

# Expanding self-consciousness of health status for diabetes chronic complications among adults: a systematic review

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**Abstract. – OBJECTIVE:** Self-consciousness is defined as a subject (I) then becomes the object (Me) associated with a present moment of self-experience in which one is aware of their experience without any reflexive judgment attached, a state commonly investigated in mindfulness studies. On the other hand, self-consciousness is viewed as a reflexive experience and, thus, as a synonym for self-reflection. Self-consciousness is an important determinant of behaviors. Expanding self-consciousness is important among adults with diabetes to optimize health prevention and compliance with diabetes self-management in the long term. The chronic complications of diabetes comprise heart disease, stroke, nephropathy, retinopathy, and neuropathy. This review aims to explain the relationship between self-consciousness and chronic diabetes complications.

**MATERIALS AND METHODS:** An electronic literature search was conducted in the English language in several databases. The Joanna-Briggs Institute was referenced for the quality assessment of case studies, cohort and cross-sectional studies, and qualitative studies, while systematic reviews were evaluated through PRISMA-S. Results were reported according to the PRISMA guidelines.

**RESULTS:** A total of 89 studies related to self-consciousness of diabetes chronic complications were not found. However, many findings related to chronic complications are based on a lack of knowledge of diabetes and long-term self-management. People with less education, multiple comorbidities, and cognitive dysfunction need lifestyle changes to prevent diabetes and chronic complications.

**CONCLUSIONS:** Future research should be oriented toward assessing the risk of chronic diabetes complications. Our findings suggest that research should expand self-consciousness and caring partnerships to improve self-consciousness and patients' obedience.

## Key Words:

Expanding self-consciousness, Diabetes mellitus, Chronic complications, Adults, Health status.

## Introduction

Expanding self-consciousness among adults regarding chronic complications from diabetes is important for monitoring. People with this disease have changes in their health status, which impact on function and daily life. They may know what to do and be motivated by a therapy program but relapse into “unhealthy” behavior because of problems or barriers to achieving self-care activities. Almost 50% of people with diabetes have been estimated not to achieve and maintain the recommended target of < 7.0% for glycated hemoglobin (HbA1c). Based on previous reports<sup>1</sup>, only 14.3% achieved the target goal for HbA1c, blood pressure, low-density lipoprotein cholesterol, and smoking abstinence. They experience physical and psychological burdens that affect their health status. Therefore, diabetic patients are at risk of facing critical threats from chronic microvascular and macrovascular complications<sup>2</sup>.

## Overview of Expanding Self-Consciousness of Health Status

A caring partnership is part of advanced non-intervention nursing care, as proposed by Margaret Newman<sup>3</sup>. She stated that health, as part of self-consciousness, can be expanded by partnership and dialogue. Therefore, pattern recognition is formed because of agreement between nurses and diabetes patients. The purpose of ac-

tively involving diabetes patients is to recognize self-care difficulties and reduce barriers related to adherence to increase their self-confidence<sup>4</sup>. Based on Newman's Theory, the process of health behavior is the patient's recognition of the environment and the understanding of self-consciousness. Nurses assist patients in understanding how to use their strengths to develop higher levels of consciousness, thereby helping the caring process, recovery, and prevention. The practice of nursing entails a synergistic alliance between the healthcare professional and the recipient of care, wherein both entities undergo developmental progression characterized by an elevated state of cognitive awareness. In every nursing activity, it is believed and emphasized that humans deserve to be treated with respect and are valued for their uniqueness. In accordance with the principle of individuality, human beings encounter diverse situations and conditions that may pose challenges to their dignity and humanity. The nursing paradigm further elucidates that humans are unique, emphasizing their status as individuals rather than mere objects. The partnership between nurses and patients in nursing is a fundamental value that enhances individuals' acceptance of their health status.

