



Body image related to quality of life diabetic ulcer patients[☆]



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KEYWORDS

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Abstract

Objective: Identify the relationship between body image with the quality of life of diabetic ulcer patients.

Method: This research design used a cross-sectional study in 97 diabetic ulcer patients at a wound care clinic in Jakarta, Indonesia was selected using consecutive sampling. Data were collected using the body image questionnaire to assess the body image and Short Form 36 (SF 36) questionnaire to assess the quality of life.

Result: The result showed that there was a significant relationship between body image with the quality of life diabetic ulcer patients (p -value = 0.001, α = 0.05). Beside of the body image, the factors affecting the quality of life diabetic ulcer patients were social, economic status (p = 0.007), grade of diabetic ulcer (p = 0.001), pain (p = 0.001) and odor (p = 0.002).

Conclusion: Body image assessment of diabetic ulcer patients is important as a basis for identifying body image to improve the quality of life by providing comprehensive nursing care. For further research is expected to discuss the relationship between body image with the quality of life in patients with other types of wound such as patients with wound cancer and amputation patients.

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Introduction

According to the World Health Organization (WHO), diabetes mellitus is a chronic disease that occurs when the pancreas cannot produce enough insulin or when the body cannot

use insulin production effectively.¹ WHO (2016) reported a worldwide prevalence of diabetes mellitus nearly doubled from 1980 to 2014, from (4.7%) to (8.5%) in the adult population, an estimated 108 million adults were living with diabetes mellitus in 1980, compared to 422 million in 2014. The World Health Organization also explained that 8.4 million people in Indonesia are living with diabetes mellitus in 2000, this number is predicted to increase by 2030 to 21.3 million people.²

Diabetes mellitus is a chronic disease characterized by high blood glucose level. Hyperglycemia if not managed properly can cause various complications. A diabetic ulcer

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is a frequent complication of diabetes mellitus patients, and the presence of ulcer may negatively affect to psychological aspect. Adverse psychological effects on patients with wounds occur when there are permanent changes in the structure or function of the body.³ According to Fauerbach et al., altered body image perception, decrease body image satisfaction and avoidance behavior may result from changes in appearance or function.⁴ Individuals who experience a change of perception to their body image may have an impact on the emergence of body image disturbance. In the study by Nizam, Hasneli, and Arneliwati obtained (56.7%) of diabetic ulcer patients have negative body Image.⁵

A diabetic ulcer is a complication of diabetes mellitus which affects the quality of life diabetes mellitus patients with diabetic ulcer. Owayolu et al., reveals that diabetes mellitus and diabetic foot ulcer reduced quality of life, and patients with diabetic foot ulcer had the lowest quality of life than patients without diabetic foot ulcer.⁶ Supporting the statement, Snyder and Hanft describes diabetic ulcer-causing pain and limit daily activities and social activities, leading to reduced quality of life of diabetic foot ulcer patients.⁷ In the study by De et al., explains that patients with diabetes mellitus and foot ulcer experience changes in the quality of life domains include the physical, social and psychoemotional.⁸

This study aimed to identify the relationship between body image with the quality of life of diabetic ulcer patients.

Method

This research design used a cross-sectional study in 97 diabetic ulcer patients at a wound clinic in Jakarta, Indonesia was selected using consecutive sampling. In this study, data were collected in the period from May to June 2017. Data were collected using three instruments. The first questionnaire contained questions about respondent characteristics. The second instrument was the body image questionnaire to assess the body image. And the third instrument was the Short Form 36 (SF 36) questionnaire to assess the quality of life.

Results

Table 1 shows the results majority of respondents aged <60 years (66.0%) and (54.6%) respondents were female (62.9%). Respondents had a high level of education and (73.2%) respondents had a low level of social, economic status. The majority of respondents (50.5%) reported having other complications (presence of complications associated with diabetes mellitus). Most patients with diabetes mellitus had the disease >5 years (54.4%). Most of diabetes mellitus patients with diabetic ulcer had a duration of diabetic ulcer <6 months (76.3%). The majority (51.5%) of respondents reported severe pain, deep grade of diabetic ulcer (79.4%), diabetes category of random blood glucose (56.7%), and mild odor (72.2%).

Table 2 shows the results (17.5%) of diabetic ulcer patients had a positive body image, while (82.5%) of diabetic ulcer patients had negative body image.

