



Testing the validity and reliability of the Depression Anxiety Stress Scale (DASS)-21 instrument for individuals with Psychodermatology

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Abstract: Individual psychological health can be seen from the health of the skin. Some skin diseases such as psoriasis and atopic dermatitis can be exacerbated by psychological problems. Based on this, a collaboration between specialist doctors and psychologists is needed to screen for psychological disorders in sufferers. One psychological screening instrument is the Depression Anxiety Stress Scale (DASS)-21; this study aims to test its validity and reliability. Non-probability convenience sampling was employed, and 292 participants aged 18-54 were willing to take part in the study. An internal structure validity test was conducted using confirmatory factor analysis, while concurrent validity was assessed by correlating DASS-21 with PHQ-9, GAD-7 and PSS scores. The reliability test was analyzed using composite reliability. The results of the CFA analysis showed that the data matched Lovibond's theory and that all DASS-21 items were valid (RMSEA = .076, CFI = .961, TLI = .955, SRMR = .065). The results of the concurrent analysis showed that the three scales had a positive correlation with the dimensions of DASS-21, while the reliability results showed a satisfactory value (.850 – .923). The results of the study indicate that DASS-21 is a valid and reliable instrument and can be used to measure depression, anxiety and stress in individuals with psoriasis and atopic dermatitis.

Keywords: DASS-21; psychodermatology; reliability; validity

Abstrak: Kesehatan psikologis individu dapat dilihat dari kondisi kesehatan kulit. Beberapa penyakit kulit seperti psoriasis dan atopik dermatitis dapat diperburuk oleh permasalahan psikologis. Berdasarkan hal tersebut, diperlukannya kolaborasi antara dokter spesialis dan psikolog untuk melakukan skrining gangguan psikologis pada pengidapnya. Salah satu instrumen skrining psikologis adalah Depression Anxiety Stress Scale (DASS)-21. Penelitian ini bertujuan menguji validitas dan reliabilitas DASS-21. Pengambilan sampel menggunakan pendekatan nonprobability sampling convenience dan responden yang bersedia mengikuti penelitian ini terdiri dari 292 partisipan yang berusia 18-54 tahun. Uji validitas struktur internal dilakukan dengan analisis factor konfirmatori, sedangkan validitas konkuren dilakukan dengan mengkorelasikan DASS-21 dengan skor PHQ-9, GAD-7 dan PSS. Uji reliabilitas dianalisis dengan reliabilitas komposit. Hasil analisis CFA menunjukkan data memiliki kecocokan dengan teori milik Lovibond dan seluruh item dari DASS-21 adalah valid (RMSEA = 0,076, CFI = 0,961, TLI = 0,955, SRMR = 0,065). Hasil analisis konkuren menunjukkan ketiga skala memiliki korelasi positif dengan dimensi DASS-21. Hasil reliabilitas menunjukkan nilai memuaskan (0,850–0,923). Hasil penelitian ini menunjukkan DASS-21 merupakan instrumen yang valid dan reliabel dan dapat digunakan untuk mengukur depresi, cemas dan stres pada pengidap psoriasis dan atopik dermatitis.

Kata Kunci: DASS-21; psikodermatologi; validitas; reliabilitas

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Introduction

Individual mental health can be seen through the health condition of the skin. Indications include somatic symptoms such as redness, sweating, and itching (Bostoen et al., 2012). These conditions can indicate that those with skin disorders are possibly experiencing psychological disorders, with a prevalence of around 30-40% (Roberts et al., 2020). Based on this, clinicians such as dermatologists, psychiatrists, and psychologists, pay particular attention to the relationship between skin and mental health, which is referred to as psychodermatology (Roberts et al., 2020). The field is divided into three categories: psychophysiological, which relates to skin disease exacerbated by negative emotions, such as psoriasis and atopic dermatitis; skin disease whose main source is psychological disorders such as trichotillomania; and secondary psychiatric disorders, which are caused by skin diseases (Koo & Lebwohl, 2001).