Regarding the health status self-consciousness, it is important to know the mindset of individuals concerning accepting health behavior changes and maintaining them in the long run. Health behavior reflects the changing nature of autonomy in dealing with chronic illness. It can also recognize individuals' vulnerabilities to monitor the previous treatment planning process<sup>5-7</sup> and chronic complications that may occur. The self-consciousness of health status is the key to secondary prevention for chronic diseases such as diabetic patients.

Newman's theory assumes that expanding consciousness in health requires partnership, dialogue, pattern recognition, and transformation, as well as self-transcendence in health. Therefore, this literature review clarifies the variables associated with the construction of self-consciousness of health status. It highlights the conceptualization of the subject as elucidated in previous research<sup>3</sup>, grounded in Newman's theoretical framework. Self-consciousness of health status can affect behavioral changes in diabetes patients in controlling chronic complications. This study was carried out to identify the self-consciousness of health status in diabetes patients with chronic complications.

### **Overview of Diabetes Chronic Complications**

Physical symptoms and complaints cannot be measured objectively by diabetes patients as part of their health status. A program to increase self-consciousness of health status is very important to be carried out regularly to improve healthy behavior, reduce HbA1c, and control chronic complications<sup>8</sup>. Besides physical issues, the prevalence of depression among the patients is also significantly high. Pouwer et al<sup>9</sup> showed symptoms of depression were exhibited by 9.3% of diabetes patients as determined by self-report, while Nouwen et al<sup>10</sup> reported an increase in the prevalence of depression among patients. This shows that diabetes patients also have a psychological burden from the disease. Therefore, knowledge about diabetes and the management of diabetes and its complications must be continuously provided. Symptoms of increased depression are also related to emotional and chronic sources of stress, such as work pressures, changes in economic status, anxiety, sleep disturbances, anger, and low self-care abilities. This occurs due to the symptoms of chronic complications such as chronic pain, uncured wounds, visual disturbances, dementia, and sexual dysfunction<sup>11-13</sup>. Based on previous reports<sup>14</sup>, the risk of depression is 1.36 and 1.24 times higher for microvascular and complications, respectively. The report showed that the ability to recognize the physical and psychological burden for diabetes patients at risk of experiencing chronic complications is needed.

### **Materials and Methods**

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Literature Search Extension (PRISMA-S)<sup>15</sup>. The protocol of this systematic review was developed *a priori* following an initial discussion between members of the research team. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) were used as a basis for organizing the review. A variety of keyword terms in the Medical Subject Headings list combined with Boolean operators was also applied and adapted for use in different databases.

### **Focused Question**

A literature review was conducted following the focused question: How do adult diabetic

patients increase their self-consciousness of the chronic complications of diabetes mellitus effectively?

Population: diabetes, diabetes mellitus, diabetic.

Exposure: patients' self-consciousness affected by chronic complications or one/more of its components (heart disease, stroke, retinopathy, nephropathy, and neuropathy).

Comparison: patients without diabetes.

Outcome: self-care, knowledge, self-management, health status, prevention of diabetes chronic complications.

### **Search Strategy**

An electronic literature search was conducted independently by three authors (DA, PS, DI) for reports published up to June 2022 in the English Language in several databases: Cochrane, Embase, Medline, Ovid, and PsycINFO.

The following search strategy was adopted:

“Diabetes Complications” AND (“Diabetes Mellitus, Type 2+” OR “diabetes mellitus type 2” OR “DM type 2” OR DMT2 OR “Diabetes mellitus, non-insulin-dependent” OR “diabetes mellitus non-insulin-dependent” OR “diabetes mellitus, non-insulin-dependent” OR “diabetes mellitus, non-insulin-dependent” OR “diabetes mellitus, slow onset” OR “diabetes mellitus, slow onset” OR “type 2 diabetes” OR “type 2 diabetes mellitus” ) AND (“Health Status” OR “Health Status Indicators” OR “Health Status Disparities”) AND (self-consciousness OR self-concordance).

Within the confines of primary nursing research, scrutiny is restricted to English-language, peer-reviewed journal articles, particularly those related to consciousness in the context of human subjects.

