The mediating effect of mental health status between self-system and sexual risk behaviour among university students in Malaysia

Syifa' Mohd Azlan, MSc[1], Fadzilah Mohamad, MMed[1], Ahmad Iqmer Nashriq Mohd Nazan, PhD[2], Rahima Dahlan, MMed[3], Khairatul Nainey Kamaruddin, MMed[4], Nur Amirah Shibraumalisi, MMed[4], Sharifah Najwa Syed Mohamad, MMed[5], Irmi Zarina Ismail, MMed[1], Hayati Kadir@Shahar, DrPH[2], Nurainul Hana Shamsuddin, MMed[1]

[1]Department of Family Medicine, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia, [2]Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia, [3]Department of Psychiatry, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia, [4]Department of Primary Care Medicine, Faculty of Medicine, Universiti Teknologi MARA, Sg. Buloh, Selangor, Malaysia, [5]Department of Primary Health Care, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Nilai, Negeri Sembilan, Malaysia

ABSTRACT

Introduction: Young adults' engagement in sexual risk behaviour (SRB) is a growing concern worldwide. Addressing this issue is crucial as it can lead to various detrimental effects on individuals, including psychological, behavioural, and, in severe cases, suicidal tendencies and mortality. This nationwide study aimed to determine the mediating roles of depressive, anxiety, and stress symptoms in the relationship between adverse childhood experiences (ACE), religiosity, knowledge on sexuality, attitude towards premarital sex, and SRB among young Malaysian adults using structural equation modelling (SEM).

Materials and Methods: A quantitative, cross-sectional design was employed in this study. Respondents were recruited from June to December 2021 among students attending higher education institutions in Malaysia. Institutions were sampled using stratified random sampling and the respondents were selected via convenience sampling. Data were collected via an online survey that inquired about respondents' socio-demographic characteristics, ACE, religiosity, knowledge on sexuality, attitude towards premarital sex, mental health status (MHS), and engagement in SRB. The data were analysed using SPSS version 27 for descriptive analysis, and SPSS AMOS version 27 for structural equation modelling (SEM) analysis.

Results: A total of 1171 respondents were recruited in this study. From the SEM analysis, the proposed model indicated a good fit, and it explained 26% of the SRB variance. There was a partial mediation effect of the relationship between ACE on SRB through MHS ($p<0.05$), as well as religiosity on SRB through MHS ($p<0.05$). There was no significant mediation effect was found for the other variables.

Conclusion: This study highlighted the mediation effect of MHS between ACE on SRB, as well as between religiosity and SRB. Apart from addressing ACE and religiosity of the young adults, MHS should also need to be explored when dealing with SRB issues and vice versa. Preventive measures should be considered at younger stage to prevent high risk behaviour among young adults.

KEYWORDS:
Sexual risk behaviour, mental health, adverse childhood experiences, religiosity

INTRODUCTION

Young adults are vulnerable to engaging in risky behaviours, including sexual risk behaviour (SRB). SRB is imperative to address as it can lead to various reproductive health problems and psychological issues.[1] SRB is defined as engagement in premarital sex, early sexual debut, and having multiple sexual partners.[2,3] Malaysia has reported an increase from 7.3% to 7.6% between 2017 and 2022.[4,5] Nonetheless, Malaysia still ranks among the countries with the lowest reported rates of engaging in SRB.

The escalation of mental health issues among young adults, particularly those in tertiary education, is a growing concern with wide-ranging consequences.[6,7] Depression, anxiety, and stress are among commonly experienced by tertiary level students.[8] Studies have shown that poor mental health status (MHS) could lead to engagement in SRB.[9]

In addition, depression, anxiety, and stress, are often associated with adverse childhood experiences (ACE), religiosity, knowledge of sexuality, and attitudes toward premarital sex among young adults. It has been reported that individuals who have experienced adversities during childhood are more likely to engage in SRB.[10] Studies have also highlighted that those who exhibit high engagement in religiosity are associated with lower rates of SRB, as religious beliefs often influence moral standards, thus discouraging such behaviours.[11] Similarly, individuals with permissive attitudes toward premarital sex tend to engage in fewer SRBs, as they adhere to conservative sexual practices and norms.[12]

This article was accepted: 24 February 2025
Corresponding Author: Fadzilah Mohamad
Email: ilafadzilah@upm.edu.my

Additionally, a limited understanding of sexual health often leads to an increased SRB, as individuals may lack the necessary knowledge for informed decision-making.[13] These factors collectively highlight the determinants contributing to SRB among young adults.

