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The Influence of Participation of Healthcare Insurance and Social Security (BPJS) on Therapeutic Success in Diabetes Mellitus Patients at Primary Healthcare Centers in Madura

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ABSTRACT

The prevalence of Diabetes Mellitus (DM) worldwide is increasing. This condition will be followed by an increase in complication, if not controlled properly. One of the factors for failure of therapy is patient non-adherence in undergoing treatment due to inability to buy medicine. To overcome this, the Indonesian government organizes a national health insurance program (JKN) which is implemented by BPJS. BPJS participants who cannot afford to pay were paid by the state and called contribution assistance participants (PBI).

This study aims to analyze the effect of BPJS membership on the success of therapy in DM patients. A cross-sectional observational design was carried out on 425 DM patients in Madura. The independent variables were age, body mass index, smoking habit, adherence to health check at healthcare facilities, adherence in taking medication, and type of BPJS membership. The dependent variable was the success of therapy. The instrument was a questionnaire that was developed by the authors and validated by a team of experts and tested for validity and empirical reliability.

The result showed that, the majority of respondents who participated in the BPJS category of PBI was 48.2%, the comorbidity was hypertension with 39.5%, respondents who adhered to taking medication were 42%, the success of therapy was 49%.

The type of BPJS membership has no effect on the success of therapy in DM patientswhile the variables that affect the success of therapy were the presence of hypertension comorbidities, age, and medication adherence.

Keywords: Diabetes mellitus, BPJS membership, Therapy success, Adherence.

Introduction

Diabetes mellitus (DM) is a type of disease characterized by high blood sugar level (exceeding normal level) as a result of body inability to produce and/or use insulin.[1] DM is one of the most common chronic diseases in almost all countries and continues to increase significantly in number because lifestyle change leads to reduced physical activity and increased obesity.[2]

The prevalence of DM in the world for adults in the age range of 20-79 years is 6.4%, with around 285 million adults in 2010, and will increase to 7.7%; approximately 439 million adults in 2030. The prevalence in Indonesia is estimated to be 6,964,000 in 2010 and to be 11,980,000 in 2030, in which it is estimated to increase by an average of 251,000 each year.[2] In 2013, East Java was the province with the fifth highest DM prevelence in Indonesia.[3]

The increase in the prevalence of diabetes mellitus is followed by an increase in complication with varying conditions, including physical, psychological, social, and economic complications. Physical complications that occur include eye damage, kidney damage, heart disease, high blood pressure, stroke,[4] and gangrene. Diabetes can also reduce the quality of life of sufferers. Quality of life is one of the main criteria for knowing which health service interventions should be provided.[5] In addition, uncontrolled blood sugar can result in decreased cognitive function.[3]

The level of education and socioeconomics of the community is closely related to their understanding of the risk factors for acute and chronic complications of DM. In addition, socioeconomic factors will affect their adherence to treatment.[6] Good knowledge of managing diabetes mellitus will affect the way patients manage their disease.[7] Research has consistently shown that improved glycemic control and strict metabolic control can delay or prevent the development of diabetes complications. Evidence suggests that patients who are knowledgeable about DM self-care,[8] have better long-term glycemic control ability, and can avoid complications.[9] Therefore, it is very necessary to ensure that the patient's knowledge, attitude, and behavior are adequate.[4,10]

The adherence of DM patients to treatment depends on several factors, one of which is their economic capability; considering that treatment requires a lot of money, both for examination needs and drug purchase. For this reason, the Indonesian government has implemented a health insurance program called "National Health Insurance (JKN)" which has been implemented since 1st January 2014 based on the principle of humanity, the principle of benefit, and the principle of social justice for all citizens.[11] Prior to the establishment of JKN, the poor and indigent people used to experience difficulty in accessing proper health services due to economic factors.

