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Determinants of Diabetes Mellitus Among Women Aged 15–49 Years in The Pakutandang Health Center Area, Bandung Regency

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ABSTRACT

Diabetes is one type of non-communicable disease and has become a serious global health issue, including in the Republic of Indonesia. According to *Riskesdas* data, 70% of people with diabetes mellitus are unaware that they have the disease, partly due to their instant lifestyle. Individuals at risk of developing diabetes include those with genetic or hereditary factors, older age, obesity, hypertension, and a lack of physical activity. The objective of this study is to determine of diabetes mellitus among women of reproductive age (15–49 years) in the service area of the Pakutandang Community Health Centre in Bandung Regency. This study used a quantitative method with a case-control design. Data collection techniques used questionnaires. The population in this study was all women in the working area of the Pakutandang Community Health Centre in Bandung Regency. The sample size was 135 respondents with a 1:2 ratio, namely 45 respondents who were women of childbearing age (15-49 years) with diabetes mellitus and 90 respondents who were women of childbearing age (15-49 years) without diabetes mellitus. The data in this study were processed using univariate analysis, bivariate analysis, and multivariate analysis. The results of this study show that among women of childbearing age (15-49 years), 35.5% had diabetes mellitus and 64.5% did not have diabetes mellitus. The results of the bivariate chi-square analysis showed that the factors associated with diabetes mellitus were education, occupation, genetic factors, age, hypertension, and physical activity, while obesity was not associated. The conclusion of this study is that the occurrence of diabetes mellitus in women of childbearing age (15-49 years) influenced by genetic factors, and this influence significant in the occurrence of diabetes mellitus in women of childbearing age (15-49 years). Meanwhile, the logistic regression results show that the dominant variable is genetic factors.

Keywords: risk factors, non-communicable diseases, reproductive-age women, primary health care

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INTRODUCTION

Diabetes is a type of non-communicable disease and has become a serious global health issue, including in the Republic of Indonesia. According to the World Health Organization, 70% of deaths (Titis Kurniawan, Nursiswati, Hasniatisari Harun, 2024).

According to the International Diabetes Federation (IDF) (2021), there are an estimated 537 million people worldwide living with diabetes mellitus. The number of diabetes mellitus patients continues to increase year by year. (Titis Kurniawan, Nursiswati, Hasniatisari Harun, 2024)

In Indonesia, the number of people with diabetes mellitus in 2020 reached 10.7 million, ranking 7th among the 10 countries with the highest number of diabetes mellitus patients in the world. (Titis Kurniawan, Nursiswati, Hasniatisari Harun, 2024).

Diabetes mellitus in women of childbearing age (WCA) 15-49 years needs to be considered because women of childbearing age 15-49 years who are married have the opportunity to become pregnant, and women have a higher risk of developing type 2 diabetes mellitus than men. In women of childbearing age, diabetes mellitus can affect reproductive health and pregnancy quality, which in turn can affect the next generation.(Lilis & Imelda, 2020).

Women who have diabetes mellitus before pregnancy are at greater risk of premature birth, induction of labor, caesarean section, and women of childbearing age 15-49 years with hypertension usually require longer hospitalization than women of childbearing age 15-49 years who are pregnant without diabetes mellitus. (World Health organization, 2016).

In the last five years, the incidence of diabetes mellitus has increased significantly, from 6.9% in 2013 to 8.5% in 2018.(Azam et al., 2023).

In Indonesia, the lowest prevalence of diabetes based on doctor's diagnosis among those aged ≥15 years was found in East Nusa Tenggara province at 0.8%, while the highest prevalence was found in DKI Jakarta at 3.4%. (Safitri et al., 2024).

