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# CASE STUDY: THE APPLICATION OF LAUGHTER THERAPY IN TYPE II DIABETES MELLITUS PATIENTS FOR BLOOD GLUCOSE INSTABILITY

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**ABSTRACT**
Elevated blood glucose levels in type II diabetes mellitus (DM) can cause serious organ damage. In Indonesia, the prevalence of DM is increasing, with many patients not receiving adequate treatment. Non-pharmacological therapies, such as laughter therapy, are considered effective in reducing blood glucose levels and stress, especially in elderly patients with type II DM. Research Objective: To describe the outcomes of implementing laughter therapy nursing care in type II DM patients with the nursing problem of blood glucose instability in the working area of Citra Medika Health Center, Lubuklinggau, in 2024. Research Method: A case study method involving two individuals with a medical diagnosis of type II DM, utilizing family nursing care, and implementing laughter therapy over four sessions in one week, with a duration of 20-30 minutes each session. Research Results: Subject I experienced a decrease in random blood glucose levels from 189 mg/dl on the first day to 83 mg/dl on the fourth day. Subject II experienced a decrease from 237 mg/dl on the first day to 116 mg/dl on the fourth day. The difference in reduction between the two subjects was influenced by factors such as family support, the use of hyperglycemia medication, and diet control. Conclusion: The application of laughter therapy can reduce blood glucose levels in patients with type II DM. Further research should include the control of independent repeated actions, the use of diabetes medication, and a larger number of respondents. Suggestions: Laughter therapy can be used as a complementary therapy in the management of type II DM in older adults.

Keywords: diabetes mellitus; hyperglycemia; laughter therapy

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## INTRODUCTION

Blood glucose instability, which can cause serious organ damage such as to the heart, blood vessels, eyes, kidneys, and nerves (World Health Organization, 2021). Type II diabetes typically occurs in adults, where the body becomes resistant to insulin and experiences insulin production deficiency (Pan American Health Organization, 2022). Symptoms of type II DM include frequent urination, excessive thirst, excessive hunger, weight loss, changes in vision, and persistent fatigue. These symptoms often go unidentified until several years after onset or when serious complications have developed (Bains et al., 2015). This disease is a leading cause of death worldwide, with a doubled risk of mortality. In 2019, there were 1.5 million deaths due to DM complications, especially heart disease and stroke (STATISTA, 2021). The Western Pacific region has recorded the highest number of deaths, with 717,000 people dying from DM in 2021. In the same year, the global number of adults with DM reached 537 million, projected to increase to 643 million by 2030 and 783 million by 2045, predominantly in low- and middle-income countries (IDF Diabetes Atlas, 2022).

In Indonesia, the prevalence of DM reached 1,017,290 individuals in 2018, with many not receiving adequate treatment and lacking awareness of routine blood glucose checks (RISKESDAS, 2018). South Sumatra Province ranks tenth in DM cases in Indonesia, with

Kota Lubuklinggau contributing 919 cases (RISKESDAS PROVINSI SUMSEL, 2018). Based on medical records from Puskesmas Citra Medika Kota Lubuklinggau, in 2022, there were 201 cases (23.92%) of elderly individuals suffering from DM (Puskesmas Citra Medika, 2022). The primary diagnosis in DM patients is blood glucose instability, leading to fluctuations outside the normal range (TIM Pokja SDKI DPP PPNI, 2017). DM patients neglect disease management due to lack of symptoms or time constraints (RISKESDAS, 2018). Non-pharmacological therapies like laughter therapy are considered effective options (Kemenkes RI, 2019). Laughter therapy has been shown to reduce stress hormone levels, improve sleep quality, and lower blood glucose levels in elderly individuals with type II DM (Ahmadi et al., 2020; Kurniawan, 2018)mplementary therapy can serve as a management option for elderly individuals with type II DM at a low cost. It has been demonstrated to lower blood glucose levels and can be self-administered through 8 sessions of laughter therapy (Ahmadi et al., 2020). Research by Candra et al. (2014) indicated that non-pharmacological therapies like laughter therapy, conducted for 12 weeks with sessions lasting 20-30 minutes (20-40 seconds per session), at Puskesmas IV Denpasar, led to reduced blood glucose levels in type II DM patients (Candra, 2014). Laughter therapy engages facial muscles and internal organs such as the heart, lungs, chest, diaphragm, and abdomen. These movements stimulate the brain to suppress epinephrine and cortisol secretion and promote the release of endorphins, inducing feelings of calm and comfort (Friska, 2020).

