

INFLUENCED HYPERTENSION AND HDL ON THE INCIDENCE OF KIDNEY FAILURE COMPLICATION IN DM TYPE II PATIENTS

Abstract

Introduction according to the international Diabetes Federation in the case of diabetes in the world 2015 ; 382 million, 2016 ; 415 million, 2017 ; 425 million, prevalence Indonesia 6.9%, North Sumatera 5.3%, and Medan 2.3%. The Objective of the research was to analyze the hypertension and HDL which influenced the incidence of kidney failure complication in DM Type II patients at RSUD dr. Pirngadi, Medan. The sample in the case group were 32 DM Type II patients with kidney failure complication, and in control group were 32 DM Type II patients without kidney failure complication. Each case of the subject was adjusted to the control according to age and sex. The data were analyzed by using chi square test, t-independent test, mann-whitney test, and multiple logistic regression analysis, the total of the 64 respondent. the result of multivariate analysis showed that hypertension OR ; 17.845, HDL OR; 7.049. The conclusion it was also found that the factor which the most dominant influence on the incidence of kidney failure complication in DM Type II patients was hypertension at the Population Attributable Risk of 91%. The Recommended was the DM Type II patients blood pressure should be controlled by applying dieting, physical activity, and taking medicines which are in line with DM Type II patients so that their glucose content and lipid profile which influence blood pressure and forestall the risk for kidney failure complication can be controlled.

Keywords: Diabetes Mellitus Type II, Kidney Failure, Hypertension, HDL

JEL Classification : fill in this section based on the JEL Codes by American Economic Association; separator uses a semicolon

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Citation:

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Introduction

Diabetes mellitus (DM) is a collection of symptoms that arise in a person caused by an increase in blood glucose levels due to a decrease in progressive insulin secretion against the background of insulin resistance (FKUI, 2014, and Papadakis, 2014). The 2012 WHO noted that in low and middle income countries more than 80% of deaths were caused by DM. By 2030 it is predicted that more than two-thirds (70%) of the global population will die from non-communicable diseases such as cancer, heart disease, stroke and DM (WHO, 2014, and Ministry of Health, 2012).

DM is the most common cause of kidney failure, almost 44% of cases exist. Even when DM can be controlled, this disease can still cause kidney failure. DM even causes 28.5% retinopathy, and 60% reduction in lower limbs (NIH, 2014, and ADA, 2014).

According to the 2014 International Diabetes Federation (IDF) data in Indonesia there was 5.8% prevalence of DM. 2013 Basic Health Research DM prevalence in Indonesia based on interviews diagnosed by doctors by 1.5%. DM is diagnosed by a doctor or symptom by 2.1% (IDF, 2014, and Riskesdas, 2012)

The prevalence of DM in Indonesia based on interviews in 2013 was 2.1%. This figure is higher than in 2007 1.1%. A total of 31 provinces (93.9%) showed a significant increase in DM prevalence (Ministry of Health, 2012). Riskesdas data in 2013 on the prevalence of DM in North Sumatra based on interviews diagnosed by doctors was 1.8%. DM is diagnosed by a doctor or symptom by 2.3%. The prevalence of DM patients in North Sumatra is almost close to the national average. North Sumatra has a prevalence of 5.3%, or only 0.4% below the national average which reached 5.7%. patients who have known that they have DM before are only 26%. While most of those diagnosed with DM or about 74% did not know of suffering from previous DM

Based on the preliminary survey conducted at the RSUD. Dr. Pirngadi Medan found the number of cases of diabetes mellitus (DM) with complications of kidney failure in 2012 as many as 20 cases, in 2013 as many as 6 cases, in 2014 as many as 65 cases

Based on the description of the various literature above, it is necessary to do research on cases of DM complications of renal failure in Dr. RSUD Pirngadi Medan

From the background above, the problems that will be studied further in this study are: What are the risk factors that affect DM cases of complications of kidney failure in Dr. RSUD Pirngadi Medan in 2015

The purpose of this study was to analyze what risk factors affected cases of DM complications of renal failure in Dr. RSUD Pirngadi Medan in 2015.