Based on the doctor's diagnosis, patients with diabetes mellitus aged 55-64 years accounted for the largest percentage (6.9%), while 1.8% of patients were female and 1.2% were male. In terms of place of residence, 1.9% of patients with diabetes mellitus lived in urban areas and 1.0% lived in rural areas. The prevalence of obesity is higher among women than men. Among women, it increased from 14.8% in 2007 to 32.9% in 2013, while among men, it increased from 13.9% in 2007 to 19.7% in 2013. (Venita Syavera & Muhamad Syazali, 2024).

One of the indirect factors of diabetes mellitus is education. A person's education has an influence because if their education level is low, they are very vulnerable to unhealthy lifestyles that put them at risk of developing diabetes mellitus. Similarly, occupation can affect an individual's quality of life. Jobs that typically require working from morning until evening, or even into the night, often leave workers with little time for exercise. Additionally, a preference for fast food is common in many communities.(Imelda, 2019).

Genetic factors are believed to reduce the risk by 15% in children if one of their parents has diabetes mellitus. (Wahyuningrum, 2015).

An increase in glucose intolerance occurs when a person reaches the age of 40, making them at risk of developing diabetes mellitus, due to the ageing process which causes a decrease in the ability of pancreatic β cells to produce insulin.(WD et al., 2021).

Individuals who are obese or overweight are also believed to have an 80-85% risk of developing diabetes mellitus. Hypertension sufferers have a risk of developing diabetes mellitus when their systolic blood pressure is >140 mmHg and their diastolic blood pressure is >90 mmHg. Physical activity is related to blood glucose management; increasing physical activity can reduce weight in people with diabetes mellitus. (Sipayung et al., 2017).

Diabetes in women of childbearing age (WCA) is crucial due to its increasing prevalence, the risk of complications during pregnancy and for the baby, and its long-term impact on the health of women and their offspring. It is important to understand the risk factors, develop better prevention and management strategies, and improve the overall quality of life of women of childbearing age (WCA). The effects of diabetes itself can increase its prevalence in women of childbearing age, which can increase the risk of gestational diabetes during pregnancy. Diabetes can lead to complications during pregnancy and for the baby. Diabetes in mothers can cause various complications, such as an increased risk of the baby experiencing hypoglycaemia (low blood sugar) after birth. The long-term effects of uncontrolled diabetes can have lasting consequences, including an increased risk of obesity and other health problems in the future. The importance of early detection can help identify specific risk factors associated with diabetes in WUS, such as family history, physical activity, obesity, hypertension and others. (Titis Kurniawan, Nursiswati, Hasniatisari Harun, 2024).

METHOD

This study was conducted in the Pakutandang Community Health Centre Working Area, Bandung Regency, in 2025, targeting women of childbearing age, namely those aged 15-49 years. This study is an analytical observational study using a case-control approach. A case-control study begins by identifying subjects with an effect (case group) and then seeking subjects who do not experience the effect (control group). Risk factors are studied retrospectively in both groups and then compared. (Ahmad et al., 2021), This design moves backwards/retrospectively, or looks back at the history of the research exposure experienced by the subject.(Pitaloka et al., 2024).

The population in this study consisted of all women of childbearing age (15–49 years) the Pakutandang Community Health Centre in Bandung Regency in 2025, namely 116 women of childbearing age.

The sample in this study consisted of 116 women of childbearing age (15–49 years) and was divided into two groups, namely a case group consisting of 45 respondents and a control group consisting of 90 respondents aged 15–49 years with diabetes mellitus. This study was conducted in the working area of the Pakutandang Community Health Centre in Bandung Regency in 2025, from September to November 2025.

