

Original Research Article Outline:**INFRARED THERAPY FOR CLIENTS WITH DIABETIC
GANGRENE AT THE SURABAYA WOUND CARE HOME :
ANALYTICAL DESCRIPTIVE STUDY**Sumiati^{1)*}, Arifin Hidayat²⁾¹⁾Nursing Study Program, Audi Indonesia University, Indonesia²⁾Nursing Department, Taipei Medical University Taiwan*Corresponding Author, E-mail: sumiyati@gmail.com**ABSTRACT**

Introduction : Diabetic gangrene is a complication of Diabetes Mellitus due to chronic neuropathy, vascular insufficiency and infection. Aggressive therapy for diabetic gangrene is needed so that leg amputation can be avoided, one of which is treating local wounds in the leg area using the infrared method. **Research. Method:** Descriptive analytic with a *cross sectional approach* was used in this research. The research respondents were 30 patients who underwent infrared treatment at the Surabaya Wound Care Home in Sidoarjo. The aim of this study was to determine the factors that influence compliance with infrared therapy. **Result & Analysis** : The research results showed that 18 respondents (60%) complied and 12 respondents (40%) did not comply, mean: 35.36 and standard deviation: 4.94. **Discussion** : Respondents who did not comply with infrared therapy were influenced by: the perceived benefits of the wound healing process were not felt enough, the length of the wound healing process, feelings of laziness caused respondents not to comply with recommendations, wounds that improved caused respondents to stop therapy.

Keywords : Compliance, Infrared, Therapy, Diabetic Gangrene**INTRODUCTION**

Diabetes Mellitus (DM) is a chronic disease caused by absolute or relative insulin deficiency, resulting in an increase in plasma glucose concentration (Silberngl & Lang, 2006). Data on the prevalence of people aged 20-79 years with DM in the world is recorded at 463 million (9.3%) of the world's population according to data from the International Diabetes Federation Organization. The prevalence is likely to increase in 2030 to 578 million and is estimated to reach 700 million people in 2045, quoted from data from the

Ministry of Health of the Republic of Indonesia, 2019. Indonesia apparently ranks 7th in 2019 based on the data summarized and China is in first rank of the data. Lifelong therapeutic management is needed to control blood sugar within normal limits by following a diet, exercising to increase insulin sensitivity and consuming drug or insulin therapy if blood sugar levels cannot be controlled with diet and exercise (L. Lin & Rypkema, 2002). The aim of good blood control is to prevent chronic complications of DM in the microvascular and macrovascular areas. Chronic macrovascular complications include coronary artery disease

and peripheral vascular disease, another complication that can occur is diabetic foot.

Diabetic feet and diabetic gangrene occur as a result of chronic neuropathy, vascular insufficiency accompanied by infection. The incidence of diabetic foot is estimated at 2% of the patient population with diabetes (American Diabetes Association, 2019). Aggressive therapy for diabetic gangrene is needed so that leg amputation can be avoided, one of which is treating local wounds in the leg area. (L. Lin & Rypkema, 2002) Proper management of diabetic feet or diabetic gangrene can prevent amputations. Therapy carried out includes: wound care/debridement, either conventional or using *modern dressings* and surgery if necessary, antibiotics according to culture results, *off loading* of the foot (American Diabetes Association, 2019). Therapy that can be applied as *an adjuvant for* diabetic feet or diabetic gangrene is infrared therapy which is also accompanied by wound care.

The application of infrared therapy for diabetic gangrene aims to accelerate wound healing by reducing the size of the wound and reducing the infection process (Nugraha, Wahyuni, & Saraswati, 2019). Research conducted (Juniarto, Ismanyah, & Hidayat, 2019) on 15 respondents with grade 2 and 3 diabetic foot ulcers using the wound healing scale from *the Bates-Jensen Wound Assessment Tool* showed that modern wound care methods accompanied by infrared therapy had an influence on the healing process of diabetic foot wounds, especially on the

wound regeneration process. Based on the benefits obtained with infrared therapy for treating diabetic gangrene wounds, researchers aim to determine the supporting factors that influence compliance with infrared therapy. Compliance with infrared therapy uses a questionnaire adopted from Bloom's theory which will assess the respondent's cognitive, affective and psychomotor areas.

METHOD & ANALYSIS

Research method uses descriptive analytics through a *cross sectional approach*. The research subjects were 30 respondents who experienced diabetic gangrene, consisting of 20 women (67%) and 10 men (33%) who received wound care accompanied by infrared therapy. The research instrument is a compliance level questionnaire to determine supporting factors in carrying out infrared therapy. The questionnaire uses the basis of Bloom's theory which assesses the cognitive, affective and psychomotor areas which have been tested for validity and reliability. The location of this research was carried out at the Surabaya Wound Care Home, Wonoayu District, Sidoarjo Regency which was carried out on 15-25 May 2019. Data collection techniques used questionnaires regarding compliance with infrared therapy and data analysis techniques using descriptive statistical tests to determine frequency, mean and standard deviation.

