

ANALYSIS OF ECONOMIC LOSSES DUE TO DIABETES MELLITUS IN NATIONAL HEALTH INSURANCE PARTICIPANTS

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Abstract.

The result of Indonesia Basic Health Research in 2018 showed an increase in the percentage of people with diabetes mellitus. This study aimed to analyze economic losses due to diabetes mellitus in National Health Insurance (NHI) participants with insurance fee waiver (IFW) and non-insurance fee waiver (IFW). This research was a quantitative study with a cross-sectional design. The sample of this study was 17 patients with IFW and 15 patients with non-IFW. The instrument used in this study was a questionnaire consisting of questions about the variable characteristics of the respondents and the direct and indirect costs that should be paid for treatment. Economic losses due to diabetes mellitus were analyzed through direct and indirect total costs. The economic loss for patients with IFW was IDR 5,572,366. Meanwhile, the economic loss for patients with non-IFW was IDR 2,989,984. So, the biggest economic loss due to diabetes mellitus was found in patients with IFW. This was very high when compared to their average income of around IDR 634,375. This can happen because the NHI participants have not taken full advantage of the use of NHI.

Keywords:*Diabetes Mellitus, economic loss, national health insurance, insurance fee waiver, non-insurance fee waiver*

1. Introduction

The health system is an essential component in the health aspect to provide better services for the community. The functions of the health system are (1) stewardship consisting of regulations, vision, and mission; (2) creating resources consisting of investment and training; (3) providing services; and (4) financing consisting of collecting, pooling, and purchasing (1). The objectives of the health system are (1) responsive to people's non-medical expectations; (2) fair in financial contributions, and (3) to improve the quality of public health. Cases of morbidity, mortality, and accidents are indicators of this objective(1). The

focus of this research is on finance as one of the functions and goals in the health system. There are various kinds of health finance mechanisms, including (1) tax-based financing applied in England, Malaysia, Hong Kong, and Canada; (2) social health insurance applied in Japan, Korea, Thailand, and Indonesia; (3) private health insurance applied in the US; (4) community-based health insurance applied in Africa; and (5) a medical savings account applied in Singapore(1),(2).

In 2014, the Indonesian government implemented social security called the National Health Insurance (NHI) as an effort to fulfill citizens' rights to health. NHI is managed by a legal entity, namely the Social Security Organizing Agency (SSOA). The number of NHI participants continues to increase every year, so it is expected that by 2020, Indonesia can achieve universal health coverage (UHC). UHC is an illustration that the nature of NHI membership is mandatory and implemented gradually so that it covers all Indonesian residents(3),(4). NHI participants consist of an insurance fee waiver (IFW) and a non-insurance fee waiver (IFW). IFW participants are people who are classified as poor and unable to afford the fee so that health insurance financing comes from the state budget (APBN) or regional budget (APBD) (3), (4). Meanwhile, non-IFW participants are people who are not classified as poor, consisting of breadwinners and their families, non-wage earners and their families, and not workers and their families(3), (4).

During the last ten years, Indonesia has experienced a triple burden disease. Infectious diseases are still high, but cases of non-communicable diseases are increasing, and the emergence of new infectious diseases. One of the silent killer diseases that are still rarely noticed by the public is diabetes mellitus (DM). According to WHO, diabetes mellitus is a disease or chronic metabolic disorder due to multiple etiologies characterized by high blood sugar levels accompanied by disorders of carbohydrate, lipid, and protein metabolism as a result of disruption of insulin production(5). The results of the Indonesian Basic Health Research in 2018 showed the prevalence of diabetes mellitus at the age of ≥ 15 years was 8.5%(6). This is an increase compared to the results of the Indonesian Basic Health Research in 2013 with the prevalence of diabetes mellitus at the age of ≥ 15 years that was 6.9%(7). One of the districts experiencing an increase in diabetes mellitus cases based on the comparison of Indonesian Basic Health Research data in 2013 and 2018 is Bojonegoro Regency(8).

The illness suffered by a person can cause economic losses. The losses suffered in the economic aspect are not only about the financing of health services but also indirect costs of

obtaining health services, including losses in terms of productivity(9). Total direct costs represent costs incurred by patients for treatment, such as medical service rates(10). The total indirect costs include the supporting costs incurred by the patient for getting treatment, such as the cost of assistive equipment, transportation costs, and so on(10). The economic loss suffered by type 2 diabetes mellitus sufferers in America is \$ 245 billion, with details of \$ 176 billion for direct costs and \$ 69 billion for indirect costs(11).

Based on the explanation, the problems raised were diabetes mellitus and economic losses in the Bojonegoro Regency. The purpose of this study was to analyze the economic losses due to diabetes mellitus in people with NHI membership status (IFW and non-IFW) through a case study at the Bojonegoro Regional Hospital (RSUD).

