The Correlation between Adherence and Asthma Patients Quality of Life in Medan, Indonesia

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Abstract

BACKGROUND: Asthma is a chronic airway disease that is based on an inflammatory process and a serious health problem around the world. Asthma is often associated with treatment management factor. Adherence is the patient's compliance towards their doctor's advice, which is accompanied by their understanding and follows the doctors' advice consistently.

AIM: This study aimed to get a valid and reliable adherence measure in asthma patients especially in Medan.

METHODS: This research used the method of quantitative done by the cross-sectional approach. The sample (200 adult asthma patients) used standard asthma medication, stable asthma patients and did not suffer from severe asthma or other accompanying diseases. Data were analysed using univariate, bivariate and multivariate analysis, which is SEM (Structural Equation Modeling) analysis.

RESULTS: The best dimension of medication adherence was the dimension of beliefs in medication 64%. The highest education adherence is at college education level which is 67.6%. Employment status with highest adherence value is medication on civil servant/military/police with the value of 67.7.

CONCLUSIONS: There is a correlation between adherence and asthma patient's quality of life in Medan.

Introduction

Asthma is a chronic airway disease which underlying pathogenesis is an inflammatory process and one of the most serious health problem around the world. The chronic inflammatory process in the respiratory tract of asthma patients involves many inflammatory cells and their elements. This condition causes the respiratory tract to become hyper-responsive, resulting in clinical symptoms that occur periodically, especially at night or early morning/dawn. This condition causes airflow limitations in the respiratory tract, which results in shortness of breath as a major clinical manifestation that greatly disrupts the activity, productivity and quality of life of asthma patients [1].

The prevalence of asthma continues to increase in both developed and developing countries, although appropriate medications for asthma management (inhalation of combination corticosteroids and agonist β2 prolonged/LABA) are available. Currently, the number of asthma patients is estimated to reach 300 million people, and total patients who died from asthma attacks reach 255,000 people. Respiratory system illness is the cause of 17.4% of deaths in the world, in the following order: lung infection (7.2%), Chronic Obstructive Pulmonary Disease (COPD) (4.8%), tuberculosis (TB) (3%), lung cancer (2.1%) and asthma (0.3%) [2].

Asthma has a wide impact on the activity, productivity, and social conditions of the community, especially among asthma patients, who will certainly increase the burden of health financing and the

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economic burden of the community [3] [4]. The right management of asthma requires appropriate and adequate treatment which is right dose, appropriate duration, appropriate time, appropriate way/technique of inhalation therapy, etc. Management of asthma continues to grow, and currently, standard asthma management guidelines are outlined in the Global Initiative for Asthma (GINA 2011). Achieving and maintaining controlled asthma is the main aim in asthma management which is an optimal condition that allows asthma patients to do their activities like other healthy people. Indicators of controlled asthma are no symptoms, no activity limitations, and no symptoms at night, no reliever medication, normal lung function and no asthma attacks throughout the year [1].

Adherence is the patient's compliance towards their doctor's advice, which is accompanied by their understanding about the illness relating to the management/treatment until they follow the doctor's advice consistently [5]. The factor, adherence in the management of asthma consists of two parts: the problem of drug use such as the complexity of management, drug side effects, medical cost, and inconvenience to treatment; and the problems outside of management such as poor understanding of doctors' instructions, dissatisfaction with health personnel, not as expected, lack of supervision from doctors and families, false estimate of disease risk, cultural problems, false stigmatization, forgetting, and religion/belief problems [6].

We can draw the problem on how the instrument/model of adherence asthma patients in the management of the disease, especially in Medan and how the adherence of asthma patients to the management with asthma patients' quality of life.

This study aimed to get an instrument/model of adherence to asthma patients in the management of the disease and to know the correlation between adherence and asthma patients' quality of life.

Methods

This research used 2 stages of research. The first stage is done with the qualitative approach and the second phase with a quantitative approach. The qualitative approach aimed to develop the research instruments, and the quantitative approach aimed to analyse the research instrument, testing the hypothesis and structural model of measurement.

This research was preceded by the development stage of the research instrument. The first stage is the exploration of adherence instruments/measure tool and asthma patients' quality of life of. At this stage, the model of treatment adherence instrument is developed with indicators which are knowledge, attitude, belief, action, doctor-patient communication and family support.

