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Development of a Model of Asthma Management in Children Based on Beliefs by Parents in The Concept of The Health Belief Model

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ABSTRACT

Introduction: Asthma in children causes loss of school days, and also causes growth in children. Parents have a responsibility to manage asthma, they need asthma management education for children who can increase their wisdom in managing it. The research objective was to develop a model of asthma management education in children based on beliefs in the concept of the Health Belief Model. *Method*: quasi-experimental research with 66 respondents, probability sampling method through simple random sampling. Using 3 HBM model development questionnaires belief, threat and behavior. *Statistical analysis* : using a paired t-test, Mann Whitney test, linear regression adjusted for each variable studied in developing HBM. *Results and Analysis* : education on trust ($p < 0.001$), confidence in threats ($p = 0.001$), threats towards behavior ($p < 0.001$), educational influence on behavior ($p < 0.001$). *Discussion and Conclusion*: Parents' beliefs about their ability to discuss existing problems are very important to overcome recurrence. Increased confidence in skills, increased satisfaction and self-confidence, with an effective increase in good conditions by children with asthma.

I. Introduction

Asthma is a common chronic respiratory disease that affects 1-18% of the population in various countries. Asthma is characterized by variable symptoms of wheezing, shortness of breath, chest tightness and/or coughing, and by the limitations of variable expiratory air flow. Both the symptoms and limitations of airflow characteristically vary over time and in intensity. This variation is often triggered by factors such as exercise, exposure to allergens or irritation, weather changes, or respiratory infections (Page et al., 2017). Each asthma sufferer will have a different trigger factor than other asthma sufferers so parents need to identify factors that can trigger the incidence of asthma in children (Dharmayanti, Hapsari, & Azhar, 2013). Asthma is a multifactorial disease with a clinical course that varies in each child and can change over time. Asthma occurs during childhood and young age so that it can cause loss of school days or productive workdays which means, also causes disruption of social activities and even the potential to disrupt the growth and development of children. Asthma cannot heal but can be controlled so that symptoms do not appear frequently. Communication, information, and education to parents is an important key to achieving controlled asthma (IDAI, 2007).

The incidence of asthma varies in various countries but has a tendency that the number of people with this disease increases, although recently asthma drugs have been developed. The report of the World Health Organization (WHO) in the World Health Report 2000 states, five major lung diseases constitute 17.4% of the entire world, each consisting of 7.2% pulmonary infection, 4.8% COPD, 3.0% tuberculosis , lung / trachea / bronchial cancer 2.1% and asthma 0.3%(WHO, 2017). Based on GINA (Global Initiative for Asthma), around the world, there are an estimated 300 million people suffering from asthma and in 2025 it is estimated that there will be 400 million asthma patients. Poor air quality and changing patterns of life are thought to be the cause of increasing asthma sufferers.

Data from various countries shows the prevalence of asthma ranges from 1-18% (GINA, 2018). The survey using the International questionnaire on the Study of Asthma and Allergy in Childhood (ISAAC) was conducted in 155 asthma centers in 56 countries, one of which was Indonesia aimed at the 6-7 year age group and 13-14 showing varied results in several countries with the prevalence of asthma between 2.1 - 32.2% (ISAAC, 2013). PTM data in Riskesdas in 2013 the prevalence of asthma in all age groups in Indonesia was 4.5%, which previously in Riskesdas in 2007 was 3.5%, there was an increase in the prevalence of asthma nationally by 1%. In Riskesda in 2007 based on age groups the prevalence of asthma sufferers in children aged 1 - 4 years was 2.4% and ages 5-14 years were 2.0% (Badan Penelitian dan Pengembangan Kesehatan, 2008). There was an increase in prevalence in Riskedas in 2013 in this age group, namely children aged 1 - 4 years by 3.8% and ages 5 - 14 years by 3.9% (Badan Penelitian dan Pengembangan Kesehatan, 2013). For families and the health service sector, uncontrolled asthma will increase costs (IDAI, 2007).

