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ORIGINAL RESEARCH

Development of a Holistic Nursing Model Based on Transcultural Nursing to Improve the Quality of Life of Patients with Type-2 Diabetes Mellitus

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Abstract

Background: The management of type 2 diabetes mellitus (T2DM) primarily emphasizes physical care, yet the quality of life (QoL) remains suboptimal. The management of diabetes often neglects psychological, socio-cultural, and spiritual aspects, which are essential components of transcultural nursing. Developing a holistic nursing model rooted in transcultural nursing, which has never been broadly investigated, is imperative to enhance QoL in individuals with T2DM.
Purpose: This study aimed to develop a nursing model based on transcultural nursing to enhance the QoL of individuals with T2DM.
Methods: This study employed a quantitative research design with a cross-sectional approach. A sample of 145 individuals with T2DM was recruited using a simple random sampling technique. A self-developed questionnaire was used, incorporating factors from Dossey's holistic nursing model, Leininger's transcultural nursing model, and a QoL questionnaire. Inferential statistics using smart PLS-structural equation modeling (SEM) were employed for data analysis.
Results: The findings revealed that the holistic nursing model based on transcultural nursing in individuals with T2DM was influenced directly by respondent characteristics (t=3.313, p=0.001), religious and life philosophy (t=2.836, p=0.005), social and kinship (t=2.579, p=0.010), cultural and lifestyle (t=2.833, p=0.005), biological (t=2.718, p=0.007), and psychological (t=2.497, p=0.013) factors. However, the technological factor was not significantly (t=0.802, p=0.423) associated with the model. The holistic nursing model based on transcultural nursing had a direct influence on the quality of life (t=9.124 and p=0.000).
Conclusion: The holistic nursing model based on transcultural nursing encompasses six variables: respondent characteristics, religious and life philosophy, social and kinship, cultural and lifestyle, and biological and psychological factors. The model can serve as a guideline for managing type 2 DM patients to enhance the QoL.

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1. Introduction

Type-2 diabetes mellitus (T2DM) is a chronic metabolic disease characterized by hyperglycemia that occurs due to abnormalities in insulin secretion, insulin action, or both (American Diabetes Association, 2019; Perkeni, 2021). T2DM remains a global health problem with increasing incidence rates, high rates of complications, difficulty in glycemic control, and high mortality rates (Roglic, 2016; Tolossa et al., 2020; Zhou et al., 2019). In Indonesia, the challenges of managing DM are related to patients, healthcare services, and healthcare financing factors (Wibisono et al., 2021). Indonesia also has diverse geographical, cultural, and social contexts that can affect T2DM management (Perkeni, 2021). As many as 30.4% of DM patients in Indonesia are diagnosed, but only two-thirds receive treatment, and only a third have good quality of life and well-controlled glycemia (Soelistijo et al., 2019).

International Diabetes Federation (IDF) data from 2019 reported that the number of people with T2DM worldwide was approximately 463 million and is estimated to continue increasing (International Diabetes Federation, 2019). In 2021, Indonesia ranked fifth in the world for the highest number of diabetes mellitus (DM) cases, with 19.5 million DM patients (Ministry of Health, Republic of Indonesia, 2023). The increasing proportion of DM patients is also in line with the increasing problems faced by people with T2DM, such as difficulty in controlling blood glucose and low quality of life (Mamo et al., 2019). Studies have found that out of 1,967 people with T2DM in Indonesia, the majority had unsatisfactory glycemic levels with HbA1c levels of more than 7.5% (Cholil et al., 2019). Also, approximately 60% of people with T2DM in Indonesia die before the age of 60 (International Diabetes Federation, 2019). Therefore, the management of DM has become a national call to reduce this number.

Various DM management models have been implemented. However, these models focus only on physical care aspects such as medication management, blood glucose monitoring, education, physical activity, and diet management, yet glycemic control is still not optimal (International Diabetes Federation, 2019; Soelistijo et al., 2019). People with T2DM and uncontrolled glycemia require comprehensive and holistic management based on culture in all aspects of life (Ofori & Unachukwu, 2022; Soelistijo et al., 2019). Traditional culture and practices influence almost all aspects of DM management (Lagisetty et al., 2017; Sachdeva et al., 2015). Previous models did not address all aspects of life, such as biological, psychological, spiritual/belief, cultural, and social factors based on transcultural nursing to control glycemia and improve the quality of life of people with T2DM. A holistic nursing model based on transcultural nursing has never been developed and explained to improve the quality of life of people with T2DM, especially in psychological, social-cultural, and spiritual aspects.

A holistic nursing model based on transcultural nursing needs to be developed to improve the quality of life of people with T2DM. This model is developed based on Dossey's holistic nursing theory (Dossey et al., 2005) and Leininger's transcultural nursing theory (Leininger, 2002). Dossey et al.'s (2005) theory explains that the holistic care assessment aspects consist of biological, psychological, socio-cultural, and spiritual dimensions; however, nursing interventions are still very general and do not yet integrate culture in all dimensions. Meanwhile, patient beliefs regarding interventions, lifestyle patterns, and knowledge in people with T2DM are strongly influenced by culture (Sitawa & Muhati, 2016). Leininger's transcultural nursing theory can complement the weaknesses of the holistic nursing theory because it discusses a broader cultural context. Transcultural nursing theory has the advantage of focusing on cultural concepts in providing patient nursing care (Leininger, 2002). This theory examines seven aspects of cultural factors and has three decisions regarding nursing actions, namely culture care preservation, culture care accommodation, and culture care repatterning. Transcultural nursing is a theory that can be used to identify determinants of T2DM because it comprehensively describes cultural diversity in daily life and nursing care (Albougami, 2016). Previous management of T2DM mainly focused on basic physical problems, yet the patients' quality of life and glycemic control were still poor (Soelistijo et al., 2019). Accordingly, this study was conducted to develop a holistic nursing model based on transcultural nursing principles to improve the quality of life of people with T2DM.

