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RESEARCH ARTICLE

The Effectiveness of Stress Management and Resilience Training on Psychological Well-Being in Patients with Thalassemia in Bangladesh

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Abstract

Background: Thalassemia is a chronic blood disorder that significantly impacts the psychological well-being of patients. Stress, pain, and rejection sensitivity are common concerns, affecting their quality of life. Stress Management and Resilience Training (SMART) has been shown to improve psychological resilience and coping mechanisms in various populations. This study aimed to assess the effectiveness of SMART in improving psychological well-being among patients with thalassemia in Bangladesh.

Methods: A quasi-experimental study was conducted at Bangladesh Medical College and Hospital from December 2023 to December 2024. A total of 30 thalassemia patients aged 20-30 years were recruited using random allocation, with 15 participants in the experimental group and 15 in the control group. Psychological well-being was assessed using the Ryff Scales of Psychological Well-Being. The experimental group underwent a 10-week SMART intervention, while the control group received usual care. Data were collected using KoBoToolbox and analyzed using Analysis of Covariance (ANCOVA) in R Programming (version 4.3.2).

Results: The study found that the SMART intervention significantly improved psychological well-being, reduced rejection sensitivity, and enhanced resilience in patients with thalassemia. Post-intervention scores showed notable improvements in multiple domains of well-being in the SMART group, while the control group exhibited no significant changes. These findings highlight the effectiveness of structured stress management and resilience training in enhancing mental health.

Conclusion: The SMART intervention significantly improved psychological well-being, reduced rejection sensitivity, and enhanced resilience in patients with thalassemia. These findings suggest that structured stress management and resilience training can be an effective strategy for enhancing mental health outcomes in this patient population.

Keyword: Cognitive-Behavioral Intervention, Psychological Well-Being, Resilience, Stress Management, Thalassemia.

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1. Introduction

The prevalence of thalassemia in Bangladesh is a significant public health concern, with an estimated 60,000–70,000 individuals affected by thalassemia, including beta major and HbE beta [1]. Located in the thalassemia belt, Bangladesh has approximately 3.6 million carriers of thalassemia, making hereditary hemoglobinopathies the most common genetic disease in the country [2]. A recent review reported an estimated prevalence of beta-thalassemia at 3–6% and 3–4% for Hb-E in Bangladesh [3]. Thalassemia and other structural hemoglobinopathies are major erythrocyte formation disorders, prevalent in certain parts of the world, including Bangladesh [4]. The carrier frequency of both HbE and β-thalassemia is alarmingly high, calling for a nationwide awareness and prevention program to address the deteriorating situation [5]. However, despite the widespread prevalence of thalassemia in Bangladesh, facilities providing services to combat the disease are mainly limited to urban areas [5]. This situation places a significant burden on the healthcare system and underscores the need for accurate data on thalassemia-related illnesses in the country [6]. Moreover, the double heterozygous state of α- and β-thalassemia, though relatively rare in Bangladesh, may alter hematological indices and modify the phenotypic features of thalassemia [7]. A study conducted on schoolchildren in Bangladesh showed a higher carrier status with regional variation in carrier prevalence [8]. The high prevalence of both beta-thalassemia and HbE traits in Bangladesh highlights that thalassemia is a major genetic challenge for the future [9]. Thalassemia represents a significant health burden in Bangladesh, with high carrier prevalence and limited treatment facilities. The urgent need for nationwide awareness and prevention programs is crucial to address the increasing burden of thalassemia in the country. Psychosocially, individuals with thalassemia often experience elevated levels of depression, anxiety, rejection sensitivity, and uncertainty, which impact their psychological well-being [10,11]. Additionally, the psychosocial burden of the disease can affect adaptive functioning and quality of life [12,13]. This underscores the need for interventions that address these psychological challenges in thalassemia patients. Several studies have explored the effectiveness of mindfulness-based interventions, such as Mindfulness-Based Stress Reduction (MBSR), in improving psychological symptoms, pain, and resilience in thalassemia patients [14,15]. Furthermore, research highlights the importance of psychosocial support and coping strategies in managing the psychological impact of thalassemia [16,17]. However, there remains a gap in the literature regarding the effectiveness of Stress Management and Resilience Training (SMART) specifically in addressing the psychological well-being of thalassemia patients, particularly in the context of Bangladesh.

