

ORIGINAL ARTICLE

A Pilot Study on Self-Care Module in Preventing Mental Health Risks for Youth

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ABSTRAK

Golongan belia merupakan aset negara yang berpotensi membangunkan negara melalui pencapaian akademik dan kemahiran kerjaya. Namun, golongan ini berdepan dengan cabaran pasca pandemik yang mengakibatkan tekanan hidup, ketahanan diri yang terjejas serta kemerosotan fungsi kesihatan diri. Situasi ini memberi impak kepada kesihatan awam dan sosial, termasuk peningkatan keciciran sekolah, cubaan bunuh diri, vandalisme, buli dan penggunaan bahan terlarang. Masalah kesihatan mental terus meningkat pada tahap yang membimbangkan walaupun pelbagai inisiatif telah dilaksanakan. Selain itu, terdapat kekurangan penerbitan yang boleh dicapai berhubung dengan intervensi strategik sebagai amalan terbaik. Kajian ini bertujuan untuk menilai kebolehlaksanaan intervensi modul penjagaan sendiri yang baru dibangunkan bagi mempromosikan kesihatan mental. Kajian ini menggunakan reka bentuk kaedah campuran penerokaan berurutan yang mengabungkan analisa kuantitatif dan kualitatif dengan memberi tumpuan kepada belia berumur 18-21 tahun di institusi pengajian tinggi. Kumpulan kawalan ($n = 33$) dan kumpulan intervensi ($n = 33$) dipilih untuk kajian kebolehlaksanaan serta susulan selepas 3 bulan. Modul intervensi dalam bentuk buku selak (flip book) dan aplikasi digital telah dibangunkan bagi meningkatkan amalan penjagaan sendiri dalam kalangan belia untuk mencegah masalah stres, kebimbangan dan kemurungan, di samping mengukur kesejahteraan serta kualiti hidup belia. Hasil kajian menunjukkan terdapat perbezaan yang signifikan bagi semua pemboleh ubah bersandar ("Barriers to Mental Health Services Scale-Revised", "Youth Quality of Life-Short Form", "Depression, Anxiety and Stress Scale-21", "Brief-COPE" dan Kuiz Modul Y-Healthy Life) dengan nilai $p < 0.001$ menggunakan kedua-dua kaedah penyampaian (modul bercetak dan aplikasi digital) antara penilaian pra-intervensi dan pasca-intervensi. Kesimpulannya, pendekatan pendidikan sendiri dalam mempromosikan pengurusan kesihatan mental di kalangan belia boleh dilaksanakan.

Kata kunci: Belia, intervensi; kebimbangan; kemurungan; kesihatan mental; stres

ABSTRACT

Youth are a national asset with growing potential to develop the country through academic achievement and career skills. They are facing post-pandemic challenges resulting in life stress, resilience and declining personal health functions. It has an impact on public and social health due to school dropout, suicide attempts, vandalism, bullying and the use of illegal substances. Mental health problems continue to increase at an alarming rate despite various initiatives that have been implemented. There is a lack of accessible publications regarding strategic interventions as best practices. This study aimed to assess the feasibility of a newly developed self-care module intervention for promoting mental health. A sequential

exploratory mixed methods study was used, combining quantitative and qualitative analyses focusing on young people in higher education institutions aged 18-21 years. The control group ($n = 33$) and intervention group ($n = 33$) were assessed for feasibility and 3-month follow-up. Intervention modules in the form of flip books and digital applications were developed to improve youth self-care in preventing stress, anxiety, depression, and measuring youth well-being and quality of life. The study found significant differences for all Dependent Variables (Barriers to Mental Health Services Scale-Revised, Youth Quality of Life-Short Form, Depression, Anxiety and Stress Scale-21, Brief-COPE and Y-Healthy Life Module Quiz) with a $p < 0.001$ using both methods (printed modules and digital applications) at pre- and post-intervention. In conclusion, self-education approaches in promoting mental health among youth are feasible to implement.

Keywords: Anxiety; depression; intervention; mental health; stress; youth

INTRODUCTION

Youth is a vital asset to the nation, possessing the potential to advance the country through academic achievements and skills for career opportunities. If mental health among the youth is not well-maintained, they will face contemporary challenges such as personal or family issues, post-pandemic situations and inflation due to economic recession, which can contribute to a decline in resilience and self-health functionality, as well as an increase in social issues such as dropping out of education, suicide, vandalism, bullying and substance abuse (Mindu et al. 2023). Various initiatives have been introduced by the Ministry of Health and other health agencies to promote adolescent health in general. However, these initiatives are not focused on youth after school or freshman college students and do not specifically address the targeted issue of promoting mental health in a self-care structured approach. This caused mental health issues to continue to rise at an alarming rate. A report by the Mental Health and Psychosocial Support Services Division under the Ministry of Health Malaysia found that extreme stress and isolation from family and close friends were major factors affecting youth mental health (UN Refugee Agency 2021). Depression among youth has contributed to a 58.9% increase in suicide cases, rising to 638 cases over seven months in 2021 compared to 262 cases the previous year (Roslan 2021). The suicide trend has continued to rise, from 35.66% in 2019 to

36.94% in 2020 and sharply to 74.34% in 2023 (Razali 2021). These findings highlight the urgent need to identify the causes and factors behind the rise in suicide cases, which are linked to a growing mental health crisis among youth who often face insufficient family support and a lack of attention, especially those with poor academic performance.

According to Benton et al. (2021), youth are the most at-risk group for mental health disorders, often experiencing high levels of stress. This is mainly because they faced major challenges when physical learning was halted and replaced with online classes during the pandemic, which began in 2020. Limited internet access and poor learning facilities, especially among low-income households, worsened the situation. This finding aligns with the Centres for Disease Control (CDC) study, which reported that stress levels increased when governments-imposed lockdowns, closing schools, universities and economic activities during disease outbreaks such as severe acute respiratory syndrome, influenza and COVID-19 (Lee 2020; Thunstrom 2020). Stress reflects an individual's struggle to adapt to environmental pressures, which affects their emotional well-being and psychological responses (United Nations Children's Fund 2020).

This is further supported by a study on stress among youth aged 15 and above. A report from parents in the United States revealed that youth aged 13–15 faced the highest mental and emotional health challenges (64%), followed

by those aged 16–18 (55%). The main issues included loneliness or social isolation (27%), anxiety (27%), difficulty regulating emotions (19%), depression (14%), poor stress management (15%), unhealthy social media use (13%), lack of family support (6%), bullying (6%), self-harm (3%) and substance abuse (3%) (Taggart 2021). Parents also reported worsening mental health among their children, with depression, anxiety and sleep disorders rising by 71% compared to 53% before the pandemic (Das et al. 2020). Previous studies have also linked the youth mental health crisis to employment-related issues such as unemployment, economic instability, and income gaps between new and older graduates (Mansor & Abu Rahim 2020). However, there is still limited research focusing on the three main risk factors: individual, social and environmental, that contribute to psychological issues like stress, anxiety and depression, which affect emotional well-being and may worsen mental health among youth and university students.

