

Research Paper:

Effects of Health Belief Model-based Education on Maternal Abilities to Caring for Children With Avoidant Restrictive Food Intake Disorder

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Citation: Prasetyo, Y. B. & Dewi, Y. S. 2021. Effects of Health Belief Model-based Education on Maternal Abilities to Caring for Children With Avoidant Restrictive Food Intake Disorder. *Journal of Client-Centered Nursing Care*, 7(3), pp. 205-214. <https://doi.org/10.32598/JCCNC.7.3.376.1>

doi <https://doi.org/10.32598/JCCNC.7.3.376.1>

**Article info:**

Received: 03 Jun 2021

Accepted: 04 Jul 2021

Published: 01 Aug 2021

Keywords:

Health education, Health belief model, Food intake regulation, Childhood eating and feeding disorders, Maternal behavior

ABSTRACT

Background: Health education, using new approaches in the nursing area, is of great importance. The current study aimed to evaluate the effects of a health belief model-based education on maternal abilities to caring for children with Avoidant Restrictive Food Intake Disorder (ARFID).

Methods: This was a quasi-experimental non-randomized controlled trial with pre-test, post-test and a control group design. In total, 30 families with children with ARFID in Malang regency, Indonesia were divided into experimental (n=15) and control (n=15) groups. The experimental group was trained based on the Health Belief Model (HBM); however, the control group received an education based on the routine nursing process model. The necessary data were collected by a researcher-made questionnaire constructed based on HBM constructs. The obtained data were analyzed in SPSS. Descriptive statistics, homogeneity test, and Paired-Samples t-test were used to outline the relationship between the dependent and independent variables.

Results: HBM effectively improved maternal abilities to manage eating disorders (P=0.009), promoting behaviors (P=0.000), and paternal involvement (P=0.000).

Conclusion: HBM-Based education is recommended to be used in the provision of training in the mothers of children with ARFID.

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Highlights

- The mean score of motherhood abilities in the experimental group was significantly higher than that of the control group.
- Health Belief Model-Based education improved the explored mothers' abilities to manage the eating disorders of their children.
- Health Belief Model-Based education improved the promoting behaviors of the mothers of children with ARFID.
- Health Belief Model-Based education improved the examined mothers' abilities in the involvement of fathers in caring for their children with ARFID.

Plain Language Summary

Health promotion and preventive behaviors are the most basic strategies in improving maternal abilities to manage eating disorders, promoting behavior, and paternal involvement. The present study results indicated that health belief model-based education improves maternal abilities to take care of their children with ARFID according to the criteria of managing eating disorders, promoting behaviors, and paternal involvement.

1. Introduction

Health education programs play an essential role in improving the nursing profession. It is a manifestation of nursing intervention that influences affective, cognitive, and behavioral characteristics (Lee et al. 2018). Health education using new approaches in the nursing area is of great importance (Sanaie et al. 2019). It is mainly because traditional health education is less effective in improving individual motivation, knowledge, and skill (Policicchio et al. 2019). Mothers' belief in health issues and preventive behaviors essentially impact promoting or interfering with health behaviors (Dindarloo, Nabilou & Khalkhali 2017). A weak belief may contribute to failure to get medical help due to the lack of perceived control upon health matters that happen (Reiff et al. 2017). Health Belief Model (HBM) could be used as a guide to improving healthy behaviors. Teaching according to HBM is based on the theory of HBM. Generally, the HBM is used to determine whether an individual has committed precautionary actions on health issues and health promotion activities (Akey, Rintamaki & Kane 2013); explain why they change or keep practicing specific health activities (James et al. 2012, Poortaghi et al. 2015); describe why individuals fail to participate in any activities aiming for detection or prevention from particular illnesses (Borowski & Tambling 2015); predict what they should do for preventive actions; conduct screening tests, and control the illness (Glanz, Rimer & Viswanath 2008). HBM-Based education further refers

to a health education program conducted by health professionals to assist individuals to take measures for prediction, taking action, and promoting behavioral change over healthy and ill conditions.

Avoidant Restrictive Food Intake Disorder (ARFID) is a new term for a feeding disorder that affects infants and toddlers. It includes rejection to eat, irregular eating patterns, and a failure to demonstrate eating skills adequate for their developmental stage. The extent of promotional and preventive behaviors in the management of ARFID cases remains to be less than necessary. The majority of mothers taking care of children with ARFID appear to encounter extensive stress from overpressure and distress due to their children's eating disorders (Mairs & Nicholls 2016). The prevalence of stressful parent-children bonding falls in the range of 13%-82%, depending on the risk factors in the family, such as negligence and maltreatment on the children (Skovgaard Væver, Smith-Nielsen & Lange 2016).