Table 3 shows that the mean score of quality of life diabetic ulcer patients 63.72 ± 11.987 .

Table 1 Respondent characteristics.

| No | Respondent characteristics | Frequency N (%) |
|-----|--------------------------------------|-----------------|
| 1. | <i>Age</i> | |
| | Age <60 years | 64(66.0%) |
| | Age >60 years | 33(34.0%) |
| 2. | <i>Gender</i> | |
| | Female | 53(54.6%) |
| | Male | 44(45.4%) |
| 3. | <i>Education level</i> | |
| | Low | 36(37.1%) |
| | High | 61(62.9%) |
| 4. | <i>Social economic status</i> | |
| | Low | 71(73.2%) |
| | High | 26(26.8%) |
| 5. | <i>Other complications</i> | |
| | Yes | 49(50.5%) |
| | No | 48(49.5%) |
| 6. | <i>Duration of diabetes mellitus</i> | |
| | <5 years | 44(45.6%) |
| | >5 years | 53(54.4%) |
| 7. | <i>Duration of diabetic ulcers</i> | |
| | <6 months | 74(76.3%) |
| | >6 months | 23(23.7%) |
| 8. | <i>Pain</i> | |
| | Mild | 47(48.5%) |
| | Severe | 50(51.5%) |
| 9. | <i>Grade of diabetic ulcers</i> | |
| | Deep | 77(79.4%) |
| | No Deep | 20(20.6%) |
| 10. | <i>Random blood glucose</i> | |
| | Normal | 42(43.3%) |
| | Diabetes | 55(56.7%) |
| 11. | <i>Odor</i> | |
| | Mild | 70(72.2%) |
| | Severe | 27(27.8%) |

Table 2 Distribution of body image diabetic ulcer patients.

| Variable | Frequency | Percentage (%) |
|-------------------|-----------|----------------|
| <i>Body image</i> | | |
| Positive | 17 | 17.5 |
| Negative | 80 | 82.5 |

Table 3 Distribution of quality of life diabetic ulcer patients.

| Variable | Mean | SD | Min–Max | 95% CI |
|-----------------|-------|--------|---------|-------------|
| Quality of life | 63.72 | 11.987 | 42–87 | 61.31–66.14 |

Table 4 The relationship between body image with quality of life.

| Variable | N | Mean | SD | MD (95% CI) | p value |
|------------------------|----|-------|--------|----------------|---------|
| <i>Quality of life</i> | | | | | |
| Positive body image | 17 | 73.61 | 10.292 | 11.990 | 0.001* |
| Negative body image | 80 | 61.62 | 11.298 | (6.086–17.894) | |

* Significant ($\alpha = 0.05$).

Table 4 shows that the mean score of quality of life of respondents with positive body image 73.61 ± 10.292 , while the mean score of quality of life of respondents with negative body image 61.62 ± 11.298 . The results show that there was a significant relationship between body image with the quality of life ($p = 0.001$, $\alpha = 0.05$).

Table 5 shows factors affecting the quality of life diabetic ulcer patients. The results show that social, economic status ($p = 0.007$), grade of diabetic ulcer ($p = 0.001$), pain ($p = 0.001$) and odor ($p = 0.002$) related to the quality of life. While age ($p = 0.216$), gender ($p = 0.139$), education level ($p = 0.090$), duration of diabetes mellitus ($p = 0.543$),

Table 5 The relationship between factors affecting quality of life with quality of life diabetic ulcer patients.

