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Development of Asthma Management Based on Health Belief Model in Parents

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Abstract--- *Asthma is chronic diseases which often happened in childhood, while parents are the key to control asthma by provide adequate education. This study aimed to increase belief in parents about asthma in their children who consists of four components that build beliefs. A quasi-experiment design with 33 samples parents of Children aged 6 - 11 with asthma. Measurement of belief in parents using the development of the Health Belief Model (HBM). The educational intervention given used an asthma-based childhood management module in the prevention of asthma relapse. MANOVA was used to determine the effect of management of asthma on belief-based children given to parents. Chi-square test showed no difference of respondent characteristic on education, occupation, age, asthma information and sex (p> 0.05). F group prices for Pillai Trace, Wilk Lambda, Hotelling's Trace, and Roy's Largest Root have significance values <0.001 (p <0.05). It showed a significant influence in every variables of the group on the component of the belief. Strength of the relationship also showed between the management of asthma in belief components, which were indicated by partial Eta Squared value, perceived susceptibility/seriousness (0.486), perceived benefit (0.547), perceived barrier (0,539), and self- 0.150) of parents. The education intervention for management asthma integration with HBM theory can be used as an alternative education all parents. Healthy behaviors that individuals do because of the belief about the benefits of a new activity, usually prevent the arrival of the disease.*

Keywords--- *Asthma management, Health Belief Model, Children, Parents.*

I. INTRODUCTION

Asthma was chronic disease which often happened in childhood, it causes deaths occur in country with average low and middle income [1],[2]. Asthma is a chronic inflammatory respiratory disorder involving various inflammatory cells. The basis of this disease is bronchial hyperactivity at various levels, airway obstruction, and respiratory symptoms [3]. This disease is still a public health problem in various countries in the world, suffered by children to adults with degrees of disease from mild to severe, even in some cases causing death [4],[5].

Asthma become crussial in childhood health because it can recurrence and occur last long, school aged childrens have experince exacerbation of asthma is 3.4 million and it makes increasing 18.9 times patient become emergency condition [6]. Although the level of morbidity or mortality in children is not caused by asthma, but health service must concern about this problem. It can be important because high recurrence rates in children can reduce children's quality of life, disrupt growth, restrict activities in habitual, sleep, decrease school attendance rates, and led to declining the children's achievement [1],[7]. Parents are important and the key to controlling asthma in children, so adequate education is needed [8].

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Parents lack an understanding of the role of various asthma management medications and therapies including preventive strategies and management at home in the face of recurrence. Management of asthma is generally influenced by family characteristics [9] add asthma education to affect a child's asthma management skills [10],[11] found that modified education in asthma give result for parent to manage asthma in their child. Based on previous reseach that had conducted, children still dependent on their parents and can not to make decision for their self, so it makes problem difficult to solve. [10]. The goals of asthma management are achieved through partnerships between parents/nurses and teams of health professionals, with cycles: assessing (diagnosis, symptom control, risk factors, inhaler techniques, adherence, parental preferences), adjusting medications (drugs, pharmacological, and treatment of modifiable risk factors), reviewing responses including treatment effectiveness and side effects [12]. Parental management of children with asthma contribute as important role to achieve goals in controlling asthma. Based on Health Belief Model (HBM) approach, management in asthma can help parents to manage and to control asthma. This theory is a theory of behavioral changes in health and psychological models that can be used to predict health behavior by focusing on individual perceptions and beliefs on disease [13],[14].

The Health Belief Model (HBM) has been widely used to measure health beliefs and behaviors [14]. HBM is a cognitive model that tries to identify healthy behavior patterns. The susceptibility, seriousness, benefits, and perceived barriers are the four main components of HBM. The behavior is explained by HBM as follows from a combination of attitudes related to the four concepts [13]. Researchers compiled an education module for parents with children with asthma based on the basic concepts of HBM which were then applied for the purpose of this study which is to increase parents' trust in asthma in their children which consists of 4 components that build confidence are: perceived susceptibility / seriousness, perceived benefits, perceived barriers, and self-efficacy. This study aimed to increase belief in parents about asthma in their children who consists of 4 components that build beliefs.

