

# Family Support for Diabetes Self-care Behavior in T2DM Patients who Use Herbs as a Complementary Treatment

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## ABSTRACT

This study aims to identify family support for the use of herbs as complementary treatments based on diabetes self-management in regulating blood sugar levels in patients with Type 2 Diabetes Mellitus (T2DM) in Surabaya City East Java Indonesia, using cross-sectional approach. Participants were collected from 7 public health center in Surabaya using simple random sampling with a sample size of 230. Data were collected with a questionnaire, then analyzed using PLS. The indicator of characteristic of disease and family support had factor loading >0.6. There was influence of disease characteristics and family support on the use of herbs. The use of herbs had an effect on blood sugar regulation. Family support was necessary for patients to keep diabetes self-management when T2DM patients use herbs.

**Keywords:** *Complementary treatment, Diabetes self-management, Family support*

## INTRODUCTION

Patients with T2DM aware of his illness after his body was damaged due to an increase in blood glucose levels. They are often diagnosed with T2DM after complications occur. Some of the major risk factors that can trigger T2DM disease include obesity, incorrect diet, and lack of activity<sup>(1)</sup>. DM can lead to macrovascular and microvascular disorders such as cardiovascular disease, nephropathy, retinopathy and neuropathy<sup>(2)</sup>.

The prevalence of DM in Indonesia was ranked seventh along with China, India, USA, Brazil, and Mexico. The percentage of deaths due to DM in Indonesia is the second highest after Sri Lanka<sup>(1)</sup>. T2DM patients should carry out the treatment relating to the control of blood sugar. Medical treatment given to T2DM patients are oral hypoglycemic medications that can trigger insulin secretion, improve insulin sensitivity, gluconeogenesis inhibitors and alpha glucosidase inhibitors. In addition to oral hypoglycemic drugs, patients may also be given an insulin injection as indicated<sup>(3)</sup>.

Treatment of T2DM patients should be implemented for life. Medications used by T2DM patients, not only in conventional medicine, but there are patients using complementary medicine. There is a growing trend around the world for patients with T2DM to use or choose complementary and alternative medicine (CAM) in order to improve their health status. Complementary medicine is used together with conventional medicine, not as a substitute for conventional treatment<sup>(4),(5)</sup>. Ching research results showed the prevalence of CAM use in Malaysia is still high<sup>(5)</sup>. Research Niswha et al.<sup>(6)</sup> shows the results of the high use of herbs as a complementary treatment by diabetic patients in outpatient departments Hospital of Banda Aceh Indonesia.

CAM in Indonesia has been regulated in Regulation of the Minister of Health of the Republic of Indonesia No.1109/MENKES/PER/IX/2007. Complementary medicine is currently applied to public health center in Surabaya which already has a traditional treatment that is in 20 public health centers and Dr. Soetomo hospital. Health care center provided is socialization about the use of herbs, acupuncture and acupressure. Nurses as part of health professionals authorized to conduct complementary and alternative nursing management in performing their duties as a nursing care provider in the field of public health efforts<sup>(7)</sup>.

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Treatment is part of a component of self-care behaviors, in addition to diet, activity, self-monitoring of blood sugar levels, and reduced risk of complications behavior. Diabetes self-management behavior should be conducted regularly to prevent acute complications and long-term complications, so it needs the support of relatives of patients with T2DM<sup>(8)</sup>. Factors affecting the implementation of self-care are called basic conditioning factors, such as age, gender, developmental status, health status, socio-cultural orientation, health care system, family system, lifestyle, environment and availability of resources<sup>(9),(10)</sup>.

Family support is attitudes, actions and family acceptance of family members. Family support, consisting of emotional support, informational support, tangible support, appraisal support<sup>(9),(11),(12)</sup>. Hensarling divides family support into 4 dimensions: empathetic, encouragement, facilitative, and participative. Referring to Misra & Lager<sup>(13)</sup> on 180 adult patients with T2DM in Texas found that high levels of social support can increase patient acceptance of the disease and may reduce the perceived difficulty in self-care behaviors ultimately leads to improved quality of life of patients.

