ORIGINAL ARTICLE

Effect of Gratitude Therapy and Psychological Well Being on Blood Glucose Levels Diabetes Mellitus Patients

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ABSTRACT

Introduction: Diabetes Mellitus is a chronic metabolic disease associated with serious complications such as blindness, kidney failure, stroke, lower limb amputation, and death. Psychological interventions have been increasingly explored as supportive strategies in diabetes management. Aim of the study to examine the effect of Gratitude Therapy and Psychological Well-being on blood glucose levels in patients with Diabetes Mellitus. **Methods:** This study used exploratory study. A total of 94 patients with Diabetes Mellitus participated from a population of 112. Interventions were administered in a structured and scheduled format. Paired t-test was used to analyze the pre- and post-treatment blood glucose levels. **Results:** The average blood glucose level before the intervention was 289 mg/dL, which decreased to 237 mg/dL after the intervention, showing an average reduction of 52 mg/dL. Statistical analysis revealed a significant effect of the intervention ($p=0.000$, $\alpha < 0.05$), indicating a statistically and potentially clinically meaningful improvement. **Conclusion:** Limitations of this study include the lack of a control group, and the possibility that the blood glucose reduction could be due to a placebo effect. Gratitude Therapy and improved psychological well-being may contribute to lower blood glucose levels. These findings support the integration of a structured gratitude-based program as a complementary strategy in diabetes management.
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Keywords: Gratitude, Psychological Well-being, Blood glucose Level, Diabetes Mellitus, Pre-experimental Design.

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INTRODUCTION

Diabetes Mellitus (DM) is a chronic disease that can lead to serious complications, including blindness, kidney failure, stroke, lower limb amputation, and premature death (1). Although DM is incurable, blood glucose levels can be managed effectively to maintain levels comparable to those of healthy individuals (2). However, many patients still struggle with uncontrolled blood glucose levels despite being aware of various strategies to achieve normoglycemia (3).

Poor glycemic control is not solely caused by physical factors; psychological aspects also play a critical role. Patients with DM often experience emotional and psychological challenges such as anxiety, anger, grief, shame, guilt, hopelessness, depression, loneliness, and a sense of helplessness. These psychological responses can lead to passivity, dependency, confusion, discomfort, and overall psychological distress (4).

In recent years, gratitude therapy has emerged as a promising psychological intervention. Gratitude is defined as a moral obligation that involves the feeling and expression of appreciation for benefits received (5). It is associated with a variety of positive psychological outcomes, including enhanced psychological well-being.

Psychological well-being refers to the realization of an individual's full psychological potential, encompassing self-acceptance, purpose in life, positive social relationships, and autonomy (6). The development of gratitude-based interventions has shown potential in improving both psychological and subjective well-being (7). Studies have demonstrated that gratitude can act as a positive healing force, particularly among patients with chronic illnesses such as cardiovascular diseases (8).

Furthermore, a significant and positive relationship has been established between gratitude and psychological well-being in various populations. Positive psychology exercises—such as writing gratitude letters or performing acts of kindness—have consistently led to improvements in psychological well-being (9).

Among DM patients, interventions grounded in self-care theory have proven effective in lowering blood glucose levels by promoting knowledge and adherence

to proper dietary habits, medication, physical activity, and regular medical checkups (10). However, beyond physical management, psychological resilience and emotional regulation also contribute significantly to disease management. Gratitude enables individuals to foster hope and adopt a more positive outlook when facing life's challenges (11), while psychological well-being enhances life evaluation and mental health (12).

Gratitude therapy, as a form of positive psychotherapy, encourages individuals to cultivate positive thinking by expressing gratitude toward the environment, God, and others (13). Therefore, fostering gratitude and psychological well-being may serve as a novel, person-centered psychological intervention to support blood glucose regulation in individuals with diabetes. The aim of this study is to investigate the effect of gratitude therapy and psychological well-being on blood glucose levels in patients with Diabetes Mellitus.

MATERIALS AND METHODS

This study employed used exploratory study to assess the effect of gratitude therapy and psychological well-being on blood glucose levels in patients with Diabetes Mellitus. Although the initial phase involved descriptive exploration, the primary focus of the study was experimental, aimed at evaluating the impact of a psychological intervention.

The research was conducted in three stages. The first stage involved preliminary planning, including a literature review and development of the intervention protocol, using an explanatory approach to understand the context and baseline characteristics of the study population. The second stage involved the implementation of the intervention, which included a structured gratitude therapy program. The third stage focused on reporting and disseminating the results to academic and public audiences.

