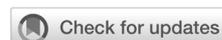


Precision health care strategies for older adults with diabetes in Indonesia: a Delphi consensus study

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ABSTRACT

BACKGROUND Studies on precision health care for older adults with diabetes in Indonesia are still limited. This study was aimed to reach the experts consensus on the suitable precision health care strategies for older adults with diabetes.

METHODS A total of 10 experts (4 physicians, 4 nurses, and 2 dietitians) agreed to participate in the 3-round interview using Delphi technique. The experts should have at least 5 years of experience in teaching or working as health professionals in a hospital.

RESULTS Consensus was reached that precision health care consisted of eight elements: self-management, interdisciplinary collaborative practice, personalized genetic or lifestyle factors, glycemic target, patient preferences, glycemic control, patient priority-directed care, and biodata- or evidence-based practice. The strategies of precision health care for diabetes were divided into seven steps: conducting brief deducting teaching; assessing self-management level and risk of cardiovascular disease; organizing a brainstorming session among patients to exchange experiences on glycemic target and specific target behavior; making a list of patients' needs and ranking the priorities; setting a goal and writing action; doing follow-up; and reporting the goal attempts.

CONCLUSIONS The eight elements of precision health care provided the basis of precision health care strategies for diabetic older adults, which are the real and measurable strategies for precision health care implementation in clinical settings.

KEYWORDS Delphi technique, diabetes, personal health service, precision health care, precision medicine

Older adults are at high risk of developing diabetes mellitus, especially in Indonesia. According to the surveillance data, the prevalence of diabetes in Indonesian for patients aged 55–64 years represents 6.29% and 6.03% of the population aged 65–74 years.¹ Moreover, diabetes in older adults has been linked to higher mortality and further complications such as heart and kidney diseases.^{2,3} The total health care expenditure for people with diabetes and diabetes-related complications was US\$760 billion, projected to reach US\$825 billion by 2030 and US\$845 billion by 2045.⁴

Health education and self-management can prevent diabetes-related complications in older adults with diabetes.^{5,6} Studies showed that health education might reduce the risk of complications if managed individually (social–cognitive determinants, intention, preference, and behavior).⁷ Patient-centered education leads to better patient satisfaction.⁸

Precision health care focuses on patient care and preferences, patient-centered care, evidence-based care, and self-management.^{9–12} It is a health care delivery model that relies on data, analytics, and personal information;^{10,13} and it provides integrated

care through interprofessional collaborative practice based on personalized information on patients' genetic and lifestyles to improve self-management.^{9,14,15} Although the concept of precision health care has been developed, studies on its implementation strategy for diabetic older adults in clinical settings are limited, especially in Indonesia. Thus, this study was aimed to reach the experts consensus regarding precision health care strategies for older adults with diabetes using Delphi method.

METHODS

Delphi method was used to survey and collect the opinion of the experts^{16,17} on precision health care for older adults. This study was approved by Health Research Ethics Committee STIKES Bina Usada Bali (No: 232/EA/KEPK-BUB-2020). This study was conducted from November 28 to December 17, 2020 in referral hospitals in Surabaya, Jogjakarta, and Semarang.

Expert criteria

The potential experts were screened based on their expertise in diabetes management. Ten experts (4 physicians, 4 nurses, and 2 dietitians) were selected based on their competence, experience, and reputation in referral hospitals in Surabaya, Jogjakarta, and Semarang as well as reputable universities in Java, Indonesia. Selected academicians had an extensive publication on diabetes management, while practitioners had at least 5 years of work experience as health professionals in a referral hospital.

Data collection and analysis

An invitation e-mail was sent to the potential experts, which included an explanation of the study and participation time estimation. Participation was voluntary and confidential. The experts were asked to participate in the three-round interview using Delphi technique, which took approximately 1 hour to complete each round. Of 13 invited experts, only 10 agreed to complete the process.

The experts were blinded or did not know each other. The first round of the Delphi questionnaire consisted of open-ended questions covering the problem and procedure or strategies of the precision health care program. The objectives were conducting a brainstorming session and generating the experts' opinions on the program. Experts were asked to

describe their thinking related to precision health care in Indonesia using a semi-structured interview.