2. Methods

2.1. Research design

This study employed a quantitative research design with a cross-sectional approach. Data were collected without any interventions on the samples. The study aimed to develop a holistic nursing model based on transcultural nursing. The model development process commenced with a literature review, preparation of instruments for variables including characteristics, technology, religion, and philosophy of life, social and kinship, cultural values and lifestyle, biological and psychological factors, holistic protection, and quality of life for individuals with T2DM. Validity and reliability tests were conducted on the instruments, followed by data collection, analysis using SEM PLS, and focus group discussions involving 11 noncommunicable disease program holders, five health cadres, and five individuals with T2DM. Expert consultations were carried out with internal medicine specialist doctors and endocrine consultants based on strategic issues and PLS analysis results. Subsequently, a holistic care model based on transcultural nursing was finalized, and modules for this model were compiled.

2.2. Setting and samples

The study population consisted of 428 individuals with T2DM. Samples were drawn from 145 people with T2DM receiving primary health care across all public/primary health centers in Denpasar City, Bali, Indonesia, using purposive sampling techniques. This research was conducted in Denpasar City due to its status as the area with the second-highest prevalence of T2DM in Bali Province, Indonesia. The majority of individuals with T2DM in Denpasar were not yet under control and had HbA1C levels ≥7.5% (Bali Provincial Health Office [Dinas Kesehatan Provinsi Bali], 2017). When employing sample collection techniques for SEM analysis, the recommended range is between 100 to 200 or a minimum of five times the number of indicators and a maximum of ten times the number of indicators to achieve a larger effect size (Hair et al., 2019). Since there were 29 parameters, the sample size was 29 x 5 = 145 people with T2DM.

The inclusion criteria were individuals who had been diagnosed with T2DM for at least 12 months; did not have complications such as kidney failure, diabetic foot, hypertension, or stroke; aged between 30 and 65 years old; were able to read and write; were cooperative; and were receiving oral antidiabetic therapy. Meanwhile, the exclusion criteria were individuals who were receiving insulin injections or were not receiving any treatment. Researchers recruited samples from 4 primary healthcare facilities based on sub-districts and selected the primary health center with the highest number of visits from T2DM patients. Researchers then selected 37 patients with T2DM based on the inclusion criteria from each health center.

2.3. Measurement and data collection

All questionnaires, except the quality of life questionnaire, were developed by the researchers themselves because they were integrated based on factors from Dossey et al. (2005)'s holistic nursing model and Leininger's (2002) transcultural nursing model. These questionnaires were developed by creating a blueprint of questions, determining the information needed to answer the research questions, structuring the questionnaire, creating a scoring system, conducting a pilot test of the questionnaire, and revising the items that were found to be invalid and unreliable, then conducting another pilot test. The content validity of these questionnaires was tested by the experts with a content validity index (CVI) ranging from 0.89 to 0.95. The quality of life questionnaire was based on the WHOQOL BREF. This questionnaire has been translated into the Indonesian language. The validity and reliability tests of all questionnaires were conducted by providing all questionnaires to 30 predetermined respondents. Each patient was given 40 minutes to complete the instrument. After the respondents filled out the instrument, the researcher reviewed the completeness of the responses, input the data, and analyzed it. The questionnaires comprised the study's variables, including respondent characteristics (X1), technological factors (X2), religious and life-philosophical factors (X3), social and kinship factors (X4), cultural and lifestyle factors (X5), biological factors (X6), psychological factors (X7), holistic nursing based on transcultural nursing (X8), and quality of life (Y1).

Respondent characteristics consist of eight question items about age, gender, education level, employment, income, marital status, family type, and health insurance. Technological factors (X2) were composed of indicators of knowledge of self-blood sugar checks and the use of telehealth. The question items on the instrument for knowledge about blood glucose testing were developed based on a theoretical review of the blood glucose testing concepts from the Indonesian Endocrinology Association and Leininger's (2002) transcultural concepts. The telehealth instrument was developed based on the instrument from Ade et al. (2011). The Knowledge of Self-Blood Sugar Checks questionnaire consisted of 10 questions. A correct answer received a score of 2, while an incorrect answer received a score of 1. The researcher then multiplied the item scores by 5 to obtain a total score, resulting in scores ranging from 10 to 100 on an interval data scale interpreted as the higher the score, the better the knowledge. All items were favorable. The validity scores ranged from 0.531 to 0.881, while the reliability score was 0.916. The telehealth questionnaire consisted of 10 favorable items, scored as follows: 1 for never, 2 for rarely, 3 for often, and 4 for always. The resulting scores range from 10 to 40 on an interval data scale, with the higher the score, the better the use of technology. The validity score ranged from 0.445 to 0.881, and the reliability score was 0.890.

Religious and life philosophy factors (X3) consisted of indicators of religiosity and the meaning of life. The questionnaire was developed based on the variables from holistic care by Dossey et al. (2005) and transcultural variables from Leininger (2002). The religiosity questionnaire contained

15 items, with 13 favorable items and 2 unfavorable items, while the meaning of life questionnaire contained 10 items, including 9 favorable items and 1 unfavorable item. Favorable responses were scored as follows: 1 for strongly disagree, 2 for disagree, 3 for neither or doubt, 4 for agree, and 5 for strongly agree. For unfavorable items, the scoring was reversed. The religiosity questionnaire scores ranged from a minimum of 15 to a maximum of 60, the higher the score, the better the religiosity. The validity test results ranged from 0.463 to 0.804, and the reliability test results were 0.862. Meanwhile, the scores of the meaning of life questionnaire ranged from 10 to 50, interpreted the same as religiosity. Its validity score was 0.515 to 0.788, with a reliability score of 0.889.

Social and kinship factors (X4) consisted of family support indicators. The family support questionnaire contained 15 items and was structured into four dimensions. The first dimension was informational, consisting of favorable items in questions 1, 2, and 3. The second dimension was emotional, including favorable items in questions 4, 5, and 7, and an unfavorable item in question 6. The third dimension was appraisal, consisting of four favorable items (8, 9, 10, 11), and the fourth dimension was instrumental, with favorable items in questions 12, 14, and 15, and an unfavorable item in question 13. Favorable responses were scored as follows: 4 for always, 3 for often, 2 for rarely, and 1 for never, while unfavorable questions were scored inversely. The scores of the family support questionnaire ranged from a minimum of 15 to a maximum of 60, with the higher the score, the better the family support. Its validity score ranged from 0.387 to 0.905, with a reliability score of 0.940.

