcomes included sociodemographics, clinical characteristics, acne-related quality of life (Acne-Specific Quality of Life Questionnaire), psychological symptoms (Patient Health Questionnaire), and work/school productivity. Racial/ethnic differences were evaluated using descriptive statistics and analysis of variance/chi-square analyses.

Results: Three-hundred twelve subjects (Black = 30.8%, Hispanic = 17.6%, Asian/other = 17.3%, White = 34.3%) completed the survey (mean age = 35.3 ± 5.9 years). Acne negatively impacted quality of life for all subjects. Black subjects reported significantly less negative impact on self-perception versus Asian/other (Black = 12.6 ± 9.9, Asian/other = 8.4 ± 8.6; p = .05). Social functioning was less negatively impacted in White and Black subjects versus Asian/other (White = 12.7 ± 7.5, Asian/other = 8.4 ± 7.8, p < .05; Black = 12.1 ± 9.2, Asian/other = 8.4 ± 7.8, p = .06). Over one third (total sample = 40.7%, Black = 31.3%, Hispanic = 36.4%, Asian/other = 50.0%, White = 46.7%) reported moderate/severe anxiety/depression symptoms. Acne also impacted ability to concentrate on work/school.

Conclusion: Racial/ethnic differences were observed in acne-related quality of life and psychological symptoms in female adults; acne negatively impacted self-perceptions and social/emotional functioning.

Key words: Acne, Female, Observational Study, QoL, Survey

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BACKGROUND

Acne vulgaris (acne) is a common dermatological condition typically associated with the adolescent population. However, the condition is also prevalent and persistent into adulthood, with 64% of the 20- to 29-year-old and 43% of the 30- to 39-year-old male and female populations experiencing acne (Bhate & Williams, 2013).

Facial acne is a multifactorial disease with respect to pathophysiology as well as its impact on daily functioning and quality of life (QoL; Callender, 2004; Tanghetti, 2005). It has also been shown to impact patients' ability to develop social relationships (Callender, 2004; Mallon et al., 1999). The impact of adolescent and adult acne on QoL (as measured using the 36-item Short Form Health Survey) has been documented as being comparable with chronic disabling diseases including arthritis and diabetes, and worse than asthma, epilepsy, back pain, and coronary heart disease in the 36-item Short Form Health Survey domains of mental health, social function (except coronary heart disease), and role-emotional (except coronary heart disease and diabetes; Mallon et al., 1999).

Compared with other dermatologic conditions such as psoriasis, which can have more severe physical symptoms, acne has been associated with greater negative psychosocial impacts, particularly on feelings of despair and distress (Ahmed, Leon, Butler, & Reichenberg, 2013). Acne-related QoL in adolescents and adults, as measured by the Dermatology Life Quality Index (DLQI), was shown to be worse than in women than in men (Mallon et al., 1999). Acne-related QoL in women may be more impaired because of differences in perceptions regarding self-appearance and levels of cosmetic concern, as patient perception of acne is more influenced by social and emotional factors than clinical assessments such as acne severity or duration (Zauli et al., 2014). Gender differences in patient perception are also apparent when considering comorbidities in acne, with depression being a more common comorbidity in women (10.6%) compared with men (5.3%; Uhlenhake, Yentzer, & Feldman, 2010; Yentzer et al., 2010).

Among women, acne is more common in skin of color. Acne prevalence is higher in Black (37%), Hispanic (32%), and Asian (30%) versus White (24%) women, and it is known that there are racial/ethnic differences in the clinical presentation of acne in women across all ages (Perkins, Cheng, Hillebrand, Miyamoto, & Kimball, 2011); however, there is limited published research on racial/ethnic differences in acne-related QoL. The published literature that is available is more culturally focused and/or specific to adolescents. Takahashi and colleagues (2006) described the negative impact of acne on QoL of men and women aged ≥16 years in Japan using the DLQI. In addition, Yap (2012) described the impact of acne on male and female adults in Sarawak, Malaysia, with results showing that acne-related QoL impairments were not statistically significantly different between ethnic groups (indigenous: $n = 103$, Chinese: $n = 70$; $p > .05$). Ahmed and colleagues

(2013) further showed that acne negatively impacted QoL in Scottish, Serbian, Greek, and Japanese adolescents both on a personal and social level, although no direct cross-cultural comparisons were made.

