Using the Theory of Planned Behavior to Explore Factors Associated with the Behavior of Consuming Blood Booster Tablets Among Adolescent Girls in Bantul Regency

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ABSTRACT

***Background**: Providing iron and folic acid through the ingestion of blood booster tablets is an intervention to lower the prevalence of anemia in adolescents. However, just a small percentage of adolescent girls have consumed blood booster tablets as prescribed.* ***Aims**: To identify the factors related to the behavior of consuming blood booster tablets among adolescent girls in Bantul Regency based on the Theory of Planned Behavior.* ***Methods**: The cross-sectional study was conducted in Bantul Regency, a Special Region of Yogyakarta Province, between March and May 2023. A total of 381 adolescent girls aged 16-18 years participated in filling out questionnaires to collect data. The questionnaire includes socio-demographics, knowledge about blood booster tablets and anemia, attitudes, subjective norms, intentions, and behaviors of consuming blood booster tablets. Path Analysis was used to analyze the data with statistical significance (p) at 0.05.* ***Result**: As a result, intention directly influences the behavior of consuming blood booster tablets (p=<0.001). Subjective norms have a direct influence on the behavior of consuming blood booster tablets (p=0.023) and have an indirect influence through attitudes (p<0.001) and intentions (p<0.001). Attitude has an indirect influence on the behavior of consuming blood booster tablets through intention (<0.001), then the level of knowledge has an indirect influence on intention (p=0.037) and attitude (p=0.032).* ***Conclusion**: Adolescent girls will have good consumption behavior of blood booster tablets if they have a positive attitude, a high level of knowledge, subjective norms, and high intentions. These findings can be used to design health promotion models useful for increasing the consumption behavior of blood booster tablets. Further research is needed to find the right educational model to increase knowledge, attitudes, subjective norms, and intentions to consume blood booster tablets.*

***Keywords**: Adolescent girls, Blood booster tablets, Theory of Planned Behavior*

INTRODUCTION

One of Indonesia's health issues is anemia. According to the Ministry of Health, Republic of Indonesia, anemia affects 32% of teenagers. This indicates that 3–4 out of every 10 teenagers have anemia (Ministry of Health Republic of Indonesia, 2021). In addition, the Health Service of Special Region of Yogyakarta noted a rise in the prevalence of anemia in teenage females from 37.1% in 2013 to 48.9% in 2018, with the age categories of 15–24 and 25–34 years having the highest anemia (Dinas Kesehatan Daerah Istimewa Yogyakarta, 2023).

Low hemoglobin content is a symptom of anemia. It is one of the most significant public health issues in the world (Sundararajan & Rabe, 2021). According to the WHO, anemia affects 40% of children aged between six and 59 months, 37% of pregnant women, and 30% of women between the ages of 15 and 49 worldwide (World Health Organization, 2023). Iron deficiency is the primary cause of anemia in most cases (Vázquez *et al*., 2019).

Anemia is a significant risk factor for women's and children's health and development. Anemia is a significant issue in developing nations because it has a negative impact not only on people's quality of life but also on national social and economic growth (Mantadakis *et al*., 2020). In addition to affecting teenage physical development, performance, and immunity, anemia can have long-term

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impacts on later age groups, particularly on women of reproductive age. A higher risk of pregnancy problems, including low birth weight, early birth, and infant death, may occur from this (Shaka & Wondimagegne, 2018). Additionally, the risk of stunting increases with impending birth, perpetuating the harmful cycle of malnutrition (Iftikhar, 2018).

In Indonesia, stunting continues to be a significant public health issue. Stunting prevalence is 24.4% in 2021 and will drop to 21.6% in 2022 by a 2.8% margin. Although it is anticipated that the national stunting rate will drop by 2.7% annually, significant efforts are still required to bring it down to 14% (Ministry of Health Republic of Indonesia, 2023).

One of the interventions to reduce the prevalence of anemia in adolescents is iron and folic acid supplementation through the administration of blood booster tablets. Giving blood booster tablets is prioritized to adolescent girls and women of childbearing age to prevent stunting (Kementerian Kesehatan Republik Indonesia, 2018). This supplementation is carried out by giving one blood booster tablet with a composition of 60 mg elemental iron and 400 mcg folic acid per week to adolescent girls aged 12-18 years.

