

ORIGINAL RESEARCH

Healthcare Providers' Knowledge, Attitude, and Perspective regarding Diabetes Self-Management during Ramadan Fasting: A Cross-Sectional Study



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Abstract

Background: Evidence shows that most general practitioners have low knowledge related to diabetes self-management during Ramadan fasting. However, studies on healthcare providers' competencies related to diabetes self-management during Ramadan fasting are still rare.

Purpose: This study aimed to investigate healthcare providers' knowledge, attitude, and perspective concerning diabetes self-management during Ramadan fasting.

Methods: The study applied a cross-sectional design and was conducted in forty-one (41) community health centers in Pekalongan, Central Java, Indonesia. The study participants were medical doctors, nurses, nutritionists, pharmacists, and public health officers. The total sampling technique was used. There were 205 healthcare providers who met the inclusion criteria. Their knowledge, attitude, and perspective were assessed using a questionnaire developed by Zainudin and Hussain. The Wilcoxon test was used to analyze the data.

Results: The healthcare providers' knowledge of Ramadan fasting was very low (36.79±26.11). More than half of the respondents (53.17%) advised diabetic patients to manage diabetes in general, although specific counseling for diabetic patients related to fasting in Ramadan month was not provided (55.12%). The perspective of Ramadan fasting among healthcare providers was moderate (62.68±30.40). The results also showed that general and safe practice knowledge significantly affected the healthcare providers' perspective toward Ramadan fasting ($Z=-12.49, p=0.000$), ($Z=-12.02, p=0.000$), respectively.

Conclusion: Healthcare providers' knowledge and attitude concerning diabetes self-management during Ramadan fasting were low. Accordingly, this affected their perspective. It is strongly recommended that a formal Ramadan fasting management training program should be given regularly to provide appropriate consultations and services.

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1. Introduction

Diabetes mellitus (DM) is a chronic metabolic syndrome characterized by inappropriate high blood sugar (hyperglycemia) resulting from either low levels of insulin hormones or abnormal resistance to insulin's effects, coupled with inadequate levels of insulin secretion (American Diabetes Association [ADA], 2021). The prevalence of diabetes for all age groups worldwide was 463 million in 2019 and projected to rise by 51% or 700 million by 2045 (International Diabetes Federation [IDF], 2019). According to Misra et al. (2019), almost one-third of DM population is in developing countries. As one of the developing countries, Indonesia ranks seventh in the epidemiology of diabetes mellitus in the Asia-Pacific region (IDF, 2019). The prevalence of diabetes in Indonesia in 2019 was 10.7 million of the population, estimated to be 13.7 million and 16.6 million in 2030 and 2045, respectively (IDF, 2019). In addition, most populations in developing countries are Muslim populations (Rashid et al., 2020).

Indonesia is one of the developing countries with a large Muslim population and has been known to have a high population of DM. Muslims are obliged to observe the five pillars of Islam, i.e., the profession of faith (shahada), prayer (salat), alms (zakat), fasting (sawm), and pilgrimage

to Mecca (hajj). Fasting during the month of Ramadan is the fourth pillar of Islam, and it is obligatory for all Muslims. However, fasting requires restriction from food and drink from dawn to sunset. According to Ghani (2013), 93% of Muslims are fasting during Ramadan worldwide, especially among Muslims in Asia. In addition, 99% of Indonesian Muslims were observed fasting during Ramadan (Bell, 2012). In Islam, certain groups are allowed not to do fasting. They are the older people with severe illness or mental disorders, people traveling, and women who are pregnant, breastfeeding, or menstruating (Hanif et al., 2020).

For some diabetic patients, fasting is a kind of honor and faith to miss. According to Salti et al. (2004), around 42.8% of Type 1 Diabetes Mellitus (T1DM) and 78.7% of Type 2 Diabetes Mellitus (T2DM) were doing fasting every year. Most T2DM patients did fasting for at least 15 days (Babineaux et al., 2015) to 25 days of the month (Kaplan & Afandi, 2015). There are so many reasons they break from fast since fasting for people with diabetes can lead to a high risk of hypoglycemia, hyperglycemia, diabetic ketoacidosis, dehydration, and thrombosis (Deeb et al., 2017; Eid et al., 2017; Gad et al., 2020; Kaplan & Afandi, 2015). Hence, to minimize these complications and fast safely, individual guidance and advice from healthcare providers are required to enhance their knowledge (Eid et al., 2017; Tourkmani et al., 2018).