| No | Quality of life | N | Mean | SD | SE | MD (95% CI) | T | p-Value |
|----|--------------------------------------|----|-------|--------|-------|---------------------|--------|---------|
| 1 | <i>Age</i> | | | | | | | |
| | <60 years | 64 | 64.71 | 11.619 | 1.452 | 2.901 | 1.131 | 0.261 |
| | >60 year | 33 | 61.81 | 12.632 | 2.199 | (-2.191 to 7.994) | | |
| 2 | <i>Gender</i> | | | | | | | |
| | Male | 44 | 65.70 | 12.561 | 1.894 | 3.624 | 1.492 | 0.139 |
| | Female | 53 | 62.08 | 11.346 | 1.558 | (-1.199 to 8.447) | | |
| 3 | <i>Education level</i> | | | | | | | |
| | Low | 36 | 61.03 | 10.805 | 1.801 | -4.277 | -1.715 | 0.090 |
| | High | 61 | 65.31 | 12.446 | 1.594 | (-9.228 to 0.675) | | |
| 4 | <i>Social economic status</i> | | | | | | | |
| | Low | 71 | 61.76 | 11.635 | 1.381 | -7.334 | -2.759 | 0.007* |
| | High | 26 | 69.09 | 11.481 | 2.252 | (-12.610 to -2.058) | | |
| 5 | <i>Duration of diabetes mellitus</i> | | | | | | | |
| | <5 years | 44 | 64.54 | 10.804 | 1.629 | 1.498 | 0.611 | 0.543 |
| | >5 years | 53 | 63.04 | 12.950 | 1.779 | (-3.371 to 6.368) | | |
| 6 | <i>Duration of diabetic ulcers</i> | | | | | | | |
| | <6 months | 74 | 63.02 | 11.824 | 1.375 | -2.943 | -1.029 | 0.306 |
| | >6 months | 23 | 65.97 | 12.497 | 2.606 | (-8.622 to 2.737) | | |
| 7 | <i>Grade of diabetic ulcers</i> | | | | | | | |
| | Deep | 77 | 60.68 | 10.630 | 1.211 | 14.772 | 5.644 | 0.001* |
| | No Deep | 20 | 75.45 | 9.578 | 2.142 | (9.576 to 19.968) | | |
| 8 | <i>Other complications</i> | | | | | | | |
| | Yes | 49 | 62.65 | 11.521 | 1.646 | -2.163 | -0.888 | 0.377 |
| | No | 48 | 64.81 | 12.471 | 1.800 | (-7.001 to 2.675) | | |
| 9 | <i>Pain</i> | | | | | | | |
| | Mild | 47 | 68.62 | 11.862 | 1.730 | 9.509 | 4.235 | 0.001* |
| | Severe | 50 | 59.11 | 10.233 | 1.447 | (5.051 to 13.967) | | |
| 10 | <i>Odor</i> | | | | | | | |
| | Mild | 70 | 66.07 | 11.890 | 1.421 | 8.425 | 3.253 | 0.002* |
| | Severe | 27 | 57.64 | 10.110 | 1.946 | (3.284 to 13.565) | | |
| 11 | <i>Random blood glucose</i> | | | | | | | |
| | Normal | 42 | 62.19 | 11.816 | 1.823 | -2.707 | -1.103 | 0.273 |
| | Diabetes | 55 | 64.89 | 12.092 | 1.631 | (-7.578 to 2.164) | | |

* Significant ($\alpha = 0.05$).

duration of diabetic ulcer ($p=0.306$), other complications ($p=0.377$) and random blood glucose ($p=0.273$) not related to quality of life.

Discussion

The results of this study indicate that respondents who have a positive body image (17.5%) less than respondents who have a negative body image (82.5%). These results supported by Salome et al., which revealed that venous leg ulcer patients had low self-esteem and negative feeling about their own body.⁹ Most respondents have negative body image as a result of physical problems include changes in body appearance and body function. In the study by Nizam, Hasneli, and Arneliwati reveals that changes in body appearance, changes in body function, comparisons of others and reactions of others are factors that affect body image of diabetic ulcer patients.⁵

The results of this study show the mean score of quality of life diabetic ulcer patients 63.24 ± 11.987 . De et al., in study of 100 respondents who were divided into 50 diabetes mellitus patients without diabetic ulcer as a control group and 50 diabetes mellitus patients with diabetic ulcer as study group.⁸ Observations were performed on all domains and obtained the mean score of each domain in the study group were lower than in the control group, which can be concluded that the quality of life diabetes mellitus patients with diabetic ulcers lower than diabetes mellitus patients without diabetic ulcers.

A diabetic ulcer is a common complication of diabetes mellitus that can affect the quality of life. According to Ovayolu et al., diabetes mellitus and diabetic foot ulcers can decrease the quality of life, and patients with diabetic ulcer have the lowest quality of life than patients without diabetic foot ulcer.⁶ Gilpin and Lagan reported people with diabetes mellitus had a lower quality of life than people without chronic disease.¹⁰ Price explains that health-related quality of life diabetic foot ulcer patients may lower than amputation patients.¹¹ Lower quality of life in diabetic foot ulcer patients because many diabetic foot ulcer patients fear of recurrence ulceration, repeated of infection and high risk to disability.