This study will focus on the first category, psychophysiological skin diseases that are not directly caused by stress, but can be triggered or exacerbated by it (Koo & Lebwohl, 2001). Diseases often found in this group include psoriasis and atopic dermatitis (Koo & Lebwohl, 2001), both of which are categorized as visible skin diseases (VSDs), meaning sufferers are vulnerable to social stigma (Germain et al., 2021; Jankowiak et al., 2020; van Beugen et al., 2017). When the disease occurs, clinical symptoms include reddish, thickened lesions and an itching sensation (Egeberg et al., 2020). Such symptoms can cause a negative response from the society, such as disgust or fear of infection, which makes others keep their distance from sufferers, making them feel helpless and desperate to withdraw from their environment (Germain et al., 2021; Jankowiak et al., 2020; van Beugen et al., 2017). Sufferers can internalize the stigma, leading to feelings of guilt

and fear of being judged by others (Jankowiak et al., 2020). The impact of the stigma faced by those with psoriasis and atopic dermatitis means it can be a stressor (van Beugen et al., 2017).

Based on previous studies, it is known that stressors can trigger and even worsen the condition of those with psoriasis or atopic dermatitis (Kwon et al., 2018; Senra & Wollenberg, 2014; Wardhana, 2012). If stressful conditions are not handled appropriately, sufferers' quality of life can be affected (Jankowiak et al., 2020). Reduced quality of life is not only caused by stigma and the nature of the disease, but also by several other factors. A worsened quality of life can begin with a diagnosis, as sufferers must face and accept ones related to their disease (Mento et al., 2020). In addition, the treatment process, which lasts a lifetime, requires extra care (Bostoen et al., 2012). Reduced quality of life in sufferers is characterized by poorer sleep quality due to itching sensations, joint pain, and the risk of obesity (Egeberg et al., 2020). As a result, sufferers are vulnerable to loneliness, and lower self-esteem increases the risk of experiencing psychological disorders such as depression, anxiety, and suicidal tendencies (Kwon et al., 2018; Senra & Wollenberg, 2014; Wardhana, 2012).

In light of the above problems, the treatment process for those with skin diseases such as psoriasis and atopic dermatitis not only involves dermatologists, but also requires collaboration from psychiatrists or psychologists in the early detection or screening of psychological disorders (Roberts et al., 2020) such as depression, anxiety, and stress. The benefit of screening is that it can immediately provide prevention or psychological intervention to reduce symptoms or comorbidities (Roberts et al., 2020).

An instrument often used for the early detection of psychological disorders is the Depression Anxiety Stress Scale (DASS), developed by Lovibond and Lovibond in 1995 (Lovibond &

Lovibond, 1995). The scale initially included 42 items that measured three dimensions, namely depression (D), anxiety (A), and stress (S). Lovibond and Lovibond (1995) then developed a shortened version with 21 items (DASS-21) to save time when completing the process. This scale is often used to detect depression, anxiety, and stress in individuals diagnosed with such disorders (Lovibond & Lovibond, 1995). Advantages of DASS-21 include the fact that it is publicly accessible (free of charge), relatively short and its use is relatively easy in some situations as it is not time-consuming (Bottesi et al., 2015). Another advantage is that it has a clearer latent factor structure compared to the 42-item version (Henry & Crawford, 2005). This study is therefore based on DASS-21.

Several studies on the psychological health of individuals with psychodermatological problems have been conducted using DASS-21. The results of these show that DASS-21 can be used as screening for psychological disorders, as indicated by the findings on the risk of such disorders, such as depression and anxiety (Clarke et al., 2020; Pezirkianidis et al., 2018; Picchianti Diamanti et al., 2020; Soliman, 2021). In Indonesia, psychometric evaluation of DASS-21 has been made by Kinanthi et al., (2020) through the use of validity and reliability tests.

Kinanthi et al. (2020) conducted a construct validity test by correlating the DASS-21 with the gratitude scale, while their reliability test used Cronbach's alpha. The results of the validity testing based on discriminant testing showed a negative correlation between the gratitude scale and the anxiety and stress subscales of DASS-21. However, the depression subscale showed a positive correlation. The results of the DASS-21 reliability test had values ranging from .77 to .90 (Kinanthi et al., 2020). In addition to Kinanthi et al. (2020), psychometric evaluation has been conducted by Muttaqin and Ripa (2021), whose study showed

that DASS-21 has good validity and reliability after factor analysis, composite reliability, and measurement invariance were conducted (Muttaqin & Ripa, 2021).

