ORIGINAL ARTICLE

Relationship between Socioeconomic Risk Factors, Psychological Inflexibility, and Depression among Individuals Living in Rural Areas

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ABSTRACT

Introduction: A high prevalence of depression in rural areas has led to increases in suicidality. Our study aim is to investigate the role of psychological inflexibility as a mediator in the relationship between socioeconomic risk factors and depression in a rural population in Borneo. **Methods:** 115 participants were enlisted in this cross-sectional study that utilized convenience sampling of all participants in a community healthcare program. Three questionnaires were used: the sociodemographic risk factor questionnaire, the PHQ-9 questionnaire to measure depression, and the AAQ-II questionnaire to measure psychological inflexibility. The sociodemographic data was analyzed and described using descriptive statistics using IBM SPSS version 28.0. The statistical analysis of the mediating model was carried out using PLS-SEM and SmartPLS 4.0 (Henseler et al., 2016). An indirect effects analysis was performed on the structural model to explain the mediating effect of psychological inflexibility between socioeconomic factors and depression. **Results:** The analysis showed that psychological inflexibility acts as a mediator in the relationship between both being married and native, and depression. Other socioeconomic risk factors such as gender, employment, and education level did not mediate between psychological inflexibility and depression. **Conclusion:** Marriage and native ethnicity are identified as a buffer and protective factor from psychological inflexibility and depression. Future research should focus on establishing a clearer picture of how marital status and native ethnicity of Sabah affects psychological flexibility and mental health.
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INTRODUCTION

Over the past decade in Malaysia, prevalence of mental disorders has been dramatically increased (1). The rural region of East Malaysia had the highest prevalence of mental disorders, at 43% (1). Malaysia is transitioning from a middle-income country to a high income country, with rapid cultural and lifestyle changes due to increased urbanisation and globalisation, and associated increased levels of perceived stress (2). Despite the huge differences between developing and developed countries, access is the major issue in rural health around the world. Even in the countries where the majority of the population lives in rural areas, the resources are concentrated in the cities (3). Sabah is one of the state in Malaysia that has diverse culture and ethnicity. This can correlate to the majority of natives people who lives in the rural area in Sabah in which their quality of life and basic needs are not guarantee secured.

Besides that, depression consistently exists in societies around the world and its incidence is rising globally. The recent rise in suicidal attempts and psychiatric disorders within our society had called for more vigilance in efforts to determine the amount, type, variety, and distribution of mental disorders in our increasingly modernised environment. There is no study conducted in Sabah to correlate socioeconomic risk factors and prevalence of depression among natives people who lives in the rural community, and hence it is crucial that prior to doing descriptive or inferential analysis, we perform preliminary analyses to assess the reliability and validity of conventional research instruments. Hence, our study aim is to investigate the role of psychological inflexibility as a mediator in the relationship between

socioeconomic risk factors and depression. We target to see whether there are correlational relationships between socioeconomic risk factors, depression, and psychological flexibility, and then see if psychological inflexibility is a factor that can be targeted as a mediator between the non-modifiable socioeconomic risk factors and the psychological illness.

MATERIALS AND METHODS

Participants
This was a cross-sectional study that utilized convenience sampling. The sample population consisted of all participants in a community healthcare program organized by a university hospital in Sabah state. A total of 115 participants were involved in this study, and there were no dropouts. The inclusion criteria for this study were being aged 13 years old and above and having the ability to comprehend the questionnaires. The exclusion criteria were being under 13 years old, or having any acute medical or psychiatric illness. Hence this study included a healthy study population. This study was carried out in accordance with the criteria for Strengthening the Reporting of Observational Studies in Epidemiology (STROBE). The approval and ethical clearance from the Medical Research Ethics Committee, Faculty of Medicine and Health Sciences was attained upon commencement of the study [Approval Code: JKEtika 1/22 (5)].

Instruments
This questionnaire contains three sub-sections: the sociodemographic risk factor questionnaire, the PHQ-9 questionnaire to measure depression, and the AAQ-II questionnaire to measure psychological inflexibility.

Socioeconomic Risk Factors Questionnaire
This was a brief survey in which demographic information such as gender, age, ethnicity, education level, marital status, employment status, house ownership, car ownership, and internet access were asked.