In relation to complementary medicine, family support affects a person to choose CAM on the type of biological treatment and body manipulation<sup>(14)</sup>. People with a positive attitude to CAM and those with a high family support were more likely to use CAM and more involved in self-care behaviors<sup>(15)</sup>. Joeliantina et al. showed that family support for T2DM patients who used herbs as complementary medicine was to give patients permission to use herbs as a treatment, to remind their medication schedule and control, to deliver patients to health facilities, and to help prepare herbal preparations<sup>(16)</sup>. Social support is an important thing that encourages one to behave in a positive manner and perform effective treatment in acute and chronic diseases<sup>(17)</sup>.

The purpose of this study was to identify family support for diabetes self-care behavior in T2DM patients who use herbs as a complementary treatment to regulate modified blood sugar levels from self care nursing theory developed by Dorothea Orem. Family support and disease characteristics as the basic conditioning factors that affect the implementation of self-care.

## MATERIALS AND METHOD

This study used cross sectional approach. Sample size was 230 T2DM patients, based on the rule of thumb

(5-10 times the number of parameters studied), selected using simple random sampling. The first step in taking the samples were randomly select 7 public health centers that have a traditional treatment services in Surabaya, then determine the sample according to predefined criteria. The inclusion criteria were patients with T2DM >1 year, in stable condition, age: 30-70 years, and using herbs for  $\geq 2$  months.

Data were collected in 2016 by a questionnaire. The instrument consisted of: disease characteristics, family support, diabetes self-care behavior, and blood sugar levels. Disease characteristics were about the complications, complaints, duration of disease, hereditary history, and drug administration. The family support was developed from the Hensarling Diabetes Family Support Scale (HDFSS)<sup>(18)</sup> and Nursalam<sup>(9)</sup>, consisting of emotional support, informational support, and facilitative support. The diabetes self-care behavior developed from The Summary of Diabetes Self Care Activities (SDSCA) from Toobert<sup>(19)</sup>. The SDSCA was including diet, exercise, blood glucose testing, medication, and foot care. Data were analyzed using Partial Least Square (PLS).

## FINDINGS

**Outer Model:** Convergent validity can be seen from factor loading and t-value. Based on Table 1, indicators that did not meet the convergent validity was X1.5 (factor loading <0.6).

**Table 1: Outer Model**

Indicators	Factor Loading	Description
X1.1 (Complication)	0.792418	Valid
X1.2 (Complaints)	0.789718	Valid
X1.3 (Duration of disease)	0.769163	Valid
X1.4 (Hereditary history)	0.666363	Valid
X1.5 (Drug administration)	0.204204	Not valid
X2.1 (Emotion)	0.912298	Valid
X2.2 (Informative)	0.914639	Valid
X2.3 (Facilitative)	0.908323	Valid
X3.1 (Diet)	0.770285	Valid
X3.2 (Activity and exercise)	0.745200	Valid
X3.3 (Monitoring)	0.808843	Valid

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X3.4 (Complementary treatment)	0.783761	Valid
X3.5 (Decreasing risk of complications)	0.768219	Valid
Y (Blood glucose level)	1.000000	Valid

All the indicators that make up each construct X1, X2, and X3 had a value greater than the factor loading with other constructs. This shows that the latent

constructs predict the indicator on the block they are better than the indicator in the other blocks.

