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Research Article

Identification of Effort and Issues in the Prevention of Diabetic Foot in the Community: A Qualitative Study

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ABSTRACT

Background: Diabetic foot is one of chronic complications that can cause significant issue on diabetes mellitus patient. In addition to contributing to mortality and morbidity rate, this disease also increases the family as well as national health economy burdens. Therefore, preventive efforts are necessary to decrease the risk of diabetic foot. In this case, intervention model in preventing diabetic foot is known to focus more on diabetes mellitus patients and healthcare service provider. **Objective**: Current research aims to identify the determinant of the efforts and issues in the prevention of diabetic foot in the community. **Method:** This research applied qualitative method through focus group discussion and in-depth interview with 19 informants selected through purposive sampling, including the holder of Public Health Center programs, cadre, diabetes mellitus patients, and family. Data obtained through record were further transcribed and analyzed thematically. **Result:** There are several themes produced, including the education of foot care, cadre empowerment, role of cadre, strategy of cadre empowerment, knowledge, perception, self-efficacy, as well as patient and family strengthening. **Conclusion:** Diabetic foot preventive efforts focuses on the education of foot care and cadre empowerment in the community. Meanwhile, the issues discovered include the lack of knowledge, perception, efficacy and behavior in taking care of foot on diabetes mellitus patients. Hence, further study is needed in designing proper intervention strategy to prevent diabetic foot in the community.

Keywords: Diabetes mellitus, Diabetic foot prevention.

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INTRODUCTION

Diabetic foot is one of chronic complications that can lead to the occurrence of infection and amputation. Such case increases as the disease develops. Systematic review and meta-analysis research that has been done by Zhang et al [1] found that the prevalence of diabetic foot wound throughout the world is 6.3%. In this case, the highest rate was found in North America by 13%, followed by Africa by 7.2%, and Europe by 5.1%. Meanwhile, the prevalence of diabetic foot wound in Indonesia reaches 12%. This rate is higher compared to China and global prevalence [2]. Therefore, preventive efforts are needed to decrease the diabetic foot risk through self-care promotion efforts.

There are three levels of disease preventive efforts in the community, including primary, secondary, and tartier. The primary preventive efforts targets the healthy community by focusing on the risk factor preventive efforts before the disease emerges. Secondary preventive efforts is the complication preventive efforts on patients suffering from diabetes mellitus through early detection and initial treatment on the disease, one of which is diabetic foot. Meanwhile, tertiary preventive efforts targets the diabetes mellitus patients who have suffered from complication, aiming to prevent further disabilities [3].

As the first-level healthcare service provider facility, Public Health Center (*Puskesmas*) has an essential role in controlling and preventing diabetes mellitus complication. One of the preventive efforts to the occurrence of diabetic foot is through the implementation of non-ulcer diabetic foot care. In this case, several activities need to be carried out, including anamnesis, foot examination, foot risk evaluation, and education [4], yet the implementation of this activity is not optimal yet since it only focuses on the curative efforts and has not been a regular activity in Public Health Center.

Results of qualitative research conducted by Guel & Unwin [5] revealed several inhibiting factors in the prevention of diabetic foot, those are the diabetes mellitus patients and healthcare service provider that tend to prioritize glycemic control. Another inhibiting factor is the difficulties of healthcare service provider in conducting foot screening due to limited resources and addition to their workload. In addition, Sohal et al [6] through their research also revealed the inhibiting factors of patients in conducting self-care management, those are discrepancy of communication and language between the health workers and patients, causing the patients find difficulties in understanding diabetic education. Therefore, alternative approach is needed to bridge the healthcare service and diabetes mellitus patients in order to prevent the complications, particularly diabetic foot.

One of the partners and connectors between primary healthcare service and the community is cadre. Cadre is the member of community assigned to become the frontline public healthcare officials who are able to give positive contribution in the surrounding communities. Olaniran et al [7], in their systematic review, stated that cadres are commoners that have in-depth understanding about

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the community culture and language. Cadre takes important role in providing healthcare service in accordance with the community culture. Furthermore, another systematic review carried out by Hill et al [8] also explained that cadre can take a role as an educator, supporter of care provision, treatment coordinator, and social supporter[8].

Study implemented by Marques et al [9] further found that intervention model in the prevention of diabetic foot focuses more on diabetes mellitus patients and healthcare service provider, either individually, in group, or combination of both. No research involving the role of cadre in such efforts has been found. Previous research on the involvement of cadre in diabetes mellitus management only focused on the outcome of self-care behavior, psychosocial health, and physical health results such as glycemic control, blood pressure, body weight, and other biomarkers [10]. Meanwhile, specific research concerning the behavior in conducting diabetic foot preventive efforts by involving cadre is limited. Hence, current research aims to review the efforts and issues in the prevention of diabetic foot in the community.