II. LITERATURE REVIEW

The literature review showed that researchers have been analyzing the commonly management of asthma in the world, because researcher tried to study about the other alternative about astma using conceptual theory. Asthma was a world problem in childhoold and it needs role from interdiciplany sector to manage it, eventhough government and community [4],[5]. The previous research that conducted in management of asthma had been done by some country and scientist, they conducted in medical sector, nursing sector and other diciplinary. One of the study about asthma stated that health service must concern about this problem. It can be important because high recurrence rates in children can reduce children’s quality of life, disrupt growth, restrict activities in habitual, sleep, decrease school attendance rates, and led to declining the children’s achievement [1],[7]. This statement is supported by the other research that parents was the key role in management of asthma patient, parents can give treatment to their children and controlling habituality of children, so asthma can to control and children may not get asthma attacked and exacerbation period [8].

The parents of the children should understand about caring in their child that have asthma, but in our environment there still many parents did not undertand what they shoud do, it make the condition of their children getting worse. Previous study conducted that parents lack an understanding of the role of various asthma management medications and therapies including preventive strategies and management at home in the face of recurrence. Management of asthma is generally influenced by family characteristics [9] add asthma education to affect a child's asthma management skills [10],[11] found that modified education in asthma give result for parent to manage asthma in their child. Based on previous reseach that had conducted, children still dependent on their parents and can not to make decision for their self, so it makes problem difficult to solve [10].

Based on some previous reseach, we interested to conduct study abou managemenet asthma with novelty was parents contributing in managed their children. We modified the theory from Health Belief Model in integrating with parents behavior. The Health Belief Model (HBM) has been widely used to measure health beliefs and behaviors [14]. HBM is a cognitive model that tries to identify healthy behavior patterns. The susceptibility, seriousness, benefits, and perceived barriers are the four main components of HBM. The behavior is explained by HBM as follows from a combination of attitudes related to the four concepts that build confidence [13].

III. DATA COLLECTION

This study conducted with quasi-experiment quantitative design. The study sample was parents of Children (6 – 11 years old) that diagnosed asthma who came for treatment between the month of January until April 2018 at Pediatric Department in Mardi Waluyo Hospital Blitar, Indonesia. G Power software used to determine sample size, using 5% rate of error and the power was 95% [15]. Mean group I had assumptions 59.50 and SD 17.23 while mean group II has assumptions of 44.9 and SD of 12.19. So using the software generates a sample size of 33 samples per group. 33 respondents in the treatment group and 33 control group respondents, and sample was taken by simple random sampling.

A questionnaire modified from Becker et al., (1978) and Bursch, Schwankovsky, Gilbert, & Zeiger (1999) [16] based on the Health Belief Model (HBM) used to Measure belief in parents. The questionnaire of parent's belief totaled 48 questions consisting of perceptions of susceptibility/seriousness, perceived benefits, perceived barriers, and self-efficacy. The belief questionnaire has an interval scale, with a score of 1-5 answer choices each question. Before use, the first step was measured validity of the instrument. The level of validity was tested with Pearson's product moment correlation obtained the range value for r count 0.99 - 0.605, while the reliability was tested with Cronbach alpha with a value of 0.89, the results showed a valid and reliable belief questionnaire.

The intervention tool of education used an asthma-based childhood management module in to prevent asthma relapse. The module was developed before the study began, where the module preparation process had consulted with the figure that have experts. Intervention was developed and focese on 4 Health Belief Model (HBM) constructions: perceived susceptibility, perceived seriousness, perceived benefits, perceived barriers, and self-efficacy, 3 times in 3 meetings conducted based on the distribution of educational materials given: 1) Assessment/rate 2) adjust the treatment 3) review. While the time taken was 21 days based on, that habits can be established by giving the child's asthma diary to be filled with

parents. The protocol of this study was approved by Commission of Ethical Faculty of Nursing, Airlangga University, and number of certificate was 642-KEPK. The effect of asthma management on belief-based children given to parents on the belief component of the parents, namely perceived susceptibility/seriousness, perceived benefit, perceived barrier, and self-efficacy test used MANOVA.