Based on youth population data from 2018 to 2021, there was a slight decrease from 9.99 million to 9.66 million youths. However, Bumiputera youths remain the majority in Malaysia, with 5.71 million (62.8%), followed by Chinese and other non-Bumiputera groups. The prevalence of depressive symptoms varied by ethnicity, with Malays at 28.7%, Chinese 20.6%, Indians 20.2%, Bumiputera Sabah 33.0%, Bumiputera Sarawak 27.7% and Others 28.6%. When grouped, Bumiputera adolescents (Malays, Bumiputera Sabah, and Sarawak) showed a higher prevalence of about 29.0%, compared to 21.4% among non-Bumiputera adolescents (Chinese, Indian and Others) (Institute for Public Health [IPH] 2022). These findings suggest that Bumiputera adolescents experience a higher burden of depressive symptoms compared to non-Bumiputera peers. This difference is not due to the larger Bumiputera population but rather to social factors such as socioeconomic disadvantage, unequal access to healthcare (especially in Sabah and Sarawak), gender differences, and family or peer stressors. This aligns with other Malaysian studies identifying

low household income, family conflict, bullying and female gender as consistent risk factors for youth mental health problems (Perveen et al. 2020).

Despite ongoing initiatives, there are still no specific guidelines or structured strategies focusing on adolescent mental health. This highlights the need for further research to identify key risk factors and develop effective interventions. Previous studies have mainly examined current psychosocial issues affecting families, post-pandemic learning challenges among students (Zainudeen et al. 2021) and the use of digital applications to address mental health problems during the pandemic. However, there remains a lack of accessible studies or best-practice interventions tailored to Malaysian youth from diverse ethnic and cultural backgrounds (Ibrahim et al. 2020).

In facing this challenging situation, youths greatly need psychosocial support from family, friends, educators and those around them. They also benefit from positive encouragement on social media, a supportive environment, stable financial aid and access to lifelines that can help during emergencies or when mental health support is needed, especially during and after the COVID-19 pandemic (Sundarasan et al. 2020). Therefore, this study aims to evaluate the effectiveness of a mental health promotion intervention module for youth in reducing barriers to accessing mental health services [Barriers to Mental Health Services Scale-Revised (BMHSS-R)], improving quality of life [Youth Quality of Life-Short Form (YQOL-SF)] and enhancing mental health outcomes [Depression, Anxiety and Stress Scale-21 (DASS-21)], as well as coping strategies for mental health problems [Brief-COPE (COPE-B)] and Y-Healthy Life Quiz Module.

MATERIALS AND METHODS

Study Design and Setting

This study used a mixed-methods approach (*Sequential Exploratory Research Design*) that

combined quantitative and qualitative methods, including written questionnaires, semi-structured interviews and digital surveys. The intervention phase was conducted over three months, from October to December 2023. This duration was appropriate for participants to engage in activities, apply learned behaviours and show measurable changes, while minimising fatigue and dropout. Two study groups were involved: Intervention group (IG) at Murni International College (MURNI College) and the control group (CG) at the National University of Malaysia (UKM). The group was assigned based on the availability of the support program and the study location. To reduce selection bias, only first-year students from both institutions were included to ensure similar academic exposure and minimise differences related to year of study.

To reduce selection bias, only first-year students from both institutions were included to ensure similar academic backgrounds. Baseline demographic and academic data, such as age, gender and cumulative grade point average (CGPA) were collected to assess group comparability. Although some differences were observed (e.g., CGPA and type of educational assistance), these were considered in interpreting the results. Statistical adjustments were not applied to maintain simplicity and transparency in analysis. By focusing on first-year students and reporting baseline characteristics, this study aimed to minimise confounding within the limits of a non-randomised design.

Study Population and Sample Selection

A total of nine respondents were included in the qualitative study until data saturation was achieved. For the quantitative study, the sample size was calculated using an online calculator for hypothesis testing involving two means. Based on an expected standard deviation ($\sigma = 6.74$) and an anticipated mean difference ($\Delta = 5$), with a significance level of $\alpha = 0.05$ and study power of 80%, the minimum required sample size was 29 participants per group. Considering a possible 20% dropout rate, the adjusted sample size

was 37 participants per group. The final sample consisted of 33 participants in the CG and 33 in the IG, who were followed up after three months. The effect size was estimated using Cohen's d to assess the magnitude of group differences. The calculation [$d = \Delta/\sigma = 5/6.74 \approx 0.74$] indicated a large effect size (Cohen 1988), suggesting a meaningful difference between groups. Therefore, the sample size was considered sufficient for statistical accuracy and reliable interpretation of the findings.

A total of 135 first-year students from the Faculty of Health Sciences were screened for eligibility. Inclusion criteria were: (i) aged 18–21 years, (ii) Malaysian citizen, (iii) registered in the study area, (iv) no known medical or mental health conditions and (v) voluntary participation. Exclusion criteria included: (i) inability to participate throughout the study period, and (ii) having health issues, transferring, or dropping out during the study. Of these, 69 students were excluded due to ineligibility, incomplete questionnaires, withdrawal of consent, or absence from intervention sessions. The final analysis included 33 participants per group. Participant selection was illustrated in Figure 1.

Participants were recruited through purposive sampling among first-year students in the Faculty of Health Sciences at Universiti Kebangsaan Malaysia (UKM), specifically from the Bachelor of Biomedical Science and Bachelor of Environmental and Occupational Health programmes. Focusing on first-year students ensured similar academic exposure, while selecting only Health Sciences students provided a homogeneous sample aligned with the study's objectives. However, this approach limited generalisability, as the findings may not represent students from other faculties or programmes. This limitation was discussed in the relevant section.

Instruments

This study used a guided questionnaire in Malay as the main research instrument. The questionnaire consisted of five sections, where the respondents' basic demographic information

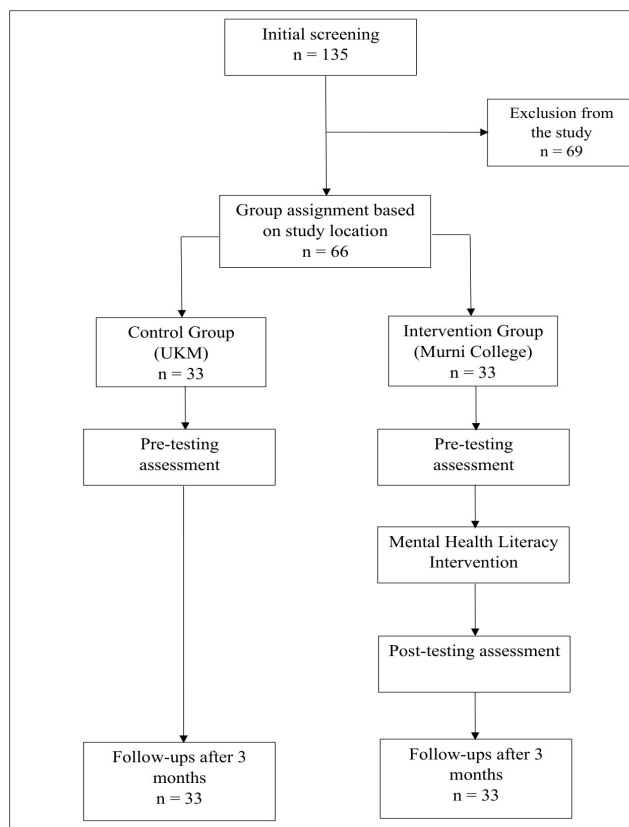


FIGURE 1: Flow chart of the mental health literacy intervention study (Y-Healthy Life Module)

