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ORIGINAL ARTICLE

Factor structure and psychometric properties of the Arabic Brief COPE among Arab adolescents in the Klang Valley, Malaysia

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ABSTRACT

Objective: To examine the factor structure and internal reliability concerning the factors of Brief COPE (Coping Orientation to Problems Experienced) for assessing coping skills among Arab adolescents in Malaysia.

Methods: A total of 150 eligible Arab migrant adolescents (aged 14 to 18) from the Klang Valley in Malaysia who had experienced depression, anxiety and stress participated in this cross-sectional study from May to July 2022. The factor structure concerning the translated items was investigated utilising the exploratory factor analysis (EFA). Internal consistency reliability was evaluated using Cronbach's alpha coefficients. Moreover, parallel analysis was performed to count the number of components precisely.

Results: The Arabic version of Brief COPE demonstrated acceptable psychometric properties. Exploratory factor analysis (EFA) confirmed its suitability for factor extraction (KMO = 0.79; Bartlett's Test, $p < 0.0001$). A four-factor structure was identified, with all 28 items loading well into the model, explaining 52.3% of the total variance. Factor loadings ranged from 0.52 to 0.77, indicating strong construct validity. Internal consistency was satisfactory, with Cronbach's alpha ranging from 0.74 to 0.88.

Conclusion: This research confirms the validity and reliability of the Arabic version of the Brief COPE for usage with Arab migrants and it has the potential as a valid and reliable instrument for future use in assessing coping strategies among minority teenagers.

Keywords: Brief COPE (MeSH); Coping Orientation to Problems Experienced Questionnaire [Supplementary Concept] (MeSH); Coping Strategies (MeSH); Validity, Social Validity (MeSH); Research (MeSH); Reliability (MeSH); Arab adolescents (Non-MeSH); Factor Analysis, Statistical (MeSH).

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INTRODUCTION

Research on stress and coping methods has expanded tremendously over the last decades. Some individuals experience distress when they are in a difficult situation, while others can stay resilient.[1] Adolescence, between ten and nineteen years old, is a difficult transitional period in a person's life because of many concurrent emotional and physical changes,[2,3] and around 20% suffer from mental health issues.[4] Stress in adolescents can trigger many problems, adversely affecting their psychological and physical well-being, besides the deterioration of their academic performance.[5,6] Especially in the context of migration, which poses additional challenges due to various social, political, and financial factors.[7-10]

Accordingly, the ability to deal with the stress of migration and adapt to a foreign environment is probably a vital component in ensuring optimal physical and mental well-being.[11] Cognitive and behavioural approaches used to deal with stresses (either internally or externally) that are greater than the person's abilities are referred to as "copin".[12]

Numerous studies have highlighted the importance of coping methods as an individual's tool for managing stress.[11,13] According to research, the extent to which an individual is subjected to stressful situations and the strategies they employ to deal with the stresses and difficulties they face may significantly affect their mental and physical health, including their capability to perform their respective tasks.[14,15] The coping strategies are then classified as either problem-focused or emotion-focused. Problem-focused methods address challenges within the person's connection with his environment and can direct the person's internal and external behaviours. Emotion-focused techniques, on the other hand, aim to alter a person's emotional state to minimise the undesirable physical sensations caused by stress.[16]

The COPE (Coping Orientation to Problems Experienced) inventory's acronym, Brief COPE, refers to the tool utilised most frequently in prior investigations.[17] It is a short version of the initial 60-item COPE scale, with 14 subscales which were created for simplicity and decreased filling-up time. Furthermore, it is applied to measure effective (adaptive) and ineffective (maladaptive) coping strategies with respect to stressful life events. The Brief COPE was first validated and tested on individuals affected by a hurricane.[18]

Various research has investigated the Brief COPE structure in different

situations and populations and showed various factor loading extraction.[1,12,19,20] Furthermore, a sample of the Saudi population was used to validate the Arabic version of the Brief COPE.[21] Nevertheless, due to the considerable levels of reported stress in this demographic, the lack of coping research among adolescents using this scale, especially on Arabic adolescents, is alarming.[10] Therefore, having well-validated Arabic versions of the Brief COPE with fewer factors may benefit healthcare providers and researchers for simple and easy use.

