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The Effect Of Psychosocial Nursing Training On Type 2 Diabetes Mellitus Patients By Measuring Anxiety And Cortisol Hormones At The Pekanbaru City Health Centre

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ABSTRACT

Type 2 diabetes mellitus has a significant impact on patients' quality of life, both physically and psychologically. Patients must undergo long-term therapy, regular check-ups, and lifestyle changes, which can cause anxiety and increase glucocorticoid (cortisol) hormone levels. The role of nurses as frontline workers is crucial in providing holistic psychosocial services through education, emotional support, and anxiety screening. Nurses at community health centres must master the competencies in accordance with SDKI, SLKI, and SIKI standards for the management of anxiety. The purpose of this study was to prove the effect of psychosocial nursing training on anxiety by measuring anxiety and cortisol hormone levels in DMT2 patients at community health centres in Pekanbaru City. This research is quantitative with a quasi-experimental design. There were 21 research subjects divided into two groups, 11 subjects as the intervention group and 10 subjects as the control group. Data were collected using the ZSAS Questionnaire for anxiety and ARCHITECT C8000 for blood cortisol through laboratory tests. Data analysis using the t-test showed no significant difference between the pretest anxiety scores of the intervention group and the control group (p value = 0.858), but there was a significant difference. There was no significant difference between the intervention group and the control group in the pretest cortisol hormone test scores (p value = 0.123) or posttest scores (p value = 0.146). The psychosocial training provided to nurses was proven to be effective in significantly reducing patient anxiety in the intervention group. Therefore, this training should be routinely integrated into the professional development of nurses, particularly those who treat patients with Type 2 Diabetes Mellitus at the primary care level (community health centres).

KEYWORDS: ZeroWaste Dataset, Automated waste recycling, Object Detection, Deep Learning. intelligent sorting systems.

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INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a systemic metabolic disorder characterised by insulin resistance, a condition in which insulin is produced in excess, but the body's cells are unable to respond properly to the insulin hormone. This condition results in the body's cells being unable to absorb glucose to be processed into energy, leading to hyperglycaemia Type 2 diabetes mellitus (T2DM) is a systemic metabolic disorder characterised by insulin resistance, a condition in which insulin is produced in excess, but the body's cells are unable to respond properly to the insulin hormone. This condition results in the body's cells being unable to absorb glucose to be processed into energy, leading to hyperglycaemia (Muchaeron, 2022). Type 2 diabetes mellitus (T2DM) is a growing health problem today. One in 11 adults worldwide has type 2 diabetes mellitus, and the prevalence rate continues to rise. This condition can lead to a decline in mortality and morbidity rates as well as life expectancy (Aslan & Dikmen,2023).

The International Diabetes Federation (IDF) in 2021 stated that the prevalence of diabetes worldwide was 536.6 million or 10.5% living with diabetes and is estimated to increase to 783.2 million or 12.2% of the world's population by 2045. Based on IDF 2021 data, there will be an increase in diabetes cases in Indonesia, where Indonesia ranks 5th in the world and 3rd in Southeast Asia with 11.3% of people aged 20 to 79 years old having diabetes (Hong Sun, Pouya Saeedi, Suvi Karurangga, 2022). The prevalence of diabetes mellitus in Indonesia in 2023 will reach 10 million people and will increase to 30 million people in 2030, according to data from the Ministry of Health of the Republic of Indonesia.

The issue of diabetes mellitus is also a problem in provinces, regencies and cities throughout Indonesia. In Riau Province, the number of diabetes mellitus patients has increased significantly, from 85% in 2021 to 98% in 2022. The city of Pekanbaru itself has a percentage of diabetes mellitus patients that is not much different from the previous year, from 37% in 2021 to 95% in 2022.

Type 2 diabetes is the most common form of diabetes, directly linked to genetic factors, increased stress due to lifestyle changes and eating habits such as tobacco, alcohol, and insufficient vegetables, as well as low physical activity (Singh & Khandelwal, 2020). The main cause is insufficient insulin production. The decrease in insulin is caused by several factors, including damage to pancreatic beta cells due to external influences such as chemicals and viruses. Damage to insulin receptors causes a decrease in glucose receptor glands and peripheral tissues. This process makes it difficult for the body of a DMT2 patient to repair the

metabolism that occurs in the body in the form of carbohydrates, fats and proteins, causing glucose to exceed normal limits. This then causes signs and symptoms in DMT2 patients.