served as the independent variable influencing youth mental health status, followed by four dependent variables. Five instruments were used in this study: the BMHSS-R, YQOL-SF, DASS-21, COPE-B and the Y-Healthy Life Quiz Module. In total, the questionnaire included 138 items. Responses were collected using dropdown and Likert-scale questions, where higher scores (“very often”) indicated increased frequency and lower scores (“never”) indicated decreased frequency (1 = never; 2 = sometimes; 3 = moderately; 4 = very; 5 = extremely) (Shahrudin et al. 2016).

Open-ended Questionnaire

The BMHSS-R instrument (Pepin et al. 2015) is a questionnaire containing 44 items that measure 10 barriers preventing individuals from

effectively accessing mental health services. This survey consists of two domains: intrinsic barriers and extrinsic barriers. Secondly, the YQOL-SF instrument (Patrick et al. 2002) contains 15 items that measure the quality of life of youth in terms of mental health from both positive and negative aspects across various socioeconomic backgrounds, health and disabilities. Thirdly, the DASS-21 instrument (Musa et al. 2007) includes 21 items that are widely used due to their accessibility, brevity and ease of understanding for the general population without requiring any training. Fourthly, the Brief-COPE (COPE-B) instrument (Yusoff 2019) contains 28 items that play a role in identifying the causes and determining suitable strategies to address this mental health crisis in colleges or universities.

Youth Mental Health Module (*Y-Healthy-Life Module*)

Based on the information and needs of youth gathered from secondary data and quantitative analysis, a more effective, affordable, time-efficient and easily accessible online intervention - the Y-Healthy Life Mental Health Module, was developed for the Malaysian public. This application helps identify an individual's mental health status, including signs and symptoms of stress, fatigue, anxiety or depression, and provides appropriate guidance for counselling and follow-up treatment if needed. The application is user-friendly, allowing users to download or access it through a website. Users registered by entering accurate personal information, granting consent and then began reading Modules 1 to 10. After completing the readings, users answered a module quiz to assess their mental health literacy. Quiz results were categorised into three levels: (i) low literacy (recommended to reread and retake the quiz), (i) moderate literacy and (iii) high literacy. Individuals with low scores were advised to seek help from registered counsellors or contact the psychosocial and emotional support hotlines provided in the application or website.

Procedure

Data were collected at two points, before the intervention (pre-test) and after the three-month intervention (post-test). The principal researcher and trained facilitators monitored the intervention to ensure it followed the schedule. Participant engagement was tracked using attendance logs monitored in the apps and WhatsApp (Meta Platforms, Inc., Menlo Park, CA, USA) group. This study used a mixed-methods design that combined qualitative and quantitative approaches and was carried out in three phases:

(i) Phase I: Document review analysis and development of the youth mental health module

Phase I is a key stage in developing the mental health application module. This phase involved

analysing existing mental health data from government sources and conducting a systematic review to identify issues, gaps, challenges and potential improvements in youth mental health interventions. Qualitative research was also carried out by engaging five experts through email correspondence with biweekly follow-ups over three months. In addition, relevant mental health and digital theories were adapted, and existing psychological questionnaires were used as screening tools to assess youth mental health. The phase concluded with the preparation of the first draft of the Y-Healthy Life Mental Health Application Module.

(ii) Phase II: Validation and feasibility process and testing

Pre-testing is an essential step before conducting actual research or developing an instrument, such as an intervention. It ensures that the tool is practical, accessible to the target audience, methodologically sound, and ethically appropriate, producing high-quality results that can guide future studies. For this study, ten randomly selected Year 1 students from the Healthcare Management programme at Murni International College participated in the pre-test. These students were different from those involved in the earlier face-to-face module validation process. They answered open-ended questions and quiz items from the developed module within 15 to 20 minutes.

The pre-test results showed that the questionnaire and quiz items were relevant, clear and easy to understand. The module was found to be practical for school-leaving youth and useful for helping them identify personal weaknesses and mental health concerns. The revised module was then adapted for easier use among youth, serving as a tool for self-management, self-care and access to psychosocial and emotional support in daily life.

(iii) Phase III: Effectiveness process and testing

After the revision and improvement phase,

the instrument was finalised and proceeded to Phase III, which involved testing the feasibility of the module as an intervention tool to promote mental health and improve the quality of life among youth. It also served as a potential self-care mental health package for school-leaving youth. As shown in Figure 1, two respondent groups were recruited, the CG and the IG with 33 participants in each. The CG consisted of 17 first-year students from the Biomedical Science programme and 16 from the Environmental and Occupational Health programme, selected through purposive sampling. The inclusion criteria included individuals aged 18 to 21 only, registered first-year students of the Faculty of Health Sciences, able to attend sessions physically, and with no history of mental health issues.

This group received existing mental health materials from the Counselling Unit in collaboration with the UKM Student Affairs Centre, known as the Kit Sayangi Diri. This digital book contained valuable information on mental health, including stress management techniques, breathing and grounding exercises, emotional checklists (daily, weekly, monthly), the DASS-21 screening test, Q&A from the Counselling Unit, and engaging infographics to encourage self-monitoring and psychosocial support at UKM.

Meanwhile, the IG, consisting of 33 randomly selected and voluntary participants, took part in the Y-Healthy Life mental health intervention for three months. As shown in Table 1, they were provided with both the digital Y-Healthy Life Quiz Module and a printed version for the effectiveness testing process. During the three months, participants joined several activities, including the "1 Week 1 Module" Reading Programme, Heart-to-heart Sharing Sessions and Counselling and Mental Health Interlude Sessions. At the end of the intervention, all respondents completed a post-intervention session and received appreciation souvenirs for their commitment and cooperation.

Statistical Analysis

Data were collected and analysed using Statistical Package for Social Sciences (SPSS), version 27 (IBM Corp. Armonk, NY, USA). The study results for both groups were presented through univariate, bivariate, and multivariate analyses. Univariate analysis was used to summarise variable characteristics, including frequency, percentage, mean, standard deviation, median and range, to provide an overview of respondents' demographic characteristics such as gender, age, ethnicity, marital status and monthly income. Bivariate analysis using independent t-tests examined the relationships between stress, anxiety and depression (dependent variables) and socio-demographic factors. Paired t-tests were applied to assess differences in these variables before and after the intervention. In addition, multivariate analysis using repeated measures ANOVA was conducted to evaluate the dependent variables and measure respondents' understanding and acceptance of the digital application over the three-month follow-up period.