However, the psychometric evaluation of DASS-21 conducted by Kinanthi et al. (2020) and Muttaqin and Ripa (2021) did not evaluate DASS-21 in clinical populations, although several studies outside Indonesia show that it can be used in clinical populations on the basis of good validity and reliability values (Antony et al., 1998; Bottesi et al., 2015; Ng et al., 2007; Page et al., 2007; Wood et al., 2010; Yildirim et al., 2018). For example, a study conducted in Turkey with a clinical population yielded good construct validity by achieving a model fit with the DASS-21 structure when Exploratory Factor Analysis (EFA) was conducted, together with strong alpha coefficient reliability values of .87, .85, and .81 for the depression, anxiety and stress subscales respectively (Yildirim et al., 2018). To the best of the researcher's knowledge, DASS-21 has not been psychometrically evaluated in relation to those with psychodermatological problems. Therefore, this study is based on a clinical population, namely individuals with psychodermatological condition, meaning that the results on the use of DASS will not only refer to the general population.

This research is important because several studies in Indonesia have used DASS-21 as an instrument to measure psychological conditions before conducting psychological interventions (Bakara et al., 2015; Hidayati et al., 2021; Malfasari & Erlin, 2017; Nurjanah, 2018; Priyanti et al., 2014; Wahyuliarmy, 2016). In addition, the results of several studies that conducted factor analysis of DASS-21 showed a factor structure that differed from Lovibond's original one. For example, González-Rivera et al. (2020) research indicated a low model fit between the data and the structure of DASS-21. Other findings show that the bifactor model, by adding a new factor termed "psycho-

logical distress," produces the best model fit value compared to Lovibond's original model (Bottesi et al., 2015; Henry & Crawford, 2005; Kia-Keating et al., 2018; Muttaqin & Ripa, 2021).

Differences in factor structure can affect the ability of the scale to identify symptoms and can raise questions of accuracy, especially when used in the clinical realm, as it will have an impact on intervention design and clinical decision-making (Paola, 2020). Therefore, in this study a psychometric evaluation of DASS-21 needs to be made because it is expected to be a reference instrument used in the clinical realm as is an instrument that can help individuals receive treatment according to their needs (Primasari & Hidayat, 2016). In addition, evidence of the validity and reliability of DASS-21 is required to assist in appropriate diagnosis, which has implications for the interventions conducted on patients (González-Rivera et al., 2020).

This study aims to conduct a psychometric evaluation of psychodermatological patients. The psychometric testing includes validity and reliability tests; the validity test is based on the internal structure and relationship with other variables (concurrent validity). Testing the source of internal structure validity is undertaken to evaluate the extent to which the internal structure components are in accordance with the predetermined constructs by conducting CFA analysis (AERA et al., 2014). To complement the information related to validity testing on DASS-21 in Indonesia, concurrent validity testing was also conducted in order to predict score of DASS-21 with other measuring instruments that measure the same construct and have already been validated, which are referred to as criteria and employed at the same time (McCoach et al., 2013). Concurrent validity testing was conducted by correlating the results of each DASS-21 dimension with other scales, namely GAD-7, PHQ-9, and PSS-10, while reliability testing was conducted using

composite reliability coefficients, based on the structural equation approach and factor analysis (Widhiarso & Ravand, 2014).

Methods

The study aims to test the reliability and validity of DASS-21 for people with psoriasis and atopic dermatitis. The participants were individuals suffering from the two conditions, as diagnosed by a doctor, with an age range of 18-54. The criteria for the selection of the population was based on previous studies that found that those with psoriasis and atopic dermatitis have a risk of experiencing depression, anxiety, and stress (Golpour et al., 2012; Kim et al., 2015; Leibovici et al., 2010; Schut et al., 2013; Wardhana, 2012). In addition, the selection of the age range was based on a report from Kemenkes RI (2019) stating that the prevalence of mental disorders in Indonesia tends to increase with age, starting from the age of >15 years.

Non-probability sampling was used with a purposive sampling technique because the characteristics of the study subjects had been already determined (Coolican, 2018). The research data was collected by disseminating research information through social media. Participants who met the research criteria and were willing to participate in the study were given a questionnaire link and a statement of willingness (informed consent). Those who agreed to participate were directed to the research questionnaire for voluntary completion online via Google Forms. The participants totalled 242; 152 with psoriasis and 90 with atopic dermatitis. With regard to the duration of the conditions, 215 participants had had psoriasis for > 6 months, and 27 had had psoriasis and atopic dermatitis for < 6 months. The age range was 18-54 years ($M = 26.01$). 229 female participants took part in the study, with 13 males. Approval to conduct the research was obtained from the university and it

was performed under the supervision of a lecturer.