The quantitative approach is made to the initial draft, which will be analysed statistically to get valid and reliable values. The validity of the constructs is tested by using Exploratory Factor Analysis and Confirmatory Factor Analysis (CFA). The following step is data validation. The process of factor analysis tries to find the relationship between independent variables [7]. CFA is essentially an exploratory statistical method, but the loading factor for variables is set based on previous studies or relevant theories. Then, CFA processed and measured the suitability of loading in a target matrix. The CFA was done by considering factor structure that was positioned. The CFA examined the suitability of a model with some specific factors and determined the specific items that measure or load on each factor [7] [8].

The testing of Hypothesis and the development of behavioural adherence model of treatment as well as its relation to asthma patients' quality of life were performed using Structural Equation Modeling (SEM) analysis. This research design is called comparative causal or explanatory research. This study explains the relationship and effect between one variable with other variables. Besides, this study uses instantaneous data (cross-sectional). The obtained data is used to predict future circumstances.

This study was done on asthma patients who live in Medan. The selection of research sites based on consideration: (1) Medan area is the capital of North Sumatera Province with the prevalence of asthma patients is estimated to be high enough that is 3% (2) standard of asthma service, especially behaviour of management/treatment of asthma patients in Indonesia and especially in Medan City, generally is not maximal [9].

The population of this study was asthma patients who live in Medan and has been treated by a general practitioner or pulmonary specialist. The inclusion criteria of this study were adult asthma patients aged 18-60 years, asthma patients who came to general practitioners or pulmonary specialists in Medan city, patients who had undergone asthma treatment with appropriate drug (inhalation of combination corticosteroids and agonist β2 prolonged/LABA) at least 6 months, stable asthma patients (not in asthma attacks), selected patients are patients who have complete address data, willing to follow this study (approved with informed consent). The exclusion criteria in this study are a history of coexisting diseases such as COPD (Chronic Obstructive Pulmonary Disease), heart disease, diabetes mellitus, hypertension, kidney disease, liver disease and a history of allergy to drugs used in this study and severe or moderate asthma patients who were hospitalised.

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The sampling technique in this research with the quantitative approach is done by Consecutive Sampling which the process of sampling based on the criteria set by the researchers [10].

Asthma is a disease that is mostly influenced by season as a risk factor. Duration of data collection in this research was about 8-10 month. With this time the researcher considers the duration is long enough, so the results of this research by consecutive sampling technique can approach or resemble probability sampling results. The samples number is determined based on the hypothesis test formula one proportion and obtained a sample with the number of 200 people.

Interviews and questionnaires were completed after obtaining the patient's consent at the respondent's residence/home or at the place where the patient controls the medication. The goal is to get valid and not influenced result by other conditions (research bias).

Interviewers in this study are 6 students from Faculty of Medicine, the University of North Sumatra who has been trained by researchers. Also, the researcher's collaborate with 8 hospital nurses who have trained researchers to collect research data. Interviewers were trained to be able to guide and provide technical data filling in the prepared questionnaire. Some interviewers demonstrated the technique of filling out the questionnaire in the presence of the researcher. This was done to obtain valid data on the asthma patients study.

The Secondary data was obtained from Medan Health Care Office to determine the prevalence of asthma in Medan which originating from Basic Health Research Province of North Sumatra. The Data of asthma patients were collected from drug distributors or pharmaceutical parties who had completed patient data records of ICS drug users. Furthermore, asthma patients' data is also collected from the practice of specialist doctors and pulmonary polyclinics in a hospital or private doctors' practice.

Instruments of knowledge, attitudes, beliefs, actions, doctor-patient communication, and family support: The measurement technique of knowledge is to give a score of 1 for each correct item of the question. For attitude is to give score according to the attitude of the respondent. The assessment range is 1 to 4. Score 4 shows the patient's attitude is getting more positive. Assessment of trust based on true belief and score given is 1. Assessment of action is score 1 for corrective action. The patient doctor's communication appraisal is a score of 1 if the patient answers any or has ever been to any doctor-patient communication question. Assessment of family support variables based on the presence or absence of family support for asthma patients. A score of 1 is given when the patient answers are on the family support questionnaire.

