

ORIGINAL ARTICLE

Prevalence and Predictors of Anxiety and Depressive Symptoms among Adult Patients with Atopic Dermatitis in Malaysia Tertiary Referral Hospital

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ABSTRACT

Introduction: Atopic dermatitis (AD) is not only a cosmetic nuisance but is also associated with a significant impact on mental health and quality of life. Psychological symptoms are highly related to poor treatment adherence and recovery, more comorbidities, and a significant overall socioeconomic burden. Identifying the factors associated with anxiety and depression among patients with AD is important to modify and reduce the risk of developing these psychiatric complications. **Methods:** This was correlational research conducted in the dermatology clinic of four hospitals in Klang Valley, namely Hospital Kuala Lumpur, Hospital Tengku Ampuan Rahimah Klang, Hospital Selayang, and Hospital Ampang. By using a purposive sampling method, 128 samples (n=128) of adult patients with AD aged 18-65 were included. A questionnaire was administered regarding sociodemographic background, illness characteristics of AD, the Investigator's Global Assessment (IGA), Malay version of the Automatic Thought Questionnaire-17, GAD-7, and PHQ-9. **Results:** The prevalence of anxiety and depressive symptoms among adult patients with AD is 31.3% and 46.9% respectively. Multivariable logistic regression analysis revealed that age and personal maladjustment (PM) predict anxiety symptoms, while only negative self-concept/expectation (NSNE) predicts depressive symptoms. The hierarchical logistic regression model explained 51% (Nagelkerke's R²) of the variance in anxiety symptoms and 56% (Nagelkerke's R²) of depressive symptoms. **Conclusion:** There is a high proportion of anxiety and depressive symptoms among adult patients with AD which is associated with negative automatic thoughts. In the management of adult patients with AD, clinicians should consider mental health symptom screening and monitoring. *Malaysian Journal of Medicine and Health Sciences* (2023) 19(4):193-200. doi:10.47836/mjmhs19.4.29

Keywords: Atopic dermatitis, Predictors, Anxiety, Depression, Negative automatic thought

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INTRODUCTION

Atopic dermatitis (AD) is a chronic and recurrent inflammatory itchy skin disorder that is characterized by fluctuating symptoms, and unpredictable courses throughout life (1). AD is not caused by stress but appears to be triggered or exacerbated by stress, and emotional factors can influence the natural course (2). According to disability-adjusted life years (DALYs), AD is the skin disease with the largest disease burden among all non-fatal illnesses, coming in at number 15 (3). AD is associated with the risk of developing anxiety and depressive symptoms (4, 5) with 14% and 17% increased incidences of depression and anxiety, respectively (6). Lim et al reviewed data from Singapore's National Skin Centre from 2008 - 2009, people with AD have a considerable psychological burden, with anxiety

prevalence reaching 18% and depression prevalence reaching 5% (7). Correspondingly, local research by Tan et al. among patients at Hospital Queen Elizabeth, Kota Kinabalu, and Hospital Kuala Lumpur indicated a 12% prevalence of anxiety and a 5% prevalence of depression among people suffering from AD (8).

The consequences of anxiety and depression among patients with AD, are related to higher symptoms burden of AD, poor treatment adherence (9), more complications (10), poor recovery (11), and increase overall burden of illness and health outcome (12). The purpose of this study was to determine the prevalence and factors for anxiety and depression in atopic dermatitis patients. Additionally, it aimed to ascertain these factors in sociodemographics, illness characteristics, and negative automatic thoughts that predicted anxiety and depression symptoms.

Relatively, there has not been a lot of study on AD among adult patients, particularly in a local environment, it does appear that there was a strong and

favourable relationship between AD and anxiety and depression (13). Since there was a void in the literature addressing putative mechanisms driving these effects, research on NAT may help clinicians prevent or treat these psychological burdens despite the lack of clarity in understanding the process. According to Beck's cognitive theory, cognitive processes were assumed to be responsible for the emergence and maintenance of some maladaptive psychological states and specific psychopathology (14). Considering NAT was a huge component of cognitive models and has a direct link to the development of anxiety and depressive symptoms, it was deemed important to examine NAT among adult patients with AD.