Signs and symptoms in patients with DMT2 include excessive thirst, leading to increased fluid intake (polydipsia), increased appetite, leading to increased food intake (polyphagia), frequent urination (polyuria), especially at night, weight loss, fatigue and the need for more sleep, frequent itching and tingling in the legs, blurred vision, erectile dysfunction in men, and vulvar pruritus in women (Perkeni,2006).

The impact of DMT2 has a major influence on clients' lives, both physically and psychologically, including scheduled therapy, routine check-ups and lifestyle changes that can cause various emotional responses such as low mood, fatigue, diet, anxiety, depression, sexuality issues, dietary restrictions and fear of daily insulin injections (Pearce MJ, Pereira K, 2013b). This can cause problems in terms of quality of life, financial systems, healthcare and the mental health of sufferers (Pearce MJ, Pereira K).

Mental health in people with DMT2 is often compromised because their physical and psychological conditions are under pressure due to chronic illness and the impact or complications and prognosis that arise (Baumeister et al., 2012). Mental health is also influenced by the Hypothalamic-Pituitary-Adrenal (HPA) axis, where cortisol production, stress response, psychoneuroimmunology, and psychosomatic disorders are related to the HPA axis. The mechanism is finely tuned to respond to stress and maintain homeostasis (Knezevic et al, 2023). When anxious, the body produces excessive amounts of the hormone cortisol, which can lead to increased blood pressure, chest tightness, and emotional instability. People with DMT2 are at greater risk of developing a number of mental health problems, such as stress, depression, anxiety and other pressures, compared to individuals without type 2 diabetes (Blonde et al., 2023; Burns et al., 2016). The risk of depression and anxiety in people with diabetes is approximately twice that of people without DMT2, and 50% of people with DMT2 who are depressed have not received treatment from health services. (Varela-Moreno et al., 2022) .

According to the World Health Organisation (2022), anxiety disorders are a serious problem with a prevalence of 28% or around 139 million people worldwide experiencing this condition. Data from the 2022 Basic Health Research (Riskesdas) shows that 9.8% of Indonesians experience anxiety, which means that 25.97 million Indonesians suffer from emotional mental disorders characterised by symptoms of anxiety. Meanwhile, in the Riau region, particularly Pekanbaru, the prevalence is higher than the national prevalence, at 13.3%. DMT2 patients with anxiety issues exhibit negative coping strategies that negatively impact their future, leading to increased diabetes fatalism (perceptions of hopelessness, despair, and helplessness), reduced adherence to treatment, and poor self-care.

Anxiety can trigger an increase in glucocorticoid hormones (cortisol), catecholamines (epinephrine), and four other growth hormones. Anxiety involves emotional, behavioural, and physiological responses. Physiologically, anxiety can affect the hypothalamic-pituitary system, which in turn affects endocrine function, such as increased cortisol levels. This increase has a negative impact on insulin function, stimulates gluconeogenesis, and inhibits glucose absorption, all of which contribute to elevated blood glucose levels. If anxiety in patients with type 2 diabetes mellitus is not promptly addressed and continues to worsen, it can lead to further increases in blood glucose levels. Anxiety can be managed through pharmacological and non-pharmacological approaches (Duke, 2021).

The most basic health service in the community is the community health centre (puskesmas). Community health services (keswamas) at puskesmas are still oriented towards physical problems, so that the mental health of the community (keswamas) is still not given enough attention. Health centre services for diabetes patients experiencing anxiety are usually provided in the form of GDS examinations and DMT2 medication. Although this does not threaten life, this health problem can affect overall health and the results of examinations in DMT2 patients. (Gallo, 2021).

