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IMPROVING FAMILY ABILITIES THROUGH BONDRES DIABETIC EDUCATION MODEL: A QUASI-EXPERIMENTAL RESEARCH

I Dewa Ayu Rismayanti*[1], I Made Sundayana[1], Lilik Supriati[2], Ni Ketut Putri Marthasari[1]

[1] Nursing, Sekolah Tinggi Ilmu Kesehatan (STIKes) Buleleng, Indonesia

[2] Department of Nursing, Faculty of Health Sciences, Universitas Brawijaya, Indonesia

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CONTACT

I Dewa Ayu Rismayanti
rismajegeg@gmail.com
Sekolah Tinggi Ilmu Kesehatan (STIKes) Buleleng

ABSTRACT

Introduction: Families play an important role in the well-being and self-management of diabetes patients, but only 25% participate in diabetes programs, with only 27.6% of caregivers having self-management abilities for type 2 diabetes patients and 64.6% having low foot care abilities. This paper aimed to analyze the impact of the health education model through Bondres media on the ability of families to care for T2DM patients.

Method: This research employed a quasi-experimental design utilizing a cross-sectional study approach, and an intervention model of health education using Bondres media on family and patients with T2DM in Buleleng Regency. The sampling utilized the probability sampling method through cluster random sampling, resulting in a total of 106 respondents consisting of 53 interventions and 53 controls. The independent variable is the health education model using Bondres, while the dependent variable is family abilities. The data collection instrument used a questionnaire. This research data was analyzed using the Wilcoxon and Mann-Whitney statistical tests.

Results: The results showed that the family's abilities: healthy diet (p=0,0001), physical activity (p=0,0001), consuming medicine (p=0,0001), management of blood pressure (p=0,001), rest and stress (p=0,0001), and smoking habit (p=0,0001).

Conclusion: The health education model using Bondres media significantly improved the family's ability to provide care for patients with T2DM. This approach proved effective in enhancing knowledge and practices in DM management.

Keywords: bondres, culture, family ability, health education, type-2 diabetes mellitus

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INTRODUCTION

Managing type 2 Diabetes Mellitus (T2DM) independently is one of the crucial mechanisms in the management of T2DM. The role of the family is one of the determinants of successful T2DM management. The involvement of family members in the care of T2DM patients helps improve patients' blood sugar control, knowledge about diabetes, self-efficacy, and quality of life (Mao et al., 2019). Increasing family cohesion and improving well-being and diabetes self-management require the support of family members (Mphasha et al., 2022). However, not every family can care for a member with diabetes on their own because families, as caregivers and the closest people to DM patients at home, face demands, challenges, and emotional and cognitive problems. Low family support indicates a low level of family ability in managing DM, which will result in a decreased ability of DM patients to adhere to their treatment (Pereira et al. 2019).

To improve the quality of life and assist prevent complications, family education about the food and exercise habits of diabetes patients is crucial (Bakri et al., 2023). However, family knowledge about diabetes worldwide is still lacking, including behaviors related to the causes of diabetes, such as eating foods high in fat and a lack of exercise (Mphasha et al., 2024). Effective health education for families will improve knowledge, attitudes, and practices for better glycemic control (Chawla et al., 2019). Education needs to be delivered repeatedly and through engaging media. Technological advancements facilitate education delivery through social media such as WhatsApp, YouTube, text messaging, and the Internet (Chen et al., 2020). However, utilizing social media as an educational medium often lacks culturally relevant aspects in the management of T2DM patients and focuses only on delivering general health information (Suprapto, 2023). Therefore, the Balinese community uses Bondres as a medium for conveying social information. Bondres is a traditional Balinese art form that contains elements of humor and comedy, making its performances more easily accepted by the community (Wirawan et al., 2023). To date, the impact of health education through Bondres media on the ability of families to care for T2DM patients has not been studied.