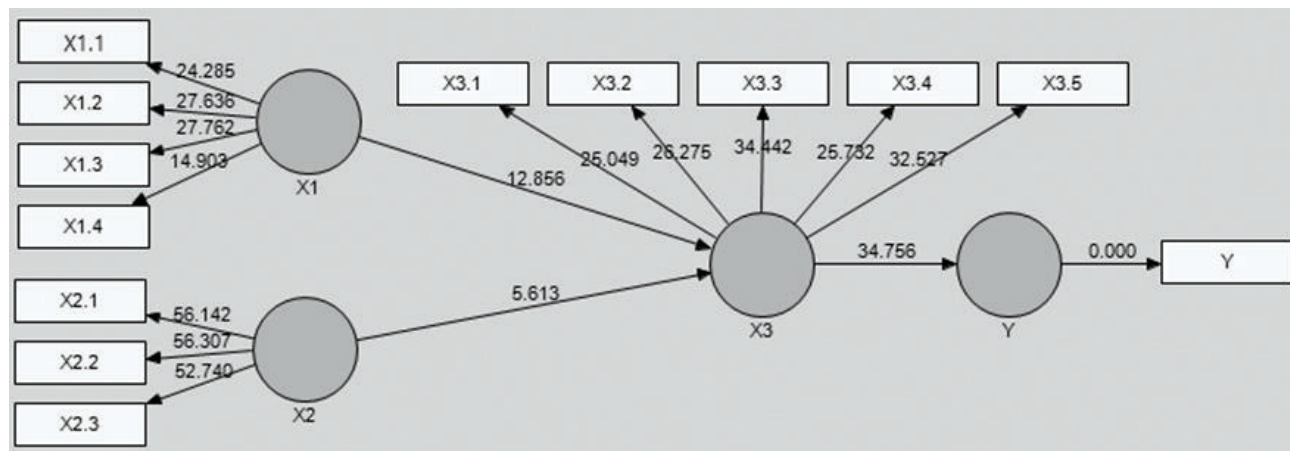
The construct validity can be seen from AVE (Average Variance Extracted). The adequacy of good validity if it >0.5. The reliability of the constructs was measured using the composite reliability or Cronbach's alpha. All composite reliability were >0.70 and Cronbach's alpha were >0.6, so it can be concluded that X1, X2, and X3 had good reliability (Table 2).

**Table 2: AVE, Composite Reliability, and Cronbach's Alpha**

Constructs	AVE	Composite Reliability	R Square	Cronbachs Alpha
X1	0.465786	0.795344		0.680040
X2	0.831301	0.936641		0.898629
X3	0.601466	0.882911	0.555243	0.834216
Y	1.000000	1.000000	0.666465	1.000000

The indicators of disease characteristics (X1.1, X1.2, X1.3, X1.4), family support (X2.1, X2.2, X2.3), and the use of herbs (X3.1, X3.2, X3.3, X3.4, X3.5) have met the requirements of convergent validity, construct validity, discriminant validity, and reliability.

**Inner Model:** Structural model analysis (Figure 1) was done through 2 stages: goodness of fit and hypothesis testing.



**Figure 1: The Inner Model**

Goodness of fit test can be seen from: coefficient of determination ( $R^2$ ), Predictive Relevance ( $Q^2$ ), and Goodness of Fit Index (GoF). R Square, which means variability X3 (The use of herbs) which could be explained by X1 and X2 was 55.5%, while 45.5% was explained by other variables. Predictive relevance test aims to determine the predictive ability of the family support model for the use of herbs based on diabetes self-management to regulate blood sugar levels.  $Q^2 = 1 - (1-R^2_1) (1-R^2_2) = 1 - (1-0.555243) (1-0.666465) = 0.851658$  (the prediction results from the model of family support for the use of

herbs based on diabetes self-management has a good predictor ability, because 85.17% this model can be explained by the variable characteristics of disease and family support). The calculation of GoF result was AVE average (0.725) and  $R^2$  average (0.611). After calculation, the result of GoF=0.665. The result of T-test were 12.856, 5.612, and 34.756 (>1.96), so it could be concluded that disease characteristics, family support had an effect on the use of herbs as complementary medicine based on diabetes self-management, and the use of herbs as a complementary treatment affect the regulation of blood sugar levels.

## DISCUSSION

This study identified disease characteristics and family support as a factor that influences the use of herbs as complementary treatments that are integrated into diabetes self-management to regulate blood sugar levels.

