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ORIGINAL ARTICLE

Effectiveness of Jacobson's Progressive Muscle Relaxation in Reducing Anxiety and Depression in Hospitalised AIDS Patients

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Abstract

Background/Aim: Hospitalised patients with AIDS frequently experience anxiety and depression due to social stigma, prognostic uncertainty and the physiological effects of the disease. These conditions can adversely affect the quality of life and treatment adherence. A relaxation method known as Jacobson's progressive muscle relaxation (JPMR) has shown efficacy in alleviating stress and anxiety across various medical conditions. However, evidence regarding JPMR's efficacy of JPMR in patients with AIDS remains limited, particularly in Indonesia. The research sought to assess the efficacy of JPMR in alleviating anxiety and depression amongst AIDS patients in hospital settings.

Methods: This study employed a randomised controlled trial (RCT) with a pretest-posttest design conducted at Dr Jhon Piet Wanane General Hospital, Sorong Regency, Southwest Papua. The study involved 52 AIDS patients who fulfilled the selection criteria. These participants were divided equally and randomly into two groups: the intervention group (n = 26) and the control group (n = 26). Participants in the intervention group engaged in JPMR sessions lasting 20-30 minutes, twice per day for a period of 10 days. In contrast, the control group received only routine care. The Patient health questionnaire anxiety and depression scale (PHQ-ADS) was utilised to assess anxiety and depression levels both before and after the intervention. Statistical analysis was conducted using paired and independent t-tests to evaluate the results.

Results: The study findings revealed a notable decrease in PHQ-ADS scores amongst the intervention group when compared to the control group ($p < 0.001$). Several factors were found to significantly contribute to elevated anxiety and depression scores in AIDS patients receiving hospital care. These included co-occurring tuberculosis (TBC), insufficient social support, prior mental health conditions and alcohol use, with respective p-values of 0.04, 0.002, 0.001, 0.07 and 0.05.

Conclusion: Research indicates that JPMR serves as an efficacious non-drug treatment for alleviating anxiety and depression amongst AIDS patients in hospital settings. These results advocate for the incorporation of JPMR into psychosocial care programmes within hospitals. Additional studies involving a larger patient group are necessary to validate these outcomes.

Key words: Acquired immunodeficiency syndrome; AIDS; Depression; Hospitalisation; Autogenic training; Jacobson's progressive muscle relaxation; Anxiety.

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Introduction

Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) continues to pose a substantial challenge to global health. The UNAIDS report indicates that around 39 million individuals worldwide are affected by HIV, with over 1.3 million new infections occurring each year.[1] In Indonesia, HIV cases are on the rise, with an estimated 543,100 people living with the virus in 2022.[2] Southwest Papua Province stands out as one of the areas in Indonesia with the highest HIV prevalence, showing a yearly increase in incidence. As of October 2024, Sorong City reported 3,945 HIV/AIDS cases, comprising 1,162 males and 1,676 females in the HIV stage, along with 482 fatalities attributed to the disease.[3-5] The Indonesian government has set a target to eliminate the AIDS epidemic by 2030, as detailed in the Minister of Health Regulation No 23 of 2022 concerning HIV/AIDS Prevention and Control.[6]

Beyond its significant physical impact, patients with HIV/AIDS frequently experience psychological distress, including anxiety and depression, due to social stigma, uncertainty regarding prognosis and adverse effects of antiretroviral therapy (ART). These psychological conditions can negatively impact quality of life, exacerbate clinical outcomes and reduce adherence to treatment, ultimately increasing morbidity and mortality risks.[7-10] Therefore, evidence-based psychosocial management strategies are essential to alleviate the psychological burden experienced by hospitalised patients with HIV/AIDS.

