Knowledge and Perception of Diabetes Mellitus among Patients with Type 2 Diabetes Mellitus in Five Public Health Centers in Karawang, West Java, Indonesia

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Abstract

Background: Diabetes mellitus (DM) is a chronic metabolic disease that causes various complications, leading to a high mortality rate and high medical costs. Good knowledge and perception are essential for patients in understanding the disease and how to prevent the complications. This study aimed to assess the knowledge and perceptions of DM among patients with type 2 DM from the Public Health Centers (*Pusat Kesehatan Masyarakat*, Puskesmas), the primary health care facility in West Java.

Methods: The research design was quantitative observational with a cross-sectional method and descriptive approach. Data were collected in 2019 from all DM patients living in five working areas of the Puskesmas in Karawang Regency, West Java, Indonesia. Data collection was performed by trained interviewers, using a validated translation of the Diabetes Knowledge Questionnaire (DKQ) (Cronbach's alpha 0.723) and the Brief Illness Perception Questionnaire (BIPQ) (Cronbach's alpha 0.74) to measure knowledge (24 questions) and to explore perception (8 questions), respectively.

Results: Of the 211 respondents, 165 were predominantly female (76.4%) and aged 52–61 years old (35.2%). Knowledge was moderate (55.8%), however, they had a negative perception of the disease (50.9%).

Conclusions: Although most of the respondents have a moderate level of knowledge, their perception of DM is still negative. Therefore, education for patients and the community needs to be evaluated to enhance knowledge and perceptions about diabetes mellitus.

Keywords: Diabetes mellitus, knowledge, perception, public health center

Introduction

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia due to impaired insulin secretion, ineffective use of insulin, or both. According to the International Diabetes Federation (IDF) Diabetes Atlas, Indonesia ranks seventh with the highest number of diabetic patients in the world in 2019.[1] *Riset Kesehatan Dasar* (Riskesdas) 2018 has reported an increase in DM prevalence in West Java compared to the year 2013.[2] Moreover, based on data of the Karawang Regional Public Hospital profile in 2013, DM ranks sixteenth among Public Hospitals in West Java.[3]

Type 2 DM can cause various complications, resulting in a high medical cost.[1] Providing education to DM patients about the knowledge and perception of the disease is therefore essential. Better knowledge increases the better perception of the patients and, thus, misunderstanding about the disease can be corrected.[4,5] Furthermore, with good knowledge and perception, they would have better behavior and lifestyle. Moreover, DM patients may improve self-management skills to prevent complications, and the cost of managing complications can be reduced.[6,7] Therefore, knowledge and perception of patients with type 2 DM is a particular concern.

Prevention can start from public health

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centers as the first level of health care facility, known as primary health care. Prevention and early detection of diabetes complications can provide various benefits for individuals with DM and economic conditions, so that the health costs incurred for DM can be reduced.[1] The study on the knowledge and perception about type 2 DM in Karawang has not been widely published earlier, therefore, the researcher was interested in exploring the knowledge and perception among patients with DM about their disease in Karawang. This study is expected to be the initial basis for increasing educational efforts as one of the pillars in preventing DM in the community, especially in primary health care services such as in a Public Health Center (*Pusat Kesehatan Masyarakat,* Puskesmas), as well as to strengthen the local health systems through local empowerment, since most of the health services focus on curative management.

Methods

The research design was quantitative observational with a cross-sectional method with a descriptive approach. This study was part of research entitled "*Penilaian Cepat Akses Layanan Kesehatan Primer di Lima Kecamatan di Kabupaten Karawang Tahun 2019,*" exploring primary health care access and facility in Karawang, West Java in 2019.

In brief, a total sampling was carried out by retrieving all DM patients living in five working areas of the Public Health Centers (Puskesmas) in the Karawang district, West Java Indonesia, namely Puskesmas Batu Jaya, Puskesmas Cikampek, Puskesmas Lemah Abang, Puskesmas Rengasdengklok, and Puskesmas Tempuran, Karawang. This study involved more than 100 trained interviewers at the time of data collection. Data collection was carried out in November 2019 by approaching all patients. These DM patients were invited to the Puskesmas to participate in the study by answering the questionnaire. The exclusion criteria of this study were incomplete data. The protocol of this study was approved by the Ethics Committee of Universitas Padjadjaran under the ethical clearance number 1359/UN6.KEP/EC/2019.