2. Methogology

2.1 Study Design and Setting

This study utilized a quasi-experimental design with a pre-test and post-test model. The research was conducted at Bangladesh Medical College and Hospital from December 2023 to December 2024.

2.2 Participant Recruitment

Patients diagnosed with thalassemia were selected based on the following inclusion criteria:

- Age between 13-40 years
- Have institutional education
- Attended tertiary hospital care
- Non-residence in Dhaka city
- Physically able to attend sessions
- No prior participation in stress management workshops or use of psychiatric drugs

A total of 30 participants were included in the study, with 15 in the experimental group and 15 in the control group. Participants were selected through random allocation.

2.3 Intervention

The experimental group underwent a 10-week SMART program, consisting of 120-minute weekly sessions [18]. The program integrated cognitive-behavioral stress management techniques, resilience-building exercises, and relaxation practices. Topics included stress awareness, cognitive distortions, coping strategies, anger management, and social support.

2.4 Data Collection

Psychological well-being was measured using the Ryff Scales of Psychological Well-Being, which assesses dimensions such as self-acceptance, autonomy, positive relationships, personal development,

Table 1. *SMART Training Module (Overview of the 10-Week Program)*

Session	Content
1	Introduction to stressors, stress responses, and relaxation techniques (16 muscle groups)
2	Stress awareness and resilience, diaphragmatic breathing, and mental imagery
3	Cognitive distortions, automatic thoughts, cognitive restructuring, relaxation (8 muscle groups)
4	Substituting negative thoughts, deep relaxation, and combined breathing and mental imagery
5	Coping strategies and self-taught relaxation techniques
6	Adaptation of coping styles to situations, diaphragmatic breathing
7	Anger management, awareness of anger, mantra meditation
8	Interpersonal communication styles, breath counting meditation
9	Social support, understanding sources of support, breath counting meditation
10	Review of training, extending skills, and evaluation of progress

environmental control, and life purpose. Data was collected through KoBoToolbox, an open-source data collection tool.

2.5 Ethical Considerations

Ethical approval was obtained to ensure participant confidentiality and adherence to ethical standards. Informed consent was obtained from all participants.

3. Result

The study included 30 participants, with 15 in the SMART group and 15 in the control group. The mean age was 24.7 ± 2.8 years in the SMART group and 25.1 ± 3.2 years in the control group, with no significant difference between them ($p = 0.72$). Gender distribution was also comparable, with 8 males and 7 females in the SMART group and 7 males and 8 females in the control group ($p = 0.74$). Pre-test psychological well-being scores were similar between both groups across all domains, indicating no baseline differences ($p > 0.05$). However, post-test scores in the SMART group demonstrated significant improvement across multiple domains. Autonomy increased to 5.6 ± 1.0 ($p = 0.003$), environmental mastery to 5.5 ± 1.1 ($p = 0.005$), personal growth to 5.9 ± 1.0 ($p = 0.002$), positive relationships to 5.4 ± 1.2 ($p = 0.004$), purpose in life to 5.7 ± 1.1 ($p = 0.006$), and self-acceptance to 5.8 ± 1.2 ($p = 0.001$). In contrast, the control group showed no significant changes in these domains. Rejection sensitivity scores significantly decreased in the SMART group, from 5.1 ± 1.3 to 3.6 ± 1.2 ($p = 0.002$), while no significant change was observed in the control group (5.2 ± 1.2 to 5.0 ± 1.1, $p > 0.05$). Similarly, resilience scores improved significantly in the SMART group, rising from 3.9 ± 1.4 to 5.7 ± 1.1 ($p = 0.004$), whereas no meaningful change was observed in the control group (4.0 ± 1.3 to 4.2 ± 1.2, $p > 0.05$). Levels of anxiety and depression showed significant reductions in the SMART group. Anxiety levels decreased from 6.2 ± 1.5 to 3.9 ± 1.2 ($p = 0.004$), while the control group exhibited no significant change (6.0 ± 1.4 to 5.8 ± 1.3, $p > 0.05$). Similarly, depression scores declined in the SMART group from 5.8 ± 1.6 to 3.7 ± 1.3 ($p = 0.003$), whereas the control group did not show a significant reduction (5.9 ± 1.5 to 5.7 ± 1.4, $p > 0.05$). The overall psychological well-being score significantly increased in the SMART group, from 4.0 ± 1.2 to 5.7 ± 1.1 ($p < 0.001$). In contrast, the control group exhibited no significant change (4.1 ± 1.1 to 4.3 ± 1.0, $p = 0.63$).