Sufficient knowledge can be obtained through structured health education (Rashid et al., 2020). Furthermore, structured health education of pre-Ramadan fasting is mandatory. This course includes a meal plan, physical activity, blood glucose monitoring, medication adjustment, and adverse effects such as dehydration, hypoglycemia, and hyperglycemia (Bravis et al., 2010; Jamoussi et al., 2017; Rashid et al., 2020). Another required topic includes information on risks and indications of breaking fast (IDF, 2019; Pinelli & Jaber, 2011). The benefits of Ramadan fasting preparedness for T2DM patients are improvement of HbA1c, loss of body weight, and decrease in lipid profile (AlAlwan & Banyan, 2010; Bravis et al., 2010; Jamoussi et al., 2017). To get these beneficial results, structured health education must be delivered by competent healthcare providers (HCP).

Unfortunately, studies show that not all HCPs are knowledgeable. Lack of knowledge related to diabetes self-management during Ramadan fasting among general practitioners (GPs) and among pharmacists was reported by Gaborit et al. (2011) and Amin and Chewing (2014), respectively. Another evidence shows that GPs' knowledge related to fasting complications and fasting exemption was low (Beshyah et al., 2017). Lack of knowledge related to the basic concepts of diabetes and Ramadan, dietary modification, and drug dosage adjustment during Ramadan was also found among GPs in Pakistan (Ahmedani et al., 2016). Accordingly, basic training of diabetes self-management related to Ramadan fasting for HCPs was strongly recommended to increase their knowledge and skills (Ahmedani et al., 2016; Gaborit et al., 2011; Hanif et al., 2020).

Previous studies mostly focused on examining GPs' and pharmacists' knowledge related to diabetes self-management during Ramadan fasting. However, diabetic patients are not only treated by the two professions. Like in Indonesia, diabetic patients are served under chronic illnesses service program (PROLANIS) by a team consisting of a medical doctor, a nurse, a nutritionist, a pharmacist, and a public health officer. Unfortunately, there has been no previous research conducted in Indonesia to explore knowledge, attitude, and perspective related to diabetes self-management during Ramadan fasting among these team members. Therefore, this study aimed to investigate healthcare providers' knowledge, attitude, and perspective related to diabetes self-management during Ramadan fasting.

2. Methods

2.1 Research design

The study applied a cross-sectional design.

2.2 Setting and sample

The study was conducted from September to December 2019. The respondents were selected purposively from forty-one (41) community health centers in Pekalongan, Central Java, Indonesia. They were medical doctors, nurses, nutritionists, pharmacists, and public health officers. These health professions were parts of PROLANIS, which provided chronic care for T2DM and hypertension. The inclusion criteria of the respondents were a member of person-in-charge (PIC) of PROLANIS, with age \geq 18 years old. The respondents who were on leave for more than two months were excluded. Accordingly, the sample size was 205, coming from 5 healthcare

providers multiplied by 41 community health centers. The total sampling technique was used to obtain the respondents.

2.3 Measurement and data collection

The questionnaire was adapted from Zainudin and Hussain (2017). It consists of 25 items asking about Ramadan fasting for diabetic patients from the HCPs' perspective. This questionnaire is divided into three dimensions. The first dimension consists of 7 items assessing knowledge of the pathophysiology of fasting and general knowledge of Ramadan. The second dimension consists of 11 items assessing knowledge of safe practices and management of diabetes during Ramadan. The scoring of these two dimensions is 1 for the correct answer and 0 for the wrong answer. The total value of both dimensions reflects the perspective of HCPs in the management of diabetes during Ramadan. The questionnaire was translated by the author into Bahasa Indonesia using a simple translation. The Cronbach's α of these 18 items was 0.62, meaning that the instrument was moderately reliable. The Pearson correlation ranged from 0.183 to 0.559. The *r*-table of 205 participants with a 5% level of significance was 0.113. Accordingly, all items were valid because the value was >0.113 . The third dimension consists of 3 items assessing the attitude on the management of diabetes during Ramadan. This dimension was assessed but not scored. Five items asking the directions on how to do fasting in Ramadan (i.e., abstaining from food, oral fluids, medication, fasting for approximately 14 hours annually, and 29 consecutive days) were modified. The reasons underlying the modification of these items were as follows: (1) these items cover basic knowledge about the rules of Ramadan fasting that was quite easy and well-known among Indonesians, who were mostly Muslims; (2) it was more essential to ask specific questions related to knowledge of diabetes management during Ramadan; and (3) if these items were retained, the result could not depict the basic knowledge of diabetes management during Ramadan.

