Skin-lightening products (SLPs) and levels of depression, anxiety, and stress among Filipino emerging adults: a cross-sectional study

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Background: The Philippines is one of Southeast Asia's top consumers of beauty products. There have been few studies on the psychological aspects of skin-lightening products (SLPs) consumption in the Philippines. Hence, we investigated the association between knowledge of, perception towards, and frequency of use of SLP and psychological distress (depression, anxiety, and stress) levels among Filipino emerging adults.

Methods: Using convenience sampling, a cross-sectional online survey collected data from Filipino emerging adults (18 to 29 years old) residing in the Philippines. Associations between knowledge, perception, and use of SLPs and psychological distress levels were estimated using generalized linear models with Poisson log-link function, adjusted for confounding factors. Effect estimates were expressed as adjusted prevalence ratio (aPR) with a 95% confidence interval (95% CI).

Results: We recruited 3,127 participants (67% female; M_{age} =20.91, SD =2.97). High perceived benefit of SLP use is associated with increased depression levels (aPR: 1.21; 95% CI: 1.07–1.37). In addition, a high frequency of SLP use is related to decreased depression levels (20–24%) and increased anxiety levels (11–18%). Lastly, once-a-week use of SLP is linked with reduced stress levels among the participants by 35% (aPR: 0.65; 95% CI: 0.49–0.86).

Conclusions: Perceptions and frequency of SLP use are suggested to be associated with psychological distress levels among Filipino emerging adults.

Keywords: Anxiety; depression; emerging adults; skin-lightening products (SLPs); stress

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Introduction

The darkness or the whiteness of skin color is considered a vital beauty criterion in most cultures where whiter people are typically considered more attractive (1). The use of skin-lightening products (SLPs) is globally prevalent due to their skin's complexion-whitening effect (2,3), and there is a high demand for SLPs worldwide (4,5).

Since the 16th century, European women have been famous for lightening their skin tone (6). The women of upper status in Egypt, Greece, and Rome have used a concoction comprising mercury to reassert their aristocratic level in society (7). However, skin lightening as an industry in some countries is far more expanded than in Western countries (5,8). For example, it is estimated that 18% of women in Japan, and 30% in China utilize SLPs daily or weekly (9). Since the 21st century, there has been an increase in global profits from SLPs observed among the Asian markets (10). In India, the SLP market was worth USD 432 million, with an expansion rate of 18% per year (11). One of the contributory factors driving men and women to believe that lightness of skin tone is more powerful is the colonial legacy brought by the Western cultures in Asia, including the United States and the United Kingdom (12). The pursuit of being white was more vital than ever because of colonialism and the spread of globalization with an embedded perspective that "white is beautiful" among the colonized countries. During colonial times, social privilege and prioritization existed for people with lighter skin (13).

Some people use SLP to manage and treat conditions relating to dermatology (14). Other people use SLP to lighten the skin tone, enhance radiance or luminescence, improve the skin texture, cope with peer pressure, gratify their partners, attract partners, and increase their chances of career opportunities (15). However, in Asian society, for example, the lightness in skin color is bordering on obsession (16). Despite using SLPs as a common practice in many cultures, the inclination to use them in Asian cultures is particularly profound, rooted in the consideration that whiter skin has higher status implications (17,18). Consequently, the use of SLPs and its related practices that led to obsession may be related to the results obtained and the positive well-being they experience (19).

The definition of beauty is also somehow dictated based on the socialization process, and media influences (20). Local and international celebrities extensively use different media to present ideas on the preferred skin tone type (21). Societal norms play a pivotal role in setting beauty standards, and an individual's essential cultural values may also influence their motivation to uphold societal norms (20). These representations of beauty in terms of skin tone in the media affect young people, particularly emerging adults, to practice beautification, such as using SLPs. Hence, some mimic their idol's attitudes and model their actions and behaviors (15,17,19,22-24).