Table 2. *Baseline characteristics of participants*

Variable	SMART Group	Control Group	p-value
Age (years), mean ± SD	24.7 ± 2.8	25.1 ± 3.2	0.72
Gender (Male/Female)	8/7	7/8	0.74
Educational Level (%)			
Secondary	46.7	53.3	0.65
Higher Secondary & above	53.3	46.7	0.78

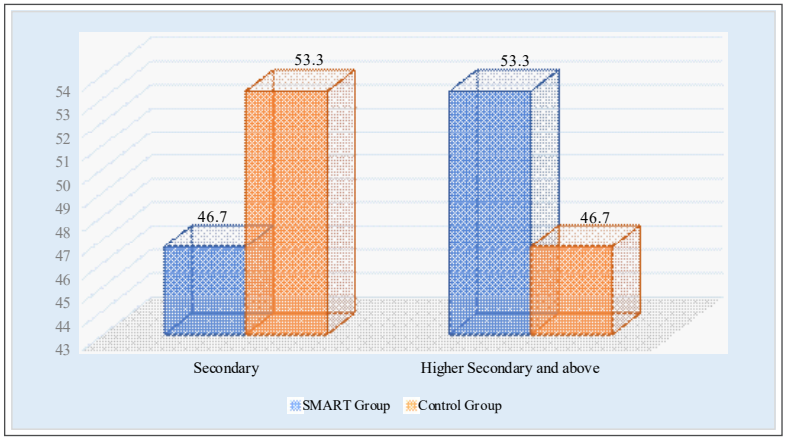

Figure I. *Column chart showing the educational Level of the participants (n=30)*

Table 3. *Pre-Test and Post-Test Psychological Well-Being Scores*

Domain	Groups				p-value
	SMART (Pre-Test)	SMART (Post-Test)	Control (Pre-Test)	Control (Post-Test)	(ANCOVA)
Autonomy	4.1 ± 1.2	5.6 ± 1.0	4.3 ± 1.1	4.4 ± 1.0	0.003
Environmental Mastery	3.9 ± 1.3	5.5 ± 1.1	4.0 ± 1.2	4.2 ± 1.1	0.005
Personal Growth	4.2 ± 1.1	5.9 ± 1.0	4.4 ± 1.0	4.6 ± 0.9	0.002
Positive Relationships	3.8 ± 1.4	5.4 ± 1.2	3.9 ± 1.3	4.0 ± 1.2	0.004
Purpose in Life	4.0 ± 1.2	5.7 ± 1.1	4.1 ± 1.1	4.3 ± 1.0	0.006
Self-Acceptance	3.7 ± 1.3	5.8 ± 1.2	3.8 ± 1.2	4.0 ± 1.1	0.001

Table 4. *Rejection Sensitivity and Resilience Scores*

Domain	Groups				p-value
	SMART (Pre-Test)	SMART (Post-Test)	Control (Pre-Test)	Control (Post-Test)	(ANCOVA)
Rejection Sensitivity	5.1 ± 1.3	3.6 ± 1.2	5.2 ± 1.2	5.0 ± 1.1	0.002
Resilience	3.9 ± 1.4	5.7 ± 1.1	4.0 ± 1.3	4.2 ± 1.2	0.004

Table 5. *Comparison of Psychological Distress Measures*

Domain	Groups				p-value
	SMART (Pre-Test)	SMART (Post-Test)	Control (Pre-Test)	Control (Post-Test)	
Anxiety Level (Mean ± SD)	6.2 ± 1.5	3.9 ± 1.2	6.0 ± 1.4	5.8 ± 1.3	0.004
Depression Level (Mean ± SD)	5.8 ± 1.6	3.7 ± 1.3	5.9 ± 1.5	5.7 ± 1.4	0.003
Stress Level (Mean ± SD)	6.5 ± 1.4	4.1 ± 1.2	6.3 ± 1.3	6.2 ± 1.2	0.002

