The impact of discomfort: Physical and psychological to social interaction in diabetic ulcer patients in Jakarta – Indonesia☆

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Abstract
Objective: Identify the correlation of discomfort physical and psychological to social interaction on diabetic ulcer patients.
Method: This research design used Cross-sectional design was applied in this study with 69 samples that had been recruited from a clinic of wound care in Jakarta, Indonesia. The instruments used in this research were Bates–Jensen Wound Assessment Tool (BWAT) and The Rand Social Health Battery.
Results: Data statistics analyzed using independent *t*-test showed that wound degree had no significant relationship with social interaction ($p = 0.448$, $\alpha = 0.05$). However, this study concludes that the related factor of social interaction is odor ($p = 0.009$), psychology ($p = 0.010$) and stress ($p = 0.005$).
Conclusion: This study recommended the importance of paying attention to the psychological comfort of physical discomfort to increase the social comfort of diabetic ulcer patients.
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Introduction

Diabetes mellitus (DM) is a metabolic disorder characterized by high blood sugar levels resulting from insulin damage.[1] World Health Organization stated that there were 422 million adult citizens who are diabetics (8.5% of the population) in 2014.[2] This has been increasing since 1980 which only amounts to 108 million citizens (4.7% of population). One of

Table 1 Univariate characteristics analysis.

No	Variable	Mean	SD	95% CI
1	*Wound degree*	28.96	9.161	26.76; 31.16
2	*Age*	55.78	8.024	53.86; 57.71
3	*Wound age*	19.20	22.013	13.91; 24.49
4	*BMI*	24.91	4.781	23.76; 26.06
5	*Pain*	3.65	3.226	2.88; 4.43
6	*Odor*	1.16	1.779	0.73; 1.59
7	*Shame*	1.57	3.220	1.13; 2.00
8	*Psychological status*	225.918	20.61	20.96; 30.86
	Stress	07.78	7.098	7.08; 10.49
	Anxiety	77.33	6.557	5.75; 8.91
	Depression	77.19	7.695	5.34; 9.04

the most common complications in DM patients is neuropathy which may lead to a diabetic ulcer.

A diabetic ulcer is classified by its severity. The more severe the wound, the more likely it is to cause other problems, such as physical, psychological, and social problems. The diabetic wound appearance and odor may alter the patients' comfort. Thus it keeps patients' from socialize because it may make the patients feel ashamed.

A study done by Astuti reported that the respondents with diabetic ulcer were also experiencing the poor psychosocial problem.[3] Therefore, the respondents were having problem to adapt to their social environment. The existing study showed that diabetic ulcer patients had poor adaptability in their social environment. The wound may also lead patients to feel depressed, thus may prolong the wound healing. The other study about wound degree showed that there was a correlation between wound degree and depression level of the diabetic ulcer patients with the *p*-value of 0.001.[4] Based on those phenomena, the study aimed to identify the correlation between wound degree and social interaction along with its factors that may affect diabetic ulcer patients' social interaction.

Method

This study used a cross-sectional method. The population in this study was all of the diabetic ulcer patients in a clinic of wound care in Jakarta. A sample of 69 patients was drawn using a consecutive sampling method. The instruments used were respondent's characteristic questionnaire, Bates–Jensen Wound Assessment instrument for measuring respondents' wound degree, The RAND Social Health Battery instrument for measuring respondents' social interaction frequency, and DASS-21 instrument to assess respondents' psychological status.

Both univariate and bivariate analysis was done to analyze the data. Univariate analysis was done to describe respondents' characteristic distribution (age, gender, BMI, diabetic wound age), the independent variable (wound degree), dependent variable (social interaction), and disturbance aspects (pain, odor, shame, mobilization, and psychological status).

Results

The wound degree range was 13–65. The age was ranged from 40 to 71 years old. The wound age range was 1–72 weeks. Respondents' BMI range was 16–28. The odor and the shame range was 0–6. The psychological status range was 2–96, with stress 0–32, anxiety 0–28, and depression 0–38.