Methodology.

This research is a case control study. This study was conducted in Dr. Puliradi Hospital in Medan in 2017. The population of the case was all patients with Type II DM who had complications of kidney failure who visited the RSUD Dr. Pirngadi Medan in 2017.

The control population was that all Type II DM patients had no complications of kidney failure who visited Dr. Pirngadi Medan in 2017. Large sample group cases were 32 people with type II diabetes mellitus Complications of Kidney Failure and control group 32 people with Type II DM without Complications of Kidney Failure. The comparison of cases with controls was 1: 1, matching by age and sex.

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Results & Analysis

Univariate Analysis

In the univariate results, the distribution of family history in the case group is the same between having and not the proportion of 50.0%. In the highest control group, those who did not have a family history of Type II DM were 62.5%.

The highest distribution of blood glucose in the case group in blood glucose was not good (≥ 200 mg / dl), the proportion was 78.1%, as well as in the control group the proportion was 65.6%. The highest distribution of HbA1c in the case group was HbA1c not good (56.5%), the proportion was 71.9%, while the highest control group was good HbA1c (<6.5%) the proportion was 87.5%

The highest distribution of total cholesterol in the case group was not good total cholesterol (≥ 200 mg / dl), the proportion was 71.9%, while the highest control group in total cholesterol was good (<200mg / dl) the proportion was 59.4%. The distribution of the average HDL in the highest case group in HDL was not good (≤ 45 mg / dl), the proportion was 71.9%,

while the highest control group in HDL is good (> 45 mg / dl) the proportion is 71.9%.

The highest distribution of LDL in the case group in LDL was not good (≥ 100 mg / dl), the proportion was 68.8%, so was the control group with a proportion of 53.1%. The highest distribution of triglycerides in the highest case group in triglycerides was not good (≥ 150 mg / dl), the proportion was 65.6%, while the highest control group in triglycerides was good (<150mg / dl) the proportion was 59.4%.

The highest distribution of physical activity in the case group at risk of physical activity has a proportion of 56.2%, as well as in the control group the proportion is 53.1%

%. The highest distribution of hypertension in the case group in those with hypertension was 78.1%, while the highest control group in those who did not have hypertension was 81.2%. The long distribution of suffering from Type II DM in the highest case group suffered 10 years, the proportion was 75.0%, while the highest control group had a diabetes mellitus <10 years, the proportion was 71.9%.

The distribution of medication adherence in the highest case group in those who did not adhere to taking drugs had a score (<9) which proportion was 71.9%, while the highest control group in the obedient taking medication had a score (9) the proportion was 56.2%

The highest distribution of cardiovascular disease history in the case group had a history of cardiovascular disease (53.1%), while the highest control group was in those who did not have a history of cardiovascular disease (59.4%)

Bivariate Analysis

a. Categorical Data

In Table 1 it can be seen that the Chi-Square test results show that the variables that have an influence on the incidence of Type II DM complications fail

he kidneys were HbA1c averages ($p = <0.001$), average total cholesterol ($p = 0.012$), average HDL ($p = <0.001$), average triglycerides, ($p = 0.045$), hypertension ($p = <0.001$), duration of suffering from Type II DM ($p = <0.001$) diet (diet) ($p = <0.001$), medication adherence score ($p = 0.023$).

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Is this a characteristic of the basic data of research subjects?

Table 1. Effect of Risk Factors on Type II DM Events Complications of Kidney Failure in Dr. Hospital Pirngadi Medan

Faktor Risiko yang Dapat Diubah		
Jumlah		
Rata-rata HDL		
Tidak Baik (≤ 45 mg/dl)	<0,001	2,55 (1,53-4,24)
Baik (> 45 mg/dl)		
Jumlah		
Hipertensi		
Ya	<0,001	4,00 (2,30-6,93)
Tidak		
Jumlah		

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the table is made clearer is the result of the statistical calculation of the incidence of type II DM with complications of kidney failure and uncomplicated kidney failure with risk factors for hypertension and HDL levels

b. Numeric data

In Table 2, it can be seen that the results of different means show that there are significant differences in mean HDL, systolic and diastolic blood pressure between cases with controls ($p < 0.05$).