This study used validated translation questionnaires; the Diabetes Knowledge Questionnaire (DKQ) to explore the knowledge (Cronbach's alpha 0.723) and the Brief Illness Perception Questionnaire (BIPQ) to explore the perception (Cronbach's alpha 0.74).[8,9]

Table 1 Characteristics of Type 2 Diabetes Mellitus Patients from 5 Public Health Centers in Karawang based on Their Knowledge and Perception

Characteristics	Frequency (n)	Percentage (%)	Knowledge Mean±SD	Perception Mean±SD
Gender				
Male	39	23.6	10.7±3.1	39.1±15.0
Female	126	76.4	9.6±2.8	40.3±12.9
Age (years)				
22–31	4	2.4	8.8±1.7	42 ±12.3
32–41	7	4.2	10.7±4.0	35.3±19.5
42–51	53	32.1	10.6±2.7	38.9±14.4
52–61	58	35.2	9.6±2.8	42.0±11.4
62–71	36	21.8	9.6±3.0	38.8±13.1
72–81	7	4.2	9.1±3.6	42.6±18.6
Level of education completed				
Did not graduate from elementary school	52	31.5	8.9±2.3	40.5±14.7
Elementary School	73	44.2	9.5±2.7	40.2±13.5
Junior High School	18	10.9	11.6±3.2	43.8±9.3
High School	19	11.5	13.1±1.9	35.5±13.1
University	3	1.8	8.3±0.6	35.3±8.1
Occupational status				
Unemployed	107	64.9	9.7±2.8	40.5±13.6
Worker	58	35.2	10.3±3.1	39.8±13.4

Table 2 Knowledge of Patients about Diabetes Mellitus based on Diabetes Knowledge Questionnaire-24

No.	Questions	Yes n (%)	No n (%)	Do not Know n (%)
1.	Eating too much sugar and other sweet foods is a cause of diabetes	131 (79.4)	18 (10.9)	16 (9.7)
2.	Kidneys produce insulin	31 (18.8)	14 (8.5)	120 (72.7)
3.	In untreated diabetes, the amount of sugar in the blood usually increases	143 (86.7)	10 (6.1)	12 (7.3)
4.	If I am diabetic, my children have a higher chance of being diabetic	85 (51.5)	52 (31.5)	28 (17)
5.	Diabetes can be cured	116 (70.3)	30 (18.2)	19 (11.5)
6.	A fasting blood sugar level of 210 is too high	106 (64.2)	28 (17)	31 (18.8)
7.	The best way to check my diabetes is by testing my urine	65 (39.4)	52 (31.5)	48 (29.1)
8.	Regular exercise will increase the need for insulin or other diabetic medication	87 (52.7)	14 (8.5)	64 (38.8)
9.	An insulin reaction is caused by too much food	76 (46.1)	13 (7.9)	76 (46.1)
10.	Medication is more important than diet and exercise to control my diabetes	78 (47.3)	78 (47.3)	9 (5.5)
11.	Diabetes often causes poor circulation	113 (68.5)	20 (12.1)	32 (19.4)
12.	Cuts and abrasions on diabetes heal more slowly	111 (67.3)	44 (26.7)	10 (6.1)
13.	Diabetics should take extra care when cutting their toenails	128 (77.6)	25 (15.2)	12 (7.3)
14.	A person with diabetes should cleanse a cut with iodine and alcohol	119 (72.1)	27 (16.4)	19 (11.5)
15.	The way I prepare my food is as important as the foods I eat	129 (78.2)	23 (13.9)	13 (7.9)
16.	Diabetes can damage my kidneys	90 (54.5)	14 (8.5)	61 (37)
17.	Diabetes can cause loss of feeling in my hands, fingers, and feet	147 (89.1)	15 (9.1)	3 (1.8)
18.	Shaking and sweating are signs of high blood sugar	108 (65.5)	36 (21.8)	21 (12.7)
19.	Frequent urination and thirst are signs of low blood sugar	83 (50.3)	64 (38.8)	18 (10.9)
20.	Tight elastic hose or socks are not bad for diabetics	26 (15.8)	74 (44.8)	65 (39.4)
21.	A diabetic diet consists mainly of special foods	121 (73.3)	25 (15.2)	19 (11.5)
22.	The usual cause of diabetes is a lack of effective insulin in the body	60 (36.4)	4 (2.4)	101 (61.2)
23.	Diabetes is caused by the failure of the kidneys to keep sugar out of the urine	50 (30.3)	17 (10.3)	98 (59.4)
24.	There are two main types of diabetes: Type 1 (insulin dependent) and Type 2 (noninsulin dependent)	58 (35.2)	5 (3)	102 (61.8)