According to data from the International Diabetes Federation (IDF), there will be 700 million diabetics globally by 2045, up from 463 million individuals with the disease in 2019. In Indonesia, the prevalence of diabetes is expected to rise from 9.1 million in 2014 to 14.1 million by 2035 (IDF, 2019). According to data from the 2018 Basic Health Research (Riskesdas), Indonesia's diabetes prevalence increased from 6.9% in 2013 to 10.9% in 2018. The prevalence of diabetes in Bali Province has also increased, from 1.3% in 2013 to 1.7% in 2018. In Buleleng Regency, the number of people with type 2 diabetes is quite high, reaching 7,841 people (Ministry of Health RI, 2023). A multinational survey conducted in China revealed that just 25% of family members reported involvement in a diabetes management program (Mao et al., 2019). Research by (Rondhianto et al., 2020) shows that families acting as caregivers still have moderate self-management abilities for type 2 diabetes patients (27.60%) and low foot care abilities (64.60%).

The lack of involvement of family members is due to the family viewing the obligation to provide support to the patient as a major burden. Effective patient self-management is thought to be hampered by disruptive family behaviors, such as disagreements on medication, diet, or exercise. The inability of a patient's family to support their self-management practices can impede attempts to make the required behavioral adjustments (Mphasha et al., 2022). Family dynamics and functioning can influence the care provided to T2DM; for instance, low income and low education levels can negatively impact diabetes management (Zan et al., 2024). Support from family members is linked to better glycemic results, quality of life, and coping (Mphasha et al., 2022). Some indicators in assessing family capabilities include the ability to provide a diet (El Masri et al., 2019; Kiguli et al., 2019), assist with physical activity/exercise (Cannata et al., 2020), perform regular blood sugar checks (Blum et al., 2020), help with medication intake (Jannoo & Khan, 2019), manage stress and rest, and change the patient's bad habits such as smoking (Georges, Galbiati, and Clair 2019).

Healthcare professionals participate in providing health education to patients to adopt a healthy lifestyle, stay motivated to regularly test their glycemic status, and be aware of diabetes complications (Chawla et al., 2019). Education about caregiving and the disease is considered necessary to enable care to be provided by family members (Kokorelias et al., 2019). Research results (Hoe et al., 2024) show that providing health education through videos lasting less than 10 minutes can significantly reduce HbA1C within 7 days. Health literacy, self-efficacy, physical activity, medication adherence, and other outcomes have all improved. Educational materials for type 2 DM patients internationally refer to the standards of Diabetes Self-Management Education (DSME) (Buana et al., 2023). In Indonesia, the Ministry of Health promotes an initiative known as CERDIK to maintain the health status of individuals with Non-Communicable Diseases (NCDs), including type 2 DM (Ministry of Health RI, 2019).

Employing Bondres media for health education is chosen because Bondres is one of the dances used in sacred Balinese traditional ceremonies, with dancers wearing masks that entertain the community. Balinese mask dance is also closely associated with a tradition rich in sacred ritual nuances, believed to bring peace and safety to both the dancers and the audience. The Bondres mask dance emphasizes the element of "education" with moral messages conveyed through words, tone of voice, facial expressions, gestures, movements, make-up, costumes, hairstyles, properties, settings, lighting, music, and sound effects. This dance is also adapted to the times, while still prioritizing cultural values. The Bondres mask dance makes it easier for people to

understand health protocols during the COVID-19 era because of its creative and innovative appearance (Dana, 2023). However, until now, there has been no research using Bondres as an educational medium regarding non-communicable diseases such as diabetes. Therefore, this research aims to determine the health education model through Bondres media on the family's ability to care for type 2 DM patients in Buleleng Regency.

METHOD

This type of research is a quasi-experimental research. The purpose of this study was to analyze the impact of the Bondres diabetic education model on improving families' ability to care for patients with T2DM. A quasi-experimental study was carried out using pretests and posttests following the testing of the model. This study will include two groups: the intervention group and the control group.