Respondents in this study had a mean score for wound degree of 28.96 that can be categorized as a moderate wound. Mean score for respondents' age was in the middle adult category. Mean score for BMI was in the normal category. Mean score for pain, smell perception, shame, and psychological status were in the mild category (Table 1).

The result showed that respondents had poor social interaction. The majority of respondents were female (59.4%). The majority of patients had limited mobility (66.7%) (Table 2).

Bivariate analysis using chi-square test showed that 90.2% of female respondents had poor interaction. The study also found that there was no significant correlation between gender and social interaction ($p = 0.537$; $\alpha = 0.05$). The majority of respondents with mobility limitation also had poor social interaction (89.1%). The study found no significant correlation between mobilization and social interaction ($p = 0.190$; $\alpha = 0.05$) (Table 3).

The study also used independent *t*-test for bivariate analysis. The results revealed that respondents with a mean score of 56.22 years old had poor social interaction (SD = 8.112). Poor social interaction also found on the respondents who already had wound for 19.4 weeks or about 5 months (SD = 22.653). Respondents with a BMI score of 24.59 had poor social interaction (SD = 4.691). The study revealed that there was no significant correlation between the three variables (age, wound age, and BMI score) and social interaction (age $p = 0.249$; wound age $p = 0.849$; BMI $p = 0.161$; $\alpha = 0.05$) (Table 4).

Table 5 shows that the respondents with a mean wound degree of 29.28 (SD = 9.451) were also had a poor social interaction. The analysis resulted that there was no significant correlation between wound degree and social interaction.

The respondents with a mean pain level of 3.78 (SD = 3.309) were also had poor social interaction. The

Table 2 Univariate proportion analysis.

No	Characteristics of respondents	Frequency (100%)
1	*Social interaction*	
	Good	9 (13%)
	Poor	60 (87%)
2	*Gender*	
	Female	41 (59.4%)
	Male	28 (40.6%)
3	*Mobilization*	
	Limited	23 (33.3%)
	Unlimited	46 (66.7%)

Table 3 Bivariate characteristics analysis.

Variable	Social interaction		p	OR (95% CI)
	Good N (%)	Poor N (%)		
Gender			0.537	
Male	5 (17.9)	23 (82.1)		0.497 (0.121; 2.045)
Female	4 (9.8)	37 (90.2)		
Mobilization			0.144	
Unlimited	4 (17.4)	19 (82.4)		0.579 (0.140; 2.403)
Limited	5 (10.9)	41 (89.1)		

Table 4 The correlation between the respondents' characteristics and social interaction.

Social interaction	Mean	SD	SE	N	MD (95% CI)	T	p value
Age							
Good	52.89	7.149	2.383	9	3.328 (−2.382;9.038)	1.163	0.249
Poor	56.22	8.112	1.047	60			
Wound age							
Good	17.89	18.224	6.075	9	1.511 (−14.308;17.330)	0.191	0.849
Poor	19.40	22.653	2.924	60			
BMI							
Good	27.00	5.132	1.711	9	−2.406 (−5.792;0.980)	−1.418	0.161
Poor	24.59	4.691	0.606	60			

analysis resulted that there was no significant correlation between pain level and social interaction.

On the odor scale, the study found that respondents with a mean odor score of 1.28 (SD = 1.860) were had a poor social interaction. The study showed a significant correlation between wound odor and social interaction on diabetic ulcer patients ($p = 0.009$; $\alpha = 0.05$). The study also found poor social interaction on the respondents with a mean shame score of 1.63. However, there was no significant correlation found between shame and social interaction.

The respondents with poor social interaction had a mean psychological status score of 27.43 (SD = 21.443). The results showed that there was a significant correlation between psychological status and social interaction ($p = 0.010$; $\alpha = 0.05$). Specifically, the respondents with poor social interaction had a mean stress level of 9.33 (SD = 7.380). This showed that there was a significant correlation between stress level and social interaction. However, the results showed that there was no significant correlation between anxiety, depression, and social interaction.

Table 5 Social interaction based on the disturbance aspects of diabetic ulcer patients.