In addition, a recent systematic review and meta-analysis discovered that earlier research used a variety of alternative definitions of anxiety and depression based on self-report or difference scales rather than clinical diagnosis (15). This study used the GAD-7 and PHQ-9 questionnaires to describe anxiety and depression symptoms while adhering to the diagnostic criteria of DSM-5 diagnosis, to compile what is presently known in this field, and to identify knowledge gaps.

MATERIALS AND METHODS

Study Design

This was a correlational research design that determines the association between AD and anxiety and depressive symptoms. National Medical Research Registry and Ethics Committee of the Ministry of Health via the National Medical Research Registry approved, and a research identification number was obtained [NMRR-19-2537-46374 (IIR)]. Permission was also acquired from the administrative office (Hospital Director) of Hospital Kuala Lumpur, Hospital Selayang, Hospital Ampang, and Hospital Tengku Ampuan Rahimah, Klang, as well as the Heads of the Department of Dermatology from those respective hospitals. The research team also wrote to the Ethics Committee for Research Involving Human Subjects, Universiti Putra Malaysia (JKEUPM) for acknowledgment. The study was conducted in compliance with the ethical principles outlined in the Declaration of Helsinki and Malaysian Good Clinical Practice Guidelines.

Patient Population/Participants

The sampling population was patients living with AD and were attending the Dermatology Clinic at Hospital Kuala Lumpur, Hospital Tengku Ampuan Rahimah, Klang, Hospital Selayang, or Hospital Ampang from July 1, 2020, to October 31, 2020. A 2-proportion sample calculation was used to determine the sample size, taking into account a 10% dropout rate. The estimated sample size of 128 was sufficient. Nonetheless, the current study looked at adult AD patients in four major tertiary referral hospitals in the Klang Valley, which serve a large population in Selangor and Kuala Lumpur,

increasing the study's generalizability.

The inclusion criteria where a deemed eligible person must have been diagnosed by the dermatologist/medical officer who works in the dermatology clinic to have AD based on the Hanifin and Rajka's criteria, with persistent AD (i.e., > 1-year history of disease), aged between 18 to 65 years old from the dermatology outpatient clinic, receiving clinical treatment at the study centers such as with regular follow-up, and a subject who was able to give consent for the study. Exclusion criteria were pre-existing major mental illness (such as any psychotic disorder, mood disorder, or substance disorder), unable to understand or comprehend the questionnaires, and pregnant women. The clinical diagnosis of AD has been made using Hanifin and Rajka's criteria, which were most often used in randomized controlled studies (16). Dermatologists from Malaysia (73%), Singapore (75%), and Thailand (90%) were more familiar with this criterion, according to a survey of Southeast Asian dermatologists (17).

Procedure

Participants have explained the purpose of this study, and upon their agreement, informed consent would be obtained. Consenting patients would be screened for inclusion and exclusion criteria before being included in the study. Subsequently, the eligible participants would be administered a questionnaire regarding sociodemographic background, illness characteristics of AD, Automatic Thought Questionnaire-17 to measure negative automatic thought, while anxiety symptoms were measured via the GAD-7 questionnaire, and depressive symptoms were measured using PHQ-9, in both Malay and English language. All participants were required to read and understand the consent form and participate voluntarily.

Variables/Measurement Scales

Investigator's Global Assessment (IGA)

Investigator's Global Assessment (IGA) is to assess the severity of AD for clinical purposes by the dermatologist. It is a static evaluation (no reference to baseline) of the overall severity of AD at a given time. It consists of a six-point scale, ranging from totally clear (0) to very severe atopic dermatitis (5), and allows rapid overall evaluation of disease severity (18).