Nurses are professionals who are at the forefront of society. The role of nurses in community health centres is very important in providing holistic and comprehensive psychosocial services. Nurses must be able to identify psychosocial diagnoses, particularly anxiety, provide nursing care, address mental health issues, provide education, provide support, address social issues, and provide holistic care. Therefore, it is important for nurses to prepare for quality education and training related to the support and care available at health centres. Education and training in self-management and problem-solving for anxiety in patients with type 2 diabetes are key elements of diabetes care. Trained nurses will be able to promptly screen for anxiety issues and complications that arise (Salihu, 2023). The ability of nurses to provide effective and efficient psychosocial services, particularly for anxiety, has been established by care standards that use SDKI, SLKI and SIKI as references for nurses in Indonesia. In nursing services in clinical settings, particularly at the primary level or community health centres, the implementation of psychosocial care is still very low. The purpose of this study was to prove the effect of psychosocial nursing training on anxiety and cortisol hormones in DMT2 patients at the Pekanbaru City Community Health Centre.

METHODS

This study used quantitative research with a quasi-experimental design and a pre-test and post-test control group. The research design was carried out on two groups, namely the control group and the experimental group, with measurements taken before and after the intervention. The study was conducted in all 21 community health centres in Pekanbaru City, where 11 community health centres underwent intervention and 10 community health centres served as controls. Data analysis for testing differences used the Independent T-test.

RESULTS

Characteristics of Nurses

Table 1. Basic Characteristics of Nurse Data Data Category

Variable	Group	Mean	SD	Minimum-Maximum	95%CI	Pvalue
Age	Intervension (n=11)	43.64	3.906	38-52	41.01-46.26	0,343
	Control (n=10)	40.70	6.865	27-50	35.79-45.61	
Length of Service	Intervension (n=11)	19.00	4.754	15-20	15.81-22.19	0.005
	Control (n=10)	12.00	6.532	1-20	7.33-16.67	

Source: Primary Data 2025

Table 2. Basic Characteristics of Nurse Data Data Category

Variable	Intervention Group (n=11)		Control Group (n=10)		Total Number (=21)	P value	P value
	n	%	n	%	n	%	
Marital Status							
Unmarried	1	9.1	0	0	1	4.8	1.000
Married	10	90.9	10	100	20	95.2	
Education							
Diploma	6	54.5	7	70.0	13	61.9	0.659
Bachelor's Degree	5	45.5	3	30.0	8	38.1	

Source: Primary Data 2025

Based on the results of the study, the characteristics of nurses with an average age of 43.64 years (95% CI: 41.01–46.26) with a range of 38–52 years were found in the intervention group that received training. and an average length of service of 19 years (95% CI: 15.81–22.19) with a range of 15–20 years. For the control group without training, the average age was 40.70 years (95% CI: 35.79–45.61), ranging from 27 to 50 years, and the average length of service was 12 years (95% CI: 7.33–16.67), ranging from 1 to 20 years. The age data was normally distributed ($p > 0.05$), while the length of service data was not normally distributed but was equal ($p < 0.05$). The majority of nurses in both groups were married, namely 90.9% in the intervention group and 100% in the control group. The equality test showed no significant difference in the proportion of marital status between the two groups ($p > 0.05$), indicating that marital status was homogeneous. In terms of educational background, the majority of nurses had a D3 degree, namely 54.5% in the intervention group and 70% in the control group, and the equality test also showed no significant difference ($p > 0.05$).

Patient Characteristics

Table 3. Characteristics of Basic Data Subjects Numerical

Variable	Group	Mean	SD	Minimum-Maximum	95%CI	P Value
Age	Intervension (n=11)	45.73	10.209	29-63	38.87-5229	0.494
	Control (n=10)	20.40	8.682	31-62	44.19-56.61	
Durating of suffering	Intervension (n=11)	2.55	1.753	1-6	1.37-3.72	0.004
	Control (n=10)	2.80	1.751	1-6	1.55-4.05	

Source: Primary Data 2025

Table 4. Characteristics of Basic Data Subjects of Research Data Category

Variable	Intervention Group (n=11)		Control Group (n=10)		Total Number (=21)	P value	P value
	n	%	n	%	n	%	
Gender							

