THE RELATIONSHIP OF KNOWLEDGE ABOUT DIABETIC KETOACIDOSIS WITH INSULIN USE IN DM PATIENTS

Sara Tania*, Lisnawati, Lulu Lutfiah, Marlina Diana Kristianti

Bachelor of Nursing Study Program, Wijaya Husada Health Institute
Jl. Letjend Ibrahim Adjie, No. 180, Sindang Barang, Bogor, West Java, Indonesia
***corresponding author:** wijayahusada@gmail.com

ABSTRACT
Community data in the United States, Rochester shows that the incidence of DKA is 8 per 1000 DM patients per year. Even though there is no community data in Indonesia, it seems that the incidence of DKA in Indonesia is not as high as in Western countries, given the low prevalence of type-1 DM. Reports of DKA incidents in Indonesia generally come from hospital data, and especially in type-2 DM patients. This study aims to determine the relationship between knowledge of diabetic ketoacidosis and insulin use in DM sufferers. This research uses quantitative research and analytic design, this research is measured at the same time (cross sectional). Sampling in this study using accidental sampling technique as many as 92 respondents. Statistical test results using Chi-Square, obtained results as many as 53 respondents (58, 2%) with good knowledge and correct use of insulin with a p value of 0.039 (<0.05). There is a positive relationship between diabetic ketoacidosis and insulin use.

Keywords : Diabetic Ketoacidosis, Use of Insulin

INTRODUCTION

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both.

Seeing the tendency for an increase in the frequency of diabetes globally to be mainly caused by an increase in the affluence of a population, it is thus understandable that one day or more precisely within the next 1 or 2 decades the frequency of DM in Indonesia will increase drastically. This is in accordance with the estimates put forward by WHO, Indonesia will be ranked number 5 in the world with the number of people living with diabetes as many as 12.4 million people in 2025, up 2 levels compared to 1995 which amounted to 4.5 million people. 1 In line with WHO data 2016 , the population aged 30-69 years in Indonesia has a death rate due to diabetes of 48,300 with a predominant number of women at 58.3%.

There are two acute complications of DM, namely hypoglycemia and hyperglycemia. Hyperglycemia occurs in diabetic ketoacidosis (DKA), non-ketotic hyperosmolar (HNK) and lactic acidosis (AL). DKA ranks first as an acute complication followed by hypoglycemia

DKA is a severe and acute insulin deficiency resulting from a DM disease course. 3 DKA is a state of metabolic decompensation-disorder characterized by the triad of hyperglycemia, acidosis and ketosis, mainly caused by absolute or relative insulin deficiency. 1 DKA and hypoglycemia are

serious acute complications of DM and requires emergency management. As a result of osmotic diuresis, DKA usually experiences severe dehydration and can even cause shock

Community data in the United States, Rochester shows that the incidence of DKA is 8 per 1000 DM patients per year. Even though there is no community data in Indonesia, it seems that the incidence of DKA in Indonesia is not as high as in Western countries, given the low prevalence of type-1 DM. Reports of DKA incidents in Indonesia generally come from hospital data, and especially in type-2.1 DM patients

In developed countries with complete facilities, the mortality rate for DKA ranges from 9-10%, while in clinics with simple facilities and elderly patients the mortality rate can reach 25-50%. The number of KAD patients from year to year is relatively constant/not decreasing

There are two classifications of DM namely type I DM or also called insulin dependent diabetes mellitus (IDDM) and type II which is called non insulin dependent diabetes mellitus (NIDDM). Type I DM that is insulin dependent is characterized by the destruction of pancreatic beta cells caused by genetic factors. The patient does not inherit type diabetes itself, but inherits a genetic predisposition or predisposition towards

type I diabetes, immunological factors (autoimmune) and environmental factors that may be caused by certain viruses or toxins can trigger an autoimmune process that causes beta cell destruction. Type II DM is caused by relative beta cell failure and insulin resistance. Risk factors associated with the process of developing type 2 diabetes include age, obesity, history and family

Insulin is a hormone consisting of a series of amino acids, produced by beta cells of the pancreas gland. Under normal circumstances, when there is stimulation of the beta cells, insulin is synthesized and then secreted into the blood according to the needs of the body for the purposes of blood glucose regulation. and hepatic cells, and inhibits fat metabolism. 5 If there is interference with the mechanism of insulin action, it creates obstacles in glucose utilization and increases blood glucose levels. 1

Knowledge plays an important role to support the success of DM therapy. Patients who undergo DM therapy armed with knowledge about the disease and its therapy tend to have better therapeutic results. In addition to receiving oral anti-diabetic therapy, DM patients also receive insulin therapy. In the use of insulin, patient knowledge is absolutely necessary regarding the purpose and method of use. The use of insulin also has a dangerous effect if the patient uses it incorrectly. Insulin is an anti-DM drug that works with a fast onset

