

## BEHAVIOUR MODEL PREVENTION FOR THE EVENT OF PEDICULOSIS CAPITIS AT ORPHANAGES IN PALEMBANG, SOUTH SUMATERA (INDONESIA)

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### Abstract

*Pediculus humanus capitis, also known as head lice, is a disease that is still categorized as an overlooked disease, and is still commonly found throughout the world, especially in developing and poor countries. The purpose of this study is to develop behavioral models and Planned Behavior Theory for prevention of pediculus humanus capitis orphanages in Palembang, south sumatera (Indonesia). Method: The type of this research is an explanatory survey with a cross-sectional design. The population is the children of orphanages in Palembang which is in August 2022. The total sampling in this study are 211 children that collected from 12 orphanages located in 12 sub-districts within the city of Palembang, South Sumatra (Indonesia). The data collected using questionnaires were then analyzed using PLS (partial least squares), and added with the results of focus group discussions (FGD). Results: proposed models with significant pathways between modifying factor pathways to behavioral beliefs, normative beliefs, and control beliefs. Normative pathways to intention, control beliefs to intention, and the intention path to behavior (practice). There is one non-significant path between the Behavioral belief pathways to intention. Conclusion: improvement in behavior for prevention of pediculus humanus capitis can be done by observing normative beliefs with adhering to the advice of parents by not lending personal items, belief control factor with diligently changing bedding, and keeping the environment clean and comfortable, intention with increasing the the desire of female students to clean the bed by changing bed pads and pillows regularly. Normative pathways to intention, control beliefs to intention, and the intention path to behavior (practice). There is one non-significant path between the Behavioral belief pathways to intention. Conclusion: improvement in behavior for prevention of pediculus humanus capitis can be done by observing normative beliefs with adhering to the advice of parents by not lending personal items, belief control factor with diligently changing bedding, and keeping the environment clean and comfortable, intention with increasing the desire of female students to clean the bed by changing bed pads and pillows regularly. Normative pathways to intention, control beliefs to intention, and the intention path to behavior (practice). There is one non-significant path between the Behavioral belief pathways to intention.*

**Keywords:** Preventive Behavior, Pediculus Humanus Capitis, Orphanage

## INTRODUCTION

Ectoparasite infestation, especially insect infestation, is a factor that can threaten public health, one of which is *Pediculus humanus capitis* (Saghafipour et al., 2017). *Pediculus humanus capitis*, otherwise known as head lice, which commonly causes disturbance to adults and especially school children (Andresen and McCarthy, 2009). In general, *pediculus humanus capitis* spreads through direct transitions, namely through contact with the head of an infected person, contact with clothes, hair combs, hats, towels, or other personal items as agents (Abd El Raheem et al., 2015). Diseases caused by *pediculus humanus capitis* infestation are still categorized as neglected diseases, and are still widely found throughout the world, especially in developing and poor countries ((Esy Maryati, 2018) & (Zulinda,

Epidemiologically, the spread of *pediculus humanus capitis* is more common among children, especially school children who live in relatively high dormitories. This risky behavior is influenced by the habits of children in maintaining personal and environmental hygiene, or also inadequate boarding facilities. So a preventive behavior model is needed in preventing the occurrence of *pediculus humanus capitis* in the community, especially in school children.

The incidence of *pediculus humanus capitis* is caused by several risk factors including: age based on the research of Moshki, Zamani-Alavijeh and Mojadam (2017) aged 11-12 years around 49 people out of 78 people from the intervention group experienced *pediculus humanus capitis* infestation. Another factor that influences the incidence of *pediculus humanus capitis* infestation according to Saghafipour, Nejati, Zahrei-Ramazani (2017), namely the number of people (occupants) the incidence of *pediculus humanus capitis* infestation occurs more in families that have 6 or more family members in one house around 40,13 % of 38,237 samples. Socio-economy also influences the incidence of *pediculus humanus capiti* infestation, where 39.55% of the 38,237 samples are families with low incomes.