The quality of life instruments comprise the dimensions of health, emotion, environment and activity limitations. Assessment of quality of life scores has a range of 1-5. The highest score (5) indicates the patients quality of life not disturbed.

Table 1: The Asthma Patients Demographic Characteristics in Medan

Variable	n	%
Age		
≤ 20	44	22.0
21-30	44	22.0
31-40	33	16.5
41-50	41	20.5
51-60	38	19
Mean/SD	35.7/SD 13.3	
Sex		
Male	74	37.0
Female	126	63.0
Education		
Elementry School	9	4.5
JHS	11	5.5
SHS	84	42
College	96	48
Marital status		
Married	126	63.0
Single	74	37.0
Employment		
Unemployment	11	5.5
Housewife	40	20.0
Student	40	20.0
Civil servant/Military/police	35	17.5
Private employee	28	14.0
Entrepreneur	31	15.5
Etc	15	7.5
Income		
<1 million	29	14.5
1-3 million	93	46.5
4-5 million	35	17.5
>5 million	43	21.5
Tribe		
Batak	92	46.0
Jawa	48	24.0
Melayu	11	5.5
Minang	25	12.5
Aceh	13	6.5
Etc	11	5.5

The instruments of sociodemographic characteristics are age, sex, education, marital status, employment, income, and tribe. Assessment of demographic characteristics is based on the choice determined from the patient in accordance with the criteria outlined in the operational definition in this study.

Ethical Clearance of this study was obtained in March 2011 issued by the Commission on Medical Research Ethics Faculty of Medicine, University of North Sumatra/USU Hospital.

Results

Based on the Table above, it is known that age is more prevalent in the age group < 20 years old and 21-30 years old with a proportion of 22%. Respondents of the female sex are more than male respondents that are 63%. The highest level of education is college 48%; the most marital status is married 63%, most of the employment is housewife and student which is 20% respectively. For the highest income level is 1-3 million that is 46.5%, and

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most of the respondents are from the Batak tribe that is 46%.

Table 2: The Adherence Medication of Asthma Patients

Adherence	Number of Questions	Min	Max	Mean	SD
Knowledge	9	0	8	3.9	1.8
Attitudes	9	9	36	28.9	4.0
Beliefs in disease/medication	12	1	12	8.0	2.4
Actions	9	0	9	5.4	2.3
Patient-doctor communication	20	0	18	14.6	3.5
Family support	5	0	5	4.2	1.1
Total Adherence	84	45	84	66.8	8.6

The Table above contains an assessment of knowledge, attitudes, beliefs, patient-doctor communication, actions, and family support. The average knowledge is 3.9 (SD 1.8), attitudes 28.9, (SD 4) beliefs in disease/medication are 8.0 (SD 2.4), actions 5.4 (SD 2.3) and patient-doctor communication is 14.6 (SD 3.5), and family support is 4.2 (SD 1.1).

Table 3: The Distribution of Adherence Dimensions on Asthma Patients Medication

Adherence dimensions	Good		Not Good		Border*
	N	%	N	%	
Knowledge	127	63.5	73	36.5	≥ 3.9
Attitudes	101	50.5	99	49.5	≥ 28.9
Beliefs in disease/medication	128	64.0	72	36.0	≥ 8
Actions	105	52.5	95	47.5	≥ 5.4
Patient-doctor communication	100	50.0	100	50.0	≥ 14.6
Family support	113	56.5	87	43.5	≥ 4.2
Total Adherence	106	53.0	94	47.0	≥ 66.8

The results showed that the best dimension of medication adherence was the dimension of beliefs in disease/medication (64%) and the least was the patient-doctor communication dimension (50%).

Table 4: The Characteristics of Treatment Adherence Based on Sociodemographic Characteristics of Asthma Patients