Furthermore, psychological factors such as depression, anxiety, and stress can significantly increase the likelihood of engaging in SRB. Studies have consistently found that individuals commonly report experiencing anxiety symptoms, followed by depressive and stress symptoms.[6] The severity of mental health symptoms correlates positively with the likelihood of engaging in SRB.[9,14] Emotional instability can result in emotionally driven decision-making, leading to involvement in risky behaviours.[9] Therefore, this study aims to employ the Problem-Behaviour Theory (PBT) proposed by Jessor & Jessor to understand the underlying mechanisms of SRB.[15] Specifically, the mediating effect of MHS between ACE, religiosity, knowledge on sexuality, and attitude towards premarital sex, and SRB.

MATERIALS AND METHODS

Study design and setting

This study adopts a quantitative, cross-sectional design conducted among young Malaysian adults attending tertiary education institutions in Malaysia. Data collection was carried out from June to December 2021.

Study population

The study recruited students who were in the young adult category, from tertiary education institutions in Malaysia, specifically Malaysian citizens aged 18-24 years, proficient in either Malay or English. Individuals diagnosed with psychiatric illness were excluded to prevent bias in responding to the Depression Anxiety Stress Scale-21 (DASS-21), which screens for mental illness. The sample size was determined using the Daniel-Sopher Sample Size Calculation for Structural Equation Model. Considering a significance level of 0.05, anticipated effect size of 0.2, statistical power of 0.8, along with the inclusion of 34 manifest variables and seven latent variables, the recommended minimum sample size was 425. Following adjustment for a 70% non-response rate, the final minimum sample size was determined to be 723 respondents.

Sampling method

A two-stage sampling method was employed, with institutions chosen through stratified random sampling, and students were selected via convenience sampling. Malaysia was stratified into Peninsular Malaysia and East Malaysia, with Peninsular Malaysia was further divided into five regions for sampling. Gatekeepers from each selected institution distributed the survey link through official WhatsApp groups and emails. Students who volunteered responded to the survey. Sample size in each region were determined proportionally to the number of students. Out of 32 selected institutions, only 25 institutions agreed to participate in the study.

Study instrument

A self-administered online questionnaire consisting of seven sections was used, with the first section comprising the informed consent form. The second section contained questions related to socio-demographic characteristics of the respondents. The subsequent sections covered ACEs, religiosity, knowledge on sexuality, attitude towards premarital sex, MHS, and SRB. All instructions and questions were available in both English and Malay to facilitate respondents' comprehension.

A history of ACE was assessed using a set of dichotomous questions focusing on four major forms of ACE which are childhood sexual abuse, physical abuse, emotional abuse, and neglect. This scale showed an acceptable level of internal consistency, with a Cronbach's alpha value of 0.61. Face validity was tested to ensure the instrument measured what it is intended to measure. Total scores ranged from 0-4, with higher scores indicating a history of multiple exposures to ACE.

The Duke University Religion Index (DUREL) was utilized to assess the respondents' level of religious involvement.[16] The DUREL exhibits high test–retest reliability (intra-class correlation=0.91), internal consistency (Cronbach's alpha=0.78–0.91), and convergent validity with other religiosity measures (r=0.71–0.86). Similarly, the Malay-translated version (DUREL-M) also demonstrates a good internal reliability of 0.8.[17] It comprises of a Likert scale with five items, measuring three dimensions: organizational religious activity (ORA), non-organizational religious activity (NORA), and intrinsic religiosity (IR). ORA involves religious activities conducted in formal and public settings, while NORA refers to private religious activities. IR reflects the internal dimension such as engaging in religious activities as an ultimate goal. Scores on the DUREL range from 5 to 27, with higher scores indicating greater religiosity.

A set of questionnaire on fundamental knowledge of sexuality was adopted from a prior study conducted by Nik Farid et al. (2013).[18] These questionnaires demonstrate a moderate kappa value of 0.41. The questionnaire comprises six items related to knowledge on sexuality, including inquiries such as "A person can get pregnant after having sexual intercourse once", "Have you ever heard of contraception?", "Which of the following are types of contraception?", "Do you know about sexually transmitted infections?", "Which of the following are sexually transmitted infections?", "From the list below, which of the following are symptoms of sexually transmitted infections?". The total score ranges from 0 to 17 and categorised into two, inadequate and adequate knowledge of sexuality. The cut-off point was set using the mean score value, which was 10.

Respondents' attitude towards premarital sex were assessed using questions adopted from a prior study conducted by Nik Farid et al. (2013).[18] This adopted questionnaire has an excellent Cronbach's alpha of 0.85. The questions consisted of four items with a 4-point Likert scale. The questions were "It is alright for people my age to have sex before marriage if both people want to", "It is okay for people my age to have sexual intercourse as long as they have fallen in love", "Having sexual intercourse before marriage is not a good choice, but I can understand it" and "Young people who have premarital sex should be punished". The last question was reverse coded. The sum of the scores ranging from 1-16, and

higher scores indicates a high level of non-permissiveness towards premarital sex.