Parents have the responsibility to manage asthma until the child reaches the level of development of mental maturity to begin self-management (Brown, Gallagher, Fowler, & Wales, 2014). The experience of parents with asthma children, especially their beliefs in managing asthma in children, avoids the threat of triggering recurrence and recurrence prevention behaviors. Recurrence of asthma in children, one reason is that asthma management carried out by the family is not optimal. Parents do not fully understand the management of asthma in children, with asthma education can increase parents' knowledge in the management of childhood asthma (Urrutia-Pereira et al., 2018). Modified good asthma education will affect the management of parents' asthma. Asthma control in children is very difficult to achieve because children are still dependent on parents or caregivers to make decisions about their health (Conn, Halterman, Lynch, & Cabana, 2007).

Education about asthma management needs to pay attention to parents' beliefs in asthma. Asthma management by parents is needed in the management of childhood asthma so that there is no recurrence, but the fact is that parents management is still not optimal with many cases of recurrence, this is due to the lack of knowledge of parents about asthma management so that it affects parents' beliefs in preventing childhood asthma recurrence. Management of parents in asthmatic children is an important factor in achieving the goals of controlled asthma through nursing interventions with the Health Belief Model (HBM) approach, management of parents with good asthma children, helping parents to be able to manage and control asthma. In this study, asthma management education was given using the HBM theory approach, so that parents 'beliefs can be expected to increase so that the influence of the threat of triggering recurrence and parents' behavior in preventing parents from recurrence can also increase. The main construction of the HBM theory is the perception of vulnerability, seriousness, advantages, and obstacles. Nursing interventions in the form of belief-based asthma management health education are prepared to improve positive perceptions and beliefs so that they can improve the prevention of recurrence in asthmatic children. Beliefs are characteristics that exist in individuals that shape behavior and can also be modified. Therefore, if persuasive methods can be used to change behavior-related beliefs, these interventions also produce behavioral changes (Conner & Norman, 2005). HBM has been used extensively to determine the relationship between health beliefs and health behavior. For example, several studies have been significantly associated with greater perceived vulnerability, lower barriers, higher benefits and cues in the form of recommendations from health care providers (Glanz & Rimer, 2012).

II. Method

A. Design

This research is a quantitative research that uses a queasy-experiment design. The study sample was parents of children aged 6-11 years in the clinic's polyclinic, a government hospital in Blitar. The inclusion criteria in this study are 1) parents who can communicate well 2) parents with asthma children without other respiratory diseases. Determination of sample size in this study using G Power software with static tests: the difference between two independent means (two groups) resulted in a sample size of 66 samples divided into two treatment groups and control groups (Buchner, 2010). Sampling in this study was carried out by probability sampling method through simple random sampling

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B. Measurement

The instrument in this study is the belief questionnaire in older people with asthma children, based on the development of the Health Belief Model (HBM) domain which was then modified according to the needs of this study. The belief questionnaire consisted of perceived susceptibility/seriousness, perceived benefits, perceived barriers, and self-efficacy (Champion & Skinner, 2008), recurrence trigger questionnaires were adapted from the questionnaire used by (Putu, 2012) and behavioral questionnaires made by researchers from adaptation the questionnaire was used (Setiyorini, 2012), which was then modified according to the needs of this study. Before being used, the instrument was tested first to determine the level of validity and reliability of the instruments used as follows:

Table 1. The results of the validity test of the study of the effect of belief-based asthma management education on the prevention of recurrence of asthma by parents.

No	Questionnaire	r count range	Conclusion
1	Belief	0,99 – 0,605	All items are valid
2	Threat	0,982 – 0,331	1 item is invalid
3	Behavior	0,934 – 0,492	2 item are invalid

Table 2. The reliability test results of the study of the influence of belief-based asthma management education on the prevention of recurrence of asthma by parents

No	Questionnaire	*Alpha Cronbach*	Conclusion
1	Belief	0,89	Reliabel
2	Threat	0,985	Reliabel
3	Behavior	0,965	Reliabel

C. Interventions

Educational intervention given in this study uses a module of asthma management in children based on belief in the prevention of recurrence of asthma by parents. Modules have been prepared before the research is conducted, where the process of preparing this module has gone through the stages of consultation and discussion with 5 experts involved in this research. Parental management education referred to in this study is an educational method given to parents about asthma management including assessment/adjusting, adjusting the management of asthma in children and reviewing the management response of asthma in belief-based children.