Table 2. Differences in Mean Risk Factors That Can Be Changed by Type II DM Events Complications of Kidney Failure

	Mean	P Value
HDL (mg/dl)		
Kasus		<0,001
Kontrol	44,44	
LDL (mg/dl)		
Kasus		<0,001
Kontrol	106,53	
Sistolik (mmHg)		
Kasus		
Kontrol	137,12	0,001
Diastolik (mmHg)		
Kasus		

Kontrol	147,78	0,001
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the table is made clearer is the result of the statistical calculation of the incidence of type II DM with complications of kidney failure and uncomplicated kidney failure with risk factors for hypertension and HDL levels

Multivariate Analysis

In Table 3, the results of multiple logistic regression tests show that HDL averages (p = 0.022), hypertension (p = 0.002 affect the incidence of Type II DM complications of renal failure. The most dominant variable affects the incidence of kidney failure in Type II DM patients in Dr. Pirngadi Hospital in Medan is hypertension with a regression coefficient value of 2.882 and Exp B (OR) 17.845 means that if Type II DM sufferers experience kidney failure 18 times more likely to have hypertension than Type II DM patients who do not experience kidney failure.

Tabel 3 Hasil Akhir Uji Regresi Logistik Berganda

Variabel	B	Sig.	Exp B(OR)	95%CI
Rata-rata	1,953	0,022	7,049	1,327-
HDL				37,433
Hipertensi	2,882	0,002	17,845	2,975-
				107,062
Konstanta	-4,325	0,000	0,013	

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Percentage Correct value obtained at 85.9%, which means that the average variable HDL, hypertension, diet (diet), and duration of suffering from Type II DM explain the effect on the incidence of Type II DM complications of kidney failure in Dr. RSUD. Pirngadi Medan is 85.9%, while the remaining 14.1% is influenced by other factors not included in this research variable

PAR (Populatio Attributable Risk)

Calculating PAR value (Population Attributable Risk) on the most significantly influential variable with the highest OR (Odds Ratio)

Hypertension most influential on the incidence of Type II DM complications of renal failure obtained OR at 17.845 (95% CI = 2.975-107.062) and p at 0.002 statistically significant, then PAR values were:

$$PAR = \frac{0,64(17,845 - 1)}{0,64(17,845 - 1) + 1} \times 100\% = 91\%$$

This means that almost 91% of cases with the incidence of Type II DM complications of kidney failure can be prevented by correcting risk factors, namely hypertension to normal blood pressure.

Based on the results of bivariate analysis with independent t-test on systolic blood pressure and mann-whitney test on diastolic blood pressure there were significant differences in mean systolic and diastolic blood pressure between Type II DM patients complicating kidney failure (cases) with uncomplicated Type II DM patients kidney failure (control) (p <0.05).

This is in line with the results of the chi-square test where there is an influence between hypertension and the incidence of Type II DM complications of renal failure obtained OR = 4.00 (95% CI = 2.30-6.93), meaning that Type II DM patients who experience

failure kidney has a chance of 4.00 times hypertension compared to Type II DM patients who do not experience kidney failure,

In line with the results of multivariate hypertension, the influence of the incidence of Type II DM complicating renal failure was OR = 17,845 (95% CI = 2,975-107,062), meaning that Type II DM patients who had kidney failure had a chance of 17,845 times hypertension compared to Type II DM patients who did not experience kidney failure.

This is also in line with Arsono's research, 2005 in the RSUD Prof. Dr. Margono Soekarjo Purwokerto obtained results that analyzed the influence of hypertension with the incidence of Type II DM complications of renal failure obtained OR = 14,15 means that Type II DM patients who experience kidney failure have a chance of 14.15 times hypertension (systolic blood pressure ≥ 140 mmHg) compared with DM patients II who did not experience kidney failure and statistically explained that there was a significant effect with a value of $p < 0.05$.