The responses of the experts (three physicians, three nurses, and a dietitian) in the first round formed the basis of the precision health care program for the second round. Furthermore, three additional experts (a nurse, physician, and dietitian) were chosen for the second round. The consensus reached in the first and second rounds was integrated into the elements and strategies of precision health care. In the third round, all experts (four physicians, four nurses, and two dietitians) were asked whether they strongly disagree or strongly agree with the results as well as providing additional comments on the specified concept areas.^{16,17} Data collection, analysis, and key action of each Delphi round are presented in Figure 1.

RESULTS

In total, 10 invited experts agreed to participate in this study. Eight important elements were found in the implementation of precision health care, which were obtained using an in-depth analysis.

Delphi round 1

Seven experts completed the first round, which discovered the elements of precision health care. The elements included self-management, interdisciplinary collaborative practice, personalized genetic or lifestyle factors, patient priority-directed care, glycemic target, patient preferences, glycemic control, and biodata- or evidence-based practice. Detail explanation of each element can be seen in Table 1.

Delphi round 2

Round 2 was conducted based on the results of the first round. Additional suggestions including patient priority-directed care, glycemic targets, and glycemic control were obtained from the experts to complete the results as shown in Table 1.

Delphi round 3

The strategies of precision health care implementation in clinical settings were made by integrating all information in the systematic stage after suggestions were collected. The suggestions included individual needs such as personalized genetic or lifestyle factors, biodata- or evidence-based practice, glycemic targets, patient