This study shows that there is a significant relationship between body image with the quality of life diabetic ulcer patients ($p=0.001$). These results similar with research in Iran about body image and quality of life in female patients with breast cancer and health women, and obtained results there is a significant relationship between body image with the quality of life in female patients with breast cancer and health women.¹² In the study by Shen et al., toward Ankylosing Spondylitis patients in China explains that body image disturbance associated with poor quality of life in all sub domain.¹³

According to Rhoten, Murphy, and Ridner, patients with head and neck cancer high risk for body image disturbance due to visible disfigurement resulting from its cancer and the treatment.¹⁴ A study about the psychosocial effects of diabetes mellitus patients with amputation concluded that body image disturbance influenced by its amputation.¹⁵ In diabetic ulcer patients, a diabetic ulcer can affect body image is caused by the negative perception of their body

resulting from the ulcer and treatment, thus affecting the quality of life. Have a good body image is a predictor to enhance the quality of life in all sub domain, and create a positive body image perception is important to improve the quality of life.¹⁶

The findings of this study show there is no significant relationship between age with the quality of life diabetic ulcer patients ($p=0.261$). The same finding revealed by Al-Shehri about the quality of life diabetic patients in Saudi reported that there is no relationship between age, occupation, and education with the quality of life.¹⁷ In contrast, the previous study reveals that a lower quality of life occurs in older person patients (>65 years) and longer duration of treatment.¹⁸

In this study shows that there is no significant relationship between gender with quality of life diabetic ulcer patients ($p=0.139$). These results are similar to research by Issa and Baiyewu which explains there is no relationship between gender and quality of life.¹⁹ Women with diabetic ulcers have a lower quality of life than men with diabetic ulcer.²⁰ Women have a lower quality of life than men because it relates with social status, social roles and also expectations.⁶

The result of statistical test shows that there is no significant relationship between education level with quality of life diabetic ulcer patients ($p=0.090$). These results supported that education was not significantly associated with quality of life.¹⁷ In the study by Spasic et al., concluded that statistically, the level of education does not affect the quality of life diabetes patients.¹⁸ Education is one of an important factor in understanding the management of self-care, glycemic control and perception of self-worth.²¹ Level of education will affect people to understand the disease and the treatment to be performed. Kakhki and Saeedi explains that level of education can affect to the job, therefore affect socioeconomic, and consequently access to health services and to well-being.²²

The result of this study shows that there is a significant relationship between social, economic status with quality of life diabetic ulcer patients ($p=0.007$). These results similar with research by Didarloo and Alizadeh there is a relationship between family income with quality of life diabetes mellitus patients.²³ Sociodemographic characteristics of patients associated with lower quality of life patients with diabetes mellitus are lower socioeconomic status, older person, and female gender.²⁴ Diabetic ulcer patients with low income have more problems than high income because of diabetic ulcer associated with high costs to treatment.

The result of the statistical test shows that there is no significant relationship between the duration of diabetes mellitus with the quality of life diabetic ulcer patients ($p=0.543$). Similarly, there is no relationship between duration of diabetes mellitus with quality of life diabetes mellitus patients.²³ Goz et al., states there in no relationship between the duration of diabetes mellitus and quality of life.²⁵ This finding is contrary to the results of a previous study that insulin treatment and duration of diabetes mellitus were the two most important factors associated with quality of life.²⁶ Long duration of diabetes mellitus associated with worst health-related quality of life.²⁷

In this study shows that there is no significant relationship between duration of diabetic ulcer with the quality of life

diabetic ulcer patients ($p=0.306$). The results of this study are contrary to the results of a previous study by Valensi et al., that duration of the diabetic ulcer may affect the quality of life.²⁸ Family and caregiver support are necessary to provide information and motivation about wound healing. Patients with long duration of diabetic ulcer, if followed by family and caregiver support, it will increase the motivation and adherence of patients to treat the wounds. According to Miller and DiMatteo, family support in diabetes mellitus patients was associated with better adherence to diabetes treatment.²⁹