In 2018, 76.2% of adolescent girls had received blood booster tablets within 12 months. However, only 1.4% of them took tablets as recommended (≥52 tablets in one year) (Kementerian Kesehatan Republik Indonesia, 2022). Research in Ghana and India shows that, in general, several factors influence the behavior of consuming blood booster tablets among young women, including parental education and employment, awareness of anemia, knowledge about anemia, and programs for administering blood booster tablets (Dubik *et al.*, 2019). Side effects include stomach ache, nausea, vomiting, and dislike of blood supplement tablets. There are still girls who think that blood booster tablets cause weight gain, and may have side effects such as discomfort, stomach pain, and dizziness. Sometimes the unavailability of blood booster tablets, low awareness of the importance of blood booster tablets, and unintentional program implementation are other important factors (Priya *et al.*, 2016).

In Indonesia, factors that influence the behavior of consuming blood booster tablets among adolescent girls include the motivation of adolescent girls to consume these supplements, and the motivation of teachers to provide education about anemia, and iron-folic acid supplementation to students (Apriningsih *et al.*, 2020), access to information on iron-folic acid, knowledge, and use of the Cegah Anemia Remaja Indonesia (CERIA) application (Thifal *et al.*, 2023).

Ceria is an application launched by the Ministry of Health to increase adolescent girls' compliance with consuming blood booster tablets. The CERIA application is a means for recording and reporting data electronically for the consumption of blood booster tablets for adolescent girls, as a source of information for adolescent girls about blood booster tablets and anemia, as well as a reminder to take blood booster tablets every week.

The Theory of Planned Behavior (TPB) was developed as an extension of the Theory of Reason Action (TRA) which emphasizes that the most important determinant of behavior is intention. Direct determinants of a person's behavioral intentions are attitudes toward behavior and subjective norms. TPB adds Perceived Behavior Control (PBC). Attitudes, subjective norms, and PBC will influence intentions and, in turn, will influence behavior (Ajzen, 2020). The TRA and the TPB focus on theoretical constructs related to individual motivation factors as determinants of the possibility of carrying out certain behaviors. TRA and TPB both consider the best predictor of behavior to be behavioral intentions, which, in turn, are determined by attitudes toward the behavior and social normative perceptions.

Several studies have tried to reveal the factors that influence the behavior of consuming blood booster tablets using the Theory of Planned Behavior. Research (Ningtyias *et al.*, 2020) reveals that behavioral control influences the intention to comply with taking blood booster tablets. Research (Puspitasari *et al.*, 2022) conducted in Madiun also revealed that better attitudes, subjective norms, perceived behavioral control, and intentions of young women will lead to better anemia prevention behavior.

Although there is research on adolescent girls who refuse to take blood-

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boosting tablets, research in Bantul Regency has never been conducted, so the reasons behind this behavior of adolescent girls in Bantul Regency are still not fully understood. To improve the behavior of drinking blood tablets, developing programs that are more focused and targeted can be increased by understanding elements that directly or indirectly affect behavior. The Theory of Planned Behavior (TPB) serves as the theoretical foundation for this report's examination of the aspects that influence the consuming behavior of blood booster tablets (Figure 1).

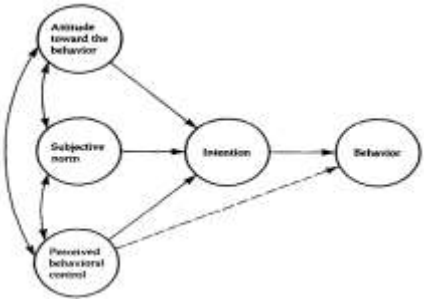

Figure 1. Theory of planned behavior (Ajzen, 1991)

METHODS

The research was carried out in nine (of 17) sub-districts in Bantul Regency between March and May 2023, with one school in each sub-district selected randomly.

Inclusion criteria include adolescent girls aged 16-18 years and who have menstruated. The sample size was calculated using the Lemeshow formula with an unknown population and with a confidence level of 95%, sampling error (d) 0.06, and estimated research proportion (P) 0.5; this method produced 267 respondents (Lwanga & Lemeshow, 1991). A random sampling technique was used for participant selection.

The research variables consist of one exogenous variable (level of knowledge) and four endogenous variables (attitude, subjective norm, intention, and behavior of taking blood booster tablets).