Likewise in the analysis of the influence of hypertension with the incidence of Type II DM complications of renal failure obtained OR = 10.00 means that Type II DM patients who have kidney failure have a chance of 10.00 times hypertension (diastolic blood pressure ≥ 90 mmHg) compared to Type II DM patients who do not experienced kidney failure and statistically explained that there was a significant effect with a value of $p < 0.05$.

Having the highest PAR value of 91%, meaning that almost 91% of cases with the incidence of Type II DM complications of kidney failure can be prevented by improving hypertension to have normal blood pressure

CONCLUSION

Based on the results of this study, it can be concluded as follows:

1. There is an influence of HDL on the incidence of Type II DM complications of kidney failure in Dr. RSUD Pirngadi Medan.
2. There is the influence of hypertension on the incidence of Type II DM complications of kidney failure in Dr. RSUD Pirngadi Medan.
3. There is an effect of diet (diet) on the incidence of Type II DM complications of kidney failure in Dr. Hospital Pirngadi Medan.
4. There is a long-standing influence on Type II DM on the incidence of Type II DM complications of kidney failure in Dr. RSUD Pirngadi Medan.
5. The most dominant variable influences the incidence of Type II DM complications of kidney failure in Dr. RSUD Pirngadi Medan is hypertension with OR = 17,845 (95% CI = 2,975-107,062).
6. Population Attributable Risk (PAR) obtained by 91% of cases with the incidence of Type II DM complications of kidney failure can be prevented by correcting risk factors, namely hypertension.

SUGGESTION

1. To the RSUD Dr. Pirngadi Medan in order to make easy and fast access by providing access to computerized-based medical cards for people with Type II DM to make data collection better, patients more easily and diligently controlling blood pressure, blood glucose, lipid profiles, and take medication, and provide a manual DM parameters at home to avoid complications of kidney failure.
2. To Type II DM Patients are expected to control blood pressure by applying diet, physical activity, and taking medication that is appropriate for patients with Type II DM

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point no 3 → Diet ?

so that blood glucose levels and lipid profiles can be controlled that affect blood pressure and prevent the risk of complications of kidney failure .

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INFLUENCED HYPERTENSION AND HDL ON THE INCIDENCE OF KIDNEY FAILURE COMPLICATION IN DM TYPE II PATIENTS

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Abstract

Introduction according to the international Diabetes Federation in the case of diabetes in the world 2015 ; 382 million, 2016 ; 415 million, 2017 ; 425 million, prevalence Indonesia 6.9%, North Sumatera 5.3%, and Medan 2.3%. The Objective of the research was to analyze the hypertension and HDL which influenced the incidence of kidney failure complication in DM Type II patients at RSUD dr. Pimgadi, Medan. The sample in the case group were 32 DM Type II patients with kidney failure complication, and in control group were 32 DM Type II patients without kidney failure complication. Each case of the subject was adjusted to the control according to age and sex. The data were analyzed by using chi square test, t-independent test, mann-whitney test, and multiple logistic regression analysis, the total of the 64 respondent. The result of multivariate analysis showed that hypertension OR ; 17.845, HDL OR; 7.049. The conclusion it was also found that the factor which the most dominant influence on the incidence of kidney failure complication in DM Type II patients was hypertension at the Population Attributable Risk of 91%. The Recommended was the DM Type II patients blood pressure should be controlled by applying dieting, physical activity, and taking medicines which are in line with DM Type II patients so that their glucose content and lipid profile which influence blood pressure and forestall the risk for kidney failure complication can be controlled.