Prior to data collection, the primary investigator (PI) shared the information about the study project and schedule through the PROLANIS WhatsApp group. As scheduled, the PI and research assistant (RA) went to 41 community health centers to meet the respondents. Informed consent was signed by the respondents who met the inclusion and exclusion criteria and were willing to join the study. Moreover, the respondents were explained about the questionnaire and asked to fill out the questionnaire. RA checked the questionnaire and summarized the results into excel.

2.4 Data analysis

Data were analyzed using the IBM SPSS statistics version 23.0. The characteristics of respondents were analyzed using descriptive statistics. Categorical data were analyzed using percentages and frequencies, while mean and standard deviations were used to analyze continuous data. Since the result of the Kolmogorov-Smirnov test was not significant ($p=0.000$), the data of basic knowledge, knowledge of safe practice, and perspective were not normally distributed. As a result, the Wilcoxon test was used to examine the correlation between knowledge and healthcare providers' perspective of Ramadan fasting.

2.5 Ethical considerations

The ethical clearance was obtained from the Research Ethics Committee of Universitas Islam Sultan Agung (Reference number 267/A.1/FIK-SA/VII/2019). The permission to modify the items was obtained from the original author through personal communication. The potential respondents who agreed to join the study then signed the informed consent.

3. Results

3.1 Characteristics of respondents

Two hundred and five healthcare providers participated in this study. The characteristics of the respondents were presented in Table 1. The mean age was 36.25 years (standard deviation [SD]=8.43). The mean of work experience was 1.8 years (SD=1.2). More than one-third (156) of the respondents were female and more than half (130) of the respondents had a bachelor degree. The majority of the respondents were Muslim (97.6%). There were no healthcare providers who had prior education on diabetes management in Ramadan, and 37.5 % of the participants learned individually by searching for information from online sources.

Table 1. Characteristics of respondents (n=205)

Variable	f	%	Mean	SD
Age (years)			36.25	8.43
Working experience (year)			1.8	1.2
Gender				
Female	156	76.1		
Male	49	23.9		
Education				
Master	2	1.0		
Bachelor	130	63.4		
Diploma	73	35.6		
Religion				
Muslim	200	97.6		
Protestant	3	1.4		
Catholic	2	1.0		
Training-joined				
Never	128	62.5		
Self-learning	77	37.5		

SD=Standard deviation

3.2 Knowledge, attitude, and perspective of Ramadan fasting

Table 2 shows that the healthcare providers' knowledge of Ramadan fasting was 36.79 (SD=26.11). However, the healthcare providers' knowledge of safe practice and management of diabetes during Ramadan was 79.16 (SD=19.84). The healthcare providers' perspective of Ramadan Fasting was 62.68% (SD=30.40). As Table 3 indicates, 109 respondents stated that before the Ramadan month was coming, they advised the diabetic patients to manage diabetes and/or adjust their medication during fasting. Moreover, 55.12% (113) respondents did not provide specific counseling for diabetic patients related to fasting in Ramadan month. The most dominant reason was the lack of specific knowledge and lack of experience in practice. Only 13.66% (28) of the respondents encountered people with diabetes complications during fasting in Ramadan.