From the preliminary studies that have been conducted, there are a total of 8,657 visit data in 2017. December 2017, the total number of DM patient visits was 978. It can be concluded that DM patient visits are classified as large. The results of interviews with 10 DM patients, there is 1 type 1 DM patient who has had DM for 17 years, regularly uses insulin, controls to the hospital, family actively participates in the process of controlling the improvement of DM management results. Then 8 other DM patients classified as type 2. 4 patients said they were regular on medication and blood sugar control checks. While the other 4 said they sometimes forgot to take their medication according to the prescription, did not regularly check their blood sugar. However, patients said they did not experience negative effects if they were late or did not take the medicine according to schedule.

RESEARCH METHODS

The type of research used in this research is analytic research and correlational design with a cross sectional approach. The population in this study were diabetes mellitus patients in the internal medicine polyclinic with a total of 978 patients.In this study researchers used*accidental sampling*as many as 91 respondents. The data analysis used is univariate and bivariate (chi square).

RESEARCH RESULT

Table 1. Frequency distribution of knowledge of diabetic ketoacidosis in DM patients

No.	KAD Knowledge	Frequency	Percentage (%)
1.	Good	75	82.4
2.	Enough	0	0
3.	Not enough	16	17,6
	Total	91	100

Based on the results of table 1 above, it is known that of the 91 research respondents, the highest frequency distribution of knowledge of diabetic ketoacidosis was in the good knowledge category of 75 people (82.4%).

Table 2. Frequency distribution of insulin use in DM patients

No.	Use of Insulin	Frequency	Percentage (%)
1.	Correct	60	65,9
2.	Wrong	31	34,1
	Total	91	100

Based on the results of table 2 above, it can be concluded that of the 91 research respondents, the highest frequency distribution of insulin use was in the correct category of 60 people (65.9%).

Table 3. The relationship between knowledge about diabetic ketoacidosis and the use of insulin in DM sufferers

No.	Pengetahuan Ketoasidosis Diabetik	Pengggunaan Insulin Benar		Salah		Jumlah		OR	*P Value*
		N	%	N	%	N	%		
1.	Baik	53	58,2	22	24,2	75	82,4	3,097	0,039
2.	Kurang	7	7,7	9	9,9	16	17,6		
	Total	60	65,9	31	34,1	91	100		

Based on the results of table 3 analysis of the relationship between diabetic ketoacidosis and insulin use in DM sufferers from 53 respondents (58.2%) with good knowledge and correct use of insulin.

The results of statistical tests using the non-parametric Chi-Square test, obtained a p value of 0.039 (<0.05). Because the p value ≤ 0.05 then Ho is rejected and Ha is accepted, it can be concluded that there is a relationship between diabetic ketoacidosis and the use of insulin in people with DM. An OR value of 3.097 is also obtained, so it can be said that good knowledge of ketoacidosis will have a value of 3.097 times the the correct use of insulin in DM patients.

DISCUSSION

1) Diabetic Ketoacidosis Knowledge

KetoacidosisDiabetes is an emergency for DM sufferers which is characterized by hyperglycemia, ketonemia and sideemia. Is a serious acute complication in patients with DM. This emergency is still a cause of high morbidity and mortality in people with diabetes mellitus

Factors related to the emergency of KAD include KAP factors (knowledge, attitude and practice) and stress factors. Knowledge is the result of knowing and this occurs after someone senses a certain object. Knowledge or cognitive is a very important domain for the formation of one's actions. The knowledge possessed by a person will be the starting point for changing their attitude and behavior so that their life will be of a higher quality. It is not easy to see non-compliance related to patient failure to comply with clinical instructions.6

Based on table 1 of 91 respondents, 16 respondents (17.6%) had insufficient knowledge, no respondents had sufficient knowledge (0%), and 75 respondents (82.4%) had good knowledge.

According to the researcher's analysis, from the theory and research results above, there is harmony. In this study, the highest distribution in the education category was junior high school, senior high school and D3 with 52 people (57.1%). The educational background of the respondents also affects knowledge because the higher a person's educational level, the better the level of knowledge.

This is in line with previous research on the analysis of factors affecting the severity of diabetic ketoacidosis in diabetes mellitus patients by Ririn Ludfitri in 2016 who reported that 20 respondents obtained 7 respondents (35%) with sufficient knowledge, and 13 respondents (65%) with good knowledge. .

2) Use of Insulin

Insulin is a hormone produced by the beta cells of the islets of Langerhans in the pancreas gland. Insulin is formed from proinsulin which is then stimulated, especially by an increase in blood glucose levels, to be cleaved to produce insulin and a bridging peptide (C-peptide) which enters the bloodstream in large quantities. A number of proinsulin will also enter the blood circulation. Endogenous insulin is insulin produced by the pancreas, while exogenous insulin is insulin that is injected and is a pharmaceutical product.