A relaxation method known as Jacobson's progressive muscle relaxation (JPMR) has shown effectiveness in alleviating stress, anxiety and depression amongst diverse groups of patients suffering from long-term illnesses.[11, 12] This technique functions by decreasing sympathetic nervous system activation and enhancing parasympathetic balance, ultimately reducing physiological stress responses.[13, 14] Waluyo et al, have indicated that relaxation interventions can improve sleep quality and lower cortisol levels in patients with HIV.[15]

Despite the growing prevalence of HIV/AIDS in Indonesia, there is a dearth of research examining the efficacy of JPMR in alleviating anxiety and depression amongst hospitalised AIDS patients in the country. This gap in knowledge emphasises the need for further exploration into JPMR's effectiveness within inpatient AIDS care. The present study sought to assess the impact of JPMR on anxiety and depression levels in hospitalised AIDS patients, utilising the validated PHQ-ADS scale to measure changes before and after the intervention. The findings are expected to offer valuable insights into psychosocial management strategies for HIV/AIDS patients and support the incorporation of JPMR as a non-pharmacological therapy in healthcare settings.

The research aimed to assess the effectiveness of JPMR in alleviating anxiety and depression amongst AIDS patients in hospital care.

Methods

Study design

A single-centre, single-blind, randomised controlled trial (RCT) was conducted at Dr Jhon Piet Wanane General Hospital in Sorong Regency, Southwest Papua, Indonesia. To reduce bias, participants were randomly assigned to groups and a blinded assessor evaluated the intervention outcomes. To prevent any exchange of information about the treatment received, all patients were housed in individual rooms.

Participants and setting

The study's eligibility requirements were as follows: inpatients with confirmed HIV/AIDS, exhibiting moderate to severe anxiety and depression as indicated by Patient health questionnaire anxiety and depression scale (PHQ-ADS) scores, aged between 18 and 45 years and capable of providing informed consent. Patients were deemed ineligible if they had severe mental health conditions necessitating immediate psychiatric care, unstable medical conditions, or physical constraints that would impede JPMR implementation. The research cohort comprised 52 participants, randomly chosen from an initial group of 64 individuals who had completed the PHQ-ADS. The sample size was determined using an 80 % power and a 5 % significance level. A random sampling technique was used. Participants were recruited through direct approaches by the research team upon their hospital admission.

The intervention

The intervention lasted for 10 days and com-

menced once the patients' conditions were deemed stable. Patients in the intervention group underwent JPMR following a standardised protocol, whereas those in the control group received only standard medical treatment without JPMR. JPMR sessions were conducted twice daily, each lasting 20–30 min. The intervention procedure involved a preparatory phase in which the patients were instructed to select a quiet environment, assume a comfortable position, wear loose clothing and engage in initial breathing exercises to prepare for relaxation. The JPMR exercises involved sequentially tensing and relaxing specific muscle groups, including the hands, arms, face, neck, shoulders, chest, abdomen, back, legs and feet. Each tension phase was maintained for 5–10 s, followed by a relaxation phase lasting 15–20 s. A trained therapist supervised all the sessions to ensure adherence to the protocol.

Data collection

This research primarily employed the PHQ-ADS, a brief survey instrument developed to evaluate the intensity of anxiety and depressive symptoms.[16] The instrument integrates items from the PHQ-9, which measures depressive symptoms and the GAD-7, which evaluates anxiety symptoms, thereby providing a comprehensive assessment of both conditions. The PHQ-ADS comprises 16 questions, including nine items from the PHQ-9 and seven items from the GAD-7. Each query was evaluated on a 4-point Likert scale with the following options: 0 (not at all), 1 (several days), 2 (more than half the days) and 3 (nearly every day). The overall score, which ranged from 0 to 48, was calculated by adding up all item scores. The interpretation of scores was divided into five categories: 0–4 (no or minimal symptoms), 5–9 (mild symptoms), 10–14 (moderate symptoms), 15–19 (moderately severe symptoms) and 20–48 (severe symptoms).

Concerning validity, the PHQ-ADS exhibited robust convergent validity, with the majority of correlations falling between 0.7 and 0.8 when compared to measures of mental health, quality of life and disability. Additionally, construct validity was supported by correlations with other mental health measures, showing correlation values between 0.4 and 0.6. A bifactor factor analysis also indicated sufficient one-dimensionality of the PHQ-ADS scores, supporting its use as a composite measure of depression and anxiety.