The objective of this study was therefore to describe acne-related QoL in a population of racially/ethnically diverse female adults with facial acne, to increase our understanding of the impact of acne and the role of racial/ethnic differences in influencing acne-related QoL.

METHODS

Study Design

The study was a cross-sectional, Web-based, observational survey conducted with subjects in the United States in 2011 and 2013. The survey screened for subject-reported acne signs and captured data on sociodemographics, clinical characteristics, acne-related QoL, and work/school productivity. The study was approved by a central institutional review board before initiating contact with health panel members. Additional details on study design and methodology are described elsewhere (Callender et al., 2014; Tanghetti et al., 2014).

Study Population: Recruitment and Screening

All subjects were recruited through the YouGov Panel (Palo Alto, CA) from a pool of preregistered U.S. Web panelists ≥ 18 years old. Data were collected in two waves: Cohort 1 (October–November 2011) and Cohort 2 (November 2013). Eligibility criteria were female gender; age of 25–45 years; an active email address at the time of study invitation; ability to read and understand English; and presence of self-reported acne, defined as ≥25 visible facial lesions. Recruitment targeted enrollment of a minimum of 300 subjects, 200 subjects for Cohort 1 (~25% Black, ~25% Hispanic and Asian/other, and ~50% White) and 100 subjects for Cohort 2 (~50% Black, ~25% Hispanic, and ~25% Asian/other).

Study Variables

Sociodemographics, clinical characteristics, and information on comorbid health conditions were collected. Acne-related QoL as measured by the Acne-Specific Quality of Life Questionnaire (Acne-QoL), psychological symptoms as measured by the Patient Health Questionnaire-4 (PHQ-4), and work and/or school productivity as measured by generic questions were also assessed.

Acne-Specific Quality of Life Questionnaire

The Acne-QoL (Martin et al., 2001) is a 19-item patient-reported outcome measure evaluating the impact of facial acne. The questionnaire consists of four domains: self-perception, role-emotional, role-social, and acne symptoms. The concepts assessed in each domain are shown in Figure 1. Acne-QoL was developed through literature review, patient interviews, and expert opinion (Girman et al., 1996). Responses are based on a 7-point adjectival scale; responses of "extremely" to "not at all" are used for 16 of the 19 items,

Acne-specific Quality of Life (Acne-QoL)

Self Perception
- Feel unattractive
- Feel embarrassed
- Feel self-conscious
- Dissatisfied with self appearance
- Self-confidence negatively affected

Role-Emotional
- Feel upset
- Feel annoyed about time spent treating face
- Worried about not looking your best
- Worried about medication not working fast enough
- Feel bothered about needing to have medication/cover-up available

Role-Social
- Worried about meeting new people
- Worried about going out in public
- Problem with socializing
- Problem with interacting with the opposite sex (or same sex if gay or lesbian)

Acne Symptoms
- Bumps on face
- Bumps full of pus
- Scabbing from acne
- Worried about scarring from acne
- Oily skin

Patient Health Questionnaire (PHQ-4)

Anxiety
- Feel nervous, anxious, or on edge
- Not able to stop or control worrying

Depression
- Little interest or pleasure in doing things
- Feel down, depressed, or hopeless

FIGURE 1. Acne-QoL and PHQ-4 domains and concepts.

and responses of "extensive" to "none" are used for three of the five symptom-related items. The standard recall period for Acne-QoL is "past week"; the recall period was modified in this survey to "past 4 weeks" to understand acne-related QoL over a longer period with consent from the developer (A. M. Nguyen, personal communication, January 26, 2011).

Higher Acne-QoL domain scores indicate better acne-related QoL. The self-perception, role-emotional, and acne symptoms domains are composed of five items each with scores ranging from 0 to 30. The role-social domain includes four items with scores ranging from 0 to 24. The instrument has been validated and has evidence of acceptable content validity, internal consistency, and test-retest reliability (Girman et al., 1996).