Male	3	27.3	1	10	4	19.0	0,586
Female	8	72.7	9	90	17	81.0	
Education							
Low (Primary, Secondary)	4	36.4	3	30.0	7	33.3	1.000
High School, University	7	63,6	7	70.0	14	61.9	
Occupation	7	63,6	6	60	13	38.1	1.000
Not Working	4	36.4	4	40	8	61.9	
Income							
<Minimum wage	9	81.8	8	80	17	81.0	1.000
>Minimum wage	2	18.2	2	20	4	19.0	

Source: Primary Data 2025

Patient characteristics obtained showed that the average age of patients in the intervention group was 43.64 years (95% CI: 38.87–52.59) with a range of 29–63 years, and the average duration of illness was 2.55 months (95% CI: 1.37–3.72) with a range of 1–6 months. In the control group, the average age of patients was 50.40 years (95% CI: 44.19–56.61), ranging from 31 to 62 years, and the average duration of suffering was 2.80 months (95% CI: 1.55–4.05), ranging from 1 to 6 months. Age data were normally distributed ($p > 0.05$), while duration of illness data were not normally distributed ($p < 0.05$). The majority of patients in both groups were female, namely 72.7% in the intervention group and 90% in the control group, with a homogeneous gender proportion ($p > 0.05$). The majority of patients had a high school or college education, namely 63.6% in the intervention group and 70% in the control group, which was also homogeneous ($p > 0.05$). Most patients were unemployed, namely 81.8% in the intervention group and 80% in the control group, and the majority of patients had an income below the minimum wage (63.6% in the intervention group, 60% in the control group), and all of these characteristics did not show significant differences between groups ($p > 0.05$).

Dependent Variables (Patient Anxiety and Blood Cortisol)

Table 5. Test of Equality of Pre-test Anxiety Scores and Patient Cortisol Levels (n=21)

Variable	Group	Mean	SD	Minimal-Mksimal	95%CI	Pvalue
Anxiety screening	Intervension (n-11)	64.54	6.10	56-75	60.444-68.664	0.469
	Control (N=10)	64.00	7.68	53-80	58.500-69.499	
Cortisol	Intervension (n-11)	10.30	4.77	4.50-21.20	8.134-12.487	0.091
	Control (n-11)	8.61	4.01	4.50-17.10	5.737-11483	

Source: Primary Data 2025

The mean anxiety score of patients before training was 64.54 (95% CI: 60.44–68.66) in the intervention group and 64.00 (95% CI: 58.50–69.50) in the control group, with a normal distribution of anxiety scores ($p > 0.05$). The mean cortisol levels of patients were 10.30 µg/dl (95% CI: 8.13–12.49) in the intervention group and 8.61 µg/dl (95% CI: 5.74–11.48) in the control group, also normally distributed ($p > 0.05$). The mean anxiety score of patients in the intervention group was 48.90 (95% CI: 42.518–55.299) with a standard deviation of 9.51 and a score range of 36–64. In the control group, the average anxiety score of patients was 58.20 (95% CI: 53.541–62.858) with a standard deviation of 6.51 and a range of 48–71. The anxiety screening data was normally distributed ($p > 0.05$). The mean cortisol hormone level of patients in the intervention group was 10.71 µg/dl (95% CI: 7.080–14.356) with a standard deviation of 7.08 and a range of 4.30–19.80 µg/dl. In the control group, the mean cortisol hormone level was 7.87 µg/dl (95% CI: 6.065–9.674) with a standard deviation of 2.52, ranging from 3.80 to 10.80 µg/dl. The cortisol hormone data was also normally distributed ($p > 0.05$).