According to Ahmadi et al. (2020), laughter therapy is more effective in enhancing hope, compassion, and reducing hyperglycemia in elderly patients with type II diabetes compared to solution-based therapy (Ahmadi et al., 2020). Candra & Sumirta's (2014) research found that laughter therapy over 8-12 weeks reduced blood glucose levels in diabetes mellitus patients ( Candra & Sumirta, 2014). Additionally, Hirosaki et al. (2023) found through randomized controlled trials that laughter yoga programs over 12 weeks could improve blood glucose control and be a pleasant self-care intervention for individuals with type II diabetes. The mechanism of laughter therapy on blood glucose involves inhibition of the hypothalamus in secreting CRH, ACTH, and cortisol, thereby enabling the body to produce endorphins and inhibit glucocorticoid hormone release (Hirosaki et al., 2023). The effects of laughter therapy include improved sleep quality and blood glucose levels, recommending it as a non-pharmacological treatment for elderly individuals with type II DM (Kurniawan, 2018).

The purpose of this study is to explore the effectiveness of laughter therapy in helping manage blood glucose instability in patients with type II diabetes mellitus. Based on the mechanisms outlined by Wibowo et al. (2024), this research aims to assess the impact of laughter therapy on elderly health, particularly in terms of stress reduction, improved blood circulation, oxygen distribution, insulin sensitivity, and sleep quality. Additionally, the study seeks to understand how laughter therapy may serve as a form of light physical exercise that could increase insulin sensitivity and assist the body in utilizing glucose more efficiently ( Wibowo et al., 2024). Through this research, it is expected to obtain empirical data on the benefits of laughter therapy in managing type II diabetes mellitus, specifically in lowering blood glucose levels. The study also aims to provide recommendations for Citra Medika Health Center regarding the implementation of laughter therapy as a complementary intervention to support diabetes care in their service area.

## METHOD

The design this study is a case study, utilizing a descriptive method aimed at objectively depicting the condition under study and conducting a more in-depth analysis of nursing care for type II diabetes mellitus patients with 2 patient with blood glucose instability at Citra

Medika Helath Center, Lubuklinggau City. In Subject I, interventions were carried out from April 16, 2024 to April 19, 2024, while in Subject II, interventions were carried out from April 19, 2024 to April 22, 2024.

Inclusion criteria refer to the general characteristics of the research subjects from the target population that are accessible and will be studied (Nursalam, 2017). The inclusion criteria for this study are:

1. Clients and families willing to participate as respondents.
2. Families with type II diabetes mellitus for less than 1 year since diagnosis in the Puskesmas Citra Medika Kota Lubuklinggau area in 2023.
3. Type II diabetes mellitus clients aged over 60 years (older adults).

Exclusion criteria refer to eliminating subjects who meet the inclusion criteria from the study for various reasons (Nursalam, 2017). The exclusion criteria are:

1. Clients with respiratory disorders.
2. Individuals with mental disorder.

## RESULT

### Nursing Assessment

assessments on subjects I and II through direct interviews with clients and families, observation, and physical examinations. Based on the assessments conducted on subjects I and II: Subject I, with initials Ny. N, aged 64 years, female, Muslim, elementary education, housewife, presenting with chief complaints of fatigue, frequent tingling sensations, frequent thirst, and frequent urination. Ny. N has been aware of having diabetes mellitus (DM) for the past 5 years. BP: 140/90 mmHg, RR: 20 x/minute, Pulse: 85 x/minute, Temperature: 36.5ºC, FBS: 220 mg/dl. Subject II, with initials Ny. R, aged 64 years, female, Muslim, elementary education, farmer, complaining of frequent thirst and hunger, nocturnal polyuria, weakness, and tingling in the legs. Ny. R has been aware of having DM for the past 10 years, with a history of hypertension since youth. BP: 140/80 mmHg, RR: 20 x/minute, Pulse: 90 x/minute, Temperature: 36.5ºC, FBS: 237 mg/dl.

