



# Knowledge and Experience of Community Health Volunteer (Cadre) on Type 2 Diabetes Mellitus Management in Yogyakarta

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## Abstract

**Edited by:** Sasho Stoleski  
**Citation:** Primanda Y, Fatah DI. Knowledge and Experience of Community Health Volunteer (Cadre) on Type 2 Diabetes Mellitus Management in Yogyakarta. Open Access Maced J Med Sci. 2021 Apr 12; 9(T4):240-244. <https://doi.org/10.3889/oamjms.2021.5863>  
**Keywords:** Cadre; Community health volunteer; Diabetes mellitus type 2; Experience, Knowledge; Yogyakarta  
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**Received:** 14-Feb-2021  
**Revised:** 03-Mar-2021  
**Accepted:** 02-Apr-2021  
**Copyright:** © 2021 Yanuar Primanda, Desy Ivani Fatah  
**Funding:** This study was supported by a grant from Universitas Muhammadiyah Yogyakarta  
**Competing Interest:** The authors have declared that no competing interest exists  
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**BACKGROUND:** Type 2 diabetes mellitus (T2DM) is a chronic disease that requires long-term and comprehensive management. People with T2DM play a significant role in managing their condition and day-to-day life adjustment related to T2DM. In the Indonesian context, community health volunteers (cadres) roles are imperative because the community can influence day-to-day health care.

**AIM:** The study aimed to describe the knowledge and experience of cadre on T2DM management in Yogyakarta, Indonesia.

**METHODS:** It was a descriptive study with a cross-sectional approach. Five primary health-care center (*Puskesmas*) areas in Bantul district were selected based on their high population, including Kasihan 2, Jetis 1, Sedayu 1, Jetis 2, and Imogiri 2 areas. Sixty-eight cadres from those five areas were enrolled in this study through accidental sampling. The data were collected using questionnaires and analyzed using descriptive statistics.

**RESULTS:** The results showed that the average age of cadres was 43 years old (20–64 years), with more than half of them graduating from high school, unemployed (61.8%), and never received education about DM and its management (51.5%). Forty-two cadres (61.8%) had a moderate level of knowledge, and 64.7% had inadequate experience in T2DM management.

**CONCLUSION:** Knowledge and experience of cadre regarding T2DM management in Yogyakarta need to be increased. Further research is needed to examine certain training programs' effects to improve cadre's knowledge and experience in T2DM.

## Introduction

Diabetes mellitus (DM) is one of the chronic metabolic diseases characterized by hyperglycemia due to abnormality of insulin action, insulin secretion, or both and metabolism disturbance of carbohydrate, fat, and protein [1]. The International Diabetes Federation estimated that about 9.3% of the global population aged 20–79 years are currently living with DM, which accounted for about 463 million [2].

In Indonesia, a national study revealed that about 10.9% of Indonesia's people live with DM [3]. In Yogyakarta, a province in Java Island, Indonesia, the prevalence of DM is considered high. About 3.1% of people older than 15 years old have been diagnosed with DM, and this puts Yogyakarta as the top three provinces with the highest prevalence of DM after Jakarta (3.4%) and East Kalimantan (3.1%) [3]. In Bantul District, one out of the five districts in Yogyakarta, there were about 15,925 visits to primary health-care centers (*Puskesmas*) due to diabetes, which puts DM among the top 10 diseases in *Puskesmas* [4].

Uncontrolled DM can cause either macrovascular or microvascular complications and

possible mortality [5], [6]. Furthermore, the number of mortality associated with DM is very high, equivalent to 4.2 million deaths worldwide among adults between 20 and 79 years old [2]. DM care and its related complications can cause economic burdens. Globally, it was estimated that diabetes and its complication cost more than USD 760 billion [2]. Considering those overwhelmed impacts of DM, effective DM management strategies are essential to prevent and delay DM-related complications.

In general, the DM management strategies consist of behavior and psychological management and pharmacologic approaches to achieve DM treatment goals. Health care providers play significant roles in facilitating DM management strategies. Recently, the American Diabetes Association has highlighted the importance of local community resources and their roles in diabetes self-management support for people with DM [7]. They may assist in diabetes self-management education (DSME) and support delivery, especially in underserved communities.