Regarding reliability, the PHQ-ADS demonstrated excellent internal consistency across the three trials, with Cronbach's alpha values falling between 0.8 and 0.9, suggesting robust inter-item coherence. Furthermore, the standard error of measurement (SEM) for the PHQ-ADS was estimated to be approximately 3–4 points, ensuring measurement stability. Based on these validity and reliability findings, the PHQ-ADS was a robust and accurate instrument for measuring anxiety and depression among hospitalised patients with AIDS.

Information was gathered at two intervals: before the intervention (baseline) and on the tenth day following the intervention. A methodical approach to data collection was employed to guarantee precision and uniformity. To reduce bias, evaluations were conducted by assessors who were unaware of the study details. The data collectors underwent rigorous training prior to the study to ensure consistency in measurements. To minimise input errors, quality assurance measures included duplicate data entry and verification. All information was stored in an encrypted system with limited access to maintain participant privacy and data security. Multiple imputations were utilised to address missing data, thereby preserving analytical accuracy and data representation.

Data analysis

Jamovi statistical software version 2.6.25 was utilised for data analysis. The sample characteristics and data distribution were examined using descriptive statistics. To evaluate the intervention's effectiveness, various statistical methods were employed based on the analysis objectives. Within each group, a paired t-test was used to compare PHQ-ADS scores pre- and post-intervention, whilst an independent t-test assessed differences in score changes between the intervention and control groups. Additionally, factors influencing changes in PHQ-ADS scores were explored through multiple linear regression analysis. The threshold for statistical significance was established at $p < 0.05$. The intervention's impact was further assessed by calculating effect sizes and confidence intervals. To ensure the study findings' robustness against variations in participant adherence, a sensitivity analysis was performed by comparing per-protocol and intention-to-treat analyses.

Results

Demographic characteristics of respondents

This study involved 52 hospitalised AIDS patients, divided into two groups: the intervention group (n = 26), which received JPMR technique and the control group (n = 26), which did not receive this intervention. The demographic and clinical characteristics of the respondents are presented in Table 1.

Based on Table 1, both groups exhibited balanced characteristics with no significant differences in demographic and clinical variables ($p > 0.05$), indicating similar baseline conditions before the intervention.

Table 1: Demographic and clinical characteristics of respondents

Variable	Group		p-value
	Intervention (n = 26)	Control (n = 26)	
Age (years, mean ± SD)	35.2 ± 5.8	34.8 ± 6.1	0.74
Gender (%)			
Male	16 (61.5 %)	14 (53.8 %)	0.63
Female	10 (38.5 %)	12 (46.2 %)	
Marital status (%)			
Married	17 (65.4 %)	18 (69.2 %)	0.79
Unmarried	9 (34.6 %)	8 (30.8 %)	
Educational level (%)			
Primary/secondary	9 (34.6 %)	10 (38.5 %)	0.79
High school	12 (46.2 %)	11 (42.3 %)	
Higher education	5 (19.2 %)	5 (19.2 %)	
Employment status (%)			
Employed	14 (53.8 %)	13 (50.0 %)	0.80
Unemployed	12 (46.2 %)	13 (50.0 %)	
Economic status (%)			
Low	10 (38.5 %)	11 (42.3 %)	0.83
Middle	12 (46.2 %)	11 (42.3 %)	
High	4 (15.3 %)	4 (15.4 %)	
HIV/AIDS diagnosis duration (%)			
< 1 year	6 (23.1 %)	7 (26.9 %)	0.78
1–5 years	14 (53.8 %)	13 (50.0 %)	
> 5 years	6 (23.1 %)	6 (23.1 %)	
Comorbidities (%)			
Tuberculosis	10 (38.5 %)	9 (34.6 %)	0.81
Hepatitis	8 (30.8 %)	9 (34.6 %)	
Other opportunistic Infections	8 (30.8 %)	8 (30.8 %)	
Social support (%)			
Good	15 (57.7 %)	14 (53.8 %)	0.77
Poor	11 (42.3 %)	12 (46.2 %)	
History of mental disorders (%)			
Present	7 (26.9 %)	6 (23.1 %)	0.76
Absent	19 (73.1 %)	20 (76.9 %)	
Smoking habit (%)			
Yes	13 (50.0 %)	14 (53.8 %)	0.80
No	13 (50.0 %)	12 (46.2 %)	
Alcohol consumption (%)			
Yes	10 (38.5 %)	11 (42.3 %)	0.79
No	16 (61.5 %)	15 (57.7 %)	
Anxiety and depression levels before intervention (PHQ-ADS, mean ± SD)	21.4 ± 4.2	21.7 ± 4.5	0.81