The Depression, Anxiety and Stress Scale (DASS-21) developed by Lovibond and Lovibond (1995) was employed to evaluate three domains of MHS: depression, anxiety and stress. The depression domain assesses feelings of hopelessness, devaluation of life, anhedonia, and lack of interest.[19] The anxiety domain evaluates autonomic arousal, skeletal muscle effects, situational anxiety, and the presence of anxious feelings. The stress domain measures chronic, and non-overreactive arousal. demonstrated high internal consistency, with Cronbach's alpha values of 0.91 for the depression domain, 0.84 for the anxiety domain, and 0.90 for the stress domain.[19] Similarly, the translated Malay version exhibited Cronbach's alpha values of 0.84 for the depression domain, 0.74 for the anxiety domain, and 0.79 for the stress domain.[20] It employs a 4-point Likert scale, and the sum score is calculated separately for each domain. Subsequently, the total score is doubled and classified into five levels of severity: normal, mild, moderate, severe, and extremely severe. The scores were further categorised into normal and abnormal (mild to extremely severe) using cut-off scores of ≤9 for a normal depressive symptom, ≤7 for anxiety, and ≤14 for stress symptoms.

Respondents' engagement towards SRB was determined using an adopted from a previous study by Nik Farid.[21] It demonstrated a Cronbach's alpha reliability coefficient of 0.85. The questionnaire comprised dichotomous questions, with the first question determining whether respondents had ever engaged in sexual activity. Subsequently, four follow-up questions were presented if respondents responded 'yes' and were scored as '1' indicating their engagement in SRB. Respondents who responded negatively were scored as '0', indicating no engagement in SRB. The total score of SRB ranges from zero to five and respondents that scored "Yes" to any of the items would be considered as engaging SRB.

Data collection

Data collection was facilitated by the Student Representative Council and Student Affairs Department, serving as gatekeepers within each institution. These gatekeepers distributed a link containing the informed consent form via email and WhatsApp to the targeted respondents. Subsequently, respondents who met the inclusion criteria were granted access to the questionnaire. To ensure genuine responses without concerns of criticism or judgment, the surveys were conducted anonymously and confidentially, thereby reducing social desirability bias.

Data analysis

Data were managed and analysed using SPSS version 27, with Statistical Package for Social Sciences (SPSS) AMOS version 27 utilized specifically for analysing the mediation effect. The dataset was cleaned to identify missing values, coding errors, or illogical values. Descriptive statistics were computed for all variables. Categorical data were reported as frequencies and percentages, and continuous data as median and interquartile range (IQR) as these were found to be not normally distributed data. Goodness of fit was measured using Chi-Square (Chisq), the Root Mean Square Error of Approximation (RMSEA), and the Goodness-of-Fit Index (GFI); Incremental Fit, which includes the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Normed Fit Index (NFI), were also employed to evaluate the model fit. The mediation effect was assessed using bootstrap analysis methods which utilised the resampling technique. In this study, the resampling number was set at 5000.

Ethical approval

Ethical clearance was granted by the Medical Research and Ethics Committee for Research Involving Human Subjects at Universiti Putra Malaysia (approval ID: JKEUPM-2021-141). he acquired data were treated with confidentiality and will be securely disposed off after a period of 5 years. Respondents who exhibited severe or extremely severe symptoms in the DASS-21 domains were contacted for additional assessment upon their consent.

RESULTS

Table I outlined the demographic characteristics of the respondents. Majority of the students aged between 18-20 years (60.3%, n=706), females (70%, n=820), Malays (62.3%, 730), Muslims (66.5%, 779), living in urban areas (65.8%, n=770), staying with family (89.2%, n=1044), currently single (99.7%, n=0.3), parents were still married (84.4%, 988), household income below RM4,849 (58.5%, n=685). In terms of academic background, studying at public institutions (n=50.3, n=589), pursuing social science stream (61.7%, n=722), in their first year of tertiary study (45.3%, n=531).

As of MHS, most of the respondents reported having normal depressive symptoms (54.4%, n=637), abnormal anxiety symptoms (60.5%, n=709), and normal symptoms of stress (68.5%, n=802). Stress symptoms reported to have the highest median score of 12.0 (IQR=14) followed by anxiety, and stress. Additionally, there was a fraction (7.2%, n=84) of the respondents reported engaging in SRB. Table II present the summary of young adults' engagement in SRB.