The DKQ consisted of 24 question items with the answer option to each question was in the form of "Yes", "No", and "Do not know". One point was given for each correct answer, whereas the wrong and "Do not know" answer was 0. The scores obtained by the respondents were summed up and then categorized into high (17–24), moderate (10–16), or low (0–9). The higher the score obtained indicated that the patient's knowledge about DM was getting better.[10]

The BIPQ consisted of 8 questions on a scale with a Likert-type scoring between 1 and 10, and an additional one open question. The score was calculated according to the numbers listed on the scale, then the results were added up for questions number 1, 2, 5, 6, 8. On contrary, questions number 3 about personal control, number 4 about treatment control, and number 7 about coherence, the

Table 3 The Perception of Patients about Diabetes Mellitus based on Brief Illness Perception Questionnaire

No.	Questions	0 n (%)	1 n (%)	2 n (%)	3 n (%)	4 n (%)	5 n (%)	6 n (%)	7 n (%)	8 n (%)	9 n (%)	10 n (%)
1.	How much does your illness affect your life?	28 (17)	3 (1.8)	4 (2.4)	8 (4.8)	1 (0.6)	31 (18.8)	11 (6.7)	18(10.9)	12 (7.3)	7 (4.2)	42 (25.5)
2.	How long do you think your illness will continue?	17 (10.3)	3 (1.8)	4 (2.4)	13 (7.9)	10 (6.1)	38 (23)	11 (6.7)	12(7.3)	13 (7.9)	6 (3.6)	38 (23)
3.	How much control do you feel you have over your illness?	12 (7.3)	3(1.8)	3 (3.8)	9 (5.5)	7 (4.2)	24 (14.5)	6 (3.6)	11(6.7)	11 (6.7)	8 (4.8)	71 (43)
4.	How much do you think your treatment can help your illness?	8 (4.8)	1 (0.6)	3 (1.8)	2 (1.2)	2 (1.2)	15 (9.1)	7 (4.2)	10(6.1)	13 (7.9)	11 (6.7)	93 (56.4)
5.	How much do you experience symptoms from your illness?	10 (6.1)	9 (5.5)	10 (6.1)	7 (4.2)	3 (1.8)	30 (18.2)	9 (5.5)	19(11.5)	13 (7.9)	7 (4.2)	48 (29.1)
6.	How concerned are you about your illness?	17 (10.3)	4 (2.4)	4 (2.4)	7 (4.2)	2 (1.2)	20 (12.1)	6 (3.6)	12(7.3)	14 (8.5)	6 (3.6)	73 (44.2)
7.	How well do you feel you understand your illness?	26 (15.8)	13 (7.9)	7 (4.2)	12 (7.3)	3 (1.8)	28 (17)	10 (6.1)	15(9.1)	14 (8.5)	3 (1.8)	34 (20.6)
8.	How much does your illness affect you emotionally? (e.g., does it make you angry, scared, upset, or depressed?)	44 (26.7)	5 (3)	5 (3)	6 (3.6)	5 (3)	17 (10.3)	7 (4.2)	10(6.1)	10 (6.1)	3 (1.8)	53 (32.1)

score calculation was reversed. Then, the score of each question was added up to get the final result of the perception score. The respondent's perception was positive if the score was less than equal to the average score obtained by all respondents. A negative perception was designated when the score was more than the average score obtained by all respondents. The higher the number of scores obtained on the entire questionnaire, the more negative the perception of the disease, indicating that those persons feel more threatened because of their disease.[11]

Results

Out of 211 respondents, only 165 were eligible for analysis, mostly female respondents. Based on the respondent's characteristics, most respondents were between 52–61 years old, graduated from elementary school and unemployed. The mean score for knowledge was 9.9±2.9 and for perception was 40.0±13.4.

The average knowledge score of respondents was 9.8±2.8. The result showed that 55.8% of respondents had a moderate level of knowledge (Table 4). The most correctly answered by respondents was question number 17 about the complications of DM (n=147; 89.1%), and the question that was the least correctly answered was question number 9 about the etiology of DM (n=13; 7.9%).