A questionnaire served as the research's tool for gathering data. The questionnaire was developed based on the four constructs of the Theory of Planned Behavior—attitude, intention, subjective norms, and behavior—as well as the construct of knowledge about blood-boosting tablets in adolescent girls becoming the basis for the question grid in the questionnaire. Meanwhile, the variables studied included adolescent girls' knowledge about the meaning of blood booster tablets, the benefits of blood booster tablets, the meaning of anemia, the impact of anemia on adolescent girls, and how to prevent anemia. Knowledge is classified as high or low if the respondent's answer score is higher or lower than the median, respectively.

Attitude is a pleasant and unpleasant response to the behavior of taking blood booster tablets in terms of affective, cognitive, and conative aspects. It is categorized as positive or negative if the answer score is higher or lower than the median. Subjective norms are the perceptions or views of young women regarding other people's beliefs which influence their interest in consuming blood booster tablets as recommended and are also grouped into high or low. Meanwhile, the intention is the desire to take blood booster tablets regularly/irregularly is classified as high or low if the respondent's answer score is higher or lower than the median. Participants were asked to rate individual agreement with a 5-point Likert Scale on 50 questions. Favorable statements include 1=strongly disagree, 2=disagree, 3=somewhat agree, 4=agree, 5=strongly agree, while unfavorable statements include 1=strongly agree, 2=agree, 3=somewhat agree, 4= disagree, 5=strongly disagree. Apart from that, the questionnaire also produced data such as age, parents' education level, parents' employment status, history of anemia, and level of knowledge.

Cronbach's alpha was employed to assess reliability with findings of $r_{count} > r_{table}$ (0.254), and the product-moment correlation formula was used to test the validity of the instrument with results of p-value 0.05 and r_{count} 0.254.

Data collection was carried out from March to May 2023. Informed consent was carried out before data collection, and then questionnaires were given to 384 adolescent girls. School teachers were recruited and trained as facilitators who were responsible for distributing questionnaires to female students. A random sampling technique (lottery based on female students'

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absence numbers) was used to select participants. No respondents refused to fill out the questionnaire, but three respondents filled it out incompletely so only 381 questionnaires were analyzed.

Path analysis in Stata 64 was used for the data analysis in this study. A system of linear equations serves as the foundation for the multivariate analysis method known as path analysis, which ensures that all cause-and-effect linkages are linear and additive. All models are recursive, the causal link is one-way, there is no two-way causal relationship, and the model includes all important causal factors (Ayuningrum & Murti, 2020).

Because the outcome variable is binary, the analysis was based on path analysis estimation using general structural equation modeling (GSEM) to estimate the determinants of consumption behavior of blood booster tablets which have a direct relationship with the outcome variable and indirect effects through mediators. One of the features of structural equation modeling is that it provides goodness-of-fit statistics to assess model fit. However, GSEM estimation using Stata software is not applicable for calculating goodness-of-fit indices. To overcome this problem, model fitting was implemented based on the principle that most path coefficients are significant at a 5% error level provided that the observed and predicted frequencies match (Lombardi *et al.*, 2017).

Research ethical approval was obtained from the ethics committee of the Akbidyo College of Health Sciences Number: e-KEPK/Stikes Akbidyo/15/III/2023 which includes informed consent, anonymity, confidentiality, and ethical permission. Issues of data confidentiality and how the data will be stored after data collection were discussed, and all participants agreed in writing by signing an informed consent.

RESULTS AND DISCUSSION

The results showed that 188 (49.3%) respondents were 18 years old, 371 respondents (97.4%) came from working parents, and 375 (98.4%) respondents had cell phones. Most respondents had parents with secondary education level, 158 (41.5%), and 349 (91.6%) had no history of anemia. Furthermore, 201 respondents (52.8%) had a good level of knowledge about the benefits of consuming blood booster tablets, 202 (53%) had a positive attitude, 245 (64.3%) had high subjective norms, 204 (53.5%) %) had high intentions, and 272 (71.6%) had good behavior in consuming blood booster tablets (Table 1).