The JKN implementers formed a separate scheme under the President called Healthcare Insurance and Social Security. BPJS participants are Indonesian citizens and foreigners who are domiciled in Indonesia for at least 6 months.[11] With the existence of JKN, it aims to reduce the gap in access to health services between the rich and the poor because

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the poor get the same facilities as the rich community by becoming BPJS participants through the Contribution Assistance Beneficiary (PBI) participant scheme.[12]

In Indonesia, before the implementation of JKN, there were various kinds of health insurance, such as Social Security for Workers (Jamsostek), a health insurance scheme for formal sector workers; Public Health Insurance (Jamkesmas), a health insurance program for the poor and underprivileged; Regional Health Insurance (Jamkesda), a health subsidy program for the poor managed by the provincial government:[12] social health insurance (ASKES) for Civil Servants, Pension Recipients, Veterans, Independence Pioneers, and their families; The Indonesian Armed Forces Social Insurance (ASABRI) for the Indonesian National Army, Members of the Indonesian National Police, and State Civil Servants within the Ministry of Defense and the Indonesian National Police. Under JKN, all existing social health insurance schemes are combined into one under the single payer insurance provider, which is administered by BPJS,[13] in accordance with Law Number 24 of 2011 concerning Social Insurance Administration Organization.

The Indonesian government has launched a high quality and efficient health program that is easily accessible to all citizens, so that division of tasks between health facilities, or what is known as a referral system, is needed because in this way service objectives can be achieved with minimal costs.[14] However, to be able to achieve this condition, there are still many obstacles, such as a long administrative process, lack of medical personnel in health facilities, and lack of health infrastructure.[15]

Healthcare BPJS implements a tiered referral system, namely health service arrangement that regulates the delegation of duties and responsibilities for health services vertically and horizontally. This tiered referral system occurs hierarchically starting from primary, secondary, and tertiary health facilities. Primary health facilities as Gatekeeper, namely provider of basic health services as the first contact for formal health services and referral filters according to medical service standards. Referrals to second-level health facilities can only be made by first-level health facilities (FKTP), which consist of Health Centers (*Puskesmas*), independent practicing doctors in collaboration with BPJS, dentists, pratama clinics, and class D hospitals. Likewise, referrals to third level health facilities can only be done by second level health facilities.[16]

Healthcare BPJS membership consists of: 1) PBI membership consists of people who are classified as underprivileged and poor; 2) Participants who do not receive contribution assistance (Non-PBI), which consist of Salaried Workers and their family members, Non-Salaried Workers and their family members, consisting of workers outside employment relationships and independent workers, non-workers and their family members. The last group is the community of employers or recipients of pensions.

Before BPJS was established, PBI participants were members of the Jamkesmas and Jamkesda beneficiary groups. The implementation of the Healthcare BPJS PBI in the first year has succeeded in increasing the participation of the poor and underprivileged to take advantage of both outpatient and inpatient health services in first-level health care facilities.[11] The payment system for health service facilities is carried out by BPJS through the Capitation mechanism for first-level service facilities, and the Indonesian Case Based Groups (INACBGs) mechanism[17] for advanced health facilities. Capitation is a pre-effort payment for the number of participants registered at the first level health facilities. Services for drugs, medical devices, and consumable medical materials at advanced level referral health facilities are one of the components paid for in the INA-CBG package.

Contribution payment by participants to BPJS is monthly through various mechanisms according to the type of participation. Especially for PBI participants, the fees are funded by the State so that participants do not have to pay themselves. The JKN program really helps the community, especially the poor and underprivileged, namely people who do not receive wages because their contributions are assisted by the government. When they are sick, they can come directly to the first level health care facilities to get services without having to be bother about costs. Services for them are the same as for non-PBI participants whose dues are paid by themselves. This program is expected to improve public health through pre-effort and increase the success of medical care for people who are already sick. The effect of BPJS membership on the success of care of DM patients has not been widely studied. Therefore, the purpose of this study is to determine the effect of BPJS membership on the success of care of DM patients on the island of Madura.