### **Study Selection**

Studies were included if they presented data on patients diagnosed with diabetes mellitus type 2 who were affected by chronic complications or one/more of its components. Case reports, cross-sectional surveys, and in-depth interviews were included in this systematic review. Studies were selected based on the following inclusion criteria: diabetes patients, self-consciousness, health status, English language only, and studies conducted in the last 22 years (2000-2022). Articles were screened by reading the title and abstract; when a discrepancy was found in self-consciousness and health status in diabetes patients, two reviewers decided if the article could be reviewed.

### **Quality and Risk of Bias Assessment**

Articles with the keywords “self-consciousness” and “health status” among diabetes patients with chronic complications were observed before reviewing the title and abstract. Subsequently, there were meetings and discussion sessions to improve inter-rater reliability at the screening and analysis stages. During the discussion process, the self-consciousness of the health status of the individuals with diabetes mellitus was identified in symptoms of chronic and acute complications. Standard systematic review procedures were followed to prevent selection bias. The literature search remained consistent with the study objectives, so the studies about acute complications like hypoglycemia were not included. A discussion was held with the reviewers, who were endocrinologists-diabetes, nursing experts, and psychometricians with more than 30 years of experience in online meetings, to determine the bias and the reason was conveyed.

### **Data Extraction and Analysis**

The reviewers collected notes on self-consciousness, health status, and diabetes patients in the literature matrix. The next meeting was held to discuss individuals' findings and group themes. This process is called narrative analysis and sensemaking. Observations of controlled blood sugar were combined with the review results in the final analysis. The literature search was carried out with a combination of self-consciousness and health status in diabetes patients, the presence of complications, and the identification of controlled blood sugar. Meanwhile, articles not relevant to the study were excluded. However, due to the heterogeneity of study designs and outcome variables, data were reported narratively, and, therefore, no meta-analysis was performed.

## **Results**

A total of 89 records were identified through database searching. After the removal of duplicates, 70 studies were selected for title and abstract analyses, with 28 articles considered for detailed screening. Two studies<sup>46,48</sup> included qualitative analysis of in-depth interviews, four<sup>24,26,40,43</sup> were cohort studies, five<sup>20,37,47,39,31</sup> were randomized controlled trials, eleven<sup>16,18,19,33-36,38,42,52</sup> were cross-sectional studies,

and seven<sup>23,27,28,44,17,32</sup> were case report studies. All studies are mentioned in **Supplementary Table I**. The reasons for exclusion are detailed in Figure 1. The kappa agreement achieved a value of 1 between the reviewers. More than five studies<sup>18,26,35,40,42</sup> were related to diabetes compli-

cations such as heart disease, stroke hemorrhagic, diabetic retinopathy, diabetic nephropathy, and neuropathy. Nevertheless, two articles<sup>33,38</sup> based on qualitative research both reported data about knowledge of diabetes, self-management, and coping with illness.