METHOD

This research was carried out in March to May 2023 in Wonorejo Public Health Center that has the most diabetes mellitus cases in Samarinda City. In this case, the data were collected through *focus group discussion* and *in-depth interview* with *semi structured interviews* to dig into information concerning the efforts and issues in the prevention of diabetic foot, chance, and inhibition in preventing diabetic foot by involving cadres, their role in preventing diabetic foot, problems experienced by diabetes mellitus patients, and family support. The informants involved include the program holders in Public Health Center, cadre, diabetes mellitus patients, and families selected through *purposive sampling* by 19 people. This activity was carried out for around 45 to 60 minutes using the instruments of writing tools, recorder, and interview sheet. Furthermore, the record data were transcribed into written form and analyzed thematically. This research has also received ethical agreement from the faculty of Public Health Universitas Hasanuddin with ethical number 11975/UN4.14.1/TP.01.02/2022.

RESULTS

The analysis in this research found 9 themes, including foot care education, cadre empowerment, role of cadre, strategy of cadre empowerment, knowledge, perception, self-efficacy, foot care behavior, as well as patient and family strengthening. The results were further grouped into preventive efforts of diabetic foot and issues in the prevention of diabetic foot.

Diabetic Foot Preventive Efforts in Community

Foot Care Education

Healthcare service provider in Public Health Service delivers the information that in order to prevent the occurrence of diabetic foot, patients need to be educated about foot care. However, its implementation has not optimal yet, since the education provided is still in general and only focused on blood sugar level control. This can be seen in the quotes "*Prevention can be carried out through KIE method, dietary regulation, taking the medicine regularly, wearing footwear, and checking the foot condition*" (PP1). "*In the case of blood sugar control, patients are required to control their blood sugar once a month and taking the medicine regularly, however, the provision of specific education regarding foot issues is rarely done*" (PP3).

They also reported that no specific program focusing on diabetic foot prevention in the Public Health Center. "*Specific program focusing on diabetic foot is not available yet, materials provided in Prolanis activities is in general and varied, so those focusing on diabetic foot is not provided yet*" (PP1). "*Specific program focusing on diabetic foot is not available yet and there are only laboratory examination, medication, counseling, and referral back that have been carried out by the Public Health Center*" (PP3). "*Conducting individual education in poly, group counseling such as in Prolanis as well as PTM screening*" (PP4).

Cadre Empowerment

Interview result revealed that the diabetic foot preventive efforts can be carried out by involving the role of the community. This refers to the quotes of the interview from the healthcare service provider "*Community empowerment is needed by educating the cadre, family, and patients so that caregiver training can be carried out*" (PP1). "*Training for the cadre is needed so that they can accompany diabetes mellitus patients at least once a month*" (PP2). "*It can be carried out through the family but it is difficult, or through the surrounding people who often contact him, including the cadre*" (PP4)

This statement is further supported by the statement of a patient who needs cadre involvement in giving education "*Extension agents are needed in the neighborhood of the village, how to give first treatment to DM patients*" (P1). "*I want a socialization from the health cadre to the community, we can gather, for example the cadre can give extension in the head of neighborhood house, something like that*" (P2). "*The community needs a simulation of how to take care of their foot so they need more knowledge*" (P3). "*Cadre specifically for diabetes needs to be established*" (P4). "*If we want to rely on the limited health workers, it is quite difficult to reach the community who live in the remote area.. So involvement from the community is needed, they need to be educated and trained as a cadre... so the information can be delivered well*" (P5).

Cadre presence is an important key in the preventive efforts of diabetic foot in the community. The following quotes explain related matters "*Relationship between cadre and patient is closer emotionally and their distance is also closer*" (PP1). "*Patient can be monitored more by the cadre than by the family*" (PP3). "*Cadre is more trusted and listed by patients because they are considered as closed ones*" (PP4). However, cadres' involvement has not been structured well in the program. This can be seen in the quotes "*No specific cadres yet, the female cadres usually come door to door or communicate with the others through WA to ask the patients' condition or complaint*" (PP2). It is known that cadre does not really know how to prevent diabetic foot. This statement is supported by the quote *"I do not really know, I just learned about it*" (K2). "*I do not really know about it and need more guidance*" (K4). Such condition is caused by the absence of extension about preventive efforts of diabetic foot.

Cadres Empowerment Strategy

There are several things need to be considered in involving cadres, one of which is that cadre who does not really know about how to prevent diabetic foot. The intervention plan to improve cadres' ability can be obtained by providing direct extension to the cadre to give knowledge about diabetic foot. "*It can be carried out through extension, field practice, and activity monitoring*" (PP1). "*Providing extension to cadres is needed so that they can educate the patients and family directly*" (PP3). "*All people receive knowledge regarding initial characteristics of diabetic foot*" (PP3)

In addition, no special funding is allocated to cadre. This statement can be seen from the interview quote with the healthcare service provider "*Not all cadres are active and no special funding, there is only transportation fee*" (PP1). The strategy used includes cross-sector and cross-program approach for *sharing cost*. This is stated by the healthcare service provider *"Educating the cadres and approach through the head of neighborhood and sub-village for the activity funding as a form of community empowerment*" (PP2). "*Involving cross-sector through probebaya program for cadre activity budget*" (PP4).