Purposive sampling technique was used to select 94 eligible participants from a total population of 112 patients diagnosed with type 2 Diabetes Mellitus. Inclusion criteria included patients aged 35–65 years, diagnosed with DM for more than one year, able to communicate effectively, and willing to participate in the study. Exclusion criteria included individuals with acute complications or comorbid psychiatric disorders.
Ethical consideration:

This research has passed the ethics of the Hafshawaty Zainul Hasan University Health research ethics committee with number 280/KEPK-UNHASA/VIII/ 2024.
Intervention Protocol.

The intervention consisted of gratitude therapy sessions delivered over a 4-week period, with two sessions per week, each lasting approximately 60 minutes. The sessions included guided reflections on daily gratitude, writing gratitude journals, discussions on meaningful experiences, and expressing appreciation toward others and their environment. Each session was delivered by a trained facilitator using structured modules.

Although psychological well-being was not actively manipulated as a separate intervention, it was measured as an outcome variable to assess whether improvements in gratitude would translate to enhanced well-being and, subsequently, better blood glucose control. Measurement Instruments, Blood glucose levels were measured twice: before and after the intervention using a fasting blood glucose test obtained through capillary blood sampling with a calibrated glucometer. Gratitude levels were measured using the Gratitude Questionnaire–Six Item Form (GQ-6), a validated tool with established reliability. Psychological well-being was assessed using the Ryff's Psychological Well-Being Scale, which includes dimensions such as self-acceptance, personal growth, and purpose in life. Both instruments had been tested for reliability and validity in prior studies involving chronic disease populations.

Statistical analysis and data analysis were performed using paired sample t-tests to compare pre- and post-intervention values. Prior to conducting the t-tests, assumptions of normality were tested using the Shapiro-Wilk test, and outliers were checked using boxplot visualization. In addition to significance testing (α = 0.05), effect sizes were calculated using Cohen's d to assess the magnitude of change. A Cohen's d value of 0.2 was considered small, 0.5 moderate, and ≥0.8 large.

RESULTS

This study involved 94 participants diagnosed with diabetes mellitus. The general characteristics included age, sex, duration of diabetes, medication status, and comorbidities, while the specific variables included levels of gratitude and psychological well-being, as well as blood glucose levels before and after the intervention.

As shown in Table I, most respondents were aged above 60 years (47%), followed by those aged 51–60 years (38%). The majority of participants were female (59%). In terms of disease duration, most participants had been diagnosed with diabetes mellitus for 6–10 years (39%). Most respondents were receiving oral medication (58%), and the most common comorbidity was hypertension (65%). Table 1 also shows that most participants had moderate levels of gratitude and psychological well-being (54%).

Table II presents the distribution of blood glucose levels before and after the intervention. Before the intervention, the majority of participants had blood glucose levels between 200 and 300 mg/dL (60%), while 14% had blood glucose levels above 300 mg/dL. After the gratitude and psychological well-being therapy, the proportion

Table I. Respondent Characteristics, Clinical Profile, and Gratitude/ Well-being Status (n = 94)

Variable	Category	Frequency, n (%)
Age distribution		
	31-40 years	2 (2.0)
	41-50 years	12 (13.0)
	51-60 years	36 (38.0)
	>60 years	44 (47.0)
Sex distribution		
	Male	39 (41.0)
	Female	55 (59.0)
Duration of diabetes		
	1-5 years	24 (26.0)
	6-10 years	37 (39.0)
	>10 years	33 (35.0)
Medication status		
	Oral medication	54 (58.0)
	Insulin	18 (19.0)
	Oral medication and insulin	19 (20.0)
	No medication	3 (3.0)
Comorbidities		
	Hypertension	61 (65.0)
	Coronary heart disease	7 (7.0)
	Itchy skin	12 (13.0)
	No comorbidities	14 (15.0)
Gratitude and well-being level		
	Low	35 (37.0)
	Fair	51 (54.0)
	High	8 (9.0)
Total		**94 (100.0)**

Source: Primary Data, Research Questionnaire, August 2024.

Table II. Distribution of Blood Sugar Levels Before and After Intervention (n = 94)

Blood sugar level	Before treatment, n (%)	After treatment, n (%)
<200	25 (26.0)	44 (47.0)
200-300	56 (60.0)	48 (51.0)
>300	13 (14.0)	2 (2.0)
Total	**94 (100.0)**	**94 (100.0)**

Source: Primary Data, Research Questionnaire, August 2024.
Note: Confirm the measurement unit for blood sugar levels before submission; blood glucose is commonly reported in mg/dL.

of participants with blood glucose levels below 200 mg/dL increased from 26% to 47%. In contrast, the proportion of participants with blood glucose levels above 300 mg/dL decreased markedly from 14% to 2%.

