

# Hydrotherapy of Blood Glucose Level at Time for Deabetes Mellitus (DM) Patient

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**Abstract**—Diabetes Mellitus is a metabolic disease belonging to collection of symptoms for person due to an increase of blood glucose levels above normal to insulin deficiency, both in absolute and relative terms which cause high mortality rates in Indonesia. Hydrotherapy is one of the non-pharmacological therapies that aim to help the process of removing all the poisons in the body including excess blood glucose therefore it can reduce blood glucose levels in DM patients. This study aims to determine the effect of hydrotherapy on changes in blood glucose levels (KGD) of patients who have 2 types of DM in Public Health Center of Welahan 1 Jepara. This study used the pre experimental one group pretest-posttest design. The samples size were 34 respondents consisting of 17 respondents of each group taken by purposive sampling technique. Besides that, the test used is the T test and normality test using Shapiro Wilk. The result of this study obtains P value of 0,000 ( $\alpha < 0.05$ ) therefore there is an effect of hyprotherapy on blood glucose levels in DM patients in Public Health Center of Welahan 1 Jepara. The results of this study can be an input for health workers, especially in the Public Health Center of Welahan 1 Jepara to make hodrotherapy as one of the independent interventions.

**Keywords**—*Hydrotherapy, Blood Glucose, Diabetes Mellitus*

## I. INTRODUCTION

Diabetes Mellitus (DM) is a group of progressive chronic diseases characterized by the body's inability to break down the metabolism of carbohydrates, fats and proteins, resulting in hyperglycemia or high blood glucose levels [1]. High glucose or hyperglycine levels are marked with glucose levels when  $> 200$  mg / dl, fasting glucose levels  $> 126$  mg / dl (no calorie intake for 8 hours), 2 hours postprandial  $> 200$  mg / dl [2].

The prevalence of diabetes mellitus in the world in 2015 at the age range of 2-79 years was 415 million people (8.8%). It is estimated that it will increase by 2040 by 642 million people (10.4%). The highest prevalence in the world is China 109.6 million people and the 10th lowest country is Bangladesh with 7.1 million people. Indonesia ranks 7th out of the 10 highest countries with 10.0 million people with diabetes mellitus [3]. Indonesia in 2013 had the

proportion of population aged  $\geq 15$  years with DM was 6.9%, the highest prevalence of DM was found in DI Yogyakarta (2.6%), DKI Jakarta (2.5%), North Sulawesi (2.4 %), and East Kalimantan (2.3%). The highest prevalence of diabetes was found in Central Sulawesi (3.7%), North Sulawesi (3.6%), South Sulawesi (3.4%) and East Nusa Tenggara (3.3%)[4]

DM in Central Java in (2013) 110.86 inhabitants, in (2014) increased to 121.20 people. For the year (2015 Tw) 46.64 inhabitants.[5]. Central Java Province was ranked 3rd after Riau and Bangka Belitung Provinces [6]. In Jepara in 2016 there were 22,989 DM cases which ranked third from non-communicable diseases. Whereas for DM data in the work areas of Welahan Public Health Center in 2017 there were 1,122 cases with an average of 143 cases each year. From the data of the Jepara District Health Office in 2017 there were 16,823 DM patients, DM patients increased in 2015 by 20,367, and in 2016 the number of DM patients was 21,324 people [7].

Management of hyperglycemia that can be done by nurses in nursing activities to overcome the problem of hyperglycemia, one of which is complementary therapy that is needed to complement or strengthen conventional and biomedical treatment, in order to accelerate the healing process. Natural medicine treatments (complementary) handle the causes of disease and stimulate the body itself to cure the illness.

The complementary therapy that nurses can do is to encourage the patient to increase oral fluid intake and monitor the patient's fluid status. By drinking water can reduce obesity. The need for fiber and fluids can be fulfilled by doing health therapy that is the cheapest and very large benefits, namely by getting used to drinking water at least 8 glasses per day. Consumption of water (Hydrotherapy), helps the process of removing all the poisons in the body, including excess sugar [1].

Drinking water will break down sugar. To help remove chemicals such as glucose and substances through the kidneys and the cleansing process of organs, a large amount of fluid is needed at one time in the morning [2]. Lowering

blood sugar levels that are most appropriate for people with type 2 Diabetes Mellitus are by drinking lots of warm water, exercising a lot, and reducing food portions. Drinking lots of warm water will speed up sugar out through sweat and urine. This is caused by drinking warm water, the water will be more quickly absorbed by the stomach, and is a source of energy and energy. According to him also that drinking cold water (ice), will damage the stomach, duodenum, bile, and pancreas. Damage to the pancreas can cause diabetes mellitus [3].

This study was conducted to determine the effect of hydrotherapy on blood glucose levels in DM patients in the Work Area of Welahan 1 Health Center in Jepara Regency.

**II. RESEARCH METHOD**

This research used quasy experimental research. While the research design in this study used the pre experimental one group pretest - posttest research design. The population in this study was DM patients in Puskesmas Welahan 1, Jepara Regency, with an average number of diabetes mellitus patients each year of 213 patients. The sampling technique used purposive sampling.