Table 2. Healthcare providers' knowledge and perspective of Ramadan fasting

Variable	Mean (SD)
Knowledge of the pathophysiology of fasting and general knowledge of Ramadan	36.79 (26.11)
Knowledge of safe practices and management of diabetes during Ramadan	79.16 (19.84)
Healthcare providers' perspective of Ramadan fasting	62.68(30.40)

Table 3. Attitudes of respondents on the management of diabetes during Ramadan

Attitude variable	Yes	No
	n (%)	n (%)
Did you advise your patients on how to manage diabetes and/or adjust their diabetes medication when fasting during previous Ramadan?	109 (53.17)	96 (46.83)
Would you provide specific counseling for people with diabetes on fasting in Ramadan?	92 (44.88)	113 (55.12)
Have you encountered people with diabetes complications during fasting in Ramadan?	28 (13.66)	177 (86.34)

3.3 The correlation between knowledge and perspective of Ramadan fasting

The results showed that basic knowledge and knowledge of safe practice significantly affected healthcare providers' perspective of Ramadan fasting ($Z=-12.49, p=0.000$), ($Z=-12.02, p=0.000$), respectively (Table 4).

Table 4. The correlation between knowledge and perspective of Ramadan fasting

	Healthcare providers' perspective of Ramadan Fasting	
	Z	p
Knowledge of the pathophysiology of fasting and general knowledge of Ramadan	-12.49	0.000*
Knowledge of safe practices and management of diabetes during Ramadan	-12.02	0.000*

*Wilcoxon test

4. Discussion

The study results showed that the HCPs lacked knowledge in the pathophysiology of fasting and general knowledge of Ramadan fasting for diabetic patients, although they had good knowledge on safe practice and management of diabetes during Ramadan. General diabetes management was mostly advised by the HCPs rather than specific counseling related to fasting in Ramadan. The result also showed that the perspective of Ramadan fasting among HCPs was influenced by knowledge.

4.1 Knowledge, attitude, and perspective of Ramadan fasting

The result showed that the knowledge of the pathophysiology of fasting and general knowledge of Ramadan among HCPs was suboptimal. This result aligns with the study conducted in Pakistan (Ahmedani et al., 2016) and Egypt (Amin & Chewning, 2014). According to these two studies, no training program offered in these countries contributed to the lack of knowledge among HCPs. The lack of knowledge among Indonesian HCPs is also related to the availability of a formal training program. The majority of HCPs did not receive training programs nor attend workshops related to diabetes management during Ramadan fasting. Only few HCPs stated that they learned independently through the internet or journal articles that they read. Their basic knowledge of Ramadan fasting was based on the respondents' experience as Muslims. This assumption was supported by the result that almost all respondents were Muslim. Generally, Muslims have significant knowledge of Ramadan-specific diabetes management (Amin & Chewning, 2014). Another reason is that Indonesia has a dominant Muslim population. Accordingly, most of the population is familiar with fasting in Ramadan. However, not all Muslims and HCPs are knowledgeable regarding the pathophysiology of fasting and diabetes (Ahmedani et al., 2016; Gaborit et al., 2011; Hanif et al., 2020).

On the contrary, the HCPs' knowledge of safe practices and management of diabetes during Ramadan was above the average. The possible reasons were because the majority of the HCPs were Muslim with a higher educational background, and they mostly had a 2-year experience of becoming a PIC. The lack of HCPs' knowledge is related to their services, such as giving advice regarding Ramadan-specific diabetes management (Almalki et al., 2018) and insufficient education (Hassan et al., 2014; Malek et al., 2019; Masood et al., 2014). Pre-Ramadan education among diabetic patients is the responsibility of all PICs of PROLANIS. Structured and proper education of self-management during Ramadan fasting would improve the patients' skills, which impacts safe fasting to reduce morbidity and mortality (Almansour et al., 2017).

Most of the HCPs stated that they advised their patients to manage diabetes in a simple way during Ramadan. On the contrary, the HCPs would not give counseling related to self-management during Ramadan. This result aligns with a study conducted by Ali et al. (2016). In their study, healthcare providers did not give any health education related to diabetes self-management during Ramadan (Ali et al., 2016). One reason why the HCPs did not give consultation related to diabetes management during Ramadan fasting is that they are not confident due to their lack of knowledge of diabetes and Ramadan (Ahmedani et al., 2016; Gaborit et al., 2011; Hanif et al., 2020). Communication skill is also an essential skill for delivering the message during a consultation (Widyarani et al., 2020). Therefore, It is important to improve HCPs' knowledge and skills concerning diabetes and Ramadan. This is also recommended by Ahmedani et al. (2016) and Zainudin & Hussain (2017).