The education was arranged focusing on 4 constructs of the Health Belief Model (HBM), namely: perceived susceptibility, perceived seriousness, perceived benefits, and perceived barriers, and added self-efficacy. The educational intervention is expected to form a belief in parents in managing children with asthma, which in turn increases the behavior of parents in preventing recurrence of childhood asthma. Educational content is compiled based on references to several books and references relating to topics that have been adapted to research needs related to language and content that are more easily accepted by ordinary people.

Modules are given to parents to increase confidence in managing asthma in children so that there is no recurrence. This education is divided into 3 21-day sessions, the first session is about assessing/assessing child asthma carried out in groups through lecture and discussion methods, at the end of the first session a time contract with each respondent for the second session with a home visit. The second session was conducted home visits with a management education topic in childhood asthma, the third session was home visits again with the topic of education reviewing the response from the management that had been done. Each session was conducted for 50 minutes and evaluated at the end of each session.

D. Statistical Analysis

Table 3. Statistical Tests of research on the influence of belief-based asthma management in children on the prevention of asthma recurrence by parents of each variable

Variable	Test
Asthma management education in children based on belief to belief	Paired t Test Mann Whithney Test
Belief against the threat of exposure triggering recurrence	Multiple linear regression
The threat of exposure to recurrence in the behavior of parents to preventing recurrence	Simple linear regression
Education on asthma management in children based on belief in the behavior of parents to preventing recurrence	Paired t Test Mann Whithney Test

III. Results

Table 4. Differences in beliefs between parents and asthma children between intervention and control groups before and after belief-based parent management education

Belief	Grup	Pre test		Post test		p value	
		Mean	SD	Mean	SD		
	Intervention	76,36	2,584	79,18	2,994	<0,001*	<0,001**
	Control	76,48	2,959	76,67	3,038	0,136*	

*) *paired t test*
**) *mann whithney test*

The paired t test results of the intervention group showed significant differences with the results of p <0.001 between the mean values of each component of the belief variable before and after the intervention, whereas in the control group there were no significant differences with the results of p = 0.136. The results of the Mann Whitney test on the delta value with abnormal distribution were obtained <0.001 ** which showed that there was a significant influence on the belief of parents between the intervention group and the control group.

Table 5. Differences in asthma recurrence prevention behavior in children between the intervention and control groups before and after belief-based parent management education

Group	Behaviour				p Value	
	Pre test		Post test			
	Mean	SD	Mean	SD		
Intervention	55,94	3,020	57,18	2,994	<0,001*	<0,001**
Control	54,61	2,772	54,76	2,969	0,201*	

*) *paired t test*
**) *mann whithney test*

The results of the paired t test intervention group showed significant differences (p <0.001) between the mean values of the behavioral variables before and after the intervention, whereas in the control group there were no significant differences in the pre test and post test (p = 0.201). The results of the Mann Whitney test on delta values indicate that there is a significant effect (p <0.001) on behavior between the intervention group and the control group.

Table 6. Significance Test Results (ANOVA) influence of belief on the threat of exposure triggering recurrence of children with asthma

Model		Sum of Squares	df	Mean Square	F	Sig.
1	**Regression**	16.492	4	4.123	5.156	0.001[b]
	Residual	48.781	61	.800		
	Total	65.273	65			

a. *Dependent Variable: Ancaman*
b. Predictors: (Constant), Self Efficacy, Barrier, Susceptibility, Benefit

The table above shows the significance of the components of belief (perceived susceptibility / seriousness, perceived benefit, perceived barrier, and self-efficacy) simultaneously influencing the threat of exposure to trigger relapse with a significance value of p = 0.001.