2. Methods

This research was a quantitative study with a cross-sectional design. The data used was secondary data from the research location and was equipped with primary data obtained from interviews with diabetes mellitus sufferers and their families. The population in this study were all diabetes mellitus patients with insurance fee waiver (IFW) and non-insurance fee waiver (IFW) in Bojonegoro. The sample in this study was 32 respondents, 17 diabetes mellitus patients with IFW status, and 15 diabetes mellitus patients with non-IFW status. The research was conducted at the Bojonegoro Regional Hospital from May to June 2019.

There were three main variables in this study, namely: (1) respondent characteristics including variables of gender, age, occupation, income, and year of illness; (2) direct costs including variables of outpatient costs, other medical costs, and inpatient costs; and (3) indirect costs including variables of outpatient transportation costs, outpatient productivity costs, outpatient family productivity losses, inpatient transportation costs, inpatient productivity costs, inpatient family productivity losses, and equipment costs. The research instrument used a questionnaire consisting of all those variables. The questionnaire was used as a guideline when interviewing respondents. After all the data was collected, the data was then analyzed. Respondent characteristic data were analyzed with SPSS software. Direct and indirect costs were analyzed with Microsoft Excel. In the end, direct and indirect costs were calculated to obtain the total costs borne by diabetes mellitus patients with insurance fee waiver (IFW) status or non-insurance fee waiver (non-IFW) status.

3. Results

Table 1. Characteristics of Respondents

Variable	Membership Status				TOTAL	
	IFW		Non-IFW		N	%
	Sample	%	n	%		
Gender						
Male	7	53.8	6	46.2	13	100
Female	10	52.6	9	47.4	19	100
Age						
21-30 years old	1	100	0	0	1	100
31-40 years old	0	0	0	0	0	100
41-50 years old	3	42.9	4	57.1	7	100
51-60 years old	8	50	8	50	16	100
≥61 years old	5	62.5	3	37.5	8	100
Occupation						
Office worker	1	100	0	0	1	100
Farmer	7	53.8	6	46.2	13	100
Entrepreneur	0	0	1	100	1	100
Factory worker	0	0	2	100	2	100
Housewife	6	60	4	40	10	100
Others	3	60	2	40	5	100
Income						

Variable	Membership Status				TOTAL	
	IFW		Non-IFW			
	Sample	%	n	%	N	%
Maximum Value	IDR 2,000,000		IDR 2,500,000			
Minimum Value	IDR 0		IDR 0			
Modus	IDR 0		IDR 1,500,000			
Mean	IDR 634,375		IDR 978,571			
Year of Illness						
21-30 years old	3	100	0	0	3	100
31-40 years old	2	50	2	50	4	100
41-50 years old	2	28.6	5	71.4	7	100
51-60 years old	6	54.5	5	45.5	11	100
≥61 years old	4	57.1	3	42.9	7	100

Table 1 shows the characteristics of diabetes mellitus patients with IFW and non-IFW status at Bojonegoro Regional Hospital.

Table 2. Direct Costs for Diabetes Mellitus Patients in Bojonegoro Regional Hospital

	Membership Status	
	IFW	Non IFW
Routine Direct Cost (IDR)		
Mean of outpatient costs	484,550	364,986
Mean of other medical costs	4,375	7,500

Incidental Cost (IDR)		
Mean of inpatient costs	4,421,781	2,211,625
Total Direct Cost	4,910,706	2,584,111

Table 2 shows the direct costs incurred by diabetes mellitus patients at the Bojonegoro Regional Hospital. Direct costs consist of routine costs and incidental direct costs that should be incurred by diabetes mellitus patients of IFW and Non-IFW.

Table 3. Indirect Costs for Diabetes Mellitus Patients in Bojonegoro Regional Hospital

	Membership Status	
	IFW	Non IFW
Routine Indirect Cost (IDR)		
Mean of outpatient transportation costs	13,750	17,714
Mean of productivity loss cost for outpatient	2,402	7,522
Mean of productivity loss cost for outpatient family	9,044	6,220
Incidental Indirect Cost (IDR)		
Mean of inpatient transportation costs	119,500	66,882
Equipment costs	0	0
Mean of productivity loss cost for inpatient	230,772	151,537
Mean of productivity loss cost for inpatient family	308,872	155,998

Total Indirect Cost	661,660	405,873
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Table 3 shows the indirect costs incurred by diabetes mellitus patients at Bojonegoro Regional Hospital. Indirect costs consist of routine and incidental indirect costs that should be incurred by diabetes mellitus patients of IFW and Non-IFW.