RESULTS

1. Respondent Characteristics

Table 1. Characteristics of Research Respondents

Variable	n	%
Gender		
Woman	20	67
Man	10	33
Last Education		
elementary school	11	37
JUNIOR HIGH SCHOOL	8	27

SENIOR HIGH SCHOOL	7	23
Bachelor	4	13
Monthly income		
< East Java UMR	28	93
In accordance with East Java UMR	2	7
Long suffering from diabetic gangrene		
< than 1 year	21	70
> from 1 year	2	7
> from 2 years	7	23
Frequency of visits per week		
1	5	17
2	19	63
3	5	17
4	1	3
Length of treatment undertaken		
1 year	25	83
1 year	4	14
2 years	1	3
Therapeutic benefits		
Client feels	26	87
Not felt by clients	4	13
Seriousness in undergoing therapy		
Are you serious	28	93
Not serious enough	2	7

Based on the demographic data above: the majority of respondents who participated were women, namely 20 people (67%), the majority of respondents' education level was elementary school, 11 people (37%), the majority of respondents had incomes below the minimum wage in Surabaya and East Java, 28 people (93

%), the majority of respondents had injuries < 1 year as many as 21 people (70%), the majority of respondents felt the benefits of therapy as many as 26 people (87%), and the majority of respondents were serious about taking therapy as many as 28 people (93%)

2. Research Result

Table 2. Research Result

Variable	n	%
Obedience		
Obedient	18	60
Not obey	12	40
Mean compliance	35.36	
Standard deviation	4.94	

Based on the research results above, the majority of respondents complied with infrared therapy in the management of diabetic gangrene, amounting to 18 people (60%) and Client compliance was 4.94, which has less varied meaning and shows that respondents are

the mean results of this study were 35.36, which means that the average of research respondents complied with infrared therapy. Standard deviation of research about obedient to following therapy at the Surabaya Wound Care Home.

3. Recapitulation Of Special Data From Research Results

Table 3. Recapitulation of specific data from research results

Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Total score
	-	+	-	+	-	+	-	-	+	-	+	-	+	
7	3	3	2	4	3	3	3	3	2	1	2	2	2	33
11	2	3	2	3	2	4	3	1	2	2	3	2	3	32
12	3	2	3	3	3	2	2	2	3	1	3	3	2	32
13	3	2	3	4	2	3	3	2	4	1	3	2	1	33
16	4	1	2	3	3	2	2	1	1	1	3	2	3	28
19	4	1	3	4	3	1	3	3	2	2	2	1	1	30
20	2	3	2	3	2	2	2	2	3	2	3	2	2	28
22	4	1	2	3	2	2	3	2	2	1	2	2	2	28
26	3	2	2	3	1	3	3	2	2	1	2	2	4	30
27	3	3	3	3	2	2	2	4	1	2	3	3	1	32
30	3	3	2	2	2	4	2	2	3	2	2	2	2	31

The recapitulation of the questionnaire data above uses a Likert scale with a rating of 1 to 4 with answer choices of strongly agree, agree, disagree, and strongly disagree. Positive statements get the highest score of 4 if the respondent answers strongly agree. Negative statements with answers of strongly disagree have the highest score of 4. Respondents are declared compliant if the assessment range is 34-55, and non-compliant if the score is in the range 13-33 as in the data recapitulation in table 3. The above recapitulation of respondent data is for 12 Respondents who did not comply with infrared therapy were assessed with 13 statements covering the cognitive area with 1 statement in Q1, affective 6 statements in Q2 to Q7 and psychomotor 6 statements in Q8 to 13. The recapitulation focused on describing respondents who did not comply with infrared therapy. at the Surabaya Wound Care Home is influenced by any factors.

The results of the research recapitulation showed that respondents who did not comply with infrared therapy were influenced by: the benefits felt in the wound healing process were less felt by 7

respondents (58%) from statement Q3, the length of the diabetic gangrene wound healing process caused 7 respondents to be reluctant to undergo therapy. (58%) obtained in Q5, feelings of laziness caused respondents not to comply with health care providers' recommendations expressed by 8 people (67%) obtained from Q8, improving wounds caused respondents to stop infrared therapy expressed by 12 people (100%) from Q10.

DISCUSSION

Based on table 1 regarding the characteristics of respondents in this study, the majority of respondents were women, namely 20 people (67%), 21 people (70%) had injuries < 1 year, 26 people (70%) felt the benefits of therapy, and 26 people (87%) felt the benefits of therapy seriously. 28 people (93%) . The majority of respondents in this study felt the benefits of infrared therapy to cure their diabetic gangrene, so they stated that they were serious about following the therapy according to the recommendations of health service providers. The perceived benefit of therapy provided to solve a problem or treat

a disease is one of the factors that influences compliance with following health care providers' advice. The therapeutic benefit factor as a supporter of respondent compliance is in accordance with the results of research conducted by (Ulum, Kusnanto, & Widyawati, 2014).