The population of this research is family and patients with diabetes mellitus type 2 in Buleleng Regency. The sampling method used was probability sampling with cluster random sampling, resulting in four predetermined primary health centers: Sukasada I and Buleleng 3 for the intervention group, and Banjar I and Kubutambahan I for the control group. The sample size calculation used the two mean sample size formula from Dharma K (2011). After adjusting for an estimated 10% dropout rate, the sample consisted of 53 respondents in the control group and 53 respondents in the intervention group, making a total of 106 respondents from the predetermined population.

Before putting the nursing intervention into practice, the ability of the family to care for patients with diabetes was measured for both the intervention and control groups. The intervention involved applying a Bondres diabetic education model for the intervention group, while the control group received standard care from the primary health center. The intervention lasted for 12 weeks or 3 months, with a total of 8 educational video series, each lasting 5-20 minutes, watched in each session. Educational videos have been created by the content of diabetes health education including CERDIK components and involving a group of Bondres Rare Kual players who have been contracted in advance. The role Bondres played is adjusted to the language, music, and background of the community in Buleleng Regency, Bali. Evaluations were conducted twice. The first evaluation was conducted after 1.5 months, in the 6th week after the intervention was given, while the second evaluation, which was the final evaluation, was conducted after 3 months, in the 12th week after the intervention was administered.

The family's ability to care for diabetes patients was measured using the Family Ability Questionnaire for Diabetes Care, which consists of six indicators: providing a healthy diet, accompanying physical activity, medication management, blood sugar monitoring, rest and stress management, and changing smoking habits. The patient's condition was assessed using the Patient Condition Questionnaire, which includes self-management assessment and blood sugar control. The self-management assessment consists of four indicators: glucose management, diet management, physical activity, and the use of healthcare services and pharmacological therapy. The results of the validity test for the instruments used in this research are declared valid with an r-value>r-table value and a 2-tailed significance value of less than 0.05. The instruments are also considered reliable with an internal consistency reliability (Cronbach's alpha) value greater than 0.6.

Both descriptive and inferential analysis were used to analyze the data. Each study variable is intended to be described via descriptive analysis. Central tendency is the format in which numerical data are displayed (mean, standard deviation, minimum and maximum, and 95% CI). Categorical data, on the other hand, shows information as a percentage and frequency. The homogeneity and normality tests were used in the inferential analysis. To assess group homogeneity, the normalcy test employing the Kolmogorov Smirnov and Bartlett tests was utilized. An independent t-test was employed as the statistical test to examine the variation in the family's capacity to give care if the data distribution was normally distributed. The differences in the intervention group before and after the treatment were analyzed using the paired t-test. Non-parametric tests were utilized in statistical analyses when the data distribution was not normally distributed. The Mann-Whitney test was utilized to examine variations in the family's capacity to offer care, and the Wilcoxon test was employed to examine variations in the intervention group's pre- and post-treatment conditions. These were non-parametric tests. This research received approval from the Nursing Research Ethics Committee (KEPK) of the Faculty of Nursing, Universitas Airlangga on April 21, 2021, with ethics certificate number No. 2223-KEPK.

RESULTS

The results of this phase 3 research aim to prove the influence of a transcultural nursing-based health education model through Bondres media on the ability of families to care for type 2 DM patients in Buleleng Regency in terms of ability to manage diet (Y1.1), ability to carry out physical activity (Y1.2), drug management ability (Y1.3), blood sugar management ability (Y1.4), ability to manage stress and rest (Y1.5), and ability to stop smoking (Y1.6). As well as the influence of family abilities on self-management (Y2.1) and blood sugar levels (Y2.2).

Demographic characteristics of family

The demographic characteristics of families consist of family age, education, job, long-term care, and insurance. The results of the demographic characteristics of families in the intervention and control groups can be seen in Table 1.