Patient Health Questionnaire-4

The PHQ-4 (Kroenke, Spitzer, Williams, & Löwe, 2009) is a brief self-administered four-item screening tool that measures anxiety and depression in the previous 2 weeks (Figure 1). The scale assesses core symptoms of generalized anxiety disorder and major depressive disorder and was developed as a brief screener for use in general practice and clinical settings (Kroenke & Spitzer, 2002; Kroenke, Spitzer, & Williams, 2001; Spitzer, Kroenke, Williams, &

Löwe, 2006). Each PHQ-4 item is completed using a 4-point adjectival scale from 0 = *not at all* to 3 = *nearly every day*. PHQ-4 total scores range from 0 to 12 and are interpreted as normal (0–2), mild (3–5), moderate (6–8), and severe (9–12) anxiety and depression. The PHQ-4 has also been validated in the general population (Löwe et al., 2010).

Work/School Productivity

Four generic questions were used to evaluate the impact of acne on productivity related to work and/or school. These questions assessed number of days missed because of acne, difficulty concentrating on work/school, work interference, and impacts on ability to perform at work/school because of acne in the past 4 weeks.

Statistical Analyses

Descriptive analyses were performed to summarize results in the pooled Cohorts 1 and 2 sample by racial/ethnic group (Black, Hispanic, Asian/other, and White). For continuous variables, sample size, mean, standard deviation (*SD*), median, minimum and maximum, and percentage missing (where applicable based on survey design) were examined. For categorical variables, frequencies and percentage missing were reported. Comparisons between racial/ethnic groups were conducted using chi-square/Fisher's

exact test and Student's *t* test/analysis of variance on acne-related QoL, psychological symptoms, and work/school productivity variables.

RESULTS

Sample Characteristics

In the survey, 11,334 female panelists were invited to participate, of which 4,894 responded to the email invitation, consented, and completed eligibility screening (Figure 2). After screening, 312 female adults with facial acne were eligible and completed the survey.

Sociodemographic and Clinical Characteristics

Sociodemographic characteristics of the sample are presented in Table 1. Subjects were predominantly White (34.3%) or Black (30.8%), with fewer being Hispanic (17.6%) and Asian/other (17.3%). The average age was 35.3 years (SD = ±5.9 years), and over half were employed full or part time (51.0%). The only statistically significant difference observed between racial/ethnic groups in sociodemographic characteristics was in body mass index; a smaller proportion of Asian/other subjects (33.3%) were overweight or obese compared with the other racial/ethnic groups ($p < .05$; Table 1).

Racial/ethnic differences in subject-reported clinical and acne characteristics are presented in Table 2. Acne located within the hairline and on the chin was more common in White subjects ($p < .05$). Furthermore, White subjects reported more erythema (referred to as "redness"; $p < .05$) and less scarring ($p < .05$) and postinflammatory hyperpigmentation (referred to as "dark marks"; $p < .01$) than subjects of other racial/ethnic groups. Acne became either a bother or concern for White subjects at a significantly earlier age compared with the Black racial group (mean ± SD = 16.6 ± 6.5 vs. 19.9 ± 8.9 years, $p < .05$). In addition, White subjects were primarily concerned about lesions (referred to as "pimples" or "bumps"), whereas Black, Hispanic, and Asian/other subjects were concerned more about postinflammatory hyperpigmentation in addition to lesions ($p < .0001$). Comorbid health conditions were common in the sample. Allergies/hay fever was reported most frequently (28.2%), followed by anxiety or nervous/excessive worry (26.6%), depression (21.2%), and migraines (20.2%). More White than non-White subjects reported having anxiety (White = 40.2% vs. non-White = 19.5%, $p < .0001$), depression (White = 32.7% vs. non-White = 15.1%, $p < .001$), or migraines (White = 29.0% vs. non-White = 15.6%, $p < .05$). No other statistically significant differences in frequency of comorbidities between racial/ethnic groups were observed.