Complications experienced were hypertension, cataracts, gangrene, increased-cholesterol, hypoglycemia, mild-stroke, coronary-heart and nerve-disorders. Patients with complications had good herbal treatment behaviors. This is consistent with the study of Gao et al. that complicated DM patients have an increase in self-care behavior because of better physician communication with those without complications. DM patients usually require a doctor's advice to treat the disease<sup>(20)</sup>. According to Khalil et al., the history of complications affects patients in choosing complementary and alternative treatments<sup>(21)</sup>.

Patients who have complications carrying out complementary herbal remedies by trying herbs of more than one type. In accordance with the healer shopping theory developed by Kroeger, during illness, the patient is likely to seek a second healer, without reference from the first healer<sup>(22)</sup>. Similarly, T2DM patients have a tendency to do complementary herbal<sup>(4),(5)</sup>.

Patient complaints in this study have an effect on the behavior of herbal use. Complaints experienced is the body felt weak or tired, trembling, pain in the body, unable to sleep at night, chest thumping and tingling in the legs. Patients who have a complaint tend to use self-care based complementary herbs, as patients consider complications, so they have high vigilance to manage the disease. Basity and Irvani Research showed that the presence of complaints affecting DM-patients in implementing disease management. Complaints that often felt by DM-patients are frequent urination, extreme thirst and hunger, difficulty working or walking for long periods, stiffness, tingling, numbness, feeling tired and weak, heaviness in the head, and slow wound healing<sup>(24)</sup>.

The results of this study are consistent with previous research conducted by Ceylan that diabetes duration affected the use of CAM<sup>(25)</sup>.

T2DM patients who have a family history of T2DM had an effect on herbal use behavior. Hereditary history was 56.4% from mothers, 26.4% from fathers, and 17.2% from both. Patients with a family history have

a tendency to choose a self-care based complementary herbal, because the patient feels a serious problem. This is in accordance with research Vazini & Barati, that family history with DM associated with increased self-care. The presence of family history resulting in the involvement of the patient's family in managing the disease and being alert in observing the possibility of DM complications<sup>(24)</sup>.

Adherence to the use of herbs as a complementary treatment has an effect on the regulation of blood sugar. Compliance of patients to use herbs is based on the dosage of medicinal drug use coupled with the use of herbs. The regularity of medical treatment should be used according to the dosage prescribed by the doctor, while the regularity of herbal use is based on the frequency of use that is consumed daily according to the rules. The combination of conventional and complementary treatments was believed to produce better results than conventional therapy, especially the reduction of negative side effects<sup>(26)</sup>.

T2DM patient response was a feeling of change such as the body feeling good, healthy, blood sugar go down, do not feel weak, feet do not pain, and do not tingling. This is consistent with the previous studies that the response of DM patients using herbs is feeling healed, no complications, increased health status, and lower blood sugar levels<sup>(5),(29)</sup>.

T2DM patients use herbal medicine as their 2nd choice. According to Kroeger, the behavior is known as healer shopping conducted by patients to overcome the complaints of the disease. Patients with chronic disease have a tendency to seek treatment for more than one treatment regardless of the first treatment<sup>(22),(30)</sup>.

T2DM patients who received family support when using herbs had good blood sugar. Delamater shows that families have an important role in the management of DM. Family involvement in mentoring, giving input and reminders of patients to obey the management of DM. Family members will more easily receive information, if the information is supported by other family members<sup>(31)</sup>.

## CONCLUSION

Family support influence the behavior of the use of herbs as a complementary treatment based diabetes self-management need to be developed to achieve the regulation of blood sugar levels of T2DM patients.

Regulation of blood sugar levels of T2DM patients optimally can be achieved if the patient can use herbs that is integrated into diabetes self-management comprehensively, precisely and regularly. Family support is indispensable for patients to continue to implement diabetes self-management when T2DM patients use herbs.

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