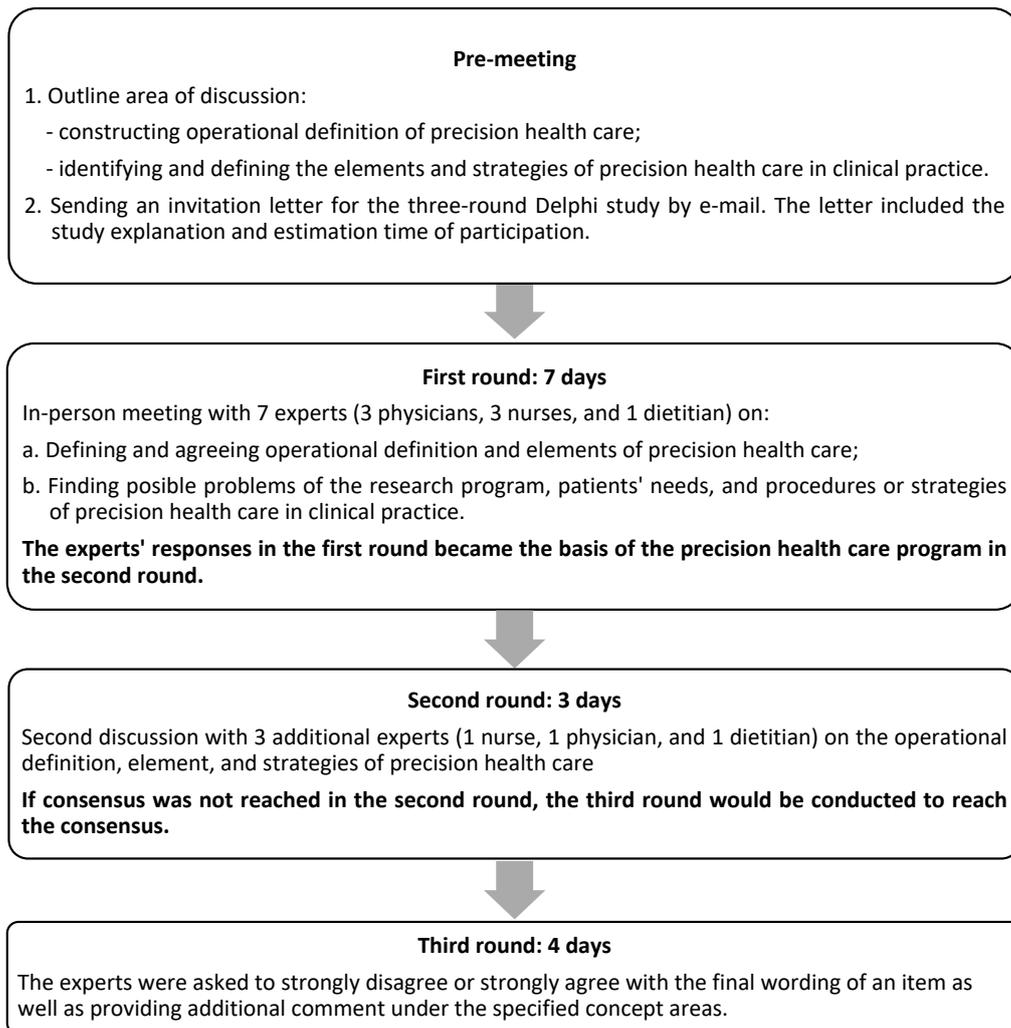


Figure 1. Flowchart of the three-round interview using Delphi technique

preferences, glycemic control, interdisciplinary collaborative practice, self-management, and priority-directed care. After all the elements were integrated into precision health care strategies, the experts were asked whether they agree or disagree with the strategies. All experts agreed on the seven steps in the strategies of precision health care implementation in diabetic patients. This approach could become a model to obtain health information, improve diabetes self-management, and reduce diabetes-related complications among patients. The strategies of precision health care based on the development of each element are shown in Table 2.

DISCUSSION

A consensus was reached on the elements of precision health care, which became the basis of the 7-step strategy for precision health care

implementation. Those seven strategies were: brief deducting teaching; assessing self-management level and risk of cardiovascular disease among patients; organizing a brainstorming session among patients to exchange experiences on glycemic target and specific target behavior; making a list of patients' needs then ranking the priorities; setting a goal and writing action; doing follow-up; and reporting the goal attempts.

Brief deducting teaching is implemented based on self-management and interprofessional collaborative practice and conducted through health seminars involving various health professionals and older adults with diabetes. Health education is expected to improve self-management awareness.^{18,19} Self-management provides an accurate treatment for older adults with diabetes,^{20,21} which is one of the critical components of precision health care for diabetes. Moreover, self-management supports precise problem solving and

Table 1. Elements of precision health care for diabetes in round 1 and 2

Element of precision health care	Round 1	Round 2
Self-management	<p>Patients with diabetes need basic information about their disease.</p> <p>The basic information can help them to perform self-management at home.</p> <p>Self-management is an independent dietary pattern, blood glucose monitoring, regular exercise, insulin injection procedure, injection location, or regular diabetes medication as recommended by health professionals.</p>	
Interdisciplinary collaborative practice	<p>The provision of basic information can be provided through a lay seminar conducted by a hospital or health facility.</p> <p>The speakers are doctors, nurses, and nutritionists who are expert and competent in their fields.</p>	
Personalized genetic or lifestyle factors	<p>Patients with diabetes can learn from each other on keeping stable blood glucose.</p> <p>The valuable experience can be shared through a group discussion.</p> <p>Discussions among patients require assistance by health personnel to ensure the information is safe and avoid malpractice risk.</p>	
Patient priority-directed care	<p>A monitoring book that contains content about diabetes, strategies to keep blood sugar stable, and a personal monitoring sheet is needed.</p> <p>The monitoring book should use clear and simple language, which can be easily understood by the patients.</p> <p>The personal monitoring of each patient can be completed independently by the patient and checked by the health workers when the patients are doing regular follow-up in the health center or hospital.</p>	<p>To support a successful diabetic therapy, a good communication between the patient and the therapist should be established</p> <p>Patients with independent funding should find alternative evaluation methods for laboratory examinations besides HbA1c to reduce medication cost.</p>
Glycemic target	<p>Patients with good health literacy may determine their goals and the suitable management individually.</p>	<p>Determining the suitable intervention individually without health literacy on diabetes is risky. Thus, a strategy should be offered to overcome this condition.</p>
Patient preferences	<p>Health professionals must respect the preferences of each patient.</p> <p>The patients can determine the most suitable intervention themselves.</p>	
Glycemic control	<p>The HbA1c examination is an effective test to monitor the patients' self-management.</p> <p>HbA1c examination can also be used as a predictor of the risk of complications for diabetic patients in the future.</p>	<p>HbA1c can be used as valid data when there is no hemoglobin disturbance, and it reflects mean blood glucose 2–3 months.</p> <p>A 1-month parameter with glycated albumin can also be used for glycemic control.</p> <p>Health care providers should keep up with the latest information of diabetes.</p>
Biodata- or evidence-based practice	<p>The risk of complications and individual patient data can be kept by the hospital or health facility.</p> <p>The data become big data for health facilities to determine the right intervention for each patient at present or in the future.</p>	

HbA1c=glycated hemoglobin

Table 2. Precision health care strategies based on the development of each precision health care element