The study result showed that HCPs' perspective of Ramadhan fasting was tolerable. The individuals' perspective is influenced by their knowledge, experience, and culture (Almansour et al., 2017). Another factor is cultural competence (Beshyah et al., 2018). HCPs should have

knowledge in relation to taking care of diabetic patients during Ramadan (Gaborit et al., 2011; Hanif et al., 2020). Furthermore, religiosity also plays a key role in the perspective of HCPs (Almansour et al., 2017; Ismail et al., 2015).

4.2 The correlation between knowledge and perspective of Ramadan fasting

There was a statistically significant correlation between knowledge and perspective of Ramadan fasting among HCPs. This result proved that HCPs' perspective was influenced by their basic knowledge of diabetes management during Ramadan fasting. As mentioned above, several factors contributed to the HCPs' perspective (Almansour et al., 2017; Beshyah et al., 2018; Ismail et al., 2015). In this study, the HCPs' perspective is related to their basic knowledge of Ramadan fasting as a Muslim. Even though the HCP is not a Muslim, he/she is familiar with Ramadan fasting since, in Indonesia, this is an annual religious event.

Perspective means an individual's point of view of an object (Cambridge Dictionary, 2021). The HCPs' perspective was influenced by their characteristics, including experience, educational background, religion, and training program. Knowledge is a cornerstone and plays an important role in HCPs' perspective. In this study, the majority of respondents were bachelor and master in education. In addition, some respondents were self-learned related to diabetes management during Ramadan fasting. Probably, their education and basic knowledge influence their perspective. The HCPs' experience was almost two years on average, arranged from one to five years. This sufficient experience can affect the HCPs' perspective. More experienced HCPs, more tolerable and wise they made a decision (Adler-Lazarovits & Weintraub, 2019).

Another determinant factor is culture and religiosity. The HCPs' culturally-competence is an essential skill to deliver an appropriate treatment or intervention (Lagisetty et al., 2017; Sirois et al., 2013). In other words, culture is a social behavior and norms, that whether it is realized or not, influence our perspective, likewise, religiosity. In this study, almost all respondents were Muslim. Accordingly, the thought of Islam impacts the HCPs' knowledge of Ramadan fasting (Abolaban & Al-Moujahed, 2017). However, they did not have specific knowledge in diabetes management during Ramadan fasting. Therefore, knowledge of diabetes management during Ramadan fasting among HCPs is demanding. It can open their horizon to provide safe and healthy intervention (Mubeen et al., 2012).

5. Implication and limitation

The findings in this study can be used as a basis for formulating policies and improving the skills of PICs of the PROLANIS. There are several limitations of the study. Firstly, the study did not conduct a subgroup analysis. Accordingly, the knowledge, attitude, and perspective among provisions were not comparable. Second, the study project was announced through the Whatsapp group in advance. This could yield bias as some participants may be learned about the topic before answering the questionnaire. To ensure the results, the PI and RA accompanied the participants when they were filling out the questionnaire. Lastly, the questionnaire was simply translated from the original English version to the Indonesian version without back-translation. However, some items had been culturally modified. The reliability and validity tests were also conducted.

6. Conclusion

In conclusion, knowledge had a positive effect on the perspective of diabetes self-management during Ramadan fasting. In addition, specific counseling related to diabetes management during fasting in Ramadan was still rarely carried out through general advice on diabetes management was mostly provided. Based on this study, several recommendations are proposed: (1) As a professional, HCPs should actively update their knowledge and skills; (2) Education should be continuously provided to PICs of PROLANIS especially related to diabetes self-management education and support; (3) HCPs should always assess patients' knowledge and attitude regarding diabetes self-management during Ramadan fasting to give proper education and counseling to ensure safe fasting practices; and (4) Researchers should explore the diabetic patients' knowledge, attitude, and practice in diabetes management during Ramadan fasting.

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Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this study.

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