The Malay Version of the Automatic Thought Questionnaire (ATQ- Malay)

The Malay Version of the Automatic Thought Questionnaire (ATQ- Malay) is a 17-item scale designed to measure the frequency of negative automatic thoughts over the past weeks (19). Participants rate items on a five-point Likert scale ranging from 1 (not at all) to 5 (all the time). Higher scores indicate greater negative automatic thoughts. Cronbach's alpha was 0.95 in the present study.

The Malay Version of the Generalised Anxiety Disorder Scale (GAD-7)

The Malay version of the Generalised Anxiety Disorder Scale (GAD-7) is a seven-item scale designed to measure anxiety (20). Participants rate items on a four-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). Higher scores indicate greater anxiety. Cronbach's alpha was 0.88 for the Malay version of the GAD-7 in the present study.

The Malay Version of the Patient- Health Questionnaire-9

The Malay version of the Patient Health Questionnaire-9 (PHQ-9) is a nine-item scale designed to measure depression (21). Participants rate items on a four-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). Higher scores indicate greater depression. Cronbach's alpha was 0.86 for the Malay version of the PHQ-9 in the present study.

The authors granted authorization to administer the ATQ-17 (19), GAD-7 (20), and PHQ-9 (21) scales after they were validated for use in the Malaysian context. According to the user handbook, the PHQ-9 and the GAD-7 can be used for free. In addition to having convenient use of Malay version instruments for the local community, the instruments were also having good validity and reliability profiles (22, 23).

Statistical Analysis

Data cleaning was carried out to identify any missing values, and clean for any double entries and outliers before data analysis. The skewness and kurtosis z scores were used to assess the normality of continuous data. If the z scores are higher than the cut-off limit of 3.29, the data were not normally distributed (24). Normally distributed data were presented in mean and standard deviation (SD), while non-normally distributed data were expressed in median and interquartile range (IQR).

As for inferential analysis, t-tests or Mann-Whitney were applied to determine the association of continuous variables with anxiety and depression as binary outcomes, depending on the normality of the data. The authors included all factors (free of multicollinearity issue) with a 0.25 level of significance in a logistic regression analysis. Hierarchical logistic regression was used for the analyses investigating predictors of AD and anxiety and depressive symptoms relationship across all groups. Significance was determined using nominal alpha ($p \leq 0.05$). All statistical analyses were conducted using SPSS version 23.

RESULTS

Descriptive analysis

We identified 128 adult patients with AD and the sociodemographic profile was summarized in Table 1. The median age of the participants was 25.0. The gender

Table 1: Descriptive data on sociodemographic profile, illness characteristics and negative automatic thought among patients with AD