RESULT

1. Univariate Analysis

Table 1 Univariate Analysis

No	Variabel	f	%
1.	Diabetes Mellitus in Women of Childbearing Age 15-49 Years Old		
	Diabetes mellitus	45	35.5
	Not diabetes mellitus	90	64.5
2.	Education		
	Lower (Primary school-Lower secondary school)	56	39.5
	High (Secondary School University)	79	60.5
3.	Work		
	Not working	116	89.5
	Working	19	10.5
4.	Genetic		
	There is a family history of diabetes mellitus.	38	25.1
	No history of diabetes mellitus	97	74.9
5.	Age		
	< 40 Years	41	27.2
	≥ 40 Years	94	72.8
6.	Obesity		
	Obesity	69	51.4
	Not Obesity	66	48.6
7.	Hypertension		
	Hypertension	44	30.9
	Not Hypertension	91	69.1
8.	Physical activity		
	Not physically active	53	37.7

Physical activity	82	62.3

2. Bivariate Analysis

Table 2 Bivariate Analysis

independent variable	Diabetes Mellitus in Women of Childbearing Age 15-49 Years Old				Total		*P. Value*	OR (95% CI)
	Diabetes mellitus		Not diabetes mellitus					
	n	%	n	%	n	%		
Education								
Lower	31	68.9	25	27.8	56	39.5	0,001	5.758
High	14	31.1	65	72.2	79	60.5		(2.635-12.581)
Work								
Not working	44	97.8	72	80.0	116	89.5	0,0004	11.000
Working	1	2.2	18	20.0	19	10.5		(1.418-85.302)
Genetic								
Yes	30	66,7	8	8.9	38	25.1	0,001	20.500
No	15	33,3	82	91.1	97	74.9		(7.892-53.249)
Age								
< 40 Years	1	2.2	40	44.4	41	27.2	0,001	0.029
≥40 Years	44	97.8	50	55.6	94	72.8		(0.004-0.215)
Obesity								
Obesity	25	55.6	44	48.9	69	51.4	0,584	1.307
Not Obesity	20	44.4	46	51.1	66	48.6		(0.637-2.681)
Hypertension								
Hypertension	30	66,7	14	15.6	44	30.9	0,001	10.858
Not Hypertension	15	33,3	76	84.4	91	69.1		(4.677-25.201)
Physical activity								
Not physically active	26	57.8	27	30.0	53	37.7	0,003	3.194
Physical activity	19	42.2	63	70.0	82	62.3		(1.518-6.718)

3. Multivariate Analysis

Table 3 Multivariate Analysis

Variable	P. value	OR	OR (95% CI)	
			Lower	Upper
Education	0.055	3.375	0.980	11.619
Work	0.274	3.968	0.338	46.632
Genetic	0.000	13.369	3.924	45.539
Age	0.031	0.088	0.010	0.788
Obesity	0.899	0.932	0.311	2.788

Hypertension	0.056	2.935	0.977	8.811
Physical activity	0.267	1.869	0.622	5.617

DISCUSSION

Based on the research results, 35.5% of respondents had diabetes mellitus and 64.5% did not. Diabetes mellitus is a non-communicable disease that occurs due to increased blood sugar levels. Women are at greater risk of developing diabetes mellitus because physically, women have a greater chance of increasing their body mass index. Premenstrual syndrome and post-menopause cause the distribution of body fat to accumulate easily due to hormonal processes, putting women at risk of developing diabetes mellitus. (Lilis & Imelda, 2020).

Based on the results of the study, it appears that 60.5% of respondents had a high level of education and 39.5% had a low level of education. Education is part of human culture and debate that will continue to evolve. The state of education is an indicator in measuring a country's level of human development. Education contributes to changes in health behaviour through knowledge. Knowledge, which is influenced by the level of education, is a factor that influences a person's decision to behave in a healthy manner.

The results of the study show that 79 respondents with higher education had diabetes mellitus (31.1%) and did not have diabetes mellitus (72.2%). Meanwhile, of the 556 respondents with lower education, 68.9% had diabetes mellitus and 27.8% did not have diabetes mellitus. The chi-square test yielded a p-value of 0.001, which is <0.05, indicating that there is a relationship between educational level and diabetes mellitus among women of childbearing age (15–49 years) in the Pakutandang Community Health Centre working area in Bandung Regency in 2025, thus accepting the hypothesis. With an odds ratio (OR) of 5.758, respondents with low education levels are 5.758 times more likely to have diabetes mellitus than respondents with high education levels.