The explanation speculated behind the psychologic determinants of skin-lightening practices suggests that symptoms of poor mental health are interlinked with deficits in self-esteem or body image (4). Poor mental health conditions, including symptoms of depression and trauma, may drive the use of more SLPs (2,25). For some, there exists a positive perception regarding skin lightening. It increases self-esteem, makes one healthier, and expands social engagements (15,26). Using SLPs may also be viewed as a de-stressing and coping mechanism (27). Furthermore, skin-lightening practices may also lead to fragile skin, poor wound healing, scarring, and the need for corrective surgery (28). These harms extend from the acute or chronic long-term exposure to the often hazardous chemical agents present in SLPs. The understudied field of skin-lightening practices accentuated the need for more epidemiologic research, particularly in underrepresented countries (29). In the Philippines, this field of study has yet to be fully explored, and little is known about the relationship between using SLPs and mental well-being. The psychological effect

Highlight box

Key findings

- High perceived benefits of skin-lightening product (SLP) use suggest being associated with high levels of depression, and the frequency of SLP use might be associated with decreased levels of depression.
- The frequent SLP use suggests a relation to anxiety levels in which high frequency of use increased anxiety levels.

What is known, and what is new?

- Previous articles reported a high prevalence of severe/extreme levels of depression, anxiety, and stress among Filipinos.
- This current study reports the first quantitative findings on the association between different SLP parameters and levels of depression, anxiety, and stress among Filipino emerging adults.

What is the implication, and what should change now?

- This study's findings can provide the Ministry of Education's secondary and tertiary levels with a basis to incorporate and encourage safe skin-lightening practices, acceptance of skin diversity, and mental health awareness into the current curriculum at an early age for students.

for many people to lighten one's skin to fit within the larger society's definition of beauty is now more rampant than ever. These observations may serve as a warning and pose a detrimental global public health problem.

The link between skin-lightening practices and the mental health status of emerging Filipino adults is not fully understood. This study's approach to measuring SLP-related factors included knowledge of, perception of the benefits, and frequency of use to create a holistic understanding of the phenomenon of SLP-related practices. We assessed the association between the knowledge, perception, and use of SLP and psychological distress levels, including depression, anxiety, and stress. We present this article in accordance with the STROBE reporting checklist (available at https://jphe.amegroups.com/article/view/10.21037/jphe-23-156/rc) (30).

Methods

Study design and setting

We performed an online cross-sectional survey between October 2022 and April 2023. The study population consisted of Filipino emerging adults (18–29 years old) living anywhere in the Philippines. For this nationwide online survey, convenience sampling was applied using social media to recruit participants. An independent institutional ethics review committee approved this study, and online informed consent was required before answering the questionnaire. The details of the study are described elsewhere (31). The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). Ethical approval for this study was sought from the University of the Philippines Manila Research Board (UPMREB 2022-0407-01) before the study implementation and adhered to the Philippine Data Privacy Act of 2012. In addition, written informed consent was gathered from all participants involved in the study.

Data collection

Qualtrics™ was used to develop the online survey, which allowed participants to respond independently and anonymously. Each participant was assigned a unique numerical identification to track data gathering. All other direct personal identifiers were deleted for data analysis. The online survey included sections on demographic data, socioeconomic status, media usage levels, relationship status, skin-lightening assessment (knowledge, perception, and frequency of SLP use), and psychological distress measurements (depression, anxiety, and stress levels).

Exposure assessment: skin lightening

The questionnaire on skin lightening was adapted from a previous study conducted in Southeast Asia (32) (see Appendix 1). Knowledge of SLP was assessed with two questions: (I) the awareness that SLP can harm the skin and (II) knowing the active ingredients in SLP (15). Perceptions about lighter skin tone benefits were assessed with eight items. Examples of the questions include: "A lighter skin tone is more beautiful." and "The way SLPs are advertised on TV has an influence on one's preference for a lighter skin tone." Response options ranged from 1= strongly agree to 4= strongly disagree (Cronbach alpha 0.78) (15). Lastly, the frequency of SLP use was assessed using the question "How often have you used SLPs in the past year?" in which response options ranged from 0= never to 4= at least once per 3 months (2).