Cultural and lifestyle factors (X5) consisted of three indicators: lifestyle based on culture, perception of T2DM based on culture, and perception of complementary therapy (*Usadha Bali*). The questionnaire was developed based on the variables from holistic care by Dossey et al. (2005) and transcultural variables from Leininger (2002). The first indicator, a lifestyle based on culture, contained 10 items, with 7 favorable and 3 unfavorable items. The second indicator, perception of T2DM based on culture, consisted of 10 items, with six parameters: consequences (1 item), timeline (1 item), personal control (1 item), treatment control (2 items), concern (1 item), and causal (4 items). Favorable items of this indicator were 1, 2, 3, 4, 5, and 7, while unfavorable items were 6, 9, and 10. The third indicator, perception of complementary therapy (*Usadha Bali*), consisted of 10 items, with favorable items in 2 and 8 and unfavorable items in 1, 3, 4, 5, 6, 7, 9, and 10. The scoring for favorable items was as follows: 1 for not suitable, 2 for somewhat suitable, 3 for quite suitable, and 4 for very suitable, while the unfavorable items were scored inversely. The resulting scores of the first and second indicators ranged from 10 to 40, interpreted as the higher the score, the better the lifestyle and perception based on culture. The validity and reliability scores of the first indicator were 0.396 to 0.813 and 0.743, respectively, while the validity score of the second indicator was 0.386 to 0.684 with a reliability score of 0.756. The third indicator scores ranged from 20 to 100, and the higher the score, the better the perception of complementary therapy *(Usadha Bali)*. The validity and reliability scores of this third indicator were 0.376 to 0.816 and 0.721, respectively.

Biological factors (X6) consisted of nutritional status as measured by body mass index and the duration of the patient's suffering from T2DM. The questionnaire items consisted of only 2 items. Psychological factors (X7) consisted of motivation and diabetes distress. The motivation questionnaire composed of Dossey et al. (2005)'s holistic nursing theory contained 10 questions, with 9 favorable items and 1 unfavorable item. Favorable responses were scored as follows: 1 for strongly disagree, 2 for disagree, 3 for doubtful, 4 for agree, and 5 for strongly agree, while unfavorable responses followed the inversed scoring. The scores ranged from 10 to 50, the higher the score, the better the motivation. The validity score ranged from 0.421 to 0.918, and the reliability was 0.868. The questionnaire on diabetes distress contained 10 questions adapted from the Diabetes Distress Scale (DDS) (Fisher et al., 2008). The favorable score ranged from 1 to 4, while the unfavorable score ranged from 4 to 1. A higher total score indicated increased diabetes-related distress in patients, while a lower score indicated a decrease in diabetes distress. The validity score ranged from 0.431 to 0.819, and the reliability score was 0.820.

The holistic nursing based on transcultural nursing (X8) questionnaire was composed of biological, psychological, social-cultural, and spiritual aspects from Dossey et al. (2005) and Leininger's (2002) theories. The questionnaire consisted of 25 questions: 10 items for biological aspects, 5 for psychological aspects, 5 for social-cultural aspects, and 5 for spiritual aspects. A score of 1 was assigned for a 'yes' answer and 0 for 'no'. The resulting scores ranged from 0 to 25, with a validity score of 0.613 to 0.912 and a reliability score of 0.983. Quality of life factors (Y1) consisted of physical aspects, psychological well-being, social relationships, and environment. The quality of

life questionnaire was adapted based on the Indonesian WHOQOL BREF. It consisted of 25 items, with 22 favorable items and 3 unfavorable items. The scoring varies depending on the question category. The validity score ranged from 0.363 to 0.784, and the reliability score was 0.936.

The data were obtained through visits to primary health centers and home visits from January to March 2023, and data collection was conducted without any intervention. T2DM individuals were approached based on the inclusion criteria and provided with an explanation of the research aims. Those willing to participate as research respondents were given informed consent. Respondents were provided with the questionnaire to fill out themselves, which took approximately 40 minutes while being accompanied by the researcher. After completing the questionnaire, the researcher reviewed it for completeness before tabulating the data.

2.4. Data analysis

The respondent characteristics were analyzed using descriptive statistics. Inferential analysis was conducted using the Structural Equation Model (SEM PLS) with SmartPLS software. This analysis aimed to generate a fit holistic nursing model based on transcultural nursing and to address the hypotheses.

2.5. Ethical considerations

The study was carried out following an approved ethics protocol, with all respondents giving their consent to participate. The respondents were informed about the study, including its aim, procedures, and benefits. They were treated fairly throughout the study, and their names were not written on the questionnaire during data collection. Ethical approval for the study was obtained from the Health Research Ethics Committee of the Faculty of Nursing, Universitas Airlangga, with reference number 2721-KEPK, dated 15 December 2022. Data confidentiality was maintained by storing the completed questionnaires in a closed folder managed by the researchers

3. Results

3.1. Respondent characteristics

Table 1 shows that out of 145 respondents, the majority were aged between 46 and 65 years old (93.8%), female (51.7%), and had secondary education (49.7%). Additionally, a significant portion did not work or were housewives (42.1%), had high family income (40.7%), were married (87.6%), lived with a nuclear family (51.7%), and had health insurance (84.1%). %). The results of the characteristics of the respondents are displayed in Table 1

Table 1. Characteristics of the respondents (n=145)

Characteristics	f	%
Age		
30-45 years old	9	6.2
46-65 years old	136	93.8
Gender		
Male	70	48.3
Female	75	51.7
Education levels		
No school	0	0
Elementary school	37	25.5
Junior high school	72	49.7
Senior high school	36	24.8
Occupation		
No working/ housewife	61	42.1
Private	4	2.7
Self-employed	18	12.4
Government employees	22	15.2
Farmer/ laborer	40	27.6
Economic status		
Low income (RMW <2,553,000 rupiahs)	34	23.4
Moderate income (RMW=2,553,000 rupiahs)	52	35.9
High income (RMW >2,553,000 rupiahs)	59	40.7

Table 1. Continued

Characteristics	f	%
Marital status		
No married	18	12.4
Married	127	87.6
Family type		
Nuclear family	75	51.7
Extended family	70	48.3
Health insurance		
No	23	15.9
Yes	122	84.1

Note. RMW: Regional minimum wage

3.2. Development of the holistic nursing model based on transcultural nursing

3.2.1. Results of convergent validity testing

The holistic nursing model based on transcultural nursing in this study was developed by modifying the holistic nursing model of Dossey and the transcultural nursing model of Leininger. The factors used to develop the model included respondent characteristics, technological factors, religious and life philosophical factors, social and kinship factors, cultural and lifestyle factors, biological factors, psychological factors, holistic nursing based on transcultural nursing, and quality of life.