Role of Cadre

Cadres' involvement in the preventive efforts of diabetic foot in the community can be carried out through several intervention, including them taking a role as an educator, companion, communicator with the healthcare service provider and helping to carry out diabetic foot risk screening. This statement can be seen from the interview quotes said by the healthcare service provider "*Cadre can carry out education, reminding the diet, medicine control, checking the foot condition, and referring the patients to health workers so if there is any wounds, cadre can also be a communicator to the health worker*" (PP1). "*Providing direct practice to the patients and their family about taking care of their foot and providing extension in group to the community*" (PP2). "*Cadre can help the family to screen diabetic foot and educating them about blood sugar control*" (PP3). "*Probably helping with the control, reminding the diabetes mellitus patients regarding how to prevent diabetic foot and checking their blood sugar*" (PP4).

Issues in the Prevention of Diabetic Foot in the Community

Foot Care Behavior

Healthcare service provider stated that adherence of diabetes mellitus patients in taking care of themselves is low, especially in terms of taking their medicines and taking care of their foot. Diabetes mellitus patients tend to go to the healthcare service when they have experienced wound so they want to treat them. This can be seen in the following quotes "*Diabetes Mellitus patients has low adherence in taking their medicines*" (PP1). "*Patients' adherence is low and they do not want to take care of their foot themselves*" (PP2). "*Patients tend to visit the Public Health Center with post-operation condition*" (PP3).

This statement is also confirmed by the cadre who found that diabetes mellitus patients rarely check themselves to the healthcare service. "*Patients are lazy to visit the Public Health Center*" (K2). Diabetes mellitus patient also stated similarly based on his quote, "*The problem is that we are lazy to take care of our foot and we are also lazy to visit the hospital because the queue is too long*" (P3). "*The problem is concerning taking care of their diet, taking the medicine, and maintaining our foot*" (P5).

Knowledge

Interview results reveal that diabetes mellitus patients about their disease, especially about preventive efforts of diabetic foot is low. The cause is due to the difficulties in educating the patients. The following quotes were obtained from the healthcare service provider "…….*It is difficult to educate the patients*" (PP4). Similar statement is also stated by a cadre "*It is difficult to communicate and tell the patients*" (K1). "*Patients are lack of knowledge… so they sometimes close themselves*" (K3).

Perception

The perception of diabetes mellitus patients about their disease is categorized as low. Although they already have initial symptoms of diabetic foot risk factor, patients are not aware that their disease can lead to complication and further cause diabetic foot. In addition, patients also tend to underestimate their disease. The following is quote obtained from the interview "*I do not think it is a problem*" (P1). "*I do not have a diabetic foot….probably the one I get often is cold feet*" (P2). This is also stated by the cadre "*The problem is that the patients are sometimes cannot stay still, they have too many activities, and their feet are not taken care of, often get dust…. Patients often neglected their disease…they underestimated the disease*" (K4).

Self-Efficacy

It was found that diabetes mellitus patients do not have confidence and motivation to stay healthy. They tend to feel fed up and bored with their disease. This can be seen from the interview result with the patients. "*The problem is that I lack the motivation to become healthier…sometimes we are motivated…sometimes we are not motivated either, we are not confident for it*" (P4). This statement is also supported by the cadres' statement that diabetes mellitus patients tend to close themselves about their diseases "*Patients are often difficult to be communicated with, they closed themselves and lack of knowledge regarding their own disease*" (K5).

Strengthening of Patients and Their Family

Diabetes mellitus patients have several issues, one of which is the lack of knowledge and adherence, have low perception and confidence in managing their disease. Although their family is ready to give full support, yet it does not emphasize on the efforts to prevent diabetic foot. The following quote is obtained from the interview result "*I have more support on him taking his medicines every day, and I cut his nails every two weeks*" (KP1). "*Reminding him to always take a rest regularly, maintain his dietary. The problem is that his meal and mind cannot be controlled*" (KP3). "*I usually remind him to keep his diet well and not to forget to take his medicine and to control his blood sugar*" (KP5).

In addition, the family also found difficulties in taking care of the patients because the patients often neglected the family advice. The following quote is obtained from the interview result with the patients' family. *"I sometimes ask him to maintain his diet and exercise as well as to take care of his foot so that it will not get sharp objects that can cause wounds. However, he sometimes does not listen to me, he does not trust me*" (KP2). "*He sometimes obeys and sometimes not. If something bad happens, then he will obey but later on he will forget about it. The problem is concerning this psychology. Sometimes when we tell him, we get emotional because it is so difficult to tell him..*" (KP4).

Similar condition is also explained by the healthcare service provider in involving family to become the patients' companion "*Patients need to be accompanied. I have tried to educate the family to become a companion, but it is difficult and no one comes so I change it to cadre*"(PP2). Therefore, patients and their family need to be strengthened and supported.

DISCUSSION

This research aims to review the efforts and issues in the prevention of diabetic foot in the community. There are nine themes obtained, including foot care education, cadre empowerment, role of cadre, cadre empowerment strategy, knowledge, perception, self-efficacy, foot care behavior, as well as patients and family strengthening.

1. Foot Care Education

Diabetes mellitus patients have a risk to suffer from various complication in various organs, one of which is diabetic foot. Diabetic foot control in the efforts of preventing and treating diabetic foot issues need to be concerned more seriously. This qualitative study resulted in the absence of specific program focusing on diabetic foot prevention. In addition, it was also found that the prevention needs to be implemented by focusing on giving education, especially regarding foot care. Such education becomes the first step in preventing diabetic foot since it can improve the knowledge and behavior concerning foot issues [11,12]. Systematic review and meta-analysis that was conducted by Adiewere et al [13] revealed that in addition to preventing the occurrence of diabetic foot, intensive education to patients can also prevent recurrence.