Among four forms of ACE, most of the students reported experiencing history of childhood emotional abuse (11.4%, n=133), child neglect (4.3%, n=50), physical abuse (3.8%, n=44), and sexual abuse (2.7%, n=32). Overall, the ACE median score was 0.0 (IQR=0) indicating limited variability in the total scores among the respondents. IR scored the highest median score, followed by ORA, and NORA with median score of 14.0 (IQR=4.0), 6.0 (IQR=3.0), 5.0 (IQR=4.0), respectively. Overall, the respondents showed a high engagement in religiosity with a median score of 25.0 (IQR=10.0). The distribution of knowledge on sexual health among the respondents were almost equal where 594 (50.7%) of the students reported having an adequate knowledge on sexuality, while 577 of the respondents reported having inadequate knowledge on sexuality (49.3%). The overall median score for knowledge on sexuality was 11.0 with interquartile range of 5.0. Furthermore, half of the respondents admitted to being non-permissive towards premarital sex (50.7%, n=674) than being permissive towards premarital sex (42.4%, n=497). The overall median score was 13.0 with an interquartile range of 6.0. Table III presents the detailed breakdown of the studied factors.

Table I: The sociodemographic characteristics of the respondents (N=1171)

Variables	n	%
Age		
18-20 years old	706	60.3
21-24 years old	465	39.7
Gender		
Male	351	30.0
Female	820	70.0
Race		
Malay	730	62.3
Non-Malay	441	37.7
Religion		
Muslim	779	66.5
Non-Muslim	392	33.5
Locality		
Rural	401	34.2
Urban	770	65.8
Living arrangements		
With family	1044	89.2
Without family	127	10.8
Current relationship status		
Single/in a relationship	1168	99.7
Married	3	0.3
Parents' marital status		
Married	988	84.4
Others	183	15.6
Household income		
<RM4,849	685	58.5
RM4,850 – RM10,959	357	30.5
>RM10,960	129	11.0
Academic background		
Institution		
Public	589	50.3
Private	582	49.7
Field of study		
Science	449	38.3
Social Science	722	61.7
Year of study		
Year 1	531	45.3
Year 2	307	26.2
Year 3	228	19.5
Year 4	105	9.0

Table II: The prevalence of mental health status and sexual risk behavior among the respondents (N=1171)

Variables	n	%	Median	IQR
Depressive symptoms				
Normal	637	54.4	8.0	14
Abnormal	534	45.6		
Anxiety symptoms				
Normal	462	39.5	10.0	14
Abnormal	709	60.5		
Stress symptoms				
Normal	802	68.5	12.0	14
Abnormal	369	31.5		
Sexual Risk Behavior (SRB)				
SRB	84	7.2		
Non-SRB	1087	92.8		

Table III: The prevalence of the adverse childhood experiences, religiosity, knowledge on sexuality, and attitude towards premarital sex (N=1711)

Variables	F	%	Median	IQR
Adverse Childhood Experiences			0.0	0
History of sexual abuse				
No	1139	97.3		
Yes	32	2.7		
History of physical abuse				
No	1127	96.2		
Yes	44	3.8		
History of emotional abuse				
No	1038	88.6		
Yes	133	11.4		
History of child neglect				
No	1121	95.7		
Yes	50	4.3		
Religiosity			25.0	10.0
Organized religious activity (ORA)			6.0	3.0
Non-organized religious activity (NORA)			5.0	4.0
Intrinsic religiosity (IR)			14.0	4.0
Knowledge on sexuality			11.0	5.0
Inadequate knowledge	577	49.3		
Adequate knowledge	594	50.7		
Attitude towards premarital sex			13.0	6.0
Permissive attitude	497	42.4		
Non-permissive attitude	674	50.7		

Table IV: Mediation effect of depressive symptoms, anxiety, and stress on the relationship between the factors and sexual risk behavior (N=1171)

Relationship	Direct effect	Indirect effect	Conclusion		p-value	Conclusion
			Lower bound	Upper bound		
ACEs > Depression > SRB	7.47 (p=0.012)*	-10.340	-27.904	-1.916	0.018*	Partial mediation
Religiosity > Depression > SRB	2.12 (p=0.011)*	-0.070	-0.250	-0.007	0.021*	Partial mediation
Knowledge on sexuality > Depression > SRB	-0.78 (p=0.136)	0.697	-0.351	4.341	0.155	No mediation
Attitude towards premarital sex > Depression > SRB	-1.22 (p=0.197)	0.033	-0.038	0.188	0.274	No mediation
ACEs > Anxiety > SRB	7.47 (p=0.012)*	-11.544	-35.743	-1.783	0.020*	Partial mediation
Religiosity > Anxiety > SRB	2.12 (p=0.011)*	-0.089	-0.363	-0.010	0.017*	Partial mediation
Knowledge on sexuality > Anxiety > SRB	-0.78 (p=0.136)	1.051	-0.142	6.510	0.085	No mediation
Attitude towards premarital sex > Anxiety > SRB	-1.22 (p=0.197)	0.034	-0.050	0.231	0.307	No mediation
ACEs > Stress > SRB	7.47 (p=0.012)*	-38.934	-128.152	-10.101	0.003*	Partial mediation
Religiosity > Stress > SRB	2.12 (p=0.011)*	-0.289	-1.254	-0.049	0.007*	Partial mediation
Knowledge on sexuality > Stress > SRB	-0.78 (p=0.136)	2.800	-0.970	19.220	0.135	No mediation
Attitude towards premarital sex > Stress > SRB	-1.22 (p=0.197)	0.189	-0.057	1.028	0.121	No mediation