Based on the results of the study, 89.5% of respondents were unemployed and 10.5% were employed. Most respondents were unemployed. This group consisted of housewives. This employment variable is related to physical activity. The unemployed group does not necessarily have low physical activity. Housewives actually perform various activities such as sweeping, cooking and washing.

Based on the results of the study, it appears that of the 116 respondents who were unemployed, 97.8% had diabetes mellitus and 80.0% did not have diabetes mellitus, while of the 19 respondents who were employed, 2.2% had diabetes mellitus and 20.0% did not have diabetes mellitus. The chi-square test yielded a p-value of 0.004, which is <0.05, indicating that there is a relationship between employment and diabetes mellitus among women of childbearing age (15-49 years) in the Pakutandang Community Health Centre working area in Bandung Regency in 2025, thus accepting the hypothesis. The results (Odds Ratio) OR 11.000 indicate that respondents who are not employed are 11,000 times more likely to develop diabetes mellitus compared to respondents who are employed.

The results of the study showed that 25.1% of respondents had a family history of DM and 74.9% did not. Genetic factors in DM cases stem from DM concordance, which can increase in monozygotic twins, a high prevalence of DM in children of parents with diabetes, and a high prevalence of DM in certain ethnic groups. Type 2 DM is a polygenic disorder and has no clear relationship with the human leucocyte antigen (HLA) gene.(Safitri et al., 2024).

Based on the results of the study, 25.1% of the 97 respondents who did not have genetic factors developed diabetes mellitus, while 74.9% did not develop diabetes mellitus. Meanwhile, 66.7% of the 38 respondents who had genetic factors developed diabetes mellitus, while 8.9% did not develop diabetes mellitus. The chi-square test yielded a p-value of 0.001, which is <0.05, indicating a relationship between genetic factors and diabetes mellitus in women of childbearing age (15-49 years) in the Pakutandang Community Health Centre working area in Bandung Regency in 2025, thus accepting the hypothesis. With an odds ratio (OR) of 20.500, this means that respondents without genetic factors have a 20.500 times

greater chance of not developing diabetes mellitus compared to respondents with genetic factors.

The results of the study show that 27.2% of respondents were aged <40 years and 72.8% were aged ≥40 years. Research by (John S. Kekenusa, Budi T. Ratag, 2020) shows that respondents aged ≥45 years accounted for the largest percentage (56.3%). Age is a non-modifiable factor for diabetes mellitus but is closely related to the incidence of type 2 diabetes mellitus. Therefore, by knowing this factor, people at risk of type 2 diabetes mellitus can take preventive measures by controlling other factors related to the incidence of type 2 diabetes mellitus.

Based on the results of the study, of the 94 respondents aged ≥ 40 years, 97.8% had diabetes mellitus and 55.6% did not, while of the 41 respondents aged <40 years, 2.2% had diabetes mellitus and 44.4% did not. The chi-square test yielded a p-value of 0.001, which is <0.05, indicating that there is a relationship between age and diabetes mellitus in women of childbearing age (15–49 years) in the Pakutandang Community Health Centre working area in Bandung Regency in 2025, thus accepting the hypothesis. The odds ratio (OR) of 0.029 indicates that respondents aged <40 years have a 0.029 times lower chance of developing diabetes mellitus compared to respondents aged ≥40 years.

The results of the study showed that 51.4% of respondents were obese and 48.6% were not obese. This study indicates that the majority of respondents were not obese. Obesity carries a risk of diabetes. In abdominal (visceral) obesity, fat accumulated around the mid-abdomen is associated with insulin resistance and diabetes.(Wahyuningrum, 2015)

Based on the results of the study, 55.6% of the 69 obese respondents had diabetes mellitus and 48.9% did not, while 44.4% of the 66 non-obese respondents had diabetes mellitus and 51.1% did not. The chi-square test yielded a p-value of 0.584, which is >0.05, meaning that there is no relationship between obesity and diabetes mellitus in women of childbearing age (15-49 years) in the Pakutandang Community Health Centre working area in Bandung Regency in 2025, so the hypothesis is rejected.