The problems found in this effort include the education about foot care that rarely implemented. The education provided is still general and is not focusing on diabetic foot preventive efforts. In addition, the preventive efforts have not been emphasizing the foot care. This is in line with the previous research conducted by Kasiya et al [14] that discovered the inhibition in taking care of foot is the lack of patients and healthcare service providers' awareness about foot care issues. In

this case, patients and healthcare service providers tens to prioritize glycemic control more [5].

Foot care and blood sugar level control are self-care aspect aiming to prevent the occurrence of wound. Diabetes mellitus patients with controlled blood sugar level (HbA1C 6%-7.5%) are known to be able to decrease their amputation risk [15]. In addition to controlling glycaemic, foot care practice is also able to prevent risk factor that can cause diabetic foot complication [16]. Previous research carried out by Chin et al [17] found that foot care has a role in preventing diabetic foot ulcer on diabetic neuropathy patients. Bad foot care on diabetes mellitus patients can cause serious problems, including foot amputation. Therefore, alternative approach is needed to prevent diabetic foot by involving the communities themselves.

2. Cadre Empowerment

Current healthcare development for developing country is involving the local commoners in preventing diseases. A qualitative study revealed that diabetic foot prevention is expected to be carried out by involving the communities, in this case is the cadres. Cadre is the ones chosen by the community to handle health issues and those related closely to the healthcare service. Olaniran et al in their systematic review explained that cadre is a commoner who has in-depth understanding about the community culture and language. In addition, they can also be considered as professional who received short extension compared to the health professionals. In this case, the primary purpose of cadre presence is to provide healthcare service in accordance with the community culture.

Factors that support the cadre presence in preventing diabetic foot is that cadre is in the environment of patients' residence so there is emotional closeness between the cadre and patient who can also be a companion for the patient. This is also supported by the statement given by Rifkin [18] who added that the lack of resources in healthcare service in providing intervention and basic prevention also support the presence of cadre. In this case, cadre has the potential to improve the knowledge, health behavior, and healthy results related to the prevention and management of diabetes mellitus type 2 in low and middle income countries [19].

Based on the information obtained from the interview, cadre involvement has not been structured in the program. Cadre usually only helps the service in *Posbindu* PTM (Integrated Guidance Post of Non-Communicable Disease) and *Posyandu Lansia* (Integrated Service Post of the Elderly). However, no specific program focusing on diabetic foot of diabetes mellitus patients have been implemented. In addition, cadre has not received extension regarding diabetic foot prevention, so cadre understanding concerning the matter is lacking. Therefore, program or intervention in improving cadre empowerment is needed.

3. Cadre Empowerment Strategy

Cadre empowerment is a process aiming in cadres' changes, which is initially unwilling to become willingly, know nothing to become know, and unable to become capable. Mendenhall [20] and Rodriguez et al [21] found that cadre empowerment program in diabetes management or control focus more on the results of physical health, knowledge regardung diabtes, sel-care behavior, emotional pressure and well-being. Cadres involved receive intervention in the forms of extension program [22,23] and structured education of diabetes management [24,25] to improve their knowledge, skill and roles.

Based on the results of this research, in the case of empowerment process, cadres need extension particularly focusing on diabetic foot prevention. In addition, there are also several factors need to be concerned in cadres empowerment program, including the unavailability of funding and time setting. Therefore, cross-sectoral approach and support from health workers are needed for the cross-program. It becomes the strategic efforts in carrying out cross subsidy in fulfilling cadre empowerment program needs.

4. Role of Cadre

Presence of the role of cadre becomes a supporting factor in the cadre-based diabetic foot preventive programs. The results of this research further revealed several information, including the importance of cadre involvement in disease management. In addition, diabetes mellitus patients' need for cadre presence to give simulation of foot care. Another role of cadre is providing direct education to the patients and their family, becomes a communicator between the patient and health workers, as well as helping the patients in diabetic foot risk screening. These results are according to the systematic review research carried out by Hill et al that explains the role of cadre as an educator, supporter in giving treatment, care coordination, and social support.

In line with another previous study by Egbujie et al [26], cadre indeed has important role as educator, supporter, and advocate. They also have potential as changes agent. Coordination concept in providing care is categorized as a role in advocacy on patients, for example helping the patients in communicating with the health workers and accessing the health sources. Messenger et al [27] further stated that cadre is also an *informal care giver* who takes a role in diabetic foot care management. The activities carried out by cadre include conducting negotiation and monitoring, helping patients in taking decision and giving support. Furthermore, in the case of empowerment program, cadre can also carry out his role in giving health education about self-care management of diabetes mellitus patients, establishing a meeting class, home visit, and providing social support in diabetes management [22,28].