RESULTS

Section A: Socio-Demographic Background of Respondents

Table 2 presented the results of the intervention study. In the IG, most respondents were 19 years old ($n = 23$, 69.7%), while those aged 20 and 21 years each accounted for five respondents (15.2%). The majority were female ($n = 25$, 75.8%), with males comprising eight respondents (24.2%). Most were of Malay ethnicity ($n = 30$, 90.9%), followed by Bumiputera Sabah ($n = 2$, 6.1%) and Indigenous groups ($n = 1$, 3.0%). Almost all respondents were Muslim ($n = 31$, 93.9%), with two Christians (6.1%). All were diploma students from Murni International College ($n = 33$, 100.0%). In terms of academic performance, 13 respondents (39.4%) had a CGPA between 2.50–2.99, 11 respondents (33.3%) scored above

TABLE 1: Contents of the digital module package & application for the promotion of mental health and psychosocial support for youth (Y-Healthy Life)

Items	Details
Objective	· To assess and determine the effectiveness of the mental health promotion intervention module for youth in reducing the barriers to accessing mental health services (BMHSS-R); improving the quality-of-life wellbeing scores (YQOL-SF); and mental health scores (DASS-21) and coping strategies score for mental health problems (Brief-COPE).
Module	Module 1: Social media and youth · Features; infographics; challenges; benefits; frequency of internet usage; 12 guidelines for social media usage and screen time Module 2: Stress, anxiety and depression · Definitions; symptoms; factors; coping strategies; tips; negative effects; facts and information on suicide in Malaysia; chart Module 3: Self-care and management · Weight management; healthy eating management; health management; personal hygiene and toilet management; health screening Module 4: Exercise and physical activity · Term; examples; benefits; metabolic equivalent of task/activity (MET); calorie calculation; PSS-10 Test Module 5: Diet and healthy nutrition · The need for a balanced diet; body mass index (BMI) calculation; healthy plate Malaysia; tips for healthier cooking; RNI Malaysia Module 6: Healthy lifestyle practices · Cigarettes; electronic cigarettes; vapes; drugs; contents of registered & unregistered KKM products; alcohol consumption Module 7: Sleep quality · Definition; duration; good sleep practices; factors; activities that promote quality sleep Module 8: Competition with peers and family · Guidelines for relationships with family and peers; ways and tips to strengthen family and friendship bonds Module 9: Communication and marriage · Social relationships or interaction; 12 tips for choosing the right life partner; how to avoid marrying late; communication skills Module 10: Emotional support and spiritual health · Term; benefits; steps to achieve spiritual health; activities; mental health helpline; statistics; discrimination and solutions for youth
Delivery of intervention	· Materials: flipbook; printed module · PowerPoint Slide Presentation · Explanation Session by Moderator · Time: 5 minutes (explanation session); 10 minutes (Q&A session)
Module quizzes	· To test the respondents' literacy and understanding level towards mental health using Y-Healthy Life Module · Three (3) quizzes per module (Total: 30 questions)

2.00, eight respondents (24.2%) had a CGPA between 2.00–2.49, and only one respondent (3.0%) achieved a CGPA of 3.00–3.50. Most respondents ($n = 30$, 90.9%) were supported by educational loans, while three respondents (9.1%) self-financed or received family support.

For the CG, most respondents were 20 years old ($n = 21$, 63.6%), followed by seven aged 19 years (21.2%) and 5 aged 21 years (15.2%). The

majority were female ($n = 24$, 72.7%) and Malay Muslims ($n = 32$, 97.0%), with one Bumiputera Sarawak respondent (3.0%) who was Christian. All were bachelor's degree students from UKM ($n = 33$, 100.0%). In terms of academic performance, 29 respondents (87.9%) achieved a CGPA above 3.50, while four respondents (12.1%) had a CGPA between 3.00–3.50. Regarding financial support, 17 respondents (51.5%) had student loans, 11

TABLE 2: Respondent demographic background

Items	Pre-intervention						Post Intervention					
	Intervention Group			Control Group			Intervention Group			Control Group		
	Number (n = 33)	Percentage (%)	Number (n = 33)	Percentage (%)	Number (n = 33)	Percentage (%)	Number (n = 33)	Percentage (%)	Number (n = 33)	Percentage (%)	Number (n = 33)	Percentage (%)
Age												
19 Years	23	69.7	7	21.2	23	69.7	7	21.2	23	69.7	7	21.2
20 Years	5	15.2	21	63.6	5	15.2	21	63.6	5	15.2	21	63.6
21 Years	5	15.2	5	15.2	5	15.2	5	15.2	5	15.2	5	15.2
Gender												
Male	8	24.2	9	27.3	8	24.2	9	27.3	8	24.2	9	27.3
Female	25	75.8	24	72.7	25	75.8	24	72.7	25	75.8	24	72.7
Race												
Malay	30	90.9	32	97.0	30	90.9	32	97.0	30	90.9	32	97.0
Chinese	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Indian	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Bumiputera Sabah	2	6.1	0	0.0	2	6.1	0	0.0	2	6.1	0	0.0
Bumiputera Sarawak	0	0.0	1	3.0	0	0.0	1	3.0	0	0.0	1	3.0
Indigenous People	1	3.0	0	0.0	1	3.0	0	0.0	1	3.0	0	0.0
Other	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Religion	31	93.9	32	97.0	31	93.9	32	97.0	31	93.9	32	97.0
Islam	2	6.1	1	3.0	2	6.1	1	3.0	2	6.1	1	3.0
Christian	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hindu	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Buddha	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other												
Academic Qualifications												
Diploma	33	100.0	0	0.0	33	100.0	0	0.0	33	100.0	0	0.0
Bachelor's Degree	0	0.0	33	100.0	0	0.0	33	100.0	0	0.0	33	100.0
Academic Achievement (CGPA)												
< CGPA 2.00	11	33.3	0	0.0	11	33.3	0	0.0	11	33.3	0	0.0
CGPA 2.00 - CGPA 2.49	8	24.2	0	0.0	8	24.2	0	0.0	8	24.2	0	0.0
CGPA 2.50 - CGPA 2.99	13	39.4	0	0.0	13	39.4	0	0.0	13	39.4	0	0.0
CGPA 3.00 - CGPA 3.50	1	3.0	4	12.1	1	3.0	4	12.1	1	3.0	4	12.1
> CGPA 3.50	0	0.0	29	87.9	0	0.0	29	87.9	0	0.0	29	87.9

Continue...

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Items	Pre-intervention				Post Intervention			
	Intervention Group		Control Group		Intervention Group		Control Group	
	Number (n = 33)	Percentage (%)	Number (n = 33)	Percentage (%)	Number (n = 33)	Percentage (%)	Number (n = 33)	Percentage (%)
Types of Study Assistance								
None	0	0.0	4	12.1	0	0.0	4	12.1
Self-Dependency	3	9.1	11	33.3	3	9.1	11	33.3
Government Scholarship	0	0.0	0	0.0	0	0.0	0	0.0
Loan	30	90.9	17	51.5	30	90.9	17	51.5
Zakat	0	0.0	1	3.0	0	0.0	1	3.0
Other	0	0.0	0	0.0	0	0.0	0	0.0
Study Placement								
Murni International College	33	100.0	0	0.0	33	100.0	0	0.0

(33.3%) were self- or family-financed, one (3.0%) received zakat assistance and four (12.1%) had no financial aid.