Health promotion and preventive behaviors are the most basic strategies in improving motherhood's ability to manage eating disorders, promoting behavior, and paternal involvement. Health promotion is not only intended to reinforce individual skills and abilities but also to evenly distribute health services and properly fulfill human rights (Maijala, Tossavainen & Turunen 2016). Nurses are responsible for reducing the frequency of unhealthy behaviors through health education programs (Arslan Yurumezoglu & Gokce Isbir 2019; Younas et al. 2019). Additionally, evaluating health education programs is es-

essential for identifying success and satisfaction among patients (Malekzadeh, Amouzeshi & Mazlom 2018).

Nurses frequently fail to conduct health education programs for behavior change among the patients. Two main reasons explain why health education programs cannot run very well. First, the nurses are unwilling to attempt to promote a healthy lifestyle, especially if they have no such experience. Secondly, any suggestions from the nurses might sound credible; however, the patients are unwilling to follow those (Kelly, Wills & Sykes 2017). Less credible education is related to nurses' low understanding of particular cases the patients undergo. Mothers who take care of children with ARFID experience role strain. A familial environment may influence the occurrence of strain or stress amongst mothers, which in turn, will rise behavioral problems, like problematic parent-child interaction (Yoo, Popp & Robinson 2014). Furthermore, a supportive home environment, including a parenting system and proximity amongst family members, present positive effects on children's appropriate eating skills (Melbye et al. 2013).

HBM, as a model of behavioral changes in individuals, has been widely used to predict one's health behaviors (Ashoori et al. 2020), developed through fear and risk management (Tajeri Moghadam et al. 2020), and used for protective actions, such as screening and examination (Yuen et al. 2020). Furthermore, the basic concepts of HBM encompass 5 factors, namely perceived susceptibility, perceived severity, perceived benefit, perceived barrier, and self-efficacy (Ma 2018; Gabriel, Hoch & Cramer, 2019; Lee et al. 2019; Ashoori et al. 2020). HBM-Based education could be used to rise mothers' belief in taking care of their children with ARFID. Additionally, the HBM concept has become very essential in solving the parenting problems, especially in the families that raise children with ARFID, due to several reasons, such as the following: When children have more serious problems due to delays in proper treatment, mothers experience further anxiety, and mothers feel helpless in the treatment process due to the child's condition not changing and losing confidence. Any activities related to proper and healthy food selection are strongly dependent on belief matters, i.e., self-efficacy, perceived benefit, and perceived barrier. Ideally speaking, self-efficacy improves perceived benefits and reduces perceived barriers to healthy eating behavior (Kamimura et al. 2016).

Health education programs for mothers are related to the mother's educational background. It is stated that mothers' education background influences children's nutritional status (Hossain, 2020). In other words, the

higher the mother's educational background, the better the quality of children's health (Karki Nepal 2018). Thus, it is necessary to research by highlighting how maternal belief contributes to the best decision-making in taking care of children with nutritional disorders, like ARFID. Accordingly, the current study is deemed very crucial to carry out in the attempt of examining the success of HBM-based training for mothers for taking care of children with ARFID. Accordingly, the present study aimed to determine the effects of HBM-based education on maternal abilities to care for children with ARFID.

2. Materials and Methods

This was a quasi-experimental non-randomized controlled trial with pre-test, post-test and a control group design.

All mothers of children with ARFID in Malang Regency, Indonesia included the research population. To determine the sample size, the Z-value on the normal curve in one-way hypothesis testing signified 1.64 in the significance level of $\alpha=0.05$. Moreover, at the significance level of $\alpha=0.02$, the Z-value on the normal curve equaled 1.285. Besides, with 0.65 Standard Deviation (SD) of the research population, the sample size constituted 15 mothers per group. Additionally, the inclusion criteria included the mothers of children with ARFID and consent to participate in the study. The subjects who did not attend the sessions were excluded from the study.