### Nursing Evaluation

The evaluation conducted by the researcher is tailored to the patient's condition and available facilities, so that action plans can be completed with SOAP, subjective, objective, analysis, and planning. The evaluation results for Subject I, Ny. N, on the last day of implementation, Ny. N stated that nocturnal urination began to decrease and felt easier to fall asleep now at night, after laugh therapy and sleep more relaxed and comfortable and feel fresher, with a FBS value of 110 mg/dl on the last day. During the 4-day recording, there was always a decrease before and after laugh therapy with the most significant decrease occurring on day 2 with a decrease of 199 mg/dl. The evaluation results for Subject II on the last day of implementation, Ny. R, complaints of frequent thirst and hunger, and nocturnal urination have decreased, Ny. R's family participated in monitoring food and reminding to take medication, feeling more relaxed, comfortable every time after therapy, the family participated in laugh therapy activities on day 3, with a recording on the last day of Ny. R's FBS of 201 mg/dl. Looking at both subjects, the FBS of both subjects has not yet reached normal limits, but each time the intervention was carried out, there was a decrease in FBS before and after the intervention. Here are the evaluation results of blood glucose levels before and after laughter therapy for both subjects:

Table 1.
Evaluation of Blood Glucose Levels in Subject I

| No | Day/Date | Before Laughter Therapy (mg/dl) | After Laughter Therapy (mg/dl) | Difference | Remarks |
|---|---|---|---|---|---|
| 1. | Tuesday, April 16, 2024 | 189 | 132 | 57 | Decreased |
| 2. | Wednesday, April 17, 2024 | 243 | 169 | 74 | Decreased |
| 3. | Thursday, April 18, 2024 | 212 | 187 | 25 | Decreased |
| 4. | Friday, April 19, 2024 | 193 | 110 | 83 | Decreased |

Table 2.
Evaluation of Blood Glucose Levels in Subject II

| No | Day/Date | Before Laughter Therapy (mg/dl) | After Laughter Therapy (mg/dl) | Difference | Remarks |
|---|---|---|---|---|---|
| 1. | Friday, April 19, 2024 | 237 | 223 | 14 | Decreased |
| 2. | Saturday, April 20, 2024 | 228 | 201 | 27 | Decreased |
| 3. | Sunday, April 21, 2024 | 323 | 229 | 94 | Decreased |
| 4. | Monday, April 22, 2024 | 315 | 199 | 116 | Decreased |

Based on tables 1 and 2, it is evident that there was a decrease in blood glucose levels after implementing nursing interventions involving laughter therapy for both subjects over a period of 4 days.

## DISCUSSION

The researcher conducted assessments for Subjects I and II through direct interviews with the clients and their families, as well as observation and physical examination. The findings for each subject are as follows; Subject I (Initials: Mrs. N) is a 64-year-old woman, Muslim, with elementary school education, and a homemaker. She reported fatigue, frequent tingling, thirst, and frequent urination. Diagnosed with DM five years ago, her measurements were: BP 140/90 mmHg, RR 20 breaths/min, pulse 85 beats/min, temperature 36.5°C, and blood glucose level (BGL) of 220 mg/dl.Subject II (Initials: Mrs. R) is also a 64-year-old woman, Muslim, elementary school-educated, working as a farmer, with similar complaints of thirst, hunger, frequent nighttime urination, fatigue, and tingling in the legs. Diagnosed with DM 10 years ago and with a history of hypertension, her measurements were: BP 140/80 mmHg, RR 20 breaths/min, pulse 90 beats/min, temperature 36.5°C, and BGL of 240 mg/dl.

According to the TIM Pokja SDKI DPP PPNI (2017), both subjects exhibit symptoms typical of DM, including frequent nighttime urination, fatigue, tingling in the legs, and elevated blood glucose levels (TIM Pokja SDKI DPP PPNI, 2017). As Maria (2021) states, Type II DM is often characterized by polyuria, polydipsia, polyphagia, weight loss, and peripheral neuropathy, causing tingling and weakness (Bakri, 2021).Both subjects have fluctuating BGLs, with Mrs. N's range over the past five years between 150 mg/dl and 312 mg/dl, and Mrs. R's range over ten years between 160 mg/dl and 353 mg/dl. These fluctuations are influenced by medication adherence, dietary habits, and physical activity. This aligns with Putra (2023), who found that factors like age, sex, type of therapy, and duration of diabetes significantly correlate with blood glucose control (Putra et al., 2023).