Section B: Normality Testing

A normality test was conducted to examine the data distribution using SPSS (Rahim 2013). The Shapiro–Wilk test was applied to all dependent variables, and the results showed that the data met the assumption of normality: BMHSS-R ($p = 0.773$), YQOL-SF ($p = 0.314$), DASS-21 ($p = 0.522$), and Brief-COPE ($p = 0.548$). Since the null hypothesis was not rejected, the data were considered normally distributed. Therefore, parametric tests were used, including the independent samples t-test, paired samples t-test and two-way repeated measures ANOVA, as all dependent variables were continuous. Univariate and bivariate analyses were performed to compare means and standard deviations between dependent and independent variables, while the two-way repeated measures ANOVA was used to compare variables between groups and across different study phases.

Section C: Paired T-test

Based on Tables 3 and 4, the paired samples t-test was used to compare the IG and CG across two phases consisting of pre-intervention and post-intervention which to assess the effectiveness of the youth mental health promotion package. The comparison involved socio-demographic characteristics as independent variables and BMHSS-R, YQOL-SF, DASS-21, Brief-COPE, and the Youth Mental Health Module Quiz scores as dependent variables. As shown in Table 3, the BMHSS-R scores (barriers) decreased at the post-intervention phase for both groups, while YQOL-SF scores (quality of life) increased. For Brief-COPE, the IG showed higher post-intervention scores in avoidance and problem-focused domains, while the CG scored higher at pre-intervention for these domains. In the emotion-focused domain, the IG scored higher at pre-intervention, while the CG scored higher at

TABLE 3: Study results based on dependent variables (BMHSS-R; YQOL-SF; DASS-21 and Brief-COPE)

Item (Category)	Intervention Group		Control Group	
	Pre-intervention	Post Intervention	Pre-intervention	Post Intervention
Variable I: BMHSS-R (%)				
Intrinsic Barrier	55.48	53.24	59.55	54.15
Extrinsic Barrier	41.12	42.97	42.58	41.48
Variable II: YQOL-SF (%)				
Youth Quality of Life	5.10	9.33	10.10	10.56
Variable III: DASS-21				
Depression (n = 33)				
Normal (0-9)	0	0	15	13
Mild (10-13)	0	0	10	12
Moderate (14-20)	14	14	5	8
Severe (21-27)	6	9	3	0
Very severe (>28)	13	10	0	0
Anxiety (n = 33)				
Normal (0-7)	0	0	2	8
Mild (8-9)	0	0	10	4
Moderate (10-14)	3	6	10	17
Severe (15-19)	3	5	11	4
More severe (>20)	27	12	0	0
Stress (n = 33)				
Normal (0-14)	2	2	18	23
Mild (15-18)	6	8	9	7
Moderate (19-25)	9	5	6	3
Severe (26-33)	5	14	0	0
More severe (>34)	11	4	0	0
Variable IV: Brief-COPE (%)				
Avoidant	19.88	20.42	21.88	21.82
Problem-focused	21.55	21.76	31.45	23.52
Emotion-focused	31.55	30.27	20.97	21.18
Average Total				

post-intervention.

For DASS-21, stress levels in the IG showed a decrease from severe by seven participants, while in the CG, normal levels increased by five participants. Anxiety levels in the IG decreased from severe in 15 participants, and in the CG, severe cases decreased by seven while normal cases increased by six. For depression, severe cases in the IG decreased by seven participants, while in the CG, normal levels increased by five participants. As shown in Table 4, the IG demonstrated higher literacy levels post-intervention compared to pre-intervention, with

significant improvements in Module Quizzes 1, 3, 4, 5, and 6 ($p < 0.05$). The CG also showed higher post-intervention literacy levels, but the differences were not statistically significant ($p > 0.05$).

Section D: Two-Way ANOVA Repeated Measures Analysis of Variance

Data were analysed using two-way repeated measures ANOVA to examine the effects of time (pre-test vs. post-test), group (intervention vs. control), and their interaction (time group)

TABLE 4: Paired t-test determined the mean comparison of items on barriers to accessing mental health services (BMHSS-R), youth quality of life (YQOL-SF); coping strategies for mental health problems (Brief-COPE) and Y-Healthy Life Module Quiz between the Pre-Intervention and Post-Intervention Phases for the Intervention Group and the Control Group

Item	Intervention Group					Control Group				
	Mean (SD)	Mean Difference (95% CI)	t-value	p-value	df	Mean (SD)	Mean Difference (95% CI)	t-value	p-value	df
BMHSS-R										
Pre-intervention	96.61 (25.087)	[-7.547, 8.335]	0.101	0.920	32	102.12 (19.693)	[2.034, 10.936]	2.968	0.006	32
Post Intervention	96.21 (23.381)					95.64 (22.911)				
BMHSS-R (Domain of Intrinsic Barrier)										
Pre-intervention	55.48 (15.653)	[-2.347, 6.832]	0.995	0.327	32	59.55 (12.104)	[2.553, 8.235]	3.868	0.001	32
Post Intervention	53.24 (12.230)					54.15 (13.475)				
BMHSS-R (Domain of Extrinsic Barrier)										
Pre-intervention	41.12 (10.573)	[-5.897, 2.200]	-0.930	0.359	32	42.58 (8.804)	[-1.008, 3.189]	1.059	0.298	32
Post Intervention	42.97 (11.970)					41.48 (10.263)				
YQOL-SF										
Pre-intervention	5.10 (0.845)	[-4.951, -3.501]	11.873	0.000	32	10.10 (10.56)	[-0.839, -0.088]	-2.514	0.017	32
Post Intervention	9.33 (2.317)					2.00 (1.876)				
DASS-21										
Pre-intervention	85.27 (34.117)	[-0.162, 17.253]	1.999	0.054	32	37.67 (11.154)	[1.205, 5.159]	3.278	0.003	32
Post Intervention	76.73 (27.353)					34.48 (9.517)				
DASS-21 (Domain of Depression)										
Pre-intervention	29.03 (14.028)	[0.107, 6.438]	2.106	0.043	32	11.58 (4.430)	[-0.286, 1.862]	1.494	0.145	32
Post Intervention	25.76 (10.744)					10.79 (3.462)				
DASS-21 (Domain of Anxiety)										
Pre-intervention	27.76 (11.077)	[-0.546, 6.000]	1.697	0.099	32	12.33 (3.764)	[0.538, 1.886]	3.665	0.001	32
Post Intervention	25.03 (9.671)					11.12 (3.343)				