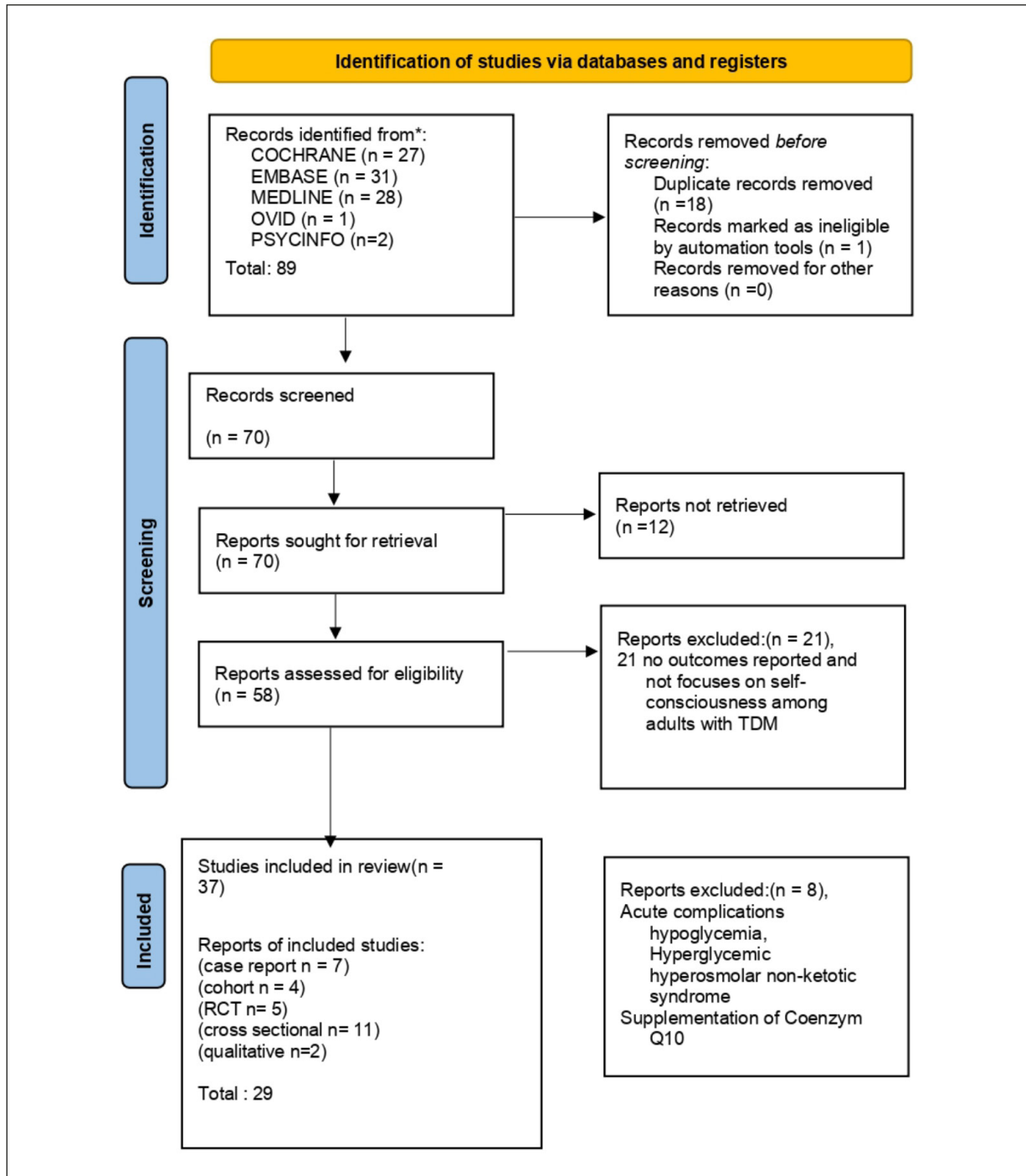


Figure 1. PRISMA “search and selection” chart.

## Discussion

### ***Knowledge of Diabetes Mellitus and Chronic Complications***

A total of five publications<sup>16-20</sup> discussed the importance of knowledge of diabetes mellitus. Duan<sup>18</sup> added that the level of awareness of people with diabetes mellitus in the cigarette factory community was lower. Age, gender, occupation, educational background, income status, and self-monitoring of blood sugar were found to be the main factors that influence gender awareness and related knowledge. Therefore, health education about knowledge related to the disease for patients should be the main point in the prevention and treatment of community medical services. Geriatric patients usually report, in their medical history, several comorbidities, with the most common ones being cardiovascular disease (CVD), hypertension, diabetes mellitus, and hyperglycemia<sup>21</sup>.