Table 6. Test of Equality of Post-test Anxiety Scores and Patient Cortisol Levels (n=21)

Variable	Group	Mean	SD	Minimal-Maksimal	95%CI	Pvalue
Anxiety screening	Intervension (n-11)	48.90	9.51	35-64	42.518-55.299	0,580
	Control (N=10)	58.20	6.51	48-71	53-541-62.858	

Cortisol	Intervension (n-11)	10.71	7.08	4.30-1980	7.080-14.356	0.059
	Control (n-11)	7.87	2.52	3.80-10.80	6.065-9.674	

Source: Primary Data 2025

The results of the independent t-test analysis obtained Analysis of ZSAS anxiety scores in the intervention group (11 subjects) and control group (10 subjects) using an unpaired t-test showed that the average anxiety score for the intervention group was 64.5 ± 6.10 and for the control group was 64 ± 7.68, with no statistically significant difference (p = 0.858). In the intervention group, 1 subject experienced severe anxiety, 8 moderate anxiety, and 2 mild anxiety. In the control group, 1 subject experienced severe anxiety, 6 moderate anxiety, and 3 mild anxiety. The ZSAS questions with the highest scores were related to numbness and tingling in the fingers and toes, fatigue, nervousness or anxiety, irritability/panic, and dizziness. Analysis of cortisol hormones in the intervention group (11 subjects) and control group (10 subjects) showed a higher mean cortisol level in the intervention group (11.85 ± 5.06 µg/dl) than in the control group (8.61 ± 4.01 µg/dl), but this difference was not statistically significant (p = 0.123). . The cortisol hormone range was 6.10–21.20 µg/dl for the intervention group and 4.50–17.10 µg/dl for the control group, with no values exceeding the normal limit.

Bivariate Analysis

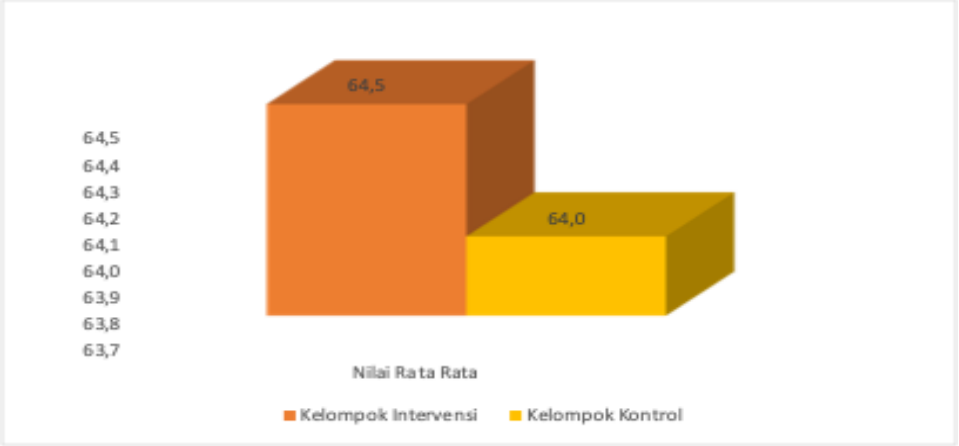

Figure 1. Bar diagram of the distribution of respondents in the intervention group and control group based on ZSAS anxiety scores

Analysis of ZSAS anxiety scores in both groups showed higher mean anxiety in the control group (58.2 ± 6.51) than in the intervention group (48.9 ± 9.51), with a significant difference (p = 0.018). In the intervention group, 1 subject had moderate anxiety, 6 had mild anxiety, and 4 had no anxiety. In the control group, 4 subjects had moderate anxiety and 6 had mild anxiety, with no subjects having no anxiety. The questions with the highest scores included feelings of being broken, trembling, headache/neck/back pain, indigestion, and hot/flushed face.

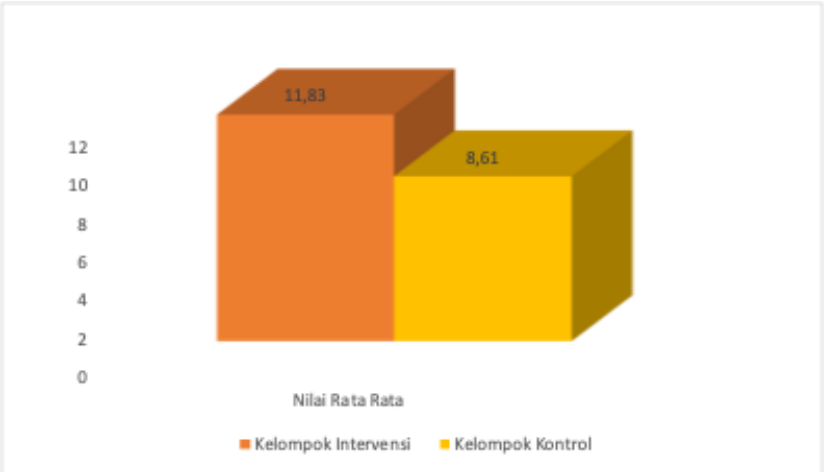

Figure 2. Bar diagram of the distribution of respondents in the intervention group and control group based on cortisol hormone levels