	Social interaction	Mean	SD	SE	N	MD (95% CI)	T	p value
Wound degree	Good	26.78	6.960	2.320	9	2.506 (−4.051; 9.062)	0.763	0.448
(13–65)	Poor	29.28	9.451	1.220	60			
Pain	Good	2.78	2.587	0.862	9	1.006 (−1.300; 3.311)	0.870	0.387
(0–10)	Poor	3.78	3.309	0.427	60			
Odor	Good	0.33	0.707	0.236	9	0.950 (0.262; 1.638)	2.823	0.009[*]
(0–6)	Poor	1.28	1.860	0.240	60			
Shame	Good	1.11	1.691	0564	9	0.522 (−0.761; 1.806)	0.812	0.420
(0–6)	Poor	1.63	1.813	0.234	60			
Psychological status	Good	15.78	9.298	3.099	9	11.656 (3.075; 20.236)	2.805	0.010[*]
(2–96)	Poor	27.43	21.443	2.768	60			
a. Stress	Good	5.11	3.018	1.006	9	4.222 (1.374; 7.071)	3.047	0.005[*]
(0–32)	Poor	9.33	7.380	0.953	60			
b. Anxiety	Good	4.67	3.162	1.054	9	3067 (−1.601; 7735)	1.311	0.194
(0–28)	Poor	7.73	6.874	0.887	60			
c. Depression	Good	3.78	3.232	1.077	9	3.922 (−1.526; 9.370)	1.437	0.155
(0–38)	Poor	7.70	8.049	1.039	60			

[*] Significant at $\alpha = 0.05$ on the independent t-test.

Discussion

The study revealed that respondents in this study had a mean age of 55.78 years old (range = 40–71 years old). A study was done by Gumaa, Shwaib, and Ali on 270 diabetes patients with 88 diabetic ulcer patients also had a similar mean age, which is 55.5 years old (range = 36–62 years old).[5] Another study with a sample of 617 respondents also showed that the respondents had a mean age of 65 years old (range = 22–91 years old).[6] These results showed that this study could not represent the correlation between age and social interaction because the majority of respondents were in the adult age category.

More than half of the respondents were female (59.4%). Contrary to this study, a study in Great Britain about patients' belief and mortality prediction on 160 respondents of diabetic ulcer patients reported that 75% of respondents were male.[7] Other study was done by Rahardiany and Gayatri about the measurement of Wagner wound scale analysis on diabetic ulcer patients also showed that the majority of respondents (54.2%) were male.[8]

The data analysis by Chi-Square revealed that there was no significant correlation between gender and social interaction. Noorkasiani, Heryati, and Ismail stated that social interaction is a form of interpersonal relation with no limitation between male and female because communication can be done by anyone.[9]

The data analysis also showed that the mean of patients' wound age was 22 weeks (range = 1–96 weeks or 2 years). The patients' wound age depends on the wound healing process, such as inflammation, proliferation, and remodeling phase.[10] A study done in Australia about the incidence and risk factor toward infection development on uninfected diabetic ulcer patients with a sample of 720 respondents reported that 383 respondents experienced wound healing in less than 3 months, while 181 respondents healed within 3–12 months, and 156 respondents had not healed within 12 months.[11] This showed that the wound healing process could not be predicted and there were factors that may affect the rate of the wound healing process.

The study showed that a mean BMI of the respondents was 24.91 (SD = 4.781) which still in the normal category. Body Mass Index (BMI) is one of the nutrition status indicators. Nutrition status may affect the wound healing process. This may happen because protein had a role in collagen synthesis, angiogenesis, fibroblast proliferation, and increasing immune system.[12] The Spearman correlation test showed a correlation with the p-value of 0.001 ($p < 0.05$). There was a significant correlation between BMI and blood glucose level on DM patients.[13] The authors assumed that BMI score might not alter social interaction because it is not one of the factors that may affect social interaction.