IV. DATA ANALYSIS

Table 1 showed the competencies developed in the management of asthma in belief-based children. The component of parents competencies to developed were 1) assessing children asthma by Improving perceptions of seriousness/susceptibility in performing assessment, Improve the perception of benefits in conducting assessment, Reduce the perception of obstacles in managing asthma in children and Increase parental beliefs in assessing child's asthma; 2) Adjust the management of childhood asthma by Increase perceptions of seriousness/susceptibility, the perception of benefits, Reduce the perception of obstacles and Increase the belief of parents to manage asthma in their children; and 3) Review response of asthma management by Increase the perception of seriousness/susceptibility in reviewing the management response to asthma in children and improve the perception, Increase the perception of parents about the obstacles in reviewing the response of management of asthma in children and Increase parents' belief in reviewing the response of asthma management in children.

Table 1 Competencies developed in the management of asthma in belief-based children

No	Asthma Management	Basic Activities of Belief	Materials
1	Assessment child's asthma	Improving perceptions seriousness/susceptibility in performing assessment	Explain the concept of asthma 1. Understanding Asthma 2. Signs and symptoms 3. Classification of asthma 4. Risk factors 5. Childhood Asthma Disorders
		Improve the perception of benefits in conducting assessment	Describes the benefits of assessing childhood asthma
		Reduce the perception of obstacles in managing asthma in children	Explain the asverse effects of not performing asthma management
		Increase parental beliefs in assessing child's asthma	Teach you how to assess asthma in children: 1. The degree of asthma control 2. Peak flow meter 3. Daily notes of asthma 4. Rainbow of asthma
2	Adjust the management of childhood asthma	Increase perceptions of seriousness/susceptibility in the management of asthma in children	Describes the purpose of asthma management in children.
		Increase the perception of benefits in doing the management	Explain the benefits gained in the management of asthma
		Reduce the perception of obstacles in managing asthma in children	Explain the adverse effects of not performing asthma management.
		Increase the belief of parents in the management of asthma in children	Explain about the management performed on children with asthma Medicaments: 1. Asthma medicines 2. Use of inhaled drugs 3. Management of asthma attacks at home. Non-medical: 1. Identification and controlling control of the originator
3	Review the response to asthma management	Increase the perception of seriousness/susceptibility in reviewing the management response to asthma in children	Explain the importance of evaluating the management that has been undertaken
		Improve the perception of benefits in reviewing the management response to asthma in children.	Explain the benefits of doing a review of the management that has been undertaken.

		Increase the perception of parents about the obstacles in reviewing the response of management of asthma in children.	Explain the adverse effect of not evaluating the management.
		Increase parents' belief in reviewing the response of asthma management in children.	Explains how to monitor child's asthma

Table 2 shows that the majority of respondents graduate secondary education (Intervention group Vs Control group, 48.5% Vs 57.6%). The majority of respondents' occupations from the two groups were housewives by 66.7% in the group of intervention and 63.6% in the control group. Respondent's age range in intervention group was 31-35 years and in the control group in the 26-30-year age range with the same percentage of 39.4%. Based on information about childhood asthma that a parent has found, the majority did not receive previous asthma information (Intervention group Vs Control group, 48.4% Vs 36.4%).

Table 2. Distribution of respondent characteristics

	Intervention		Control		p value
	n	%	n	%	
Education					0,857
Basic	10	30,3	9	27,3	
Madium	16	48,5	19	57,5	
High	7	21,2	5	15,2	
Jobs					
Housewife	22	66,7	21	63,6	
Entrepre	6	18,1	6	18,2	0,484
Officer	5	15,2	3	9,1	
Freelance			3	9,1	
Age					
21-25	4	12,1	9	27,3	
26-30	12	36,4	13	39,4	0,107
31-35	13	39,4	8	24,2	
36-40	4	12,1	3	9,1	
Asthma Information					
No	16	48,4	12	36,4	
TV	3	9,1	3	9,1	
Media	5	15,2	8	24,2	0,274
Nurse	5	15,2	2	6,1	
friend	1	3,0	2	6,1	
Internet	3	9,1	6	18,1	
Gender					
Male	33	100	33	100	1.000
Female	0	0	0	0	

All respondents are 100% female. The chi-square test shows that there is no difference of respondent characteristic on education, occupation, age, asthma information, sex, with p> 0.05 which means that both groups are equal or equal. The data distribution normality of each variable (Kolmogorov-Smirnov test), with significant value (p> 0.05) which means normal data distribution. The distribution of pre and post data on each variable is normally distributed with p> 0,05. The Lavene test also shows the results of homogeneity of the variable values in this study with sig value > 0,05.