Researchers conducted a preliminary study at 12 orphanages located in 12 sub-districts within the city of Palembang, South Sumatra Province, where there were 891 orphans. A preliminary study was conducted on 211 all of the orphans were infested with *pediculus humanus capitis*, and on average the orphan experienced an infestation of *pediculus humanus capitis* when entering an orphanage. Based on the results of interviews with the orphans, there is a habit of the orphans borrowing personal accessories such as combs and hair ties, the habit of students wearing headscarves when their hair is still wet, and some students say they often wet their hair but don't use shampoo. Based on previous research on *pediculosis humanus capitis* at the Darul Hujrah Puteri Martapura orphanage, other factors that might cause *pediculosis humanus capitis* infestations in orphanages are parents' education, socio-economic factors, and residential density (dormitories) (Yunida and Rachmawati, 2015).

The study uses two theories to overcome the incidence of *pediculosis humanus capitis* infestation in orphanages, namely the theory of Health Belief Models (HBM) and which is combined with a behavioral theory, namely Theory of Planned Behavior (TPB). HBM is one of the oldest behavioral sciences and has been used for 50 years in the resolution of health problems, especially disease prevention. This comprehensive model highlights the relationship between beliefs and behavior and argues that preventive behavior is formed based on personal beliefs about a person's illness (Moshki, Zamani-Alavijeh and Mojadam, 2017). This is in line with the TPB behavioral theory that the behavior displayed by individuals arises because of the intention or intention within the individual to make changes in health (Armitage, 2005). Modifying factors such as age, recurrence, race/ethnicity, family income, parent's education, parent's occupation, and knowledge, in HBM theory can influence,

intention, coupled with belief, which is expected to change the behavior of orphanage children in cleaning especially personal hygiene to avoid the occurrence of pediculosis humanus capitis. Pediculosis humanus capitis infestation can result in impaired self-confidence of orphanage children, decreased concentration while studying, anemia, allergic rhinitis and others (Sciscione and Krause-Parello, 2007). Which is expected to change the behavior of orphanage children in carrying out cleanliness, especially personal hygiene so that they avoid the occurrence of pediculosis humanus capitis. Pediculosis humanus capitis infestation can result in impaired self-confidence of orphanage children, decreased concentration while studying, anemia, allergic rhinitis and others (Sciscione and Krause-Parello, 2007). Which is expected to change the behavior of orphanage children in carrying out cleanliness, especially personal hygiene so that they avoid the occurrence of pediculosis humanus capitis. Pediculosis humanus capitis infestation can result in impaired self-confidence of orphanage children, decreased concentration while studying, anemia, allergic rhinitis and others (Sciscione and Krause-Parello, 2007).

## RESEARCH METHODOLOGY

This study used an explanatory survey research design. Furthermore, this research will be continued with descriptive research to develop knowledge about a topic and explain the findings in the research and use a cross sectional approach. The population in this study were 211 children that collected from 12 orphanages located in 12 sub-districts within the city of Palembang, South Sumatra (Indonesia). The research was conducted from August to September 2022. Research Variables Independent variables: modifying factors (age, incidence of head lice, family income, parents' occupation, parents' education, and knowledge), behavior beliefs (attitudes), normative beliefs (encouragement), control beliefs (self and environment). Dependent variable: This research has carried out an ethical clearn test at Health Polytechnic Palembang, No: 1165/KEPK/Adm 2/VIII/2021.

**Data analysis was carried out to determine the frequency distribution of each variable in the form of categories and produce data in the form of percentages and inferential analysis. The test used is Partial Least Square (PLS), which is one of the Structural Equation Modeling (SEM) techniques. There are 2 instruments used in this study, namely: the first is a questionnaire about knowledge, the parameters used are adapted and developed from the KAP questionnaire ((Yingklang, Sengthong, Haonon et al., 2018) & (ALBashtawy, 2014)), and the second questionnaire sheet about TPB questionnaire (Ajzen, I., 2006).**

These strategic issues are used as a reference in Focus Group Discussion (FGD) activities. The FGD presented the solutions used to formulate a behavior model for preventing pediculosis humanus capitis with the HBM and TBP model approaches in orphanages. The results of the FGD were discussed with experts, namely community nurses at the Puskesmas, youth health program holders at the Puskesmas, with orphanage caretakers and representatives of foster children. The next step is to develop a model and recommend a behavioral model for preventing pediculosis humanus capitis and the theory of HBM and TPB for foster children in orphanages.