The result of this study shows that there is a significant relationship between grade of diabetic ulcer with the quality of life diabetic ulcer patients ($p=0.001$). These results are similar with research by Niranjana, Santwani, and Baghel that grade of diabetic ulcer associated with quality of life.³⁰ This results supported by Ribu et al., which states that grade of diabetic ulcer related to the quality of life diabetic ulcer patients.³¹ A study reveals having a higher grade of ulcer (grades 3 and 4 according to Wagner's classification) related to lower scores in all quality of life domains.²⁴ Yekta, Pourali, and Ghasemi-rad reveals high grade of ulcer is predictor health-related quality of life impairment in diabetic foot ulcer patients.³² Grade of the diabetic ulcer may illustrate a disease process that may interfere with activities and social interaction. Grade of diabetic ulcer affects time healing and can lead to interfering in the job, therefore affect finances condition, and consequently to the cost of treatment directly.

The results of statistical test show that there is no significant relationship between other complications with the quality of life diabetic ulcer patients ($p=0.377$). This finding is contrary to the results of a previous study about health-related quality of life patients with diabetes mellitus and diabetic ulcer in Turkey, which resulted in diabetes mellitus patients with complications and patients with other chronic diseases besides diabetes mellitus had lower scores of quality of life.⁶

The results of this study show that there is a significant relationship between pain with the quality of life diabetic ulcer patients ($p=0.001$). These results similar with a study by Vymetalova and Zelenikova, pain ulceration significantly affects the quality of life patients with diabetic foot syndrome.³³ Herber, Schnepf, and Rieger reveals that pain described in qualitative and quantitative studies as the worst for patients living with ulcer.³⁴ According to Obilor and Adejumo, pain on diabetic foot ulcer occurs at rest, during activities and dressing changes.³⁵ Pain is subjective, and each patient has a different perception of perceived pain. The impact of pain contribute to stress, and it can affect the wound healing process. On the other hand, pain from the chronic wound can effects sleep, feelings of depression and interfere to social interaction.

The result of this study shows that there is a significant relationship between odor and quality of life diabetic ulcer patients ($p=0.002$). In the study by Jones et al., reveals that odor and excessive exudate can affect the psychological aspect, leading to a feeling of disgust, self-loathing and also low self-esteem.³⁶ Malodorous have a negative impact on social life.³⁷ Patients with foot ulcer are reportedly not leaving their house when the dressing soaked with fluid from the wound. The unpleasant smell from the ulcer can affect

the quality of life because odor can affect the psychological and social aspects. According to Castro and Santos, unpleasant odor is a frequent and distressing concern for patients with infected wound.³⁸

The findings of this study show that there is no significant relationship between random blood glucose with the quality of life diabetic ulcer patients ($p=0.213$). According to Al-Shehri the worst quality of life occurs in diabetes mellitus patients with poor control of diabetes, while the best quality of life occurs in patients with excellent control of diabetes.¹⁷ Blood glucose control is one of main component of diabetic foot ulcer management that can ensure rapid healing of diabetic foot ulcer.³⁹ Diabetes mellitus is characterized by high blood glucose level. Diabetes mellitus patients at risk of diabetic ulcer, or if diabetic ulcer already exists and not managed properly, then the wound healing process becomes longer resulting from poorly blood glucose control.

Based on the results concluded that body image related to the quality of life diabetic ulcer patients ($p=0.001$, $\alpha=0.05$). Body image assessment of diabetic ulcer patients is important as a basis for identifying body image to improve the quality of life by providing comprehensive nursing care. For further research is expected to discuss the relationship between body image with the quality of life in patients with other types of wound such as patients with wound cancer and amputation patients. As well as the need for further research to discuss body image interventions that can improve the quality of life diabetic ulcer patients.

Conflict of interests

The authors declare no conflict of interest.