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Item	Intervention Group					Control Group				
	Mean (SD)	Mean Difference (95% CI)	t-value	p-value	df	Mean (SD)	Mean Difference (95% CI)	t-value	p-value	df
DASS-21 (Domain of Stress)										
Pre-intervention	28.48 (11.500)	[-0.903, 5.994]	1.504	0.142	32	13.76 (4.373)	[0.422, 1.942]	3.169	0.003	32
Post Intervention	25.94 (8.624)					12.58 (3.889)				
Brief-COPE										
Pre-intervention	72.97 (1.946)	[-4.177, 5.207]	0.224	0.824	32	74.30 (10.451)	[-2.448, 2.994]	0.204	0.840	32
Post Intervention	72.45 (2.131)					74.03 (11.933)				
Brief-COPE (Domain of Avoidant)										
Pre-intervention	19.88 (3.533)	[-1.986, 0.895]	-0.771	0.446	32	21.88 (3.560)	[-0.965, 1.087]	0.120	0.905	32
Post Intervention	20.42 (4.062)					21.82 (3.609)				
Brief-COPE (Domain on Problem-focused)										
Pre-intervention	21.55 (3.001)	[-1.613, 1.189]	0.224	0.824	32	31.45 (4.352)	[6.589, 9.289]	11.979	0.000	32
Post Intervention	21.76 (3.734)					23.52 (4.515)				
Brief-COPE (Domain on Emotion-focused)										
Pre-intervention	31.55 (6.500)	[-1.085, 3.630]	1.100	0.280	32	20.97 (4.217)	[-1.166, 0.742]	-0.453	0.654	32
Post Intervention	30.27 (6.125)					21.18 (3.972)				
Kuiz Modul 1: Social media & Youth										
Pre-intervention	2.58 (0.663)	[0.072, 0.594]	2.602	0.014	32	2.52 (0.566)	[-0.177, 0.238]	0.297	0.768	32
Post Intervention	2.85 (0.364)					2.79 (0.485)				
Kuiz Modul 2: Stress, Anxiety & Depression										
Pre-intervention	2.76 (0.561)	[-0.258, 0.136]	-0.627	0.535	32	2.61 (0.609)	[-0.227, 0.045]	-1.359	0.184	32
Post Intervention	2.85 (0.364)					2.79 (0.415)				

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Item	Intervention Group				Control Group					
	Mean (SD)	Mean Difference (95% CI)	t-value	p-value	df	Mean (SD)	Mean Difference (95% CI)	t-value	p-value	df
Kuiz Modul 3: Self-Care and Management										
Pre-intervention	2.48 (0.795)	[0.031, 0.636]	2.242	0.032	32	2.45 (0.666)	[-0.183, 0.425]	0.812	0.423	32
Post Intervention	2.82 (0.465)					2.58 (0.614)				
Kuiz Modul 4: Exercise and Physical Activity										
Pre-intervention	2.27 (0.761)	[0.505, 1.252]	4.792	0.000	32	1.70 (0.684)	[-0.294, 0.294]	0.000	1.000	32
Post Intervention	2.58 (0.708)					2.27 (0.719)				
Module Quiz 5: Diet & Healthy Nutrition										
Pre-intervention	2.52 (0.667)	[0.034, 0.693]	2.248	0.032	32	2.30 (0.728)	[-0.243, 0.303]	0.226	0.823	32
Post Intervention	2.67 (0.692)					2.55 (0.666)				
Module Quiz 6: Healthy Lifestyle Practices										
Pre-intervention	2.00 (0.901)	[0.201, 0.890]	3.226	0.003	32	1.82 (0.635)	[-0.105, 0.468]	1.292	0.206	32
Post Intervention	2.36 (0.742)					2.18 (0.584)				
Module Quiz 7: Sleep Quality										
Pre-intervention	2.64 (0.653)	[-0.027, 0.392]	0.373	0.712	32	2.58 (0.692)	[-0.294, 0.173]	-0.529	0.601	32
Post Intervention	2.70 (0.684)					2.61 (0.609)				
Module Quiz 8: Competition with Peers and Family										
Pre-intervention	2.88 (0.331)	[-0.091, 0.213]	-0.812	0.432	32	2.79 (0.545)	[-0.189, 0.310]	0.494	0.625	32
Post Intervention	2.94 (0.242)					2.85 (0.364)				
Module Quiz 9: Communication and Marriage										
Pre-intervention	2.70 (0.529)	[-0.143, 0.507]	1.139	0.263	32	2.58 (0.751)	[0.045, 0.227]	1.359	0.184	32
Post Intervention	2.79 (0.485)					2.76 (0.502)				

Continued...

...continuing

Item	Intervention Group				Control Group					
	Mean (SD)	Mean Difference (95% CI)	t-value	p-value	df	Mean (SD)	Mean Difference (95% CI)	t-value	p-value	df
Module Quiz 10: Emotional Support and Spiritual Health										
Pre-intervention	2.24 (0.857)	[-0.299, 0.481]	0.475	0.638	32	2.21 (0.792)	[-0.233, 0.415]	0.571	0.572	32
Post Intervention	2.36 (0.549)					2.30 (0.728)				
BMHSS-R: Barriers to Mental Health Services Scale-Revised; DASS-21: Depression, Anxiety and Stress Scale-21; df: degrees of freedom; YQOL-SF: Youth Quality of Life-Short Form										

in reducing mental health issues among youth across three phases: pre-intervention, post-intervention using printed modules and post-intervention using the Y-Healthy Life digital application. The repeated measures included four main variables: BMHSS-R, YQOL-SF, DASS-21 and Brief-COPE, as well as the Y-Healthy Life Module Quiz, which assessed mental health literacy across ten domains.

As shown in Table 5, Mauchly's Test of Sphericity confirmed that the assumption of sphericity was met for all variables [BMHSS-R ($\chi^2(2) = 0.992$, $p = 0.067$); YQOL-SF ($\chi^2(2) = 18.546$, $p = 0.695$); DASS-21 ($\chi^2(2) = 3.008$, $p < 0.001$); Brief-COPE ($\chi^2(2) = 5.580$, $p = 0.144$)]. The multivariate test showed significant effects on the following: barriers to mental health services (Wilks' Lambda = 0.820, $F(2,31) = 3.392$, $p < 0.001$, $\eta^2 = 0.180$), youth quality of life (Wilks' Lambda = 0.304, $F(2,31) = 35.434$, $p < 0.001$, $\eta^2 = 0.696$), levels of depression, anxiety and stress (Wilks' Lambda = 0.237, $F(2,31) = 49.918$, $p < 0.001$, $\eta^2 = 0.763$), and coping strategies (Wilks' Lambda = 0.000, $F(2,31) = 4.435$, $p < 0.001$, $\eta^2 = 0.222$). These results indicate that the interventions had a significant impact on reducing barriers, improving quality of life, and enhancing coping strategies among youth.

