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Original Article

Structural model of factors relating to the health promotion behavior of reproductive health among Indonesian adolescents

Siti Nur Kholifah [a], Hilmi Yumni [a], Minarti [a], Tantut Susanto [b,*]

[a] Polytechnic of Health Sciences of Ministry of Health of Surabaya, Surabaya, Indonesia
[b] Department of Family and Community Health Nursing, School of Nursing, University of Jember, Jember, Indonesia

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ABSTRACT

Objectives: We aim to explore the factors related to the health promotion behavior of reproductive health (RH) among Indonesian adolescents via structural equation modeling.
Methods: A cross-sectional quantitative study was used to measure 108 adolescents aged 12–16 years. We employed a self-administered questionnaire developed from the health promotion model (HPM) and the empowerment model (EM) on the basis of self-efficacy to determine the factors related to health promotion in maintaining RH behavior. Structural equation modeling (SEM) was used to examine relationships among the variables. The Analysis of Moment Structures (AMOS) approach was used to evaluate if the proposed model is suitable for the data based on goodness-of-fit indices.
Results: The model is appropriate for the data. Three interrelationships emerge among independent variables ($P > 0.05$), namely, personal and cognitive behaviors ($r = -0.01$), cognitive and health promotion behaviors ($r = 0.09$), and affective and health promotion behaviors ($r = -0.17$). The strongest relationship is between empowerment and health promotion behavior ($r = 0.72$). Affection (interpersonal and situational influences), immediate competing demands and preferences, and empowerment (participation and control) are directly related to RH behavior maintenance. Meanwhile, willingness of adolescents, prior related behavior, personal factor, and commitment to a plan of action are indirectly related to RH behavior maintenance. The model explains 43.9% of the variance in maintaining RH behavior.
Conclusions: The HPM and EM models help determine the factors related to RH behavior maintenance among adolescents. Intervention to promote RH among Indonesian adolescents should begin from the level of child–parent–health care professional encounter for empowering the RH of adolescents.

1. Introduction

According to the national survey conducted in Indonesia, 1% of the female and 8% of the male population have engaged in sexual intercourse outside of marriage [1]. In addition, 5% of adolescents aged 10–24 have engaged in various sexual activities, such as masturbation. The survey also confirms symptoms of premarital sexual activities, including sexual intercourse [2]. The normative standards of Asian countries, particularly the Indonesian Islamic culture and debates on sexual activity and its related factors among adolescents have emerged [3]. The differences of culture, ethnicity, and religious background influence the reproductive health (RH) of adolescents [4]. Currently, adolescents have liberal attitudes toward sexuality due to liberalism and Westernization [5]. Thus, an education program on sexuality to maintain RH behavior is necessary. Susanto (2016) corroborated that an RH program for improving the life skills of adolescents during puberty should be based on their personal characteristics [6]. Meanwhile, health education generally promotes health behavior for adolescents in a school setting [7].

Communications between children and parents regarding RH are uncommon due to limited RH information [8]. Previous studies conducted in Indonesia verified that active RH behaviors were higher in males (56.6%) than in females (43.7%) [3] and that negative attitudes are higher in females (40.6%) than in males (37.1%) [8]. The RH behavior of adolescents is related to several factors: lack of knowledge [9], religiosity [10], personal

* Corresponding author. Department of Family and Community Health Nursing, School of Nursing, University of Jember, Jl. Kalimantan 37, Jember, Jawa Timur, 68121, Indonesia.
E-mail address: tantut_s.psik@unej.ac.id (T. Susanto).
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characteristics [11], parent–child relations [12], and social and cultural factors [13]. A suitable theoretical model that can be employed to explain factors affecting how adolescents maintain their RH behavior is the integration of the health promotion model (HPM) [14] and the empowerment model (EM) [15].

The HBM assumes that human behavior is affected by personal factor, prior-related behavior, cognition, and affection [14]. In addition, the HBM components also indicate the factors that influence adolescent's health-promoting lifestyle [16,17] and adolescent physical activities [18,19]. No research has employed the HBM for identifying factors related to adolescents' RH behavior. Meanwhile, empowerment is a process where individuals, communities, and/or organizations are enabled to allow them to improve their lives [20]. In this study, health promotion could be implemented through individual empowerment to facilitate self-efficacy (SE). The belief and capability of individuals are important for achieving healthy behavior [21]. The EM, which includes participation and control, could be promoted to maintain health behavior [15]. On the basis of previous research, individual community-related empowerment (ICRE), whose levels are measured using the empowerment expansion framework, is applied and regarded to be significantly favorable for self-efficacy, participation, and participation intention and motivation [20]. Meanwhile, SE prevents adolescents from committing negative sexual behavior [22,23].

