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# The Relationship Between PTSD-Related Symptoms and Skin Disease Symptom Severity in a Dermatological Sample

Kristin Barnett

# THE RELATIONSHIP BETWEEN PTSD-RELATED SYMPTOMS AND SKIN DISEASE SYMPTOM SEVERITY IN A DERMATOLOGICAL SAMPLE

by
Kristin Diana Barnett

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Approved by:

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Advisor: Professor Laura J. Dixon

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Reader: Professor Aaron A. Lee

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Reader: Professor Laura R. Johnson

**Abstract**

Previous research has demonstrated associations between stress and physical health conditions, including skin disease. The stress cycle, including its associated hormonal responses and stress behaviors, contributes to more severe skin disease symptoms. Psychological stress and anxiety-disorder symptoms are known to be associated with skin disease severity; however, research has yet to examine the relationships between stress-disorders and skin disease severity. Therefore, stress disorders (e.g., posttraumatic stress disorder [PTSD]) are hypothesized to have a similar relationship with skin disease severity, wherein greater severity of PTSD-related symptoms would be positively associated with skin disease severity. Participants from Amazon's Mechanical Turk ($N$ = 450) were screened for the presence of a dermatological condition in the past year. Participants ($n$ = 311) who endorsed skin disease symptoms completed online self-report measures of skin disease characteristics and symptom severity, exposure to potentially traumatic events, PTSD-related symptoms, perceived stress, and demographic information. The sample was 68.2% white and 59.2% female, with a mean age of 33.9 years ($SD$ = 11.0). Overall, participants reported moderate perceived stress ($M$ = 18.9, $SD$ = 6.6), and subthreshold symptoms of PTSD ($M$ = 30.7, $SD$ = 22). Bivariate correlations indicated significant positive associations between perceived stress and PTSD symptoms ($r$ = .644, $p$ < .01), and PTSD symptom clusters ($r$ = .560-.677, $p$ < .01). Skin disease severity was positively associated with perceived stress ($r$ = .257, $p$ < .01), PTSD symptoms ($r$ = .435, $p$ < .01), and all PTSD symptom clusters, with alterations in arousal and reactivity demonstrating the strongest relationship to skin disease severity ($r$ = .428, $p$ < .01). Consistent with prior work among dermatological samples, findings indicate skin disease severity was positively, significantly correlated with perceived stress, PTSD symptoms, and PTSD symptom clusters. These results contribute to the existing literature on stress and posttraumatic stress in dermatological populations. Future research

directions may include additional dimensions of stress and stressful life events, as well as clinician-rated evaluation of PTSD symptoms and skin conditions. Additionally, longitudinal research examining the temporal relationship between PTSD symptoms, stress, and skin disease is warranted.

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## Introduction

Skin is the largest organ of the body, with a surface area of almost two square meters ($m^2$) for each human and compromising about 15% of the body's total weight (Alexopoulos & Chrousos, 2016). The skin serves as a physical barrier to protect an organism from the external environment. It can be adversely affected by microorganisms, such as fungi, bacteria, viruses, and potentially harmful substances, including harsh chemicals. Although the skin can be harmed by these influences, exposure can prepare immune cells for responding to future harmful microbes, and this process may result in skin diseases (Grice & Segre, 2011). There are endogenous and exogenous variables that affect the relationship between the skin barrier and the outer environment. Endogenous variables include uncontrollable factors, such as stress and genetics that selectively allow certain microbes. Exogenous variables, by contrast, include factors a person can control, including bathing and applying medications.

Reactions between immune cells and microorganisms cause various skin conditions, such as psoriasis, acne vulgaris, eczema, and dermatitis. The 2010 Global Burden of Skin Disease study estimated that there are 15 categories of skin diseases (Hay et al., 2010). Eight distinct skin diseases are in the top fifty most prevalent diseases worldwide with three of those in the top ten (Hay et al., 2010). Skin diseases are estimated to affect over 2.5 billion people around the world, with approximately 1 out of 3 people affected worldwide and 1 out of 4 individuals (approximately 84.5 million) in the United States (U.S.; Hay et al., 2010; Lim et al., 2017). In 2017, the Burden of Skin Disease Report for the U.S. classified nine additional categories of skin diseases including acne, ulcers, urticaria, and pruritus (Lim et al., 2017). Certain skin conditions, such as acne or dermatitis, can be nonfatal, whereas other skin conditions can be fatal, such as melanoma or skin cancer. Skin cancer is the most common cancer worldwide (American Cancer

Society [ACS], 2021), and nonfatal skin conditions are the fourth highest cause of nonfatal disease burdens worldwide, making it the fourth most common cause of all human diseases across the globe (Hay et al., 2010). Acne is the most prevalent skin condition in the U.S., affecting approximating 50 million people (Bickers et al., 2006). In the U.S., skin disease treatment and prevention were estimated to cost over $75 billion in medical, preventative, and drug costs in 2013 alone (Lim et al., 2017). Thus, skin disease is rampant, affecting the lives of millions, and its associated treatment is costly not only to dermatological patients but also healthcare systems. Further investigation into factors that cause skin diseases and affect disease severity may assist in reducing the economic burden of future patient treatment. Some research has been conducted to examine the role of internal factors on skin disease, such as stress (Bin Saif et al., 2018; Chen & Lyga, 2014; Chiu et al., 2003), sleep quality (Chiu et al., 2003; Halioua et al., 2021), and many other factors.

Skin disease symptom severity is idiosyncratic, and two of the many contributing factors of increased severity symptoms are stress (Alexopoulos & Chrousos, 2016; Bin Saif et al., 2018; Chen & Lyga, 2014; Chiu et al., 2003; Dixon et al., 2018; Kimyai-Asadi & Usman, 2001) and mental health concerns, including anxiety disorders (Dixon et al., 2018; Dixon & Witcraft, 2020; Guo et al., 2020). Dermatological patients have been found to report symptoms of both depression and anxiety, with the latter being more prevalent among dermatology patients (Dixon et al., 2016; Guo et al., 2020). Higher levels of anxiety are associated with more severe skin disease symptomology (Basavarai et al., 2010; Dixon et al., 2016). Dermatology patients also reported that their experiences with skin disease, including the associated symptoms and physical presentation, were commonly associated with greater distress and diminished quality of life (Urpe et al., 2005).

A cyclical relationship appears to affect individuals in dermatological populations, such that skin disease symptoms are associated with higher levels of stress and, in turn, higher levels of stress from external sources are associated with lower quality of life and higher distress (Urpe et al., 2005). The stress cycle itself involves biological and psychological components wherein the hormones associated with the stress response are excreted according to the corresponding phase of the cycle (Chen & Lyga, 2014; Reznick, 1989; Rom & Reznick, 2016), and these hormones may, and often do, adversely affect the exhibited skin condition (Pondeljak & Lugovic-Mihic, 2020). This secretion of hormones begins a series of biochemical processes throughout the body in response to the initial stressor (e.g., the associated skin condition for dermatology patients), and its response acts as a means for the body to adapt to the stress (Chen & Lyga, 2014; Reznick, 1989; Rom & Reznick, 2016). Excess or even inadequate stress responses may trigger negative physiological effects, including certain diseases or adverse health conditions (Cohen et al., 2007). In essence, stress wrought on by the presence of a skin condition may exacerbate the condition, thus causing more stress, and repeating into an endless cycle.