Variable	n	%	SD	p
Age				
≤ 20	44	65.4	7.8	0.13
21-30	44	68.7	8.3	
31-40	33	68.9	8.5	
41-50	41	65.2	9.1	
51-60	38	66.1	9.2	
Sex				
Male	74	66.9	8.8	0.943
Female	126	66.8	8.6	
Education				
Elementry School	9	62.6	9.9	0.027
JHS	11	63.5	9.9	
SHS	84	65.7	7.1	
College	96	68.6	9.2	
Marital status				
Married	126	67.2	9.0	0.400
Single	74	66.2	8.0	
Employment				
Unemployment	11	60.0	7.3	0.008
Housewife	40	64.6	8.7	
Student	40	66.5	7.1	
Civil servant /Military / police	35	69.0	10.2	
Private employee	28	69.9	7.4	
Entrepreneur	31	66.1	8.7	
Etc	15	69.5	7.6	
Income				
<1 million	29	65.6	9.1	0.484
1-3 million	93	66.7	8.3	
4-5 million	35	66.1	10.9	
>5 million	43	68.5	7.0	
Tribe				
Batak	92	67.2	8.4	0.766
Jawa	48	66.7	9.9	
Melayu	11	69.6	9.5	
Minang	25	65.9	7.3	
Aceh	13	64.7	7.6	
Etc	11	65.9	8.4	

The table above shows there is no difference in the mean value of adherence based on age, sex, marital status, income and tribe with p > 0.05. There is an average difference in the value of adherence based on education and employment (p < 0.05). The highest education adherence is at college education level which is 67.6 (SD = 7.8), and the lowest level is a primary school (SD) which is 61.5 (SD = 11.3). Employment status with highest adherence value is medication on civil servant/military/police with the value of 67.7 (SD = 7.9), and the lowest is unemployment status with a value of 60.2 (SD = 5.5).

Discussion

In this study, it is found that most patients are the young adult age which is under 30 years old (44%). The average age of asthma patients is 35.7 (SD 13.3). The research from Japan, Suzuki, (2011) [11] obtained a same average age of asthma patients from the study which is 36.3 (SD = 7.9). Asthma has been known since the time of Hippocrates (2000 years ago), and until now it's still a global health problem. Epidemiologically, in people with asthma starts from childhood to adulthood. WHO shows the prevalence of asthma is about 3-5% in adults and 7-10% in children [12].

Based on sex, most patients were found are females that are 63%. Epidemiologically, asthma can affect both men and women. The prevalence of asthma in boys is greater than that of girls but after puberty asthma becomes more common in women [11]. Theoretically, it is not yet clear why the proportion of adult asthma patients are higher in women, but the population in this study are adult age group in home/residence or visiting a doctor's practice to re-control the disease. Theoretically, patients who are more concerned about the disease are women than that of a man [12], especially asthma patients in this study population are not asthma patients in attack or with severe asthma but asthma patients who are in stable conditions.

In this study, the patient's socioeconomic level is quite good. Based on the level of education in this study, it is found that highest education level is college 48%, followed by senior high school and junior high school 42% and 5.5% respectively, while the least is the level of elementary school 4.5%. Based on employment status, the highest is employee 54.5% compared to unemployed which is 45.5%. Most of the unemployed are housewives and students (40%). Meanwhile, 31.5% are from the group working as civil servants/military/police and private employees. Based on the amount of income, the largest group of income is 1-3 million/month that is 46.5%, and the least is 14.5% with income < 1 million. Meanwhile, as many as 21.5% with income > 5 million. Most of the samples

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in this study were patients treated at the practice of pulmonary specialists. There is a tendency of patients who seek treatment in the practice of specialists are from good enough economic status. The results of this study differ from the results of Atmoko research (2011) [13] that got the highest level education among asthma patients is medium education 49.5% while the level of higher education is 30.8% [13]. Imelda 2007 [14] and Atmoko 2011 [13] also obtained medium and high education level that is 54.6% and 38.5% respectively. Bachtiar (2009) [15] obtained more senior high school education level patients who are 40.7% and followed by college level of 28.8%.

Based on the marital status of the results in this study, most of the patients are married that is 63%, and 37% of patients are single status. Based on the tribe, most of the asthma patients are from Batak tribe (46%), and the least is Malay and others (5.5%). It can be explained that the adult population (> 18 years) in Medan is mostly married and most of them are a population of Batak tribe by the Profile of Medan. But the Batak tribe in Medan has several variations. There are Batak Toba, Batak Mandailing and Batak Karo. Different types of Batak tribes and other tribes in Medan have variations on social-cultural conditions, including in health behaviour. In this study, it is seen a considerable variation based on tribes in asthma patients who live in Medan.