Outcome measurement: markers of psychological distress

Validated Depression Anxiety Stress Scales-21 (DASS-21) was used to assess the psychological distress status of the respondents, which has been previously used in Asian populations (33-37). The DASS-21's reliability was demonstrated by its good Cronbach's alpha values for the depressive, anxiety, and stress subscales, which are 0.81, 0.89, and 0.78, respectively (38). This study labeled the severe/extreme outcomes as "high", while the normal, mild, and moderate levels were labeled as "low".

Included covariates

The level of media exposure (television, movies, social media, and the internet) was determined using a questionnaire modified from a study conducted in the Philippines (39). The tool includes questions on the influence of movies, television, the internet, and social media platforms on the respondent. Some examples of the questions included in this section were (I) "I watch more than nine movies in a month", (II) "I immediately try any new product that I saw in a commercial", and (III) "I compare my appearance with the photos of my Facebook friends" (39). For each item in each medium, the following response scale was used: 0= never, 1= sometimes, 2= often,

Table 1 Characteristics of the study population (n=3,127)

Characteristics	Value
Age, years	20.91±2.97
Early emerging adult (18 to 24)	2,658 (15.0)
Late emerging adult (25 to 29)	469 (85.0)
Sex at birth	
Female	2,087 (66.7)
Male	1,040 (33.3)
Sexual orientation	
Heterosexual	1,126 (36.0)
Homosexual	514 (16.4)
Bisexual	467 (15.0)
Asexual	56 (1.8)
Preferred not to say	964 (30.8)
Average monthly income, PhP	
≤10,000.00	1,783 (57.0)
10,001.00 to 30,000.00	741 (23.7)
30,001.00 to 50,000.00	283 (9.1)
>50,000.00	320 (10.2)
Working status	
No	2,553 (81.6)
Yes	574 (18.4)
Highest educational attainment	
Did not attend school	3 (0.1)
Elementary	5 (0.2)
High school	718 (23.0)
College	2,256 (72.2)
Post-graduate studies	135 (4.3)
Vocational degree	10 (0.3)
Current relationship status	
Single	2,255 (72.1)
In a relationship	872 (27.9)
Type of residence	
Rural area	1,450 (46.4)
Urban area	1,677 (53.6)
Media usage	
Movies	
Low	2,489 (79.6)
High	638 (20.4)
Television	
Low	2,989 (95.6)
High	138 (4.4)
Internet use	
Low	1,743 (55.7)
High	1,384 (44.3)
Social media use	
Low	2,405 (76.9)
High	722 (23.1)

Data are presented as mean ± standard deviation or n (%). PhP, Philippine Pesos.

and 3= always. The usage for each medium was classified as either low (scores of ≤1.50) or high (scores of >1.50).

Moreover, *a priori* selection of the socio-demographic variables was made based on previous literature, including age (in years), sex at birth (male or female), sexual orientation (heterosexual, homosexual, bisexual, asexual, or preferred not to say), household income (in Philippine Pesos/PhP), working status (yes or no), highest educational attainment (elementary, high school, college, post-graduate studies, vocational course or did not go to school), relationship status (single or in a relationship), and type of residence (urban or rural).

Statistical analysis

Descriptive statistics were computed, including frequencies and percentages. In addition, single exposure Poisson regression models with log link function and a robust variance estimator were utilized (40-43) to estimate associations between knowledge, perception, and use of SLPs, and levels of psychological distress, adjusted for confounding factors. Moreover, effect size estimates were presented as adjusted prevalence ratio (aPR) with 95% confidence intervals (CIs). Furthermore, sensitivity analysis examined the influence of unmeasured confounding and expressed as *E*-values (44,45). All statistical analyses were conducted using STATA 17 software, and all respondents' reports included no missing data.