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1 Introduction

Diabetes mellitus (DM) is a collection of symptoms that arise in a person caused by an increase in blood glucose levels due to a decrease in progressive insulin secretion against the background of insulin resistance (FKUI, 2014, and Papadakis, 2014). The 2012 WHO noted that in low and middle income countries more than 80% of deaths were caused by DM. By 2030 it is predicted that more than two-thirds (70%) of the global population will die from non-communicable diseases such as cancer, heart disease, stroke and DM (WHO, 2014, and Ministry of Health, 2012).

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RSUD Pirngadi Medan in 2015

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Methodology.

This research is a case control study. This study was conducted in Dr. Puliradi Hospital in Medan in 2017. The population of the case was all patients with Type II DM who had complications of kidney failure who visited the RSUD Dr. Pirngadi Medan in 2017.

The control population was that all Type II DM patients had no complications of kidney failure who visited Dr. Pirngadi Medan in 2017. Large sample group cases were 32 people with type II diabetes mellitus Complications of Kidney Failure and control group 32 people with Type II DM without Complications of Kidney Failure. The comparison of cases with controls was 1: 1, matching by age and sex.

Results & Analysis

Univariate Analysis

In the univariate results, the distribution of family history in the case group is the same between having and not the proportion of 50.0%. In the highest control group, those who did not have a family history of Type II DM were 62.5%.

The highest distribution of blood glucose in the case group in blood glucose was not good (≥ 200 mg / dl), the proportion was 78.1%, as well as in the control group the proportion was 65.6%. The highest distribution of HbA1c in the case group was HbA1c not good (56.5%), the proportion was 71.9%, while the highest control group was good HbA1c (<6.5%) the proportion was 87.5%

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Bivariate Analysis

a. Categorical Data

In Table 1 it can be seen that the Chi-Square test results show that the variables that have an influence on the incidence of Type II DM complications fail the kidneys were HbA1c averages ($p = <0.001$), average total cholesterol ($p = 0.012$), average HDL ($p = <0.001$), average triglycerides, ($p = 0.045$), hypertension ($p = <0.001$), duration of suffering from Type II DM ($p = <0.001$) diet (diet) ($p = <0.001$), medication adherence score ($p = 0.023$).

Table 1. Effect of Risk Factors on Type II DM Events Complications of Kidney Failure in Dr. Hospital Pirngadi Medan

Faktor Risiko yang Dapat Diubah		
Jumlah		
Rata-rata HDL		
Tidak Baik (≤ 45 mg/dl)	<0,001	2,55
Baik (> 45 mg/dl)		(1,53-4,24)
Jumlah		
Hipertensi		
Ya	<0,001	4,00
Tidak		(2,30-6,93)
Jumlah		

b. Numeric data

In Table 2, it can be seen that the results of different means show that there are significant differences in mean HDL, systolic and diastolic blood pressure between cases with controls ($p < 0.05$).

Table 2. Differences in Mean Risk Factors That Can Be Changed by Type II DM Events Complications of Kidney Failure

	Mean	P Value
HDL (mg/dl)		
Kasus		<0,001
Kontrol	44,44	
LDL (mg/dl)		
Kasus		<0,001
Kontrol	106,53	
Sistolik (mmHg)		
Kasus		
Kontrol	137,12	0,001
Diastolik (mmHg)		
Kasus		

Kontrol	147,78	0,001
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Multivariate Analysis

In Table 3, the results of multiple logistic regression tests show that HDL averages (p = 0.022), hypertension (p = 0.002 affect the incidence of Type II DM complications of renal failure. The most dominant variable affects the incidence of kidney failure in Type II DM patients in Dr. Pirngadi Hospital in Medan is hypertension with a regression coefficient value of 2.882 and Exp B (OR) 17.845 means that if Type II DM sufferers experience kidney failure 18 times more likely to have hypertension than Type II DM patients who do not experience kidney failure.