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Furthermore, to find out whether the regression model of the independent variable (perceived susceptibility / seriousness, perceived benefit, perceived barrier, and self-efficacy) partially (individually) affects the dependent variable (the threat of recurrence trigger exposure) partially as follows:

Table 7. The partial test results of the variable belief in parents with asthma children

Model	***Unstandardized Coefficients***		***Standardized Coefficients***	***t***	***Sig.***
	B	***Std. Error***	***Beta***		
(Constant)	0,279	0,162		1.730	0,089
Susceptibility	0,086	0,251	0,145	0,342	0,734
Benefit	-0,126	0,287	-0,214	-0,440	0,662
Barrier	0,360	0,255	0,590	1,413	0,163
Self Efficacy	-0,149	0,096	-0,182	-1,555	0,125

a. Dependent Variable: Delta Ancaman

From the table above shows that the sig value for the belief variable that is perceived susceptibility / seriousness (p = 0.734), perceived benefit (p = 0.662), perceived barrier (p = 0.163) and self-efficacy (p = 0.125) is p> 0 , 05, then the four variables do not have a partial effect on the threat variable exposure triggering recurrence.

Factors that cause asthma attacks in children affect the actions taken by parents in anticipating a recurrence of asthma in children. The simple linear test is used to see the effect of the two variables.

Table 8. The results of the significance test (ANOVA) influence the threat of exposure to recurrence on parental behavior in carrying out prevention

	Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	**Regression**	60.281	1	60.281	330.922	<0.001[b]
	Residual	11.658	64	.182		
	Total	71.939	65			

a. Dependent Variable: Delta Perilaku

b. Predictors: (Constant), Delta Ancaman

The table above shows the significance of the threat of exposure to recurrence on parental behavior in preventing recurrence with a significance value of p <0.001.

Development of an asthma management education model in belief-based children in the concept of the Health Belief Model. Asthma management education in belief-based children has an influence on the belief of parents with asthma children with sig. <0.001. Belief parents about asthma suffered by children, simultaneously affect the threat of exposure to trigger recurrence with sig. 0.001, but partially the component of belief does not affect the threat of exposure to recurrence, it can be seen from the significance value of each belief component has a significance value> 0.05. The threat of exposure to recurrence affects the behavior of parents in preventing asthma recurrence in children, with a sig value. <0.001. Directly asthma management education in belief-based children has an influence on the behavior of older people in preventing asthma recurrence in children with sig values. <0.001.