Patient Health Questionnaire (PHQ-9)
Depression was assessed using the Patient Health Questionnaire (PHQ-9), a versatile tool for screening, diagnosing, monitoring, and assessing the severity of depression. The PHQ-9 was available in two languages, the Malay version, and the English version. This study found that the Malay version of the PHQ-9 was a valid and reliable tool for identifying depression in Malaysia, where the majority participants understood the Malay language better. The severity of depression was determined by the PHQ-9 scores, which ranged from 0 to 27. Each of the nine items was scored on a scale of 0 to 3 (not at all to nearly every day). PHQ-9 scores of 4 or less, 5 to 9, 10 to 14, 15 to 19, and 20 to 27 were classified as no depression, mild depression, moderate depression, moderately severe depression, and severe depression, respectively (4).

The Acceptance and Action Questionnaire-II (AAQ-II)
The study utilized the Acceptance and Action Questionnaire-II (AAQ-II) to assess psychological inflexibility among the participants. Psychological flexibility refers to the capacity to recognize and adjust to situational demands in order to achieve personally significant long-term goals. Greater psychological inflexibility has been consistently linked to increased stress, anxiety, depression, and decreased well-being across a wide range of populations and conditions (5-7). The study used two versions of the AAQ-II, the Malay version and the English version. The Malay version was used, which was developed by Shari et al. (8) and had a Cronbach's alpha of 0.91, excellent parallel reliability, and adequate concurrent validity.

Data Collection and Analysis
This study's data collection period lasted from April 1, 2022 to September 31, 2022. The locations were chosen based on the "Program KPT Prihatin Komuniti Sejahtera (KRIS)" implementation schedule. The surveys were completed by the participants, but some questions had missing data, and corrections were made accordingly. The sociodemographic data was analyzed and described using descriptive statistics such as frequency, percentage, mean, and standard deviation using IBM SPSS version 28.0. To facilitate analysis, categorical variables were transformed into dummy variables. Kurtosis and skewness measurements were used to determine the normality of the test variables, which should be between -2 and 2 for skewness and -10 and 10 for normal kurtosis to indicate a normal distribution (9). The statistical analysis of the mediating model was carried out using PLS-SEM and SmartPLS 4.0 (10). To ensure that the measures used in the study were adequate, the measurement model was evaluated for indicator reliability and validity (11). This entailed determining the convergent and discriminant validity as well as the reliability of each item and construct for internal consistency. An indirect effects analysis was performed on the structural model to explain the mediating effect of psychological inflexibility between socioeconomic factors and depression. The R-squared (R2) value, the significance of the indirect effects using the p-value and t-value were all evaluated during the structural model assessment (12).

RESULTS

Sociodemographic of participants
The data presented in Table I represents demographic information collected from a sample of 115 individuals. The variables analyzed include gender, age, ethnicity, education level, marital status, employment status, house ownership, car ownership, and internet access. In terms of gender, 53 individuals (46.1%) identified as male and 62 individuals (53.9%) identified as female. The mean age of the sample was 42 years old, with a standard deviation of 17.86. In terms of ethnicity, 56 individuals

Table I: Respondents' sociodemographic profile (N = 115)

	Variables	Frequency (%)	Mean (SD)
Gender	Male	53(46.1)	
	Female	62(53.9)	
Age			42(17.86)
Ethnic	Native	56(48.7)	
	Non-Native	59(51.3)	
Education Level	Less than High School	21(18.3)	
	More than High School	89(77.4)	
	No Answer	5(4.3)	
Marital Status	Single	35(30.4)	
	Married	80(69.6)	
Employment	Employed	58(50.4)	
	Not Employed	54(47.0)	
	No Answer	3(2.6)	
House Ownership	Own a House	76(66.1)	
	Not Own a House	39(33.9)	
Car Ownership	Own a Car	68(59.1)	
	Not Own a Car	45(39.1)	
	No Answer	2(1.7)	
Internet Access	Has Internet Access	96(83.5)	
	No Internet Access	17(14.8)	
	No Answer	2(1.7)	

(48.7%) identified as Native, while 59 individuals (51.3%) identified as Non-Native. In terms of education level, 21 individuals (18.3%) having less than a high school education, 89 individuals (77.4%) having more than a high school education, and 5 individuals (4.3%) not answering the question. Regarding marital status, 35 individuals (30.4%) were single, and 80 individuals (69.6%) were married. The employment status of the sample showed that 58 individuals (50.4%) were employed, 54 individuals (47.0%) were not employed, and 3 individuals (2.6%) did not answer the question. In terms of house and car ownership, 76 individuals (66.1%) reported owning a house and 68 individuals (59.1%) reported owning a car. 39 individuals (33.9%) reported not owning a house and 45 individuals (39.1%) reported not owning a car. Two individuals (1.7%) did not answer questions about housing and transportation. Finally, the internet access of the sample showed that 96 individuals (83.5%) reported having internet access, while 17 individuals (14.8%) reported not having internet access. Two individuals (1.7%) did not answer the question.