Acne-Related QoL

Acne-Specific Quality of Life Questionnaire

Results from the Acne-QoL (Figure 3) indicated that acne negatively impacted QoL. White and Black subjects reported less negative impact of acne on QoL than Hispanic and
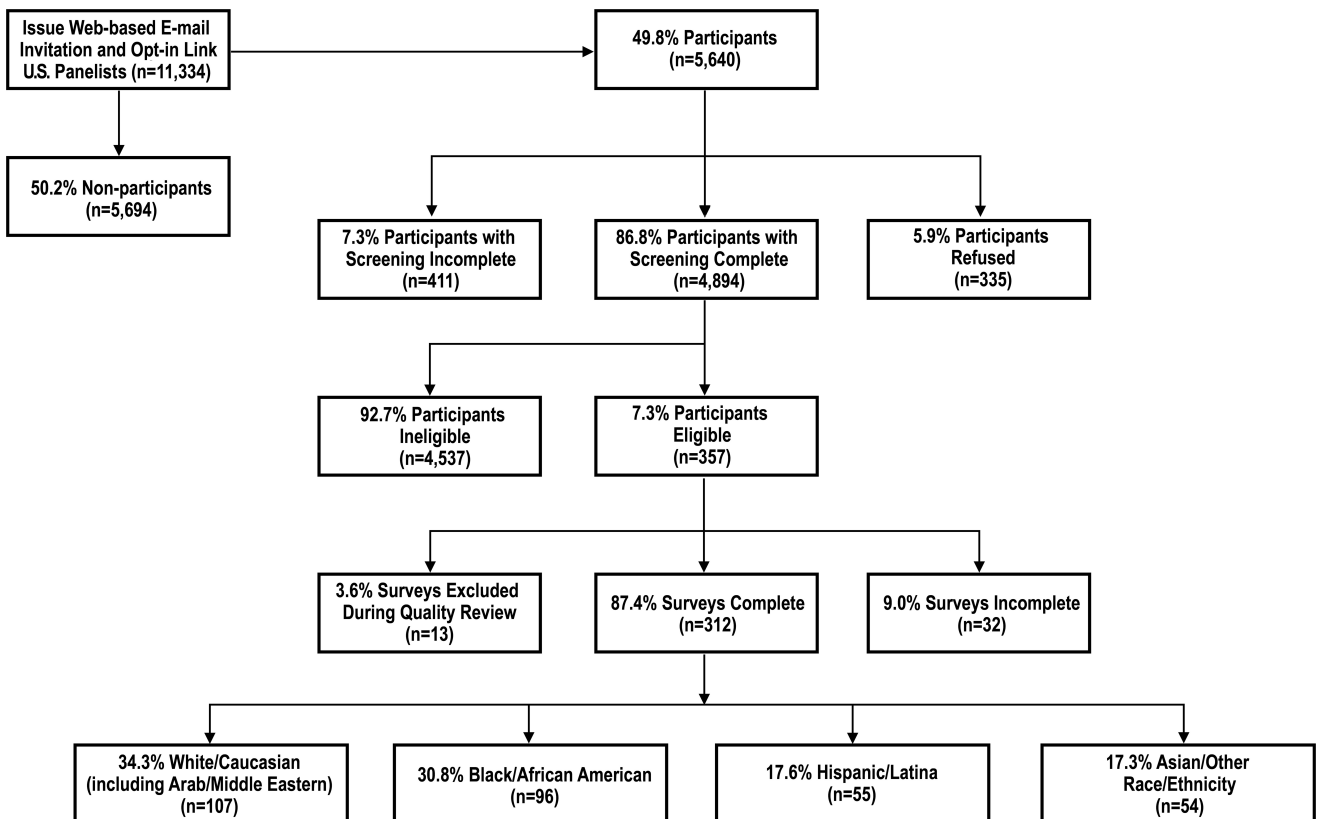

FIGURE 2. Acne Cohort 1 and 2 (total sample) survey participant disposition.