Table 6. *Overall Psychological Well-Being Scores*

Group	Pre-Test	Post-Test	p-value
	Mean ± SD		
SMART Group	4.0 ± 1.2	5.7 ± 1.1	<0.001
Control Group	4.1 ± 1.1	4.3 ± 1.0	0.63

4. Discussion

The present study aimed to assess the effectiveness of the Stress Management and Resilience Training (SMART) program in improving psychological well-being, reducing rejection sensitivity, and enhancing resilience in patients with thalassemia. The findings revealed that participants who underwent the 10-week SMART intervention demonstrated significant improvements in psychological well-being compared to the control group. These results align with previous studies that have highlighted the benefits of cognitive-behavioral stress management techniques in improving mental health outcomes in chronically ill patients [1,2]. The Ryff Scales of Psychological Well-Being, a validated instrument for assessing

psychological well-being across multiple domains, was used to measure the intervention's impact. The significant improvement in psychological well-being scores in the SMART group suggests that structured stress management and resilience training can positively influence the mental health of individuals with thalassemia. Similar findings have been reported in studies involving patients with chronic diseases, where psychological interventions led to improvements in autonomy, environmental mastery, and self-acceptance [14,19]. Rejection sensitivity, a common psychological challenge in thalassemia patients due to the social stigma associated with the disease, significantly decreased in the SMART group. This finding is particularly important, as high rejection sensitivity has been linked to poor mental health outcomes, including depression and anxiety [20]. Previous research has demonstrated that cognitive restructuring and mindfulness techniques, key components of the SMART program, help individuals reframe negative perceptions and develop healthier coping mechanisms [21]. The study also found a notable increase in resilience among participants in the SMART group. Resilience, the ability to adapt to stress and adversity, plays a crucial role in maintaining psychological well-being in individuals with chronic illnesses [22]. The observed increase in resilience suggests that the intervention provided participants with the necessary skills to manage stressors more effectively. This is consistent with studies indicating that resilience-building interventions significantly improve emotional regulation and stress coping strategies in patients with chronic conditions [23,24]. Furthermore, the overall psychological well-being score significantly improved in the SMART group, demonstrating the comprehensive effectiveness of the intervention. The control group, on the other hand, did not exhibit any significant changes, suggesting that without structured intervention, psychological well-being remains largely unchanged in this population. These findings reinforce the importance of integrating psychological support programs like SMART into the routine care of thalassemia patients [25]. Despite these promising results, the study has some limitations. The small sample size may limit the generalizability of the findings. Additionally, the study duration was relatively short, and long-term follow-up assessments were not conducted to evaluate the sustained effects of the intervention. Future studies with larger sample sizes and extended follow-up periods are needed to confirm these findings. In conclusion, the SMART intervention demonstrated significant improvements in psychological well-being, reduced rejection sensitivity, and increased resilience in patients with thalassemia. These results suggest that structured stress management and resilience training programs should be considered as an essential component of comprehensive thalassemia care. Future research should explore the long-term benefits of such interventions and assess their applicability in broader patient populations.

4.1 Limitations

The limitations of this study include the small sample size and short duration of the intervention. The findings may not be generalizable to all thalassemia patients, and the lack of long-term follow-up prevents assessment of the sustained effects of the SMART program on psychological well-being.

5. Conclusion

The findings of this study demonstrate that the SMART intervention effectively enhances psychological well-being, reduces rejection sensitivity, and improves resilience in patients with thalassemia. Participants in the intervention group showed significant improvements across multiple well-being domains compared to the control group. These results highlight the potential of structured stress management and resilience training as a valuable non-pharmacological approach to improving mental health outcomes in individuals with chronic illnesses like thalassemia.

5.1 Recommendation

Based on the positive outcomes observed, it is recommended to incorporate the SMART program into routine care for patients with thalassemia to improve their psychological well-being. Further studies with larger sample sizes and long-term follow-up are necessary to confirm these findings and explore broader applications.

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