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References

1. World Health Organization. *Global report on diabetes*. Geneva: World Health Organization; 2016. ISBN 978 92 4 156525 7.
2. Perkeni. *Konsensus: Pengelolaan dan pencegahan diabetes melitus tipe 2 di Indonesia 2015*. Jakarta: PB Perkeni; 2015.
3. Ousey K, Edward KL. Exploring resilience when living with a wound – an integrative literature review. *Healthcare*. 2014;2:346–55, <http://dx.doi.org/10.3390/healthcare2030346>.
4. Fauerbach JA, Heinberg LJ, Lawrance JW, Munster AM, Palombo DA, Richter D, et al. Effect of early body image dissatisfaction on subsequent psychological and physical adjustment after disfiguring injury. *Psychosom Med*. 2000;62:576–82.
5. Nizam WK, Hasneli Y, Arneliwati A. Faktor-faktor yang mempengaruhi citra tubuh pasien diabetes melitus yang mengalami ulkus diabetikum. *JOM PSIK*. 2014;1:1–7.
6. Ovayolu O, Ovayolu N, Igde S, Kilic SP. Health-related quality of life patient with diabetes mellitus and diabetic foot in the Southeastern Anatolia region of turkey. *Int J Caring Sci*. 2014;7:176–87.
7. Snyder RJ, Hanft JR. Diabetic foot ulcers – effects on quality of life, cost, and mortality and the role of standard wound care and