Materials and Methods

This study used a cross-sectional observational design, as respondents are people with diabetes mellitus who performed routine checks at the Primary Healthcare centers in Madura with the following criteria:

Inclusion criteria

Patients were included if they had diabetes mellitus, were; attending routine health checks at Puskesmas in Madura in July, August, and September 2018, able to read and write and speak Indonesian, willing to be research respondents and were Healthcare BPJS participants

Sample

The sample size was 425 respondents, and the sample size (n) was calculated using the simple random sampling formula with notation N (total population size), P (population proportion), and d (degree of error) as shown below:

$$n = \frac{Z^2_{1-\frac{\alpha}{2}} \; P.(1-P).N}{d^2(N-1) + Z^2_{1-\frac{\alpha}{2}} P(1-P)}$$

Z = 1.96, P = 0.5, d = 0.05, N = 3000 DM patients, so n = 340.651935 = 341 minimal respondents

The sampling technique applied in this study was purposive sampling of DM patients who perform health control.

Research variables

The independent variables in this study were age, body mass index, smoking habits, adherence to health check at health care facilities, adherence in taking medication, and type of BPJS membership. The dependent variable was the success of therapy. The success of therapy in this study was carried out by measuring the last blood sugar level compared with the blood sugar level on the previous examination, and a successful category noted if the last blood sugar level was lower than the previous blood sugar level (decreased). In this study, blood sugar level was divided into 3 categories, namely decreased, fixed, and increased. It was categorized as increased if the last blood sugar level was higher than the blood sugar level on the previous examination. Researchers did not check blood sugar level but used data at the Puskesmas because DM sufferers routinely checked their health at the Puskesmas every month through Chronic Disease Management Program (*Prolanis*). Prolanis is a health service system and a proactive approach that involves participants, health facilities, and Healthcare BPJS in order to maintain the health of Healthcare BPJS participants who suffer from chronic diseases such as DM, so that they can achieve an optimal quality of life.

Research instrument

The instrument of this research was a questionnaire. The questionnaire was developed by the authors, written in Indonesian with a combination of multiple-choice and filling in, reviewed and validated by a team of experts. Their evaluation is based on the relevance of the data to be collected and the clarity of the questions to avoid different understanding from the respondents. The questionnaire consists of demographic data and research variables. Before it is used, the validity and reliability test is conducted first. The questionnaire was tested on other DM sufferers outside of the respondents namely in 30 DM patients. The data from the trials were analyzed to determine the validity and reliability. Valid if the correlation value was > 0.3 and reliable if the Cronbach's alpha value was > 0.6.[18] The results of the analysis show that the instrument was valid and reliable because of the

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16 question items the lowest correlation value was 0.3 and the Cronbach's alpha value of 0.791

Ethical consideration

Informed consent was obtained from each patient before the interview and filling out the questionnaire. The confidentiality of the data obtained was guaranteed because patient data related to the patient's name and address were not written on the questionnaire. Patients were told that the information they provide will be kept confidential, will not be misused elsewhere, and patients have the right to refuse to be a respondent

Results and Discussion

The gender of the respondents as presented in Table 1 show that the majority of respondents were female (73.2%). This is in accordance with several previous studies such as the study by Silavora *et al* (2018),[6] which found that more women than men had DM in their study. Similarly, a study conducted by Faridah also reported that women with diabetes tend to be more frequent than men.[19] In addition, because the respondents are patients who come for health checks at the Puskesmas, it can be understood that women are more active and obedient in carrying out health checks at the Puskesmas.[20] According to Moawad *et al*, the majority of juvenile DM patients were also female.[21]

Majority of the respondents were aged between 51 – 60 years old, the mean age was 38.4 years (Table 1). This is in accordance with the research of Alghamdi *et al* in 2017 which showed that the majority of DM patients are in the age range of 51 – 60 years old because at that age they are usually very diligent in keeping their appointments with the health service facilities for examinations and treatment.[22] Another study conducted by Hassanein *et al* also shows that the majority of DM patients are older than 50 years old and less than 65 years old.[23]