The current study aims to evaluate the adapted Arabic version of psychometric properties, which includes its factorial structure, Exploratory factor analysis (EFA) and the internal consistency reliability of the scale and each factor component among Arab migrant adolescents in Klang Valley, Malaysia.

METHODS

In this cross-sectional study, Arab migrant adolescents who reside in Malaysia's Klang Valley were asked to complete the Arabic version of the Brief COPE inventory. Participants were recruited between May and July 2022 using convenient sampling because of its easy accessibility and time efficiency. This research was authorised by the Committee for Ethics of Universiti Putra Malaysia (JKEUPM-2021-912).

The eligible participants were included if they were Arabic adolescents between 14 and 18 years old who resided in the Klang Valley, the most populated area for Arab people. Moreover, to be qualified for inclusion, participants had to score higher than normal on any component of the depression, anxiety, or stress subscales on the Depression Anxiety Stress Scales-21 (DASS-21). The exclusion criteria were those non-Arab adolescents, those who scored normal in DASS-21, and those who refused to participate. All participants received information about the objectives and procedures of the research, and those who consented to take part digitally completed an informed consent form accompanied by their guardian's consent.

The participation of a total of 162 Arab adolescents who live in the Klang Valley, Malaysia, were recruited and only 150 participants were found eligible. A google form questionnaire was sent through WhatsApp, which requested to fill in the questionnaire. Appropriate instructions were also sent before the administration of the questionnaire.

The instrument used to gather the study's data has the following sections: (1) Demographic information: it includes age, gender and duration in Malaysia. (2) Depression Anxiety Stress Scales-21: The DASS-21 is the abbreviated version of the DASS-42 and comprises three self-report scales designed by Lovibond and Lovibond to gauge respondents' negative emotions (depression, anxiety, and stress).[22] Seven 4-point Likert scale statements are included in the triple subscales of this questionnaire, where greater scores denote larger degrees of mental health issues. For this investigation, the instrument's Arabic self-administered version that has been validated was employed. The adolescent population validated the Arabic version of the DASS-21, comprising depression, anxiety, and stress. The results indicate that Cronbach's alpha values were 0.75, 0.73, and 0.73, accordingly.[22]

(3) Brief COPE: The instrument is a short version of the COPE Inventory which comprises 28 items divided into four sub-scales and is given a score from one ("I have not been doing this at all") to four ("I have been doing this a lot"), explores 14 techniques: "active avoidance coping comprised the items relating to venting of substance use, emotions, self-blame, behavioural disengagement, as well as a statement from the distraction scale", "problem-focused coping deals with seeking social support, planning, active coping, as well as an element from seeking emotional and social support scale", "positive coping comprised using positive and humour reframing, including one item each from the emotional and acceptance, as well as social support scales", as well as "denial/religious coping comprises a factor relating to religious denial and coping as a coping mechanism.[18]

Translation of the questionnaire : The Arabic Brief COPE inventory for measuring coping skills was adapted from a previous study.[23] The similarity between the Arabic and the English versions was reviewed and approved by two independent healthcare experts who are Arabic native speakers, proficient in the English language, and knowledgeable about the research topic terminology.

In order to verify the face validity, 30 Arab adolescents who were not a part of the research were given the translated questionnaire as a pre-test. The pre-test participants were questioned on terms or expressions they believed to be unsuitable or tricky to comprehend. As a result, the questionnaire's final version was utilised after several terms and phrases were modified or changed to provide options.