Koike et al<sup>16</sup> stated that nurses need an important tool to assess the level of awareness of diabetes patients to provide better care in their clinical practice. Rubak et al<sup>20</sup> discovered that general practitioners who are trained in motivational interviewing about (1) understanding of diabetes, (2) beliefs regarding prevention as well as treatment, and (3) motivation for behavior change could positively affect the attitude to behavioral changes. Furthermore, Sarkar et al<sup>19</sup> explained that limited health literacy (HL) is common among patients and may impede diabetes self-management, which increases the risk of hypoglycemia. According to Sato et al<sup>17</sup>, patients who ignored to have diabetes were transferred due to coma and having high levels of HbA1c, 2-h post breakfast, C-reactive protein (CRP), and delays in administering oral hypoglycemic drugs such as metformin and gliclazide and insulin administration. Therefore, some knowledge of the seriousness of diabetes must be educated about the complications. Also, supportive care providers are needed to supply information, help with monitoring and attempt to understand the person's self-care strategies rather than judging them<sup>22</sup>.

Agarwal et al<sup>23</sup> stated that chronic hyperglycemia in diabetes patients causes long-term damage to the heart, leading to coronary artery disease (CAD), myocardial infarction (MI), congestive heart failure (CHF), and sudden death from arrhythmias. This study also confirms that chronic complications can occur due to poor gly-

emic control, metabolic derangements, duration of diabetes, and genetic factors such as maternal. Knowledge of unstable blood glucose, such as hyperglycemia and hypoglycemia, consists of symptoms, adjustment of therapy according to the development of blood sugar levels, understanding diabetes and microvascular complications, and checking HbA1c levels every 3 months. Furthermore, Piątkiewicz et al<sup>23</sup> added that severe hypoglycemia can occur with markedly too low HbA1c levels. This illustrates the inappropriateness of the intensification of therapy with the administration of oral hypoglycemic drugs of the sulfonylurea type and insulin in elderly patients. Rosenberg et al<sup>25</sup> showed that an acute complication of uncontrolled diabetes mellitus accompanied by hypertension and hyperlipidemia is the incidence of hyperglycemic hyperosmolar non-ketotic syndrome. This can be found in elderly patients, which is characterized by neurological symptoms such as seizures and coma. Sáenz-Farret et al<sup>26</sup> explained that hyperglycemia due to diabetes is a prognostic factor in the incidence of chronic complications of subarachnoid hemorrhage, which showed the need to control blood sugar.

Berner et al<sup>27</sup> explained that diabetes patients need to know the side effects of the therapy given. An elderly patient (83 years) experienced gastrointestinal symptoms, mental confusion, and dysarthria. The patient used metformin, which induces lactic acidosis with acute renal failure. Iwai et al<sup>28</sup> showed that a diabetes patient aged 38 years who had diabetes five years ago, also experienced an overdose of metformin, leading to lactic acidosis and acute renal failure for attempted suicide. According to Kim et al<sup>29</sup>, diabetes patients with chronic complications of proliferative diabetic retinopathy should also be careful when taking high-dose ascorbic acid supplements. This is because it can cause acute complications of hypoglycemia. Therefore, blood sugar monitoring must be carried out in those with acute and chronic complications. Komatsu et al<sup>30</sup> stated that severe hypoglycemia could be caused by small doses of repaglinide and concurrent use of nilotinib and februxostat in a patient with type 2 diabetes. The liver eliminates repaglinide and is a short-acting insulin secretagogue with a good safety profile in diabetes patients complicated by renal impairment, including the elderly. However, its delayed elimination due to drug-drug interactions should be noted. Yamakura<sup>31</sup> also explained that there was no difference in the safety and ef-

ficacy of canagliflozin in patients with advanced age (> 65 years and < 75 years, and > 75 years) affecting the estimated glomerular filtration rate (eGFR) value. Nieden et al<sup>32</sup> also discovered that the side effects of using metformin could cause impaired consciousness, metabolic acidosis with a wide anion gap, and elevated lactate levels with metformin-associated lactic acidosis.