TABLE 1. Sociodemographics by Racial/Ethnic Group

		Racial/Ethnic Group				
	Total Sample (N = 312)	Black (n = 96)	Hispanic (n = 55)	Asian/Other (n = 54)	White (n = 107)	p Value[a]
Age						
Mean (SD)	35.3 (5.9)	35.8 (5.8)	34.9 (6.1)	34.1 (6.0)	35.6 (5.9)	.3324
Employment status, n (%)						.9380
Employed, full time (paid)	126 (40.4)	41 (42.7)	23 (41.8)	21 (38.9)	41 (38.3)	
Employed, part time (paid)	33 (10.6)	10 (10.4)	7 (12.7)	4 (7.4)	12 (11.2)	
Unemployed/disabled/ retired/other	151 (48.4)	43 (44.8)	25 (45.5)	29 (53.7)	54 (50.5)	
Prefer not to answer	2 (0.6)	2 (2.1)	0 (0)	0 (0)	0 (0)	
Education, n (%)						.3380
Less than a high school diploma	11 (3.5)	4 (4.2)	2 (3.6)	1 (1.9)	4 (3.7)	
High school graduate	55 (17.6)	19 (19.8)	13 (23.6)	4 (7.4)	19 (17.8)	
More than a high school diploma	245 (78.6)	73 (76.0)	40 (72.7)	48 (88.8)	84 (78.5)	
Prefer not to answer	1 (0.3)	0 (0)	0 (0)	1 (1.9)	0 (0)	
Total annual household income, n (%)						.2224
≤$50,000	178 (57.0)	61 (63.5)	34 (61.8)	28 (51.9)	55 (51.4)	
>$50,000	125 (40.1)	31 (32.3)	21 (38.2)	24 (44.4)	49 (45.8)	
Prefer not to answer	9 (2.9)	4 (4.2)	0 (0)	2 (3.7)	3 (2.8)	
Body mass index categories, n (%)						.0210
Underweight (below 18.5)/normal (18.5–24.9)	119 (38.2)	27 (28.1)	15 (27.2)	30 (55.6)	47 (43.9)	
Overweight (25.0–29.9)	63 (20.2)	22 (22.9)	14 (25.5)	8 (14.8)	19 (17.8)	
Obese (30.0 and above)	94 (30.1)	35 (36.5)	16 (29.1)	10 (18.5)	33 (30.8)	
Missing	36 (11.5)	12 (12.5)	10 (18.2)	6 (11.1)	8 (7.5)	

[a]Analysis of variance (for continuous variables) or Pearson chi-square/Fisher's exact test (for categorical responses) by race group, with p value based on comparison across White, Black, Hispanic, and Asian/other groups.

Asian/other subjects; however, not all of the differences identified between racial/ethnic groups attained statistical significance. In the prior 4 weeks, mean Acne-QoL domain scores for the total sample were 10.7 ± 8.9 for the self-perception domain, 11.3 ± 9.0 for the role-emotional domain, 13.7 ± 7.3 for the acne symptoms domain (each domain with a possible maximum score of 30), and 11.4 ± 8.2 for the role-social domain (of a maximum score of 24).

On the self-perception domain, Black subjects reported significantly less negative impact compared with Asian/other subjects (12.6 ± 9.9 vs. 8.4 ± 8.6, p = .05). Overall, less negative impact on social functioning was observed on the role-social domain among White compared with non-White subjects (White = 12.7 ± 7.5 vs. non-White = 10.7 ± 8.5, p < .05). By racial/ethnic group, social functioning was less negatively impacted by acne in White and Black subjects than in Asian/other subjects (role-social domain: White = 12.7 ± 7.5 vs. Asian/other = 8.4 ± 7.8, p < .05; Black = 12.1 ± 9.2 vs. Asian/other = 8.4 ± 7.8,

p = .06). There were no statistically significant differences in either the role-emotional or acne symptoms domains among racial/ethnic groups. Acne-QoL item-level data reflected that nearly half of the subjects (~45%) felt "very much" or "extremely" unattractive (45.2%), embarrassed (45.5%), self-conscious (48.7%), annoyed at the amount of time spent every day cleaning/treating their face (46.1%), and dissatisfied with their appearance (45.5%) because of facial acne.

Patient Health Questionnaire-4
PHQ-4 (Figure 4) showed evidence of moderate-to-severe anxiety and depression symptoms in over one third of the subjects (total sample = 40.7%, Black = 31.3%, Hispanic = 36.4%, Asian/other = 50.0%, White = 46.7%). Asian/other (5.8 ± 3.9) and White (5.6 ± 4.0) subjects had numerically higher mean PHQ-4 scores, indicating the presence of more severe anxiety and depression symptoms, compared with Hispanic (4.5 ± 3.3) and Black (4.2 ± 3.8)