In Indonesia, one of the local community resources is a community health volunteer named cadre or *Kader*. Cadre is selected from the local community and has been trained to encourage and

organize community participation in community health empowerment [8]. Further, the Ministry of Health stated that community health empowerment includes preventing and managing non-communicable diseases. The cadre's roles are in charge of facilitating the active participation of community members on community health based on their capacity, facilitating the community members to use the community health facilities, organizing community health facilities, counseling and educating related to community health, recording the empowerment programs in the community, and reporting any local health problems or cases to health-care providers or *Puskesmas* [8]. Cadres work closely under the guidance of *Puskesmas*.

In 2010, the Indonesian government initiated the development of non-communicable diseases integrated development post (*Posbindu*), a participatory community action run by the *Posbindu* cadre, which focused on detecting and preventing non-communicable diseases [9]. DM is one of the non-communicable diseases that become a big concern in the *Posbindu* program. It is expected that each village will have at least one *Posbindu* and each *Posbindu* has at least five cadres. In 2019, it was targeted that *Posbindu* could achieve at least 50% of total villages in all provinces in Indonesia, and about 43.92% of *Posbindu* were established in 2018 [10]. Unfortunately, national data about the number of *Posbindu* cadre are not available.

Health counseling and education related to non-communicable diseases, including DM, are *Posbindu* cadre roles [11]. Guideline's book to facilitate learning among the *Posbindu* cadre to perform their role has been released [12], [13]. Considering the important role of cadre, knowledge and experience of cadre are imperative among the cadre. Knowing the level of knowledge and experience among cadre is beneficial for developing further research to empower cadre.

## Methods

It was a descriptive study to describe community health volunteers' knowledge and experiences (cadre) on type 2 DM management in Yogyakarta. The Lemeshow formula was used to calculate the sample size. With  $p = 0.05$ , sampling error 10%, and  $z = 1.645$ , 68 participants were needed in this study. The participants were selected through a convenience sampling technique from five *Puskesmas* areas in Bantul district with a high number of people with Type 2 DM (T2DM) in their area, including *Puskesmas* Kasihan 2, Jetis 1, Sedayu 1, Jetis 2, and Imogiri 2. The inclusion criteria were cadres (elderly cadres and *Posbindu* cadres) who worked in the selected area and willing to participate in the study. The elderly cadres were included instead of *Posbindu* cadres only

due to the limited number of *Posbindu* cadres in the targeted areas and unavailability of a certain database of *Posbindu* cadres. The exclusion criteria were cadres who declined their participation in the study. This study was conducted in January–February 2019. Data collections were conducted during monthly cadres meetings, and for those who did not attend the meeting, the researchers visited the cadres' home based on an appointment with cadres.

The demographic characteristics of the cadres were collected using a demographic characteristic questionnaire. The cadres' knowledge and experience on T2DM management were measured by questionnaires that were developed by the researchers.

The knowledge about the T2DM management questionnaire consisted of 9 items with true, false, do not know, and uncertain response rates. Those who answered the question correctly scored 1. The possible score was 0–9. The level of knowledge was categorized into low (score 0–3), moderate (score 4–6), and high (score 7–9).

The 8-item 4-point Likert scale questionnaire was used to measure experience about T2DM. The response rates were ranged from never (score 1) to routine (score 4). The possible score was ranged between 8 and 32. The experience was categorized into the inadequate experience (score 8–19) and adequate experience (score 20–32).

The questionnaire was validated using the content validity index for an item (ICVI) with three experts, and the questionnaire was considered valid if I-CVI was at least 0.8 [14]. The 9-item knowledge questionnaire and 8-item of experience questionnaire had I-CVI ranged from 0.83 to 1. The Cronbach alpha test was used to test the questionnaires' reliability, resulting from 0.6 considered reliables [15]. The Cronbach alpha of knowledge questionnaire and experience questionnaire among 20 cadres with the same characteristics of cadres in this study but not participated in the study was 0.70 and 0.84, respectively.

The descriptive statistics were used to analyze the data. Continuous data were presented with mean (SD), and nominal data were presented with frequency (%).

This study was approved by the Faculty of Medicine and Health Science, Universitas Muhammadiyah Yogyakarta ethical committee with the number of 597/EP-FKIK-UMY/XII/2018.