As can be seen from Table 2, all indicators produced a loading factor value of more than 0.5. Similarly, all variables also produced an Average Variance Extracted (AVE) value of more than 0.5 (Ghozali & Latan, 2020; Wijaya, 2019). Therefore, all indicators were declared valid to measure the variables based on convergent validity.

Table 2. Results of convergent validity testing (n=145)

Variables	Indicators	Loading Factor	Average variance extracted (AVE)
Respondent characteristics	Gender	0.647	0.506
	Education level	0.722	
	Employment	0.593	
	Income	0.746	
	Marital status	0.703	
	Family type	0.773	
	Health insurance	0.776	
Technological factors	Utilization of telehealth	1.000	1.000
Religious and life philosophy factors	Religiosity	0.876	0.793
	Meaning of Life	0.905	
Social and kinship factors	Family Support	1.000	1.000
Cultural and lifestyle factors	The cultural-based lifestyle of DM patients	0.965	0.620
	Perception of DM based on culture	0.805	
	Perception of traditional-complementary therapy *(Usadha Bali)*	0.532	
Biological factors	Nutritional status	0.882	0.714
	Duration of type-2 DM	0.806	
Psychological factors	Diabetes distress	1.000	1.000
Holistic nursing based on transcultural nursing	Biological aspects	0.781	0.543
	Psychological aspects	0.594	
	Social-cultural aspects	0.757	
	Spiritual aspects	0.798	
Quality of life	Physical health	0.664	0.630
	Psychological well-being	0.866	
	Social relationships	0.846	
	Environment	0.783	

Note. Usadha Bali=Traditional therapy system in Bali

3.2.2. Results of construct reliability testing

Each variable produced a Cronbach's alpha value higher than 0.6 or a composite reliability value higher than 0.7, as shown in Table 3. All indicators were declared reliable in measuring the variables based on Cronbach's alpha value or composite reliability value (Ghozali & Latan, 2020).

Table 3. Results of construct reliability testing (n=145)

Variables	Cronbach's Alpha (α)	Composite Reliability
Respondent characteristics	0.841	0.877
Technological factors	1.000	1.000
Religious and life philosophy factors	0.741	0.885
Social and kinship factors	1.000	1.000
Cultural and lifestyle factors	0.774	0.823
Biological factors	0.604	0.833
Psychological factors	1.000	1.000
Holistic nursing based on transcultural nursing	0.716	0.824
Quality of life	0.799	0.871

3.2.3. Hypothesis testing

Table 4 illustrates the influence of some factors on holistic nursing based on transcultural nursing and the influence of holistic nursing on the quality of life. Hypothesis testing showed that technological factors had no significant effect on holistic nursing based on transcultural nursing with a *T*-statistic value of 0.802 (p=0.423). On the other hand, other variables, namely characteristics, religious and philosophical factors, social and kinship factors, cultural and lifestyle factors, biological factors, and psychological factors, collectively influenced holistic nursing based on transcultural nursing. Furthermore, there was a relationship between holistic nursing based on transcultural nursing and the quality of life.

Table 4. Hypothesis testing (n=145)

Influences	Path Coefficient	*T* Statistics (|O/STDEV|)	*p*	Interpretation
Respondent characteristics → Holistic nursing based on transcultural nursing	0.216	3.313	0.001	Significant
Technological factors → Holistic nursing based on transcultural nursing	0.045	0.802	0.423	insignificant
Religious and life philosophy factors → Holistic nursing based on transcultural nursing	0.218	2.836	0.005	Significant
Social and kinship factors → Holistic nursing based on transcultural nursing	0.195	2.579	0.010	Significant
Cultural and lifestyle factors → Holistic nursing based on transcultural nursing	0.211	2.833	0.005	Significant
Biological factors → Holistic nursing based on transcultural nursing	0.161	2.718	0.007	Significant
Psychological factors → Holistic nursing based on transcultural nursing	0.188	2.497	0.013	Significant
Holistic nursing based on transcultural nursing → quality of life	0.562	9.124	0.000	Significant

Note. O/STDEV=Original sample/ standard deviation

3.2.4. The final model of holistic nursing based on transcultural nursing on the quality of life in patients with T2DM

Figure 1 depicts the final model (fit) of holistic nursing based on transcultural nursing theory for the quality of life in patients with T2DM. As observed in Figure 1, holistic nursing based on transcultural nursing (X8) was directly influenced by respondent characteristics (X1), religious and life philosophy factors (X3), social and kinship factors (X4), cultural and lifestyle factors (X5),

biological factors (X6), and psychological factors (X7). Quality of life (Y1) was directly influenced by holistic nursing based on transcultural nursing (X8).

Based on the hypothesis testing that eliminated relationships between variables with no significant effect, the model construct, as seen in Figure 1, was recommended. New findings from this research focus on the development of a holistic treatment model based on transcultural nursing concerning quality of life in T2DM patients, as revealed by the results of the structural model analysis depicted in Figure 2.