Note: p > 0.05: Normality test; PHQ-ADS: Patient health questionnaire anxiety and depression scale;

Comparison of anxiety and depression levels before and after intervention

An evaluation of JPMR's efficacy in alleviating anxiety and depression was conducted by examining the alterations in PHQ-ADS scores for each group prior to and following the intervention. The findings are displayed in Table 2 and Figure 1.

Table 2: Changes in Patient health questionnaire anxiety and depression scale (PHQ-ADS) scores in the intervention and control group

Variable	Before (Mean ± SD)	After (Mean ± SD)	p-value
Intervention group	21.4 ± 4.2	14.7 ± 3.6	< 0.001**
Control group	21.7 ± 4.5	21.1 ± 4.2	0.22

***Paired t-test;*

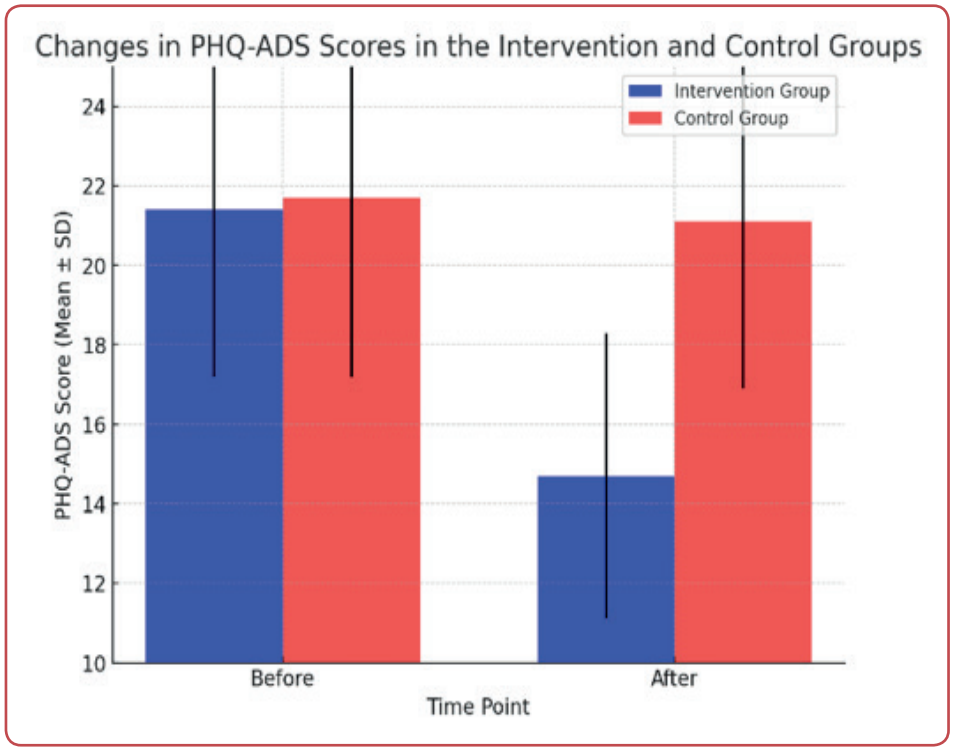

Figure 1: Changes in Patient health questionnaire anxiety and depression scale (PHQ-ADS) scores in the intervention and control group

The findings demonstrate a notable decrease in PHQ-ADS scores ($p < 0.001$) amongst participants who received JPMR in the intervention group. Conversely, the control group exhibited no substantial change in scores before and after the intervention period ($p > 0.05$), implying that anxiety and depression levels remained largely unchanged without JPMR treatment.