Factors that cause errors in insulin use include limitations in terms of skill (skill-based), method or protocol (rule-based) and knowledge in terms of insulin use.

Based on table 2 of 91 respondents, 60 respondents (65.9%) used insulin correctly, 31 respondents (34.1%) used insulin incorrectly.

According to the researcher's analysis, there is harmony between the theory and the research results. according to theory, one of the factors that influence the use of insulin is knowledge and in this study it was found that respondents with good knowledge were the highest in the distribution of 75 respondents (82.4%). So that knowledge can affect the use of insulin.

This is in line with previous research on the relationship between knowledge and adherence regarding the use of insulin in diabetes mellitus patients at the internal medicine polyclinic of RSDUD DR.H Moch. Anasari Saleh Banjarmasin by Riza Alfian in 2016 who reported the results of 52 respondents obtained low adherence to insulin use by 21 respondents (40.38%), moderate level of compliance by 23 respondents (44.2%) and high level of compliance by 8 respondents (15.38%).

3) Relationship between diabetic ketoacidosis and insulin use in DM patients

KetoacidosisDiabetes is an emergency for DM sufferers which is characterized by hyperglycemia, ketonemia and sideemia. Is a serious acute complication in patients with DM. This emergency is still a cause of high morbidity and mortality in people with diabetes mellitus. Prevention efforts are important in the management of DM in a comprehensive manner. Secondary prevention efforts to prevent the occurrence of chronic and acute DM complications, through education are very important to obtain good patient medication adherence.13 Pharmacological interventions consisting of oral hypoglycemic drugs (OHO) and insulin injection preparations13

Insulin is a hormone produced by the beta cells of the islets of Langerhans in the pancreas gland. Insulin is formed from proinsulin which is then stimulated, especially by an increase in blood glucose levels, to be cleaved to produce insulin and a bridging peptide (C-peptide) which enters the bloodstream in large quantities. A number of proinsulin will also enter the blood circulation. Endogenous insulin is insulin produced by the pancreas, while exogenous insulin is insulin that is injected and is a pharmaceutical product.

Factors that cause errors in insulin use include limitations in terms of skill (skill-based), method or protocol (rule-based) and knowledge in terms of insulin use.

Based on table 3, the results are obtained*p-value*of 0.039 (≤ 0.05). Because the p value ≤ 0.05, Hodi Rejected and Ha are accepted, it can be concluded that there is a relationship between diabetic ketoacidosis and the use of insulin in DM sufferers.

According to the researcher's analysis, there is harmony between the theory and the research results. according to theory, one of the factors that influence the use of insulin is knowledge and in this study it was found that respondents with good knowledge were the highest in the distribution of 75 respondents (82.4%). So that knowledge can affect the use of insulin.So that these results can be aligned with the results of the analysis of the relationship between knowledge of diabetic ketoacidosis and insulin use, namely 0.039 (*p-value*≤ 0.05) which states that there is a relationship between knowledge of diabetic ketoacidosis and the use of insulin.

This is in line with previous research on the relationship between knowledge of insulin use and hypoglycemia in diabetes mellitus patients at the internal medicine polyclinic at GMIM Pancaran Kasih Hospital Manado in 2016 which reported that based on the chi square test, a p value was obtained of 0.005, which means that there is a relationship between knowledge of insulin use and hypoglycemia. .

CONCLUSION

1. DM patients have good knowledge about ketoacidosis of 82.4%
2. DM patients have correct use of insulin by 65.9%
3. Based on the results of bivariate analysis using the non-parametric Chi-Square test, the results obtained were a p value of 0.039 (<0.05) with an OR value of 3.097 so that Ho was rejected and Ha was accepted, it can be concluded that good knowledge of ketoacidosis will have a value of 3.097 times on the correct use of insulin in DM patients.

SUGGESTION

1. STIKes Wijaya Husada
   It is hoped that this research can become additional literature for the development of nursing student knowledge, especially in emergency department nursing regarding the relationship between knowledge about diabetic ketoacidosis and insulin use in DM sufferers. For example by updating the discussion material regarding the use of insulin.
2. Research Place
   It is hoped that this research will serve as material for evaluating health workers in providing motivation to patients in knowing diabetic ketoacidosis as an effort to use insulin in DM sufferers. For example by holding a seminar on the importance of using insulin properly.
3. Next researcher
   For future researchers who will conduct similar research, it is hoped that they can increase the sample, increase the comparison variables, and make direct observations in order to get more objective results and similar case studies.