The adherence instrument medication of asthma patients in this study was developed on 6 indicators which are knowledge, attitudes, actions and doctor-patient communication, beliefs in disease/medication, and family support. 9 points were given to the number of questions for knowledge, 9 points for attitudes, 9 items for actions and 20 items for doctor-patient communication, 12 points for beliefs in disease and medication and 5 items for family support questions on treatment.

The first indicator is knowledge. Based on the results of this study, the knowledge indicator is formed based on questions of understanding symptoms, trigger factors, asthma control, during treatment of asthma, the best way for treatment, inhalation techniques, recommended examination to assess progress, and the benefits of using asthma control medication.

The patient is said to adhere to treatment if the patient understands comprehensively about all important aspects of asthma and its treatment. Asthma is a unique disease. This disease is a chronic disease that requires long-term treatment. In the mild-moderate stage, the disease is reversible which is often misunderstood by asthma patients. The patients must understand their illness from basic aspects such as understanding about illness, symptoms, trigger factors, until why they should use standard medication and the effects of the treatment given to him.

The second indicator is the attitude. The formation of treatment adherence is often associated with a person's attitude toward the disease and its treatment. A positive attitude toward disease/treatment will encourage patients including asthma patients to maintain proper treatment behaviour. Attitudes are also formed based on prior patient experience and knowledge. Often, attitudes are in line with existing knowledge. What patients should understand that asthma is an inflammatory disease and at the same time, it narrows the respiratory tract, correlated with the type of drug given, an inhaler with the combination of corticosteroids and LABA. This understanding will encourage patients to use the appropriate drug and also in an appropriate way which is by inhalation. The treatment at a stable stage must be consistent with the correct management of asthma with careful monitoring by treating doctor. Patients, in this case, should always be willing to work with doctors and follow the doctor's instructions. Besides that, a good attitude of patients can be formed if they also want to study the disease from various sources that exist. So that, an attitude based on knowledge will certainly lead to good behaviour [16]. In this case, it is a longer adherence than just passively following the doctor's instructions. For action indicators, the questions were formed are about the importance of asthma drug use, the use of asthma medications based on doctor's instructions, stop asthma medication by instruction, desire to cooperate with treating doctor, ask for explanation about disease treatment, consult with doctor, study asthma, and prepare asthma medication anytime.

The third indicator is beliefs. The dimensions of beliefs in disease and medication in this study are differentiated by the attitude of asthma patients to treatment. This confidence instrument was developed based on information obtained by researchers from doctors who is treating asthma patients. Many false perceptions developed among asthma patients which interfere with the success of their treatment, moreover, in terms of standard drug use by inhalation of steroid and LABA combination. Many patients consider a new standard asthma drug appropriate if it is in a state of attack, for severe illness, and for high socioeconomic groups, etc. These false perceptions must be identifiable/recognized by the doctor, so that the management of asthma patients also refers to the socio-cultural aspect. Bauman (2005) [17] mentioned one aspect that disrupts adherence treatment of asthma patients is the wrong patient's belief in the disease and its treatment. Instrument beliefs about disease/treatment that researchers successfully developed, consists of 12 questions. As for the grain of the question, it is about the perception of patients who says asthma is a mild disease and easy to cure, the absence of symptoms means asthma has healed, asthma treatment is sufficient at the time of the attack, the right treatment of asthma is by taking medicine, inhalation treatment is for severe disease and high rates of inhalation drugs will be addictive, the price of inhaled drugs is expensive and unreachable, no need

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for lung function checks, no consultation with doctors, over-the-counter breathing drugs are sufficient to treat asthma, and no complication of asthma.

The fourth indicator is the action. The action is an indicator that has been done by asthma patients every day related to behaviour towards treatment. This indicator shows the level of adherence to treatment is well under way when the patient has done the aspect of regular treatment, consult with his doctor and make prevention efforts such as avoid the trigger and exercise regularly. Indicators of action in this study were formed based on 9 items of questions that is patients use asthma medication every day as recommended by treating doctors, pay attention to the schedule/time of drug administration, using reminders to use asthma medication, conduct routine consultation with doctors, perform lung function examination, doctors to assess disease progression, avoid asthma triggers, exercise routine, and read articles or papers on asthma/disease treatment.