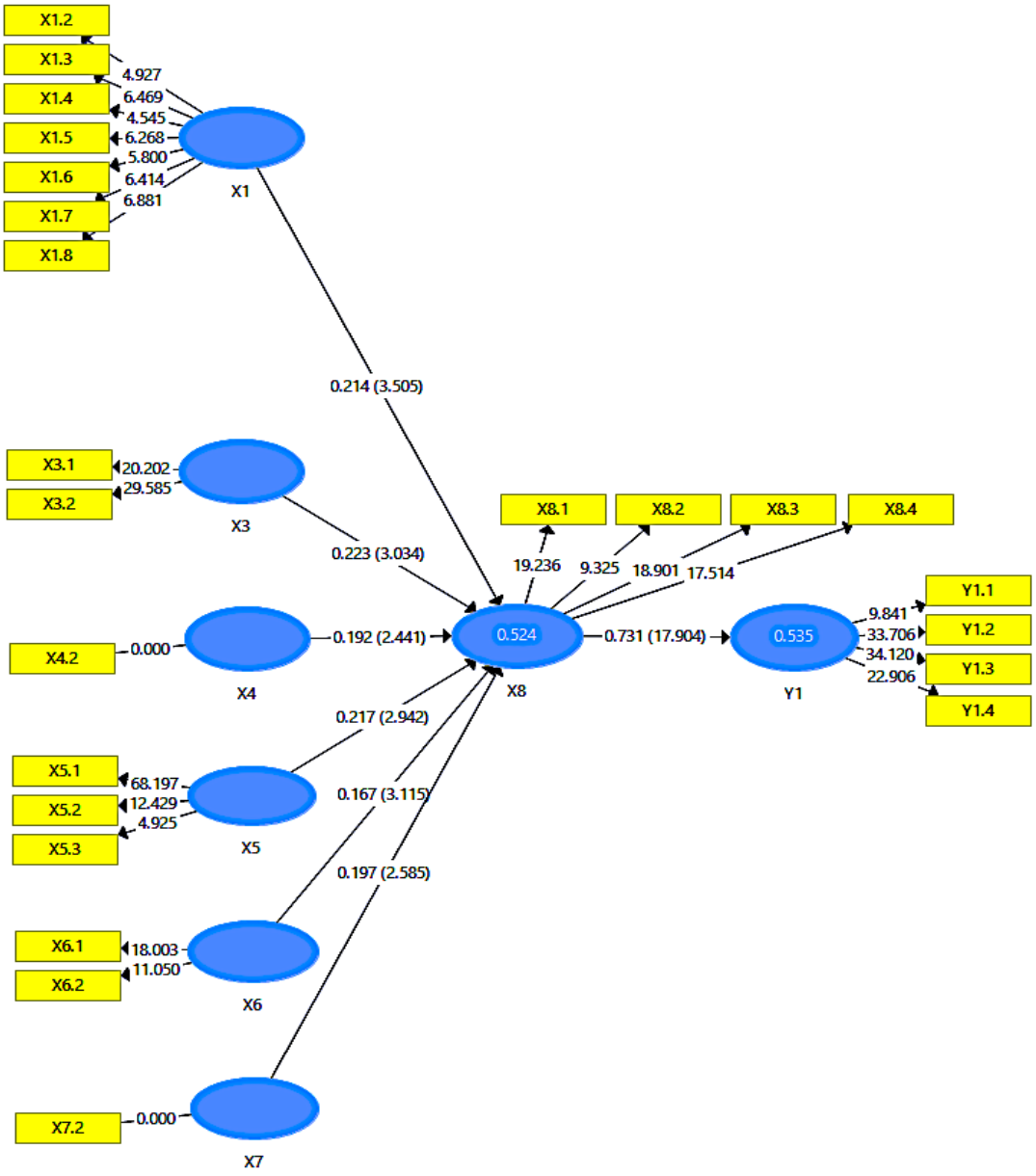

Figure 1. The final construct of the development of a holistic nursing model based on transcultural nursing for quality of life in T2DM people.

4. Discussion

This study aimed to develop a holistic nursing model based on transcultural nursing to enhance the quality of life of individuals with T2DM. The results showed that characteristic factors, religious and life philosophy factors, social and kinship factors, cultural and lifestyle factors, biological factors, and psychological factors directly influenced the holistic nursing based on transcultural nursing, while the quality of life was directly influenced by holistic nursing based on transcultural nursing. In addition, a final holistic nursing model based on transcultural nursing for the quality of life of T2DM people was developed. The following section will discuss each influence.