Measurement Model Assessment
A total of 115 samples were used to assess the validity and reliability of the measurement and structural models. The initial focus was on testing the reflective constructs of psychological inflexibility and depression for their validity and reliability. To establish convergent validity,

it was necessary to have an average variance extracted (AVE) greater than 0.5 and a composite reliability (CR) greater than 0.7 (Hair et al., 2021). However, two indicators had to be removed due to insufficient outer loadings. Table II shows that all reflective constructs have achieved convergent validity and reliability. The heterotrait-monotrait (HTMT) method was then applied to determine the discriminant validity of the measures. For the HTMT to have discriminant validity, the correlation between each pair of latent exogenous constructs must be less than 0.85 (Voorhees et al., 2016). The results in Table III, with all constructs having HTMT values less than 0.85, provide evidence of the discriminant validity of the measures.

Structural Model Assessment
Our study aimed to analyze the collinearity among the study variables to avoid any problems in the structural model due to lateral collinearity. As per Table IV, the inner VIF values were all below 5, indicating no significant collinearity issues among the predictor constructs. To estimate the path coefficient (β), t-values, p-values, and R^2 of the structural model, we employed a bootstrapping method with 5000 samples. Figure 1 depicts the R^2 values, which ranged from 26.3% to 38.9% of the exploratory variance. The mediator analysis was conducted using the product of coefficient approach with bootstrapping resampling (Preacher & Hayes, 2008). The results showed that psychological inflexibility acts as a mediator in the relationship between being married, native, and depression. This implies that being married is associated with lower levels of psychological inflexibility, which in turn leads to lower levels of depression. This highlights the importance of psychological flexibility, or the ability to adapt to changing circumstances, in maintaining mental health, especially in close relationships like marriage. Our findings also suggest that being native may protect against psychological inflexibility and reduce the risk

Table II: Results of measurement model

Construct	Items	Loadings	CR	AVE
Psychological Inflexibility	PF_1	0.695	0.903	0.573
	PF_2	0.831		
	PF_3	0.811		
	PF_4	0.616		
	PF_5	0.824		
	PF_6	0.770		
	PF_7	0.729		
Depression	PHQ_2	0.717	0.874	0.500
	PHQ_3	0.656		
	PHQ_4	0.633		
	PHQ_6	0.736		
	PHQ_7	0.810		
	PHQ_8	0.691		
	PHQ_9	0.692		
	PHQ_2	0.717		
	PHQ_3	0.656		

Table III: Discriminant Validity using HTMT ratio.

No.	Construct	1	2	3	4	5	6	7	8	9
1	Depression									
2	Employed	0.328								
3	Has Internet Access	0.162	0.044							
4	Male	0.175	0.165	0.257						
5	Married	0.418	0.251	0.066	0.043					
6	More than High School	0.102	0.02	0.23	0.129	0.294				
7	Native	0.209	0.086	0.193	0.115	0.087	0.065			
8	Own a House	0.336	0.248	0.063	0.077	0.596	0.206	0.161		
9	Psychological Inflexibility	0.675	0.263	0.113	0.149	0.426	0.113	0.214	0.343	

Table IV: Results of indirect effect

| Relationship	β	t	p	VIF	Supported
Married → Psychological Inflexibility → Depression	-0.461	2.778	0.005	1.67	Yes
Employed → Psychological Inflexibility → Depression	-0.210	1.763	0.078	1.14	No
Has Internet Access → Psychological Inflexibility → Depression	-0.159	1.379	0.168	1.16	No
Male → Psychological Inflexibility → Depression	-0.205	1.692	0.091	1.14	No
Native → Psychological Inflexibility → Depression	-0.345	2.109	0.035	1.08	Yes
Own a House → Psychological Inflexibility → Depression	-0.079	0.509	0.611	1.63	No
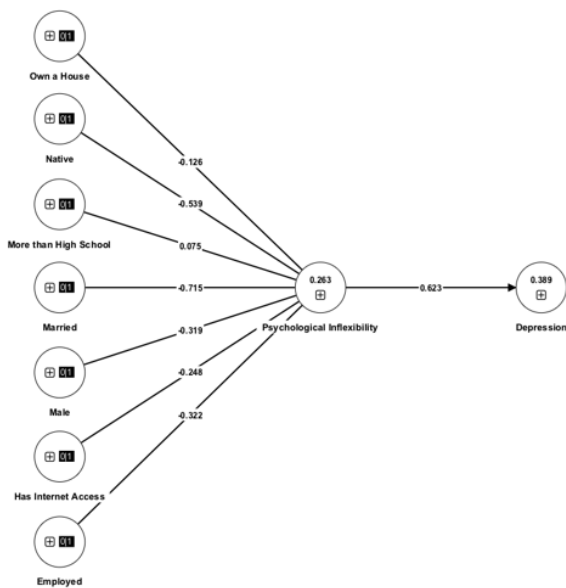
Figure 1: Results of structural model