RESULTS AND DISCUSSION

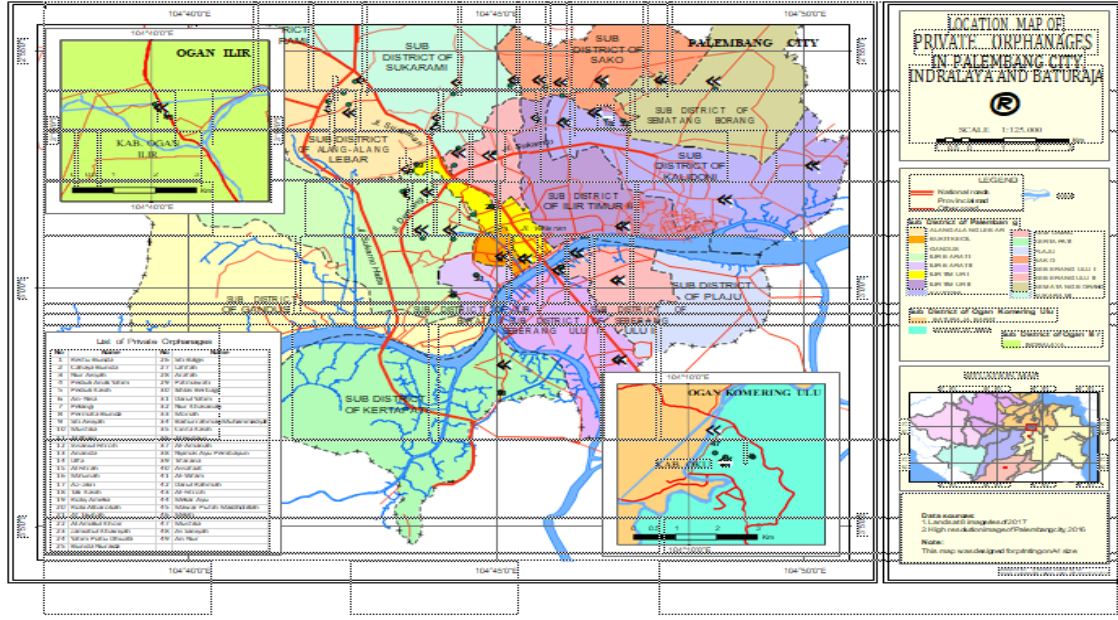


Fig 1: Distribution of human head lice collected from 12 district in Palembang

A. Sub district with in the region Province of South Sumatra, Indonesia Modifying Factor

Modifying factor explained that individual perceptions were influenced by several modifying factors such as age, occupation, education, head of family, incidence of head lice, and knowledge.

Table 1: Characteristics respondent based on age orphanages in orphanages in Palembang, South Sumatera (Indonesia)

Age Characteristics	Frequency	Percentage (%)
13 years old	95	45
14 years	92	43,6
15 years	24	11,4
Total	211	100

Table 2: Characteristics of respondents' occupation of parents (fathers) of orphanages in the Palembang South Sumatera (Indonesia)

Father's Occupational Characteristics	Frequency	Percentage (%)
Businessman	25	11,8
Private	84	40
civil servant	72	34
And others	30	14,2
Total	211	100

**Table 3: Characteristics of respondents based on the work of parents (mothers) of orphanages in Palembang city orphanages**

Characteristics of Mother's Occupation	Frequency	Percentage (%)
Businessman	27	12,8
Private	49	24
civil servant	61	29
And others	74	35
Total	211	100

**Table 4: Characteristics of respondents based on the education of parents (fathers) of orphanages in Palembang South Sumatera (Indonesia)**

Characteristics of Father's Education	Frequency	Percentage (%)
SD / SMP	29	13,7
SENIOR HIGH SCHOOL	71	33,6
College	111	52,6
Total	211	100

**Table 5: Characteristics of respondents based on the education of parents (mothers) of orphanages in Palembang South Sumatera (Indonesia)**

