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Development of a nursing assessment form for patients with diabetes mellitus in a hospital: A research and development study

Anita Joeliantina*, Dwi Adji Norontoko, and Hepta Nur Anugrahini

Abstract

Background: People with Diabetes Mellitus (DM) tend to seek herbal medicine or complementary drugs in their treatments. But, unfortunately, the existing nursing assessment forms have not prepared the format for the use of complementary medicine.

Objective: This study aimed to develop a nursing assessment form in patients with DM based on the Chronic Care Model (CCM) approach.

Methods: This study employed a Research and Development study design, which consists of ten stages. The nursing assessment form was developed based on CCM theory and integrated complementary medicines into the assessment form. A content validity test was done by four experts and calculated using Aiken's V formula. Face validity among 12 nurses through Focus Group Discussions (FGDs) was also employed to test the quality of the nursing assessment form based on three aspects: functionality, efficiency, and usability. In addition, nine nurses were included for pilot testing of the form. Data were analyzed using descriptive analysis.

Results: The nursing assessment form demonstrated a good content validity, with Aiken's V value of 0.94. The form was categorized based on four components of CCM: self-management support, decision support, social activities, and clinical information. Additionally, all nurses could fill the form properly.

Conclusion: The nursing assessment form is valid. It can be used for nurses to assess patients with DM based on the CCM with an additional component to evaluate the use of complementary medicine.

Keywords

chronic disease; complementary medicine; diabetes mellitus; nursing assessment

Diabetes Mellitus (DM) is a chronic condition that occurs when there is an increase in blood glucose levels because the body cannot produce enough insulin or the use of the hormone insulin is ineffective. Some of the main risk factors that can trigger Type 2 Diabetes Mellitus (T2DM) include obesity, a bad diet, and lack of activity. In addition, DM can cause macrovascular and microvascular disorders, such as cardiovascular disease, nephropathy, retinopathy, and neuropathy ([International Diabetes Federation, 2017](#); [American Diabetes Association, 2019b](#)). The prevalence of patients with DM in Indonesia ranks sixth in the world along with China, India, the US, Brazil, and Mexico, with an estimated number of people with diabetes of 10.3 million in

2017 and will be ranked seventh with 16.7 million in 2045 ([International Diabetes Federation, 2017](#)).

The pattern of treatment-seeking behavior in chronic diseases, such as DM sufferers, is tiered, ranging from seeking herbal treatment to conventional or vice versa ([Kroeger, 1983](#)). This behavior aims to control blood sugar levels. A literature review exploring the responses of patients with DM who use herbs to complement medical treatment have relatively normal blood sugar levels ([Joeliantina et al., 2019](#)). Patients who use herbs as a complement have a pattern of improper use, namely not carrying out regular self-care, changing the dosage of medical treatment, and not informing which herbs

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complement medical treatment. Patients with DM have a high belief that herbs can help regulate T2DM disease. Patients who currently use herbs never provide information to health workers because they are afraid of being the wrong feel they do not need to convey, and health workers never ask them about the use of herbs (Joeliantina et al., 2016; Joeliantina et al., 2019).

Various interventions have been implemented to improve adherence to a recommended standard (diabetes self-management) for patients with DM. However, its implementation to reach the standard still has significant obstacles. The system is often fragmented, lacks clinical information capabilities, is poorly designed, and duplicates services for coordinated chronic care delivery. The Chronic Care Model (CCM) considers these factors and is a practical framework for improving the quality of diabetes care (American Diabetes Association, 2019a).

Patients with DM who visit the hospital and have a habit of using herbs as a complement must get the ideal service to continue to carry out diabetes self-care appropriately and regularly. Interviews conducted with a patient with DM showed that 76.5% of 64 patients with DM who visited the outpatient department of internal medicine at Airlangga University Hospital, Indonesia, tended to use herbs as a companion to diabetes self-care, especially the aspect of medical treatment. These patients did not report to health workers about the use of herbs and had not performed self-care regularly. Self-care behavior must carry out regularly to prevent acute and long-term complications, so an efficient and effective service integration model is needed. CCM is a model used to manage chronic disease in society, which consists of six critical elements, namely: organizational influence (health system), self-management support, community linkages/resources, decision support, delivery system design, clinical information systems (Baptista et al., 2016; Sendall et al., 2017; American Diabetes Association, 2019a). The central element of CCM

is a team-centered approach to care, which facilitates and results in effective interactions between proactive and patient-empowering primary care practice teams to improve processes and outcomes in patients with chronic disease (Kong et al., 2019).