Demographic variables	Median (IQR)	n (%)		
Hospitals				
HKL		46 (35.9)		
HSEL		29 (22.7)		
HA		20 (15.6)		
HTAR		33 (25.8)		
Age	25.0 (17.0)			
Gender				
Male		56 (43.8)		
Female		72 (56.3)		
Ethnicity				
Malay		66 (51.6)		
Chinese		45 (35.2)		
Indian		15 (11.7)		
Others		2 (1.6)		
Religion				
None		7 (5.5)		
Islam		72 (56.3)		
Buddha		31 (24.2)		
Hindu		7 (5.5)		
Christian		11 (8.6)		
Others		-		
Marital status				
Single		90 (70.3)		
Married/De Facto		36 (28.1)		
Separated/divorced/widowed		2 (1.6)		
Educational level				
None		1 (0.8)		
Primary education		3 (2.3)		
Secondary education		47 (36.7)		
Tertiary education		77 (60.2)		
Employment				
Employed		72 (56.3)		
Unemployed		55 (43.0)		
Income				
No income		55 (43.0)		
<5000		65 (50.8)		
5000-10000		6 (4.7)		
>10000		2 (1.6)		
Illness characteristics	Median (IQR)	n (%)		
Duration of AD (months)	144 (180)			
No. of visits in the last 1 year	4 (5)			
No. of admissions	0 (1)			
Area affected				
Face and neck		113 (88.3)	Yes	No
Arm and hand		126 (98.4)	15 (11.7)	
Leg and foot		117 (91.4)	2 (1.6)	
Front of body		96 (75)	11 (8.6)	
Back of body		86 (67.2)	32 (25)	
Generalized		61 (47.7)	42 (32.8)	66 (51.6)
IGA score				
Almost clear			8 (6.3)	
Mild			50 (39.1)	
Moderate			32 (25.0)	
Severe			38 (29.7)	
Medication				
Topical			73 (57.0)	
Topical + systemic			49 (38.3)	
Topical + phototherapy			6 (4.7)	
Topical + systemic + phototherapy			-	
Others			-	
NAT	Median (IQR)	(%)	n (%)	
ATQ 2-Category				
Low NAT (≤ 35)			81(63.3)	
High NAT (>35)			47(36.7)	
ATQ Total	30.5 (17.5) ¹	35.9	-	
NSNE (factor 1)	21 (12.5) ¹	35.0	-	
PM (factor 2)	10 (6.0) ¹	40.0	-	

of patients was almost equal in proportion, with more females than males. Most participants were unmarried and have completed their tertiary degrees. Nearly half of the participants were unemployed and have no source of income. The average of the participants reported a duration of AD of 12 years, required 4 times

dermatology clinic throughout the last year, and never been admitted to the ward for the management of AD. Almost half of the participants experienced generalized body areas affected by AD. The Investigator’s Global Assessment scores ranged from mild, to moderate and severe with the majority of participants receiving only topical medication was 57%. NAT profile of patients with AD demonstrated that 63% of the participants had low NAT scores and 36% had high NAT scores.

Prevalence of anxiety and depression

Prevalence anxiety symptoms were 31.3 % when the cut-off point of 10 was used for GAD-7, as suggested (4). Among these 16.4% were having moderate symptoms and 14.8% with severe symptoms. Additionally, the prevalence of depressive symptoms was 46.9% when using the cut-off point as recommended by (25). Among these, it is further divided into moderate (27.3%), moderate-severe (12.5%), and severe (7.0%) depressive symptoms (Table II).

For sociodemographic variables, only race indicated a significant association with anxiety symptoms (p= 0.040) and depressive symptoms (p= 0.032). For illness characteristics variables, none were significantly associated with anxiety symptoms whereas only the leg and foot area were significantly associated with depressive symptoms (p= 0.046). Meanwhile, across all domains, the NAT showed a significant association with anxiety and depressive symptoms (p <0.001).

Under simple regression analysis, race, NSNE, and PM were significantly associated with anxiety symptoms among AD patients. Under multivariable logistic regression, age, and PM were significantly associated with the anxiety symptoms with every one unit increasing age for those patients increasing the odds of being positive for anxiety symptoms by 1.051 (95% CI: 1.01, 1.10, p= 0.02). Additionally, for every one-unit increase in PM, the odds of being positive for anxiety symptoms rose by 1.44 (95% CI: 1.24, 1.60, p= 0.00).

Whereas, for predictors of depressive symptoms, under simple regression analysis, race, NSNE, and PM were significantly associated with depressive symptoms among AD patients. After adjusting other variables, only NSNE remained significantly associated with depressive symptoms. Every one unit increasing for those patients who scored in NSNE increased the odds of being positive for depressive symptoms by 1.31 (95% CI: 1.14, 1.52, p= 0.00).