Table 1. Demographic characteristics of family

Characteristics	Intervention n (%) (n=53)	Control n (%) (n=53)	Equivalence Tests
Family age			p=0.38
35-40 years old	17 (32.1)	16 (30.2)	
41-45 years old	4 (7.5)	5 (9.4)	
45-50 years old	9 (17.0)	5 (9.4)	
51-55 years old	7 (13.2)	6 (11.3)	
56-60 years old	11 (20.8)	14 (26.4)	
61-65 years old	5 (9.4)	7 (13.2)	
Education			p=0.40
Elementary school	19 (35.8)	26 (49.1)	
Junior high school	19 (25.8)	15 (28.3)	
Senior high school	15 (28.3)	12 (22.6)	
Job			p=0.54
Self-employed	12 (22.6)	9 (17.0)	
Government employees	13 (24.5)	11 (20.8)	
Laborer	14 (26.4)	17 (32.1)	
Doesn't work	14 (26.4)	16 (30.2)	
Long time care			p=0.78
<12 months	7 (13.2)	10 (18.9)	
12-36 months	23 (43.4)	21 (39.6)	
>36 months	23 (43.4)	22 (41.5)	
Insurance			p=0.61
Don't have	1 (1.9)	1 (1.9)	
BPJS	50 (94.3)	50 (94.3)	
Independent	2 (3.8)	2 (3.8)	

Table 1 shows that the characteristics of respondents in the treatment group and control group all have the same value for each variable. The majority of families caring for them were in the 35-40 year age range (32.1% in the treatment group, 30.2% in the control group), the majority of families had a basic education level (35.8% in the treatment group, and 49.1% in the control group). Apart from that, based on the type of job they have, the majority work as laborers (32.1%). The longest period of care was more than 36 months (43.4%) and almost all respondents in both the treatment and control groups had insurance in the form of BPJS (94.3%). Based on the results of the equality test, it was found that the characteristics of respondents in the control and treatment groups had equivalent data, including age, education, employment, length of care, and insurance. All characteristics meet the equality requirements because they have a p-value> 0.05. This equality test was carried out using the Levene test to ensure that the personal characteristics of the respondents in this study were equivalent so that characteristic factors would not become confounding variables in this study.

Demographic characteristics of the patient

The demographic characteristics of patients consist of patient age, gender, long-suffering, and type of medicine. The results of the demographic characteristics of patients in the intervention and control groups can be seen in Table 2.

Table 2. Demographic characteristics of the patient

Characteristic	Intervention n (%) (n=53)	Control n (%) (n=53)	Equivalence Tests
Patient Age			p=0.75
41-45 years old	5 (9.4)	5 (9.4)	
45-50 years old	13 (24.5)	15 (28.3)	
51-55 years old	8 (15.1)	6 (11.3)	
56-60 years old	22 (41.5)	21 (39.6)	
61-65 years old	5 (9.4)	6 (11.3)	
Gender			p=1.00
Male	14 (26.4)	14 (26.4)	
Female	39 (73.6)	39 (73.6)	
Long-suffering			p=0.78
<12 months	7 (13.2)	10 (18.9)	
12-36 months	23 (43.4)	21 (39.6)	
>36 months	23 (43.4)	22 (41.5)	
Type of medicine			p=0.79
1 OAD	8 (15.1)	10 (18.9)	
2 OAD	45 (84.9)	43 (81.1)	

Based on patient characteristics. the majority of patients aged 56-60 were in the treatment group (41.5%) and 39.6% in the control group. Apart from that, both groups had the same number of female respondents, namely 39 people (73.6%). The

majority of patients had suffered from DM for more than 36 months and received type 2 OAD treatment (84.9%).

Family abilities: first measurement

The first measurement was conducted 6 weeks post-intervention on both the intervention and control groups. Pre and post-test results of family ability indicators in caring for type 2 DM patients in intervention and control groups on the first measurement can be seen in Table 3.