Characteristics of Mother's Education	Frequency	Percentage (%)
SD / SMP	39	18.5
SENIOR HIGH SCHOOL	65	30,8
College	107	50,7
Total	211	100

**Table 6: Characteristics of Respondents based on the income of the head of the family at the Palembang South Sumatera (Indonesia)**

Income Characteristics Head of family	Frequency	Percentage (%)
<IDR 2.500.000,-	36	17,1
≥Rp 2.500.000,-	175	82.9
Total	211	100

**Table 7: Characteristics of respondents based on the incidence of head lice at the Palembang South Sumatera (Indonesia)**

Pediculus humanus capitis infestation	Frequency	Percentage (%)
1 time	9	4,3
2 times	51	24,1
3 times	31	14,7
4 times	21	9.9
Countless	93	44,1
Total	211	100

**Table 8: Characteristics of respondents based on the knowledge of orphanages in Palembang South Sumatera (Indonesia)**

Knowledge	Frequency	Percentage (%)
Well	113	52,6
Enough	78	37,9
Not enough	20	9,5
Total	211	100

**B. Behavioral Beliefs Variable (X2)**

**Table 9: Characteristics based on behavioral beliefs of orphanages in Palembang South Sumatera (Indonesia)**

Characteristics of Behavioral Beliefs (attitude)	Frequency	Percentage (%)
Negative	99	46,9
Positive	112	53,1
Total	211	100

**C. Variable Normative Beliefs (X3)**

**Table 10: Characteristics based on normative beliefs of orphanages in Palembang South Sumatera (Indonesia)**

Normative Characteristics <i>Beliefs</i>	Frequency	Percentage (%)
Negative	84	39,8
Positive	127	60,2
Total	211	100

**D. Variable Control Beliefs (X4)**

**Table 11: Characteristics based on the orphanages themselves in the Palembang South Sumatera (Indonesia)**

Characteristics of by oneself	Frequency	Percentage (%)
Negative	104	49,3
Positive	107	50,7
Total	211	100

**Table 12: Characteristics based on controls from the orphanage environment in Palembang South Sumatera (Indonesia)**

Characteristics of the environment	Frequency	Percentage (%)
Negative	95	45.0
Positive	116	55.0
Total	211	100

**E. Intention Variable (Y1)**

**Table 13: Characteristics based on the intention of the orphans in the Palembang South Sumatera (Indonesia)**

Characteristics of Intention	Frequency	Percentage (%)
Negative	71	33,6
Positive	140	66,4
Total	211	100

**F. Behavior Variable (Practice) (Y2)**

**Table 14: Characteristics based on the practice of orphanages in Palembang South Sumatera (Indonesia)**

Practice characteristic	Frequency	Percentage (%)
Well	53	25,1
Enough	59	28
Not enough	99	46,9
Total	211	100

**G. Cross Tabulation of Research Variables**

Research variables that have more than one sub-variable are categorized into one score for each variable. The independent variables are presented in the rows and the dependent variables are presented in the columns.

**Table 15: Cross tabulation of research variables on behavioral beliefs, normative beliefs, and control beliefs on intention**

Independent Variable	Dependent Variable				P. Value
	Negative		Positive		
	N	%	N	%	
<b>Behavioral beliefs Attitude</b>					
Negative	52	52,5	47	47,5	0.000
positive	19	17	93	83	
<b>Normative Beliefs push</b>					
Negative	57	67,9	27	32,1	
positive	14	11	113	89	
<b>Control Beliefs Self</b>					
Negative	51	49	53	51	0.000
Positive	20	18,7	87	81,3	
<b>Control Beliefs Environment</b>					
Negative	52	54,7	43	45,3	
Positive	19	16,4	97	83,6	

**Table 16: Tabulation cross variable study Intention to behavior**

Independent Variable	Dependent Variable						P. Value
	Not enough		Enough		Well		
	N	%	N	%	N	%	
Intentions							0.000
Negative	51	71,8	16	22,5	4	5,6	
Positive	48	34,4	43	30,7	49	35	