This study aimed to develop a nursing assessment form for a patient with DM as a chronic disease that uses herbs based on CCM components. The selection of CCM theory is the basis for the development of the assessment form. The use of CCM theory is to explore the needs of DM patients who use herbs in self-care, establish an effective relationship between patients and health workers, and convey the pattern of using herbs to complement treatment.

Development of Nursing Assessment Form

This study used a Research and Development (R&D) design to develop an assessment form by modifying the ten stages of research from Gall et al. (2003). The nursing assessment form was developed based on CCM theory and integrated complementary medicines into the assessment form. The ten stages include:

Stage 1: Collecting information

The researchers identified the nursing assessment form used in the outpatient department of internal medicine. The implementation of information collection was from 27 May to 18 June 2019 at the Airlangga University Hospital Surabaya, East Java, Indonesia. The hospital was chosen because it has a traditional medicine clinic as a referral for patients using complementary medicine. Coordination with health workers (doctors and nurses), the results in this stage showed that the assessment form was not yet following the CCM component, no information for evaluating the use of complementary medicine, and not specific to a specific disease (Table 1).

Table 1 Identification of the existing nursing assessment form

| Form Components | Information |
|--|--|
| A focus or specific assessment form for patients with DM | The design did not focus on specifics for patients with DM. It was still mixed with other cases (Children, Obstetrics-Gynecology) |
| Self-care management: Regulating diet, exercise, smoking habits, drinking alcohol, patient medication patterns (herbal) | It did not describe the diet, exercise or activity, and healthy lifestyle for patients with DM |
| Assessing clinical information, including blood sugar levels, cholesterol levels, complaints, skin conditions (especially feet), pain, tingling, numbness | Nurses did this assessment. The data were in the complaint column. The information was still general and not specific for patients with DM |
| Assessing the referral system to other health teams according to the conditions and complaints of patients: nutritionists, ophthalmologists, cardiologists, etc. | Nurses carried out the assessment, but it was not documented in a nursing assessment form |
| Assessing the values of beliefs related to the patient's habits to deal with the problem | Nursing assessments regarding the implementation of worship were implemented, but no option about "always performing praying." |
| Patient's social environment or patient's activities at home or the integrated care posts | Nurses assessed the social environment by asking the patients, but it was not documented in the nursing assessment form |
| Assessing the patient's medication habits: The use of other drugs in addition to the treatment given by the doctor (herbs, acupuncture, cupping, etc.) | Nurses assessed it by asking the patients, but it was not documented in the nursing assessment form |

Stage 2: Planning to develop the assessment form

Planning the development of a CCM-based assessment form by integrating data on the use of complementary medicines into the assessment form. The assessment form in this study was developed based on the existing nursing assessment form in the hospital records and the combination of CCM model, Patient Assessment of Chronic Illness Care (PACIC) (consisting of self-management support and clinical information assessment - 14 questions) (Aung et al., 2016; Simonsen et al., 2018), and The Complementary and Alternative Medicine (CAM) (three questions) (Patterson & Arthur, 2009; Quandt et al., 2009).

Based on the identification of the problems in stage 1, researchers plan to develop an assessment form for patients with DM. The development of the form was based on CCM, and the use of complementary medicine was integrated into the assessment form. In addition, the form checklist was used as the form.

Stage 3: Developing an initial form of the nursing assessment

The initial state of the form development was determined through the FGD (Focus Group Discussion) phase 1 as face validity to get input from nurses. The FGD phase 1 was on 2 July 2019. The FGD phase 1 was to develop an assessment form for patients with DM. The FGD was implemented in the discussion room of the outpatient department among 12 nurses. The characteristics of the nurses were: (1) age (four nurses aged 20-30 years and eight aged 31-40 years), (2) gender (three males and nine females), (3) Education (three with Diploma Three Nursing, five with Bachelor Nursing, and four with Masters in Nursing), (4) length of work at the hospital (four for 1-5 years, and eight for 6-10 years), (5) employment status (seven as contract nurses, and eight as civil servants).

This FGD was to present the results of the evaluation in the first phase of the research. Participants agreed to develop an assessment form from the initial nursing assessment in patients with DM based on CCM standards (self-management support, decision support, community resources, and clinical information) by integrating complementary medicine use data into the nursing assessment form.

Stage 4. Content validity testing

Content validity was done on 13 August 2019. A total of four experts evaluated the nursing assessment form based on four data components (self-management, decision support, social activities, and clinical information). The experts included the head of the internal medicine outpatient department, the head of the nursing department, representatives from the work-group assessment team, representatives from the nursing ethics committee team. The minimum number of experts recommended for content validity testing is three people (Azwar, 2015).