To examine the contribution of each component and to understand whether the NAT factors and anxiety and depressive symptoms relationship differed across those groups, two hierarchical logistic regressions were

Table II: Hierarchical logistic regression on predictors of anxiety symptoms among patients with AD

Variables	Chi-square likelihood ratio	Nagelkerke’s R ²	aOR (95% CI)	VIF
Step 1	5.82	0.06		
Age			1.02 (0.99,1.05)	1.031
Race				1.031
Others (R)				
Malay			2.47 (1.11,5.51)	
Step 2	12.62*	0.19		
Age			1.01 (0.98,1.05)	1.208
Race				
Others (R)				
Malay			2.69 (1.12,6.44)	1.087
Duration of AD			1.00 (1.00,1.00)	1.272
IGA				1.545
Almost clear			-	
Mild			1.89 (0.57,6.30)	
Moderate			1.97 (0.60,6.49)	
Severe (R)				
Medic				1.529
Monotherapy (R)				
Combination			1.87 (0.70,4.98)	
Area affected				
Leg and foot				
No (R)				
Yes			3.04 (0.34,27.05)	1.059
Step 3	39.37**	0.51		
Age			1.05 (1.01,1.10)	1.28
Race				1.16
Others (R)				
Malay			1.75 (0.60,5.13)	
Duration of AD			1.00 (0.99,1.01)	1.32
IGA				1.55
Almost clear			-	
Mild			1.82 (0.42,7.87)	
Moderate			2.12 (0.49,9.14)	
Severe (R)				
Medic				1.55
Monotherapy (R)				
Combination			1.41 (0.45,4.44)	
Area affected				1.09
Leg and foot				
No (R)				
Yes			1.30 (0.12,14.45)	
NSNE			1.02 (0.93,1.13)	3.07
PM			1.44 (1.15, 1.81)	3.31

Nagelkerke’s R² = Adjusted percentage of variants explained by the model; aOR = Adjusted Odds ratio; CI = Confidence interval; VIF = Variance inflation factor. Noted:VIF > 5 suggesting collinearity issue. * = p < 0.05; ** = p < 0.001.

performed within a subset of the sample. For anxiety symptoms, predictors were entered in three steps. In step 1, the sociodemographic factors only accounted for 6% ($p = .06$) of the variance of anxiety symptoms among AD patients. The inclusion of illness characteristic factors in the second step resulted in a significantly improved model X2 (12.62, $p = .04$) accounting for 19% of the variance. Then in the final step, it further improved the model with X2 (39.37, $p = .00$) and Nagelkerke's R2 value was 0.51 explaining about 51% of the variance in the dependent variable having NSNE and PM. Results from hierarchical logistic regression analysis were consistent with predictions from the multivariate analysis with only age and PM predicted anxiety symptoms in AD patients in this study.

Likewise, predictors for depressive symptoms were entered in three steps. In the first block, race and marital status significantly predict the depressive symptoms accounting for only 7% ($p = .02$) of the total variance. However, the model improved non-significantly to 17% after adding factors in clinical characteristics, with X2 (10.61, $p = .32$). Finally, in the third block, the model improved significantly with X2 (56.04, $p = .00$) and Nagelkerke's R2 value was 0.58, explaining about 58% of the variance in the dependent variable, indicating that the model was good enough to predict depressive symptoms.

DISCUSSION

The present study demonstrated a balanced gender representative of the samples, as we understand that in general, gender is a critical determinant of mental health and mental illness. The data showed a higher rate of unemployment despite having secondary or tertiary education and no source of income. This could be explained by the influence of AD on one's employment as mentioned in another study, which includes reduced productivity (26), restrictions and avoidance of specific jobs (27), and workplace discrimination (28). However, this was unclear, either because of the country's low employment and wage predicament because of the prolonged movement control order (MCO) imposed in response to the Covid-19 pandemic, or because of the occupational impact of long-standing AD (29, 30).