Results

Throughout data collection, 3,127 valid responses were gathered from the participants (*Table 1*). The participants' average age (SD) was 20.91 (2.97), and they were predominantly females (67%). Most of them were college

Table 2 Exposure and outcome levels of the study population (n=3,127)

Exposure and outcome measurements	Value, n (%)
Exposure: SLPs	
Knows the active ingredients in SLPs	
No	1,084 (34.7)
Yes	2,043 (65.3)
Perceived benefits of lighter skin tone index	
Low	1,127 (36.0)
High	2,000 (64.0)
Frequency of SLP use	
Never	863 (27.6)
Over the past three months	308 (9.8)
At least once a month	261 (8.4)
At least once a week	630 (20.2)
At least once a day	1,065 (34.0)
Outcomes: psychological distress	
Depression levels	
Normal	698 (22.3)
Mild	523 (16.7)
Moderate	1,090 (34.9)
Severe	383 (12.3)
Extreme	433 (13.9)
Anxiety levels	
Normal	264 (8.4)
Mild	122 (4.0)
Moderate	768 (25.1)
Severe	672 (21.5)
Extreme	1,283 (41.0)
Stress levels	
Normal	557 (17.8)
Mild	1,465 (46.9)
Moderate	687 (22.0)
Severe	342 (10.9)
Extreme	76 (2.4)

SLPs, skin-lightening products.

graduates (72%), single (72%), and resided in urban areas (54%). In addition, the majority of the participants had low utilization of social media (77%), television (96%), or movies (80%). However, 44% of them reported heavy internet usage.

Regarding knowledge and perception of SLPs, the majority (65%) of the respondents knew the active ingredients in SLPs and had a high index (64%) of perceived benefits on lighter skin tones. Most participants use SLP at least once a day (34%) or at least once a week (28%). Furthermore, the outcome assessment results revealed that approximately 26% of the participants had severe to extremely high levels of depression, 62% had severe to extremely high levels of anxiety, and 13% had severe to extremely high levels of stress (see *Table 2* for details).

Table 3 shows the aPRs with a 95% CI for the relationships between knowledge, perception, and use of SLPs and markers of psychological distress. With regards to the association between SLP benefits and depression, participants with high perceived SLP benefits were 21% more at risk of experiencing severe/extreme levels of depression (aPR: 1.21; 95% CI: 1.07–1.38) than those with low perceived SLP benefits. Furthermore, in terms of frequency of SLP use, the risk of having severe/extreme depression levels is decreased by 20% (aPR: 0.80; 95% CI: 0.68–0.93) for those who use SLPs once a day. In addition, for those who use SLP once a week, the risk of having severe/extreme depression levels is decreased by 24% (aPR: 0.76; 95% CI: 0.64–0.91), relative to those who never use SLP.

In terms of anxiety levels, participants who were ever-users of SLP were more likely to experience severe/extreme anxiety than those who never used it. Specifically, participants who used SLP at least once a day were 11% (aPR: 1.11; 95% CI: 1.03–1.20) more likely to have severe/extreme levels of anxiety, respectively, compared to never-users of SLP. Furthermore, participants who used SLP at least once a week were 13% (aPR: 1.13; 95% CI: 1.04–1.22) more likely to experience severe/extreme levels of anxiety, compared to those who did not use SLPs. This positive association is also observed for those who use SLP once a month, in which a 13% (aPR: 1.13; 95% CI: 1.01–1.25) increase in the likelihood of having severe/extreme levels of anxiety, compared to never users of SLPs. Additionally, in terms of stress levels, participants who used SLP at least once a week were 35% (aPR: 0.65; 95% CI: 0.49–0.86) less

Table 3 aPRs with 95% CI for the association between knowledge, perception, and frequency of skin-lightening product use, and markers of psychological distress outcomes adjusted for age (early/late emerging adult), sex at birth (male or female), sexual orientation (heterosexual, homosexual, bisexual, asexual, or preferred not to say), average monthly income (in Philippine Pesos), working status (yes or no), highest educational attainment (elementary, high school, college, post-graduate studies, vocational course or did not go to school), relationship status (single or in a relationship), type of residence (urban or rural), and different media use (low or high use of movies, television, internet, and social media)