Table 1. Characteristics of the Respondents

No	Variable	Total	Percentage (%)
1	**Age**		
	16 years old	141	37
	17 years old	188	49,3
	18 years old	52	13,6
2	**Parent's employment**		
	Employed	371	97,4
	Unemployed	10	2,6
3	**Parent's educational level**		
	Elementary	141	37
	Middle	158	41,5
	Higher	82	21,6
4	**History of Anemia**		
	Without anemia	349	91,6
	With anemia	32	8,4
5	**Gadget (cell phone)**		
	Have phone	375	98,4
	Do not have a phone	6	1,6
6	**Knowledge level**		
	Low	180	47. 2
	High	201	52,8
7	**Attitude**		
	Negative	179	47
	Positive	202	53

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8	**Subjective norm**		
	Low	136	35. 7
	High	245	64,3
9	**Intention**		
	Low	177	46,5
	High	204	53. 5
10	**Consumption behavior of blood booster tablets**		
	Poor	109	28,4
	Good	272	71,6

Source: Primary Data 2023

The results of bivariate analysis showed that there was a significant relationship between adolescent attitudes (OR=3.00, 95% CI=1.88 to 4.77, p=<0.001), subjective norms (OR = 3.46, 95% CI=2.16 to 5.55, p=<0.001) and intention (OR = 4.18, 95% CI=2.61 to 6.68, p=<0.001) with consumption behavior of blood booster tablets (Table 2).

Table 2. Characteristics of the Respondents

Independent variable	Consumption behavior of blood booster tablets				OR	95% CI		p-value
	Poor		Good			Lower limit	Upper limit	
	N	%	N	%				
Knowledge level								
Low	50	13.13	130	34.12	0.21	0.59	1.44	0.73
High	59	15.47	142	37.28				
Attitude								
Negative	72	18.90	107	28.08	3.00	1.88	4.77	<0.001
Positive	37	9.72	165	43.30				
Subjective Norm								
Low	65	17.06	71	18.64	3.46	2.166	5.55	<0.001
High	44	11.55	201	52.75				
Intention								
Low	74	19.42	103	27.03	4.18	2.61	6.68	<0.001
High	35	9.19	169	44.36				

Figure 2 shows the structural model that has been estimated with Stata. Indicators that show the suitability of the model (goodness of fit) path analysis can be seen in Table 3 which shows the value of Akaike's Information Criterion (AIC)= 1768. 58 and Bayesian Information Criterion (BIC)=1819,837, which means that the empirical model meets the specified criteria and is stated in accordance with the empirical data.

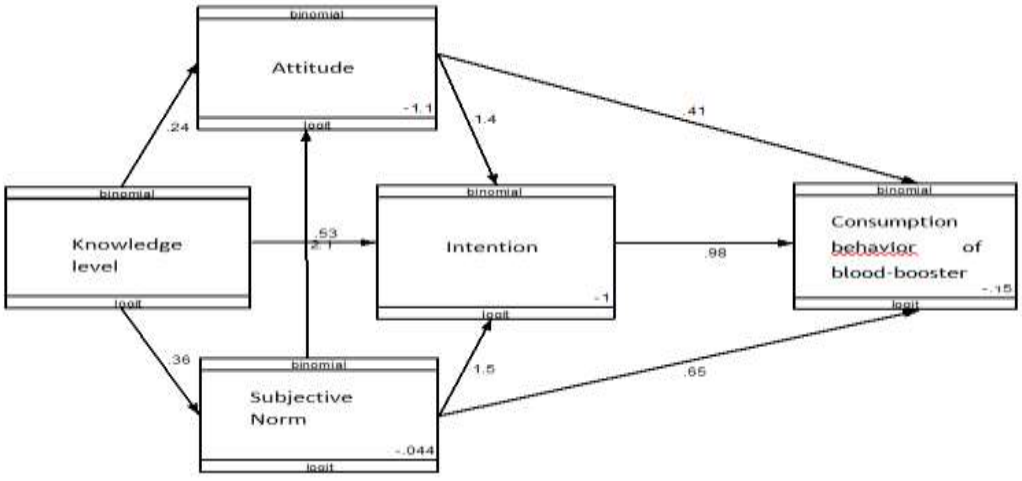

Figure 2. Structural model with estimation

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Table 3 shows that blood booster tablets consumption behavior was directly influenced by high intentions (b=0.98; 95% CI= 0.44 to 1.51; p=<0.001), and high subjective norms (b=0.64; 95 % CI=0.08 to 1.20; p=0.023), and indirectly influenced by subjective norms through high intentions (b=1.54; 95% CI=1.01 to 2.07; p<0.001), attitudes through high intentions (b=1.38; 95% CI=0.85 to 1.91; p=<0.001), and level of knowledge through high intentions (b=0.52; 95% CI= 0.03 up to 1.02; p=0.037). In addition, the consumption behavior of blood booster tablets was influenced indirectly by subjective norms through positive attitudes (b=2.09; 95% CI=1.63 to 2.55; p<0.001), and the level of knowledge through positive attitudes (b=0.24; 95% CI= -0.21 to 0.70; p=0.032).