Four measuring instruments were used, namely the Depression Anxiety Stress Scale (DASS)-21, the Patient Health Questionnaire (PHQ)-9, Generalized Anxiety Disorder (GAD-7), and Perceived Stress Scale (PSS). They were employed in the concurrent analysis, in which DASS-21 was correlated with measuring instruments that have the same scale.

Depression Anxiety Stress Scale (DASS)-21

The DASS-21 instrument used in the study was translated into Indonesian by Onie et al. (2020). The McDonalds Omega (Ω) DASS-21 reliability test results obtained by Onie et al. (2020) were .910 for the full DASS-21 scale; .794 for the depression subscale; and with reliability values for the anxiety and stress subscales of .785 and .800. The Indonesian version of DASS-21 consists of 21 items with three dimensions: depression, anxiety, and stress. Each of these has seven items with four available responses in the form of a four-point Likert scale, from 0 to 3 (0= "Does not apply at all", 1= "Never", 2= "Sometimes" and 3= "Quite often"). The questionnaire was completed by selecting the response that best described the participant during the previous week. The DASS-21 scale can be used in the age range of 14 to the elderly (Lovibond & Lovibond, 1995).

Patient Health Questionnaire (PHQ-9)

This measurement tool is a questionnaire containing nine question items designed to establish the level of individual depression with four response options, namely "not at all", "several days", "more than a week," and "almost every day" (Kroenke et al., 2001). PHQ-9 is based on DSM-IV criteria so that the results can be categorized from mild to severe depression, with a final score range of 0-27 (Urtasun et al., 2019). This study used the

Indonesian version of PHQ-9, which was tested for validity and reliability by Onie et al. (2020) with a McDonalds Omega (Ω) reliability value of .80 and strong predictive validity results between it and the Hopkins Self Checklist 25 (HSCL) questionnaire (Onie et al., 2020).

Generalized Anxiety Disorder Scale (GAD-7)

This measure is used to screen for a generalized anxiety disorder (GAD) in primary health care (Kroenke et al., 2007). Patients are instructed to complete seven items with four response categories, "not at all", "a few days", "more than a week" and "almost every day", based on complaints felt over the previous two weeks (Zhong et al., 2015). The results of GAD-7 will indicate the level of anxiety: low anxiety with a score range of 0 to 5; moderate anxiety with 6 to 10; and severe anxiety with scores >15 (Spitzer et al., 2006). This study used the Indonesian version of GAD-7, which passed the McDonalds Omega (Ω) validity and reliability test with a value of .80 for reliability, and with the predictive validity test showing a strong correlation between GAD-7 and the Hopkins Self Checklist 25 (HSCL) scale (Onie et al., 2020).

Perceived Stress Scale (PSS)

This measuring instrument was developed by Cohen, Kamarck, and Mermelestein to measure individual stress when facing situations that are considered stressful (Cohen et al., 1983). Patients answer 10 question items based on their condition over a period of one month by choosing one of five answer responses, namely "never", "almost never", "sometimes", "often" and "very often" (Purnami et al., 2019). The PSS results will indicate a person's stress level, with three classifications: a final score within the range of 0-13 showing an individual in the mild stress category; scores of 14-26 indicating moderate stress; and severe stress shown with a score between 27 and 40 (Cohen et

al., 1983). This study used the perceived stress scale (PSS) tested psychometrically by Purnami et al. (2019), with Cronbach's alpha reliability results above .07 (Purnami et al., 2019).