5. Foot Care Behavior

Foot care is an activity that can be carried out daily by diabetes mellitus patients. The results of current research discovered that there is difficulties in educating diabetes mellitus patients. In addition, low adherence of diabetes mellitus patients in carrying out foot care and patients' tendency in carrying out foot care only after wound occurs were found in this research as well. such results were also found in previous studies [29,30] that foot care behavior on diabetes mellitus type 2 patients are categorized low. Similar research was also carried out by Rezende Neta et al [31] who illustrated that diabetes mellitus patients have bad adherence in taking care of their foot.

Likewise the research carried out by Gholap & Mohite et al [32] through their statement saying that only 22% of diabetes mellitus patients who have good behavior in taking care of their foot. Furthermore, research was also carried out in Indonesia by AHS et al [33] finding that knowledge (M=46.7, SD=14.6) and behavior of foot care (M=46.7, SD=10.9) of diabetes mellitus patients are categorized bad. Hence, intervention is needed to improve knowledge and behavior in taking care of foot by diabetes mellitus patients in Indonesia. This can be realized through a program of awareness in early detection and foot care issue [34].

6. Knowledge

Understanding in preventing disease must be followed by suitable behavior. Some studies revealed that knowledge has significant relationship with foot care practice [32, 35–37]. Research results found that diabetes mellitus patients do not really understand how to take care of their foot. They are not aware of the diseases they suffered from can cause diabetic foot complication. This is in line with the research done by Gholap & Mohite [32] who said that only 24% diabetes mellitus patients who have good knowledge in taking care of their foot.

The lack of knowledge on diabetes mellitus patients occur due to the lack of openness of patients regarding their disease condition and the lack of health education regarding foot care from the healthcare service. Therefore, health education, information, and communication

regarding foot care need to be improve according to the understanding of diabetes mellitus patients. [38].

7. Perception

The perception of diabetes mellitus patients concerning their disease is one of the predictors of their foot care behavior [39]. This is in line with the research carried out by Indrayana et al [40] who stated that disease perception becomes a predictor in the behavior of taking care of foot on diabetes mellitus patients in Indonesia. Based on the *Health Belief Model* theory, to change someone's behavior, the first step to do is to change their perception [41]. In the theory, the perception referred to perception of susceptibility, severity, benefits, inhibition, taking action, and motivation. When someone feels prone to disease they suffered from then they will take an action based on the benefits and easiness in conducting the action [42].

The results of this research found that the perception of diabetes mellitus patients regarding the severity of their disease and complication risk is low. Patients are not aware that they already have symptoms leading to diabetic foot risk factor. However, diabetes mellitus patients tend to underestimate their disease. This cause their low awareness in taking care of their foot. Furthermore, this result is also supported by the finding of correlation between the presence of sign to take action and diabetes mellitus patients' perception on the severity of their disease ($P<0.001$) [43].

8. Self-Efficacy

Diabetes mellitus is a chronic disease that cannot be healed but must be controlled in order to prevent the occurrence of complication. Such condition tends to cause boredom on diabetes mellitus patients, and even decrease of motivation for self-care. *Health Belief Model* theory explains that someone's behavior is affected by his own belief or perception. The presence of postponement in carrying out prevention due to belief can affect the occurrence of complication.

The result of this research revealed that patients' belief and motivation is low. Patients feels bored with their disease so they are lazy to carry out self-care. They also tend to think that they do not have any issue. The patients even think that they are not confident or believe that they can overcome their problems. This makes patients lack of opening themselves and tend to close themselves. Therefore, adequate approach is needed to build communication to change diabetes mellitus patients' belief about foot care.

Such condition is in line with the findings of research by Hjelm et al [44] that found the presence of belief or perception about diabetic foot wound and lack of understanding, leading to the effects on foot care behaviour. Therefore, efforts are needed to improve patients' belief and knowledge in taking care of their foot as an effort to prevent diabetic foot.

9. Patient and family Strengthening

Forming someones' behavior can be linked to the presence of support system owned. Family support is known as one of the predictors in forming diabetes mellitus patients behavior in taking care of their foot . Active support from the family and social support from neighbor or closed ones can improve patients' motivation to control their disease. In this case, family has emotional bond and family interaction at home has an essential role to prevent the occurrence of complication [45-51].

The result of this research found that family is ready to give support to diabetes mellitus patients. However, patients sometimes neglected the advice from their family. In addition, the program holder in Public Health Center also finds difficulties in making the family as patients' companion. It is difficult to give extension to the family, because they also do not really understand the disease suffered by their family member. Hence, patient and their family need support to prevent the occurrence of diabetic foot through social support.

This support or strengthening aims to improve their knowledge in preventing diabetic foot. Good knowledge will change their perception and efficacy so that it can improve their behavior to take care of their foot. This is expected to also decrease the diabetic foot risk.