Table 3. Results of Path Analysis of Determinants of Consumption Behavior of Blood Booster Tablets

Dependent variable	Independent variable	b	CI 95%		p
			Lower limit	Upper limit	
Direct effect					
Consumption behavior of blood booster tablets	← High intentions	0.98	0.44	1.51	<0.001
	← High subjective norms	0.64	0.08	1.20	0.023
	← Positive attitude	0.41	-0.14	0.96	0.144
Indirect effect					
High intentions	← High subjective norms	1.54	1.01	2.07	<0.001
	← Positive attitude	1.38	0.85	1.91	<0.001
	← Highly knowledgeable	0.52	0.03	1.02	0.037
Positive attitude	← High subjective norms	2. 09	1.63	2.55	<0.001
	← Highly knowledgeable	0.24	-0.21	0.70	0.032
Subjective norm	← Highly knowledgeable	0.35	-0.04	0.76	0.085

N Observation= 381
Log Likelihood = -872,49934
Degree of Freedom = 13
AIC =1768. 58 BIC= 1819,837

The research results showed a direct correlation between intentions and subjective norms on the consumption behavior of blood booster tablets. Furthermore, the research results also show that attitudes, subjective norms, and level of knowledge are indirectly related to the consumption behavior of blood booster tablets through intention, while subjective norms and level of knowledge are related indirectly through attitude.

The direct antecedent of the behavior in TPB is the intention to do the behavior; the stronger the intention, the more likely the occurrence of the behavior of the behavior (Ajzen, 2020). According to the TPB, attitudes toward the behavior determine behavioral intentions, subjective norms regarding the behavior, and perceived behavioral control, each of which is represented by a separate but connected set of subcomponents. Subcomponents can help with behavior prediction and comprehension in terms of health (Sussman & Gifford, 2019). The chance that a behavior will result in the desired outcome and subjective assessments of the dangers and advantages of those outcomes both have an impact on behavioral intentions (Ajzen, 2020).

The behavioral intention examined in this research is the behavior of consuming blood booster tablets in the future based on feelings, experience/evaluation of previous experiences. In the current formulation of the theory, favorable attitudes and supportive subjective norms motivate one

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to engage in the behavior, but the actual intention to do so is only formed when the perceived control over the behavior is strong enough.

The result of this study was in line with the research by Puspitasari *et al*. (2022) which examined factors that influence anemia prevention behavior in adolescent girls. The results of this study showed that a teenager's better attitudes, subjective norms, perceived behavioral control, and intentions will carry out better anemia prevention behavior.

Subjective norms are perceptions of what the majority of people believe to be acceptable behavior. This has to do with the notion that a person should act by the judgment or approval of those closest to him or her. Particularly, command and descriptive norms are thought to make up perceived norms (Ajzen, 2020).

Command norms in TPB are the name for TPB norms because they involve social approval felt by other people which motivates behavior through social rewards/punishments and distinguishes them from descriptive norms, namely perceptions of what other people do (Ajzen, 2012). The social pressure that people experience to engage in particular actions is thought to be the source of subjective norms. Subjective norms are usually items that assess the approval of those closest to someone's behavior (Conner, 2020).

The subjective norms studied in this research are the perceptions or views of young women regarding the beliefs of other people who are influential in their lives, such as friends, parents, teachers, and health workers, which will influence their interest in whether or not to take blood booster tablets. Adolescent girls who have high confidence that friends, parents, teachers, and health workers want young girls to be obedient in consuming blood booster tablets, tend to be obedient in taking blood booster tablets. Adolescent girls agree to take blood-boosting pills if their peers also do or approve of the action. Apart from that, respondents will agree to consume blood-boosting tablets if teachers and parents have a positive view of the positive influence of consuming blood-boosting tablets on their health.