The results of the Spearman rank correlation statistical analysis as shown in Table 3 showed that there was a significant relationship between age and the success of therapy with p = 020. This finding is in accordance with the study conducted by Gamel *et al* in 2015 which reported that age has a significant effect on diabetes mellitus control.[24] This is most likely due to their activeness in checking their health at a healthcare facility and their adherence in taking medications.[25] The relationship between age and medication adherence is represented in Table 4, Again respondents within the age range of 51 - 60 years were more adherent in taking medication, with a percentage of 58.9%. This is also in accordance with the results of the study by Alghamdi *et al* which found that at the age of 51- 60 years the majority (78.9%) of their respondents always adhered to antidiabetic therapy.[22,26]

Body mass index, as presented in Table 1, showed that the majority (68.7%) of the respondents are in the normal category. From the statistical analysis, it shows that there is no significant relationship between BMI and the success of therapy, this can be understood because BMI is not related to treatment success, but is a risk factor for the occurrence of chronic diseases including DM.[27] The smoking habit of the respondents showed that most (87.8%) of the respondents did not smoke (Table 1). From the statistical analysis there was no significant difference between smokers and non-smokers regarding the success of their therapy. This is understandable because the majority of respondents do not smoke.

Hypertension was the most frequently occurring co-morbidity (42.8 %), while others did not have comorbidities. Respondents with co-morbidities had significantly lower treatment success rates than those who had no comorbidity. p = 0.008. This may be because respondents who have comorbidities have to take more drugs, so that their adherence is also lower consequently, therapy optimization is not achieved. Most of the comorbidities such as cardiovascular, hypertension, and dyslipidemia may be caused by uncontrolled blood glucose,[28] so it can be said that uncontrolled blood sugar causes co-morbid hypertension.

The most frequent type of BPJS membership is as shown in Table 2. Majority (52.3%) of the respondents were in the PBI category, while at least 0.9% were independent participants. There was no significant difference in the success of the therapy between types of BPJS membership (p = 0 .863). This shows that the success of DM therapy is not influenced by the type of BPJS membership. This study is in line with the research conducted by Athijah *et al* on hypertension sufferers which found that the type of BPJS membership did not significantly influence the success of therapy.[20] Although the study does not show a significant effect of BPJS participation on the success of therapy for DM sufferers, the authors argue that the JKN program run by the government is quite successful in increasing the participation of the poor and underprivileged people in health checks at the Puskesmas.[20]

Adherence with health checks at health service facilities is shown in Table 2. Majority (91.3%) of the respondents routinely had their health status checked. This is understandable because respondents are DM patientss who carry out routine checks at the Puskesmas, meaning those who actively come to the Puskesmas. This study is also the same as previous studies, where the majority of those who actively come to the Puskesmas are BPJS participants from the PBI category.[29] From the results however, there was no significant difference between those who were regular at their routine health checks and those who were not (p = 0.108).

In a previous study conducted by Rahem *et al* in 2019, it was found that the majority of DM patients actively checked their health at the Puskesmas every month but their blood sugar was not controlled and they had many leftover medicines at home that they had not taken. This happens because the Madurese community tends not to take their medication if they perceive that the illness has disappeared. Although they are committed to checking their health regularly, they are not necessarily obedient to taking their medications.

Table 1: Characteristics of Respondents

Characteristics	Frequency	Percentage (%)
Gender		
Female	311	73.2
Male	114	26.8
Total	425	100
Age (years)		
≤ 40	28	6.6
41 – 50	126	29.6
51 – 60	163	38.4
> 60	108	25.4
Total	425	100
Body mass index		
Too thin	17	4
A little thin	18	4.2
Normal	292	68.7
Pre obesity	98	23.1
Total	425	100
Smoking habit		
Not smoking	373	87.8
Smoking	52	12.2
Total	425	100
Comorbidity		
None	243	57.2
Hypertension	182	42.8
Total	425	100

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Even though the success of controlling DM is largely determined by the adherence with taking medication,[29] there is an interesting phenomenon related to the rest of the medicine, in which some are given to neighbors or relatives if they are sick.