Table 3. Pre and Post-Test Results of Family Ability Indicators in Caring for Type 2 DM Patients in Intervention and Control Groups on First Measurement

Indicator	Mean± SD Intervention			Mean± SD Control		
	Pre	Post	p	Pre	Post	p
Healthy diet	14.1±3.1	14.0±2.5	0.180	14.1±3.2	14.8±4.2	0.061
Physical activity	7.8±2.6	14.2±2.7	0.000	7.8±3.1	7.4±3.1	0.180
Consuming medication	7.6±2.7	8.1±3.4	0.170	6.9±2.2	6.8±2.6	0.450
Blood sugar management	6.5±2.6	8.6±2.0	0.000	6.0±2.5	6.7±2.9	0.170
Rest and stress	16.6±3.5	14.6±3.6	0.200	15.5±2.7	15.1±2.8	0.200
Smoking habit	8.1±2.1	11.3±1.4	0.000	7.2±2.0	6.7±3.4	0.600

Table 3 displays the value of the family's ability to provide care for the two groups. The first measurement was carried out 6 weeks after the intervention. Based on the measurement results, it is known that almost all indicators of family ability in the treatment group had significant results, only the ability to eat a healthy diet (p=0.180), consume medication (p=0.170), and manage rest and stress (p=0.200) were has a p-value of more than 0.05. Apart from that, almost all of the average scores in the treatment group increased, which means that there was an improvement in the family's ability to provide care after being given the intervention. Meanwhile, in the control group, none of the indicators had a significant value (p>0.05).

Differences in delta values (post-test - pre-test) for all variables were tested using Mann-Whitney because the distribution of delta data in this study was not normally distributed. The results of different test variables for a healthy diet, physical activity, drug consumption, blood sugar management, rest and stress, and smoking habits in the two groups are explained in Table 4.

Table 4. Results of Difference Test of Delta Values of Family Ability Indicators in Caring for Type 2 DM Patients in Intervention and Control Groups on First Measurement

Variable	Group				P value
	Intervention		Control		
	Delta (Δ)	SD	Delta (Δ	SD	
Healthy diet	-0.13	2.6	0.72	3.7	0.180
Physical activity	6.3	3.4	-0.34	2.9	0.001
Consuming medication	0.43	3.3	-0.02	2.5	0.190
Blood sugar management	2.15	2.5	0.77	2.9	0.001
Rest and stress	-1.9	3.0	-0.47	3.8	0.220
Smoking habit	3.2	2.5	-0.49	3.8	0.001

The difference in delta values (post-test - pre-test) for all variables in the second measurement was tested using Mann-Whitney because the distribution of delta data in this study was not normally distributed. The results of different test variables for healthy diet, physical activity, drug consumption, blood sugar management, rest and stress, and smoking habits in the two groups are explained in Table 6. Based on the results of the delta value difference test, it is known that there are significant differences in all variables in the treatment group (p<0.05). The highest average increase in family ability was in physical activity at 6.3. At rest and stress, it is 3.5. Drug consumption increased by 3.2. Smoking habits increased by 2.4. Blood sugar management increased by 2.1, and the lowest increase was in managing a healthy diet by 1.8.

Meanwhile, in the control group, there was no increase in the average family capacity across all indicators. This was demonstrated by a decrease in the average value for the physical activity indicator by 0.3 and for smoking habits by 0.7. The test results also showed that the difference in ability in the control group was not significant (p>0.05). This suggests the interventions did not significantly improve these behaviors in the control group.

DISCUSSION

The implementation of the health education model through Bondres media was carried out for 12 weeks in the treatment group. Based on the results of the analysis, it is known that the educational model influences the increase in the family's ability to provide care. Although in the first measurement (6 weeks post-intervention), there were still indicators that were not significant, in the second measurement, all indicators had an increase in the mean value of caring ability and all were significant.