The data analysis was conducted utilising Microsoft Excel 2010 and SPSS version 26.0. Here, for socio-demographic parameters, descriptive statistics were computed. In addition, Cronbach's alpha coefficients were employed to measure reliability, and the internal consistency of the whole scale and the items for each subscale was investigated. The alpha value $\alpha \geq 0.70$ is regarded as acceptable internal consistency, and factor loading levels exceeding 0.40 were also computed.

The factor structure concerning the translated items was examined employing the EFA. To precisely calculate the number of components, parallel analysis was done. The principal component analysis (PCA) is the approach of factor analysis that is most frequently utilised.

The sampling adequacy measure was examined by applying the Kaiser-Mayer-Olkin (KMO). The KMO test value ranges from 0 to 1, with a greater number indicating a more appropriate analysis. Correspondingly, Tabachnick and Fidell stated that to proceed with factor analysis, KMO must be equal to or greater than 0.60.[24] The occurrence of patterned correlations between the items was verified using Bartlett's Test for Sphericity ($P < 0.05$). Subsequently, the varimax approach was used to orthogonally rotate the derived factors, producing a better and more obvious structure. In addition, the factors' independence was presumed.[25]

Determining the number of

components is among the crucial and most challenging stages in factor analysis. The analysis of the scree plot and eigenvalues greater than 1 are the two most frequently used methods to identify the number of factors. Apart from that, parallel analysis is another method for calculating the number of factors, which is a reliable and appropriate technique for determining the number of factors.

This approach applies random data simulation to ascertain the number of variables. In addition to producing the real (actual) data set, the parallel analysis technique also produces a random artificial (simulative) data set by utilising statstodo to conduct an online application [26] after which the predicted eigenvalues are calculated. Provided that the eigenvalue in the simulated sample is greater than the real data, the number of factors is deemed significant in this technique.[27] This work has thus employed parallel analysis to precisely assess the number of factors. The analysis was then repeated using the number of factors proposed via parallel analysis.

RESULTS

Participants' socio-demographic characteristics: A total of 150 Arab students were eligible to participate, and have experienced at least one instance of depression, anxiety, and stress, according to the DASS-21 questionnaire. The participants' average age was 15.5±1.28 years. Male respondents comprise up to 37.3% of the sample, while female respondents comprise 62.7%. Most of them (80.7%) have lived in Malaysia for more than one year. indicates the findings for the participants' socio-demographic characteristics.

Exploratory factor analysis (EFA): Prior to the analysis, the 28-coping strategy-related items were reviewed to see if the data was eligible for EFA. The correlation matrix analysis revealed that there are repeating patterns in the connections between the variables. Additionally, screening demonstrated that multicollinearity was absent.

The findings pertaining to Bartlett's Test of Sphericity demonstrated patterned correlations between the items (P= 0.0001). The analysis of Kaiser-Mayer-Olkin (KMO) (0.79) concluded that the sample size was sufficient for EFA. Hence, the preliminary results show that factor analysis might be applied to the Arabic Brief COPE. Initial eigenvalue analysis revealed eight factors with a total explained variance of 69.4%, which could be extracted.

Additionally, an assessment using a screen test indicated a break after the eight-factor. (Figure 1). As was already established, additional support for the suggested usage of parallel analysis is included to enable choosing the number of factors easier. To do this, parallel analysis was conducted in this research. The analysis of (Table 11) makes it abundantly evident that the first factor's eigenvalue in the real data is 6.30 compared to 2.02 in the simulated data set. In the actual data, the second factor's eigenvalue is 4.15, but in the simulated data, it is 1.84. Moreover, in the actual data, the third factor's eigenvalue is 2.33, but in the simulated data, it is 1.73. Correspondingly, the fourth factor's eigenvalue in the real data is 1.85. Meanwhile, it is 1.63 in the simulated data, as shown in (Figure 2).