Table 3. Multivariat test

Effect		Value	Sig.
Group	Pillai's Trace	.588	<0.001
	Wilks' Lambda	.412	<0.001
	Hotelling's Trace	1.429	<0.001
	Roy's Largest Root	1.429	<0.001

Table 4. Test of Between-Subject Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Group	Suscability	89.833	1	89.833	60.423	<0.001	0.486
	Benefit	101.879	1	101.879	77.176	<0.001	0.547
	Barrier	94.561	1	94.561	74.743	<0.001	0.539
	Self-Efficacy	14.561	1	14.561	11.306	0.001	0.150

Table 3 shows Multivariate significance test results. The results of the analysis show that F group prices for Pillai Trace, Wilk Lambda, Hotelling's Trace, and Roy's Largest Root have significance values <0.001 (p <0.05). This shows that the value of F for Pillai Trace, Wilk Lambda, Hotelling's Trace, and Roy's Largest Root were significant. It can be concluded that there is a significant influence between variables both two groups on the component of the belief that is perceived susceptibility/seriousness, perceived benefit, perceived barrier, and self-efficacy of parents. Data has same variance because the value of sig> 0,05, so the second condition for MANOVA test fulfilled.

Table 4 shows the results of differences in perceived susceptibility/seriousness, perceived benefit, perceived barrier, and self-efficacy between two groups. This study is showed there was a relationship between the management of asthma in belief with perceived susceptibility/seriousness (<0.001), perceived benefit (<0.001), perceived barrier (<0.001), and self-efficacy (0.001) for intervention group and control group. There was also a strength of the relationship between management of asthma with belief components, which were indicated by partial Eta Squared value, perceived susceptibility/seriousness (0.486), perceived benefit (0.547), perceived barrier (0,539), and self-0.150) of parents.

VI. Study Results, Summary And Contribution

Research showed belief-based asthma management education had effect on belief, where parents' beliefs about the condition of asthma suffered by children in an effort to prevent recurrence have increased. 4 belief components are perceived barriers, perceived susceptibility/seriousness, perceived benefits, and self-efficacy. Belief improvements are obtained through asthma management education which includes assessment, treatment adjustment and review of treatment with belief-based for 21 days divided into 3 meetings.

This is in line with research conducted by Walker et al (2009) showing there is a relationship of family belief in asthma management with clinical outcomes of inflammatory asthma in children, family changes in the cognitive domain will affect on other domains [17]. Research conducted by Searle, Jago, Henderson, & Turner, (2017) demonstrates the role of family function through education with a belief approach to increase parental confidence in the management of asthma in children. Studies measured on parents that have children with asthma in pre-school level, the results showed that higher self-efficacy in parents make their confidence to perform asthma management, such as administration of drug, judgment and make a decision [18]. Parental beliefs that managed asthma in children

can increase parent and subcontinent compliance (treatment behavior, environmental behavior, self-management, and behavior to consultate with health) [19].

This belief-based education strategy enhances parents' perceptions of the seriousness and susceptibility of asthma suffered by children when parents understand the basic concepts of asthma and the problems facing children. Belief in this study shows the perception of parents to the problems encountered. The perceived benefit is the assumption of parents in following the advice of health workers to manage asthma in children who have been given, does it provide benefits in recurrence of asthma relapse, so that parents feel the value of benefits obtained [20]. Perceived barrier is a thought of the parents' fidelity regarding the value paid to carry out the suggested advice as a barrier factor. Perceptions of profit will be greater and the perceived obstacles can be reduced with the education that has been given. Parents' beliefs that their ability for assess asthma in certain situations are particularly important in relation to overcome recurrences [21]. Parents who have high self-efficacy in terms of doing asthma assessment, then believe in his ability to behave in assessing. When parents awared of asthma's worsening asthma symptoms and identified of triggers become strategy management between parents and children, so it can reduce the symptom of asthma [18].