Next, the Y-Healthy Life Module contains 10 domains along with quizzes. The Mauchly's Test of Sphericity indicates that the sphericity assumption has been met for the repeated measures of items [Module 1 ($X^2(2) = 13.038$, $p < 0.001$); Module 2 ($X^2(2) = 9.839$, $p < 0.001$); Module 3 ($X^2(2) = 13.320$, $p = 0.055$); Module 4 ($X^2(2) = 10.727$, $p < 0.001$); Module 5 ($X^2(2) = 1.063$, $p = 0.011$); Module 6 ($X^2(2) = 3.555$, $p < 0.001$); Module 7 ($X^2(2) = 3.238$, $p = 0.072$); Module 8 ($X^2(2) = 4.666$, $p = 0.033$); Module 9 ($X^2(2) = 11.798$, $p = 0.001$); and Module 10 ($X^2(2) = 7.872$, $p = 0.004$)]. The multivariate test also shows a significant effect on social media literacy & youth, Wilks' Lambda = 0.610, $F(2, 31) = 9.890$, $p > 0.001$, $\eta^2 = 0.390$); stress, anxiety & depression literacy levels, Wilks' Lambda = 0.688, $F(2, 31) = 9.457$, $p > 0.001$, $\eta^2 = 0.379$); self-care and management literacy levels, Wilks'

TABLE 5: Repeated measures analysis of variance for pre-intervention phase (T1) and post-intervention phase (Y-Healthy Life Module) (T2) and Testing for intervention group (Y-Healthy Life Digital Application) (T3)

Item	Mean (SD) [T1-Pre- intervention]	Mean (SD) [T2-Printed Module]	Mean (SD) [T3-Digital Application]	F	p-value	n	X ²	Wilks' lambda (λ)
Barriers to accessing mental health services (BMHSS-R)	96.61 (25.087)	96.21 (23.381)	87.70 (22.152)	3.392	0.067	0.180	0.992	0.820
Youth Quality of Life (YQOL-SF)	7.65 (1.268)	9.33 (2.317)	10.07 (2.513)	35.434	0.695	0.696	18.546	0.304
Depression, Anxiety and Stress Scale (DASS-21)	85.27 (34.117)	76.73 (27.353)	36.42 (11.242)	49.918	<0.001	0.763	3.008	0.237
Strategies for coping with mental health problems (Brief-COPE)	72.97 (11.176)	72.45 (12.243)	66.30 (11.967)	4.435	0.144	0.222	5.580	0.778
Module Quiz 1: Social Media & Youth	2.52 (0.566)	2.85 (0.364)	2.97 (0.174)	9.890	< 0.001	0.390	13.038	0.610
Module Quiz 2: Stress, Anxiety & Depression	2.61 (0.609)	2.79 (0.415)	3.00 (0.000)	9.457	< 0.001	0.379	9.839	0.688
Module Quiz 3: Self-Care and Management	2.48 (0.795)	2.82 (0.465)	2.88 (0.331)	3.193	0.055	0.171	13.320	0.809
Module Quiz 4: Exercise and Physical Activity	1.70 (0.684)	2.58 (0.708)	2.94 (0.242)	54.639	< 0.001	0.779	10.727	0.221
Module Quiz 5: Diet & Healthy Nutrition	2.30 (0.728)	2.67 (0.692)	2.82 (0.392)	5.207	0.011*	0.251	1.063	0.749
Module Quiz 6: Healthy Lifestyle Practices	1.82 (0.635)	2.36 (0.742)	2.82 (0.392)	29.848	< 0.001	0.658	3.555	0.342
Module Quiz 7: Sleep Quality	2.64 (0.653)	2.70 (0.684)	2.85 (0.364)	1.632	0.212	0.095	3.238	0.905
Module Quiz 8: Competition with Peers and Family	2.88 (0.331)	2.94 (0.242)	2.97 (0.174)	0.924	0.407	0.056	4.666	0.944
Module Quiz 9: Communication and Marriage	2.58 (0.751)	2.76 (0.502)	2.79 (0.485)	0.902	0.416	0.055	11.798	0.939
Module Quiz 10: Emotional Support and Spiritual Health	2.21 (0.857)	2.30 (0.728)	2.73 (0.517)	6.635	0.004**	0.300	7.872	0.498

BMHSS-R: Barriers to Mental Health Services Scale-Revised; η² = eta squared (effect size); SD: Standard deviation; χ² = chi-square statistic; λ = Wilks' lambda; p < 0.05; *p < 0.01; **p < 0.001

Lambda = 0.809, $F(2, 31) = 3.193$, $p > 0.001$, $n = 0.171$); exercise and physical activity literacy levels, Wilks' Lambda = 0.221, $F(2, 31) = 54.639$, $p > 0.001$, $n = 0.779$); healthy diet & nutrition literacy levels, Wilks' Lambda = 0.749, $F(2, 31) = 5.207$, $p > 0.001$, $n = 0.251$); healthy lifestyle practices literacy levels, Wilks' Lambda = 0.342, $F(2, 31) = 29.848$, $p > 0.001$, $n = 0.658$); sleep quality literacy levels, Wilks' Lambda = 0.905, $F(2, 31) = 1.632$, $p > 0.001$, $n = 0.095$); competition with peers and family literacy levels, Wilks' Lambda = 0.944, $F(2, 31) = 0.924$, $p > 0.001$, $n = 0.056$); a significant effect on the level of communication literacy and marriage, Wilks' Lambda = 0.939, $F(2, 31) = 0.902$, $p > 0.001$, $n = 0.055$) and the level of emotional support literacy and spiritual health, Wilks' Lambda = 0.498, $F(2, 31) = 6.635$, $p > 0.001$, $n = 0.300$).

Overall, the multivariate results indicated that both the printed module and digital Y-Healthy Life application had significant effects on reducing barriers to accessing services, improving quality of life, enhancing mental health outcomes, and strengthening coping strategies among youth ($p < 0.001$). These findings also align with the Y-Healthy Life Module Quiz results, which showed significant improvements across all 10 domains (Q1–Q10, $p < 0.001$). This confirms that both interventions effectively improved mental health literacy and accessibility among youth.

DISCUSSION

The study results show that most respondents were aged between 19 and 21, with an average age of 19. The majority were female school leavers from colleges and universities, representing 72.7% to 75.8% of participants. These findings are consistent with previous studies, which highlight that factors such as tuition fees and living costs significantly affect the mental health of youth, especially those from middle- and lower-income families in both urban and rural areas, including Sabah and Sarawak.

Challenges and Barriers to Psychosocial Mental Health Support Services (BMHSS-R)

These challenges stem from both individual weaknesses among youth and shortcomings in the public health system, as well as socioeconomic factors that are not effectively addressed in managing today's worsening mental health issues. As a result, youth face negative effects on their attitudes and behaviour, leading to increased social problems in schools and universities, including truancy, poor academic performance, substance experimentation and social withdrawal when unable to manage emotions and stress (Lindow et al. 2020). In addition, limitations within the mental health service system such as a shortage of trained professionals and limited treatment options in youth services also contribute to reluctance among young people to seek help from counselling centres in colleges and universities. Many doubt the expertise of professionals and lack confidence in the effectiveness of therapy. Mental health disorders among adolescents can further lead to social exclusion and have serious negative impacts on education and the economy (Tornivuori et al. 2023).