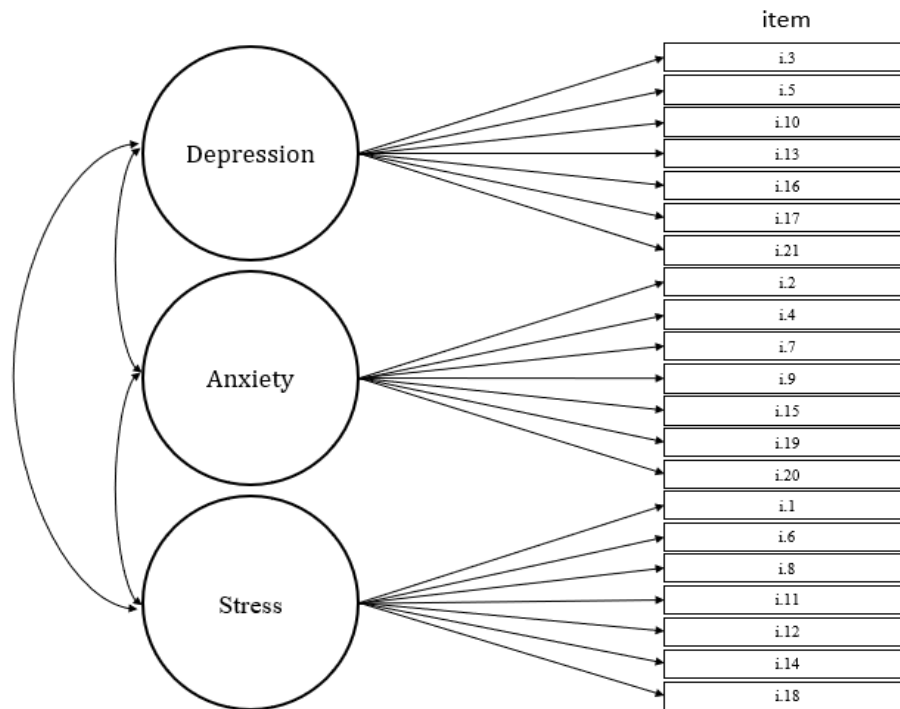
The analysis procedure involved the conducting of an internal consistency reliability test using composite reliability. The composite reliability estimate was based on the fact that the estimate has higher accuracy than the alpha coefficient and can be made out in the structural equation modeling approach with confirmatory factor analysis (Widhiarso & Ravand, 2014). According to Hair et al, the recommended value for the reliability coefficient should be >.7 (Hair Jr et al, 2009). Furthermore, the internal structure validity test was analyzed using the confirmatory factor analysis (CFA) method. This is an analytical

technique through which researchers can obtain the specific results of the number of factors and the relationship between dimensions or traits and factor loading (Brown, 2015).

This study tested the Indonesian version of DASS-21 based on the factor structure model of the original version of Lovibond and Lovibond (1995), based on participants with psychodermatological diseases, namely psoriasis and atopical dermatitis (Figure 1).

The CFA analysis was assisted by the R software program version 4.2.0 with the lavaan package, used to analyze the data previously obtained. Weighted least square mean and variance corrected (WLSMV) was used to estimate the model, but in the R program WLSMV is similar

Figure 1
DASS-21 Model Test Results



to diagonally weighted least squares (DWLS). The WLSMV estimation method was used because DASS-21 employs an ordinal scale, meaning this method is preferable (Vinet & Zhedanov, 2011). Moreover, WLSMV also produces accurate scores on statistical calculations, parameter estimates, and standard errors of the CFA model, with several conditions such as the number of samples with a range between 100 and 1000, abnormal data, and the complexity of the model (Vinet & Zhedanov, 2011). In this study, the model fit test was measured using the criteria recommended by Hair Jr. et al. (2009), namely $\geq .95$ for the comparative fit index (CFI) and Tucker-Lewis index (TLI); $< .08$ for the root mean square error of approximation (RMSEA); and $\leq .08$ for the standardized root mean square residual (SRMR). In addition to evaluating the value of model fit, the factor loading value or factor loading of the items on DASS-21 were also considered. The factor load value can determine the contribution of each item to the representation of the latent variables. The limitation value on acceptable factor loading is at least $> .4$ using standardized analysis (Stevens, 2009).

The second validity test was through validity based on relationships with other variables (concurrent validity) through correlation analysis. DASS-21 has three dimensions, namely depression, anxiety, and stress. In this regard, the results of each DASS-21 dimension will be correlated with measuring instruments that test the same construct. The DASS-21 depression dimension will be correlated with the patient health questionnaire (PHQ)-9; the anxiety dimension with the generalized anxiety disorder scale (GAD-7); and the stress dimension with the perceived stress scale (PSS).