The study was conducted from January to March 2019. The researchers queried an informed consent to the respondents by explaining to them the goals and benefits of the research along with the research procedures. After the pre-test, the experimental group was trained based on HBM constructs for 3 weeks with 3 sessions in total. In each session, the effective time of training lasted for 50-60 minutes. Furthermore, in every single session, the materials were delivered using the visual media of power-point slides and the projector screen. The content of the sessions concerned the father's involvement (the first session), managing eating disorder (the second session), and promotional behavior (the third session). Differently, the health education program was delivered for the control group through a home visits and hand in a module. In the control group, the intervention was applied same as the experimental group, but in two sessions based on the routine nursing process model. A post-test was conducted on both study groups. The flow diagram of the study process is illustrated in (Figure 1). The required data were collected by a researcher-made questionnaire based on HBM constructs. It has 4 basic parts, including demographic data (age, educational background, the

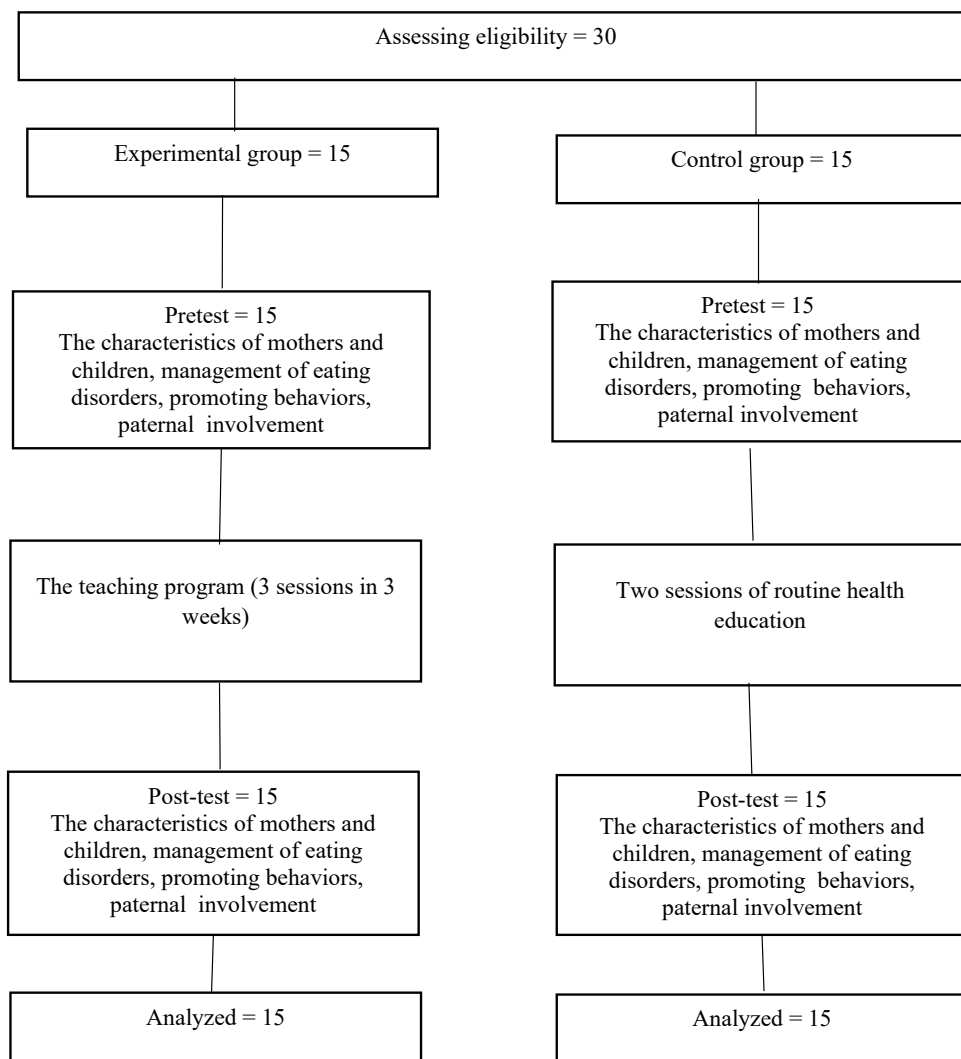


Figure 1. The flow diagram of the study process

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number of children, & income), the management of eating disorders, the management of promoting behaviors, and paternal involvement.

Specifically, the questionnaire related to the management of eating disorders composed 9 statements in total based on the following indicators: collaboration with medical personnel, cooperativeness with family members, the reinforcement of positive relationship, monitoring vital signs, monitoring fluid intake and output, satisfactory fulfillment of expectations, using behavioral modifications, discussion with the health teams, and taking over responsibility. Besides, a 5-point Likert-type scale was also used (1=never, 2=seldom, 3=sometimes, 4=frequently, and 5= always). The cut-off points was detected using the median value. Scores ranged from 9 to 45, and higher scores indicate better management of eating disorders.