Skin lightening	Psychological distress levels (n)		Effect estimates		E values	
	Normal to moderate	Severe/extreme	aPR (95% CI)	P values	E_{est}[a]	E_{CI}[b]
For depression						
Knowledge of the active ingredients in SLPs						
Do not know	782	302	1.00			
Knows	1,529	514	0.90 (0.79–1.01)	0.08		
Perceived benefits of lighter skin tone index						
Low	875	252	1.00			
High	1,436	564	1.21 (1.07–1.37)	0.03	1.71	1.34
Frequency of SLP use						
Never	633	230	1.00			
Once over the past three months	794	271	1.09 (0.91–1.31)	0.35		
At least once a month	478	152	0.80 (0.63–1.01)	0.06		
At least once a week	200	61	0.76 (0.64–0.91)	0.002	1.96	1.43
At least once a day	206	102	0.80 (0.68–0.93)	0.003	1.81	1.36
For anxiety						
Knowledge of the active ingredients in SLPs						
Do not know	428	656	1.00			
Knows	744	1,299	1.01 (0.95–1.07)	0.76		
Perceived benefits of lighter skin tone index						
Low	474	653	1.00			
High	698	1,302	1.06 (1.00–1.11)	0.07		
Frequency of SLP use						
Never	394	469	1.00			
Once over the past three months	368	697	1.18 (1.07–1.30)	0.001	1.64	1.34
At least once a month	213	417	1.13 (1.01–1.25)	0.03	1.51	1.11
At least once a week	92	169	1.13 (1.04–1.22)	0.005	1.51	1.24
At least once a day	105	203	1.11 (1.03–1.20)	0.006	1.46	1.21
For stress						
Knowledge of the active ingredients in SLPs						
Do not know	944	140	1.00			
Knows	1,765	278	0.99 (0.82–1.19)	0.89		

Table 3 (*continued*)

Table 3 (*continued*)

Skin lightening	Psychological distress levels (n)		Effect estimates		E values	
	Normal to moderate	Severe/extreme	aPR (95% CI)	P values	E_{est}[a]	E_{CI}[b]
Perceived benefits of lighter skin tone index						
Low	995	132	1.00			
High	1,714	286	1.11 (0.92–1.33)	0.29		
Frequency of SLP use						
Never	756	107	1.00			
Once over the past three months	903	162	1.15 (0.85–1.54)	0.36		
At least once a month	563	67	0.80 (0.54–1.16)	0.22		
At least once a week	231	30	0.65 (0.49–0.86)	0.003	2.45	1.60
At least once a day	256	52	0.94 (0.74–1.18)	0.58		

a, E value (point estimate); b, E value (confidence interval). aPRs, adjusted prevalence ratios; CI, confidence interval; SLP, skin-lightening product.

likely to experience severe/extreme stress levels compared to non-users of SLP.

Discussion

Main findings

The current study provided information on the association between the knowledge, perception, and frequency of SLPs and psychological distress levels, particularly depression, anxiety, and stress. There is an evident high prevalence of severe to extreme levels of depression, anxiety, and stress noted among the participants. In addition, high use of SLP among the participants was also observed. Most participants knew the active ingredients of the SLPs they were using and perceived an increased benefit of using SLPs. About 30% of the participants used SLP at least once a day. Furthermore, results also showed that high perceived benefits of SLP use suggest being associated with high levels of depression, and the frequency of SLP use might be associated with decreased levels of depression. Moreover, the frequency of SLP use suggests being related to anxiety levels in which high frequency of use increased anxiety levels. Lastly, once-a-week use of SLP may decrease the stress levels among the participants.