Multiple studies have found that greater stress is associated with worsened skin disease symptoms and quality of life (Alexopoulos & Chrousos, 2016; Bin Saif et al., 2018; Chen & Lyga, 2014; Chiu et al., 2003; Dixon et al., 2016; Dixon et al., 2018; Kimyai-Asadi & Usman, 2001). In dermatology samples, stress disorders and anxiety disorders are associated with lower quality of life, including poor quality of sleep and more sleep disturbances (Singareddy et al., 2003), more severe anxiety and depression symptoms (Urpe et al., 2005), increased social impairment from skin disease (Dalgard et al., 2015; Halvorsen et al., 2011; Jowett & Ryan, 1985), more severe social avoidance (Singareddy et al., 2003), lower self-image (Urpe et al., 2005), weakened immune system contributing to increased frequency of skin disease flare-ups

particularly in patients with autoimmune skin conditions (Graham et al., 2006), and increased avoidance of beneficial physical health behaviors such as eating healthy and exercising (Horenstein et al., 2018). With growing evidence to suggest a relationship between stress and skin disease, recent research has begun to clarify the relationships between specific types of stress and skin disease severity.

Although psychological stress is key in many mental health disorders, posttraumatic stress disorder (PTSD) and acute stress disorder (ASD) are two commonly experienced disorders classified under Trauma- and Stress-related Disorders. Stress disorders, as defined by the DSM-5 (DSM-5; American Psychiatric Association [APA], 2013), are characterized by specific symptoms (e.g., alterations in arousal and reactivity such as problems with concentration) and stress in an individual following exposure to a potentially traumatic or stressful event (APA, 2013). Traumatic experiences, which may potentially elicit symptoms that later develop into ASD or PTSD, are outlined by the DSM-5 and include exposure to actual or threatened death, injury, or sexual violence by either directly experiencing the event, witnessing the event occur, learning of the event occurring to someone close, or experiencing repeated or extreme exposure to aversive details of a potentially traumatic event (PTE; APA, 2013). PTSD and ASD are both trauma-related disorders and while their symptom diagnostic criteria overlap, their time frame differs. ASD entails experiencing DSM-5 criteria for 3 days to 1 month following a PTE, whereas experiencing DSM-5 criteria for over 1 month qualifies as PTSD (APA, 2013).

Characteristic symptoms of PTSD are outlined in the DSM-5 and divided into four subscales of the PTSD Checklist for DSM-5 (PCL-5; Sveen et al., 2016), which is a measure commonly used in research and clinical settings to assess symptomology of PTSD-related symptoms and to provide a provisional PTSD diagnosis (APA, 2013; Sveen et al., 2016). Such

symptoms that characterize presentation of a trauma-related stress-disorder such as PTSD include fear-based re-experiencing or intrusive physiological reactions or thoughts (Cluster B; intrusion; e.g., nightmares of the traumatic event), avoiding stimuli potentially associated with the traumatic event (Cluster C; e.g., avoiding the location where the event occurred), negative changes in mood and cognitive ability (Cluster D; e.g., difficulty remembering details of the traumatic event), and changes in arousal, behavior, and emotional or physiological reactivity (Cluster E; e.g., irritable behavior or unexpected outbursts of anger; Sveen et al., 2016).

Exposure to PTEs is common, with approximately 89.7% of individuals in the U.S. experiencing these events at some point in their life (Kilpatrick et al., 2014). The most common PTEs, using DSM-5 criterion, are physical or sexual assault (53.1%), death of a loved one (51.8%), natural disaster (50.5%), and accident or fire (48.3%) (Kilpatrick et al., 2014). A recent study estimated that the overall lifetime prevalence of PTSD among civilians in the U.S. is approximately 6%, with higher prevalence rates for women than men and much higher rates for people of American Indian or Alaska Native descent (23%) than people of any other race (Schein, et. al., 2021). A 2005 study estimated PTSD prevalence for the U.S. adult population to be around 6.8%, showing that the prevalence of PTSD has remained mostly unchanged (Kessler et al.). Prevalence of PTSD appears to be the greatest in veterans and individuals who have been involved with the military, with the highest prevalence among Vietnam veterans (Kang et al., 2003; Kulka et al., 1990).

PTSD can be a debilitating disorder, impacting each area of a person's life from physiological reactions (e.g., sweating), cognitive changes (e.g., intrusive, disturbing thoughts), and social changes (e.g., one's ability to interact with others; McFarlane & Bookless, 2001). Previous studies have evaluated the relationship between PTSD and quality of life,

demonstrating that a negative association exists between the two. That is, greater severity of PTSD correlates with a worse overall quality of life (Cohen et al., 2009; Sareen, 2018). PTSD and its associated symptoms are intrusive, bothersome, and disruptive as PTSD is associated with increased risk of other health problems such as depression and anxiety, drug or alcohol use, and autoimmune or endocrine diseases (Hoopsick et al., 2019; Sareen, 2018). PTSD severity has been observed to be positively correlated with chronic stress and abnormally prolonged and elevated stress hormone levels (Pitman et al., 2012; Sherin & Nemeroff, 2011). In previous studies, when exposed to reminders of the previously experienced traumatic event, individuals with PTSD exhibited much higher cortisol (i.e., stress hormone) levels than those without PTSD who previously experienced a similar traumatic event (Elzinga et al., 2003).

The relationships between trauma-related symptoms and the stress cycle continue to be investigated (Videlock et al., 2008); however, PTSD-related symptoms have been observed to overlap with chronic stress, which can lead to inability to demonstrate adequate fear or stress responses or an inability to control fear or stress (Maeng & Milad, 2017). This can exacerbate PTSD symptoms, suggesting another potential ongoing stress cycle in individuals with PTSD symptoms (Maeng & Milad, 2017). Because of the primary stress cycle affecting physical disease and the possibility of another stress cycle between PTSD symptoms and chronic fear or stress, this secondary stress cycle may further exacerbate skin conditions among dermatology patients who endorse PTSD-related symptoms. Therefore, PTSD symptomology may be strongly associated with skin disease severity, and dermatological patients with PTSD may experience more severe skin disease symptoms, particularly due to the additional stress and associated stress hormones (e.g., cortisol, which impacts the immune system) resulting from the traumatic event. However, there are difficulties in diagnosing and treating both PTSD and skin disease.

Estimated prevalence of PTSD among dermatological patients ranges from less than 5% to 76%, depending on the skin condition (Gupta et al., 2017). In dermatological patients with diagnosed PTSD, skin disease flare-ups are often associated with the physiological reactions related to trauma symptoms, such as profuse sweating caused by autonomic hyperarousal at the reminder of the initial traumatic event (Gupta et al., 2005). Thus, the behavioral and physiological effects of PTSD on dermatological patients can negatively affect skin disease symptoms long after the traumatic event occurs (Gupta et al., 2005). Stress is negatively associated with quality of life and positively associated with skin disease severity, such as flare-ups of the skin disease (Bin Saif et al., 2018; Chen & Lyga, 2014; Chiu et al., 2003; Graham et al., 2006; Gupta et al., 2005; Gupta et al., 2017). These relationships have been observed across various age groups (Abadie et al., 1994; Hafsia et al., 2019), cultures (Gupta et al., 2005; Gupta et al., 2017), races (Gupta et al., 2005; Gupta et al., 2017), genders (Koblenzer, 1997), and even causes of stress (Besiroglu et al., 2009; Kussainova et al., 2020). Skin health and skin disease severity can vary among individuals diagnosed with a stress-disorder (Friedman et al., 2011). While many studies have examined the relationships between stress and skin disease symptom severity, demonstrating that skin disease worsens with greater stress (Bin Saif et al., 2018; Chen & Lyga, 2014; Chiu et al., 2003), very few have studied these relationships with specific types of PTEs.