Figure I below depicts the structural model for this study. The structural model has successfully fulfilled all the requirements for goodness-of-fit indices, with $\chi^2/df = 3.611$, RMSEA = 0.047, CFI = 0.943, and TLI = 0.935. The results demonstrated that MHS partially mediates the relationship between ACEs, and religiosity, and SRB. Specifically, there was a significant indirect effect of ACEs on SRB through depressive symptoms (b= -10.340, t=-1.661 p=0.018), anxiety symptoms (b= -11.544, t=-1.408, p=0.020), and stress symptoms (b= -38.934, t=-1.390, p=0.003). The same result was also observed between religiosity on SRB where there was a significant indirect effect through depressive symptoms (b=

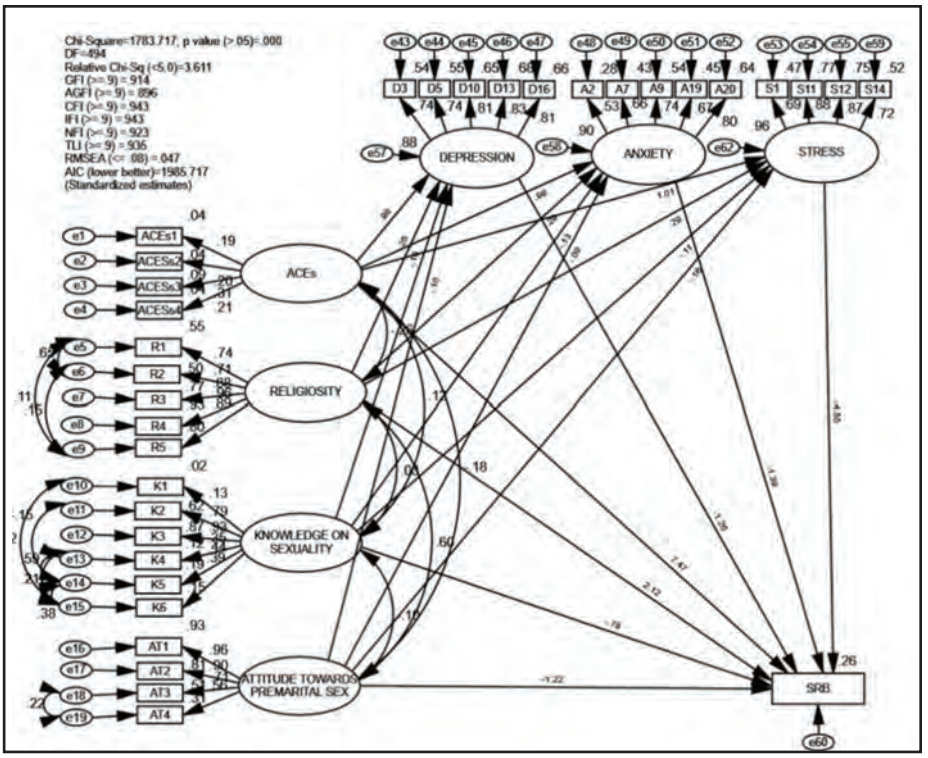

Fig. 1: Structural model of the relationship between the factors and sexual risk behaviour through depressive symptoms, anxiety, and stress (N=1171)

-0.070, t=-1.273 p=0.021), anxiety symptoms (b= -.089, t=-1.141, p=0.017), and stress symptoms (b= -0.289, t=-1.165, p=0.007). There was no mediation found for the other variables. Table IV summarise the results of the mediation effect of MHS on the studied variables.

DISCUSSION

The present study aimed to examine the mediating effect of MHS on the relationship between ACEs, religiosity, knowledge on sexuality, and attitudes toward premarital sex on SRB. The bootstrapping analysis method was used to estimate the indirect effects and the confidence intervals of the studied variables. This study demonstrates a good model fit, confirming the hypothesis. The results reveal significant indirect effects of ACEs on SRB through depressive, anxiety, and stress symptoms, as well as religiosity on SRB through depressive, anxiety, and stress symptoms. The model explains 26% of the SRB variance.