What is already known

The high prevalence of severe to extreme levels of depression, anxiety, and stress among Filipinos has previously been reported, particularly among the gender minorities (46), undergraduate students (37,47,48), general population (49), and young adults (50,51). On the other hand, qualitative assessments of skin-lightening practices among Filipinos were conducted to shed light on the role of colonialism in the success of the Filipino SLP industry (52-54). Additionally, government intervention is more efficient than market-driven approaches in addressing the health risks and harms associated with skin-lightening (5). Moreover, the use of SLP in the Philippines has been discussed before, in which the author accentuated the fact that regardless of the socio-demographic characteristics of the Filipinos, there was an unfaltering trust in manufacturers and distributors of SLP (5,55,56). This trust thereby increased the frequency of SLP use among the Filipinos.

What the current study adds

Around the world, unintentional injuries represent one of the leading causes of morbidity and mortality for people of all ages (57,58). Despite recent research documenting that dermatological threats are rising globally, efforts to prevent skin injuries or safety are among the most understudied areas of public health (59,60). Potential skin hazards exist, including occupational-related skin exposures, community skin exposures (61), and skin damage resulting from practices such as skin lightening. In addition, comparatively little research has been given to the widespread global practice of dangerous skin-

lightening practices, considering the potential harms of exposure to hazardous chemicals (14). Numerous potentially life-threatening consequences of skin-lightening practices have been identified in the literature (62-65).

Moreover, dermatologic consequences include skin lesions, skin thinning, exogenous ochronosis, eczema, bacterial and fungal infections, dermatitis, scabies, and body odor (28,64). This current study gives a better understanding of the state of SLP use among Filipino emerging adults and the association of the knowledge, perception, and use on the distress levels of this specific population. A previous study investigated these SLP-related variables among Southeast Asian countries (2), however, the Philippines was not included. Healthcare specialists have strongly advised against unsupervised SLP use due to the severe health implications they can have; hence, the high prevalence of SLP use found can be of great concern (28), such as in our study.

This study is the first quantitative research conducted in the Philippines to assess the association between SLP-related exposures and markers of psychological distress among Filipino emerging adults. The availability of literature discussing the influence of SLP-related exposures, such as knowledge, perception, and use on psychological distress levels, ranges from very limited to none. As mentioned earlier, most literature on SLP use among Filipinos was qualitative studies. Therefore, this current study provides an avenue to investigate further this burgeoning scientific field, particularly among emerging adults, who are prone and at risk for detrimental mental health consequences due to rapid developmental changes in their bodies and social interactions (66,67). Addressing this public health problem is challenging because of the intricate exchange of ingrained ideas of beauty standards and social pressure. The interplay among ideas of beauty standards, social norms, and family and peer pressures plays a significant role in the rampant SLP use and its possible poor mental health consequences, as presented in the current study. For other countries, the current study results, particularly on anxiety and stress levels, are congruent with their findings that the participants who used SLP more frequently displayed a more enduring pattern of poor mental health (2,25). The protective influence of frequent SLP use on depression levels is a unique finding in the current study, which is reported in very limited literature. Previous reports demonstrated that increased use of SLP may lead to increased levels of depression but not the protective effect (2,68,69). Our finding of this specific association should be further investigated and validated. In addition, we hypothesize that the protective influence of SLP use on the depression and stress levels of emerging adults may be related to the aspirations of these emerging adults to achieve their desired skin tone. This aspiration to achieve a desired skin tone decreases their likelihood of experiencing high levels of depression and stress. This observation was similar to a study involving middle school students. The results showed that students who were beginning to lighten their skin tone had the lowest levels of depression compared to black or brown-skinned African American students (70). The lightening of their skin color somehow increases their self-esteem, thereby reducing the risks of psychological distress. Moreover, we hypothesize that the observed association on the influence of SLP use on anxiety levels may be attributed to the feeling of being worried and bothered by the social appearance of not being white or light in skin tone. This hypothesis is backed up by limited literature reporting that skin-whitening creams make dark-colored people anxious (71,72). The influence of SLP-related exposures on psychological distress markers among emerging adults warrants further investigation as this relationship is complex and multi-faceted. It may help address this growing public health problem, particularly in underrepresented, low-middle-income countries like the Philippines, where SLP use is prevalent.