The last indicator is family support. Family support based on Green theory is a reinforcing factor that drives factors that can lead to behaviour. Asthma patients who are undergoing treatment will continue to consume the drug if there is support from the family. Families can remind, help regarding costs, and others that can improve the success of asthma treatment. This theory is also compatible with Lewis's driving forced theory where family support is a factor that reinforces the behaviour by promoting persuasion and information. The existence of intensive family support can improve the behavior for better treatment. Adherence to the treatment of asthma will be stronger because the family always reminds, provides information, encourages and even helps the provision of necessary medical funds.

Questionnaires about Adherence of treatment of asthma patients contains comprehensive questionnaire to assess adherence of treatment with 6 dimensions of measurement that is knowledge, attitudes, beliefs, actions, doctor-patient communication, family support with a total of 84 questions. As for the researchers' knowledge, until now there is no comprehensive questionnaire to assess adherence of asthma patient treatment. The researchers cut short the questionnaire to Adherence Asthmatic Patient Questionaire Medan (AAPQ-Medan) [18]. Cronbach alpha test results in this questionnaire obtained 0.84. Azwar (2001) set this measure as considered valid and reliable if the resulting Cronbach alpha value is > 0.6. This means that the questionnaire is quite reliable for use particularly in Medan with adult asthma patients who use standard drugs. However, the weakness of this questionnaire is less practical because of too many question items (84 pieces). There should be further studies to examine and explore the questions in this study to produce a simpler measuring tool to explain the adherence of treatment in patients.

In this research, the researchers have succeeded to develop patient adherence behaviour component that is knowledge, attitudes, beliefs, actions and doctor-patient communication, and family support. Someone is said to be adherent to his treatment if he has the right knowledge, positive attitude, no beliefs in impede treatment, correct treatment, comprehensive patient-doctor communication and family support. The results of this study have proven what components form a clear adherence in the treatment of asthma patients and how strong these components in forming adherence treatment.

This study found a median adherence treatment of asthma patients was 66.8 (SD = 8.6). The score of knowledge from 9 questions is 3.9 (SD = 1.8), attitude score with 4 level of like scale start strongly in disagreeing sd very agree to get an average value of 28.9 (SD = 4.0) from 9 question, trust with average 8.0 (SD = 2.4) out of 12 questions, 5.4 (SD = 2.3) action score of 9 questions, patient-doctor communication score was 14.6 (SD = 3.5) out of 20 questions and the family support score was 4.2 (SD = 1.1) out of 5 questions.

In this study, it is found that the proportion of adherence behaviour that is still not good with only 53% have good adherence. Poor adherence is still seen in the attitude and communication components of doctor-patients with asthma-related illness and treatment that is 50.5% and 50% respectively. This indicates that the behaviour towards the treatment of asthma patients in Medan is quite low, especially for attitudes and doctor-patient communication. Recorded more than 230 million Euro in the UK and 100 billion dollars annually in the United States issued to overcome the problem due to less adherence of asthma patients to their treatment.

The results of this study also showed that the level of knowledge of asthma patients is not good in establishing the understanding of asthma, triggers and symptoms of asthma. Asthma patients' attitude towards treatment has tended to be well seen that most have shown a positive attitude, both in the perception of asthma medication as well as attitudes toward the treating doctor. But the negative attitude that is often found in patients will stop asthma medication, and control of asthma. There were 15% people not agreeing to control their asthma, and 15.5% did not agree to stop asthma medication based on instructions from doctors. Based on the belief in the disease and its treatment, it is found large wrong is in perceiving the disease of asthma. In this study, 57% of the patients believed that inhaled treatment was a treatment for severe asthma, 49% thought that asthma was a mild and easily curable disease, and 45% thought no symptoms meant that asthma had recovered. Based on treatment measures, most patients have used asthma medication. But in this study, only 24% always use reminders to use asthma medication, 38% who always communicated with their

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doctors and 51.5% who regularly exercised. Based on patient-physician communication most have stated good doctor-patient communication. But in this study only 60-65% of doctors who communicate about financial and profit and loss in treatment. Based on family support, most of them are getting family support. In this study, more than 80% of patients have received family support by both moral and material aspects.

The results of this study prove that the condition of adherence of asthma patients in Medan is still very limited. Patients are not consistently attached to the disease and its treatment. This is probably because the level of interaction between doctors and patients is not so good. Though asthma is a chronic disease where the relationship between doctors and patients should be maintained maximally and lasted continuously. This study was conducted in a moment (cross-sectional), so it is not seen how the quality and continuity of doctors interactions and asthma patients.