The current study observed the characteristics of AD that may be associated with anxiety and depression. The average participant reported having had AD for 12 years duration, which was consistent with the nature of the illness, which is a chronic and relapsing course that commonly begins in infancy and can last into adulthood (31, 32). The illness duration might be associated with more psychological disturbances such as depression, anxiety, impaired quality of life, and low self-esteem (8, 33). An average of four visits were reported in the previous year before recruitment corroborated with other studies that showed adult patients with AD needed

Table III: Hierarchical logistic regression on predictors of depressive symptoms among patients with AD

Variables	Chi-square likelihood ratio	Nagelkerke's R ²	aOR (95% CI)	VIF
Step 1	6.34*	0.07		
Race				1.02
Others (R)				
Malay			2.06 (1.01,4.22)	
Marital status				1.02
Married (R)				
Non-married			1.70 (0.76,3.82)	
Step 2	10.61	0.17		
Race				1.06
Others (R)				
Malay			1.92 (0.90,4.12)	
Marital status				1.05
Married (R)				
Non-married			1.91 (0.81,4.53)	
No. of visits			1.03 (0.95,1.11)	1.17
IGA				1.69
Almost clear (R)				
Mild			3.42 (0.36,32.69)	
Moderate			5.16 (0.50,53.48)	
Severe			4.66 (0.41,53.22)	
Medication				1.58
Monotherapy (R)				
Combination			1.35 (0.54,3.41)	
Area affected				1.25
Face and neck				
No (R)				
Yes			2.00 (0.50,8.09)	
Leg and foot				1.18
No (R)				
Yes			2.94 (0.51,16.96)	
Front of body				1.68
No (R)				
Yes			0.80 (0.26, 2.45)	
Generalized				1.62
No (R)				
Yes			0.91 (0.36,2.31)	
Step 3	56.04**	0.58		
Race				1.16
Others (R)				
Malay			2.15 (0.76,6.06)	
Marital status				1.12
Married (R)				
Non-married			0.97 (0.30,3.12)	
No. of visits			1.02 (0.91,1.14)	1.22
IGA				1.72
Almost clear (R)				
Mild			0.54 (0.04,6.59)	
Moderate			1.71 (0.13,22.02)	
Severe			1.74 (0.12,24.95)	
Medication				1.59
Monotherapy (R)				
Combination			0.86 (0.25,2.94)	
Area affected				1.29
Face and neck				
No (R)				
Yes			0.76 (0.14,4.21)	1.20
Leg and foot				
No (R)				
Yes			2.56 (0.27,24.05)	
Front of body				1.70
No (R)				
Yes			0.91 (0.20,4.16)	
Generalized				1.65
No (R)				
Yes			0.71 (0.20,2.53)	
NSNE			1.31 (1.14,1.52)	3.10
PM			1.04 (0.84,1.29)	3.44

Nagelkerke's R² = Adjusted percentage of variants explained by the model; aOR = Adjusted Odds ratio; CI = Confidence interval; VIF = Variance inflation factor. Noted: VIF > 5 suggesting collinearity issue. * = $p < 0.05$; ** = $p < 0.001$.

to visit the clinic frequently and imposed a direct and indirect burden of illness, such as transportation costs, bills, and time away from work for appointments (29). Most of the individuals had a visible difference that affected their face, hands, or legs in which the levels of distress may be higher among those with noticeable changes.

According to survey data from regions across Asia (including Malaysia), there were significant diversity in current AD treatment which was influenced by accessibility and availability, responses to the medication

in which related to the variation of temperature, climate, and skin type (34). There were also differences in clinical presentation and treatment responses among individuals with darker skin tones and ethnic backgrounds may result in a delayed diagnosis, higher level of disease severity, and more severe disease progression, which leads to a higher degree of psychiatric symptoms (17, 35).

The proportion of participants with a high ATQ score is 36.7% enticed the authors' attention to understand the automatic cognition of the patient with AD and how this determinant plays a role in causing lifelong struggle among this cohort of patients. A negative and warped perception of reality, as indicated by a high level of negative automatic thoughts translated by a high level of ATQ, hindered rational interpretation of events. Some psychological states, such as anxiety and depression, are hypothesized to develop and persist as a result of these cognitive processes being distorted (36).