of depression. The results of the structural model are presented in Figure 1.

DISCUSSION

This study's primary objective was to investigate the role of psychological inflexibility as a mediator in the relationship between socioeconomic risk factors and depression. The findings revealed that being married and being a native have indirect effects on depression via psychological inflexibility. Our research emphasizes the importance of marriage, as it can aid in reducing depressive symptoms and may protect individuals from developing psychological inflexibility. One of the possible explanations for this finding is that marriage can provide a supportive and comforting environment that can act as a buffer against psychological inflexibility (15). Having a spouse can provide emotional support, comfort, and understanding, allowing individuals to feel more secure and confident in their ability to navigate life's obstacles (16). In addition, the process of navigating disagreements and overcoming obstacles within a marriage can help individuals develop greater flexibility and resilience in their thinking and behavior, thereby decreasing their risk of depression (17). In addition, marriage may provide social support and connection, which is known to protect against depression (18). Having someone to confide in, share experiences with, and receive support from can help individuals feel less isolated and alone, thereby decreasing their risk of developing depression. In conclusion, marriage acts as a buffer against psychological inflexibility and can alleviate depression by offering emotional support, fostering resilience, and fostering social connection. Despite the fact that not all marriages are equally advantageous, research indicates that marriage can play an important role in promoting mental health and well-being.

Moreover, nativity, or being indigenous to a specific region or culture, can act as a buffer against psychological inflexibility and, consequently, reduce the risk of depression. Several variables, including cultural identity and social support, can explain the connection between nativity and psychological adaptability. First, cultural identity is essential to an individual's psychological health (19). Having a strong

sense of belonging and cultural identity can contribute to psychological adaptability (20). This is due to the fact that a secure cultural identity enables individuals to utilize their cultural values, beliefs, and practices to navigate life's challenges (21). This grounding in one's own culture provides a stable foundation, allowing individuals to adapt to stressors more effectively and reduce the likelihood of experiencing depression. Social support is an essential component of mental health and resilience (22). Native people are more likely to have access to a social network within their community (23). These support networks may consist of family members, friends, and cultural organizations. This type of social support assists individuals in coping with stressors, developing problem-solving skills, and maintaining emotional equilibrium. Consequently, natives may have a greater degree of psychological flexibility, which reduces the risk of depression.

Basic needs are typically defined as minimal lists of elements that individuals require to meet basic necessities and live a decent life (24). However, despite being considered basic needs, certain socioeconomic factors such as employment status, internet access, and having a home for shelter were not found to be associated with psychological inflexibility and depression in this study. This disparity could be explained by the assessment's lack of other critical elements, which could have provided a more comprehensive understanding of the socioeconomic risk factors. Access to other basic resources, such as electricity, clean water, healthcare facilities, and public transportation, may be limited in some cases, especially for those living in rural areas. As a result, the lack of these resources may limit their ability to buffer against psychological rigidity and depression. This idea is supported by a 7-year longitudinal population study (25), which found that increased hardship in material standards of living, such as financial strain, deprivation, and poverty, increased the risk of depressive symptoms and major depression. The relationship between basic needs and mental health outcomes is complex and influenced by a number of factors, including the relative importance of various needs (26), the presence of stressors (27), individual resilience (28), and the interaction of various contextual factors (29). A comprehensive understanding of this relationship necessitates taking into account a wide range of factors, including cultural, social, and individual characteristics that may amplify or mitigate the effects of basic needs on psychological inflexibility and depression. While meeting certain basic needs can help you live a better life, their impact on mental health outcomes such as psychological inflexibility and depression is complex. Future research should look at a broader range of variables to better understand the complex interplay between basic needs, socioeconomic factors, and mental health outcomes.