Table 2 explains that the majority of respondents complied with infrared therapy in the management of diabetic gangrene, amounting to 18 people (60%), the mean of the research results was 35.36, which means that the average respondent complied with infrared therapy. The standard deviation of research regarding client compliance is 4.94, which has less varied meaning and shows that respondents are obedient to following therapy at the Surabaya Wound Care Home.

The main objective of this research is to describe the factors that influence respondents to comply with infrared therapy. The focus of the discussion is aimed at respondents who do not comply with therapy based on table 3. Based on the results of research in the recapitulation of special data referring to the research questionnaire, it shows that compliance with therapy is influenced by: the perceived benefits of the wound healing process are less felt by respondents, the length of the healing process Diabetic gangrene wounds caused respondents to be lazy about undergoing therapy obediently, the feeling of laziness felt by respondents caused respondents not to comply with the recommendations of health service providers but no supporting data was obtained which caused this feeling of laziness to appear, wounds that showed the healing process was heading in a better direction caused respondents to stop infrared therapy.

The benefits of infrared therapy in the healing process for diabetic gangrene were felt to be less useful in the wound healing process and were stated by 7 respondents (58%), as a result of which respondents did not comply with the therapy. Factors that can influence Diabetes Mellitus sufferers to adhere to the treatment program include: gender, income, knowledge, perception of seriousness, perception of benefits, self-efficacy and family support based on the results of research conducted by (Ulum, Kusnanto, & Widyawati, 2014). The benefits experienced during the treatment process were felt to be less meaningful or as expected, causing respondents to not comply with the treatment. The wound healing process requires appropriate management, including: metabolic control to control blood glucose, lipid and albumin levels; vascular control to improve vascular intake through surgery or angioplasty, controlling infections that occur; controlling wounds through regular removal of infected tissue and necrosis, controlling pressure on certain areas that can cause ulcers, education about independent wound care (Muhartono & Novalia, 2017). Based on this research, it shows that the perceived benefits of the DM medication they are undergoing causes respondents to comply with the DM medication they are receiving. Other supporting research from (Nanda, Wiryanto, & Triyono, 2018) shows that 53.8% of non-compliant respondents from a total of 26 respondents who participated in the study experienced uncontrolled blood sugar regulation, with an OR value of 14 with a CI of 95% which shows that respondents who did not comply took medication 14 times.

The long healing process of diabetic gangrene wounds causes respondents to be reluctant to undergo therapy obediently, this was stated by 7 people (58%). Diabetic gangrene wounds take a long time to heal. Supporting components for successful wound healing include non-pharmacological methods through diet and exercise. If blood sugar control is not possible then pharmacological therapy is needed according to (L. Lin & Rypkema, 2002). Other supporting research on compliance was conducted by (Romadhon, Saibi, & Nasir, 2020) 8 respondents (43.6%) who were bored of having to take DM medication for a long period of time and had to take it regularly throughout their lives.

The feeling of laziness felt by 8 people (67%) caused them not to comply with the recommendations of health service providers but no supporting data was obtained which caused this feeling of laziness to appear. High self-efficacy is very necessary for the wound healing process and fighting feelings of laziness without knowing the cause. This is supported by research conducted (Ulum, Kusnanto, & Widyawati, 2014). This research showed that good self-efficacy in 16 respondents (57.1%) out of 28 respondents had an impact on good compliance in 6 people (21.4%). Good self-efficacy of respondents with gangrene pedis will influence attitudes and behavior, subjective norms regarding behavior, and perceived control over behavior to comply with therapy.

Wounds that showed the healing process was going in a better direction caused respondents to stop infrared therapy. Infrared therapy in addition to treating diabetic gangrene wounds has an effect on

wound repair, especially in grade 2 wounds. This process occurs due to increased oxidative metabolism which produces a lot of ATP which has an impact on normalizing cell function, eliminating pain and helping wound healing (Nugraha, Wahyuni, & Saraswati, 2019). Research supports this statement according to (Nanda, Wiryanto, & Triyono, 2018) because patients will stop DM medication because they feel they are healthy. Based on the facts above, patients with DM tend not to comply with DM treatment for the rest of their lives because they feel they are healthy and no longer need to comply with the treatment recommendations given in terms of diet, regular medication consumption and exercise. So education and assistance are needed to increase knowledge, motivation and self-efficacy in DM patients.

CONCLUSION

Based on the results of this research, it is stated that the risks of patients not complying with infrared therapy include: lack of perceived benefit from the treatment they are undergoing, the length of the wound healing process, feelings of laziness so they do not comply with treatment recommendations, wounds that appear to be improving cause it to stop. Based on this reality, it is important for us as health service providers to increase the knowledge, motivation and self-efficacy of DM patients to adhere to treatment throughout their life.

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