This study demonstrates statistically significant relationships between ACEs and SRB, as well as between religiosity and SRB. Specifically, individuals exposed to multiple adversities during childhood period were found to be more likely to engage in SRB9 due to the accumulation of toxic stress, which hinders the emotional development and leads to maladaptive coping strategies resulting in risky behaviours.[9,22] Additionally, religiosity plays a crucial role in the engagement in SRB due to individuals' strong personal values guided by the religion.[23,24] The statistically significant relationship between the mediators and SRB is supported by other studies.[8,13,25] It is argued that imbalanced emotions could result in poor judgement, leading to engagement in risky behaviour as a maladaptive coping mechanism.[8,25]

The prevalence of MHS among the Malaysian young adults in Malaysian tertiary education institutions have been on the rise. Anxiety remains the most prevalent at 60.5%, followed by depressive symptoms at 45.4%, and stress at 31.5%. In comparison, a previous study conducted in 2019 reported lower percentages of anxiety, depressive, and stress symptoms at 53.9%, 31.1%, and 26%, respectively.[6] A later study conducted in 2023 recorded even higher rates at 66.3%, 53.9%, and 44.6%.[14] This trend could be attributed to increased urbanisation and the consequent higher levels of perceived stress by the young adults.

Comparing to previously reported rates of SRB in a nationwide study by the National Health and Morbidity Survey (NHMS) in 2017, there has been a slight decrease in trend.[4] This study reported that 7.2% of respondents engaging in SRB, while it spiked to 7.6% in 2022.[5] This could be attributed to liberalisation and modernisation, which is largely influenced by the western cultures.[26] Nonetheless, SRB prevalence in Malaysia is relatively low compared to other Southeast Asian countries. This discrepancy may be attributed to religious and cultural factors, which contribute to Malaysia's conservative societal norms.[27]

Emotional abuse ranks the highest frequency among the type of ACEs, a finding consistent with prior studies among domestically and internationally college students.[28,29] This suggests that childhood emotional abuse is a universal trauma experienced by a significant proportion of young

adults during their childhood.[30] Apart from that, a majority of respondents report relatively high engagement in religiosity. Similarly, it was suggested that high levels of engagement and consistent participation in religious activity promotes abstinence from risky behavior.[23] This observation aligns with PBT theory, which proposes that religiosity, as a part of the personality system, can influence individuals' behaviour.[15] This could be attributed to non-organized religious activity or private religious activity being more driven by personal willingness than external influence. Religiosity traditional practices are deemed to be highly practised by those from Asian countries like Malaysia. It was also reported that Africa, the Middle East, South Asia and Latin America, are still practising the traditional forms of religiosity compared to European countries.[31]

With regard to knowledge of sexuality, a notable percentage (50.7%) of students reported adequate knowledge on sexuality, contrasting with previous studies.[32–34] Similarly, a study conducted in southern region of Malaysia, reported poor levels of knowledge on sexuality among young adults.[35] Such disparities may be attributed to variances in sample selection, with the present study focusing on tertiary education institutions, while the latter encompassed youths from the general population. It was also revealed that nearly half of the respondents reported holding a permissive stance toward premarital sexual behaviour, which is comparable to prior local findings.[36] However, the prevalence is notably lower compared to the rates observed in other Asian countries like China, Taiwan, and, Nepal.[37,38] This could be largely attributed to cultural factors, given Malaysia's predominantly Muslim population, which traditionally restricts the act of premarital sex.[39,40]

This study is a nationwide study, incorporating data collected from all regions in Malaysia. Employing probability stratified random sampling to select institutions reduces bias, and enhance the study's generalizability to the intended population.

Due to COVID-19 restrictions, data collection was conducted online, limiting the ability to employ systematic sampling at the student level. Moreover, reliance on self-reported online questionnaire increases concerns regarding social desirability bias. It is recommended that future research adopts a longitudinal study design to establish causality and explore the dynamics over time. Additionally, qualitative studies are advised to gain deeper insights into individual experiences related to variables under study.

Based on the findings from this study, it is observed that mental health is the mediator between childhood abuse and religiosity towards SRB among university students. Therefore, it is recommended that enhancement of mental health screening should be done at earlier age group. Early psychological intervention can be provided to prevent this generation from engaging in sexual risk behaviour.

CONCLUSION

This study contributes to our understanding of the underlying mechanism of SRB through mediation analysis of MHS. The findings highlight the interplay of MHS between ACEs on SRB, as well as between religiosity and SRB. No significant mediation effect was found for the other variables. Thus, this study underscores the significance of MHS in understanding SRB, particularly in addressing SRB issues among young adults in Malaysia.