Evidence suggests that stress-disorder-related symptoms may have a significant impact on skin disease severity by impairing functioning, mental wellbeing, and quality of life (Cohen et al., 2009; Gupta et al., 2005; Gupta et al., 2017; Hoopsick et al., 2019; Maeng & Milad, 2017; Sareen, 2018). However, no known studies have examined the relationship between PTSD and skin disease, specifically the relationship between the number or types of PTEs (e.g., sexual

assault, natural disaster, etc.), perceived stress, specific stress-disorder-related symptoms, and skin diseases. Due to the prevalence and psychological toll of PTSD, stress, and physical illness, further research and understanding of this relationship will aid in better understanding PTSD, skin disease, and how skin disease is affected by exposure to PTEs. Increased understanding of this relationship additionally will promote awareness of this relationship, especially among the medical community.

With the current gaps in the literature regarding trauma-disorder-related symptoms and skin disease symptom severity, this study will enhance our understanding of how individuals with skin disease experience PTEs and PTSD symptoms. This study will also enhance our understanding of the relationship between stress, PTSD symptoms, and skin disease symptom severity. The following aims and hypotheses were investigated:

1. First, this study examined perceived stress levels, occurrence of potentially traumatic events, PTSD symptoms, and skin disease symptom severity among individuals with skin disease symptoms.
2. Second, this study examined skin disease symptom severity in relation to perceived stress and PTSD symptoms.
    a. Hypothesis 1: Greater severity of PTSD symptoms and greater perceived stress would be associated with more severe skin disease presentation.
3. Third, specific PTSD clusters of symptoms (e.g., intrusion) were evaluated in relation to skin symptom severity.
    a. Hypothesis 2: The cluster relating to arousal and reactivity will be positively associated with skin disease symptom severity.

# Methods

## Participants

Participants ($N = 450$) were recruited through TurkPrime from Amazon's online Mechanical Turk (MTurk) service. MTurk has been evaluated to be a reliable and efficient source for generalized, diverse samples and is cost-efficient (Burhmester et al., 2011; Litman et al., 2017). Participants answered a series of self-report questionnaires about skin condition symptomology, stress, and mental health, including PTSD-related symptom severity. The sample was limited to individuals living in the United States, which was determined by IP address. Participants who were 18 years of age or older and reported experiencing dermatological or skin disease symptoms within the past 12 months were included in the study. Those who were under 18 and those who did not self-report any skin disease symptoms within the past year were excluded from the study.

Participants were compensated $0.10 upon completion of a brief screening questionnaire. Those who were determined to be eligible by the initial screener assessing skin-related symptoms were invited to take part in the full study. Participants were compensated up to $3.50 upon completion of the study's questionnaire packet, which took approximately 30 minutes to complete. This compensation is in accordance with and in proportion to the compensation provided by other crowd sourcing tasks of similar duration offered through Amazon.com's Mechanical Turk and TurkPrime (Buhrmester et al., 2011; Paolacci et al., 2010). All study protocols and procedures were approved by the University of Mississippi's Institutional Review Board (IRB).

## Measures

*Demographics*

Demographic information was obtained through a self-report questionnaire developed by the researchers. Participants answered questions about gender, racial/ethnic background, relationship status, education, residential information, religion, and employment.

*Skin Disease Characteristics*

Physical health and skin condition information was obtained through self-report questionnaires which asked participants about their dermatological symptoms throughout the past year. Additional dermatological information included diagnoses, factors that affected symptom onset, severity, and physical presentation of the skin condition. See Appendix A.

*Skin Symptom Severity*

Skin symptom severity was self-reported on a 0 to 10 scale, with 0 = normal or no symptoms and 10 = very severe symptoms. This single item measuring skin symptom severity asks how the participant would rate their skin disease severity on a scale 0-10 and has been used in prior work to examine skin symptom severity among dermatology patients and online samples of adults with skin disease (Böhm et al., 2014; Dixon et al., 2018; Gupta & Gupta, 1995; Montogomery et al., 2016; Salman et al., 2016).

*Potentially Traumatic Events*

Experience of potentially traumatic events (PTEs) was assessed with the Life Events Checklist for DSM-5 (LEC-5; Gray et al., 2004; Weathers, Blake, et al., 2013). The LEC-5 is a 17-item measure that lists a variety of potentially traumatic events outlined by DSM-5 criteria (e.g., natural disaster), and the response options for experiencing the event include direct, indirect, occupational, and no experience. The measure is scored using a 6-point nominal scale. This measure does not produce a composite or total score. In order to better analyze the participant data, the options “witnessed it” and “learned about it” were dichotomized to form one

response and are hereby referred to as "indirectly happened to me," whereas the response options "not sure" and "doesn't apply" were also dichotomized under one response. See Appendix B.

*PTSD Symptoms*

PTSD symptom severity was measured by the PTSD Checklist for DSM-5 (PCL-5). The PCL-5 is a 20-item questionnaire designed to measure severity of distress and frequency of posttraumatic stress symptom severity, such as repeated, disturbing dreams of the stressful experience and difficulty concentrating, in the past month in response to a PTE (Blevins et al., 2015; Sveen et al., 2016; Weathers, Litz, et. al., 2013). Participants indicate to which extent they agree with each statement (e.g., being bothered by "repeated, disturbing dreams of the traumatic event," "feeling jumpy or easily startled," etc.) on a 5-point Likert-type scale, ranging from 0 (*Not at all*) to 4 (*Extremely*) with higher scores corresponding to more severe PTSD symptomology. The PCL-5 has four subscales, including five items assessing intrusion symptoms (e.g., reliving memories of the event), two items on avoidance (e.g., avoiding physical and introspective reminders of the traumatic event), seven items on negative alterations in cognitions and mood (e.g., experiencing issues remembering the traumatic event or experiencing more negative emotions towards oneself or others), and six items on alterations in arousal and reactivity (e.g., feeling on high-alert or behaving irrationally; Sveen et al., 2016). The items are summed and yield a total score ranging from 0 to 80. A cutoff score of 33 is recommended to predict a provisional DSM-5 PTSD diagnosis (Bovin et al., 2016) and is indicative of probable PTSD (Weathers, Litz, et al., 2013). See Appendix C.

*Stress Symptoms*

The PSS is a 10-item questionnaire that assesses ability to cope with perceived stress (Cohen et al., 1994). Participants rate how often they experienced stress and their ability to cope

with stress over the past month (e.g., how often they have been "upset because of something that happened unexpectedly" and "how often [they] have felt stressed or nervous") using a 5-point Likert-type scale, ranging from 0 (*Never*) to 4 (*Very often*). Items are summed and higher scores are indicative of greater levels of perceived stress. Scores can range from 0 to 40, wherein 0-13 is considered low stress, 14-26 is moderate stress, and 27-40 is high stress (Cohen et al., 1994). Prior work has found that higher scores have been associated with higher cortisol levels, suppressed immune function, greater inflammation, and higher susceptibility to infection (Cohen & Janicki-Deverts, 2012). Each of the PSS-10 subscales was also significantly correlated with anxiety and depression (Maroufizadeh et al., 2018). See Appendix D.

# Results

## Participant Characteristics

In the final sample of participants ($N$ = 311), most participants were women (59.2%). The average age of participants in the study was 33.9 years ($SD$ = 11.0). Additionally, most participants were white (68.2%). See Table 1 for a summary of demographic characteristics.

With regard to dermatological characteristics, 24 skin conditions were reported. The most prevalent skin conditions were eczema (35%), acne (27.3%), rosacea (17.4%), facial dermatitis (15.8%), psoriasis (14.8%), hyperhidrosis (14.5%), and fungal infections (14.4%). Over half (67.2%) of the sample reported itching as a current skin disease symptom. Other commonly experienced current symptoms included dryness or peeling (60.5%), redness (59.8%), pain (39.9%), and color changes (39.2%). Almost half (45.3%) of the sample reported that the severity of skin condition was between moderately severe and very severe, and 30.8% of participants reported their skin disease severity to be between normal and moderate. More participants reported that their skin condition has worsened in the past year (31.5%) than has improved (23.5%). However, more participants reported that their skin condition has remained stable in the past year (45%). The most commonly reported area of current skin disease presentation was the face (59.2%), but the most commonly reported area for skin disease presentation in the past year was the torso or back (40.5%). The aforementioned data and further self-report data on the sample's skin disease characteristics is detailed in Table 2.