Analysis of JPMR effectiveness in reducing anxiety and depression

To evaluate the differences in PHQ-ADS score changes between the two groups, a separate t-test was performed. The results of this analysis are presented in Table 3 and illustrated in Figure 2.

Compared to the control group, JPMR demonstrated a notable reduction in anxiety and depression amongst AIDS patients in hospital care. The efficacy of JPMR in decreasing PHQ-ADS scores was statistically confirmed through an independent t-test ($p < 0.001$). Consequently, JPMR can be suggested as an additional therapeutic approach to improve the mental health of hospitalised AIDS patients.

Table 3: Changes in Patient health questionnaire anxiety and depression scale (PHQ-ADS) scores in the intervention and control group

Variable	Score change (Mean ± SD)	p-value
Intervention group	-6.7 ± 2.9	< 0.001**
Control group	-0.6 ± 1.2	

***Independent t-test;*

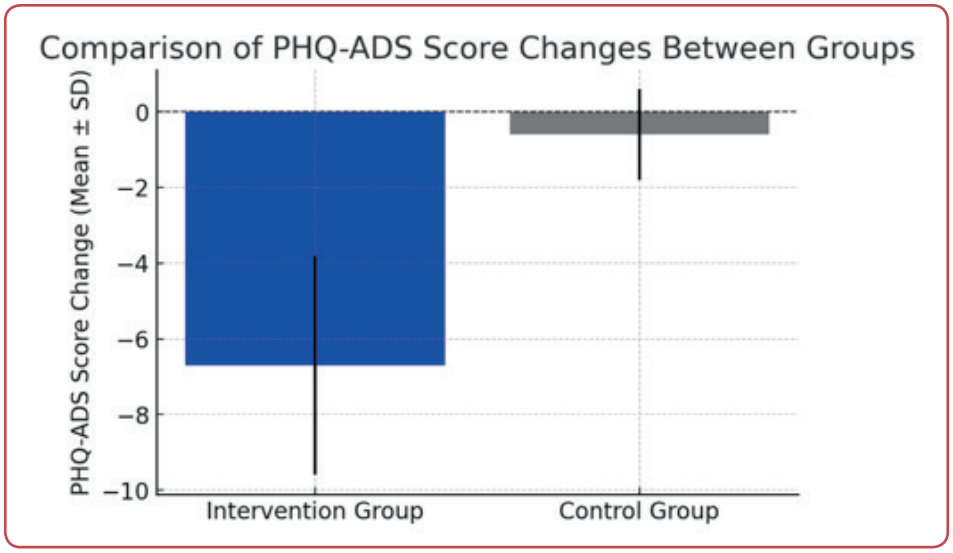

Figure 2: Changes in Patient health questionnaire anxiety and depression scale (PHQ-ADS) scores in the intervention and control group

Multiple linear regression analysis results

A multiple linear regression analysis was employed to investigate the elements influencing variations in PHQ-ADS scores. The analysis incorporated independent variables such as demographic attributes, socio-economic position, health background and lifestyle habits. Table 4 presents the findings of this analysis.

The study suggests that hospitalised AIDS patients are more likely to experience heightened levels of anxiety and depression due to several key factors. These include the presence of tuberculosis as a comorbid condition, insufficient social support networks, previous mental health issues and the consumption of alcohol.