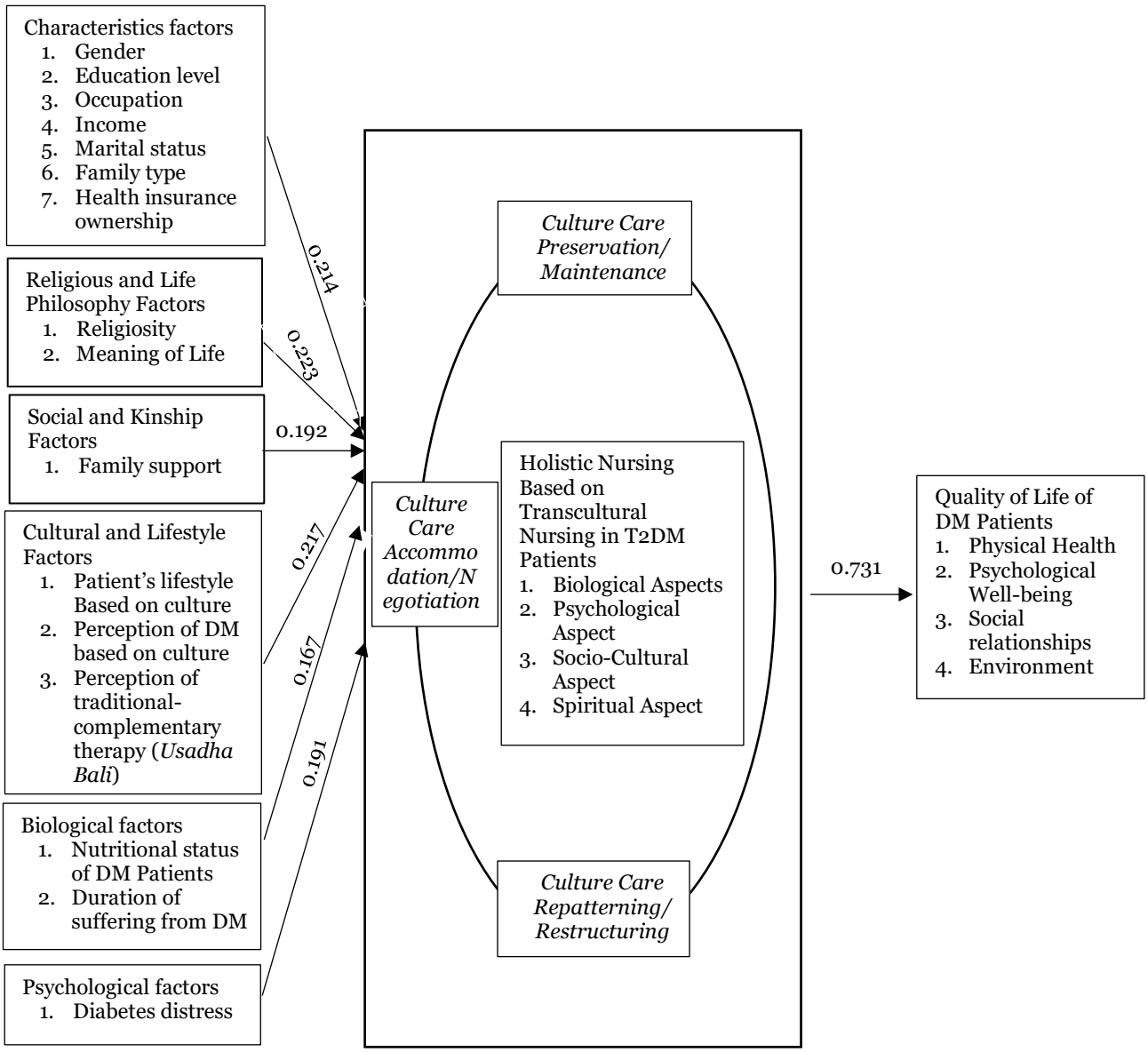

Figure 2. The final model on the development of a holistic nursing model based on transcultural nursing for quality of life in T2DM people

4.1. The influence of characteristic factors on holistic nursing based on transcultural nursing

This study showed that respondent characteristics significantly influenced the holistic nursing model based on transcultural nursing in DM patients. Female gender was associated with the holistic model based on transcultural nursing in T2DM patients. This finding aligns with a study on the determinants of adherence to holistic treatment in type 2 DM patients, which explains that gender is one of the determinants of adherence to treatment and care in T2DM (Reach et al., 2018). Women are at a higher risk of diabetes complications such as kidney diseases, blindness, and psychological disorders (CDC, 2022). A study reported that in diabetes self-care management practices, men were more dominant in reporting regular exercise and controlling their diet to manage blood glucose levels than women (Shahzad et al., 2018). Male DM patients exhibit more effective life management, lower levels of depression and anxiety, and also have more positive well-being than female patients. Another research also suggests that gender is associated with self-care practices, with men having a lower level of understanding and compliance compared to female respondents, requiring repeated education (Tran & Tran, 2022). Gender differences are crucial when individuals have to learn to live effectively with diabetes. Women with diabetes need to develop a more positive attitude toward the disease and its management. This is especially

important for those who are responsible for tasks such as caring for the family and cooking, which may make it challenging for them to adhere to self-medication, exercise, foot care, blood sugar checks, and meal schedules. Patients should realize that they can manage DM with the support of doctors, spouses, friends, relatives, and family members (Siddiqui et al., 2013).

This study also revealed that the majority of respondents had secondary education. This is consistent with the research findings from Tran and Tran (2022), which report that the level of education is one of the determining factors in patient compliance with self-care abilities and adherence in T2DM individuals. T2DM individuals with higher education tend to exhibit better treatment adherence and compliance compared to patients with lower education levels. Patients with higher education possess better literacy and efficacy in implementing holistic care. Lack of education in caring for T2DM patients will impede the provision of holistic care management (Dobrowolska, 2022). The educational background is an influential factor in implementing holistic services, ultimately improving the quality of life (Zamanzadeh et al., 2015). Individuals with lower education levels are significantly more likely to have a high body mass index, affecting their work and physical activities. However, DM patients with higher education levels tend to consume a high-cholesterol diet and have higher alcohol intake due to frequent interactions with and consumption of more fast foods (Marcus et al., 2020; Steele et al., 2017). Patients with higher education possess better literacy and efficacy in implementing holistic care (Tran & Tran, 2022).

Another characteristic related to DM was employment. This study found that the majority of DM patients were housewives. Housework is considered a low level of activity. A previous study reported that individuals who do not work regularly have a higher risk of developing T2DM than those who work regularly (Koelmeyer et al., 2016). However, based on family income, this study showed that most respondents had high incomes. Research explains that high income is a risk factor for DM because it is related to diet and body mass index (CDC, 2022).

This study also revealed that marital status correlated with DM, with most respondents being married. Consistent with this finding, marital status is associated with reduced mortality and more effective protection for glycemic control (Jones, 2014). Marital status has the potential to influence the occurrence of DM, as many changes may occur from being single to being married. Changes in marital status have been observed in marriages over the last five years (de Oliveira., 2020). Age was also a factor that affected the ability to provide care in T2DM patients. Individuals of all age groups need to make decisions that may affect their health and physical and emotional well-being (Bloom et al., 2015; Hess et al., 2015). The majority of respondents in this study had health insurance. DM patients with health insurance utilized healthcare services more, achieve better diabetes control, and have lower morbidity. Additionally, adult DM patients aged under 65 who had health insurance reported visiting doctors more often in the past year than those who did not (Casagrande & Cowie, 2018).

4.2. The influence of religious and philosophical factors on holistic nursing based on transcultural nursing

This study also indicated that religious and philosophical factors, as assessed through religiosity and the meaning of life, influenced the holistic nursing model based on transcultural nursing. In the context of chronic diseases, the meaning of life is related to surrender, destiny, and family support (Bahtiar et al., 2020). Diabetes poses a threat to patients' overall well-being and quality of life. While diabetes management approaches have been implemented, physiological, physical, and mental health problems remain challenging. Research has reported that religiosity and religious coping strategies affect the management of diabetic patients (Onyishi et al., 2022). Another study has also identified the role of religiosity in DM treatment, affecting glycemic control and improving the psychological well-being of DM patients (Sukarno & Pamungkas, 2020). The participation of DM patients in religious practices and spiritual beliefs in the existence of God has the effect of decreasing stress levels and influencing the patient's glycemic control. The aspect of religiosity can be an important barrier for T2DM patients in facing emerging disease problems, making patient self-management more effective (Darvyri et al., 2018). In the future, diabetes management should integrate beliefs and incorporate them into patient behavior change interventions (Duke, 2021; Watkins et al., 2013). Religion understands the meanings of God, making it easier to interpret life based on religion, beliefs, and values as a guide to happiness.