The choice to limit the number of components in the present research to four was collected depending on the justification provided above, and the analysis of the actual data was rerun

Table I: Participants' characteristics of socio-demographics

Variables		Frequency (n=150)	Percentage
Gender	Female	94	62.7
	Male	65	37.3
Nationality	Yemeni	32	21.3
	Libyan	24	16
	Palestinian	23	15.3
	Iraqi	22	14.7
	Syrian	15	10.0
	Sudanese	14	9.3
	Egyptian	13	8.7
	Jordanian	7	4.7
Duration in Malaysia	Less than 1 year	29	19.3
	More than 1 year	121	80.7

Table II: Eigenvalues with regards to the simulative and the data actual data

Factor	Eigenvalues of the actual data	Eigenvalues of the simulative data
1	6.30	2.02
2	4.15	1.84
3	2.33	1.73
4	1.85	1.63
5	1.36	1.55
6	1.31	1.48
7	1.12	1.40
8	1.00	1.34

Table III: Factor loadings from principal component analysis with varimax rotation for a four-factor solution with respect to brief coping scale (n=150)

No	Type of coping mechanisms	Items	F1	F2	F3	F4	VE*
16	Behavioural disengagement	I have given up the attempt to cope.	0.750	-	-	-	22.51%
6	Behavioural disengagement	I have given up dealing with it.	0.723	-	-	-	
13	Self-blame	I have been criticising myself.	0.700	-	-	-	
4	Substance use	I have been using alcohol or other drugs to make myself feel better.	0.686	-	-	-	
3	Denial	I have been saying to myself, "this is not real".	0.671	-	-	-	
26	Self-blame	I have been blaming myself for things that have occurred.	0.667	-	-	-	
8	Denial	I have been refusing to believe that it has happened.	0.662	-	-	-	
11	Substance use	I have been using alcohol or other drugs to help me get through it.	0.661	-	-	-	
21	Venting	I have been expressing my negative feelings.	0.641	-	-	-	
9	Venting	I have been saying things to let my unpleasant feelings escape	0.622	-	-	-	
19	Self-distraction	I have been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	0.590	-	-	-	
1	Self-distraction	I have been turning to other activities or work to calm my mind off things	0.532	-	-	-	
7	Active coping	I have been taking action to try to make the situation better.	-	0.738	-	-	14.85%
22	Religion	I have been trying to find comfort in my religion or spiritual beliefs.	-	0.721	-	-	
2	Active coping	I have been focusing my efforts on performing something regarding the situation I am in.	-	0.719	-	-	
25	Planning	I have been thinking hard about what needs to be taken.	-	0.696	-	-	
24	Acceptance	I have been learning to live with it.	-	0.671	-	-	
14	Planning	I have been trying to devise a strategy for what to do.	-	0.629	-	-	
20	Acceptance	I have been accepting the reality of the fact that it has occurred	-	0.550	-	-	
27	Religion	I have been meditating or praying.	-	0.528	-	-	
18	Humour	I have been joking about it.	-	-	0.773	-	8.34%
17	Positive reframing	I have been searching for something good in what happens.	-	-	0.741	-	
12	Positive reframing	I have been trying to see it from a different perspective to make it seem more positive.	-	-	0.688	-	
28	Humour	I have been making fun of the situation.	-	-	0.669	-	
10	Using instrumental	I have been getting advice and help from others.	-	-	-	0.762	6.61%
23	Using instrumental	I have been trying to obtain help or advice from others about what to do.	-	-	-	0.744	
5	Using emotional support	I have been receiving emotional support from others.	-	-	-	0.691	
15	Using emotional support	I have been understood and comforted from someone.	-	-	-	0.589	

Extraction Method: Principal Component Analysis. Rotation Method: Varimax. Factor loading < 0.4 was removed.VE*= Variance Explained

with the constrained number of factors. With only four factors, the re-performed EFA can describe a total of 52.3% of the variation.