Table 4: Multiple linear regression analysis results for PHQ-ADS score changes

Independent variables	*B*	SE	t	p	95 % CI
Age (years)	-0.12	0.08	-1.50	0.140	(-0.28, 0.04)
Gender (male)	0.85	1.02	0.83	0.410	(-1.19, 2.89)
Marital status (married)	-1.32	1.10	-1.20	0.230	(-3.48, 0.84)
Education level	-0.95	0.78	-1.22	0.220	(-2.48, 0.58)
Employment status (employed)	-1.56	1.04	-1.50	0.140	(-3.67, 0.55)
Economic status (high)	-2.04	1.15	-1.77	0.080	(-4.30, 0.22)
Duration of diagnosis (> 5 years)	2.10	1.08	1.94	0.060	(-0.04, 4.24)
Comorbidity (tuberculosis)	2.32	1.13	2.05	0.040 *	(0.10, 4.54)
Social support (low)	3.25	1.02	3.19	0.002 **	(1.22, 5.28)
History of mental disorders	4.10	1.20	3.42	0.001 **	(1.73, 6.47)
Smoking habit (yes)	1.98	1.08	1.83	0.070	(-0.14, 4.10)
Alcohol consumption (yes)	2.15	1.09	1.97	0.050 *	(0.01, 4.29)

***Significant at p < 0.05; *Highly significant at p < 0.01; SE: standard error; CI: confidence interval;*

Discussion

This research investigated the efficacy of JPMR in alleviating anxiety and depression amongst AIDS patients in hospital care. The results demonstrated a notable reduction in anxiety and depression levels within the group that received JPMR training throughout the research period. Conversely, the control group, which was not subjected to any intervention, exhibited no substantial alterations in their anxiety and depression scores. The statistical evaluation revealed a highly significant disparity in score changes between the two groups, indicating that JPMR had a substantial effect on the mental well-being of hospitalised AIDS patients.

Furthermore, multiple linear regression analysis indicated that several factors contributed significantly to increased anxiety and depression scores among hospitalised patients with AIDS. These factors included tuberculosis (TB) comorbidity, lack of social support, history of mental disorders and alcohol consumption. Patients with TB comorbidity tended to have higher anxiety and depression levels, likely due to the compounded physical and psychological burdens of a more severe infection. The absence of social support emerged as a significant factor contributing to elevated anxiety and depression levels, consistent with earlier research that emphasised the importance of social support in enhancing emotional well-being amongst individuals with long-term health conditions. Additionally, patients with a history of mental disorders exhibited greater increases in anxiety and depression scores, indicating that pre-existing psychological conditions may influence emotional responses to hospitalisation. Alcohol consumption also contributes to increased anxiety and depression, possibly due to its neurobiological effects and patients' impaired ability to manage stress adaptively.

The results are consistent with research conducted by Bommareddi et al, which showed that JPMR were effective in alleviating anxiety and depression amongst individuals with long-term medical conditions, such as HIV/AIDS.[17] Another found that JPMR significantly reduced anxiety in cancer patients receiving palliative care.[18-20] The consistency of these results suggests that JPMR can serve as an effective non-pharmacological approach for managing psychological disorders commonly associated with chronic illnesses.

Nevertheless, contrasting findings have been reported by Dias et al, particularly in relation to individuals suffering from severe psychiatric disorders or highly intricate health issues.[21] This suggests that the effectiveness of the JPMR may be contingent on individual patient characteristics, intervention duration and the availability of environmental support.

The marked decrease in anxiety and depression levels amongst the treatment group suggests that JPMR effectively stabilises the mental health of HIV/AIDS patients in hospital settings. One of the primary mechanisms of JPMR is its capacity to attenuate physiological stress responses, including reducing sympathetic nervous system activity, stabilising heart rate and enhancing muscle relaxation.[11, 13, 22] Consequently, this technique assists patients in alleviating anxiety, often precipitated by disease uncertainty and the social stigma associated with HIV/AIDS infection.

This research also highlights the significance of non-drug interventions in addressing mental health issues among HIV/AIDS patients. While pharmacological treatments, such as antidepressants and anxiolytics are commonly used to address anxiety and depression, complementary approaches, such as JPMR, offer additional benefits without undesirable side effects.