4.3. The influence of social and kindship factors on holistic nursing based on transcultural nursing

Social and kinship factors significantly influenced holistic nursing based on transcultural nursing for T2DM patients. Family support in diet planning, treatment, and control can improve the QoL of diabetic patients (Mphasha et al., 2022). Social and kinship factors comprise family support indicators. DM patients need family support in carrying out treatment for their disease, especially at home (Wulandari et al., 2021). Since most DM patients are treated at home, family participation in diabetes intervention is crucial because it can increase patient self-efficacy and compliance with the supportive care provided in the form of informational, instrumental, emotional, and appreciation support (Baig et al., 2016). Families can provide support by facilitating treatment and serving healthy food. Male patients receive more support from their wives, whereas sick wives, on the other hand, do not receive as much support as they provide to their husbands. Diabetes interventions involving family support are essential in improving the health of diabetic patients (Baig et al., 2016).

Family support refers to the family's attitude, actions, and acceptance toward the sick person. This support typically comes from others, such as parents, children, spouses, or other family members. The support given can be in the form of informational, behavioral, or material support, making diabetic patients feel loved and cared for. Family support is essential as it affects compliance with holistic management (Amelia et al., 2018). The concept of social support in Balinese society is often referred to as the concept of *'Menyama braya'*. *Menyama braya* is a local wisdom concept that is part of the culture. They are aware that life will be interdependent on each other, so they maintain good relationships, feel equal, and do good to each other (Brata, 2019). Family support is closely related to compliance with routine control and more holistic management in diabetes patients. Family involvement in self-care will reduce the impact of complications and hospitalization rates for family members with diabetes (Onyango et al., 2022; Tondok et al., 2022). Families in Bali have a culture of living together with their extended family under one roof. In Bali, they know the cultural concept of *'menyama braya*,' which was passed down from their ancestors. *Menyama braya* is a form of social support between one family member and another family member (Brata, 2019).

4.4. The influence of cultural and lifestyle factors on holistic nursing based on transcultural nursing

This study demonstrated that cultural and lifestyle factors influenced holistic nursing based on transcultural nursing. A study in Bamar on DM patients who used traditional medicine stated that cultural beliefs and practices greatly influenced the patient's treatment choices and diet. Patients believe that diabetes is caused by cultural factors such as '*karma'* from previous or current lives and that diabetes can be cured (Shwe et al., 2020). Paying attention to understanding diabetes is crucial for a patient's health and well-being. Recognizing that diabetes is perceived to be caused by the influence of spirits requires health workers to possess sensitive knowledge and understanding of the patient's culture to enhance treatment efforts by considering the patient's beliefs while simultaneously encouraging them to adopt healthy behaviors (Ameyaw et al., 2022). Diabetes patients undergo physical, psychological, and emotional changes that affect their quality of life, highlighting the importance of understanding and respecting the values, beliefs, health practices, and feelings of the patient (Álvarez-Najar, 2020). An ethnonursing study in East Sumba, Indonesia, regarding cultural factors, beliefs, and way of life of diabetes patients found that cultural factors such as traditional ceremonies, happa (betel chewing), and the use of traditional medicine are closely linked to Sumba society and the daily lives of diabetes patients, including their eating and drinking patterns, spiritual values, and sleeping habits (Elizabeth et al., 2022). The results of this study have important implications for the care of diabetes patients

Nurses, as care providers, are expected to deliver holistic and culturally-based care. They should possess cultural competency to assess and plan interventions that are culturally appropriate and do not conflict with the prescribed treatment process. Value systems, beliefs, customs, and family patterns can serve as a guide for planning culturally appropriate care for treating diabetes (Sachdeva et al., 2015). Nursing practice is expected to understand culture-based nursing theory, namely transcultural nursing, by preserving, negotiating, and/or restructuring culture (Elizabeth et al., 2022). Cultural practices and emotional functioning are diabetes risks that need to be considered when adapting culturally specific diabetes prevention programs (Tang et al.,2020).

Providing diabetes care should involve an understanding of patients' perspectives, values, cultures, social factors, and language limitations, which can facilitate optimal care and enable patients and health service providers to achieve treatment goals (Rebolledo & Arellano, 2016).

This study argues that culture is an inherent part of everyday life for the Balinese people. The culture and lifestyle of diabetes patients in Bali may serve as a reference for nurses in developing holistic, culturally sensitive nursing care plans for diabetes patients. It is important to assess diabetes patients' cultural beliefs and practices because they influence how patients manage their own disease. It is assumed by Balinese people that illness occurs due to '*karmaphala'* or the result of actions during a previous or current life that must be atoned for. They also believe that the use of *Loloh*, namely herbal concoctions prepared using Balinese procedures, is one of the choices in *Usadha Bali* (Balinese Traditional Medicine System) that can treat diseases, one of which is diabetes.

4.5. The influence of biological factors on holistic nursing based on transcultural nursing

Biological factors had a significant influence on holistic nursing based on transcultural nursing for T2DM individuals. These factors consist of indicators of nutritional status and the duration of T2DM. The focus of intervention for diagnosed T2DM patients is nutritional therapy aimed at achieving ideal body weight and maintaining glycemic, lipid, and blood pressure control. Health workers, patients, and families must collaborate in making decisions regarding the role of weight management interventions in diabetes care (Franz, 2017). Weight reduction in obese patients with diabetes can reduce the risk of cardiovascular disorders, improve quality of life, and enhance mobility, physical function, and sexual function by considering the appropriate use of hyperglycemic therapy (Wilding, 2014). Nutritional status and requirements in most communities are influenced by local cultural habits and customs. The existence of cultural differences results in various cultural practices, including the cultural diet of patients (Mora & Golden, 2017). The IDF recommends that nutritionists should pay attention to individual diets according to food preferences and the culture individuals adhere to (IDF, 2018).

Holistic and culturally sensitive management in addressing nutritional status in diabetes patients is essential and considered effective in reducing the incidence of complications and controlling glycemia in diabetes (Mora & Golden, 2017). A counter to cultural norms will complicate patient dietary compliance and decrease adherence. Therefore, understanding cultural and personal barriers to diet management is crucial (Deng et al., 2013). In Bali, many people still consume fatty meats such as pork, especially during traditional activities. People tend to view consuming processed pork as part of their culture that cannot be omitted during ceremonies. This poses a challenge for health workers in implementing holistic management based on transcultural nursing to optimize nutritional status and maintain good levels of dietary compliance in DM patients.