TABLE 2. Clinical Characteristics by Racial/Ethnic Group

		Racial/Ethnic Group				
	Total Sample (N = 312)	Black (n = 96)	Hispanic (n = 55)	Asian/Other (n = 54)	White (n = 107)	p Value[a]
Age when acne started (in years)						
Mean (SD)	16.3 (7.0)	17.1 (8.3)	17.1 (7.0)	17.1 (7.4)	14.8 (5.3)	.0621
Age when acne started (in years), for adult onset acne (age ≥ 18 years)[b]						
n	82	31	18	18	15	
Mean (SD)	26.0 (6.8)	26.8 (7.3)	25.5 (5.9)	25.3 (7.5)	25.7 (6.1)	.8680
Age when acne began to bother or concern you						
Mean (SD)	18.3 (8.0)	19.9 (8.9)	17.9 (7.9)	19.3 (8.8)	16.6 (6.5)	.0242
What bothers or concerns you most about your acne, n (%)						<.0001
Actual lesions	40 (12.8)	2 (2.1)	6 (10.9)	4 (7.4)	28 (26.2)	
Postinflammatory hyperpigmentation (PIH; discolored skin) left by lesions	31 (9.9)	18 (18.8)	6 (10.9)	4 (7.4)	3 (2.8)	
Both lesions and PIH (discolored skin)	207 (66.3)	63 (65.6)	34 (61.8)	42 (77.8)	68 (63.6)	
Not applicable: I am no longer bothered or concerned about	3 (1.0)	1 (1.0)	1 (1.8)	0 (0.0)	1 (0.9)	
Not asked	31 (9.9)	12 (12.5)	8 (14.5)	4 (7.4)	7 (6.5)	
Acne as an adult compared with acne as a teenager, n (%)						.4022
Not as bad/less severe	68 (21.8)	17 (17.7)	15 (27.3)	12 (22.2)	24 (22.4)	
The same	97 (31.1)	26 (27.1)	11 (20.0)	17 (31.5)	43 (40.2)	
Worse/more severe	65 (20.8)	22 (22.9)	11 (20.0)	7 (13.0)	25 (23.4)	
Not asked	82 (26.3)	31 (32.3)	18 (32.7)	18 (33.3)	15 (14.0)	
Facial acne on average over the last 4 weeks, n (%)						.9752
0–24 visible pimples	69 (22.1)	20 (20.8)	14 (25.5)	11 (20.4)	24 (22.4)	
25–49 visible pimples	196 (62.8)	59 (61.5)	34 (61.8)	35 (64.8)	68 (63.6)	
≥50 visible pimples	47 (15.1)	17 (17.7)	7 (12.7)	8 (14.8)	15 (14.0)	
Erythema (redness) from facial acne in the past 4 weeks, n (%)						.0134
None/some	114 (36.5)	45 (46.9)	21 (38.2)	21 (38.9)	27 (25.2)	
Moderate/a lot/extensive	198 (63.5)	51 (53.1)	34 (61.8)	33 (61.1)	80 (74.8)	
Scarring from facial acne in the past 4 weeks, n (%)						.0373
None/some	114 (36.5)	29 (30.2)	22 (40.0)	14 (25.9)	49 (45.8)	
Moderate/a lot/extensive	198 (63.5)	67 (69.8)	33 (60.0)	40 (74.1)	58 (54.2)	
PIH from facial acne in the past 4 weeks, n (%)						.0034
None/some	120 (38.5)	27 (28.1)	22 (40.0)	16 (29.6)	55 (51.4)	
Moderate/a lot/extensive	192 (61.5)	69 (71.9)	33 (60.0)	38 (70.4)	52 (48.6)	

[a]Analysis of variance (for continuous variables) or Pearson chi-square/Fisher's exact test (for categorical responses) by race group, with p value based on comparison across White, Black, Hispanic, and Asian/other groups.
[b]On the basis of participants who reported acne age of onset as age ≥ 18 years in clinical characteristics Question 1 (``How old were you when your acne started?'').
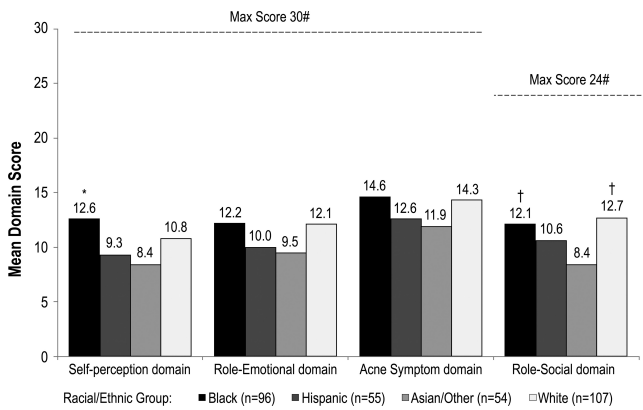
FIGURE 3. Acne-Specific Quality of Life Questionnaire domain scores by racial/ethnic group; N = 312. *Analysis of variance (ANOVA) comparing Black versus Asian/Other, p = .05; [†]ANOVA comparing Black versus Asian/other, p = .06, and White versus Asian/other, $p < .05$; [#]higher scores indicate better health-related quality of life.

subjects, although the difference was not statistically significant.