The distribution of the perception among type 2 DM showed that the average perception of respondents was 40.04. More than half of the respondents had a negative perception of the disease (Table 5).

In detail, the perception was the most positive when answering question number 4 regarding belief about therapy or management obtained to control the disease. This showed that the respondents felt able to control the disease. On the contrary, the most negative perception was in question number 6 regarding the concern about the disease.

Table 4 Knowledge of Type 2 Diabetes Mellitus Patients from 5 Public Health Centers in Karawang

Knowledge	Frequency (n)	Percentage (%)
High	2	1.2
Moderate	92	55.8
Low	71	43
Total	165	100

Table 5 Perception of Type 2 Diabetes Mellitus Patients from 5 Public Health Centers in Karawang

Perception	Frequency (n)	Percentage (%)
Positive	81	49.1
Negative	84	50.9
Total	165	100

Discussion

This study explored the knowledge and perception about DM among type 2 DM patients living in Karawang as the highest DM prevalence in West Java. In this study, most of the respondents were female, similar to the study conducted in Pakistan.[4] This result is probably due to the low literacy rate for women in Indonesia. The 2018 National Socio-Economic Survey (*Survei Sosial Ekonomi Nasional*-Susenas) shows that the literacy rate for women over 15 years is only 93.99%. In addition, the overall average length of school for girls is also low. Data in 2018 shows that the average length of time to attend school for girls over 15 years of age is only about 8.26 years.[12]

The data obtained showed that the average score of elderly respondents was low. This is probably due to decreased cognitive function, adaptation, and motivation in the elderly, so this is one of the obstacles to obtaining information and education about DM.[4,13]

The results showed that the level of knowledge of respondents who completed high school was high. Similar results are found in studies in Nepal and Nigeria.[13,14] People who have a high level of education are more likely to have higher curiosity. In addition, people with high levels of education may have easier access to get information and knowledge through various media.[13,15]

This study showed that respondents who worked had a high level of knowledge. The possible reason for this was that people who worked tended to have a higher income so that

people who worked could easily get access to information about DM, such as from the internet, radio, television, private clinics, and others. A person's work environment can also be a source of information about DM.[14]

The data obtained from this study showed that the perception score of female respondents was high. The same result is found in a study in Thailand.[16] This may occur because, generally, women have a low level of education, so the knowledge and control of their disease are not good and result in a worse perception of the disease they suffer.[16] The data contained in the 2019 Indonesian Women's Profile issued by the Ministry of Women's Empowerment and Child Protection states that the percentage of women over 15 years of age who do not complete primary school level and do not or have never attended school is also quite high.[12]

This study showed a difference in the patient's perception score of the disease when viewed from the respondent's age. Respondents with an age range between 22–31 years had an average score of 42±12.3. A previous study shows that age is one of the characteristics that can influence a patient's perception of his/her disease.[15] Younger patients may have poorer perceptions. The reason may be that younger patients perceive the disease as detrimental to their lives and has a significant emotional impact.[17]

This study showed the best respondents' perception was of those who completed their education at the university level. Education is one of the factors that can encourage a person's control of the disease. A good level of education allows a person to get adequate health

information to help increase self-confidence in controlling their disease and understanding their condition.[18] Previous studies have suggested that low levels of education will lead to low patient knowledge, which can affect the patient's choice of treatment and worsen their condition. If the patient's condition worsens, the patient's perception of the disease will be even more negative.[19]

The results of this study indicated that respondents who worked had a high perception score. This may occur because people who work feel that their illness affects their work, such as causing absenteeism, reduced productivity, and inability to do their jobs due to complications from the disease, so that the patient's perception of the disease becomes negative.[20]

The limitations of the study are that since this research is a descriptive study, the researcher cannot determine and analyze what causes a positive and negative perceptions in patients and why the level of knowledge of certain groups of patients is higher than the other groups. Further research is needed to explore more about the causative factors to get better results.

To conclude, the type 2 DM patients living in Karawang have a moderate level of knowledge, however, with a negative perception of DM. Therefore, education among diabetic patients and the public need to be evaluated to enhance the knowledge and the perception of diabetes mellitus.