Results

In this research, 242 respondents were identified who fitted the research criteria, namely

those with psoriasis and/or atopic dermatitis diagnosed by a doctor. The results of the DASS-21 reliability test with composite reliability resulted in reliability values shown in Table 1.

From Table 1, it can be seen that the overall DASS-21 results produced a value of .876. The reliability results in each dimension, namely depression, anxiety, and stress, were .923, .850, and .906 respectively. The DASS-21 reliability test results meet the recommended value according to Hair et al (2009) of above $> .7$. In addition, the validity test of the model fit test analysis with CFA using the R program can be seen in Table 2.

Based on the confirmatory factor analysis, the RMSEA score is .076, with .961 for CFI, .955 for TLI, and .065 for SRMR. These results show that there is a model fit because they meet the Hair's et al. (2009) criteria, namely, $< .08$ for RMSEA, $\geq .95$ for CFI and TLI, and $\leq .08$ for SRMR. In addition, the factor load or factor loading was analyzed. Through the factor loading data, the contribution value of each item to the latent variable can be seen. The factor loading values of the dimensions of depression, anxiety, and stress on DASS-21 are shown in Table 3.

Based on Table 3, the cut-off value on acceptable factor loadings is at least $> .4$ using standardized analysis (Stevens, 2009). When referring to the standard $> .4$, the 21 DASS-21 items can reflect the latent variables of depression, anxiety, and stress.

The next test was of the concurrent validity of the DASS-21 with the PHQ-9, GAD-7, and PSS measuring instruments (Table 4). DASS-21 employs an ordinal scale, so in testing concurrent validity it is more appropriate to use Spearman correlation analysis (Urbina, 2014). Table 5 shows the results of the correlation analysis between the DASS-21 dimensions and the PHQ-9, GAD-7, and PSS measures.

Table 1

DASS-21 Reliability Scores

	Number of items	Reliability
DASS-21 (D)	7	.923
DASS-21 (A)	7	.850
DASS-21 (S)	7	.906

Notes: D = Depression; A = Anxiety; S = Stress

Table 2

DASS-21 Model Fit Scores

	RMSEA	CFI	TLI	SRMR
N = 242	.076	.961	.955	.065

Table 3

DASS-21 Factor Loading Results

Factor	Item	Estimate	Remarks
Depression	Item 3	.753	Accepted
	Item 5	.659	Accepted
	Item 10	.827	Accepted
	Item 13	.860	Accepted
	Item 16	.732	Accepted
	Item 17	.828	Accepted
	Item 21	.888	Accepted
Anxiety	Item 2	.440	Accepted
	Item 4	.651	Accepted
	Item 7	.461	Accepted
	Item 9	.776	Accepted
	Item 15	.851	Accepted
	Item 19	.591	Accepted
	Item 20	.855	Accepted
Stress	Item 1	.536	Accepted
	Item 6	.709	Accepted
	Item 8	.852	Accepted
	Item 11	.881	Accepted
	Item 12	.798	Accepted
	Item 14	.748	Accepted
	Item 18	.779	Accepted

Table 4

Spearman Correlation

Variable	N	Spearman	P-value
DASS-21 (D) ~ PHQ 9	242	.738	<.001
DASS-21 (A) ~ GAD 7	242	.652	<.001
DASS-21 (S) ~ PSS	242	.619	<.001

Notes: D = Depression; A = Anxiety; S = Stress

Table 5*Correlation Value between DASS-21 Dimensions*

	DASS-21 (D)	DASS-21 (K)	DASS-21 (S)
DASS-21 (D)	1		
DASS-21 (A)	.766	1	
DASS-21 (S)	.865	.940	1

Notes: D = Depression; A = Anxiety; S = Stress

The results of the concurrent validity analysis show that DASS-21 has a positive correlation with PHQ-9, GAD-7, and PSS. Furthermore, the study also considered the correlation between the depression, anxiety, and stress dimensions, the results of which can be seen in Table 5.

Discussion

The study aims to test the validity and reliability of DASS-21. The DASS-21 reliability estimation results show that the instrument has good reliability, in line with Hair's et al (2009) guidelines. The reliability value of each dimension is $>.7$. The results correspond to those of several other studies conducted in Indonesia, in that the Indonesian version of DASS-21 has a good reliability value and tends to be consistent with the Indonesian population sample (Kinanth et al, 2020; Muttaqin & Ripa, 2021; Onie et al, 2020).