## Results

Of the total 68 approached participants, all of them (100%) agreed to participate in the study. All of the cadres were women with an average age which

was 42.91 (8.46) years with the youngest age, and the oldest age was 20 and 64, respectively. The average duration of being cadres was 7.10 (6.50) years, with 1 year and 33 years as the shortest and longest duration, respectively. More than half of cadres graduated from senior high school (54.4%), have no employment or housewife (61.8%), positioned as member of *Posyandu/Posbindu* (83.8%), and never received training related to T2DM management (51.5%) (Table 1).

**Table 1: Demographic characteristics of cadres (n=68)**

Characteristics	Frequency (%)
Age (year)	
20–39	20 (29.4)
40–59	45 (66.3)
≥60	3 (4.4)
Education	
No education	3 (4.4)
Primary school	5 (7.4)
Junior high school	8 (11.8)
Senior high school	37 (54.4)
Diploma or higher education	15 (22.1)
Employment	
Housewife/no employment	42 (61.8)
Employed	26 (38.2)
Position in <i>Posyandu</i>	
<i>Posbindu</i>	
Leader	11 (16.2)
Member	57 (83.8)
Received training on T2DM management	
Yes	33 (48.5)
No	35 (51.5)

T2DM: Type 2 diabetes mellitus.

This study showed that 42 of 68 cadres had a moderate level of knowledge about T2DM management (61.8%), and almost a quarter had low knowledge (23.5%). Furthermore, almost two-thirds of cadres had an inadequate experience related to T2DM management (64.7%) (Table 2).

**Table 2: Level of knowledge and experience of cadres on T2DM management (n=68)**

Variables	Frequency (%)
Knowledge	
Low	16 (23.5)
Moderate	42 (61.8)
High	10 (14.7)
Experience	
Inadequate experience	44 (64.7)
Adequate experience	24 (35.3)

T2DM: Type 2 diabetes mellitus.

## Discussion

Cadres are those who selected or trained individuals from the local community. However, they must have available time and willingness to organize and run the *Posbindu* regularly and *Posyandu* [16]. Therefore, the majority of cadre are women and housewives or no employment. *Posbindu* and *Posyandu* management's guidelines stated that cadre's education level is at least senior high school [11]. In fact, some cadres had a lower education level. It may be because the aspects of willingness and time availability of those who want to be cadres voluntarily are more than the education level itself as the nature of community participatory programs in Indonesia. The idea is that the program is run by the

community under the philosophy of "*gotong royong*," working together under a big family's spirit to achieve the results as wish to improve health status [17].

Training related to T2DM management has never been received by more than half of the cadres in this study. Training of the cadres is primarily the responsibility of the *Puskesmas*, where the cadres are based [8], [11]. However, the data about the training that has been provided by *Puskesmas* to cadres are often not available and accessible. Basically, when the *Puskesmas* conducted training, mostly not all cadres were invited, and the invited cadres might not attend the training. Those who attended the training were expected to disseminate their knowledge to other cadre members.

Indonesian government tried to accommodate the gap between the need for training and the barriers in conducting or attending the training. Education guideline books for *Posbindu* cadres were released in 2019 by the Directorate of Non-Communicable Diseases Prevention and Control of Indonesia [12], [13]. The books contain important information that should be understood by *Posbindu* cadres related to chronic diseases, including T2DM. Information about basic knowledge of T2DM, such as the risk factors, complications, and prevention strategies as well as management strategies, were provided in the books except for foot care. A previous study found quite similar results when the majority of the cadres were about 40 years old, graduated from senior high school, and never received training on DM management [18].

The training about DM may influence the moderate level of knowledge among cadres in this study received only by half of the cadres in this study. Training on DM management can effectively increase cadres' knowledge [18]. In addition, the inadequacy of the experience may relate to cadres' confidence. Lack of confidence due to self-perception of insufficient knowledge and incompetence about chronic diseases and *Posbindu* were considered barriers among *Posbindu* cadres [19].

The majority of cadres (89.7%) answered correctly that oral hypoglycemic agents (OHAs) should be taken routinely based on physician prescription and should not be stopped when people with T2DM felt healthy and did not experience any signs and symptoms of the disease. However, almost half of them thought that although people with T2DM skipped their meals and did not take any foods to replace their meal, they still must take their OHAs (Table 3). Medication adherence is one of the key components in blood glucose control. Nevertheless, skipping meals and taking medication when food ingestion is limited or skipped may cause hypoglycemia [20].