Figure 2: Algorithm Construct

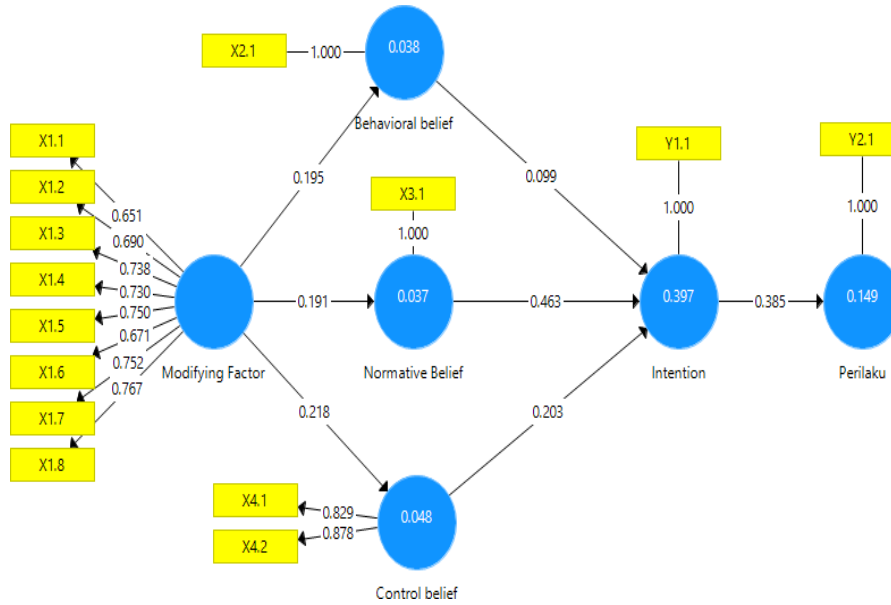


Table 17: Results of Hypothesis Testing

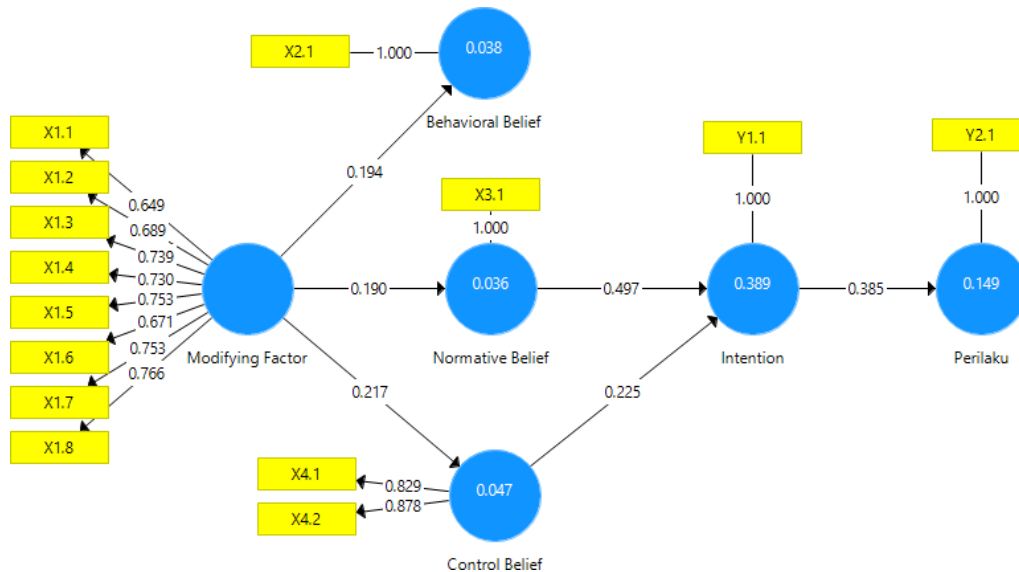
Pengaruh	Original Sample (O)	T Statistics ( O/STDEV )	P Values
Modifying Factor → Behavioral belief	0,195	3,167	0,002
Modifying Factor → Normative Belief	0,191	3,040	0,002
Modifying Factor → Control belief	0,218	3,516	0,000
Behavioral belief → Intention	0,099	1,509	0,132
Normative Belief → Intention	0,463	6,347	0,000
Control belief → Intention	0,203	3,143	0,002
Intention → Perilaku	0,385	7,261	0,000