The majority of participants reported directly experiencing (77.5%) and indirectly experiencing (i.e., witnessing or learning about an event; 85.9%) at least one PTE. The most commonly endorsed directly experienced PTE was a transportation accident, such a motor vehicle accident (39.5%). Similarly, the most commonly endorsed indirectly experienced PTEs

were a transportation accident (47.6%) and life-threatening illness or injury (46.6%). See Table 3.

**Descriptive Statistics and Bivariate Correlations**

The mean PSS total score was 18.9 (*SD* = 6.6). The mean PCL-5 total score was 30.7 (*SD* = 22.0). For the PCL-5, 47.3% of the participants met the 33-score cutoff recommended for a provisional PTSD diagnosis (Bovin et al., 2016; Weathers, Litz, et al., 2013). Additional means and standard deviations of the PSS, PCL-5, and PCL-5 clusters are reported in Table 4.

To test the hypothesis that higher PTSD symptom severity and higher stress would be associated with greater skin disease severity, bivariate correlational analysis were conducted with PTSD symptom severity (i.e., PCL-5) and perceived stress (i.e., PSS) with skin disease severity which was measured using the single item for skin disease severity. Consistent with Hypothesis 1, more severe skin disease presentation was moderately correlated with higher total scores on the PCL-5 ($r = 0.435$, $p < .01$) and weakly correlated with higher total scores on the PSS ($r = 0.257$, $p < .01$). Thus, results indicated that higher PTSD symptom severity and higher perceived stress were associated with more severe skin disease presentation.

In order to test the hypothesis that the PCL-5 cluster related to alterations in arousal and reactivity would have the strongest association with skin disease severity, scores from each PCL-5 cluster were analyzed against skin disease severity via bivariate correlational analysis. Results suggest that, consistent with hypothesis 2, Cluster E (i.e., the cluster relating to arousal and reactivity) was observed to be moderately correlated to more severe skin disease presentation ($r = 0.428$, $p < .01$). Out of the four PCL-5 clusters, Cluster E was the most strongly correlated to skin disease severity than any other cluster. Skin disease symptom severity was observed to have

a moderate correlation between Cluster B – intrusion ($r$ = .420, $p$ < .01), Cluster C – avoidance ($r$ = .389, $p$ < .01), and Cluster D – alterations in arousal and reactivity ($r$ = .402, $p$ < .01).

By demonstrating strong positive correlations between the PSS total and PCL total, perceived stress and PTSD-related symptom severity were observed to be significantly positively associated ($r$ = .644, $p$ < .01). Perceived stress (i.e., PSS total) and PTSD-related symptoms of negative alterations in cognitions and mood (Cluster D) were observed to have a significantly positive relationship as well ($r$ = .677, $p$ < .01). By exhibiting moderate positive correlations, perceived stress was also observed to have a significantly positive relationship between intrusion symptoms (i.e., Cluster B; $r$ = .560, $p$ < .01), avoidance symptoms (Cluster C; $r$ = .592, $p$ < .01), and alterations in arousal and reactivity (Cluster E; $r$ = .582, $p$ < .01).

## Discussion

The present study sought to examine the associations between perceived stress, severity of PTSD-related symptoms, and skin disease severity. The primary aim of this study was to examine perceived stress levels, occurrence of PTEs, PTSD symptoms, and skin disease symptom severity among individuals with skin conditions. Despite previous research demonstrating a positive association between stress and skin disease severity (Alexopoulos & Chrousos, 2016; Chiu et al., 2003; Koo et al., 2001; Pondeljak & Lugovic-Mihic, 2020; Reich et al., 2010), there is very little research on the relationships between PTSD symptoms and skin disease in dermatology. Consequently, the present study added to the understanding of the relationship between PTSD, stress, and skin disease severity. The results supported both hypotheses that greater PTSD severity and greater perceived stress were associated with more severe skin disease symptoms and that the cluster of symptoms related to arousal and reactivity (i.e., the PCL-5 Cluster E) was positively associated with skin disease symptom severity. These results suggest that increased levels of hyperarousal and reactivity, such as sweating, may negatively influence severity of skin disease symptoms.

Our sample characteristics were similar to that of the U.S. in terms of race, sex, marital status, employment status, education, and social class. In the U.S., the population is approximately 51% female (U.S. Census Bureau, 2019), 57.8% white (U.S. Census Bureau, 2021a; U.S. Census Bureau, 2021c), 46% middle class (Beeghley, 2004), 40% working class (Beeghley, 2004), 50% married (U.S. Census Bureau, 2021a). The current study's sample was 59.2% female, 68.2% white, 60.5% middle class, 31.5% working class, and 44.7% married.

In the current sample, the most prevalent skin diseases were eczema (35%), acne (27.3%), and rosacea (17.4%). In the U.S., the most prevalent skin conditions are noncancerous

skin growths (7.81%); cutaneous infections (5.75%); viral and fungal diseases (5.75%), which includes herpes and dermatomycosis; contact dermatitis (4.17%); hair and nail disorders (2.55%), which includes alopecia; and acne (1.63%) (Lim et al., 2017). Thus, the prevalence of skin diseases in the study did not align with the most prevalent skin diseases of the U.S. population. This result is likely because the most commonly reported skin diseases for the present study were chronic, primarily conditions that are difficult to treat. In contrast, for the U.S., the most common skin conditions are more short-lived and can be more easily treated (e.g., infections treated with antibiotics). In the study on skin disease prevalence in the U.S. by Lim et al., the most prevalent skin conditions were not similar to that of the present study; however, this may be due to the different data collection method. Data in the study by Lim and colleagues were collected by examining health insurance claims about skin diseases being currently experienced by the patients. The present study used a self-report method wherein participants record their skin condition which was not able to be verified by health professionals. The contrast in the most prevalent skin conditions in both studies may be due to this difference in data collection and verifiability by a physician.

The most commonly reported skin disease severity was between moderately severe and very severe ($n$ = 141, 45.3%). This is not consistent with U.S. statistics on the majority of people who endorse skin disease, in which less than 10% of people with skin disease report severe symptoms (Lello et al., 1995). Because of the severity of their skin condition, individuals with more severe skin disease symptoms may be more likely to participate in research and other endeavors to better understand skin conditions and how they are affected by other variables.

Of the general U.S. population, 89.7% reported exposure to at least one potentially traumatic event (Kilpatrick et al., 2014), compared to the current sample of which 96.5%

reported exposure to at least one PTE. Participants in the current sample reported between zero and seventeen PTEs, with most individuals endorsing approximately three events. The most commonly endorsed event in this sample was motor vehicle accidents, with 39.5% reported directly experiencing and 47.6% reported indirectly experiencing such an event. Meanwhile, the prevalence of transportation accidents (reported as PTEs) in the U.S. is between 15.5% (de Vries & Olff, 2009) and 43.2% (Alim et al., 2006; Overstreet et al., 2016). The results of the current study on PTEs are not consistent with prior research as the most commonly reported PTEs in the U.S. are physical or sexual assault (53.1%), death of a loved one (51.8%), and natural disaster (50.5%; Kilpatrick et al., 2013). Transportation accidents being the most prevalent PTE in this study may be due to the increased need for healthcare patients to travel in order to receive care for their physical health condition and of their psychological disorder. As they have an increased need for motor vehicle travel, dermatological patients may have a higher chance of experiencing a transportation accident as opposed to the general population.