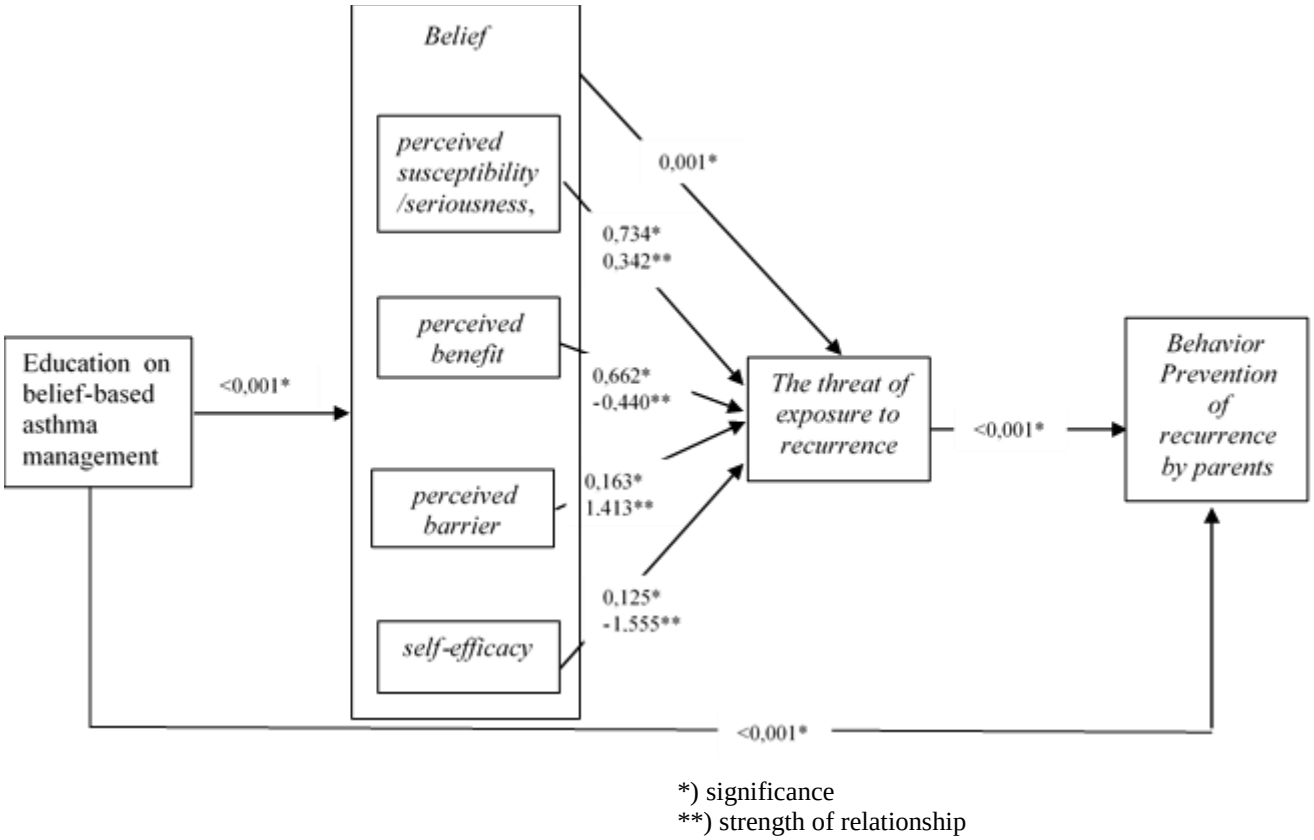

Figure 1 Framework for the application of asthma management education in belief-based children in the concept of the Health Belief Model

IV. Discussion

The results of this study indicate that there is an effect of asthma-based management education on belief in belief. Research conducted on parents with pre-school children with asthma shows that older people with higher self-efficacy have confidence in doing skills-based asthma management such as drug administration, assessment and decision making (Brown et al., 2014). Parents 'confidence in managing asthma in children will increase parents' self-sufficiency and subscales (treatment behaviors, environmental behaviors, barriers to self-management, and consultation behavior) (Iio, Hamaguchi, Narita, Takenaka, & Ohya, 2016).

There is the influence of the belief of parents with the threat of exposure to trigger recurrence. But partially, the 4 components of belief do not affect the threat of exposure to trigger recurrence. This shows the parents' belief in asthma suffered by children is a complete unity in building belief. This is a reaction or response that is still closed from someone to a stimulus or object. Belief parents are formed by the presence of stimulus in the form of information related to the condition of children who suffer from asthma, which provides an overview to parents about the factors that can trigger recurrence, so that parents avoid the factors that threaten recurrence.

The results of this study are in line with the research conducted by (Brown, Gallagher, Fowler, & Wales, 2010) that parents' beliefs in managing asthma in children is an important consideration in the treatment of chronic diseases in children who avoid recurrence trigger factors which are the capacity of parents to be responsible for handling various challenges in managing asthma in children. Increasing the confidence of parents and guardians about conditions that threaten children's health is very important to be done by professional health workers to improve understanding in managing children with asthma, which will then be taken into consideration by parents in avoiding the trigger factors for recurrence of asthma in children (Fawcett, Porritt, Campbell, & Carson, 2017).

Recurrence of asthma in children often occurs due to the threat of triggering this recurrence parents have not identified. Eight trigger factors for recurrence were examined in this study, parents

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have realized and believed that avoidance of the trigger factors can be done to avoid children from recurrence. An increase in the number of triggers for asthma is associated with increased severity and frequency of exacerbations. Avoiding triggers of asthma can reduce the level of exacerbations and improve the quality of life of children (Luskin et al., 2014). Trigger factors or triggers are factors that can cause an asthma attack so it takes a lot of effort to avoid or eliminate these factors. The various triggering factors and each patient may have different trigger factors, so that collaboration between health workers and patients is needed to find the trigger factors (Chipps et al., 2018)z. Sometimes it is not easy to recognize the trigger factors for an asthma attack, but if it is found, then it can be avoided so that the asthma attack will be reduced and may even disappear (Horn et al., 2014).