The analysis of (Table III) reveals that the EFA possesses attained a basic structure in which each component is expressed by multiple items. Here, each load

Table IV: Arabic Brief COPE's reliability of the dimensions

No	Factor	Number of items	Mean (SD)	Cronbach's alpha
1	F1	12	28.94 (8.71)	0.88
2	F2	8	23.14(5.58)	0.84
3	F3	4	10.49 (3.59)	0.78
4	F4	4	10.68(3.11)	0.74

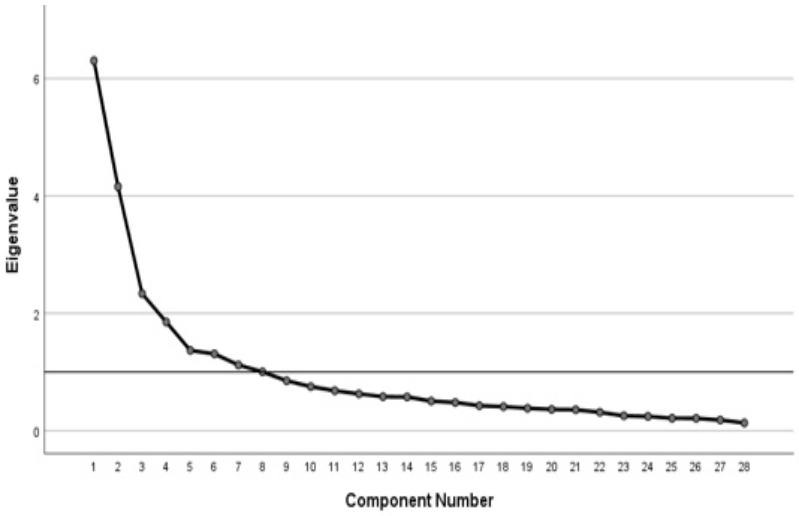

Figure 1: Scree plot of the Arabic Brief COPE.

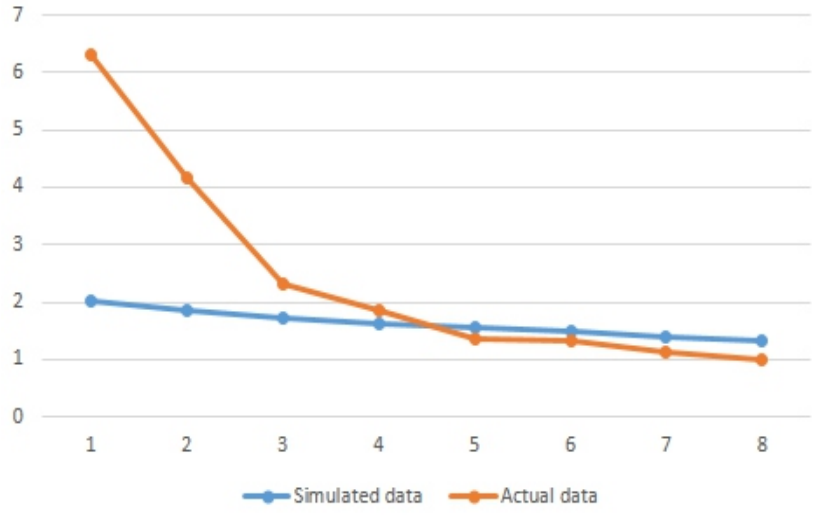

Figure 2: A scree plot presenting the simulated (random) and actual (observed) eigenvalues attained in a parallel analysis of the Arabic Brief COPE.

heavily exclusively on that factor utilising the aforementioned criteria. Each factor has at least three to five items with substantial loadings, indicating that it is a solid and stable factor.

It is also evident that the first factor's rotational factor loadings range between 0.53 and 0.75, the second factor ranges between 0.52 and 0.73, the third factor ranges between 0.66 and 0.77, and the fourth factor ranges between 0.58 and 0.76.

The choice to limit the number of components in the present research to four was collected depending on the justification provided above, and the analysis of the actual data was rerun with the constrained number of factors. With only four factors, the re-performed EFA can describe a total of 52.3% of the variation.