### **Diabetes Self-Management**

Studies<sup>33-41</sup> discuss the importance of evaluation of diabetes self-management. Conceição et al<sup>41</sup> presented that hypoglycemia in 425,706 diabetes patients is the missing or consumption of low carbohydrate meals, with symptoms requiring the immediate attention of syncope (19.2%) and transient loss of consciousness (17.4%). Hashimoto et al<sup>42</sup> reported very good results regarding the self-awareness of diabetes patients related to medication adherence, medical cost information, understanding of kidney and liver function, as well as the benefits of using metformin. It also includes how to administer the drug and experience when dropping out of medication, knowledge related to self-care ability when experiencing illness or lactic acidosis due to the side effects of metformin. According to Lane et al<sup>43</sup>, personality traits affect variations in glycemic control and adherence to diabetes self-management. The investigation was divided into five domains, namely neuroticism, extraversion, openness, agreeableness, and conscientiousness. The personality trait conscientiousness includes competence, order, dutifulness, achievement striving, self-discipline, and deliberation to enhance diabetes self-management and excellent glycemic control. Mizumoto et al<sup>44</sup> stated that movement disorders in diabetes mellitus patients with poor glycemic control could cause pyomyositis. This will prevent patients from engaging in ambulation and food preparation activities, thereby giving rise to a potential state of hunger. When this condition persists, the patient can develop acute complications of diabetic ketoacidosis due to necrotizing fasciitis. A lack of attention to foot hygiene and the use of poorly fitting footwear are the major factors that are preventable in the development of infection<sup>45</sup>.

Struthers et al<sup>46</sup> showed that self-care abilities depend on culture and educational background, which affect emotional and racial awareness in the American Indian population. The emotional status experienced by patients is the need for connectedness, collective living, and transforma-

tion. According to Trento et al<sup>47</sup>, diabetes patients require specific diabetes knowledge for self-care according to their needs. The main necessary outcome measures are knowledge of diabetes, problem-solving ability, quality of life, HbA1c, BMI, and HDL cholesterol. Weller<sup>48</sup> stated that self-care abilities must be evaluated according to the patient's health development. This propensity may escalate when patients possess interpersonal connections, significance, cognitive awareness (self-consciousness), adeptness in self-management (competence gain), and a sense of well-being (optimism). Yan et al<sup>49</sup> showed that diabetes patients must accept technology to evaluate their compliance in various self-care activities, including monitoring blood sugar and pressure.

Braver et al<sup>33</sup> showed the need for self-management evaluation of dietary and physical behavior to have long-term outcomes, namely the reduction in fasting insulin and body weight. Furthermore, Hidaka et al<sup>34</sup> stated that the future perspective is that diabetes therapy should anticipate and plan for desired outcomes, which contribute to persistent treatment for diabetes patients, including participants' status of treatment engagement (persistent/non-persistent). The theme is the presence and absence of future time perspective (FTP) with a sense of diabetes ownership, respectively. Kirk et al<sup>35</sup> showed that for diabetes self-management, physical activity decreased at the maintenance stage compared to the contemplation stage.

The process stages in the transtheoretical application of physical activity of diabetic patients with cardiovascular disease in older adults are consciousness-raising (increased contemplation to action), self-liberation (high contemplation to maintenance), helping relationships (preparation to maintenance), counter conditioning (contemplation to preparation, action, and maintenance) and reinforcement management (high contemplation and preparation to maintenance). Liu et al<sup>36</sup> showed a need to evaluate diabetes self-management related to medication adherence in the form of knowledge of the type and frequency of taking medication. The results showed that concerns about taking medication, such as adverse effects and drug dependence, significantly affect how patients behave. Therefore, psychological counselling and medication education need to be strengthened. Patients with low actual medication adherence have poor control over their blood glucose. Li et al<sup>37</sup> stated that the evaluation of daily doses of insulin glargine requires the attention of

diabetes patients in the self-management of those experiencing hyperglycemia who are currently receiving hospital treatment. According to Teruchi<sup>38</sup>, the factors influencing diabetes self-management compliance in medication adherence are self-awareness about diabetes, attitudes towards treatment, lifestyle, and personality. From these factors, it is possible to distinguish patients using medication who are optimistic or those who are giving up. Tubili<sup>39</sup> explained that one of the tools to ensure compliance with physical activity is using a pedometer. This will allow diabetes patients to evaluate their physical activity program measurably, with the parameters of success in reducing Body Mass Index (BMI), waist circumference, glucose levels, and HbA1c. Yokomichi et al<sup>40</sup> also added that a physical activity intervention such as cycling can be carried out to lose weight by 4%, thereby preventing the risk of diabetes.