This study aims (1) to develop the construct validity of adolescent health promotion for RH behavior maintenance using the HPM and EM models and (2) to examine a hypothesized model employing structural equation modeling (SEM) to explore factors related to the health promotion of RH among Indonesian adolescents. Previous research confirms that the components of the HPM [24,25] and SE [26] are essential in promoting adolescents' sexual behavior. The current study also examines the relationship factors.

2. Materials and methods

2.1. Setting and design

This research is a cross-sectional quantitative study and employs SEM to examine the relationships among the variables. In addition, this study was based on a school health survey of junior high school students in Surabaya, East Java, Indonesia.

2.2. Participants

A total of 234 junior high school students from Surabaya participated in this study. We selected a representative junior high school that is near the port harbor of the city. Determining the influence outside a profoundly strong environment is possible in this area. Moreover, according to the data of the regional ministry of health, this area has most prevalent cases of sexually transmitted diseases (STDs). The sample size was measured using the rule of thumb of SEM with maximum likelihood, in which the minimum sample size was 100–150 participants (5–10 times of observed variables) in this study.

This study involved 108 adolescents aged 12–16 years old who were randomly selected. A simple random sampling technique was used to select participants from each class of grades 1 to 2 of junior high schools. Students were allocated via code numbers and randomly selected using random number tables to reach the final sample of 108 eligible participants. The criteria for participants include the following: (1) must be junior high school students, (2) must have obtained consents from their parents (after receiving explanations about the purpose of the study), (3) must be registered in the schools, and (4) must be able to understand and answer the survey questions. Students who were absent in the day of data gathering were excluded from this study. Ethical approval for the study was obtained from the Ethical Committee Review Boards of Polytechnic of Health Science of Surabaya.

2.3. Procedure

Initially, we informed the students and school teachers about the study and interviewed them. A letter containing the information about the study was sent to the parents of the students, asking for their consent for the participation of their children in the study. After the consent was obtained, the data collection plan was designed. Subsequently, the researchers distributed the questionnaire to the participants, and the students returned it to the researchers upon completion. For controlling bias, the researchers, who are nurses, guided the students in filling out the questionnaire.

2.4. Measurement

We used a research questionnaire to collect the data. The questionnaire was developed on the basis of the HPM [14] and the EM [15] for conceptualizing the independent and dependent variables. Meanwhile, for health promotion to maintain RH behavior, we used three topics of health hygiene of genitalia, menstruation, and sexual transmitted diseases from the literature review [3,6,8]. Fig. 1 presents the variables evaluated in this study. All the variables were measured using a 4-point Likert scale (4—always, 3—often, 2—sometimes, 1—never). Thereafter, the results were calculated to create a composite score of each variable (X1 to X7, and Y), with high scores indicating a significantly positive health promotion.

The researchers developed and modified the questionnaire by evaluating its validity and reliability. The validity test was analyzed using content review analysis from the discussion of literature in previous studies [3,6,8]. Subsequently, we conducted the content validity index (CVI) between six community health nurses and four researchers. The CVI items were from 0.80 to 1.0, and the total CVI of the final version was 0.85. Thus, the content validity was adequate [27]. The reliability test was conducted using the internal consistency of Cronbach's alpha (Table 1). Table 2 describes the construct validity using factor analysis.

The questionnaire covered the socio-demographics of the participants, including age, religion, ethnicity, household companion (father, mother, or father and mother), parental income, menstruation, nocturnal emission/wet dreams, and access to RH information. Fig. 1 conceptualizes the HPM. The major constructs of the HPM include the following:

Prior-related behavior (X1). Prior-related behavior refers to direct and indirect factors related to past behavior, which may be engaged in maintaining RH behavior. This behavior was assessed using 10 questions, including dating (5 items) and exposure to pornography (5 items).

Personal factors (X2). Personal factors refers to predictive factors of given behaviors, which are shaped by the nature of maintaining RH behavior. They were assessed using 33 questions, including self-esteem (20 items), motivation (8 items), and consumption of emotional status (5 items). The personal factors also included biological factors that refer to the age of adolescents (12–16 years) and cultural factors that refer to adolescents' ethnicity (Jawa, Madura, and Batak).