CONCLUSION

This qualitative study explains that the preventive efforts of diabetic foot in the community can focus on the education intervention concerning foot care and cadre empowerment. Cadre involvement needs to be supported through extension as well as cross-sectoral and cross-program approaches. Meanwhile, the issues found concern the lack of knowledge, perception, efficacy, and behavior in taking care of foot in diabetes mellitus patients. Therefore, further study is needed to design proper intervention strategy to prevent diabetic foot in the community.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

REFERENCES

1. P. Zhang, J. Lu, Y. Jing, S. Tang, D. Zhu, and Y. Bi, "Annals of Medicine Global epidemiology of diabetic foot ulceration : a systematic review and meta-analysis," vol. 3890, 2017, doi: 10.1080/07853890.2016.1231932.
2. S. Yusuf *et al.*, "Prevalence and Risk Factor of Diabetic Foot Ulcers in a Regional Hospital , Eastern Indonesia," *Open J. Nurs.*, no. January, pp. 1–10, 2016, doi: http://dx.doi.org/10.4236/ojn.2016.61001.
3. PERKENI, "Pedoman Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 Dewasa di Indonesia.," p. 46, 2021, [Online]. Available: www.ginasthma.org.
4. Kemenkes RI, "Pedoman Teknis sPengendalian PTM di Puskesmas. pdf." Jakarta, 2013.
5. C. Guell and N. Unwin, "Barriers to diabetic foot care in a developing country with a high incidence of diabetes related amputations: An exploratory qualitative interview study," *BMC Health Serv. Res.*, vol. 15, no. 1, pp. 1–8, 2015, doi: 10.1186/s12913-015-1043-5.
6. T. Sohal, P. Sohal, K. M. King-Shier, and N. A. Khan, "Barriers and facilitators for type-2 diabetes management in south asians: A systematic review," *PLoS One*, vol. 10, no. 9, pp. 1–16, 2015, doi: 10.1371/journal.pone.0136202.
7. A. Olaniran, H. Smith, R. Unkels, S. Bar-Zeev, and N. van den Broek, "Who is a community health worker? - A systematic review of definitions," *Global Health Action*. 2017. doi: 10.1080/16549716.2017.1272223.
8. J. Hill, N. Peer, B. Oldenburg, and A. P. Kengne, "Roles, responsibilities and characteristics of lay community health workers involved in diabetes prevention programmes: A systematic review," *PLoS ONE*. 2017. doi: 10.1371/journal.pone.0189069.
9. A. D. B. Marques, A. K. S. Texeira, T. M. M. Moreira, R. E. F. L. de Carvalho, A. V. de M. Fialho, and E. M. C. Chaves, "Nursing Interventions For The Prevention Of Foot Ulcers In Patients With Diabetes: An Integrative Review," *Int. Arch. Med.*, vol. 10, pp. 1–8, 2017, doi: 10.3823/2433.