Table 18: Results of Hypothesis Testing Indirectly

Variabel	Original Sample (O)	T Statistics ( O/STDEV )	P Values
Modifying Factor → Behavioral belief → Intention	0,019	1,169	0,243
Modifying Factor → Normative Belief → Intention	0,088	2,530	0,012
Modifying Factor → Control belief → Intention	0,044	2,018	0,044
Behavioral belief → Intention → Perilaku	0,038	1,388	0,166
Normative Belief → Intention → Perilaku	0,178	4,646	0,000
Control belief → Intention → Perilaku	0,078	2,840	0,005
Modifying Factor → Behavioral belief → Intention → Perilaku	0,007	1,094	0,274
Modifying Factor → Normative Belief → Intention → Perilaku	0,034	2,366	0,018
Modifying Factor → Control belief → Intention → Perilaku	0,017	1,931	0,054



Figure 3: Structural model of the results after strip removal not significant



PLS analysis (Partial Least Square) shows that modifying factor significantly influences behavior beliefs, normative beliefs, and control beliefs. Modifying factors explain that individual perceptions are influenced by several modifying factors such as age, occupation, education, head of family, incidence of head lice, and knowledge. The PLS analysis shows that the modifying factor significantly influences behavioral beliefs (attitudes). In this study, modifying factors were seen from the age of the orphanage, education, occupation, parents' income, the incidence of head lice and the knowledge of the orphanage towards behavioral beliefs (attitudes) in carrying out the behavior of preventing pediculus humanus capitis in orphanages.

According to Ajzen (2005), attitude is the amount of positive or negative feelings towards an object (favorable) or negative (unfavorable) towards an object, person, institution, or activity. A person's attitude can be influenced by age, education, occupation, incidence of head lice, and knowledge of a person. Because it can affect a person's ability to determine good or bad behavior and take action to prevent it. Previous research stated that a family's income, education, and occupation affect a person's attitude towards the incidence of pediculus humanus capitis infestation (Tagka et al., 2016).

The PLS analysis shows that the modifying factor has a significant effect on normative beliefs (encouragement). In this study, modifying factors were seen from the age of the orphans, education, occupation, parental income, the incidence of head lice and the knowledge of the orphans on normative beliefs (encouragement) around support in carrying out the behavior of preventing pediculus humanus capitis in orphanages. Based on the cross-tabulation results, there are several factors from the modifying factor that are significant to the normative belief, these factors are the age of the orphans, the income of the head of the family and the knowledge of the orphans.

Encouragement from other people on one's behavior can influence the behavior of preventing pediculus humanus capitis. Education, occupation, and parental income have an influence in providing motivational encouragement to carry out pedicels humanus capitis prevention behavior. Based on previous research, it was stated that family support, such as family participation in screening by carrying out routine checks, is mostly carried out by mothers who live in urban areas with higher levels of education, this action can reduce the incidence of pediculus humanus capitis

infestation (Rukke, Soleng and Lindstedt, 2014). Other research also states that family support or encouragement affects the incidence of pediculus humanus capitis infestation, such as the incidence rate of pediculus humanus capitis infection is more common in children with mothers who are single parents. Encouragement from schools is also a major factor in reducing the incidence of pediculus humanus capitis infestation, a study states that the participation of the school in conducting screening and detection of students will be able to reduce the incidence of pediculus humanus capitis infestation, and also involve parents for follow-up such as treatment (Birkemoe et al., 2016).

PLS analysis shows that modifying factor significantly influences control beliefs (from oneself and the environment). In this study, modifying factors were seen from the age of the orphans, education, occupation, parents' income, the incidence of head lice and the knowledge of the orphans on control beliefs (from themselves and the environment) in carrying out pediculus humanus capitis prevention behavior in orphanages.