Tabel 3 Hasil Akhir Uji Regresi Logistik Berganda

Variabel	B	Sig.	Exp B(OR)	95%CI
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Percentage Correct value obtained at 85.9%, which means that the average variable HDL, hypertension, diet (diet), and duration of suffering from Type II DM explain the effect on the incidence of Type II DM complications of kidney failure in Dr. RSUD. Pirngadi Medan is 85.9%, while the remaining 14.1% is influenced by other factors not included in this research variable

PAR (Populatio Attributable Risk)

Calculating PAR value (Population Attributable Risk) on the most significantly influential variable with the highest OR (Odds Ratio)

Hypertension most influential on the incidence of Type II DM complications of renal failure obtained OR at 17.845 (95% CI = 2.975-107.062) and p at 0.002 statistically significant, then PAR values were:

$$PAR = \frac{0,64(17,845 - 1)}{0,64(17,845 - 1) + 1} \times 100\% = 91\%$$

This means that almost 91% of cases with the incidence of Type II DM complications of kidney failure can be prevented by correcting risk factors, namely hypertension to normal blood pressure.

Based on the results of bivariate analysis with independent t-test on systolic blood pressure and mann-whitney test on diastolic blood pressure there were significant differences in mean systolic and diastolic blood pressure between Type II DM patients complicating kidney failure (cases) with uncomplicated Type II DM patients kidney failure (control) (p < 0.05).

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In line with the results of multivariate hypertension, the influence of the incidence of Type II DM complicating renal failure was OR = 17,845 (95% CI = 2,975-107,062), meaning that Type II DM patients who had kidney failure had a chance of 17,845 times hypertension compared to Type II DM patients who did not experience kidney failure.

This is also in line with Arsono's research, 2005 in the RSUD Prof. Dr. Margono Soekarjo Purwokerto obtained results that analyzed the influence of hypertension with the incidence of Type II DM complications of renal failure obtained OR = 14,15 means that Type II DM patients who experience kidney failure have a chance of 14.15 times hypertension (systolic blood pressure ≥ 140 mmHg) compared with DM patients II who did not experience kidney failure and statistically explained that there was a significant effect with a value of $p < 0.05$.

Likewise in the analysis of the influence of hypertension with the incidence of Type II DM complications of renal failure obtained OR = 10.00 means that Type II DM patients who have kidney failure have a chance of 10.00 times hypertension (diastolic blood pressure ≥ 90 mmHg) compared to Type II DM patients who do not experienced kidney failure and statistically explained that there was a significant effect with a value of $p < 0.05$.

Having the highest PAR value of 91%, meaning that almost 91% of cases with the incidence of Type II DM complications of kidney failure can be prevented by improving hypertension to have normal blood pressure

CONCLUSION

Based on the results of this study, it can be concluded as follows:

1. There is an influence of HDL on the incidence of Type II DM complications of kidney failure in Dr. RSUD Pirngadi Medan.
2. There is the influence of hypertension on the incidence of Type II DM complications of kidney failure in Dr. RSUD Pirngadi Medan.
3. There is an effect of diet (diet) on the incidence of Type II DM complications of kidney failure in Dr. Hospital Pirngadi Medan.
4. There is a long-standing influence on Type II DM on the incidence of Type II DM complications of kidney failure in Dr. RSUD Pirngadi Medan.
5. The most dominant variable influences the incidence of Type II DM complications of kidney failure in Dr. RSUD Pirngadi Medan is hypertension with OR = 17,845 (95% CI = 2,975-107,062).
6. Population Attributable Risk (PAR) obtained by 91% of cases with the incidence of Type II DM complications of kidney failure can be prevented by correcting risk factors, namely hypertension.

SUGGESTION

1. To the RSUD Dr. Pirngadi Medan in order to make easy and fast access by providing access to computerized-based medical cards for people with Type II DM to make data collection better, patients more easily and diligently controlling blood pressure, blood glucose, lipid profiles, and take medication, and provide a manual DM parameters at home to avoid complications of kidney failure.
2. To Type II DM Patients are expected to control blood pressure by applying diet, physical activity, and taking medication that is appropriate for patients with Type II DM

so that blood glucose levels and lipid profiles can be controlled that affect blood pressure and prevent the risk of complications of kidney failure .

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