At an item-level, over a third of subjects reported on the PHQ-4 anxiety items as feeling nervous, anxious, or on edge (38.1%) or not being able to stop or control worrying (38.8%) on "more than half the days" or "nearly every day" in the prior 2 weeks. On the PHQ-4 depression items, approximately one third of the subjects reported feeling down, depressed, or hopeless (33.0%) or having little interest or pleasure in doing things (31.4%) on "more than half the days" or "nearly every day" in the prior 2 weeks.

Work/School Productivity

On the basis of subject responses to generic productivity questions, acne negatively impacted work/school productivity at some level. Less than 10% of employed subjects (n = 159) in the survey indicated having missed work or school in the prior 4 weeks because of an acne breakout. Among these, the mean number of missed work or school days because of an acne breakout was 6.3 ± 6.8 days. Approximately one third to one half of employed subjects (n = 159) reported difficulty concentrating on work or school "some," "most," or "all of the time" in the prior 4 weeks because of their acne (employed subsample = 40.3%, Black = 47.1%, Hispanic = 30.0%, Asian/other = 48.0%, White = 35.8%). However, many of the employed subjects reported that acne did not affect their work, with over half of the subjects reporting that their acne interfered "none of the time" with doing their job or completing their work in the prior 4 weeks (employed subsample = 56.0%, Black = 51.0%, Hispanic = 60.0%, Asian/other = 56.0%, White = 58.5%).

DISCUSSION

Acne is a dermatologic condition typically associated with the adolescent population but is increasingly becoming prevalent in adults, particularly in women. Because of the

visibility of acne, it is known to have psychosocial and functional impacts that can influence patients' perceptions regarding their self-appearance, resulting in poor acne-related QoL, particularly among women (Zauli et al., 2014). Evidence does support that women are more concerned than men about their physical appearance and have lower appearance-related self-esteem over their life span, which could make this subpopulation more susceptible to impairment of acne-related QoL (Pliner, Chaiken, & Flett, 1990).

Among women, acne is more common in skin of color, and previous research has suggested that race/ethnicity is an important factor in both the prevalence and clinical characteristics of acne in this population (Perkins et al., 2011). Cheng and colleagues (2010) also identified differences between racial/ethnic groups (Black, Hispanic, Asian, and White) in behaviors and attitudes about acne (e.g., help-seeking behavior for acne treatment, beliefs about external factors affecting acne, and perceptions of acne), concluding that understanding such racial/ethnic differences is important to practitioners for communicating with and educating their multiethnic patient populations. Despite these data, there is limited evidence available for racial/ethnic differences specific to acne-related QoL. Existing research, primarily conducted within culture-specific populations, has limited generalizability to the diverse multiracial/multiethnic patient populations that are now typically treated in clinical settings in the United States and highlights a knowledge gap on the differential impact of acne across different racial/ethnic backgrounds.

This study sought to describe acne-related QoL in racially/ethnically diverse female adults with facial acne and showed that acne negatively impacts QoL, psychological symptoms, and work/school productivity in all races and ethnicities. Although acne impacted QoL for all subjects (as measured by the Acne-QoL), variations in acne-related QoL among racial/ethnic groups were observed, with Hispanics and Asian/other subjects reporting greater negative impact in QoL compared with White and Black subjects. Specifically, significant differences were observed among racial/ethnic
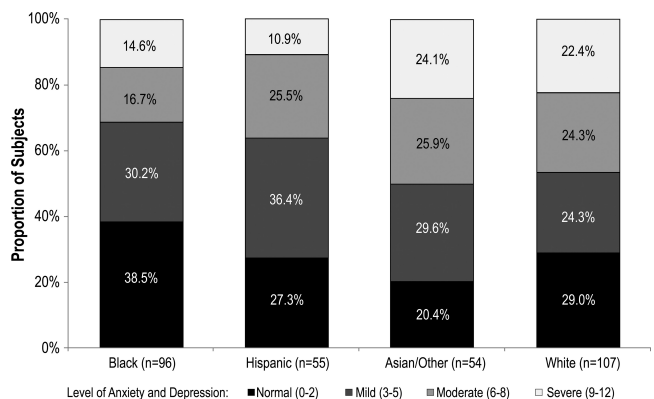