Analysis of morning cortisol levels in the intervention group (10.71 ± 5.4 µg/dl) and control group (7.87 ± 2.5 µg/dl) also showed

no significant difference (p = 0.146), with ranges of 4.30–17.00 µg/dl and 3.80–10.80 µg/dl, respectively, with no values exceeding normal.

DISCUSSION

Characteristics of Nurses

The average age of nurses in the intervention group was 43.64 years (95% CI: 41.01–46.26), including mature adults with sufficient work experience, supporting adaptability and nursing task efficiency (Nyberg et al., 2024). The control group was more varied, with an average age of 40.70 years (95% CI: 35.79–45.61) and higher variation, which could affect training response (Reddish, 2025). The intervention group, with its more homogeneous age, tended to show more consistent learning outcomes. The average length of service for intervention nurses was 19.00 years (95% CI: 15.81–22.19) with stable and homogeneous experience, positively correlated with competence and confidence (Rizani Hospital research). The control group had a lower average length of service and greater variation (12.00 years, 95% CI: 7.33–16.67), which impacted their ability to apply training and their need for skill development.

The majority of nurses in both groups were married (90.9% in the intervention group, 100% in the control group), with a homogeneous distribution of marital status (p > 0.005). This status did not have a significant impact on nurse performance but provided emotional stability and social responsibility. The majority of nurses had a Diploma III (D3) education, 54.5% in the intervention group and 70% in the control group, with a homogeneous distribution (p > 0.05). This education forms the basis of integral nursing knowledge and skills, although education does not always significantly affect certain competencies such as therapeutic communication.

Patient Characteristics

The average age of patients in the intervention group was 43.64 years (95% CI: 38.87–52.59) and in the control group was 50.40 years (95% CI: 44.19–56.61) with a homogeneous age distribution. Patient age affects nursing performance; studies show that older patients increase nurses' responsibility, empathy, and experience as well as the quality of nursing care (Kumajas, 2023; Hasanah & Maharani, 2022). The average duration of illness for patients was 2.55 months (intervention) and 2.80 months (control) with non-normal duration of illness data, indicating the need for non-parametric analysis. The duration of illness affects the intensity of intervention and nurses' workload as well as patients' quality of life (Miranda, 2023; Paris, 2023; Walukow, 2018).

The majority of respondents in both groups were female (72.7% intervention, 90% control) with a homogeneous gender distribution, reflecting the dominance of women in the nursing profession, supported by factors such as intuition, communication, and flexibility. The majority of patients had a high school or college education (63.6% in the intervention group, 70% in the control group) with a homogeneous educational distribution, which influenced patient awareness and participation in care.

Most patients were unemployed (81.8% in the intervention group, 80% in the control group) and had an income below the minimum wage of IDR 3,000,000 (63.6% in the intervention group, 60% in the control group), with a homogeneous distribution of employment and income. This condition is relevant to the profile of patients who require intensive nursing care and intervention, affecting the workload of nurses. The homogeneity of patient characteristics between groups strengthened the validity of the research results without significant bias due to socioeconomic or demographic differences.

Dependent Variables (Patient Anxiety and Blood Cortisol)

The average anxiety screening score for patients was 51.63 in the intervention group and 51.00 in the control group, with normal data distribution and overlapping confidence intervals, indicating similar anxiety levels in both groups. Patient anxiety is important to manage because it affects therapy acceptance and clinical outcomes.

The average anxiety score was lower in the intervention group (39.00) than in the control group (46.4), with a significant difference, supporting that nurse training, particularly in education and therapeutic communication, is effective in reducing patient anxiety.