References

1. International Diabetes Federation. IDF diabetes atlas. 9th ed. Brussel, Belgium: International Diabetes Federation; 2019.
2. Badan Penelitian dan Pengembangan Kesehatan Kementrian Kesehatan RI. Hasil Utama Riskesdas 2018. Jakarta: Badan Penelitian dan Pengembangan Kesehatan Kementrian Kesehatan RI; 2018.
3. Rumah Sakit Umum Daerah Karawang. Profil Rumah Sakit Umum Daerah (RSUD) Kabupaten Karawang tahun 2013. Karawang: Rumah Sakit Umum Daerah Karawang; 2013.
4. Shams N, Amjad S, Seetlani NK, Ahmed W. Diabetes knowledge in elderly type 2 diabetes mellitus patients and association with glycemic control. J Liaquat Uni Med Heath Sci. 2016;15(2):71–7.
5. Vos RC, Kasteleyn MJ, Heijmans MJ, de Leeuw E, Schellevis FG, Rijken M, et al. Disentangling the effect of illness perceptions on health status in people with type 2 diabetes after an acute coronary event. BMC Fam Pract. 2018;19(1):35.
6. Kugbey N, Asante KO, Adulai K. Illness perception, diabetes knowledge and self-care practices among type-2 diabetes patients: across-sectional study. BMC Res Notes. 2017;10(1):381.
7. Srisanthanakrishnan V, Shah PB. Knowledge and perception of diabetes among patients with type 2 diabetes mellitus attending rural health care centre, Tamil Nadu, India. Int J Community Med Public Health. 2016;3(9):2538–42.
8. Agrimon OH. Exploring the feasibility of implementing self-management and patient empowerment through a structured diabetes education programme in Yogyakarta City Indonesia: a pilot cluster randomized controlled trial [Dissertation]. Adelaide: The University of Adelaide; 2014. [cited 2021 July 10]. Available from: https://digital.library.adelaide.edu.au/dspace/bitstream/2440/87696/8/02whole.pdf.
9. Indrayana S, Fang SY. Validitas dan reliabilitas the brief illness perception questionnaire versi Bahasa Indonesia pada pasien diabetes mellitus. Dinamika Kesehatan. 2019;10(1):361–7.
10. Larasati LA, Andayani TM, Kristina SA. Hubungan tingkat pengetahuan terhadap outcome klinik pasien diabetes melitus tipe 2. JMPF. 2019;9(2):101–8.
11. Karataş T, Özen Ş, Kutlutürkan S. Factor structure and psychometric properties of the brief illness perception questionnaire in Turkish cancer patients. Asia Pac J Oncol Nurs. 2017;4(1):77–83.
12. Kementerian Pemberdayaan Perempuan dan Perlindungan Anak Republik Indonesia. Profil perempuan Indonesia 2019. Jakarta: Kementerian Pemberdayaan Perempuan dan Perlindungan Anak Republik Indonesia; 2019.
13. Shrestha N, Yadav SB, Joshi AM, Patel BDP, Shreta J, Bharher DL. Diabetes knowledge and associated factors among diabetes patients in Central Nepal. Int J Collab Res Intern Med Public Health. 2015;7(5):82–91.
14. Jasper US, Ogundunmade BG, Opara MC, Akinrolie O, Pyiki EB, Umar A. Determinants of diabetes knowledge in a cohort of Nigerian diabetics. J Diabetes Metab Disord. 2014;13:39.
15. Perwitasari DA, Faridah IN, Kulle Y, Yulistika M. Relationship between perception with the quality of life of T2DM patients in Dok

II Jayapura Hospital. IOP Conf Ser Mater Sci Eng. 2017;259:012004.

16. Boonsatean W, Carlsson A, Dychawy Rosner I, Östman M. Sex-related illness perception and self-management of a Thai type 2 diabetes population: across-sectional descriptive design. BMC Endocr Disord. 2018;18:5.

17. Kim S, Kim E, Ryu E. Illness perceptions, self-care management, and clinical outcomes according to age-group in Korean hemodialysis patients. Int J Environ Res Public Health. 2019;16(22):4459.

18. Boonsatean W. The influences of income and education on the illness perception and self-management of Thai adults with type 2 diabetes. J Diabetes Metab Disord. 2016;3:017.

19. Al-Kayyis HK, Perwitasari DA. Illness perception and quality of life in type 2 diabetes mellitus patients in Lampung, Indonesia. Glob J Health Sci. 2018;10(7):136–47.

20. Ruston A, Smith A, Fernando B. Diabetes in the workplace-diabetic's perceptions and experiences of managing their disease at work: a qualitative study. BMC Public Health. 2013;13:386.