Clinically significant levels of perceived stress were observed within the current study's sample of individuals who reported PTEs. In previous literature, perceived stress has been found to be higher in conjunction with more severe PTSD symptoms following a PTE, such as receiving a cancer diagnosis (Zhang et al., 2020), natural disasters (Leon et al., 2007; Pedrozo-Pupo et al., 2020), and sexual violence (Catabay et al., 2019). The relationship between PTSD severity and perceived stress, wherein increased stress is associated with increased PTSD severity, has also been observed in samples with chronic health conditions (Chung et al., 2010). Thus, the current study's results are consistent with previous research suggesting that higher levels of stress are associated with greater trauma symptom severity in individuals with physical health concerns.

In the current study's sample, 47.3% of participants met the 33-score cutoff recommended to predict DSM-5 PTSD diagnosis (Bovin et al., 2016; Weathers, Litz, et al., 2013). This is higher than findings in other medical samples, specifically populations with cardiovascular issues (4-24%, Tulloch et al., 2015), chronic pain (9.5%; Siqveland et al., 2017), gastrointestinal issues (36%; Glynn et al., 2021), autoimmune diseases (16%; Li et al., 2019), and diabetes (8%; Trief et al., 2006). Compared to the current study's sample wherein the average PCL-5 score was 30.7, PTSD severity is higher in veteran populations such that the average PCL-5 score is between 35 and 43 (Bovin et al., 2016). Thus, the current study's results are inconsistent with previous research, suggesting that, compared to other populations with health conditions, individuals with skin disease may experience more severe perceived stress and PTSD-related symptoms. This may be due to the physical presentation of skin disease affecting a person's individual stress levels and social activity, whereas other health conditions, such as gastrointestinal issues, are not characterized by visible physical presentation. The physical presentation associated with skin disease may cause heightened stress, particularly in regard to social activity and social avoidance. Supporting this point, results indicated a significant positive correlation between perceived stress and the cluster of trauma-related symptoms of avoidance, which is most similarly related to social activity. As indicated by the significant positive relationship, a relationship exists between personal stress and social avoidance.

The second aim of the study was to examine skin disease symptom severity in relation to perceived stress and PSTD symptoms. Consistent with the first hypothesis, greater PTSD severity was observed to be associated with more severe skin disease. These results are similar to previous studies involving other health condition populations and contribute to findings suggesting that more severe post-traumatic stress occurs alongside greater perceived stress and

worsened physical health concerns (Bin Saif et al., 2018; Chen & Lyga, 2014; Chung et al., 2010). Research has suggested that a relationship exists between PTSD and physical health and that this relationship be examined further (Glynn et al., 2021; Kang et al., 2003; Li et al., 2019; Trief et al., 2006; Tulloch et al., 2014; Zhang et al., 2021). As the current study's findings were consistent with previous literature, this suggests that greater severity of health conditions, including skin diseases, may be affected by the severity of post-traumatic stress and the severity of personal stress. Further research into this relationship may allow for a better understanding, including in other health populations where this relationship may be present. Although directionality cannot be inferred from the current results, these findings additionally suggest a future research direction examining the impact of stress associated with trauma on the stress cycle, which may trigger adverse physiological effects (e.g., exacerbation of skin disease symptoms) as a biological stress response (Cohen et al., 2007).

Higher levels of stress were also significantly associated with greater skin disease severity. This further supports the stress cycle theory, specifically suggesting that greater skin disease severity is associated with greater stress, which also influences skin disease severity. Further, the cyclical nature of this pattern of results may extend to include trauma symptoms, where greater trauma-related symptoms, such as social avoidance, increase personal stress which then impacts skin disease severity. Because stress may likely accompany PTSD symptoms, stress may further affect PTSD symptom severity, such that greater stress may be associated with greater trauma-related symptom severity. This relationship and partnered existence of PTSD symptomology and stress may adversely and exponentially impact the reported skin condition. This finding supports the stress cycle theory and the potentiality of this cyclical relationship expanding beyond personal stress and including stress disorders. The intersectionality of PTSD

and stress in the stress cycle may explain the unexpectedly high PCL-5 scores (i.e., high PTSD symptom severity) of the participants in the study, suggesting that higher stress may impact the severity of PTSD symptoms and skin disease, which would cyclically affect stress severity. This high level of symptoms may also be due to the stress hormones, such as cortisol, being critical in the severity of PTSD and personal stress, and this may further explain the relationship with skin disease severity, as higher levels of cortisol and other hormones are associated with weakened immune systems and more severe physical health (Cohen et al., 2007; Pondeljak & Lugovic-Mihic, 2020).

The third aim of the study was to examine the relationships between specific clusters of post-traumatic stress symptoms (e.g., intrusion) and skin symptom severity. Consistent with the second hypothesis, the alterations in arousal and reactivity trauma-related symptom cluster (i.e., Cluster E of the PCL-5) had a moderate relationship with skin disease symptom severity. Additionally, each of the post-traumatic stress symptom clusters was also positively related to skin disease severity, meaning that each PTSD-related symptom increasing in severity may influence the severity of the skin disease. Despite the mean score of the negative alterations in cognitions and mood cluster being higher, negative alterations in arousal and reactivity was more strongly related to skin disease severity. These results suggest that even though other PTSD-related symptoms in an individual may be more severe, symptoms related to arousal and reactivity may have more of an influence on the severity of the person's skin disease. Given the cross-sectional nature of the study, it is not clear temporally which occurred first in the study's population: the skin disease severity or the post-traumatic stress symptoms. What these results suggest, however, is that individuals endorsing skin disease symptoms may experience more severe skin disease, post-traumatic stress, and hyperarousal PTSD-related symptoms, which may

be associated with worsened skin disease symptoms. Previous research has suggested that autonomic hyperarousal and reactivity related to one's PTSD may influence skin disease severity (Gupta et al., 2005); however, relationships between specific PTSD-related symptoms and skin disease severity were previously unknown. This study demonstrates that each symptom related to PTSD likely influences skin disease severity and suggests the possibility of PTSD symptoms influencing other health conditions as well.

All associations between the variables listed in Table 4 were significant; however, some relationships were notably weaker than anticipated, particularly the relationship between PSS total (i.e., perceived stress) and skin disease severity. This suggests that PTSD severity has a stronger relationship with skin disease severity than perceived stress, which is inconsistent with previous studies that demonstrate stress and skin disease severity tend to be significantly associated, in that greater stress is often associated with more severe skin disease (Bin Saif et al., 2018; Chen & Lyga, 2014; Chiu et al., 2003). Significantly positive relationships were observed between trauma-related hyperarousal symptoms and skin disease severity, between each cluster of the trauma-related symptoms, and between severity of perceived stress and severity of PTSD-related symptoms. The significant positive associations between the PCL-5 clusters were expected and suggest that PTSD symptoms may likely occur together. This result also suggests that single PTSD-related symptoms may not appear alone in individuals and may likely occur alongside other PTSD-related symptoms (e.g., avoiding a physical reminder of the traumatic event occurring alongside angry outbursts).

These results support previous literature that examines PTSD, perceived stress, and physical health. While the relationship between stress and skin disease severity has previously been demonstrated to have a significant positive relationship (Alexopoulos & Chrousos, 2016;

Catabay et al., 2019; Chiu et al., 2003; Koo & Lebwhol, 2001; Pondeljak & Lugović-Mihić, 2020; Reigh et al., 2010), the relationship between PTSD-related symptoms and skin disease severity has not been previously examined in empirical studies (e.g., Gupta et al., 2017; Gupta et al., 2005).