10. Tini, Darmawansyah, R. Amiruddin, Masni, and A. Mallongi, "Cadre Interventions on Health Outcomes of Diabetes Mellitus Patients: Systematic Review of Randomized Control Trial," *Pharmacogn. J.*, vol. 15, no. 4, pp. 697–702, 2023, doi: 10.5530/pj.2023.15.139.
11. A. Coppola, L. Sasso, A. Bagnasco, A. Giustina, and C. Gazzaruso, "The role of patient education in the prevention and management of type 2 diabetes: an overview," *Endocrine*, vol. 53, no. 1, pp. 18–27, 2016, doi: 10.1007/s12020-015-0775-7.
12. S. K. Ahmad Sharoni, H. S. Minhat, N. A. Mohd Zulkefli, and A. Baharom, "Health education programmes to improve foot self-care practices and foot problems among older people with diabetes: a systematic review," *Int. J. Older People Nurs.*, vol. 11, no. 3, pp. 214–239, 2016, doi: 10.1111/opn.12112.
13. P. Adiewere, R. B. Gillis, S. Imran Jiwani, A. Meal, I. Shaw, and G. G. Adams, "A systematic review and meta-analysis of patient education in preventing and reducing the incidence or recurrence of adult diabetes foot ulcers (DFU)," *Heliyon*, vol. 4, no. 5, p. e00614, 2018, doi: 10.1016/j.heliyon.2018.e00614.
14. M. M. Kasiya *et al.*, "The challenge of diabetic foot care : Review of the literature and experience at Queen Elizabeth Central Hospital in Blantyre , Malawi," vol. 29, no. June, pp. 218–223, 2017.
15. R. Hasan *et al.*, "A systematic review and meta-analysis of glycemic control for the prevention of diabetic foot syndrome," *J. Vasc. Surg.*, vol. 63, no. 2, pp. 22S-28S.e2, 2016, doi: 10.1016/j.jvs.2015.10.005.
16. S. Chapman, "Foot care for people with diabetes: prevention of complications and treatment Sarah," *Br. J. Community Nurs. May*, vol. 22, no. 5, pp. 226–229, 2017, doi: 10.1212/WNL.57.12.2278.
17. Y. Chin, W. Wang, B. R. Hsu, and T. Huang, "The role of foot self-care behavior on developing foot ulcers in diabetic patients with peripheral neuropathy: a prospective study," *Int. J. Nurs. Stud.*, 2014, doi: 10.1016/j.ijnurstu.2014.05.001.
18. S. B. Rifkin, "Community Health Workers," in *International Encyclopedia of Public Health*, 2017. doi: 10.1016/B978-0-12-803678-5.00083-7.
19. H. Alaofè *et al.*, "Community Health Workers in Diabetes Prevention and Management in Developing Countries," *Annals of Global Health*. 2017. doi: 10.1016/j.aogh.2017.10.009.
20. T. J. Mendenhall, "Community health workers in diabetes care: A systematic review of randomized controlled trials," *Fam. Syst. Heal.*, 2017, doi: 10.1037/fsh0000283.
21. H. P. Rodriguez, M. W. Friedberg, A. Vargas-Bustamante, X. Chen, A. E. Martinez, and D. H. Roby, "The impact of integrating medical assistants and community health workers on diabetes care management in community health centers," *BMC Health Serv. Res.*, vol. 18, no. 1, pp. 1–14, 2018, doi: 10.1186/s12913-018-3710-9.
22. M. Micikas *et al.*, "A Community Health Worker Intervention for Diabetes Self-Management Among the Tz'utujil Maya of Guatemala," *Health Promot. Pract.*, vol. 16, no. 4, pp. 601–608, 2015, doi: 10.1177/1524839914557033.
23. M. S. Spencer *et al.*, "Influence of a Community Health Worker Intervention on Mental Health Outcomes among Low-Income Latino and African American Adults with Type 2 Diabetes," *Race Soc. Probl.*, vol. 5, no. 2, pp. 137–146, 2013, doi: 10.1007/s12552-013-9098-6.
24. P. Balagopal *et al.*, "A Community-Based Participatory Diabetes Prevention and Management Intervention in Rural India Using Community Health Workers," *Diabetes Educ.*, vol. 38, no. 6, pp. 822–834, 2012, doi: 10.1177/0145721712459890.
25. N. S. Islam *et al.*, "Evaluation of a Community Health Worker Pilot Intervention to Improve Diabetes Management in Bangladeshi Immigrants With Type 2 Diabetes in New York City," *Diabetes Educ.*, vol. 39, no. 4, pp. 478–493, 2013, doi: 10.1177/0145721713491438.
26. B. A. Egbujie, P. A. Delobelle, N. Levitt, T. Puoane, D. Sanders, and B. van Wyk, "Role of community health workers in type 2 diabetes mellitus self-management: A scoping review," *PLoS ONE*. 2018. doi: 10.1371/journal.pone.0198424.
27. G. Messenger, N. Taha, S. Sabau, A. AlHubail, and A. M. Aldibbiat, "Is There a Role for Informal Caregivers in the Management of Diabetic Foot Ulcers? A Narrative Review," *Diabetes Ther.*, vol. 10, no. 6, pp. 2025–2033, 2019, doi: 10.1007/s13300-019-00694-z.
28. M. M. Hughes, E. Yang, D. Ramanathan, and M. R. Benjamins, "Community-Based Diabetes Community Health Worker Intervention in an Underserved Chicago Population," *J. Community Health*, vol. 41, no. 6, pp. 1249–1256, 2016, doi: 10.1007/s10900-016-0212-8.
29. M. S. D'Souza *et al.*, "Foot care behaviors among adults with type 2 diabetes," *Prim. Care Diabetes*, vol. 10, no. 6, pp. 442–451, 2016, doi: 10.1016/j.pcd.2016.04.002.
30. P. Bartolo, S. Mizzi, and C. Formosa, "An evaluation of foot care behaviours in individuals with type 2 diabetes living in Malta," vol. 17, no. 2, pp. 2009–2014, 2013.
31. D. S. Rezende Neta, A. R. V. da Silva, and G. R. F. da Silva, "Adherence to foot self-care in diabetes mellitus patients," *Rev. Bras. Enferm.*, vol. 68, no. 1, pp. 103–109, 2015, doi: 10.1590/0034-7167.2015680115p.
32. M. C. Gholap and V. R. Mohite, "To Assess the Knowledge and Practice Regarding Foot Care among Diabetes Patients at Krishna Hospital Karad Population Sample Sampling Research setting Diabetic patients attending OPD and admitted at Krishna Hospital , Fifty diabetic patients Purposive s," vol. 4, no. 2, pp. 69–75, 2013.
33. S. AHS, S. Sia W, and M. K, "Diabetic Foot Care Knowledge and Behaviors of Individuals with Diabetes Mellitus in Indonesia," *GSTF J. Nurs. Heal. Care*, vol. 5, no. 1, pp. 8–12, 2018, doi: 10.5176/2345-7198_5.1.4.
34. M. T. Al-Hariri, A. S. Al-Enazi, D. M. Alshammari, A. S. Bahamdan, S. M. AL-Khtani, and A. A. Al-Abdulwahab, "Descriptive study on the knowledge, attitudes and practices regarding the diabetic foot," *J. Taibah Univ. Med. Sci.*, vol. 12, no. 6, pp. 492–496, 2017, doi: 10.1016/j.jtumed.2017.02.001.
35. H. George *et al.*, "Foot care knowledge and practices and the prevalence of peripheral neuropathy among people with diabetes attending a secondary care rural hospital in southern India," *J. Fam. Med. Prim. Care*, vol. 2, no. 1, p. 27, 2013, doi: 10.4103/2249-4863.109938.
36. Y. Sari *et al.*, "Foot self-care behavior and its predictors in diabetic patients in Indonesia," *BMC Res. Notes*, vol. 13, no. 1, pp. 4–9, 2020, doi: 10.1186/s13104-020-4903-y.
37. N. Tini, "Analisis Faktor yang Berhubungan dengan Perilaku Merawat Kaki Mandiri pada Pasien Diabetes Melitus," vol. 10, no. 2, pp. 77–85, 2020.
38. T. M. Adeyemi, T. L. Olatunji, A. E. Adetunji, and S. Rehal, "Knowledge, practice and attitude towards foot ulcers and foot care among adults living with diabetes in tobago: A qualitative study," *Int. J. Environ. Res. Public Health*, vol. 18, no. 15, 2021, doi: 10.3390/ijerph18158021.
39. Y. Y. Usta, Y. Dikmen, S. Yorgun, and I. Berdo, "Predictors of foot care behaviours in patients with diabetes in Turkey," *PeerJ*, vol. 2019, no. 2, pp. 1–13, 2019, doi: 10.7717/peerj.6416.
40. S. Indrayana, S. E. Guo, C. L. Lin, and S. Y. Fang, "Illness Perception as a Predictor of Foot Care Behavior Among People With Type 2 Diabetes Mellitus in Indonesia," *J. Transcult. Nurs.*, vol. 30, no. 1, pp. 17–25, 2019, doi: 10.1177/1043659618772347.
41. N. A. Azadi, A. Ziapour, J. Y. Lebni, S. F. Irandoost, J. Abbas, and F. Chaboksavar, "The effect of education based on health belief model on promoting preventive behaviors of hypertensive disease in staff of the Iran University of Medical Sciences," *Arch. Public Heal.*, vol. 79, no. 1, 2021, doi: 10.1186/s13690-021-00594-4.