This review also comprises the one of Yokomichi et al<sup>40</sup> on the characteristics of self-consciousness of diabetes patients and the management of the disease but showed a significantly low awareness of diabetes mellitus and complications. Hence, health education about the knowledge related to diabetes mellitus with diabetic patients should be promoted as the key point for the prevention and treatment of community medical services. The self-consciousness level can provide better care in clinical practice. By understanding patients' relationship consciousness with individuals who experience a similar medical condition, nurses can initiate the formulation of suggestions to foster connections among patients.

Therefore, coping with diabetes and handling the disease is the ultimate key to having a partnership with nurses and enhancing self-care as well as self-management. Eyler et al<sup>50</sup> stated that partnership is the initial and final parameter for the importance of information and communication between patients and health workers to convey any complications. This will present health as an expansion of consciousness and increase connectedness in health care and family transformation in the future. The principle of applying this theory is that the nurse believes in the client's inner strength and can recognize patterns, gain insight into patterns, and find new ways of living. The nurse engages in a client relationship without exerting manipulation or directing it towards problem-solving interventions. However, nurses often encounter individuals who face the uncertainty and loss associated with chronic illness

and other complications. This theory asserts that in every situation, everyone is part of expanding awareness, finding greater meaning in life, and reaching new heights in connection with others and the world.

In the patient-centered clinical approach, there are four components in the partnership between nurses and patients, according to Stewart et al<sup>51</sup>. The first component is to explore the perceptual similarities based on experience between the definitions of health, illness, and disease. Consciousness indicates ambivalence about the desire to know the truth and the disease but does not want to admit that something is wrong. Furthermore, the patient struggles with conflicting desires to remain independent and practice self-care but desires to be cared for by others. When this stage of awareness has not been passed, the symptoms of a disease will persist, and the disease will interfere with the integrity of the self.

Health can be developed by understanding the physical and psychological condition of individuals to show active, dynamic, and effective performance and the ability to adapt. Newman's theory states that the nurse's responsibility is to help individuals recognize the power to move to a higher level of consciousness and prevent them from getting sick. Recognition of the overall pattern is designated as the responsibility of nursing science and practice, while the diagnosis and treatment of disease is the science and practice of medicine. Newman also stated that this responsibility is not an easy change to make and cannot be explained by relying on the logic of cause as well as effect because it is unpredictable. One way to overcome this challenge is by studying the pattern recognition involved in the nurse's role. This theory purports that an important factor in recognizing patterns is the mutual presence of a nurse, which has been transformed by nursing theory. The focus of treatment is the individual, the disease, and the relationship with the environment.

Meanwhile, nursing focuses on the overall pattern of health as a developing whole, with caring as a moral imperative. This shows that disease reflects the person's lifestyle through pattern recognition and acceptance of the current state of health.

## Conclusions

This systematic review showed that studies on the self-consciousness of health status for individuals at risk of chronic complications of

diabetes are limited. Meanwhile, a review of this topic contributes insight into the current state of literature because it (i) includes case reports, qualitative and quantitative trials that use standardized and manualized self-consciousness for diabetes patients, (ii) covers the full spectrum of patients, including individuals with acute and chronic complications.

#### Conflict of Interest

The authors declare that they have no conflict of interests.

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#### Patient and Public Involvement

Initial results were presented orally at stakeholder workshops, which included health professionals held in Jakarta, Indonesia, November 4<sup>th</sup> - 5<sup>th</sup>, 2022, to gain feedback.

#### Ethics Approval

Not applicable.

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#### Authors' Contribution

D.A. Kurnia researched the data and wrote the manuscript. Other authors contributed to the review and discussion.

#### Informed Consent

Not applicable.

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