Some are sold through peddlers who come to homes looking for leftover medicines. This condition is very dangerous considering that the residual drug does not guarantee its quality will not be harmful to the consumer, especially if the drug has expired. Therefore, there is a need for education and counseling in the community regarding how to get the right medicine, use, store, and properly dispose of the medicine if it is no longer indicated for use. Counseling has a very significant effect on medication adherence and the success of controlling blood sugar. This education is commonly known as DAGUSIBU (Get, Use, Store, and Dispose) medicine properly.

Adherence in taking medication is one of the important factors for the success of therapy for people with diabetes. Non-adherence to medication can affect blood glucose level, and lead to complications.[26] Majority (54.6%) of the respondents did not adhere to taking their medications (Table 2). Respondents who were adherent (45.4%) significantly had better treatment success rates (p = 0.000). Low adherence may be due to lack of proper education of patients by pharmacists. This is because education/counselling for patients has a very significant effect on the patients' understanding of drug use and adherence to drug treatment.[29,30] This study is in line with the research conducted by Alghamdi *et al*, which found that medication adherence affects the success of therapy, in which patients who do not adhere to medication are less successful than those who are adherent.[22] According to other research conducted by Aronson, adherence is a very important factor because it affects the success of therapy.[31] The level of adherence in this study is lower than the study of Aghoja *et al* in 2013 conducted in a hospital which reported that the DM patients who adhere to their medications are more than those who are not adherent.[25]

Table 2: Research Variables

Variables	Frequency	Percentage (%)
BPJS membership type		
PBI	222	52.3
Civil servants	126	29.6
Workers in the private sector	73	17.2
Independent	4	0.9
Total	425	100
Health control adherence		
Not routine	37	8.7
Routine	388	91.3
Total	425	100
Medication adherence		
Non adherent	232	54.6
Adherent	193	45.4
Total	425	100
Blood sugar level at the last examination compared to previous examination		
Increased	85	20
Fixed	134	31.5
Decreased	206	48.5
Total	425	100

Table 3: Statistical analysis with dependent variables of therapy success

Variables	P Value	Type of analysis	Description
Age	.020	Spearman rank correlation	Significant
BMI	.489	Spearman rank correlation	Not significant
Smoking habit	.598	Chi-Square Tests	Not significant
Hypertension co morbid	.008	Chi-Square Tests	Significant
BPJS membership type	.863	Chi-Square Tests	Not significant
Control adherence	.108	Chi-Square Tests	Not significant
Medication adherence	.000	Chi-Square Tests	Significant

Table 4: Age cross tabulation with adherence

Age	Adherence					
	Disobeying		Obeying		Total	
	n	%	n	%	n	%
≤ 40	17	60,7	11	39.3	28	100
41 – 50	74	58.7	52	41.3	126	100
51 – 60	67	41.1	96	58.9	163	100
> 60	62	57.4	46	42.6	108	100
Total	220	51.8	205	48.2	425	100

Conclusion

The type of BPJS participation has no effect on the success of therapy in people with diabetes mellitus. Other variables that also have no effect were Body Mass Index (BMI), smoking habit, and adherence to health control. On the other hand, the variables that influence the success of therapy are presence of comorbid hypertension, age, and medication adherence.
It is recommended that massive education and counseling are carried out for DM patients in Madura to increase their understanding of their illnesses and treatment, as well as the need for monitoring regarding their medication adherence.

Conflict of interest

The authors declare no conflict of interest.

Authors' Declaration

The authors hereby declare that the work presented in this article is original and that any liability for claims relating to the content of this article will be borne by them.

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