4.6. The influence of psychological factors on holistic nursing based on transcultural nursing

This study also found that diabetes distress is an indicator of psychological factors that contribute to the development of the holistic nursing model based on transcultural nursing. Research has shown that diabetes distress can exert pressure on diabetes management, necessitating the strengthening of self-care skills and optimization of coping mechanisms while minimizing discomfort associated with changes and using external support (Kalra et al., 2017). It is important to note that diabetes distress is distinct from depression. Diabetes distress occurs when individuals with diabetes feel frustrated, overwhelmed, or defeated by their condition, and these feelings may come and go. Prolonged experiences of these feelings without resolution can escalate into depression, adversely affecting diabetes management. Individuals experiencing diabetes distress may neglect their self-care routines, such as missing insulin doses or failing to take prescribed medications, which can lead to prolonged fatigue over time (Diabetes UK, 2023).

Holistic management of individuals with diabetes encompasses psychosocial factors, psychological support, lifestyle modifications, health education, herbal remedies, cultural practices, yoga, and technology. Efforts to enhance the effectiveness of diabetes treatment programs must integrate cultural considerations, health practices, and technological advances. While culture may pose challenges to treatment programs, it can also serve as a supportive element in diabetes management (Juanamasta et al., 2021). The increased prevalence of psychological issues and other facets of diabetes underscores the necessity of a holistic approach to its treatment.

This holistic nursing intervention entails supporting patients in managing medication intake, adopting healthier dietary habits, coordinating exercise routines, and achieving weight loss goals. It should also include cognitive-behavioral therapy to enhance patients' psychological well-being and to empower them in managing their diabetes. Cultural and spiritual aspects are equally important, as patients may seek to fulfill their religious needs during the intervention, which can positively impact self-care outcomes. Social and cultural backgrounds are considered crucial sources of support in coping with the disease (Roohafza et al., 2014). Adopting a holistic care approach results in an improved quality of life for diabetic patients (Laochai et al., 2021).

Psychological distress experienced by diabetes patients can significantly influence diabetes care management. Psychological disorders in diabetes patients require attention and appropriate management, even though lifestyle and behavior changes are the main aspects of diabetes care (Kalra et al., 2018). Given that diabetes is a chronic condition that cannot be cured, it requires a more holistic approach that takes cultural factors into account. Culture must be considered because most diabetes patients receive treatment at home and are influenced by the various cultural practices prevalent in their communities. Psychological disorders tend to be more common among patients in urban areas, such as Denpasar City. The demands of urban living often lead to increased stress levels among patients, which may go unnoticed.

4.7. The effect of implementing a holistic nursing module based on transcultural nursing on the quality of life of T2DM patients

This study demonstrated that holistic nursing based on transcultural nursing significantly affected the quality of life with a positive correlation. These findings indicate that optimum holistic nursing based on transcultural nursing leads to an improvement in patient's quality of life. The variables of holistic nursing based on transcultural nursing consist of four indicators: biological, psychological, socio-cultural, and spiritual aspects, all with high factor loadings. Similarly, the quality of life significantly comprises four indicators: physical health, psychological well-being, social relationships, and the environment. According to research by Ofori and Unachukwu (2014), DM is a complex disease that requires attention to all aspects to overcome acute complications while preventing long-term complications. Holistic services based on transcultural nursing view patients from physical, psychological, socio-cultural, and spiritual aspects, considering cultural differences in their lives regarding meanings, patterns, values, and other characteristics. The culture of care provided can be a general culture or tailored to individuals/groups to enhance the patient's quality of life (Betancourt, 2016; Dossey et al., 2005). Diabetes care requires cultural factors and interventions appropriate to the patient's culture to achieve better results, such as addressing the patient's local food habits (Sachdeva et al., 2015). A holistic lifestyle approach in DM patients can lower blood glucose levels and significantly improve the patient's quality of life (Kumari et al., 2021).

One of the developments in holistic interventions in the health system is yoga. Yoga is an intervention with a spiritual approach regardless of religion, ethnicity, beliefs, gender, or health conditions. Yoga can effectively calm the body, mind, and soul (Thulasi et al., 2019; Tiwari & Negi, 2019). In addition to yoga, approaches with complementary traditional therapies are closely associated with holistic care. Each region has its own characteristics in the form of complementary traditional therapies that have been passed down through generations based on culture (Ismail et al., 2019). The use of complementary traditional therapies is also significantly related to glycemic control, quality of life, and overall health improvement (Rhee et al., 2018). Patients accept responsibility for their own quality of life and well-being, which are uniquely determined by the implementation of holistic health (Ventegodt et al., 2016).

Holistic nursing based on transcultural nursing is a new intervention developed to improve the quality of life of T2DM patients. Holistic nursing based on transcultural nursing includes the development of biological, psychological, socio-cultural, and spiritual care. Apart from medication, people believe that there are many other aspects that can maintain health. Currently, in Bali, many treatments have been developed that use medical therapies in collaboration with traditional therapies. Since time immemorial, people in Bali have developed various beliefs in society to improve their health. Beliefs in the health sector include the use of *loloh, boreh*, massage, yoga, or meditation therapy and belief in the power of prayer. Patients tend to do various things to achieve a good quality of life.

5. Implications and limitations

Transcultural-based holistic nursing modules and models can serve as the foundation for policymaking and implementation in delivering comprehensive services to enhance the quality of life and glycemic control in T2DM patients. However, while research has been conducted on model development, its effectiveness in T2DM patients has not been fully tested, nor has it been implemented in larger settings and samples.

6. Conclusion

The holistic nursing model based on transcultural nursing was directly influenced by the respondent characteristics, religious and life philosophy factors, social and kinship factors, cultural and lifestyle factors, biological factors, and psychological factors. Additionally, the holistic nursing model based on transcultural nursing directly influenced the quality of life of patients with T2DM. A final holistic nursing model based on transcultural nursing for the quality of life of T2DM people was also developed from the results. The holistic nursing model based on transcultural nursing can be used as a guide for nursing care and standard operating procedures (SOP) in healthcare services to improve the quality of life for patients with T2DM.

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Author contribution

NWS, YSA: Study design
NWS, DAR, NTD, IS: Data collection
NWS, YSA, NDK: Data analysis
NWS, YSA, NDK, DAR, NTD, IS: Manuscript preparation and revision

Conflict of interest

There is no potential conflicts of interest.

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