42. Lufthiani, E. K. Bukit, and C. T. Siregar, "'Health Belief Model' in the Prevention of Chronic Disease in the Elderly," *Kemas*, vol. 17, no. 4, pp. 500–508, 2022, doi: 10.15294/kemas.v17i4.27296.

43. L. Melkamu, R. Berhe, and S. Handebo, "Does patients' perception affect self-care practices? The perspective of health belief model," *Diabetes, Metab. Syndr. Obes. Targets Ther.*, vol. 14, pp. 2145–2154, 2021, doi: 10.2147/DMSO.S306752.

44. K. Hjelm and E. Beebwa, "The Influence of Beliefs About Health and Illness on Foot Care in Ugandan Persons with Diabetic Foot Ulcers," *Open Nurs. J.*, vol. 7, no. 1, pp. 123–132, 2013, doi: 10.2174/1874434601307010123.

45. Anwar Mallongi, Ezra Limbong, Furqaan Naiem, Hasanuddin Ishak, Syahrul Basri, Muh. Saleh, Aminuddin Syam, Laode Asrul, Health risk analysis of exposure to mercury (Hg) and cyanide (CN) in Kayeli village communities Teluk Kayeli district Buru regency, Enfermería Clínica, Volume 30, Supplement 4, 2020, Pages 427-430, ISSN 1130-8621, https://doi.org/10.1016/j.enfcli.2020.03.007.(https://www.sciencedirect.com/science/article/pii/S1130862120302424)

46. Anwar Mallongi, Anwar Daud, Hasanuddin Ishak, Ruslan La Ane, Agus Bintara Birawida, Erniwati Ibrahim, Makmur Selomo and Stang Abdul Rahman, 2017. Clean Water Treatment Technology with an Up-flow Slow Sand Filtration System from a Well Water Source in the Tallo District of Makassar. *Journal of Environmental Science and Technology, 10: 44-48.* **DOI:** 10.3923/jest.2017.44.48 **URL:** https://scialert.net/abstract/?doi=jest.2017.44.48

47. Rauf, A.U., Mallongi, A., Hatta, M. *et al.* Integrating dynamic modeling into health risk analysis to reduce the exposure of potentially hazardous elements. *Int. J. Environ. Sci. Technol.* (2024). https://doi.org/10.1007/s13762-024-05537-4

48. Muhith A, Winarti E, Perdana SSI, Haryuni S, Rahayu KIN, Mallongi A. Internal Locus of Control as a Driving Factor of Early Detaction Behavior of Servical Cancer by Inspection Visual of Acetic Acid Method. Open Access Maced J Med Sci [Internet]. 2020 Apr. 20 [cited 2022 Nov. 10];8(E):113-6.

49. Hasmi and Mallongi, A. 2016. Health Risk Analysis of Lead Exposure from Fish Consumption among Communities along Youtefa Gulf, Jayapura. Pakistan Journal of Nutrition, 15. 929-935.

50. Posmaningsih, S., Aryasih, S. K. M., Made, I. G. A., Choirul Hadi, M., Marwati, S. P., & Mallongi, A. (2018). The influence of media booklet in behavior change of waste management in elementary school students, South Denpasar, Bali. *Indian Journal of Public Health Research & Development*, *9*(8), 1506-1511.

51. Marlina, Badaruddin, Z. Fikarwin, and R. Lubis, "Model of family health empowerment preventing stroke in Puskesmas Ulee Kareng Banda Aceh," *J. Phys. Conf. Ser.*, vol. 1460, no. 1, 2020, doi: 10.1088/1742-6596/1460/1/012076.

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