The number of samples in this study was 34, by taking 25% of the total sample or if rounded up the number of respondents in this study was 29 people. And for the respondent the reserve or drop out is taken 10% from the total sample of the study which is 3 respondents. So, the number of respondents used as research samples is  $25\% \times 213 = 28.25 + 3 = 34$  people. Each group consisted of 17 respondents. For the intervention group in addition to

administering oral drugs to reduce glucose levels were also given 1.5 liters of water therapy shortly after waking up for 14 days. For the control group only received oral therapy to reduce blood gluosa levels. Data from the results of this study were analyzed using the T test statistic test.

**III. RESEARCH RESULT**

**TABLE 1. MOMENTARY BLOOD SUGAR LEVELS (KGDS) FOR TYPE 2 DM PATIENTS BEFORE ORAL THERAPY AND AFTER ORAL THERAPY ((CONTROL GROUP)**

Respondent	KGDS		% KGDS
	Before oral therapy	After oral therapy	
1	318	224	
2	209	178	
3	167	123	
4	216	197	
5	194	146	
6	234	210	40%
7	253	168	
8	268	180	
9	273	224	
10	346	253	
11	361	272	
12	268	192	
13	320	236	
14	291	256	
15	251	190	
16	254	189	
17	362	273	

From table I after being given oral therapy glucose levels when decreased by 40%

**TABLE II. MOMENTARY BLOOD SUGAR LEVELS (KGDS) FOR TYPE 2 DM PATIENTS BEFORE ORAL AND HYDROTHERAPY (H1) THERAPY AND AFTER ORAL AND HYDROTHERAPY THERAPY (H3 TO H14 INTERVENTION GROUPS)**

Respon dent	KGDS						% KGDS
	Byfore oral therapy	After therapy day 1	After therapy day3	Afre therapy day 5	After therapy day 7	After therapy day 14	
1	218	197	186	158	132	118	
2	209	178	156	124	109	100	
3	167	123	118	103	100	94	
4	216	197	182	165	143	145	
5	194	146	131	110	103	100	
6	234	210	198	164	138	120	
7	253	168	151	120	109	90	100 %
8	268	180	170	135	110	101	
9	273	224	193	173	159	134	
10	346	253	201	182	168	145	
11	361	272	224	198	162	132	
12	268	192	152	124	109	103	
13	320	236	210	196	193	176	
14	291	256	221	200	192	164	
15	251	190	136	110	101	98	
16	254	189	157	131	118	100	
17	362	273	223	206	185	154	

From table II after being given oral therapy and hydrotherapy for 14 days shortly after waking up the blood glucose level has decreased by 100%

**TABLE III. T-TEST OF THE CONTROL GROUP WITH THE INTERVENTION GROUP**

research group	Mean	SD	CI		Nilai T	P Value
			Lower	Upper		
Control	237,05	56,29	34,36	118,14	3,29	0,002
intervention	138,18	22,74	50,27	132,29	4,71	

#### IV. DISCUSSION

Hydrotreatment given to type 2 DM clients in Welahan the public health was carried out for 14 days given in the morning immediately after sleeping with drinking 1.5 liters of water in the work area of the public health. The analysis showed that the average blood glucose level (KGD) before hydrotherapy is 178.77 mg / dl, the average KGD after hydrotherapy is 157.59 mg / dl, from the statistical test results obtained  $p = 0,000$  ( $p < 0.05$ ), it can be concluded that there is a significant influence hydrotherapy for blood glucose levels in type 2 DM patients.

Hydrotherapy is one of the nursing interventions that can be given to DM patients to reduce blood glucose levels. This is in accordance with the opinion of [8] who said that to reduce blood sugar levels that are most appropriate for patients with type 2 diabetes mellitus is to drink lots of warm water, exercise a lot, and reduce food portions. Drinking lots of warm water will speed up sugar out through sweat and urine. This is caused by drinking warm water, the water will be more quickly absorbed by the stomach, and is a source of energy and energy.

Adjustment of water intake, diet and minerals will restore the situation and high blood sugar levels in the blood will be overcome [3]. Judging from the characteristics of the two respondents according to age, most respondents were in the age range of 45-60 years. According to [9] pathophysiologically the incidence of Type 2 DM occurs above 30 years of age. This is also reinforced by the theory conveyed by [10] that humans generally experience physiological changes that drastically decrease rapidly after the age of 40 years. Where this condition is caused in the elderly peripheral tissue receptor sensitivity to insulin has decreased

The older the age group the incidence of DM is increasing and 50-92% of elderly people experience impaired glucose tolerance. Rochmah further explained that the increase in blood glucose levels in old age is due to resistance that occurs due to changes in body composition, decreased activity, changes in diet and decreased neurohormonal function [11]

With 1.5 liters of water therapy (1500cc) coupled with oral therapy can reduce blood sugar levels for a moment in patients with Type 2 diabetes. The results of this study support that consuming large amounts of water in the morning after waking up is good [12]. Because in these conditions the stomach is empty so that the stomach wall can absorb water quickly, then flowed into the blood, then flowed by the blood to the kidneys and excreted through urine. The implementation of water therapy for 7 consecutive days based on the results of research and experience that of several diseases that can be cured with water therapy one of which is DM for 7 days. During 2 weeks of water therapy by doing exercises in the first week and continued in the second week in a row can reduce blood sugar levels for a moment.

#### V. CONCLUSION

The results of this study can be an input for health workers, especially in the Public Health Center of Welahan

1 Jepara to make hydrotherapy as one of the independent interventions.

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