The current study's results were similar to medical populations, wherein populations with health conditions were observed to have greater stress or greater PTSD symptom severity with greater severity of their health conditions; similarly, this study's results demonstrated that there may also be a significant relationship between stress and skin disease severity (Alexopoulos & Chrousos, 2016; Catabay et al., 2019; Chiu et al., 2003; Koo & Lebwhol, 2001; Pondeljak & Lugović-Mihić, 2020; Reigh et al., 2010). However, this study also did not account for chronic stress, everyday stress, other types of stress, and other factors that may impact personal stress, all of which may differently affect an individual's skin disease severity, and which may have produced different results.

Additional limitations of the study include not being able to verify which skin conditions are self-reported and endorsed by a medical professional, not being able to have medical diagnoses to support the self-reported skin conditions, and not having a broader and more diverse sample. The current study relied on self-report measures of psychological and dermatological assessments. Physical exams, verification by a medical professional, or another form of a formal diagnosis to support the self-reported information would provide more accurate and verified data. PTSD symptoms were also self-reported by participants, and high participant scores of the PCL-5 were not able to be verified by a mental health professional. In addition, other potentially traumatic events that participants may have experienced were not listed as options to self-report.

Furthermore, some participants may view some events as traumatic that others may not view as traumatic.

A further limitation of the study resides in the impossibility of researchers to determine which of the following appeared first within the participants of the sample: the skin condition, stress, or PTSD. The researchers also could not determine causes of participants' stress, participant hygiene practices, participant skin types that may affect their skin disease severity (e.g., excessively oily skin), and what other biological conditions affect their skin disease. Due to the limited amount of literature on this topic and these relationships, conclusions about generalizability may be limited in scope.

For future directions, clinician-administered measures are suggested to be used in order to produce more reliable results. Clinician-confirmed diagnoses from participants who self-report skin conditions may reduce the limitations in future studies. The current study's findings indicate the potential benefit of dermatologists regularly assessing their dermatology patients' mental health, and future researchers in the field of dermatology may benefit from including stress- and PTSD-related measures among future samples. Furthermore, controlled longitudinal studies are needed to better understand the relationship between the stress cycle and skin and to evaluate participants' mental health, stress, PTSD-related symptoms, and other variables following a traumatic event. This study and the relationships examined suggest further research is needed to understand the relationship between mental health and physical health. Using this information, dermatologists and other physicians may produce the appropriate referrals to the correct psychological services in order to treat the psychological condition potentially affecting the patient's physical health. This may allow more adequate treatment for not only the individual's mental health but also for their physical health condition as well. Further acknowledgment,

research, and education of the relationship between physical and psychological conditions, particularly in dermatology, would allow for the provision of psychoeducational content. For this to occur, future research needs to be conducted to better understand the stress cycle and its relationship with physical health.

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Table 1 Sociodemographic Information

| | Characteristics | n (%) |
|---|---|---|
| Age | 18-35 | 203 (65.3) |
| | 36-55 | 88 (28.3) |
| | 56-99 | 20 (6.4) |
| Sex | Female | 184 (59.2) |
| | Male | 127 (40.8) |
| Race/Ethnicity | White | 212 (68.2) |
| | African American | 46 (14.8) |
| | Asian | 37 (11.9) |
| | Hispanic, Latinx, or Spanish origin | 19 (6.1) |
| | Native American | 16 (5.1) |
| | Middle Eastern | 3 (1.0) |
| | Native Hawaiian/Other Pacific Islander | 3 (1.0) |
| | Other/prefer not to answer | 3 (1.0) |
| Marital status | Married | 139 (44.7) |
| | Living with a partner/partners | 71 (22.8) |
| | Single | 61 (19.6) |
| | In a relationship but living apart | 40 (12.9) |
| Education | Bachelor's degree | 136 (43.7) |
| | Some college/vocational training | 73 (23.5) |
| | Master's degree or higher | 52 (16.7) |
| | Associates degree | 23 (7.4) |
| | High school diploma or equivalent | 19 (6.1) |
| | Some post undergraduate work | 8 (2.6) |
| Occupation status | Employed full-time | 168 (54.0) |
| | Employed part-time | 87 (28.0) |
| | Unemployed | 43 (13.8) |
| | Other | 7 (2.3) |
| | Retired | 6 (1.9) |
| Self-identified social class | Middle class | 188 (60.5) |
| | Working class | 98 (31.5) |
| | Poor | 16 (5.1) |
| | Affluent | 9 (2.9) |
| Sexual Orientation | Straight | 225 (72.3) |
| | Bisexual | 69 (22.2) |
| | Gay/Lesbian | 14 (4.5) |
| | Other | 3 (1.0) |

Table 2 Skin Disease Information

| | Characteristics | n (%) |
|---|---|---|
| Skin condition(s) | Eczema | 109 (35.0) |
| | Acne | 85 (27.3) |
| | Rosacea | 54 (17.4) |
| | Facial dermatitis | 49 (15.8) |
| | Psoriasis | 46 (14.8) |
| | Other conditions not listed in the measure | 44 (14.1) |
| | Other conditions listed in the measure | 384 |
| Current skin disease symptoms | Itching | 209 (67.2) |
| | Dryness/peeling | 188 (60.5) |
| | Redness | 186 (59.8) |
| | Pain | 124 (39.9) |
| | Color changes | 122 (39.2) |
| | Rash/hives | 112 (36.0) |
| | Outbreak | 116 (37.3) |
| | Burning/stinging | 93 (29.9) |
| | Sores | 88 (28.3) |
| | Bleeding | 69 (22.2) |
| | Sweating | 115 (37.0) |
| | Other | 40 (12.9) |
| Severity of skin condition | Between moderately severe and very severe | 141 (45.3) |
| | Between normal and moderate | 96 (30.8) |
| | Moderately severe | 50 (16.1) |
| | Very severe | 23 (7.4) |
| | Normal | 1 (0.3) |
| History of skin disease | Stable | 140 (45.0) |
| | Worsened | 98 (31.5) |
| | Improved | 73 (23.5) |
| Frequency of experiencing skin disease symptoms | 3-6x per year | 61 (19.6) |
| | 1-2x per month | 61 (19.6) |
| | Constantly | 58 (18.6) |
| | 1-2x per week | 50 (16.1) |
| | 1-2x per year | 42 (13.5) |
| | 1-2x per day | 29 (9.3) |
| Pattern of skin symptoms | Chronic | 110 (35.4) |
| | Episodic | 65 (20.9) |
| | Seasonal | 82 (26.4) |
| | Acute | 46 (14.8) |
| | Other | 8 (2.6) |