In this study, the researchers found there is no correlation between sociodemographic factors such as age and sex with adherence treatment of asthma patients ($p > 0.05$). This is in line with Apter's study, (1998) which has no relationship between age and sex with adherence treatment in patients who are given corticosteroid inhalation twice daily [19]. This study is not in line with the research of Gamble et al., (2009) who got women more adherent compared with men ($p < 0.05$) [20].

In this study obtained adherence treatment in women almost the same as men that is 66.8 and 66.9. For the age group, treatment adherence was higher at age < 40 years, i.e. 65.4 to 68.9. This is probably because young age is a more productive age, so the conditions of asthma attacks that occur greatly disrupt the productivity and performance or achievement of learning. This must be solved immediately by the sufferer. Also at a young age, more easily remember the information which is obtained from the environment, especially from treating doctors so that this condition can increase knowledge, attitudes, beliefs, and treatment measures. But in this study, there was no significant correlation between age group with adherence treatment of asthma patients ($p > 0.05$). Meanwhile, Gillisen (2007) mentioned that pediatric and adolescent patients tend to be less adherent than adults. In this study, the study population was of adult age and did not assess adherence in children [21].

In this study also found adherence treatment is higher in patients who are still bound to marriage. This is possible because the husband or wife or other family members play a role in encouraging the adherence in asthma patients. Families can be very influential factors in determining the beliefs and health values of individuals and can also determine the treatment program they can receive. Families also provide support in making decisions about the care of sick family members.

The status of employment in this study was grouped into working groups and non-working groups. The results showed there was correlation employment with treatment adherence ($p < 0.05$). It's because the patient's working status varies greatly among the working group. In the non-working group also varied in the group of housewives, students and retirees. In this group, they have the activities that often make them forget and not adherence against their treatment

In this study, researchers found that patients with an income rate of > 5 million had the highest adherence to treatment, and the lowest treatment adherence is at the rate of < 1 million. But statistically, there is no difference in adherence treatment based on income level. This is not in line with Apter's (1998) study which found no significant association ($p = 0.002$) between income and adherence of treatment of asthma patients [15]. This is probably because not all asthma patients bear the cost of treatment, but some of the asthma patients who were studied are covered through health insurance Civil Servants as patients who received treatment at RS Pirngadi that serve civil servant health insurance.

In this study adherence of treatment is higher in Malay tribe that is 69.6 and low in Aceh tribe that is 64.7. Statistically, there is no relationship between ethnic and treatment adherence. This is not in line with Wells et al.'s investigations where there is a correlation between ethnic and treatment adherence. Wells (2008) found the difference in treatment adherence in African and American tribes [22]. Similarly, Apter's (1998) study found there is correlation adherence in the Spanish group [19]. This is probably because the tribal variations in this study are not balanced. In Indonesia, there are many different ethnic groups; especially Medan is a very heterogeneous city, where Batak tribe is more dominant in Medan.

Adherence treatment is determined by many factors. A continuous review of adherence treatment, especially aspects of the problem of treatment, psychology, and the quality of doctor-patient interactions should be undertaken. Long-term treatment often causes problems in patients. Good understanding, good attitude, adherence level and doctor-patient communication need to be developed to improve adherence of patient's treatment, especially asthma patient in Medan so that the mission of GINA 2011 which is controlled asthma can be achieved.

In conclusion, based on the analysis of the treatment adherence measurement model. The treatment adherence measurement model of asthma patients in Medan has good psychometric value (valid, reliable and fit modelling), which includes all latent variables (exogenous and endogenous) along with the indicators studied. The adherence of treatment I that

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formed are aspects of knowledge, attitudes and beliefs. Adherence of treatment II which is formed from the aspects of action, doctor-patient communication and family support. Quality of life formed from aspects of health, emotions, environment and activities.

The proportion of asthma patients adherence in Medan was 53%, and the proportion of asthma patients' quality of life in Medan was 52.5%. There are differences in treatment adherence based on demographic status that is education and employment. There is no difference in treatment adherence based on sociodemographic statuses such as age, sex, marital status, income and tribe.

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