FIGURE 4. Patient Health Questionnaire-4 scores by racial/ethnic group; N = 312.

groups in only two of the Acne-QoL domains: self-perception and role-social. This corroborates findings from previous studies (albeit in different countries/cultures), which found that QoL was mildly-to-moderately impaired because of acne (as measured by the DLQI); greater impairment was observed mostly in the DLQI symptoms and feelings domain assessing skin sensations (skin itchiness, soreness, pain, or stinging) and emotional impacts (embarrassment or self-consciousness; Mallon et al., 1999; Takahashi et al., 2006; Yap, 2012). Although the DLQI assesses QoL of dermatology patients, it is not specific to acne and contains generic questions that may not be relevant to the condition; this may help to explain why the symptoms and feelings domain reflected more impairment than the other DLQI domains (i.e., concepts in this domain were more relevant to acne). Similar to the findings of the current study, these studies independently showed that acne had greater impact on self-esteem and perceptions across all racial/ethnic groups, whether measured using the DLQI symptoms and feelings domain or the Acne-QoL self-perception domain, both of which measure similar concepts.

Although the results of these previous studies suggest potential cross-cultural differences in acne-related QoL, only Yap (2012) performed subgroup comparisons across racial/ethnic groups (indigenous ethnic groups and Chinese), showing that there were no significant differences in acne-related QoL impairments in male and female adults in Malaysia, despite indigenous subjects reporting more severe impairments in QoL. Social and cultural upbringing and socioeconomic differences were potential reasons for the differences shown in severity of acne-related QoL impairment in the Yap study. However, findings from the current study did not reflect these hypotheses. This may be a result of the U.S. cultural background being similar across racial/ethnic groups and limited variability in income levels across racial/ethnic groups in the sample.

In this study, at least a third of female adults with acne reported the presence of moderate-to-severe anxiety/depression (as measured by PHQ-4), corroborating previous research that showed the prevalence of depression in patients with acne, particularly among women (Uhlenhake et al., 2010; Yentzer et al., 2010). Although limited differences in PHQ-4 were identified among racial/ethnic groups, results showed that a statistically significantly greater proportion of White than non-White subjects reported anxiety and depression symptoms. Among the racial/ethnic groups, a greater proportion of Asian and White subjects reported moderate-to-severe anxiety and depression symptoms; these same subgroups also more frequently reported having depression as an existing comorbidity. PHQ-4 findings, however, should be interpreted with caution, as this measure cannot establish a causal relationship between acne and anxiety or depression.

The current analysis showed that the impact of acne on work/school productivity was similar and did not differ between racial/ethnic groups. This confirms and builds on earlier findings by Tanghetti and colleagues (2014), which were based on a subset of this current study population and found facial acne to not appear to affect subjects' ability to complete tasks at work or school. To the best of our knowledge, no other published study has examined the relationship between acne and its impact on work/school productivity.

This study was not without limitations. Clinical data included in this study were based on subjects' self-report and may be subject to recall bias. Exclusion of milder cases of acne may also limit the generalizability of conclusions about racial/ethnic differences in acne-related QoL and productivity in the overall population of female adults with acne. Although efforts were made to recruit a racially/ethnically diverse study sample, smaller numbers of Hispanic and Asian/other subjects in the sample may limit the generalizability of conclusions about racial/ethnic differences to the larger population of female adults with acne. Because of differences in social and cultural upbringing, these findings may also not be generalizable to the non-U.S. population of female adults with acne.

CONCLUSION

Racial/ethnic differences in acne-related QoL among female adults were identified in this study, with results highlighting that acne negatively impacts QoL in the areas of self-perception and social and emotional functioning. This assessment offers greater understanding of racial/ethnic variations in acne-related QoL in female adults. ∎

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