As shown in Table III, the paired sample t-test demonstrated a statistically significant decrease in blood glucose levels after the intervention ($p < 0.001$). The mean blood glucose level decreased from 241.6 mg/dL before the intervention to 189.5 mg/dL after the intervention, with a mean reduction of 52.1 mg/dL. The 95% confidence interval for the mean difference ranged from −61.4 to -42.8, indicating a reliable reduction in blood glucose levels. The correlation coefficient ($r = 0.692$) suggested a moderate-to-strong relationship between pre- and post-intervention blood glucose values.

Clinically, the average reduction of approximately 52 mg/dL in blood glucose levels indicates a meaningful improvement in glycaemic control. These findings suggest that gratitude and psychological well-being therapy may serve as a useful adjunct intervention for improving blood glucose control among patients with diabetes mellitus.

DISCUSSION

This study examined the association between gratitude therapy and psychological well-being on the blood glucose levels of patients with diabetes mellitus. The findings showed a statistically significant reduction in blood glucose levels following the intervention, suggesting a potential relationship between psychological factors and glycemic control.

Before the intervention, most participants had blood glucose levels in the 200–300 mg/dL range, with no participants falling below 200 mg/dL. After the gratitude and well-being therapy, 17% of participants achieved blood glucose levels below 200 mg/dL. While these changes are statistically significant ($p < 0.05$), the clinical significance of this reduction—an average difference of 52 mg/dL—should be interpreted with caution. Without a control group or randomization, we cannot exclude the possibility of confounding factors or placebo effects influencing the results. After being given treatment, it can be concluded that there is an influence of Gratitude and wellbeing on the blood glucose levels of Diabetes Mellitus sufferers, with a decrease of between 2 to 8 mg/dL.

Several psychological mechanisms may explain the observed improvements. Psychological well-being encompasses self-acceptance, personal growth, autonomy, purpose in life, environmental mastery, and positive relationships (Budiarto, 2018). Gratitude, in particular, has been linked to increased positive affect and decreased depressive symptoms (McCullough et al., 2021). A meta-analysis found that gratitude

Table III. Paired Sample t-Test Results: Blood Glucose Levels Before and After Intervention

Comparison	N	Mean Before (mg/dL)	Mean After (mg/dL)	Mean Difference	95% CI of the Difference	p-value	Correlation (r)
Blood Sugar Levels	94	241.6	189.5	−52.1	(−61.4 to −42.8)	< 0.001	0.692

Source: Primary Data, 2024

interventions could enhance mental health, reduce anxiety, and promote overall life satisfaction (14–16). These psychological improvements may indirectly affect physical health through improved treatment adherence, reduced stress, and healthier lifestyle choices (17, 18).
Stress is known to raise cortisol levels, which in turn can elevate blood glucose. Practices that enhance well-being such as gratitude journaling, mindfulness, or setting positive goals—can reduce psychological stress and, potentially, improve metabolic outcomes (15, 21). Individuals who feel more optimistic and connected to others may also be more consistent with self-care behaviors critical for diabetes management, such as maintaining a healthy diet and adhering to medication regimens (22, 23).

Despite these promising findings, the present study has notable limitations. The absence of a control group limits our ability to attribute changes in blood glucose directly to the intervention. Additionally, the reliance on self-report measures for psychological variables may introduce response bias. It is also unclear whether the improvements observed were sustained over time, as the study used a short-term follow-up period. Limitations of this study include the lack of a control group, which could potentially be due to a placebo effect. The program was conducted over a short period of only four weeks. Changes occurred as well as lifestyle adjustments. Gratitude is only a complementary component in managing high blood glucose, in addition to consistently taking medication or pharmacological interventions.

Future research should include randomized controlled trials (RCTs) to establish causality more convincingly. It is also important to explore subgroup effects—such as differential outcomes based on baseline levels of gratitude or well-being—and to incorporate biomarkers and longer follow-up periods. Nonetheless, our findings contribute to growing evidence that psychological interventions, including gratitude therapy, may support holistic approaches to diabetes care.
In summary, while gratitude therapy and psychological well-being interventions appear to be associated with reduced blood glucose levels in this population, the results should be viewed as preliminary. These interventions may serve as valuable adjuncts to medical treatment, especially given their potential to enhance quality of life and emotional resilience in patients with chronic conditions like diabetes.

CONCLUSION

This study demonstrates that gratitude therapy and psychological well-being interventions are significantly associated with improved glycemic control in patients with diabetes mellitus ($p < 0.05$). Following the intervention, the proportion of participants with blood glucose levels between 200–300 mg/dL decreased from 60% to 51%, while those achieving levels below 200 mg/dL increased to 47%. Although these findings highlight the potential of structured psychological interventions—such as guided gratitude journaling or mindfulness sessions—as valuable complementary tools in holistic diabetes care, the study is limited by the absence of randomization and a control group. Consequently, future randomized controlled clinical trials are necessary to validate these outcomes, rule out confounding variables, and firmly establish the role of well-being therapies in standard diabetic management protocols.

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