Table 3 Potentially Traumatic Events Statistics

| | Happened to me | Witnessed or Learned about it | Part of my Job | Not sure or Does not apply |
|---|---|---|---|---|
| | n (%) | n (%) | n (%) | n (%) |
| Natural disaster (e.g., flood, tornado) | 84 (27.0) | 139 (44.7) | 23 (7.4) | 103 (33.1) |
| Fire or explosion | 25 (8.0) | 129 (41.5) | 22 (7.1) | 155 (49.8) |
| Transportation accident (e.g., car accident, boat accident, train wreck, plane crash) | 123 (39.5) | 148 (47.6) | 24 (7.7) | 70 (22.5) |
| Serious accident at work, home, or during recreational activity | 38 (12.2) | 107 (34.4) | 24 (7.7) | 162 (52.1) |
| Exposure to toxic substance (e.g., dangerous chemicals, radiation) | 24 (7.7) | 82 (26.4) | 32 (10.3) | 195 (62.7) |
| Physical assault (e.g., being attacked, hit, slapped, kicked, beaten up) | 92 (29.6) | 127 (40.8) | 24 (7.7) | 114 (36.7) |
| Assault with a weapon (e.g., being shot, stabbed, threatened with a knife, gun, bomb) | 28 (9.0) | 110 (35.4) | 17 (5.5) | 175 (56.3) |
| Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm) | 69 (22.2) | 109 (35.0) | 18 (5.8) | 142 (45.7) |
| Other unwanted or uncomfortable sexual experience | 96 (30.9) | 95 (30.5) | 19 (6.1) | 138 (44.4) |
| Combat or exposure to a war-zone (in the military or as a civilian) | 16 (5.1) | 74 (23.8) | 29 (9.3) | 207 (66.6) |
| Captivity (e.g., being kidnapped, abducted, held hostage, prisoner of war) | 18 (5.8) | 59 (19.0) | 19 (6.1) | 221 (71.1) |
| Life-threatening illness or injury | 46 (14.8) | 145 (46.6) | 20 (6.4) | 124 (39.9) |
| Severe human suffering | 32 (10.3) | 114 (36.7) | 22 (7.1) | 158 (50.8) |
| Sudden violent death (e.g., homicide, suicide) | 17 (5.5) | 121 (38.9) | 27 (8.7) | 158 (50.8) |
| Sudden accidental death | 14 (4.5) | 124 (39.9) | 21 (6.8) | 163 (52.4) |
| Serious injury, harm, or death you caused to someone else | 20 (6.4) | 66 (21.2) | 23 (7.4) | 219 (70.4) |
| Any other very stressful event or experience | 108 (34.7) | 110 (35.4) | 22 (7.1) | 119 (38.3) |
| % of individuals with PTE | 77.5 (241) | 85.9 (267) | 28.9 (90) | 89.1 (277) |
| Total # of PTEs *M* (*SD*) | 2.7 (2.7) | 6.0 (4.7) | 1.2 (2.5) | 8.4 (5.4) |
| Total # of PTEs Median | 2 | 5 | 0 | 9 |
| Total # of PTEs Mode | 0 | 0 | 0 | 0 |
| Range of PTEs | 17 | 17 | 13 | 17 |

*Note*: PTE = Potentially Traumatic Event

Table 4 Pearson Correlations Between Study Variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. Skin Severity | — | | | | | | |
| 2. PSS Total | .257 | — | | | | | |
| 3. PCL Total | .435 | .644 | — | | | | |
| 4. PCL Cluster B | .420 | .560 | .951 | — | | | |
| 5. PCL Cluster C | .389 | .592 | .870 | .850 | — | | |
| 6. PCL Cluster D | .402 | .677 | .972 | .889 | .811 | — | |
| 7. PCL Cluster E | .428 | .582 | .947 | .848 | .752 | .899 | — |
| Mean | 5.74 | 18.9 | 30.7 | 7.4 | 3.3 | 10.9 | 9.2 |
| *SD* | 2.299 | 6.6 | 22.0 | 6.1 | 2.5 | 8.0 | 6.5 |
| Observed Range | 0-10 | 0-34 | 0-80 | 0-20 | 0-8 | 0-28 | 0-24 |
| Possible Range | 0-10 | 0-34 | 0-80 | 0-20 | 0-8 | 0-28 | 0-24 |

*Note*: All correlations are significant at the $p < .01$ level (two-tailed); PCL = PTSD Checklist for DSM-5; PSS = Perceived Stress Scale; Cluster B = intrusion cluster; Cluster C = avoidance cluster; Cluster D = negative alterations in cognitions and mood cluster; Cluster E = alterations in arousal and reactivity cluster

*Appendix A*

Skin Disease Characteristics

Many of these questions ask about skin (dermatology) conditions or problems that you may have experienced in the past year. *For example*: rosacea, acne, psoriasis, urticaria, vitiligo, alopecia, eczema, hyperhidrosis.

1. What skin conditions or problems are you currently experiencing (within the past 4 weeks)?
2. What skin conditions or problems have you experienced in the past year (in addition to those described in #1)?
3. In the last 12 months, have you seen a medical provider (*physician, nurse, dermatologist*) for a skin-related problem?
4. Which condition or skin related symptoms currently bother you the most?
5. How would you rate the severity of your skin condition(s) on a scale 0 – 10 (0=normal, 10 is very severe)? _____
6. At what age did your skin condition symptoms first begin (e.g., childhood, 1 year ago)? _____
7. Since you first experienced skin symptoms, your symptoms have been…
   - Stable
   - Worsened
   - Improved
8. Overall, how often do you experience symptoms of your skin condition?
   - Rarely
   - 1-2x per year
   - 3-6x per year
   - 1-2x per month
   - 1-2x per week
   - 1-2x each day
   - Constantly
9. Please check the symptoms experienced in the past year or that you are currently experiencing (i.e., within the past 4 weeks):

| Current | Past Year | Symptom |
|---|---|---|
| | | Itching |
| | | Redness |
| | | Sores |
| | | Bleeding |
| | | Pain |
| | | Color changes |
| | | Rash/Hives |
| | | Outbreak |
| | | Dryness/Peeling |
| | | Sweating |

| | | |
|---|---|---|
| | | Burning/Stinging |
| | | Other |

10. Areas of the body affected by skin problems/condition (check):

| Current | Past Year | Area |
|---|---|---|
| | | Face |
| | | Neck |
| | | Scalp/Hair |
| | | Arms/Hands |
| | | Legs/Feet |
| | | Torso/Back |
| | | Groin |
| | | Other _____ |

11. How many times have you seen a medical provider for skin-related concerns in the past year?
    - None
    - One time
    - 2-3
    - 4-6
    - 7-12
    - 13+
12. How many days have you missed from work/school/leisure activities because of your symptoms in the past year? _____
13. What treatments have you received for your skin condition(s)?
    - Oral medication
        - Specify: type-strength-frequency
    - Topical medication
        - Specify: type-strength-frequency
    - Botox/Injections
        - Specify purpose – how many times
    - Surgery
        - Specify – purpose – how many times
    - Over the counter topical creams/medications
        - Type
    - Other
        - Describe:
14. If YES to 13: Thinking about the past month, on average how would you rate your ability to follow through with treatment instructions for your skin symptoms?
    - 0 Very poor
    - 1 Poor
    - 2 Fair
    - 3 Good
    - 4 Very Good

- 5 Excellent

15. In the past month, did you miss ANY appointments with your doctors?

    _____ Yes _____ No

16. About how many doctor appointments did you miss in the past month? _____ Past year? _____
17. Weight:
18. Height:
19. Have you had any of these health problems in the past or currently (check all that apply)?
    - Arthritis/rheumatism
    - Allergies
    - Asthma
    - Frequent or severe headaches
    - Migraine
    - Seasonal allergies
    - Heart attack
    - High blood pressure
    - Diabetes
    - HIV/AIDS
    - Ulcers
    - Hives
    - Back or Neck problems
    - Other chronic pain
    - Stroke
    - Obesity
    - Heart disease
    - Chronic lung disease (other than asthma)
    - Kidney problems
    - Epilepsy/seizures
    - Skin Cancer
    - Other cancer

**How would you describe the pattern of these skin symptoms since you were first diagnosed?**
Acute (onset suddenly)
Chronic
Episodic
Seasonal (occurs regularly, but are associated with seasonal patterns such as winter/cold, heat, certain things blooming, etc.)
Other

**When was your last medical appointment for skin-related problems?**

**When is your next medical appointment for skin-related problems?**

**What type of provider do you see for your dermatology/skin disease?**
Dermatologist
General physician
Cosmetologist
Other, please specify:

**How visible are your skin symptoms to other people?**
Not at all visible
Slightly visible
Moderately visible
Very visible

**How concerned are you that other people would see or notice your dermatology/skin symptoms?**
Not at all
Slightly
Somewhat
Moderately
Extremely

**Do you try to cover or hide your skin symptoms (e.g., clothes, grow a beard, make up, bandages, etc.)?** Yes/no
**What do you do?**

**How concerned are you to be intimate or engage in sexual activities with someone due to your dermatology/skin symptoms?**
Not at all
Slightly
Somewhat
Moderately
Extremely

*Appendix B*

Life Events Checklist for DSM-5

Listed below are a number of difficult or stressful things that sometimes happen to people. For each event check one or more of the boxes to the right to indicate that: (a) it happened to you personally; (b) you witnessed it happen to someone else; (c) you learned about it happening to a close family member or close friend; (d) you were exposed to it as part of your job (for example, paramedic, police, military, or other first responder); (e) you're not sure if it fits; or (f) it doesn't apply to you. Be sure to consider your entire life (growing up as well as adulthood) as you go through the list of events.

| *Event* | *Happened to me* | *Witnessed it* | *Learned about it* | *Part of my job* | *Not sure* | *Doesn't apply* |
|---|---|---|---|---|---|---|
| 1. Natural disaster (for example, flood, hurricane, tornado, earthquake) | | | | | | |
| 2. Fire or explosion | | | | | | |
| 3. Transportation accident (for example, car accident, boat accident, train wreck, plane crash) | | | | | | |
| 4. Serious accident at work, home, or during recreational activity | | | | | | |
| 5. Exposure to toxic substance (for example, dangerous chemicals, radiation) | | | | | | |
| 6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up) | | | | | | |
| 7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb) | | | | | | |
| 8. Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm) | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 9. Other unwanted or uncomfortable sexual experience | | | | | | |
| 10. Combat or exposure to a war-zone (in the military or as a civilian) | | | | | | |
| 11. Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war) | | | | | | |
| 12. Life-threatening illness or injury | | | | | | |
| 13. Severe human suffering | | | | | | |
| 14. Sudden violent death (for example, homicide, suicide) | | | | | | |
| 15. Sudden accidental death | | | | | | |
| 16. Serious injury, harm, or death you caused to someone else | | | | | | |
| 17. Any other very stressful event or experience | | | | | | |

PART 2:

A. If you check anything for #17 in PART 1, briefly identify the event you were thinking of:

_____

B. If you have experienced more than one of the events in PART 1, think about the event you consider the worst event, which for this questionnaire means the event that currently bothers you the most. If you have experienced only one of the events in PART 1, use that one as the worst event. Please answer the following questions about the worst event (*check all options that apply*):

1. Briefly describe the worst event *(for example, what happened, who was involved, etc.)*.

   _____

   _____

2. How long ago did it happen? _____ *(please estimate if not sure)*
3. How did you experience it?

   _____ *It happened to me directly*

   _____ *I witnessed it*

_____ *I learned about it happening to a close family member or close friend*

_____ *I was repeatedly exposed to details about it as part of my job (for example, paramedic, police, military, or other first responder)*

_____ *Other, please describe:*

4. Was someone's life in danger?

   _____ *Yes, my life*

   _____ *Yes, someone else's life*

   _____ *No*

5. Was someone seriously injured or killed?

   _____ *Yes, I was seriously injured*

   _____ *Yes, someone else was seriously injured or killed*

   _____ *No*

6. Did it involve sexual violence? _____*Yes* ____*No*

7. If the event involved the death of a close family member or close friend, was it due to some kind of accident or violence, or was it due to natural causes?

   _____ *Accident or violence*

   _____ *Natural causes*

   _____ *Not applicable (The event did not include the death of a close family member or close friend)*

8. How many times altogether have you experienced a similar event as stressful or nearly as stressful as the worst event?

   _____ *Just once*

   _____ *More than once (please specify or estimate the total # of times you have had this experience _____)*

*Appendix C*

PTSD Checklist for DSM-5

Below is a list of problems that people sometimes have in response to a very stressful experience. Keeping your worst event in mind, please read each problem carefully and then circle one of the numbers to the right to indicate how much you have been bothered by that problem **in the past month**.

| *In the past month, how much were you bothered by:* | *Not at all* | *A little bit* | *Moderately* | *Quite a bit* | *Extremely* |
|---|---|---|---|---|---|
| 1. Repeated, disturbing, and unwanted memories of the stressful experience? | 0 | 1 | 2 | 3 | 4 |
| 2. Repeated, disturbing dreams of the stressful experience? | 0 | 1 | 2 | 3 | 4 |
| 3. Suddenly feeling or acting as if the stressful experience were actually happening again *(as if you were actually back there reliving it)*? | 0 | 1 | 2 | 3 | 4 |
| 4. Feeling very upset when something reminded you of the stressful experience? | 0 | 1 | 2 | 3 | 4 |
| 5. Having strong physical reactions when something reminded you of the stressful experience *(for example, heart pounding, trouble breathing, sweating)*? | 0 | 1 | 2 | 3 | 4 |
| 6. Avoiding memories, thoughts, or feelings related to the stressful experience? | 0 | 1 | 2 | 3 | 4 |
| 7. Avoiding external reminders of the stressful experience *(for example, people, places, conversations, activities, objects, or situations)*? | 0 | 1 | 2 | 3 | 4 |
| 8. Trouble remembering important parts of the stressful experience? | 0 | 1 | 2 | 3 | 4 |
| 9. Having strong negative beliefs about yourself, other people, or the world *(for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)*? | 0 | 1 | 2 | 3 | 4 |
| 10. Blaming yourself or someone else for the stressful experience or what happened after it? | 0 | 1 | 2 | 3 | 4 |
| 11. Having strong negative feelings such as fear, horror, anger, guilt, or shame? | 0 | 1 | 2 | 3 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| 12. Loss of interest in activities that you used to enjoy? | 0 | 1 | 2 | 3 | 4 |
| 13. Feeling distant or cut off from other people? | 0 | 1 | 2 | 3 | 4 |
| 14. Trouble experiencing positive feelings *(for example, being unable to feel happiness or have loving feelings for people close to you)*? | 0 | 1 | 2 | 3 | 4 |
| 15. Irritable behavior, angry outbursts, or acting aggressively? | 0 | 1 | 2 | 3 | 4 |
| 16. Taking too many risks or doing things that could cause you harm? | 0 | 1 | 2 | 3 | 4 |
| 17. Being "superalert" or watchful or on guard? | 0 | 1 | 2 | 3 | 4 |
| 18. Feeling jumpy or easily startled? | 0 | 1 | 2 | 3 | 4 |
| 19. Having difficulty concentrating? | 0 | 1 | 2 | 3 | 4 |
| 20. Trouble falling or staying asleep? | 0 | 1 | 2 | 3 | 4 |

*Appendix D*

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

For each question choose from the following alternatives:
0 - never 1 - almost never 2 - sometimes 3 - fairly often 4 - very often

_____ l. In the last month, how often have you been upset because of something that happened unexpectedly?

_____ 2. In the last month, how often have you felt that you were unable to control the important things in your life?

_____ 3. In the last month, how often have you felt nervous and stressed?

_____ 4. In the last month, how often have you felt confident about your ability to handle your personal problems?

_____ 5. In the last month, how often have you felt that things were going your way?

_____ 6. In the last month, how often have you found that you could not cope with all the things that you had to do?

_____ 7. In the last month, how often have you been able to control irritations in your life?

_____ 8. In the last month, how often have you felt that you were on top of things?

_____ 9. In the last month, how often have you been angered because of things that happened that were outside of your control?

_____ 10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?