- advanced-care therapies in healing: a review. *Ostomy Wound Manage.* 2009;55:28–38.
8. De SA, Almeida, Do PF, Santo E, Pereira RD, Salome GM. Assessment of the quality of life patients with diabetes mellitus and foot ulcer. *Braz J Plast Surg.* 2013;28:142–6, <http://dx.doi.org/10.1590/S1983-51752013000100024>.
 9. Salome GM, Almeida SA, Pereira MT, Massahud MR, Mereira CN, Brito MJ, et al. The impact of venous leg ulcers on body image and self-esteem. *Adv Skin Wound Care.* 2016;29:316–21, <http://dx.doi.org/10.1097/01.ASW.0000484243.32091.0c>.
 10. Gilpin H, Lagan K. Quality of life aspects associated with diabetic foot ulcers: a review. *Diab Foot J.* 2008;11:56–62.
 11. Price P. The diabetic foot: quality of life. *Clin Infect Dis.* 2004;39:129–31, 1058-4838/2004/390352-0010\$15.00.
 12. Bagheri M, Mazaheri M. Body image and quality of life in female patients with breast cancer and healthy women. *J Midwifery Reprod Health.* 2014;3:285–92, <http://dx.doi.org/10.22038/jmrh.2015.3584>.
 13. Shen B, Zhang A, Liu J, Da Z, Xu X, Liu H, et al. Body image disturbance and quality of life in Chinese patients with ankylosing spondylitis. *Psychol Psychother: Theory Res Pract.* 2013;87:324–37, 10.1111/papt.l2016.
 14. Rhoten BA, Murphy B, Ridner SH. Body image in patient with head and neck cancer: a review of the literature. *Head Neck Oncol.* 2013;49:753–60, <http://dx.doi.org/10.1016/j.oraloncology.2013.04005>.
 15. McDonald S, Sharpe L, Blaszczynski A. The psychosocial impact associated with diabetes-related amputation. *Diab Med.* 2014;3:1424–30, <http://dx.doi.org/10.1111/dme.12474>.
 16. Nayir T, Uskun E, Yurekli MV, Devran H, Celik A, Okyay RA. Does body image affect quality of life? A population based study. *PLOS ONE.* 2016;11:1–13, <http://dx.doi.org/10.1371/journal.pone.0163290>.
 17. Al-Shehri FS. Quality of life among Saudi diabetics. *J Diab Mellitus.* 2014;4:225–31, <http://dx.doi.org/10.4236/jdm.2014.43032>.
 18. Spasic A, Radovanovic RV, Dordevic AC, Stefanovic N, Cvetkovic T. Quality of life in type 2 diabetes patients. *Sci J Faculty of Med Nis.* 2014;31:193–200, <http://dx.doi.org/10.2478/afmnai-2014-2024>.
 19. Issa BA, Baiyewu O. Quality of life patient with diabetes mellitus in a Nigerian Teaching hospital. *Hongkong J Psychiatry.* 2006;16:27–33.
 20. Haria JM, Singh VK, Jain SK. Life with diabetic foot ulcer – across sectional study. *Int J Sci Study.* 2014;1:33–5.
 21. Nyanzi R, Wamala R, Atuhairi LK. Diabetes and quality of life: a Ugandan perspective. *J Diab Res.* 2014:1–9, <http://dx.doi.org/10.1155/2014/402012>.
 22. Kakhki AD, Saeedi ZA. Health-related quality of life of diabetic patients in Tehran. *Int J Endocrinol Metab.* 2013;11:1–6, <http://dx.doi.org/10.5812/ijem.7945>.
 23. Didarloo A, Alizadeh M. Health-related quality of life and its determinants amongst women with diabetes mellitus: a cross-sectional analysis. *Nurs Midwifery Stud.* 2016;5:1–7, <http://dx.doi.org/10.17795/nmsjournal28937>.
 24. Zelenikova R, Buzgova R, Janikova E, Jarosova D. Evaluation of quality of life of patients with diabetic foot syndrome in selected healthcare facilities of Moravian Silesian region. *Ošetř porod asist.* 2014;5:2–8.
 25. Goz F, Karaoz S, Goz M, Ekiz S, Cetin I. Effect of the diabetic patient's perceived social support on their quality of life. *J Clin Nurs.* 2007;16:1353–60, <http://dx.doi.org/10.1111/j.1365-2702.2007.01472.x>.
 26. Dimerici H, Cinar Y, Bayram N, Bilgel N. Quality of life in type II diabetic patients in primary health care. *Danish Med J.* 2012;59:1–5.
 27. Gonen S, Gungor K, Cilli AS, Kamis U, Akpınar Z, Kisakol G, et al. Comprehensive analysis of health related quality of life in patients with diabetes: a study from Konya Turkey. *Turk Jem.* 2007;11:81–8.
 28. Valensi P, Girod I, Baron F, Moreau-Defargez T, Guillon P. Quality of life and clinical correlates in patients with diabetic foot ulcers. *Diab Metab.* 2005;31:263–71, [http://dx.doi.org/10.1016/S1262-3636\(07\)70193-3](http://dx.doi.org/10.1016/S1262-3636(07)70193-3).
 29. Miller T, DiMatteo MR. Importance of family/social support and impact on adherence to diabetic therapy. *Diab Metab Syndr Obes.* 2013;6:421–6, <http://dx.doi.org/10.2147/DMSO.S36368>.
 30. Niranjani Y, Santwani MA, Baghel MS. Quality of life consequences in diabetic polyneuropathy. *Global J Res Med Plants Indig Med.* 2012;1:295–300.
 31. Ribu L, Hanestad BR, Moum T, Birkeland K, Rustoen T. Health-related quality of life among patients with diabetes and foot ulcers: association with demographic and clinical characteristics. *J Diab Complications.* 2007;21:227–36, <http://dx.doi.org/10.1016/j.jdiacomp.2007.02.001>.
 32. Yekta Z, Pourali R, Ghasami-rad M. Comparison of demographic and clinical characteristics influencing health-related quality of life in patients with diabetic foot ulcer and those without foot ulcers. *Diab Metab Syndrome Obes: Target Ther.* 2011;4:393–9, <http://dx.doi.org/10.2147/DMSO.S27050>.
 33. Vymetalova R, Zelenikova R. Painful ulceration and quality of life of patients with the diabetic foot syndrome. *Cent Eur J Nurs Midw.* 2016;7:512–7, <http://dx.doi.org/10.15452/CEJNM.0023.201607>.
 34. Herber OR, Schnepf W, Rieger MA. A systematic review on the impact of leg ulceration on patient's quality of life. *Health Qual Life Outcomes.* 2007;5:1–12, <http://dx.doi.org/10.1186/1477-7525-5-44>.
 35. Obilor HN, Adejumo PO. Assessment of diabetic foot ulcer-related pain and its relationship to quality of life. *Wound Pract Res.* 2015;23:124–31.
 36. Jones JE, Robinson J, Barr W, Carlisle C. Impact of exudate and odour from chronic venous leg ulceration. *Nurs Standard.* 2008;22:53–61, <http://dx.doi.org/10.7748/ns2008.07.22.45.53.c6592>.
 37. Bistreau R, Teodorescu M. Venous leg ulcer-patient compliance to treatment and impact on quality of life. *J Exp Med Surg Res.* 2009;16:97–102.
 38. Castro DL, Santos VL. Controlling wound odor with metronidazole: a systematic review. *Rev Esc Enferm USP.* 2015;49:851–6, <http://dx.doi.org/10.1590/S0080-623420150000500021>.
 39. Yazdanpanah L, Nasiri M, Adarvishi S. Literature review on the management of diabetic foot ulcer. *World J Diab.* 2015;6:37–53, <http://dx.doi.org/10.4239/wjd.v6.i1.37>.