The cycle of itching and scratching has been associated with the emergence of anxiety and depression because those who engage in it are more likely to feel discomfort due to the effects of itching and pain, deformity, and perceived social shame (37). The onset, progression, and resolution of AD have all been directly impacted by this psychological distress, which has been associated with increased stress reactivity, raised cortisol levels, and compromised skin barrier function (11).

The main cognitive themes in anxiety, according to research, were perceived threat and vulnerability (38) and threatening and stigmatizing (39). In the present study, the authors discovered that personal maladjustment (PM) predicted anxiety symptoms among adult patients with AD in this cohort. Understanding PM is necessary for assessing a person's cognition, which has consequences for therapy. NSNE predicted depressive symptoms in this study population. According to cognitive-behavioral theory, loss and self-devaluation were the fundamental cognitive elements of depression (38). Conferring to the stress diathesis model, some beliefs constitute a vulnerability to depression, which is one of the most fundamental predictions of the cognitive model.

Finally, in terms of practical recommendations, optimizing care and treatment of visible conditions (AD) should be comprehensive, without overlooking the invisible component of AD burden, and emphasize the value of a multidisciplinary team approach. By utilizing directive cognitive and behavioural approaches to enhance unfavourable automatic thinking, CBT may be uniquely customized to each individual's psychopathology. In turn, this controls the overall condition-related distress, social and problem-solving abilities, itching and scratching management, and perceptions of one's body. Those with higher scores for anxiety, depression, and NAT could benefit from early

referral and prompt CBT initiation.

The employed of a cross-sectional design, which precludes inferences about causality for anxiety and depression, and AD, was a significant weakness of our work. It was impossible to tell whether psychological symptoms can be caused by AD or if they were part of the causative chain for skin disease. Another key drawback of our study was that we do not however certain if the high prevalence of anxiety was related to a flare-up of sickness, insufficient illness control, pandemic conditions, ubiquitous cognitive state, or bias. Furthermore, as compared to many studies, the present study had a relatively smaller sample size which in turn resulted in insignificant findings on sociodemographic and illness characteristic factors.

Purposive sampling methods were done due to the time constraints and a declining number of patients, hence random sampling was difficult to implement (40). Consequently, the authors' capacity to draw inferences about the entire population is hampered by subjectivity and bias in selecting study subjects. It increases the study's limitations, including the inapplicability of the results to the broader populace. The most notable downside was that the study was conducted during the peak of the Covid-19 pandemic, which influenced the conclusions reported in this study. Patients with lesser conditions who did not show up to the clinic and thus lost their chance to be included in the study may not necessarily benefit from the findings.

CONCLUSION

In a nutshell, AD was associated with more anxiety and depressive symptoms while NATs predict anxiety and depressive symptoms among adult patients with AD in this study. These findings underscored the need for clinicians to consider mental health symptom screening and monitoring in the assessment and management of AD patients, and that recognizing automatic thought can aid in reducing the likelihood of anxiety and depression symptoms. CBT is a well-researched intervention for modifying automatic thought patterns that could be conducted in the future on a similar sample of adult individuals with AD.

ACKNOWLEDGEMENTS

The authors would like to thank the Director General of Health Malaysia for his permission to publish this article. The Directors, of Hospital Kuala Lumpur, Hospital Selayang, Hospital Ampang, and Hospital Tengku Ampuan Rahimah, Klang, as well as the Heads of, Department of Dermatology of all these respective hospitals, are all thanked for granting permission for the present study to be carried out in each of their facilities. This paper is based on a dissertation submitted by Nur Hafidah Ishak in fulfillment of the requirements for the

degree of Master of Medicine (Psychiatry) at Universiti Putra Malaysia. This work is supported by Geran Inisiatif Putra Muda (GP-IPM): 03-9661200-14001 from Universiti Putra Malaysia, Malaysia.

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