Mrs. R's history of hypertension since a young age also impacts her blood glucose stability, increasing GDL fluctuations compared to Mrs. N, who has no hypertension history. According to Utomo (2018), risk factors for DM include age, genetics, hypertension, dyslipidemia, physical inactivity, smoking, and stress management, with some factors modifiable (like lifestyle) and others not (like age and genetics) (Alya Azzahra Utomo, Andira Aulia R, Sayyidah Rahmah, 2018). Both subjects regularly attend healthcare centers and take prescribed medication. However, based on BGL assessments, levels are still above the normal range, likely due to their nutritional status: Mrs. N is overweight, while Mrs. R is obese. Harsari (2018) found that obesity, particularly with excess adipose tissue, can disrupt metabolism and contribute to insulin resistance in Type II DM (American Diabetes Association, 2022; Harsari et al., 2018).

Prioritizing issues is key in the nursing intervention phase. The primary nursing issue identified was blood glucose instability related to the family's lack of caregiving skills (Tim Pokja SIKI DPP PPNI, 2018). The researcher's plan aimed to help patients recognize hyperglycemia symptoms and control diet and BGL through laughter therapy. According to Kurniawan (2018), laughter therapy potentially regulates BGL in elderly Type II DM patients by inhibiting the hypothalamus from releasing CRH, ACTH, and cortisol, stimulating endorphin production, and suppressing glucocorticoid hormone release. This can improve sleep quality and BGL control, making it a viable non-pharmacological approach (Kurniawan, 2018). In the implementation phase, the nurse begins by establishing a contract with the patient's family to prepare them physically and psychologically for care. This contract includes the schedule, care materials, caregivers involved, family members participating, and necessary equipment. Implementation follows the established care plan based on diagnosis and prioritized interventions. Family involvement aims to achieve the patient family's nursing care goals. Implementation for Subject I took place from April 16–19, 2024, and for Subject II from April 19–22, 2024.

According to (Tim Pokja SLKI DPP PPNI, 2018), evaluation compares implementation results with established criteria and standards. For family nursing, it assesses cognitive, affective, and psychomotor domains, comparing nursing goals with client responses (Bakri, 2021). For Subject I (Mrs. N), on the last day of intervention, she reported reduced nighttime urination and improved sleep. Her final BGL was 182 mg/dl, showing a cumulative decrease, with the greatest reduction of 74 mg/dl on the second day. For Subject II (Mrs. R), her symptoms of thirst, hunger, and frequent urination had subsided. Family members monitored her diet and reminded her to take medication, and she felt more relaxed. Her BGL decreased by 111 mg/dl on the third day, with a final BGL of 201 mg/dl. Both subjects experienced BGL reductions with each intervention, though levels remained above normal. This aligns with the benefits of combined therapy, regular medication, dietary management, and physical activity, including laughter therapy (Bulu et al., 2019; Wintika. & Margono, 2021).

## CONCLUSION

In conclusion, the findings of this study highlight the potential of laughter therapy as a complementary intervention for managing blood glucose levels in diabetic patients. Both subjects showed consistent reductions in fasting blood glucose levels following laughter therapy sessions, underscoring its positive impact on glycemic control. Despite regular medication adherence, dietary habits, and physical activity remain crucial factors influencing blood glucose levels. Incorporating laughter therapy alongside conventional treatments could enhance patient outcomes by fostering emotional well-being and potentially reducing insulin resistance.Recommendations for implementation include integrating laughter therapy into

diabetic care programs, emphasizing its role in holistic patient management. Healthcare providers should consider incorporating non-pharmacological interventions like laughter therapy into diabetes management protocols to optimize treatment outcomes and improve patient quality of life.

While this study provides promising insights, several limitations warrant further investigation. Future research could explore larger sample sizes and long-term effects of laughter therapy on glycemic control. Additionally, comparative studies assessing laughter therapy against other non-pharmacological interventions would elucidate its relative efficacy and optimal application in clinical settings. Moreover, investigating the mechanisms underlying the physiological and psychological benefits of laughter therapy could provide deeper insights into its therapeutic potential for diabetic patientsWe extend our sincere gratitude to our colleagues who provided invaluable insights and support throughout this research endeavor. Their contributions enriched the depth and scope of this study. Additionally, we acknowledge the financial assistance received, which enabled the completion of this research.

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