*Control beliefs* is a person's perception or difficulty in carrying out a behavior, which is related to beliefs about support and resources or obstacles to carrying out a good behavior. Control beliefs are influenced by several factors, namely, internal factors where orphanage children can restrain themselves by providing boundaries not to engage in unfavorable behavior such as not lending hair accessories, not borrowing headscarves from friends, diligently keeping hair clean, beds, and the clothes used. Another influencing factor is environmental factors where when one is able to control behavior but is not supported by the surrounding environment, such as a dorm roommate who still likes to borrow personal items, friends who don't want to do pediculus humanus capitis treatment, the habit of borrowing pillows, borrowing blankets, and the environment around the dormitory that is not clean. Previous research stated that personal hygiene behavior is an important key in determining the spread of pediculus humanus capitis (Gutiérrez et al., 2012).

The results of the PLS analysis show that Behavioral Belief (attitude) has no significant effect on intention, based on the cross-tabulation results between behavioral beliefs (attitudes) towards intention having a relationship with the sig value. 0.000, it is stated that the negative attitude of the orphans has positive intentions as many as 47 of the orphans (47.5%).

The results of the PLS analysis show that Normative Belief (encouragement) has a significant effect on intention, the results of the cross tabulation between normative beliefs (encouragement) on intention have a significant relationship with the sig value. 0.000, it was stated that negative encouragement to orphans had positive intentions as many as 27 orphans (32.1%). An assessment of the encouragement of the orphanage can be seen from family, friends/environment and the caretaker of the orphanage on the behavior of preventing pediculus humanus capitis.

According to Ajzen (Ajzen, 2005) Normative beliefs are individual perceptions about whether other people will support or not realize an action. Based on the results of the frequency distribution, 60.2% of the orphanage children have positive normative beliefs. In this study, the form of support or encouragement that comes from family and boarding schools is a source of support for orphans in carrying out pediculus humanus capitis prevention behavior. In the statement of the orphanage regarding the form of encouragement from the environment around the orphanage, as many as 133 orphanages stated that they strongly agreed with cleaning the environment. Orphanage children's statement about the form of encouragement from the orphanage, as many as 103 orphanages stated that they strongly agreed to carry out cleaning activities which were held regularly by caregivers as a way to prevent being infected/infected with head lice, this was in line with the intention of the orphans, namely as many as 166 orphans who wished to carry out head lice prevention behavior by doing cleanliness of the room to keep it clean and comfortable. Based on the results of the FGD,

there is a schedule for cleaning pickets every day in each dormitory room, which is carried out once every day so that sometimes the floors still look dirty and the rooms are messy.

The results of the PLS analysis show that control beliefs significantly influence intention, the results of the cross-tabulation between control beliefs (from oneself) on intention have a significant relationship with the sig value. 0.000, it is stated that negative self-factors for orphans have positive intentions for as many as 53 orphans (51%), and the results of the cross-tabulation of control beliefs (environment) on intention have a significant relationship with the sig value. 0.000 stated that negative environmental factors had positive intentions for 43 orphans (45.3%). Internal factors and environmental factors influence the control within the orphanage to carry out preventive behavior for pediculus humanus capitis.

*Intention* orphanage children to improve behavior so as to prevent pediculus humanus capitis infestation which significantly influences the practice carried out by orphanages based on PLS results. Based on the results of the cross tabulation, there is a significant relationship between intention towards the behavior (practice) of orphans and sig. 0.000.

*Theory of Planned Behavior* (TPB) said that behavior that arises due to intention is an indication of how strong a person's belief is in trying a behavior (Ajzen, 1989). Based on the theory of the Health Belief Model (HBM), individuals will take action (practice) if they are previously influenced.

## CONCLUSION

Based on the overall hypothesis testing, it can be seen that the significant path that describes the research results model is the modifying factor consisting of age, education, occupation, and parental income, incidence of head lice, and knowledge influencing behavioral beliefs, normative beliefs, and control beliefs. Normative belief factors influence the intention of orphans to carry out preventive behavior, and control beliefs affect the intention of orphans to carry out preventive behavior for pediculus humanus capitis. Intention of orphans affects the practice of orphans in carrying out prevention behavior of pediculus humanus capitis.

## Conflict of Interest Statement

We declare that we do not have a conflict of interest

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