The analysis of (Table III) reveals that the EFA possesses attained a basic structure in which each component is expressed by multiple items. Here, each load heavily exclusively on that factor utilising the aforementioned criteria. Each factor has at least three to five items with substantial loadings, indicating that it is a solid and stable factor.

It is also evident that the first factor's rotational factor loadings range between 0.53 and 0.75, the second factor ranges between 0.52 and 0.73, the third factor ranges between 0.66 and 0.77, and the fourth factor ranges between 0.58 and 0.76.

Internal consistency reliability: The overall internal consistency reliability of the Arabic Brief COPE was acceptable with Cronbach's alpha coefficient (α = 0.86). Each internal consistency reliability with respect to the factor was also measured, utilizing Cronbach's alpha coefficient. The first factor obtained (α=0.88), the second factor obtained (α=0.84), and the third factor obtained (α=0.78), and the fourth factor obtained (α=0.74), which is greater than the original Brief COPE(18).Tablel V indicates the summary findings with respect to the internal consistency reliability for Arabic Brief COPE.

DISCUSSION

This research analysed the factor structure of the Brief COPE utilising a sample of Arabic immigrant adolescents in Klang Valley, Malaysia, who had depression, anxiety, and stress. The EFA identified four factors, with all 28 items fitting well into the four components, with a loading factor of more than 0.4. It presents a good psychometric property for all the 14 subscales listed in the authentic Brief COPE, with a high Cronbach's alpha coefficient for the whole scale of 0.86. Most coping

strategies demonstrated acceptable internal consistency, with Cronbach's alpha values exceeding 0.7, as shown in Table IV. This further supports the reliability of the Arabic Brief COPE.

The results in our sample of Arab migrant adolescents with depression, anxiety, and stress were indicated by four broader coping dimensions, which is a similar number of factors to the previous proposed study in Arab Iraqi undergraduates,[29] and in contrast to another study among Arabic adults. [21] The first factor in our study includes two items: Behavioural disengagement, Self-blame, Denial, Self-distraction, Substance abuse and Venting. This is similar to the previous study among Arabic adults, which identified these subscales as indicators of maladaptive coping strategies. The study revealed that substance-use techniques were recognised as a considerable risk indicator, demonstrating their potential as a coping mechanism that individuals may readily employ during periods of distress. Additional research has indicated that psychologists who used the coping mechanism of 'denial' exhibited more severe symptoms of depression. In contrast, previous research discovered a significant association between denial and heightened levels of anxiety in those with preexisting anxiety.[30] Furthermore, we found the mean score of the first factor was high, which could be due to the most frequently maladaptive strategies that they use to deal with their depression, anxiety, and stress status.

The second component comprised two items: active coping, acceptance, religion, and planning. In our research, the sample consists only of individuals who identify as Muslims with their religious affiliation. Moreover, it is observed that these individuals commonly rely on religion as a means of dealing with various challenges and stressors. Perior's study combined the religion and acceptance subscales into a single component. The Muslim perspective on religiosity encompasses a larger and more versatile understanding, wherein religion functions as a guiding framework towards an individual's final life purpose and an ongoing connection with God.[31]

The third factor includes two items: positive reframing and humour. Some other research has documented a beneficial association between positive reframing and the use of humour. The result implies that those who can see challenging events favourably and reinterpret them positively are also inclined to employ humour as a coping mechanism.[21]

Finally, the fourth factor includes two items from using instrumental and two from using emotional support. The findings are the same as those found in previous research conducted on the Saudi population,[21] patients with advanced cancer in Indonesia,[19] individuals from Greece[32] and HIV patients from India.[33] Theoretical perspectives suggest that instrumental support coping entails seeking assistance and guidance from others on appropriate actions, whereas emotional support involves seeking comfort, emotional assistance, and compassion.