The results of the study showed that 30.9% of respondents had hypertension and 69.1% did not. This study indicates that most respondents did not have hypertension. Hypertension or high blood pressure often triggers medical complications, including diabetes mellitus. People with high blood pressure are at risk of developing diabetes because increased blood pressure can affect insulin production in the pancreas.

Based on the results of research from 19 respondents with hypertension, 66.7% had diabetes mellitus and 11.9% did not have diabetes mellitus, while 33.3% of 44 respondents without hypertension had diabetes mellitus and 88.1% did not have diabetes mellitus. The chi-square test yielded a p-value of 0.001, which is <0.05, indicating that there is a relationship between hypertension and the incidence of diabetes mellitus in women of childbearing age (15-49 years) in the Pakutandang Community Health Centre working area in Bandung Regency in 2025, thus accepting the hypothesis. The odds ratio (OR) of 10.858 indicates that respondents with hypertension are 10.858 times more likely to develop diabetes mellitus than respondents without hypertension.

The results show that 62.3% of respondents were physically active, while 37.7% were not. This study indicates that most respondents have sufficient physical activity. The principles of exercise for diabetes mellitus patients are the same as general exercise principles, namely meeting requirements such as frequency, intensity, duration, and type of exercise. For diabetes mellitus patients, it is advisable to choose exercises that are enjoyable and feasible for them.(Sipayung et al., 2017).

Based on the results of the study, 53 respondents who did not engage in physical activity had diabetes mellitus (57.8%) and did not have diabetes mellitus (30.0%), while 82 respondents who engaged in physical activity had diabetes mellitus (42.2%) and did not have diabetes mellitus (70.0%). The chi-square test yielded a p-value of 0.003, which is >0.05, indicating that there is a relationship between physical activity and diabetes mellitus in women of childbearing age (15-49 years) in the Pakutandang Community Health Centre working area, Bandung Regency, in 2025, thus accepting the hypothesis. The odds ratio (OR) of 3.194

means that respondents with low physical activity are 3.194 times more likely to develop diabetes mellitus than respondents who are physically inactive.

Multivariate analysis revealed that the variable significantly associated with diabetes mellitus in women of childbearing age was genetic factors. The analysis results obtained an Odds Ratio (OR) from the Genetic Factor variable of 13.369 (95% CI: 3.924 - 45.539), meaning that respondents with a history of diabetes mellitus have a higher odds (risk) of developing diabetes mellitus compared to mothers who do not have a family history of diabetes mellitus.

Heredity is a factor in the onset of diabetes mellitus. The offspring of people with diabetes are more likely to develop the condition than the offspring of people without diabetes. Some people readily blame heredity as the cause of their diabetes, ignoring their responsibility to take preventive measures(Wahyuningrum, 2015)

Heredity (genetics), genes are factors that determine the inheritance of certain traits from a person to their offspring. However, an increased risk does not mean that the person will definitely develop diabetes. Heredity is a contributing factor to the risk of developing diabetes mellitus, a condition that is exacerbated by an unhealthy lifestyle. (Susanto, 2013)

CONCLUSION

The dominant factor for diabetes mellitus in women of childbearing age is genetic factors, with an odds ratio (OR) of 13.369 (95% CI: 3.924 - 45.539) for the genetic factor variable. meaning that respondents with a history of diabetes mellitus are more likely to develop diabetes mellitus compared to mothers who do not have a family history of diabetes mellitus.

RECOMMENDATION

Women of childbearing age (15-49 years) are encouraged to adopt a healthy lifestyle as one way to achieve this. The next recommendation is to combine genetic testing results with preventive measures, namely through a balanced diet, regular exercise, maintaining an ideal body weight, and getting enough sleep.

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