There is an effect of exposure to threats triggering recurrence with parental behavior in making prevention of recurrence of asthma in children. In line with the research conducted by (Singh, Jindal, & Goyal, 2017) showing univariate analysis, cooking fuels other than LPG, the absence of chimneys in the kitchen, family history of asthma, passive smoking, pets and food allergies were significant risk factors for asthma. In multivariate analysis, a family history of asthma, passive smoking and food allergies were found to be significantly associated with asthma, understanding of the trigger factors was the parents' right step in preventing recurrence. Parents are aware of worsening symptoms of asthma in children, and identification of factors that trigger them into a joint management strategy between children and parents can reduce the burden of symptoms for children with asthma (Searle, Jago, Henderson, & Turner, 2017).

In some previous studies that were not in line with this study, this might have happened because different precautions were shown for exposure to different risk factors. Whereas in different respondents, the same precautions can be shown for exposure to the same risk factors. The opinions of the researchers above are supported by several previous studies conducted by Chipps et al., (2018) of the 6 factors that triggered the exacerbation of asthma that were examined, there were only 3 factors associated with exacerbations namely emotional pressure, fungi and or moisture, and dust, factors the most predictable relationship is fungus and or moisture and emotional stress.

Education on belief-based asthma management affects parents' behavior in preventing asthma recurrence in children. In this study shows that belief-based asthma management education given provides an increase in parental behavior in preventing recurrence of asthma in children. Research conducted by Horn et al., (2014) belief-based health communication interventions carried out directly to parents of high-risk children with asthma resulted in parents' behavior in identifying the development of conditions in children with better asthma and reducing dependence at an emergency visit.

Several other studies have shown a significant effect between education on parental behavior in preventing recurrence as conducted by Vale et al., (2014) parental or caregiver behavior about asthma increases with asthma education using pre-school asthma booklet and physical activity-management plan carried out by respiratory specialist nurses. Education about the management of pre-school children's activities with asthma conducted by Määttä et al., (2018), shows an increase in the ability of parents to manage the activities of children with asthma. Asthma management education conducted by Garbutt et al., (2010) to parents with children with asthma through training using the telephone coaching method by professional nurses showed an increase in the ability of parents about asthma management.

Belief-based asthma management interventions emphasize the belief of parents in taking measures to prevent recurrence of asthma in children, confidence in the education provided shows a change in action. This is in line with the results of the meta-analysis conducted by Carpenter, (2010) explaining that beliefs must be targeted in communication campaigns to cause positive health behaviors. By directing the beliefs of the components in the HBM construct in a positive direction, the adoption of positive health behavior will be formed.

V. Conclusion

Although many asthma education programs are developed and asthma pharmacotherapy continues to increase, the prevalence of asthma, mortality and morbidity continues to increase. One reason for the lack of effective interventions for this disease might be the cause, it is necessary to

consider certain psychosocial factors that can be included in asthma management education. Belief parents influence the threat of exposure triggering recurrence. Asthma management is associated with how parents provide an assessment of control of trigger factors, treatment planning, management of childhood asthma, regular control, recording of daily sheets of asthma children, and assessment of control degrees. Belief parents in this study show when one shows a belief in susceptibility and seriousness, that children with asthma have poor health compared to other children who do not suffer from asthma. Asthma tends to recur and disrupt school activities, and causes children to feel uncomfortable so parents try to keep their children away from the threat of exposure to recurrence.

Individuals need a belief to be able to defeat the barrier in their minds, that the new behavior they do will be more beneficial than continuing the old habits. The perceived benefit in doing treatment is the extent to which parents assume that following the recommendations in the recommended method will benefit from avoiding recurrence of asthma in children, so the extent to which the value of the benefits is interpreted is very valuable or not. Perceived barriers (perceived barrier) are a parent's (belief) beliefs about the price or value to be paid when carrying out recommendations that are considered as a barrier factor. Parents' beliefs about their ability to manage asthma in their children faced in certain situations, become important especially related to preventing and overcoming recurrence.

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