The total score of the content validity was calculated using Aiken's V formula (Azwar, 2015). Each section was

scored in the range of 1-5. The results indicated good content validity, with a V-value of 0.94 (the required V value limit is 0.88).

Stage 5: Revising the assessment form as an initial product

In this stage, the researchers recorded the inputs from the experts regarding the form for assessing patients with T2DM, including (1) Developing a specific assessment form for patients with T2DM in the outpatient control of Airlangga University Hospital Surabaya, 2) The nursing assessment form was compiled as a result of this research must still refer to the hospital accreditation national standards, which include bio-psycho-socio-spiritual aspects, and 3) This assessment form can be used as additional data from the existing assessment form.

Stage 6: Pilot testing the assessment form as a result of the development

At this stage, the researchers socialized the results of the form development and conducted a pilot testing with nine nurses in the internal medicine outpatient department on 20 August 2019. In addition, the researchers analyzed nurses' ability to fill out the form consisting of four components of CCM: self-management support, decision support, social activities, and clinical information. Descriptive analysis was used for data analysis, with good, sufficient, and poor categories.

The results showed that 90% of nurses' self-management data were good, 100% good of filling decision support and social data, 70% good of filling environmental data, and 100% good of filling about clinical information data. In conclusion, almost all nurses could fill in the four components correctly.

Stages 7 and 8: Revised and re-testing the quality of the assessment form

The researchers completed the nursing assessment form and revised it based on input from the nurses about the ease and accessibility of filling out the form. After revision, the form was sent back to nine nurses for re-check. The results revealed that 100% of nurses agreed with the high functionality, efficiency, and usability of the form.

Stage 9: Revising the final assessment form

After stages 7 and 8, the researchers conducted another face validity through FGD phase 2 on 10 September 2019 with the same nurses in FGD phase 1 to confirm the form. This step was to ensure that the form was in line with the latest information and recommendations for the patients.

The results of FGD phase 2 suggested that (1) The assessment form was prepared based on the CCM by adding a data component of the assessment of other (complementary) treatments used by patients with DM as a companion to medical treatment; (2) The form was valid and specially prepared for patients with DM by providing checkpoints to facilitate data filling. This form

complemented existing forms and was based on the hospital accreditation national standard; (3) It is necessary to follow up using the nursing assessment form to explore data. **Figure 1** shows an integrative assessment form in patients with DM.

Stage 10: Dissemination and implementation

The nursing assessment form in this study has not yet gone through the trial phase, which could be considered one of the limitations of this study, so it still requires a large-scale trial from both the number of respondents and the research location.

Ethical Consideration

This research was declared to have passed ethics by the Ethics and Law Committee of the Airlangga University Hospital in Surabaya through the Ethics Review Pass Certificate No. 137 / KEH / 2019. Informed consent was done for each participant in this study.

Discussion

The CCM is an approach that has been widely used in various health care settings to guide the improvement of chronic disease care systems (Baptista et al., 2016; Sendall et al., 2017; El-sol & Babikir, 2018). The design of CCM theory is to solve complex problems, motivate health workers, including nurses. Nurses as the frontline have a fundamental role in nursing practice—providing health information and education to patients and building relationships between patients and nurses and the community. Nurses also maintain continuity of care, use technology to optimize care delivery, support long-term adherence to therapy, and promote collaborative practice (Furtado & Nóbrega, 2013).

To improve the management of chronic diseases associated with CAM use, an open dialogue between CAM practitioners and medical professionals can help improve decisions about care for patients with various chronic conditions (Faldi et al., 2016). Patients with multiple comorbidities use a variety of non-conventional approaches to managing their disease. Health care providers at every level need to proactively know the behavior of patients who use CAM products and/or services. In addition, health care providers also need to offer patients information about the risks, benefits, and potential implications of using CAM (Mbizo et al., 2018). Health beliefs consisting of perceived vulnerability and severity, perceived benefits, perceived inhibition, and perceived self-efficacy were strong predictors associated with the use of herbs as a complement to diabetes self-care. Nurses, as part of health workers, must pay attention to patient health beliefs in providing education to patients (Joeliantina et al., 2021).

Research has shown that the application of CCM in the management of T2DM in public health services can be beneficial. CCM has been used for diabetic patients in some health care settings and has shown a reduction in cardiovascular risk factors and a reduction in A1c, along

with improvements in complication screening. That is evidence to suggest that high-performing practices occur when healthcare services are combined with several elements of CCM with a systematic approach (Stuckey et al., 2011). Therefore, in this study, the nursing assessment form was developed based on the CCM consisting of self-management support, decision support, service system design, and clinical information (Simonsen et al., 2018; Kong et al., 2019). The core element of CCM is the interaction between the doctor and the patient, which benefits the patient's awareness of self-management and the development of skills that further improve patient health outcomes. A previous study indicated that the CCM-based intervention improves multiple health behaviors, clinical examination outcomes, and quality of life of Chinese patients with type 2 diabetes in the short term (Kong et al., 2019).