ACKNOWLEDGEMENT

The authors would like to express sincere appreciation to all contributors to this study, particularly the gatekeepers from each institution who were directly involved in the research process. This study was funded by the Malaysia Ministry of Higher Education through Fundamental Research Grant Scheme (FRGS/1/2020/SKK08/UPM/03/2).

REFERENCES

1. Kosunen E, Kaltiala-Heino R, Rimpelä M, Laippala P. Risk-taking sexual behaviour and self-reported depression in middle adolescence-a school-based survey. Child: Care, Health and Development 2003; 29(5): 337-44.
2. Kassa GM, Degu G, Yitayew M, Misganaw W, Muche M, Demelash T, et al. Risky sexual behaviors and associated factors among Jiga High School and Preparatory School students, Amhara Region, Ethiopia. Int Sch Res Notices 2016; 2016:4 315729.
3. Fino E, Jaspal R, Lopes B, Wignall L, Bloxsom C. The Sexual Risk Behaviors Scale (SRBS): Development & validation in a university student sample in the UK. Eval Health Prof 2021; 44(2): 152-60.
4. NHMS. National Health and Morbidity Survey (NHMS) 2017: Key findings from the Adolescent Health and Nutrition Surveys [Internet]. Institute of Public Health; 2017. Available from: https://iku.moh.gov.my/images/IKU/Document/REPORT/NHMS2017/NHMS2017Infographic.pdf
5. NHMS. National Health & Morbidity Survey 2022: Adolescent Health -Key Findings [Internet]. Institute of Public Health; 2022. Available from: https://iku.gov.my/images/nhms-2022/1a_Infografic_AHS_BI_15062023.pdf
6. Minhat HS, Abdalrheem TAA. Risks of mental problems among medical students in a public university in Malaysia. Mal J Med Health Sci 2019; 15(SP3): 65-9.
7. Wong SS, Wong CC, Ng KW, Bostanudin MF, Tan SF. Depression, anxiety, and stress among university students in Selangor, Malaysia during COVID-19 pandemics and their associated factors. PLoS One 2023; 18(1): e0280680.
8. Brenneisen Mayer F, Souza Santos I, Silveira PSP, Itaqui Lopes MH, de Souza ARND, Campos EP, et al. Factors associated to depression and anxiety in medical students: a multicenter study. BMC Medical Education 2016; 16(1): 282.
9. Tesfaye Y, Negash A, Gebrehiwot TT, Tessema W, Anand S, Ahmed G, et al. Is There Association between risky sexual behaviors and depression symptoms among youth? A case of Jimma University students, Ethiopia. Psychiatry J 2019; 2019: 3757656.
10. Wood SK, Ford K, Madden HCE, Sharp CA, Hughes KE, Bellis MA. Adverse Childhood experiences and their relationship with poor sexual health outcomes: results from four cross-sectional surveys. Int J Environ Res Public Health 2022; 19(14): 8869.
11. Estrada CAM, Lomboy MFTC, Gregorio ER, Amalia E, Leynes CR, Quizon RR, et al. Religious education can contribute to adolescent mental health in school settings. Int J Ment Health Syst 2019; 13: 28.
12. Saint-Eloi Cadely H, Finnegan V, Spears EC, Kerpelman JL. Adolescents and sexual risk-taking: The interplay of constraining relationship beliefs, healthy sex attitudes, and romantic attachment insecurity. J Adolesc 2020; 84: 136-48.