The data analysis resulted that the mean of patients' pain level was 3.65 (SD = 3.226). A study was done by Obilor, and Adejumo[14] about the correlation between diabetic wound pain and quality of life with a sample of 14 respondents reported that 50% of respondents experienced a moderate pain which in range of 4–16. This study revealed that there was no significant correlation between pain and social interaction with p-value of 0.387. In contrast with this study, Obilor and Adejumo reported a significant correlation between diabetic wound pain experience and quality of life (p value = 0.04).[14] The authors assumed that the respondents' pain might not affect social interaction directly. This may happen because during the data collecting process the majority of respondents had mild pain. Thus it may not affect social interaction.

The study revealed that the majority of the respondents had a limited mobilization (66.7%). Obilor and Adejumo stated that pain might correlate to ulcer patients' mobilization.[14] The higher the pain level, the more limited the mobilization. However, the study found no significant correlation between mobilization and social interaction with p-value of 0.144. The authors assumed that there was no correlation found because the communication media, such as telephone and social media, allows people to communicate without meeting face to face.

The wound odor is dependent on the wound dressing and treatment. If the wound had a good dressing and treatment, there would be no infection occur nor microorganism growth that may promote wound fluid and odor.[15] The independent t-test resulted that there was a significant correlation between odor and social interaction. The authors assumed that the wound odor might promote discomfort to interact. The discomfort may drive patients to avoid social environment.

The study also revealed that the mean of the respondents' shame scale was 1.57 (SD = 3.220) which can be categorized as slightly ashamed. The independent t-test resulted that there was no correlation between shame and social interaction with the p-value of 0.420 ($p > 0.05$). This may happen because the majority of the respondents stated that they did not experience shame or only felt a little bit of shame.

The study also assessed patients' psychological status using the DASS-21 questionnaire to identify patients' depression, anxiety, and stress level. The mean of the respondents' psychological status was 25.91 (SD = 20.61). Further analysis toward stress, anxiety, and depression showed that the mean score of the respondents' stress, anxiety, and depression level consecutively were 8.78, 7.3, and 7.19. A study done by Sinulingga about the psychological experience on diabetic ulcer patients with a sample of 76 respondents reported that 49 respondents (64.5%) had a severe stress level, 15 respondents (19.7%) had a moderate stress level, and 12 respondents (15.8%) had a mild stress level.[16] Other study done by Udovichenko, Maximova, Amosova, Yunilaynen, Bereseneva, and Starostina about the prevalence and prognosis of depression and anxiety on diabetic ulcer patients with a sample of 285 respondents reported that 110 respondents (39%) experienced depression while 103 respondents (36%) experienced anxiety.[17] The bivariate analysis using independent t-test in this study showed that there was a significant correlation between the psychological status and social interaction with a p-value of 0.010 ($p < 0.05$).

The independent t-test results showed that the respondents with a good social interaction had a mean wound degree of 26.78 (SD = 6.960). Meanwhile, the respondents with poor social interaction had a mean wound degree of 29.28 (SD = 9.451). There was no significant correlation found between wound degree and social interaction with the p-value of 0.448. A study done by Prianto and Damayanti about the correlation between self-image and social interaction reported that there was a significant correlation

between self-image and social interaction.[18] Another study about wound degree also reported that there was a correlation between wound degree and depression level on diabetic ulcer patients with a *p*-value of 0.001.[3]

The analysis showed that there was no correlation between wound degree and social interaction. Wound degree is a form of physical disturbance. Thus it may not affect social interaction directly. Wound degree may still affect social interaction because of the other factors, such as wound odor occurrence and psychological status.

The mean age of the respondents was 56 years old. The majority of the respondents were female. The mean wound age of the respondents was approximately 5 months. The mean BMI score of the respondents was in a normal range. There was no significant correlation found between wound degree and social interaction of diabetic ulcer patients. However, the results showed that there was a significant correlation between odor, psychological status, stress, and social interaction. Therefore, nursing assessment toward patients' psychological status is needed to increase patients' social comfort. Psychological factor needs to be concerned in order to assess patients' social comfort.

Conflict of interests

The authors declare no conflict of interest.

Acknowledgements

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