Youth Quality of Life and Well-Being Status (YQOL-SF)

The quality of life and well-being of youth are influenced by various external factors, including academic workload, family expectations for high achievement, financial problems and peer environments in colleges and universities. These pressures can lead to negative emotions such as anxiety and depression when youth are unable to cope, which further affects their psychological well-being. Studies in South Africa and Malaysia by Daviu et al. (2019) and Tay et al. (2022) found that young people with low quality of life are at higher risk of human immunodeficiency virus infection, substance abuse and violent behaviour. Unmanaged mental health disorders can also lead to prolonged depression that is difficult to treat, increasing the risk of other conditions such

as panic disorder, phobias and social anxiety.

Mental Health Performance of Youth Regarding Negative Emotional States of Depression, Anxiety and Stress (DASS-21)

The symptoms of depression are reported to be the highest, ranging from 4.5% to 18.5% within 12 months, followed by global prevalence rates of anxiety (31.0%) and depression (25.0%). These findings are consistent with studies by Newbold et al. (2020), Harrer et al. (2021), Lindow et al. (2020) and Zulkiply et al. (2023), which also highlight that stress, anxiety and depression among young people negatively affect their quality of life and academic performance. Similarly, Hamdani et al. (2022) found that nearly 35% of school-leaving youth in Pakistan face poverty, violence and socioeconomic inequality, making them more vulnerable to mental health problems in early adolescence. In Malaysia, Ibrahim et al. (2020) reported that about 29.2% of the population experience mental health issues, with 11.0% suffering from severe depression. These findings indicate that mental health problems remain a neglected issue and are often linked to rising suicidal tendencies, now recognised as the second leading cause of death among youth.

Strategies for Addressing Youth Mental Health Issues (BRIEF-COPE)

A higher average score indicates that youth are more capable and effective in coping with mental health issues after three months of intervention using the instruments provided by the researchers. Although there were no significant differences in average scores, the decrease in points suggests that the mental health intervention programme helped school-leaving youth strengthen their ability to face life challenges through avoidance, problem-focused and emotion-focused coping techniques. The analysis also showed that both groups did not differ significantly in their Brief-COPE scores ($p = 0.683, 0.400, 0.752$), indicating that avoidance was the main coping strategy used during the Movement Control Order ($p = 0.752$).

Mental Health Literacy and Information (Y-Healthy Life Module Quiz)

On average, the comparison between study groups showed a positive increase from the pre-intervention to the post-intervention phase, indicating improved mental health literacy levels. This finding is consistent with the study by Harrer et al. (2019), which developed an instrument consisting of seven modules offered as optional training to respondents. The modules covered problem-solving, muscle relaxation and breathing, mindfulness, acceptance and tolerance, self-compassion, health literacy and help-seeking intention, and personal planning. Additional mini elective modules included social support, rumination and worry, time management, anxiety testing, sleep, motivation, nutrition and exercise, and concentration.

Effectiveness of the Mental Health Promotion Package Intervention

Based on the study findings, significant differences were observed in the IG across three phases: (i) T1: Pre-intervention, (ii) T2: Post-intervention (Printed Module), and (iii) T3: Post-intervention (Digital Application or Website). The comparison of dependent variables across these time points showed a decrease in average scores for BMHSS-R, YQOL-SF, and DASS-21, while the YQOL-SF score increased. In addition, the module quiz scores (Modules 1–10) showed consistent improvement from the pre-intervention phase to the post-intervention phase using both the printed module and the Y-Healthy Life digital application. These results indicate that the three-month mental health intervention, supported by follow-up research using two different instruments, was valid, feasible and effective among youth as the target population.

This finding is consistent with Harrer et al. (2019), who demonstrated that digital applications for information dissemination, counselling and psychosocial services can effectively enhance emotional support and improve youth mental health compared to traditional methods. Similarly, Harrer et al. (2021) and Lindow et al. (2020) found

that internet-based interventions are effective for managing stress, anxiety and depression. In their study, a website was developed featuring registration forms and educational modules for at-risk youth and volunteers, providing training and materials guided by a detailed manual.

Approach Through the Use of Printed Modules in Promoting Mentally Healthy Youth

In this study, the researchers developed the Y-Healthy Life Module in written and printed form for the IG to support reading and improve understanding of each module's content. The module was designed as a small, lightweight booklet with colourful infographics and illustrations to attract adolescent readers. It was distributed weekly (two modules per week) and supported by online explanations, counselling sessions, and discussions addressing emotional issues and stressful thoughts. In addition, counsellors and mental health professionals used interactive resources, lectures, and informational materials (Michelson et al. 2020), along with online promotions through newsletters, circulars, memos, notice boards, and emails to selected schools, colleges and universities that received mental health education services (Newbold et al. 2020).

Approach Through the Use of Digital Applications in Promoting Youth Mental Well-being

The mental health intervention in this study also utilised an online app platform (<https://yhealthylife.ukm.my>) that was developed, validated and tested for feasibility before the three-month intervention programme. The findings show that the digital application was highly effective in improving youth mental health literacy and awareness, as participants in the IG showed positive increases across 10 domains in the Y-Healthy Life Module Quiz after the intervention. Digital mental health programmes in academic institutions have shown promising

results in reducing mental health issues among young people (Michelson et al. 2020). Moreover, mobile phones and social media can help bridge the gap between health services and youth who need mental health support. However, differences in delivery methods such as setting, professional involvement, intensity (group, individual or combined), duration and accessibility continue to pose challenges in digital implementation (Tornivuori et al. 2023). Therefore, it is crucial to strengthen stress management strategies and expand awareness and literacy programmes in schools, colleges and universities to address youth mental health issues effectively (Huberty et al. 2019).

Limitations

A key limitation of this study is that participants were recruited exclusively from the Faculty of Health Sciences through purposive sampling. While this approach ensured homogeneity and comparability within the sample, it may have introduced selection bias and restricted the generalisability of the findings to students from other faculties or disciplines. Future studies should consider including participants from a wider range of academic programs or employing random sampling to improve external validity. Second, the IG was recruited purposively, while the CG was selected using random sampling, though the exact randomisation strategy was not formally documented. This discrepancy may have introduced selection bias, potentially limited the comparability of the two groups and affected the internal validity of the findings. Future research should adopt a consistent and well-documented sampling strategy, preferably randomisation, to reduce bias and strengthen causal inference.

CONCLUSION

Self-care education for higher institutional education youth has positive value to promote mental health. Knowledge or information regarding mental health literacy and information; mental health challenges and barriers; youth

quality of life; academic achievement; and the effectiveness of mental health programmes are the most frequently used intervention domains. Therefore, these domains need to be emphasised in the development of self-care and mental health management to create intervention programmes for student youth in colleges and universities in the future. Overall, nearly all studies utilise an educational session approach and the delivery of information in group settings online, particularly through digital applications specifically developed to address mental health issues and burdens among student youth in academic institutions, which have shown positive effects on mental health management over time.

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