Regarding diabetic foot care, this study found that only 30.9% of cadres correctly answered that foot moisturizer should not be used in between toes (Table 3). Correct moisturizer application is important to prevent over moist, increasing the risk of fungus



infestation and infection [21]. In addition, less than 60% of cadres understand that people with DM must use footwear when going outside or stay inside the home. Appropriate and convenient footwear must be worn anywhere, at home and outside, to prevent injury [22]. However, this practice may be uncommon in Indonesian when many people believe that using footwear at home is considered impolite and not suit for their culture. Therefore, cadres' knowledge regarding footwear might be influenced by their current culture and beliefs.

**Table 3: Description of knowledge of cadres on T2DM management (n=68)**

Variables	Correct answer
Avoidance of high calories foods	32 (47.1)
Meal frequency	35 (51.1)
Exercise frequency	18 (26.5)
Exercise duration	52 (76.5)
Types of exercise	43 (63.2)
Skipping medications and meals	33 (48.5)
Stop medications while feeling better	61 (89.7)
Footwear at home	40 (58.8)
Foot moisturizer application	21 (30.9)

Data were presented with frequency (%). T2DM: Type 2 diabetes mellitus.

Several factors may contribute to the result of this study, where <20% experienced routine activities in DM management (Table 4). Lack of encouragement and supervision from *Puskesmas* health-care professionals can hinder *Posbindu* cadres' participation in DM management. In general, most of the *Posbindu* cadres are laypeople without any formal health education. With limited knowledge and skills related to the complexity of chronic diseases and their management, adequate and efficient training, encouragement, and supervision from health care professionals are essential.

**Table 4: Description of experience of cadre on T2DM management (n=68)**

Variables	Never	Occasionally	Often	Routine
Blood glucose measurement	20 (29.4)	32 (47.2)	8 (11.8)	8 (11.8)
Provide SMBG education	9 (13.2)	33 (48.5)	19 (27.9)	7 (10.3)
Provide diet education	8 (11.8)	38 (52.9)	18 (26.5)	6 (8.8)
Provide smoking cessation education	20 (29.4)	23 (33.8)	18 (26.5)	7 (10.3)
Encourage routine exercise	9 (13.2)	26 (38.2)	23 (33.8)	10 (14.7)
Encourage to consume healthy food to prevent T2DM	9 (13.2)	26 (38.2)	22 (32.4)	11 (16.2)
Provide foot care education	19 (27.9)	31 (45.6)	13 (19.1)	5 (7.4)
Provide medication education	9 (13.2)	30 (44.1)	16 (23.5)	13 (19.1)

Data were presented with frequency (%). SMBG: Self-monitoring blood glucose. T2DM: Type 2 diabetes mellitus

Another barrier may be related to facilities and education materials. In performing routine blood glucose measurements, *Posbindu* cadres need glucometer and all necessary equipment, which may not be available in *Posbindu*. Education media and materials are also not always available as the cadres may be unable to develop it. Standardized education materials developed by health-care professionals and used plain language may benefit cadres and the members of *Posbindu*.

## Conclusion and Recommendation

*Posbindu* cadres had an essential role in DM management. Their position as local community resources should be empowered to support DSME

among people with T2DM. This study showed that knowledge of cadres was at a moderate level with inadequate experience. *Puskesmas* and government should consider the importance of cadres' roles and develop effective strategies to escalate cadres' knowledge and experience through training, encouragement, supervision, and appropriate facilities.

Further research is needed to explore the barriers or challenges and enablers of cadre in performing their roles, especially in facilitating people with chronic diseases self-management. Further, the effectiveness of training program which facilitates the improvement of knowledge and skills of cadres needs to be investigated. In the end, standardized training protocols for cadres which implemented nationally may beneficial for cadres and people with chronic diseases.

## Acknowledgment

This study was supported by a research grant from Universitas Muhammadiyah Yogyakarta. The researchers thank the cadres and *Puskesmas* Kasihan 2, Jetis 1, Sedayu 1, Jetis 2, and Imogiri 2 for their support and efforts to participate in this research.

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