DM patients have several obstacles to receiving the education they need, such as: (1) dull and demeaning content; (2) embarrassment when they ask questions during educational procedures; (3) lack of transportation to the clinic; and (4) a hectic schedule. Lack of resources is an issue in terms of human resources as well. Because terms like "obese" and "fat" have negative connotations, patients have self-worth issues and engage in less physical activity (Coningsby et al., 2022). Sometimes, patients experience this stigma as a result of misinterpreting medical terminology, which lowers their level of satisfaction with healthcare services (Al Shamsi et al., 2020). Even patients sometimes do not understand the content of the information conveyed because they use medical language (Gotlieb et al., 2022), thus communication skills become essential in providing education (Udoudom et al., 2023).

Despite their need for information, many are reluctant to ask questions. Patients tend to read pamphlets rather than ask inquiries because of this concern (Jansen et al., 2021). A further factor impeding education is patient absence. This may result in a patient's ignorance (Mikhael et al., 2019). Hence, modifications to education are required for those with DM. For instance, teaching materials can be simplified for patients who are older adults. Patients want information that is not just straightforward but also engaging and engaging. Doctors and educators need to present material engagingly. For instance, to inspire patients to make changes, they need to possess the communication skills and self-assurance necessary. (Cho & Kim, 2023).

Based on the results of FGDs with patients and families, it was found that the majority of DM sufferers wanted to use more interesting media in education. This kind of instructional media makes learning easier to understand by incorporating visual aids like pictures, models, films, and actual things. Using teaching aids as a teaching strategy enhances the learning environment and encourages critical thinking (Abdulrahaman et al., 2020). The use of Bondres media in providing health education was chosen because Bondres is a special Balinese culture. Bondres is a dance used in traditional Balinese sacred ceremonies where the dancers wear masks. Balinese mask dance is also synonymous with a tradition that is strong with the nuances of sacred magical rituals so that it can provide peace and safety for the dancers and the audience who see it. This magical power is a taksu that exists in the mask dance. Taksu comes from the word "caksu" in Sanskrit which means eye or sight. Taksu is a magical radiance or virtual energy as a charismatic force that can magically enter a person and influence a person's three life forces, namely the way they think, speak, and behave. So a taksu can give someone authority and strength in their worship. In performing arts, the presence of taksu can add to the allure, charm, and authority of the performance as a whole (Khairuzzaky, 2020).

In the industrial era 4.0, multimedia has a role as a medium for conveying information and messages that is growing rapidly in society, one of which is video. The existence of technology in the form of gadgets can make it easier for someone to access videos anytime and anywhere (Khairuzzaky, 2020). This research designs a health education model through Bondres video media which is expected to improve the health information received by DM patients and their families. One of the most crucial aspects of managing DM is health education. Performing arts education is a powerful tool for enhancing blood glucose management behaviors and attitudes. Through the active participation of patients in opinion-sharing, this education is implemented on a community basis. By implementing Bondres in health education, it is hoped that it will facilitate the internalization of information between health workers and families or individuals who are given education (Kusumo & Kusumawati, 2022).

Increasing knowledge and practice through traditional arts education is successful. Based on their daily experiences, patients can share experiences with blood glucose control. Patients' engagement in blood glucose management techniques can be motivated to grow based on this experience (Kusumo & Kusumawati, 2022). Ignorance of DM protection in all facets of diabetic care. Comparing the lack of precise and tangible culturally relevant information to previous DM knowledge, it is deemed insignificant. Language barriers as well as preferences for information and guidance from doctors are limiting factors for receiving knowledge. Media, especially television and newspapers are regarded as sources of knowledge for patients who work at home, especially DM patients who are housewives. Along with a lack of

knowledge, there is a misunderstanding of DM management as well as the respective components of diabetes management. Therefore, educational media that is interesting and can be studied repeatedly needs to be developed. Apart from that, integrating local cultural arts into the educational model will further increase the interest of patients and families in studying the material presented.

CONCLUSION

The implementation of the health education model using Bondres media over 12 weeks significantly improved families' ability to provide care for patients with T2DM. The integration of Bondres in health education proved effective in improving knowledge and practices in DM management, suggesting the need for multimedia and culturally integrated educational models to improve patient engagement, knowledge, and motivation.

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