The findings of this research support earlier investigations, indicating that JPMR can serve as an effective complementary treatment for alleviating symptoms of anxiety and depression.[11-14, 20, 23] In their studies, JPMR was combined with psychological counselling, yielding superior outcomes compared with standalone therapies. This suggests that the JPMR may be more efficacious when integrated with other psychosocial interventions.

However, studies by Torales et al, have reported that the effectiveness of JPMR varies depending on factors such as patients' initial stress levels, individual commitment to relaxation exercises and the presence of supportive environments.[24] Variations in exercise duration and patient adherence to the sessions may also influence the outcomes.

Whilst this research produced favourable outcomes, there were some unanticipated discoveries. A number of participants in the treatment group initially encountered challenges in becom-

ing accustomed to the JPMR techniques. This may be attributed to a lack of prior experience with relaxation techniques or physical weakness due to illnesses.

Theoretical and practical implications

This study contributes significantly to expanding the understanding of JPMR's efficacy of JPMR in hospitalised patients with AIDS. These results support Lazarus and Folkman's stress and coping theory, which emphasises the importance of adaptive coping strategies in mitigating the impact of stress on mental health.[25]

Moreover, this research contributes to the existing body of knowledge on non-drug approaches for addressing anxiety and depression. The results indicate that JPMR could be integrated into a holistic treatment strategy for individuals suffering from long-term health conditions.

In clinical practice, these findings substantiate that JPMR can be integrated into psychosocial management strategies for hospitalised patients with HIV/AIDS. JPMR training programs can be incorporated into nursing services or psychological therapy to enhance patients' emotional well-being.

Study limitations and future research directions

Notwithstanding the notable outcomes, this research has a number of constraints. Firstly, the modest sample size (52 participants) might limit the applicability of the results to a wider demographic. Secondly, the comparatively brief intervention period may not fully reveal the enduring impacts of JPMR on anxiety and depression symptoms.

Moreover, individual factors such as patient motivation, prior experience with relaxation techniques and comorbid medical conditions may influence the effectiveness of the intervention. Therefore, further research should consider these factors. To enhance the external validity of these findings, future studies should involve larger and more diverse populations. Longitudinal studies evaluating JPMR's effects of JPMR over extended periods are also necessary to understand its long-term impact on patients' psychological well-being.

Further studies could explore the integration of JPMR with alternative psychosocial interventions, such as CBT or peer support programmes, to ascertain the most effective approaches for alleviating anxiety and depression amongst hospitalised HIV/AIDS patients.

Conclusion

The research sought to assess the impact of JPMR on reducing anxiety and depression amongst AIDS patients in hospital care. The results demonstrated that JPMR substantially lowered anxiety and depression scores, as evaluated by the PHQ-ADS, in comparison to the control group. These outcomes lend support to the notion that progressive muscle relaxation methods can mitigate physiological stress responses and boost the mental well-being of individuals with long-term conditions like AIDS. This investigation offers valuable knowledge for nursing practice, particularly in addressing the psychosocial needs of hospitalised AIDS patients. Despite constraints such as a modest sample size and focus on a single medical facility, the study yields important insights into psychological interventions for those with chronic illnesses. Additional research involving larger participant groups and longer intervention durations is required to confirm these results and explore JPMR's effectiveness in a wider demographic. Furthermore, these findings could inform the development of more comprehensive mental health strategies for patients with chronic conditions, especially in hospital environments.

Ethics

The Health Research Ethics Committee at the Health Polytechnic of the Ministry of Health in Sorong, under the Ministry of Health of the Republic of Indonesia, granted approval for this research (approval No: DM.03.01/4.1/417/2024, dated 17 February 2024). Prior to their involvement, all participants gave informed consent. The study was carried out in compliance with the ethical guidelines for medical research as outlined in the Declaration of Helsinki.

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Conflicts of interest

The author declares that there is no conflict of interest.

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Data access

The data that support the findings of this study are available from the corresponding author upon reasonable individual request.

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Validation: YK
Formal analysis: YK
Investigation: YK
Resources: YK
Data curation: YK
Writing - original draft: YK
Writing - review and editing: YK
Supervision: YK
Project administration: YK.

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