No	Elements	Steps	Actions
1.	Self-management, interdisciplinary collaborative practice	Conducting brief deducting teaching	Organizing a lay seminar attended by patients with diabetes. This seminar will be filled with the experts such as nurses, doctors, and nutritionists. The lay seminar contains self-management strategies to maintain blood glucose at home.
2.	Self-management, interdisciplinary collaborative practice	Assessing self-management level and risk of CVD among patients	After seminar is completed, a nurse conducts an assessment to determine the patients' self-management and complication risk levels. Individual report is obtained to determine the complication risks. High-risk patients will be treated by a subspecialist.
3.	Personalized genetic or lifestyle factors	Organizing a brainstorming session among patients to exchange experiences on glycemic targets and specific target behavior	A support group among patients provides information exchange on experiences and lifestyle to control blood glucose. The support group will be accompanied by a facilitator to ensure the information shared are safe and have no malpractice risk.
4.	Glycemic target, patient preferences	Making a list of patients' needs and ranking the priorities	The support group discussion becomes the source of information in choosing the suitable invention to keep blood glucose stable at home.
5.	Glycemic control, patient priority-directed care	Setting a goal and writing action	The patients' goal and intervention plan can be written in the monitoring book.
6.	Biodata- or evidence-based practice	Doing follow-up	Each report in the monitoring book can become valuable data for hospitals or health facilities to determine the most appropriate interventions for the patients in the future.
7.	Self-management	Reporting the goal attempts	Evaluation on self-management can be monitored through laboratory tests such as HbA1c, cholesterol, blood glucose level, triglyceride, glycated albumin, CVD risk chart, questionnaire (self-management, self-care activity, quality of life, and diabetes distress) after the implementation of the program.

CVD=cardiovascular disease; HbA1c=glycated hemoglobin

minimizes unnecessary interventions.^{19,22} Verifying and clarifying this understanding are paramount for health literacy.⁵ Brief deducting teaching requires every health professional including medical specialists, nurses, nurse specialists, and nutritionists to implement interdisciplinary communication and cooperation models,²³ thus improving the patients' understanding of self-management plans (e.g., test, medication, procedure, and behavioral change).²⁴⁻²⁶

Furthermore, other precision health care strategies such as making a list of patients' needs, ranking the priorities, setting goals, and writing goal-oriented actions provide exclusive health care with an accurate diagnosis, thereby improving treatment and care effectiveness.^{19,27,28} A patient-centered care model can improve the current model of precision health care, which covers broader medical assessments including patient glycemic target, glycemic control, biodata- or evidence-based practice,

patient preferences, and patient priority-directed care.²⁹⁻³³ Personalized glycemic goals are based on the agreement between health professionals and patients, while the individualization target is based on the hypoglycemic episode risk among patients.^{27,34} Precision health care strategies are patient-centered care with personalized glycemic goals and care plans established through group care.³⁴⁻³⁸ The goals are intended to reduce intervention risks, develop interdisciplinary integration, improve patients' outcomes and quality of life, and avoid unnecessary medical interventions.

In addition, a brainstorming session among older adults with diabetes enables knowledge exchange to solve health problems.^{18,39} Problem solving is an essential skill for patients to make the right, systematic, and logical decisions and various viewpoints consideration.^{40,41} Furthermore, brainstorming helps patients to discuss and be informed of their individual

needs, especially in achieving glycemic targets and specific target behavior.^{36,40,41}

All experts agreed that these precision health care strategies could be a new approach to improve self-management and reduce complication risks among diabetic patients. However, limitations of this study included the experts' opinions that were limited to the condition of patients in referral hospitals with better health literacy. These precision health care strategies should be tested in a small sample population to obtain its implementation results before being tested on a large sample population through the randomized control trial method. Further studies to evaluate the impact of precision health care strategies in improving self-management and reducing the risk of diabetes complications among older adults are needed.

In conclusion, precision health care strategies are important to prevent diabetes-related complications in older adults with diabetes. Precision health care strategy is a model of health care delivery that relies heavily on personalized information genetic, preference, evidence-based, interprofessional collaborative practice, and patients' lifestyles. A personalized approach encourages patients to take personal responsibility and minimizes conflicting recommendations between clinicians and patients because the decisions come from the patients' perspectives and their specific health outcome goals. The recommended precision health care strategies are useful for the health care providers, managers, and policymakers to provide comprehensive health care services for future diabetes management.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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