13. Woldeyohannes D, Asmamaw Y, Sisay S, Hailesselassie W, Birmeta K, Tekeste Z. Risky HIV sexual behavior and utilization of voluntary counseling and HIV testing and associated factors among undergraduate students in Addis Ababa, Ethiopia. BMC Public Health 2017; 17(1): 121.
14. Woo KS, Ji Y, Lee HJ, Choi TY. The association of anxiety severity with health risk behaviors in a large representative sample of Korean adolescents. J Korean Acad Child Adolesc Psychiatry 2021; 32(4): 144-53.
15. Jessor R. Problem-behavior theory, psychosocial development, and adolescent problem drinking. Bri J Addict 1987; 82(4): 331-42.
16. Koenig HG, Büssing A. The Duke University Religion Index (DUREL): A five-item measure for use in epidemological studies. Religions 2010;1(1):78-85.
17. Nurasikin MS, Adlan ASA, Cg N. Validity and reliability of the Malay version of Duke University Religion Index (DUREL-M) among a group of nursing student. Malay J Psy 2010; 19(2): 68.
18. Nik Farid ND, Che' Rus S, Dahlui M, Al-Sadat N. Determinants of sexual intercourse initiation among incarcerated adolescents: a mixed-method study. Singapore Med J 2013; 54(12): 695-701.
19. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behav Res Ther 1995; 33(3): 335-43.
20. Ramli M, Ariff M, Zaini Z. Translation, validation and psychometric properties of Bahasa Malaysia version of the Depression, Anxiety and Stress Scales (DASS). ASEAN J Psy 2007; 2(8): 82-9.
21. Farid NDN, Rus SC, Dahlui M, Al-Sadat N, Aziz NA. Predictors of sexual risk behaviour among adolescents from welfare institutions in Malaysia: a cross sectional study. BMC Public Health 2014; 14(3): S9.
22. Espeleta HC, Brett EI, Ridings LE, Leavens ELS, Mullins LL. Childhood adversity and adult health-risk behaviors: Examining the roles of emotion dysregulation and urgency. Child Abuse & Neglect 2018; 82: 92-101.
23. Mojahed A. Religiosity and preventing risky behaviors. Int J High Risk Behav Addict 2014; 3(3): e22844.
24. Peltzer K, Pengpid S, Amuleru-Marshall O, Mufune P, Zeid AA. Religiosity and health risk behaviour among university students in 26 low-, middle- and high-income countries. J Relig Health 2016; 55(6): 2131-40.
25. Karle A, Agardh A, Larsson M, Arunda MO. Risky sexual behavior and self-rated mental health among young adults in Skåne, Sweden - a cross-sectional study. BMC Public Health 2023; 23(1): 9.
26. Caltabiano M, Castiglioni M, De-Rose A. Changes in the sexual behaviour of young people: introduction. Genus 2020; 76(1): 38.
27. Peltzer K, Pengpid S. Sexual risk behaviour and its correlates among adolescents in Indonesia, Laos, Thailand and Timor-Leste: results from national school surveys in 2015. Int J Adolesc Med Health 2020; 33(6): 501-9.
28. Noor Azaf NS, Vizabaskaran K, Karisnan K, Sri Juwaneeta Jamaludin AN. Impact of multi-type childhood abuse on psychological development and coping strategies among Perdana University students. Mal J Med Health Sci 2022; 18(1): 187-94.
29. Gama CMF, Portugal LCL, Gonçalves RM, de Souza Junior S, Vilete LMP, Mendlowicz MV, et al. The invisible scars of emotional abuse: a common and highly harmful form of childhood maltreatment. BMC Psychiatry 2021; 21:1 56.
30. Stoltenborgh M, Bakermans-Kranenburg MJ, Alink LRA, Van IJzendoorn MH. The prevalence of child maltreatment across the globe: Review of a series of meta-analyses. child abuse. Review 2015; 24(1): 37-50.
31. Höllinger F, Makula L. Religiosity in the major religious cultures of the world. International Journal of Sociology 2021; 51(5): 345-59.
32. Asare BYA, Aryee SE, Kotoh AM. Sexual behaviour and the utilization of youth friendly health Services: A cross-sectional study among urban youth in Ghana. International Journal of Africa Nursing Sciences 2020; 13: 100250.
33. Oharume IM. Knowledge, sexual behaviours and risk perception of sexually transmitted infections among students of the polytechnic, Ibadan, Oyo state. Afr Health Sci 2020; 20(1): 39-44.
34. Soleymani S, Abdul Rahman H, Lekhraj R, Mohd Zulkefli NA, Matinnia N. A cross-sectional study to explore postgraduate students' understanding of and beliefs about sexual and reproductive health in a public university, Malaysia. Reprod Health 2015; 12: 77.
35. Ja'afar SM, Awang H, Rahman AA. Level of knowledge on sexual and reproductive health among youths in southern region of Peninsular Malaysia. Int J Hum Health Sci 2021; 5(3): 315-23.
36. Rahman AA, Rahman RA, Ismail SB, Ibrahim MI, Ali SH, Salleh H, et al. Factors associated with attitude toward premarital sexual activities among school-going adolescents in Kelantan, Malaysia. Asia Pac J Public Health 2015; 27(2): NP1549-56.
37. Adhikari N, Adhikari S. Attitude towards premarital sex among higher secondary students in Pokhara Sub-Metropolitan city. J Community Med Health Educ 2017; 07(05).
38. Zuo X, Lou C, Gao E, Cheng Y, Niu H, Zabin LS. Gender differences in adolescent premarital sexual permissiveness in three Asian cities: effects of gender-role attitudes. J Adolesc Health 2012; 50(3 Suppl): S18-25.
39. Ghani SA, Abdullah S, Akil SMS, Nordin N. Muslim adolescents moral value and coping strategy among Muslim female adolescent involved in premarital sex. Procedia Soc Behav Sci 2014; 114: 427-33
40. Majumdar C. Attitudes towards premarital sex in India: Traditionalism and cultural change. Sexuality & Culture 2018; 22: 1-18