The questionnaire for promoting behaviors was composed of 11 statements on the following indicators: proposing proper questions, accomplishing tasks, showing early examination, getting in contact with medical personnel, demonstrating skills, explaining strategy for behavioral changes, obeying the strategy, practicing healthy behaviors, seeking for health information, elaborating a strategy to maximize health, and develop a strategy for individual development. Furthermore, a 5-point Likert-type scale was used with the descriptors of 1=never, 2=seldom, 3=sometimes, 4=frequently, and 5=always. The cut-off points was detected using the median value. The obtainable scores range from 11 to 55, and higher scores indicate better-promoting behaviors.

The questionnaire for paternal involvement included 7 statements on the following indicators: paternal involvement in making out parenting atmosphere, fathers'

Table 1. Demographical characteristics of the research groups

Characteristics		No.(%)	
		Experimental (n=15)	Control (n=15)
Mothers' ages (Mean/range)		31.6/23-39	30.8/21-41
Educational background	Elementary school	-	3(20)
	Junior high school	1(6.7)	8(53.3)
	Senior high school	14(93.3)	4(26.7)
Occupations	Employed	2(13.3)	4(26.7)
	Unemployed	13(86.7)	11(73.3)
Number of children	1 child	8(53.3)	9(60)
	2 children	5(33.3)	3(20)
	3 children	2(13.3)	3(20)
Income/month	<1 million	3(20)	2(13.3)
	1-2 million	6(40)	12(80)
	>2 million	6(40)	1(6.7)
Gender	Male	9(60)	8(53.3)
	Female	6(40)	7(46.7)
Children's ages (mean/range)		2.3/1-4	2.6/0.7-5

*Test of Homogeneity of Variances (Levene's test); $P=0.105$.

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support for children's success, paternal involvement in the parenting initiation, fathers' willingness in learning about children's success, fathers' influence on parenting, suggestion for fathers to always get involved at parenting, and fathers' unobligated task in seeking for parenting information. Additionally, a 5-point Likert-type scale was used with the descriptors of 1=never, 2=sel-

dom, 3=sometimes, 4=frequently, and 5=always. Cut-off points were detected using the median value. Scores range from 7 to 35, and higher scores indicate better-promoting behaviors. To ensure the validity of the questionnaire, it was reviewed by the related experts. Test-Retest results for managing eating disorders, promoting behaviors, and paternal involvement were as follows: $r=0.89$,

Table 2. Comparing the mean scores of maternal abilities to manage eating disorders, promoting behaviors, and paternal involvement in the experimental and control groups

Domains	Mean±SD		P
	Experimental (n=15)	Control (n=15)	
Managing eating disorders	4.8±0.6	3.8±0.8	0.001
Promoting behaviors	6.5±0.5	5.4±0.7	0.000
Paternal involvement	7.6±0.6	4.9±0.8	0.000
Total	6.3±0.4	4.8±0.5	0.000

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Table 3. The paired samples t-test data for comparing the experimental and control groups

Groups		Mean±SD	Std Error Mean	Paired Differences		t	df	P (2-tailed)
				95%Confidence Interval of Difference				
				Lower	Upper			
Experimental	Managing eating disorders	-0.533±0.990	0.256	-1.082	0.015	-2.086	14	0.050
	Promoting behaviors	-0.400±0.507	0.131	-0.681	-0.119	-3.055	14	0.009
	Paternal involvement	-1.000±1.558	0.402	-1.863	-0.137	-2.485	14	0.026
Control	Managing eating disorders	-0.467±1.356	0.350	-1.217	0.284	-1.333	14	0.204
	Promoting behaviors	-0.067±0.594	0.153	-0.395	0.262	-0.435	14	0.670
	Paternal involvement	-0.200±1.146	0.296	-0.835	0.435	-0.676	14	0.510

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$r=0.83$, and $r=0.80$, respectively. The internal consistency of the questionnaire was ensured by the Cronbach alpha coefficient, i.e., 0.89 for managing eating disorders, (0.83) for promoting behaviors, and (0.80) for paternal involvement.

Data analysis was conducted in SPSS. Descriptive statistics, homogeneity test, and Paired-Samples t-test were used to manifest the relationship between the dependent variables (managing eating disorders, promoting behaviors, & paternal involvement) and the independent variable (HBM-based education). The significance level of the tests was set at 0.05.