Patients with DM need treatment in the long term. DM patients do not choose medical treatments alone, but the patients use other drugs as a companion to medical treatment. Airlangga University Hospital Surabaya has a traditional medicine department that allows patients with chronic diseases to consult with officers in the department. Health care providers should always ask about the use of herbs as complementary and alternative treatments for a patient with DM, as some herbs can cause unexpected side effects and/or interactions with traditional pharmacotherapy. Patients with DM need to inform health care providers if using herbs as a complementary and/or alternative medicine to manage their disease (Grossman et al., 2018). Herbs proved to be a better choice than synthetic drugs because of their fewer side effects. Herbal formulations are easy to obtain without a doctor's prescription. The use of this herb is for life-threatening illnesses and when chemical drugs are no longer effective in treating the disease (Verma et al., 2018). Compliance with taking medication for DM sufferers shows the behavior of using herbs to complement medical treatment. Patients with DM have experience using more than one herb to manage their disease (Joeliantina & Anugrahini, 2020). The use of herbs by patients with T2DM has a tendency to randomly lower blood sugar levels when used as a complement to medical treatment (Proboningsih et al., 2020).

However, the nursing assessment form in the outpatient department was not yet specific. It did not accommodate the needs of DM patients in taking treatment; therefore, adjustment and modification were needed. This research combined the concept of CCM with the use of herbs that complement or accompany medical treatment. The question items as other (complementary) treatment options were added and used by DM patients as a form of patient decision support in choosing treatment. Health workers (doctors or nurses) should be aware that one in two patients with DM is using CAM, and when evaluating patients, they should ask the patient about using CAM. It aims to quickly identify a decrease in quality of life in patients with DM who use CAM (Candar et al., 2018).

The government has regulated Integrated Traditional Health Services, a form of health service that combines conventional health services with traditional health services of complementary, either as a compliment or a substitute in certain circumstances. The implementation of Integrated Traditional Health Services in Health Service Facilities functions to complement conventional health services. Another function is to promote, prevent, curative, rehabilitate, and improve patient's quality of life physically, mentally, and socially (Ministry of Health of the Republic of Indonesia, 2017).

Overall, this study has provided the new form that will be beneficial for healthcare workers, especially nurses, to assess DMT2 patients who use complementary medicine.

It is also noteworthy that the form developed in this study did not replace the existing ones but rather provided additional information or insights needed for both healthcare workers and patients. Also, this form is still in line with the hospital accreditation standard, covering biopsychosocio-spiritual aspects.

Limitation

The results of this study could be used as an initial product of an assessment form development because the psychometric testing has not yet been done with the larger sample size, especially in nurses as the participants who fill the form. Therefore, further research is needed to examine the psychometric properties of the form.

NURSING ASSESSMENT FORMAT FOR PATIENTS WITH DIABETES MELLITUS

PATIENT'S IDENTITY

| | |
|---|--|
| Name : | Age : Years |
| Gender : <input type="checkbox"/> Male <input type="checkbox"/> Perempuan | Insurance Ownership <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Religion : <input type="checkbox"/> Islam <input type="checkbox"/> Christian <input type="checkbox"/> Hindu <input type="checkbox"/> Buddhism <input type="checkbox"/> Others | Education Level : <input type="checkbox"/> Higher Education <input type="checkbox"/> Senior High School <input type="checkbox"/> Junior High School <input type="checkbox"/> Elementary School <input type="checkbox"/> No |
| Ethnic : <input type="checkbox"/> Jawa <input type="checkbox"/> Madura <input type="checkbox"/> Others | Marital status : <input type="checkbox"/> Married <input type="checkbox"/> Not Married <input type="checkbox"/> Widow |
| Occupation : <input type="checkbox"/> Government employees <input type="checkbox"/> Private employees <input type="checkbox"/> Entrepreneur <input type="checkbox"/> Others <input type="checkbox"/> No | Income family/month (IDR) : <input type="checkbox"/> < 1.5 million <input type="checkbox"/> 1.5 – 3 million <input type="checkbox"/> 3 – 5 million <input type="checkbox"/> > 5 million |

SELF MANAGEMENT

Diets Settings

| | |
|---|------------------------|
| Schedule : <input type="checkbox"/> On schedule <input type="checkbox"/> Not on schedule | Weight (in kg) : |
| Quantity : <input type="checkbox"/> According to the dose <input type="checkbox"/> Not according to the dose | Height (in cm) : |
| Type : <input type="checkbox"/> Appropriate <input type="checkbox"/> Not appropriate | BMI : |