The reliability value in this study, when compared to that of the English version of DASS-21 and that of translations into other languages (Italian, Malaysian and Turkish), have the same results, namely above $\geq .8$. These results indicate that the Indonesian version of DASS-21 can be used in language contexts different from that of original language, namely English (Antony et al, 1998; Bottesi et al, 2015; Henry & Crawford, 2005; Thiyagarajan et al, 2022; Yıldırım et al, 2018).

Furthermore, the results of testing the validity of the internal structure through confirmatory

factor analysis demonstrate that DASS-21 is proven to be valid for use as a psychological test tool for measuring depression, anxiety, and stress. This is evidenced by the results of the suitable or fit model, with an RMSEA value of .076, with .961 for CFI, .955 for TLI, and .065 for SRMR. Based on these results, and according to Brown (2015), when the RMSEA and SRMR scores are close to 0, the model being tested is more fit. Likewise, with regard to the CFI value of .961 and that of .955 for TLI, the model is said to be fit when these scores are closer to 1 (Brown, 2015). Similar DASS-21 CFA results have also been obtained for clinical samples (Bottesi et al, 2015; Musa et al, 2007; Randall et al, 2017; Wood et al, 2010). Some of these studies (Bottesi et al, 2015; Henry & Crawford, 2005; Musa et al, 2007; Muttaqin & Ripa, 2021; Tran et al, 2013; Yıldırım et al, 2018) show that DASS-21 can be used to measure depression, anxiety and stress.

The DASS-21 factor load results support the factor analysis results. The values of the factor loadings listed in Table 4 provide evidence that DASS-21 items can represent latent variables, namely depression, anxiety, and stress, in accordance with the structure of Lovibond's DASS-21 model for people with psoriasis and atopic dermatitis. The factor load results ranged from .658 to .888 for the depression dimension, from .440 to .855 for the anxiety dimension, and from .536 - .852 for the stress dimension, indicating that the factor load value has met the standards recommended by (Stevens, 2009) of at least $>.4$

The results of the concurrent validity test also support the psychometric evaluation of DASS-21, showing a strong correlation within a range of .619 to .738. They indicate that individuals who scored high on the depression, anxiety, and stress DASS-21 dimensions tended to score similarly when measured by PHQ-9, GAD-7, and PSS-10. To date, concurrent validity testing on the Indonesian version of the DASS-21 dimensions using GAD-7, PHQ-9, and PSS-10 has only been conducted in this study.

Another finding of this study is the strong correlation value between the DASS-21 dimensions, which is $>.7$ has the met standards recommended by Coolican (2018). Similar results were also found in several other studies using clinical and non-clinical samples (Bottesi et al., 2015; Henry & Crawford, 2005; Oei et al., 2013; Pezirkianidis et al., 2018). Results of this study support the nature of the DASS-21 scale, which is multidimensional, with correlated dimensions; that is, each DASS-21 subscale is correlated (Lovibond & Lovibond, 1995). In addition to supporting the theory, these findings align with the model proposed by Clark and Watson (1991), that negative affect can be represented through common features of depression and anxiety symptoms (Clark & Watson, 1991). Therefore, the results of this study strengthen the benefits of the DASS-21 measurement tool, which can be used as

an instrument to measure negative emotions in general (Bottesi et al., 2015; Kia-Keating et al., 2018; Osman et al., 2012).

However, this study has limitations, such as the limited number of participants, so it is hoped that further research will be able to increase this number. In addition, researchers wishing to conduct similar research should use populations other than people with psychodermatological conditions so that the usefulness of DASS-21 can be applied to in a wider clinical population.

Conclusion

The study aimed to determine the validity and reliability of DASS-21 in individuals suffering from psychodermatological conditions, namely psoriasis and atopic dermatitis. The results show that the Indonesian version of Lovibond's DASS-21 has good reliability. In addition, the results of testing the validity of the structure through factor analysis using CFA produced a model that is in accordance with Lovibond's theoretical model and is supported by items representing each DASS-21 dimension. Other evidence supporting the research is in the form of the concurrent validity results from the correlation tests of each DASS-21 subscale with the PHQ-9, GAD-7, and PSS-10 scales, which produced positive correlation values.[]

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