The mean cortisol levels of patients in the intervention group were approximately 10.30–10.71 µg/dl and in the control group approximately 7.87–8.61 µg/dl, with normal distribution and close confidence intervals. Cortisol is a biomarker of physiological stress, and the decrease in cortisol levels after the intervention indicates effective stress management. These results are consistent with studies emphasising the role of nurse training in stress management and improving caring behaviour.

Comparison of Pre-Test Anxiety Scores and Blood Cortisol Levels in the Intervention Group and Control Group

Anxiety scores showed relatively balanced anxiety levels in the intervention group (64.5 ± 6.10) and control group (64 ± 7.68), with no statistically significant difference (p = 0.858). The majority of participants were in the moderate anxiety category, with dominant somatic symptoms such as numbness, fatigue, nervousness, irritability, and dizziness. The intervention provided may not have been long enough or intense enough to produce significant changes. Cognitive Behavioural Therapy (CBT) theory and related research confirm the effectiveness of psychosocial interventions and relaxation therapy in reducing anxiety, which need to be provided continuously to have a real impact, especially in patients with chronic conditions such as diabetes mellitus.

The average cortisol level of patients in the intervention group was 11.85 ± 5.06 µg/dl and in the control group was 8.61 ± 4.01 µg/dl, with no significant difference (p = 0.123). High individual variation and external factors such as sampling time may affect

the results. Cortisol is the main biomarker of stress through the hypothalamic-pituitary-adrenal (HPA) system, which can decrease with nursing interventions such as relaxation therapy if carried out intensively and continuously.

An unpaired t-test was used to compare the means between groups and showed that the difference in cortisol levels was not significant. A longitudinal study with repeated measurements is recommended to observe changes in stress hormones more accurately.

Comparison of Post-test Anxiety Scores and Blood Cortisol Levels in the Intervention Group and Control Group
The results of the anxiety score analysis showed a significant difference between the intervention and control groups ($p = 0.018$), with lower average scores and a greater number of subjects with mild anxiety in the intervention group. A mean difference of 9.3 points indicates a clinically significant effect of psychological interventions such as psychoeducation, relaxation, and mental support, which reduce anxiety and improve patients' psychological well-being. The dominant anxiety symptoms were psychosomatic in nature, such as 'feeling broken', tremors, pain, and facial flushing, in line with the neurobehavioural stress theory which explains the reduction in symptoms due to emotional regulation and sympathetic nervous system activity.

Psychological interventions are recommended as an important part of patient management, with training for nurses and mental health workers in providing effective relaxation therapy and education.

The average cortisol level in the intervention group (10.71 ± 5.4 µg/dl) was higher than that in the control group (7.87 ± 2.5 µg/dl), but this difference was not statistically significant ($p = 0.146$) and both groups were still within the normal morning range (approximately 5–25 µg/dl). Cortisol is a stress hormone that plays a role in regulating metabolism and immune response, but its levels are influenced by many factors other than the intervention, such as individual variation and sampling time. Thus, the intervention did not have a significant effect on cortisol levels during the study period, although it showed potential positive effects on psychological aspects of anxiety.

CONCLUSION

The average pre-test anxiety score before intervention in the intervention group was 64.5 and 64.0 in the control group. The average pre-test cortisol level in the intervention group was 10.30 µg/dl (intervention) and 8.61 µg/dl (control) in the control group. There was no significant difference in anxiety before the intervention ($p = 0.858$), but after the intervention there was a significant difference ($p = 0.018$). There was no significant difference in cortisol levels before ($p = 0.123$) and after the intervention ($p = 0.146$). Psychosocial training effectively reduced anxiety in patients in the intervention group, particularly those with Type 2 Diabetes Mellitus (T2DM). Training should be routinely integrated into the professional development of nurses, covering therapeutic communication, relaxation and distraction techniques, and appropriate psychological support. Further research is needed to assess the effect on cortisol levels in chronic T2DM anxiety. Post-training support is crucial to ensure nurses can implement care plans according to standards and patient needs. T2DM education and counselling help patients and families understand self-management and healthy lifestyle patterns.

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