Activity Settings and Exercise

| | |
|---|--|
| Regularly exercise : <input type="checkbox"/> Yes Type Frequency <input type="checkbox"/> No | Activity at home : <input type="checkbox"/> Active Type Frequency <input type="checkbox"/> No |
|---|--|

Lifestyle Healthy

| | |
|--|--|
| Smoking : <input type="checkbox"/> Yes Frequency Quantity <input type="checkbox"/> No | Alcohol : <input type="checkbox"/> Yes Frequency Quantity <input type="checkbox"/> No |
|--|--|

Visits to health workers

| | |
|--|--|
| Others doctors <input type="checkbox"/> Eye <input type="checkbox"/> Heart <input type="checkbox"/> Teeth <input type="checkbox"/> Others | Nutritionist <input type="checkbox"/> Yes <input type="checkbox"/> No |
|--|--|

DECISION SUPPORT

| | |
|--|--|
| Insurance ownership : <input type="checkbox"/> Have <input type="checkbox"/> No | Barriers in carrying out management <input type="checkbox"/> Yes Mention <input type="checkbox"/> No |
|--|--|

Beliefs and values

| | |
|--|--|
| Worship/habits praying : <input type="checkbox"/> Always <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Never | Barriers in worship/praying : <input type="checkbox"/> Yes Mention <input type="checkbox"/> No |
|--|--|

SOCIAL ACTIVITIES

| | |
|--|--|
| Participate in health activities in the community : <input type="checkbox"/> Yes Mention <input type="checkbox"/> No | |
|--|--|

| | | | |
|--------------------------------------|---|---------------------------------------|--|
| CLINICAL INFORMATION | | | |
| Duration of DM: | | | |
| Vital Sign: Blood Pressure:.....mmHg | | Pulse:.....x/min | Respiration Rate:.....x/min Temperature:.....°C |
| Hereditary history | : <input type="checkbox"/> Yes | Taking medication | : <input type="checkbox"/> Regular <input type="checkbox"/> Irregular |
| Type of treatment | : <input type="checkbox"/> Pills | Other treatment | : <input type="checkbox"/> Herbal |
| | Drug name..... | | Name |
| | Dosage | | Dosage |
| | <input type="checkbox"/> Insulin injection | | Presentation |
| | Drug name | | <input type="checkbox"/> Supplements |
| | Dosage | Name | |
| | | <input type="checkbox"/> Acupuncture | |
| | | <input type="checkbox"/> Others | |
| Complaints | : <input type="checkbox"/> Tingling in the legs | Complications | : <input type="checkbox"/> Sores on the legs |
| | <input type="checkbox"/> Pain in the legs | | <input type="checkbox"/> Disorders Eyes |
| | <input type="checkbox"/> Numbness in the legs | | <input type="checkbox"/> Heart disorders |
| | <input type="checkbox"/> Itching | | <input type="checkbox"/> Stroke |
| | <input type="checkbox"/> Heart palpitations | | <input type="checkbox"/> Amputation |
| | <input type="checkbox"/> Frequent urination | | <input type="checkbox"/> Kidney disorders |
| | <input type="checkbox"/> Difficulty sleeping | | <input type="checkbox"/> High cholesterol |
| | <input type="checkbox"/> Blurred eyes | | <input type="checkbox"/> High blood pressure |
| | <input type="checkbox"/> Others | | <input type="checkbox"/> Others |
| | | | <input type="checkbox"/> None |
| | | | |
| Blood sugar level (mg/dl) | : | | |
| | | | |
| HbA1c (%) or (mmol/mol) | : | | |

Figure 1 Form of the integrative assessment of patients with diabetes mellitus

Conclusion

This study developed a new comprehensive nursing form for assessing patients with DM, with strong content validity and face validity. Furthermore, the integration of the four components of CCM (self-management support, decision support, social activities, and clinical information) into the assessment form enriches the assessment data and describes the patients holistically. Therefore, the healthcare workers and nurses could use this form for the assessment of patients with DM.

Declaration of Conflicting Interest

Nothing to declare.

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Authors' Contributions

DAJ contributed to study conception, literature search, data collection, analysis, interpretation, manuscript preparation, manuscript review. DAJ contributed to study concept, literature search, data collection, manuscript preparation. HNA contributed to data collection and manuscript preparation. All authors agreed with the final version of the article to be published.

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Data Availability Statement

Data Availability Statement
All data generated or analyzed during this study are included in this published article.

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