Increased parental beliefs about preventing childhood asthma relapse have a positive effect on the asthma's management in children. Better beliefs about asthma allow for the reduction of exacerbations, urgent care, decided to bring to the hospital, increased school attendance, undisturbed child social activity and improved quality of life [22]. Avoiding asthma triggers can improve quality of life and reduce asthma's exacerbations [23]. Increased confidence adds to the knowledge and understanding of the concept of asthma, theoretically also can be attributed to educational factors, based on the characteristics of parents based on the education of the majority of secondary education level. Education here is associated with a person's learning process, where a person with higher education will tend to more easily absorb a lot of information. This is in line with research by Macy & Stanley (2010), which divides the research group into lowliteracy groups and high-literacy groups, a higher frequency distribution of education in high-literacy groups. after being given educational management of asthma given to both groups, high health literacy group has value [24] Beliefs of parents and guardians increased health conditions in children is very important by health professionals to improve understanding in managed children with asthma, the understanding become a parent consideration to avoidance of factors triggering for asthma's recurrence [25]. This belief-based asthma management education emphasizes parents belief to act of preventing childhood asthma relapse, the parent's belief about education indicates a change in action. The statement was suitable with meta-analysis study that carried out by Carpenter (2010) that describes confidence that targeted in a communication campaign leading a positive health behaviors. Confidence directing of the components in the HBM can construct a positive direction, and behavioral adoption of positive health behavior can be formed [26].

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REFERENCES

[1] World Health Organization (WHO). The Global Asthma Report 2018. [Internet]. Auckland, New Zealand. New Zealand; 2018. 92 p. Available from: www.globalasthmanetwork.org

[2] World Health Organization (WHO). Asthma : Fact Sheet no.307. Geneva World Heal Organ [Internet]. 2013;1–5. Available from: http://www.who.int/mediacentre/factsheets/fs307/en/

[3] Zahran HS, Bailey CM, Damon SA, Garbe PL, Breysse PN. Vital signs: Asthma in children — United States, 2001-2016. Morb Mortal Wkly Rep. 2018;67(5):149–55.

[4] Horn IB, Mitchell SJ, Gillespie CW, Burke KM, Godoy L, Teach SJ. Randomized trial of a health communication intervention for parents of children with asthma. J Asthma. 2014;51(9):989–95.

[5] Fiks AG, Mayne SL, Karavite DJ, Suh A, O'Hara R, Localio AR, et al. Parent-reported outcomes of a shared decision-making portal in asthma: A practice-based RCT. Pediatrics. 2015;135(4):e965–73.

[6] Sullivan PW, Ghushchyan V, Navaratnam P, Friedman HS, Kavati A, Ortiz B, et al. National Prevalence of Poor Asthma Control and Associated Outcomes Among School-Aged Children in the United States. J Allergy Clin Immunol Pract. 2018;6(2):536-544.e1.

[7] Bateman ED, Hurd SS, Barnes PJ, Bousquet J, Drazen JM, FitzGeralde M, et al. Global strategy for asthma management and prevention: GINA executive summary. 2008 p. 143–78.

[8] Zaraket R, Al-Tannir MA, Bin Abdulhak AA, Shatila A, Lababidi H. Parental perceptions and beliefs about childhood asthma: a cross-sectional study. Croat Med J. 2011;52(5):637–43.

[9] Brigham EL, Goldenberg L, Stolfi A, Mueller GA, Forbis SG. Associations between Parental Health Literacy, Use of Asthma Management Plans, and Child's Asthma Control. Clin Pediatr (Phila). 2016;55(2):111–7.

[10] Conn KM, Halterman JS, Lynch K, Cabana MD. The impact of parents' medication beliefs on asthma management. Pediatrics. 2007;120(3).