Our study's results may increase Filipino emerging adults' awareness of the possible influences of skin-lightening practices on their mental health outcomes. Additionally, this might help the public comprehend how numerous aspects sensitive to Filipino culture influence this phenomenon. Moreover, explicit action is required to develop and promote safe skin-lightening practices and instill acceptance of the diversity of skin tones to encourage good mental health and well-being among emerging adults. This study could be a first step in demonstrating how well safe skin-lightening practices and use should be monitored and regulated.

Furthermore, the results of this study may give both secondary and tertiary levels of the Ministry of Education the foundation to include and promote safe skin-lightening practices and acceptance of skin diversity and mental health levels in the current curriculum at early ages of the students. The study results may also call for training for frontline mental health practitioners and the early childcare workforce (73). It would include information about how parents and guardians can, from a very early age, positively influence their children's feelings about skin tone through

their behaviors and attitudes. In addition, through this research, public health policies may be developed to address the influence of skin-lightening practices on mental health status.

Study limitations

Using a cross-sectional study design is one of the study's limitations; contrasts were mostly between subjects at a single moment, and a temporal relationship between the exposure and outcome variables could not be determined. A longitudinal study design, which can account for differences between- and within-subjects, may be implemented in future studies. In addition, bias caused by residual or unmeasured confounding factors should not be ignored. Furthermore, the study results might not also apply to other population groups or other ethnic or racial groupings because the study population is exclusively comprised of Filipino emerging adults. Interpreting our results and their applicability to other groups should be done cautiously.

Moreover, our sampling was done through convenience sampling; biases arising from this framework must also be acknowledged as a limitation. Additional studies may be needed to validate our findings, as our study only included SLP parameters in the adapted questionnaire. Future studies may also look at pricing, specific brands of SLP, and the follow-up on the continuation or discontinuation of the SLP they are using.

Conclusions

This current study documented the high prevalence of SLP use among Filipino emerging adults. In addition, most participants knew the active ingredients of the SLP and perceived the increased benefits of SLP use. These high prevalence use of SLP and high levels of perceived benefits of SLP use may be associated with poor mental health outcomes, particularly severe to extreme levels of anxiety and stress. Still, they may have an inverse effect on depression. Moreover, our study is the first quantitative study to demonstrate this association among Filipino emerging adults. If our results are replicated in longitudinal studies that provide more robust evidence, these findings can be used by the government to inform public health planning and interventions, such as public education and the media, about the dangers and influence of SLP use on mental health outcomes. More research is needed to determine the varieties of SLPs used, where they are purchased, how much they cost, how long they last, and their effects on other health-seeking behaviors.

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Footnote

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Appendix 1 Skin lightening practices questionnaire

Start of Block: Skin Lightening Practices

1. Kindly rate the level of your agreement.

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The use of skin lightening/whitening products can harm the skin.	○	○	○	○	○

Q21 2. I know the active ingredients in skin lightening/whitening products.

- ○ True
- ○ False

Q22 For each question, please indicate if you strongly agree, agree, disagree, or strongly disagree.

	Strongly Agree	Agree	Disagree	Strongly Disagree
3. A lighter skin tone is more beautiful.	○	○	○	○
4. Lighter skin tone provides higher self-esteem.	○	○	○	○

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5. Lighter skin tone gives a younger look.	○	○	○	○
6. Lighter skin tone implies that one belongs to a high social class.	○	○	○	○
7. Lighter skin tone helps people to get a better job opportunity.	○	○	○	○
8. Lighter skin tone increases one's chances of getting married.	○	○	○	○
9. People consider lighter skin tone more beautiful.	○	○	○	○
10. The way skin lightening products are advertised on TV has an influence on one's preference for lighter skin tone	○	○	○	○

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11. Have you ever used skin lightening/whitening products?

- Yes
- No

12. How often have you used skin lightening/whitening products in the past three months?

- Never
- At least once a day
- At least once a week
- At least once a month
- Once over the past three months

End of Block: Section 3: Skin Lightening Practices

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