BIBLIOGRAPHY

1. Aru W Sudoyo. Bambang Setiyohadi. Idrus Alwi. Marcellus Simadibrata K. Siti Setiati. 2007. Textbook of Internal Medicine. Jakarta: Publishing Center for Internal Medicine FKUI.
2. World Health Organization. 2016. Diabetes Country Profile. www.who.int/diabetes/country-profiles/idn_en.pdf?ua=1.
3. Dr. Dr. Sidartawan Soegondo, Sp PD-KEMD, FACE. Dr. Pradana Soewondo, Sp P-DKEMD. Dr. Imam Subekti, Sp PD-KEMD. 2007. Integrated DM Management. Jakarta: Publishing Center of FKUI
4. Nurarif, Amin Huda. Hardy Kusuma. 2015. Application of Nursing Care Based on Medical Diagnosis Nanda & NIC NOC. Yogyakarta: Mediation
5. Philip Jevon. Barveley Owens. 2009. Critical Patient Monitoring. Jakarta: Erlangga Publisher.
6. Ririn Ludfitri. 2016. Analysis of Factors Affecting the Emergency of Diabetic Ketoacidosis in Patients with Diabetes Mellitus.
7. Alfian, Riza. 2016. The Relationship Between Knowledge and Compliance About Using Insulin in Diabetes Mellitus Patients at the Hospital Internal Medicine Clinic. Dr. H. MOCH. ANSARI SALEH Banjarmasin.
8. Pelle, Cindy. 2016. The Relationship between Knowledge of Insulin Use and Hypoglycemia in Diabetes Mellitus Patients at the Internal Medicine Polyclinic at RSU GMIM PANCARAN KASIH Manado.
9. Yuliana Elin. Radjati Retnosari, et al. 2009. ISO Pharmacotherapy. Jakarta: ISFI
10. Oktadiansyah, Denny. 2014. Description of Knowledge Level of Taking Diabetes Medication in Type 2 DM Patients. Jakarta: University of Indonesia (Thesis)
11. Soegondo, Siddhartha. 2007. Integrated Management of Diabetes Mellitus. Jakarta:FKUI Research Center
12. dr. Helmanu Kurniadi, Ulfa Nurrahmani, S. Kep., Ns. 2015. STOP! Symptoms of Coronary Heart Disease, High Cholesterol, Diabetes Mellitus, Hypertension. Jakarta: Media Palace
13. Shahab, Alvi. 2017. Fundamentals of Endocrinology. Jakarta: Rayyana Communications
14. LeMone, Priscilla. Karen. garene. 2017. Textbook of Medical Surgical Nursing: Endocrine Disorders, ed.5. Jakarta. EGC
15. Bilous, Rudy. Richard. 2014. Handbook of Diabetes. Jakarta: Bumi Medika
16. Major, Henry. Herquutanto. 2014. Complications of Type 2 Diabetes: Prevention and Treatment. Jakarta: FKUI Issuing Agency
17. Kristiantoro, Daeng. 2014. Evaluation of How to Use Insulin Pen Injections in Diabetes Mellitus Patients at "X" Purwodadi Hospital.
18. Jahja, dr. Riawati. 2015. Insulin Regular. https://www.alomedika.com/obat/antidiabetes-parenteral/insulin-regular/indications-and-dose.
19. Wawan, A and Dewi M. 2011. Theory & Measurement of Knowledge, Attitudes, and Human Behavior. Yogyakarta: Nuha Medika
20. Notoatmojo, S. 2010. Health Research Methodology. Jakarta: Rineka Cipta
21. KBBI. 2016. Big Indonesian Dictionary (KBBI). http://kbbi.web.id/Pusat.
22. Agus, Riyanto. Dear. 2013. Capita Selecta Knowledge and Attitude Questionnaire in Health Research. New York: Salemba Medika
23. Donsu, Jenita Doli T. 2016. Nursing Research Methodology. Yogyakarta: New Press Library
24. Yusuf, A. Muri. 2014. Quantitative Research Methods, Qualitative & Joint Research. Jakarta: Prenadamedia Group
25. Please, Ulber. 2015. Quantitative Social Research Methods. Bandung: PT Refika Aditama

26. Arikunto, Suharsimi. 2010. Research Procedures A Practice Approach (Revised Edition 2010). Jakarta: PT. Rineka Cipta
27. Sugiono. 2015. Statistics for Research. Bandung: Alphabet
28. Sunyoto D. 2012. Validity and Reliability. Yogyakarta: Nuha Medika
29. Sugiono. 2012. Statistics for Research. Bandung: CV. Alphabet
30. Hamdi D. 2014. Quantitative Research Method Applications in Education. Yogyakarta: Deepublish
31. Sugiono. 2011. Quantitative Qualitative Research Methods R&D. Bandung: CV. Alphabet
32. Nursalam. 2008. Concepts and Application of Nursing Science Research Methodology. New York: Salemba Medika