[11] Brand PLP, Mäkelä MJ, Szefler SJ, Frischer T, Price D, Baraldi E, et al. Monitoring asthma in childhood: Symptoms, exacerbations and quality of life. Eur Respir Rev. 2015;24(136):187–93.

[12] National Asthma Education. Expert Panel Report 3 (EPR-3): Guidelines for the Diagnosis and Management of Asthma-Summary Report 2007. J Allergy Clin Immunol. 2007;120(5 Suppl).

[13] Glanz K, Rimer BK, Viswanath K. Health Behavior and Health Education: Theory, Research, and Practice. Ann Intern Med. 1992;116(4):350.

[14] Abraham C, Sheeran P. The health belief model. In: Cambridge Handbook of Psychology, Health and Medicine, Second Edition. 2014. p. 97–102.

[15] Vahidi S, Shahmirzadi SE, Shojaeizadeh D, Haghani H, Nikpour S. The Effect of an Educational Program Based on the Health Belief Model on Self-Efficacy among Patients with Type 2 Diabetes Referred to the Iranian Diabetes Association in 2014. J Diabetes Mellit. 2015;05(03):181–9.

[16] Becker MH, Radius SM, Rosenstock IM, Drachman RH, Schuberth KC, Teets KC. Compliance with a medical regimen for asthma: a test of the health belief model. Public Health Rep. 1978;93(3):268–77.

[17] Walker HA, Chim L, Chen E. The role of asthma management beliefs and behaviors in childhood asthma immune and clinical outcomes. J Pediatr Psychol. 2009;34(4):379–88.

[18] Searle A, Jago R, Henderson J, Turner KM. Children's, parents' and health professionals' views on the management of childhood asthma: A qualitative study. npj Prim Care Respir Med. 2017;27(1).

[19] Iio M, Takenaka K, Narita M, Futamura M, Hamaguchi M, Fukushima K, et al. Development and effectiveness of a tailored education program for caregivers of asthmatic children. Japanese J Allergol. 2014;63(2):187–203.

[20] Iio M, Hamaguchi M, Narita M, Takenaka K, Ohya Y. Tailored education to increase self-efficacy for caregivers of children with asthma a randomized controlled trial. CIN - Comput Informatics Nurs. 2017;35(1):36–44.

[21] Walter H, Sadeque-Iqbal F, Ulysse R, Castillo D, Fitzpatrick A, Singleton J. The effectiveness of school-based family asthma educational programs on the quality of life and number of asthma exacerbations of children aged five to 18 years diagnosed with asthma: a systematic review protocol. Vol. 13, JBI database of systematic reviews and implementation reports. 2015. p. 69–81.

[22] Urrutia-Pereira M, Mocellin LP, de Oliveira RB, Simon L, Lessa L, Solé D. Knowledge on asthma, food allergies, and anaphylaxis: Assessment of elementary school teachers, parents/caregivers of asthmatic children, and

university students in Uruguaiana, in the state of Rio Grande do Sul, Brazil. Allergol Immunopathol (Madr). 2018;46(5):421–30.

[23] Luskin AT, Chipps BE, Rasouliyan L, Miller DP, Haselkorn T, Dorenbaum A. Impact of Asthma Exacerbations and Asthma Triggers on Asthma-related Quality of Life in Patients with Severe or Difficult-to-Treat Asthma. J Allergy Clin Immunol Pract. 2014;2(5):544-552.e2.

[24] MacY ML, Stanley RM, Sasson C, Gebremariam A, Davis MM. High turnover stays for pediatric asthma in the United States: Analysis of the 2006 kids' inpatient database. Med Care. 2010;48(9):827–33.

[25] Fawcett R, Porritt K, Stern C, Carson-Chahhoud K. Experiences of parents and carers in managing asthma in children: A qualitative systematic review. Vol. 17, JBI Database of Systematic Reviews and Implementation Reports. 2019. p. 793–984.

[26] Campo P, Aranda A, Rondon C, Doña I, Díaz-Perales A, Canto G, et al. Work-related sensitization and respiratory symptoms in carpentry apprentices exposed to wood dust and diisocyanates. Ann Allergy, Asthma Immunol. 2010;105(1):24–30.