Table 4. Economic Losses for Diabetes Mellitus Patients at Bojonegoro Regional Hospital

	Direct Cost (IDR)	Indirect Cost (IDR)	Total (IDR)
IFW of NHI	4,910,706	661,660	5,572,366
Non-IFW of NHI	2,584,111	405,873	2,989,984

Table 4 shows that the biggest economic loss due to diabetes mellitus in Regional Hospitals is experienced by IFW membership status.

4. Discussion

Characteristics of respondents consisted of questions about gender, age, occupation, income, and year of illness. The results showed that the majority of respondents with IFW or non-IFW status were women. Women have a greater risk of developing diabetes mellitus than men(12). The majority of them are respondents aged 51 to 60 years with the same proportion between IFW and non-IFW members. The age at risk of diabetes mellitus is 41-74 years old. The older a person, the performance of the body's organs will decrease so that the disease will be easier to attack the body, including diabetes mellitus(13).

The majority of respondents worked as farmers, both respondents with IFW and non-IFW status. Based on total income, the maximum income for respondents with IFW status was IDR 2,000,000, while for respondents with non-IFW status was IDR 2,500,000. The majority of respondents with IFW status earned IDR 0 because most of them were housewives.

Meanwhile, the majority of respondents who were non-IFW had an income of around IDR 1,500,000. The average income of IFW respondents was IDR 634,375, while for non-IFW respondents was IDR 978,571.

The majority of respondents started having diabetes mellitus at the age of 51 to 60 years, both respondents with IFW and non-IFW status. The age of most respondents and the age at illness were almost the same, namely 51 to 60 years. As much as 80% of diabetes mellitus attacks this age group in developing regions, including Indonesia(14).Old age affects the occurrence of diabetes mellitus because the body's organs have decreased function, including the less than optimal ability to control high blood glucose(13).

An illness suffered by a person causes economic loss. Calculating economic losses requires some additional data, such as direct costs and indirect costs(9), (10). Direct costs are directly related to diabetes mellitus treatment(9), (10).Direct costs consist of routine costs (costs that are routinely incurred during illness, such as buying drugs), and incidental costs (costs that occasionally incur, such as hospitalization)(9), (10).

The direct cost questionnaire consists of routine and incidental direct cost variables. Routine direct costs consist of outpatient costs and other medical costs. Incidental direct costs consist of hospitalization costs. From the research results, it could be seen that the biggest direct routine costs were incurred by diabetes mellitus patients with IFW status. Furthermore, the indirect cost questionnaire consists of routine and incidental indirect cost variables. Routine indirect costs consist of outpatient transportation costs, outpatient productivity costs, and outpatient family productivity costs. Incidental indirect costs consist of inpatient transportation costs, equipment costs, inpatient productivity lost costs, and inpatient family productivity costs. The results showed that the biggest total indirect costs were incurred by diabetes mellitus patients with IFW status. The component that most influences the amount of indirect costs for IFW participants is incidental indirect costs.

The results showed that there were significant direct and indirect costs to be incurred by people with diabetes mellitus. The biggest economic loss due to diabetes mellitus was found in patients with insurance fee waiver of NHI for about IDR 5,572,366. This is very high when compared to their average income of around IDR 634,375. Supposedly for NHI participants, the direct costs incurred for medical treatment are close to IDR 0 for IFW participants or a number of monthly fees for non-IFW participants. The reason is, direct medical costs have

been borne by the NHI. However, in reality, respondents have to pay a number of fees to use drugs that are not covered by the NHI or do not utilize their rights as NHI participants properly. In fact, if the use of NHI can be carried out properly and in accordance with the rights, the financial burden related to direct financing can be minimized by patients.

Most of the indirect costs are due to the loss of productivity of the companion of diabetes mellitus patients. The age of diabetes mellitus sufferers who are old causes the need for assistance from the family during the treatment process. This means that the time that the companion should use to work must be lost because they accompany the sufferer during the treatment process.

5. Limitations and Future Research

Although the aim of this study was achieved, this study has limitations that must be overcome in future studies. This study only calculates the total direct and indirect costs to find out how many medical costs that must be paid. It would be nice if further research also analyzes the relationship or influence between the characteristics of the respondent and the total costs (direct and indirect costs). Data on direct and indirect costs can be used as a basis for other research, such as research on diabetes mellitus.

6. Conclusion

The burdens suffered by a sick person are not only limited to economic losses due to medical costs, but also other costs such as lost productivity costs. The biggest calculation of the economic loss of patients with diabetes mellitus as one of the non-communicable diseases that has increased cases in Bojonegoro is in diabetes mellitus patients with IFW status. The economic loss is around IDR 5,572,366.

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