The findings of this study demonstrated that subjective norms indirectly influenced blood booster tablet-consuming behavior through attitudes and intentions. The higher the subjective norm of adolescents, the more positive their attitudes toward consuming blood booster tablets will be. In addition, the higher the adolescent's subjective norm, the higher the intention to consume blood booster tablets. This research is in line with research that analyzes factors related to anemia prevention with the results that attitudes, subjective norms, perceived behavioral control, and intentions of young women who are getting better will make anemia prevention behavior even better (Puspitasari *et al*., 2022).

Attitude refers to the extent to which a person has an evaluation of the advantages or disadvantages of a behavior. This requires considering outcomes over behavior. Conner (2020) defines attitude as a learned disposition to respond consistently based on preferences for certain objects. This study is in line with research that analyzes the relationship between attitudes and adherence to consuming blood supplement tablets among adolescent girls in Bantul Regency with the result that there is a relationship between attitudes and compliance behavior to consume blood booster tablets among adolescent girls. Adolescent girls have a more positive attitude toward consuming blood supplement tablets (Rohani *et al*., 2022).

Adolescents with a high level of knowledge tend to have high attitudes and intentions to consume blood booster tablets and will subsequently behave positively toward consuming blood booster tablets. This is in line with research by Alami et al. (2019) on the factors that affect Iranian adolescent girls' dietary behavior related to iron and vitamin D consumption based on the TPB. The findings of this study demonstrated that behavioral intention to use nutritional supplements was significantly influenced by knowledge.

A child who goes to school or receives education will have broader knowledge. However, those with low education does not mean they have low knowledge too. Increasing knowledge does not only come from formal education but also comes from non-formal education. This is seen from research (Singh *et al*., 2019) which shows that

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health education about anemia among adolescent girls in Delhi, which includes definitions, causes, signs and symptoms, and treatment, increases knowledge and treatment-seeking behavior. Similar to Singh *et al*. (2019), increasing compliance is also related to knowledge and awareness about anemia and its relationship with iron supplementation behavior. Students take part in educational sessions at school regarding dietary sources of iron and the benefits of iron and folic acid supplementation (Aggarwal *et al*., 2020).

According to research (Khani Jeihooni *et al*., 2021) the experimental group significantly improved in knowledge, attitudes, perceived behavioral control, subjective norms, behavioral intents, and nutritional performance after receiving educational intervention. Similarly, a study (Jalambadani *et al*., 2018), showed that following instructions regarding iron supplements, participants' average knowledge, attitudes, perceived behavioral control, subjective norms, and intention categories dramatically rose for the intervention group. Other research shows health education about anemia increases knowledge and practice of iron supplementation in adolescent girls (Farah Yanisah & Widati, 2023).

There needs to be an effort to increase knowledge, attitudes, and practices in consuming blood booster tablets. This can be done through promotional activities. Research (Madestria *et al*., 2021; Singh *et al*., 2019) proves that the development of educational media intake of iron tablets through video along with the modification of iron tablet packaging has a significant influence on the knowledge, attitudes, and intentions of young women in the intake of iron supplementation.

These findings have implications for strategies to increase compliance with consuming blood booster tablets, by utilizing research results to provide education about anemia through increasing knowledge, attitudes, subjective norms, and intentions to consume blood booster tablets.

The use of a cross-sectional design, which prevents cause-and-effect links between observed variables from being demonstrated, is the study's limitation. The generalizability of this study may be constrained by the fact that it only included adolescents between the ages of 16 and 18 (while adolescents between the ages of 12 and 15 additionally required additional blood booster tablets). It is necessary to research adolescent girls' perceptions of vulnerability and potential barriers to compliance with taking blood booster tablets.

CONCLUSION

Behavior related to adherence to consuming blood booster tablets can be predicted using TPB. High subjective intentions and norms directly influence the consumption behavior of blood booster tablets in adolescent girls. Attitudes, subjective norms, and level of knowledge indirectly influence the consumption behavior of blood booster tablets. Therefore, TPB is an integrated theory to understand the consumption behavior of blood booster tablets in adolescent girls to improve adolescent reproductive health in Bantul Regency, Indonesia. It is necessary to strengthen the role of school teachers, community leaders, parents, and peers by providing information about the benefits of blood boosters to motivate teenagers to consume blood booster tablets regularly.

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