Higher levels of education are typically regarded as protective factors against anxiety and depression, enhancing human capital and facilitating overall success and emotional well-being (30, 31). This protective effect frequently accumulates over time. The relationship between education and mental health, on the other hand, is not strictly linear and can be influenced by other factors such as poverty and limited resources. Education does not appear to provide the expected protection against depression in this study. This departure from the norm can be attributed to the high prevalence of poverty in the rural areas studied. Poverty and its associated stressors, such as limited access to basic needs, healthcare, and professional development opportunities, may negate education's protective effects on mental health. Furthermore, data from the Department of Statistics Malaysia's 2020 (32) report highlight the severity of poverty in these areas. Sabah, for example, has the highest rate of absolute poverty in the country, at 25.3 percent. The Ministry of Economy's Twelfth Malaysia Plan for 2021-2025 (33) reveals that the majority of poor households are located in Sabah. These households lag socioeconomically in terms of education, technical skills, and entrepreneurship skills, limiting their access to suitable employment opportunities even further. Significant socioeconomic disparities can exacerbate feelings of relative deprivation and social comparison, potentially exacerbating mental health problems such as depression. While higher education generally provides protection against anxiety and depression, the context in which individuals live can significantly influence, or even negate, this protective effect. When studying the relationship between education and mental health and designing interventions to promote mental well-being, contextual factors such as poverty, inequality, and limited resources must be carefully considered.

The study revealed marriage can be a protective factor from psychological inflexibility and depressive symptoms. Hence, it is important to ensure that informal social support networks remain in rural areas, where the familial structures are generally more intact. Informal social groups in religious or cultural organisations in rural areas can be helpful, as there is generally minimal access to formal therapy services in rural areas. Cultural identity is an important role in promoting psychological flexibility and mental health in this study. Developmental projects in conservation and tourism involving indigenous communities can help to educate and understand their own culture, custom and belief to consolidate their cultural identity. Promoting tourism attraction and conservation helps to enhance employment opportunities, income and infrastructures which can be a major influence on the economy of the local population to tackle the issue of poverty, to improve their standard of living and basic needs, and reducing the prevalence of depression.

This study highlighted the importance of healthcare services to the local population. Community outreach

programs by healthcare provider from government and non-government organization plays a crucial role in fostering resilience, psychological flexibility, promote social support and connection within the networks of communities. Through community-based programs, we can understand the demography, socioeconomic stressors, and disease burden in the local population to facilitate in the implement of preventative mental health strategies that target psychological inflexibility such as mindfulness-based interventions like Acceptance and Commitment Therapy. The involvement of public health and social welfare in the communities are significant roles in determining and tailoring interventions to address the specific needs of the local population to enhance treatment efficacy and promote psychological flexibility.

The study has a few limitations that need to be highlight. Firstly, the questionnaire for socioeconomic risk factors needs to improvise and tailored accordingly to the local sociodemographic. Second, the data collection for the study only taken place in a small district. The study should include town district together with rural villages to identify the consistency of the analyzed data. Lastly, a bigger sample size should include other districts. This is because certain districts have more specific ethnicity living at a community. It will be helpful to have more other ethnicities to compare between native for psychological flexibility and mental health. Also, it is important to bear in mind that the Acceptance and Action Questionnaire-II is a valuable tool for assessing psychological flexibility, but it has some limitations in capturing the concept in its entirety. Psychological flexibility is a multifaceted construct encompassing an individual's ability to adapt, respond effectively to internal and external challenges, and pursue values-based actions despite discomfort. The AAQ-II primarily focuses on experiential avoidance and cognitive fusion, which are only two aspects of psychological inflexibility, overlooking other crucial dimensions such as committed action, values clarification, and the overarching capacity to adapt to a wide range of life circumstances. While the AAQ-II provides valuable insights into specific components of psychological flexibility, it does not offer a comprehensive view of this complex construct, which is why it is often recommended to complement its assessment with other measures and contextual information for a more complete understanding of an individual's psychological flexibility.

CONCLUSION

Psychological inflexibility is known to be associated with higher level of depressive symptoms. In this study showed that psychological inflexibility became a mediator role for indirect effect between marriage and native ethnicity and depression. Marriage and native ethnicity are identified as a buffer and protective factor from psychological inflexibility and depression.

However, there is no mediating effect of other socioeconomic risk factors such as gender, employment, and education level between psychological inflexibility and depression. Future research should focus on establishing a clearer picture of how marital status and native ethnicity of Sabah affects psychological flexibility and mental health.

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