3. Results

The age range of the research subjects ranged from 41 to 21 years. Table 1 indicates that the average age of the mothers in the experimental and control groups were 31.6 and 30.8 years, respectively. The education and income level of the experimental group were higher than those of the control group. However, the differences in the demographic characteristics were already corrected using the homogeneity test ($P=0.105 > 0.05$), suggesting that both study groups were homogeneous or equivalent (Table 1).

The mean scores of maternal abilities to take care of children with ARFID concerning the 3 domains in the experimental and control groups indicated that the experimental group scores were better than those of the controls (Table 2).

Table 3 lists the results of the Paired-Samples t-test in the research groups. Accordingly, the maternal abilities in managing eating disorders, promoting behaviors, and paternal involvement have improved after receiving the intervention.

4. Discussion

The current study results indicated that the HBM-based education improved maternal abilities to take care of children with ARFID according to the criteria of managing eating disorders, promoting behaviors, and paternal involvement. Furthermore, the ability to manage eating disorders of the children was suggested by the collaboration of mothers with medical personnel, cooperation among family members, behavioral modifications, and a better sense of liability. This finding is in line with those of McCloskey et al.(1996) and Johnson and Moorhead (2000); they argued that health maintenance refers to any activities of identifying, controlling, presenting, and synthesizing actions to preserve health and prosperity statuses.

Furthermore, the HBM-based education was effective in improving maternal ability to manage promoting behaviors. This finding was supported by several indicators, such as proposing proper questions, the ability to explain any behavioral changes made to improve children's feeding patterns, and seeking health information. Additionally, the behavioral changes that appeared to be more promoting were due to education being conducted during the study. HBM is among the theories which highlight committing preventive actions from illness or has to perform health promotion activities (Akey, Rintamaki & Kane 2013).

Health promotion is a process that can empower a community to maintain, improve, and protect its health through awareness, preparedness, and capabilities, as well as the development of a healthy environment (Erlan 2014). Health promotion refers to the awareness of wellbeing and the natural state of performance and de-

fense, control, and recovery strategies to maintain normal wellbeing and performance. Moreover, the maternal ability to manage paternal involvement also improved. This result was supported by several conditions representing paternal involvement, such as the following: to create a nicer and more friendly parenting ambiance, getting involved in the initiation of parenting, and getting involved in obtaining information. Besides, the aspect of paternal involvement had an essential indicator to manage children with ARFID. It is because fathers, who get routinely involved in the parenting, are so helpful for children's growth and development (Barton et al. 2015; Flouri, Miodouhas & Narayanan 2016; Opondo et al. 2016; McBride et al. 2017; Turney & Halpern-Meekin 2017).

Paternal involvement in parenting is beneficial for children's life satisfaction; it makes the children feel less depressed, less bad-tempered, and present less negative emotions, such as fear and guilt. In contrast, children are more tolerant of stress and frustration, have problem-solving skills, are more adaptable to the environment, enjoy play to the fullest, and are creative and focused when encountering problems. Furthermore, they will be skilled at regulating their emotions and motivations. Children whose fathers are always involved in parenting are more capable of internal control and have more self-control (Abdullah 2018).

5. Conclusion

The current study results indicated that maternal abilities to manage eating disorders, promoting behaviors, and paternal involvement in taking care of children with ARFID were more significant in the experimental group than those in the control group. HBM-Based education could improve the abilities of mothers with children with ARFID. Overall, it was revealed that educating clients based on HBM is more effective than that of education based on routine training according to the nursing process. This model can be used by community nurses in educating mothers who cope with their children's nutritional problems. By improving the mother's abilities, severe eating disorders that occur in children can be prevented. The non-probability sampling method reduces the power of generalizing the results of this study to the wider community. It is suggested that future research exclusively examines paternal involvement in taking care of children with ARFID.

Ethical Considerations

Compliance with ethical guidelines

Ethical approval was obtained from the research ethics committee of the Faculty of Public Health, Airlangga University (reference number: 333-KEPK). Besides, all the participants involved were provided with written informed consent. Therefore, the issues of privacy and confidentiality of the subjects were guaranteed.

Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

Authors' contributions

Both authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflicts of interest.

Acknowledgments

The researchers want to thank the Faculty Members and the Students of the Nursing Department, Faculty of Health Sciences, University of Muhammadiyah Malang, who supported and helped out in the accomplishment of the research.

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