The variables that surfaced across diverse research in the prior literature had varying counts and labels, perhaps attributable to the complicated nature of coping aspects across many stressors and research groups. A three-factor model was discovered by,[34] and it matches the original scale factors proposed (Emotion-focused, problem-focused, and avoidance coping).[15] According to different research, the Brief COPE had a six-dimensional structure with 24 items that loaded into a six-factor model (humour coping, religious coping, substance-use coping, disengagement coping, support-seeking coping, and engagement coping). Meanwhile, in a Malaysian study, 26 items were loaded well into the nine-factor components.[1]

Moreover, in the United Arab Emirates, research among nurses showed that the scale had 22 items loaded into a two-factor scale.[35] A previous study in South India investigated the underlying structure of the Tamil version of the Brief-COPE among adult individuals living with HIV/AIDS. The findings revealed a five-factor model with 17 items (active planning, social support, avoidant emotions, substance use, and religion).[33] A similar result in Keney among caretakers for relatives affected by HIV/AIDS identified five distinct components (emotional and instrumental support; planning; active coping and acceptance; self-blame and behavioural disengagement; religion; positive reframing and humour; denial and venting).[36] Another study was conducted among Greek adults [32] and found that 28 items were loaded with eight factors (behavioural disengagement, humour, religion, substance use, active/optimistic, seeking support, avoidance, and expression of negative feelings). The Brazilian Portuguese version had 20 items loaded on three factors ;[20] the Indonesian study among advanced cancer patients had five-dimensional components with 21 things (avoidance, religion and acceptance, social support coping, problem-solving, and distraction.[31]

The internal consistency for the total scale was 0.86, and subscales ranged from 0.74 to 0.88. This study's reliability findings were consistent with those of the original scale, which ranged from 0.50 to 0.90.[18] The Cronbach's alpha coefficients were also similar to those of previous studies.[34,15,1,20,31] Meanwhile, others indicated a considerably lower range of alpha coefficients was found.[32,33] Hence, it is advisable to assess the reliability of these scales in upcoming research endeavours.

Testing this new structure in Arab migrant adolescents who have faced a stressful event during migration may be helpful for further research. The clinical significance of validating the Arabic Brief COPE among Arab adolescents in Malaysia lies in enhancing the cultural appropriateness and effectiveness of coping assessment tools for this specific population. By validating this tool, healthcare professionals can better understand and address the coping strategies used by Arab adolescents in Malaysia when dealing with stressors, which can ultimately lead to more tailored and effective interventions to support their mental health and well-being.

In addition, this study contributes to developing and refining coping scales and provides essential information about them. The main advantage of the current study is that it is the first to

analyse the validity and reliability of the Arabic Brief COPE on Arab adolescent migrants in Malaysia. A study population is a mixed group of nationalities (Arab people). Despite its strengths, the sample size is small. Here, the constraint of the research location in the Klang Valley area causes the outcomes to not apply to all Arab adolescents in Malaysia. This impacts the generalizability and accuracy of the study findings. The constraint of focusing on the Klang Valley area restricts the applicability of the results to Arab adolescents beyond this specific region in Malaysia. This limits the broader understanding of coping strategies among the entire Arab adolescent population in the country. The second drawback is that this study's results may not be accurate due to bias caused by the convenient sampling technique. Therefore, subsequent studies are advised to reproduce the findings using a greater sample size to provide conclusions that can be applied, and additional presumptions for a verified validation evaluation must be given. Subsequent research in these areas will benefit from the data that the current study has to offer.

CONCLUSION

This research represents the initial investigation to establish the factor structure and assess the psychometric properties of the Arabic version of the Brief COPE among Arab migrant adolescents in the Klang Valley in Malaysia. The scales were determined to be valid and reliable in evaluating coping methods. Therefore, the scales might be conveniently used for further research by researchers and healthcare professionals to assess the coping strategies used by minority adolescents. Additionally, various Arabic-speaking communities might use this instrument.

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AUTHORS' CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

YS & AZFA: Conception and study design, acquisition, analysis and interpretation of data, drafting the manuscript, approval of the final version to be published

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Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

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