Cognitive factors (X3). In this study, the cognitive factors included perceived benefits of action (X3.1), perceived barriers to action (X3.2), perceived self-efficacy (X3.3), and activity-related effect (X3.4), which were assessed using 29 questions. The perceived benefits of action refer to motivating behavior and the motivating behavior to maintain RH that were assessed using 5

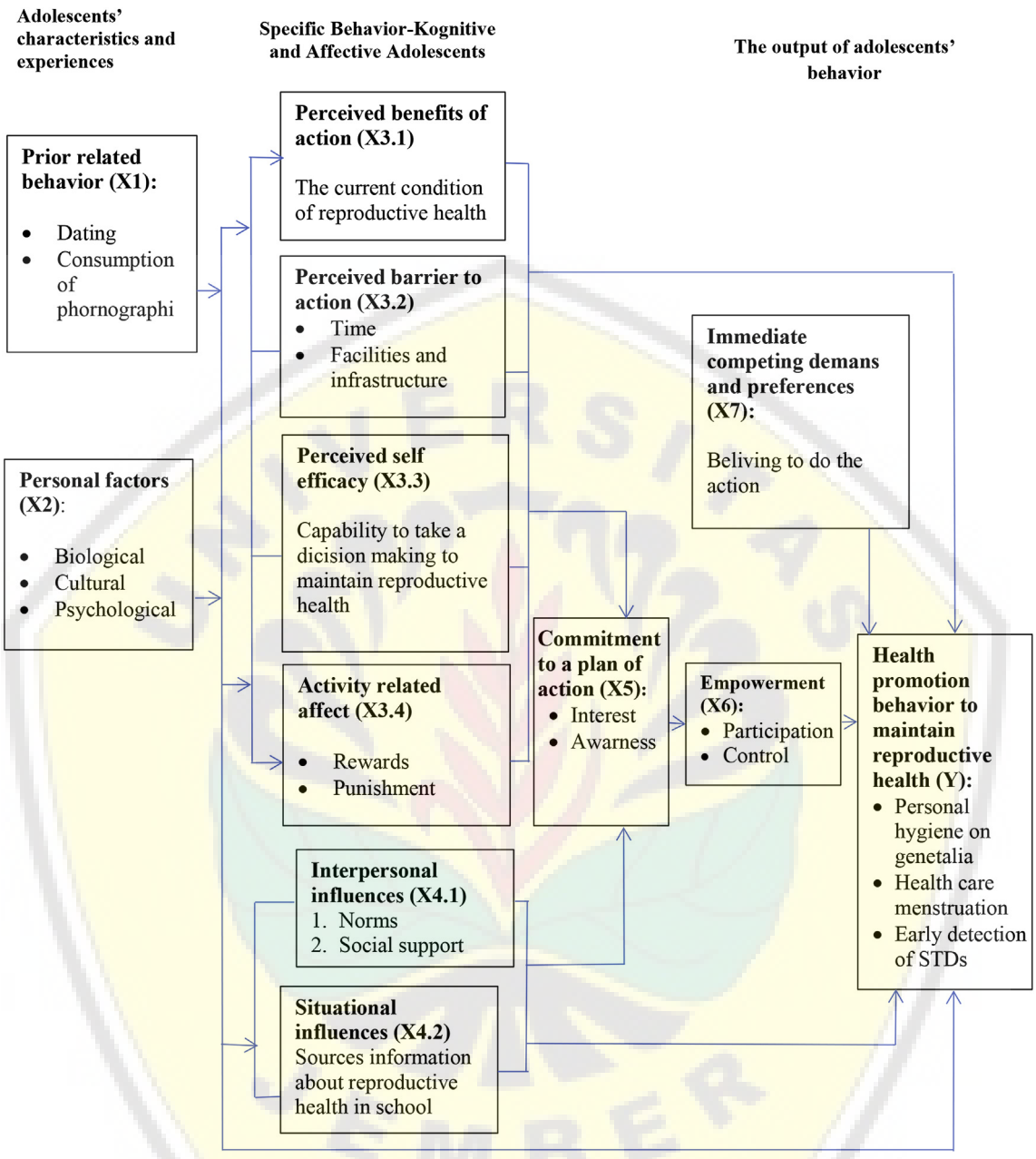


Fig. 1. Conceptual scheme of health promotion to maintain reproductive health among adolescents based on HPM and empowerment self efficacy.

items. The perceived barriers to action refers to perceptions concerning the difficulty or the problems in maintaining RH behavior that were assessed using 5 items. The perceived self-efficacy refers to the capability to organize and execute a particular course of action for maintaining RH behavior that was assessed using 10 items. The activity-related effect refers to subjective feeling to associate the behavior in maintaining RH that was assessed using 9 questions, including reward (5 items) and punishment (4 items).

Affective factors (X4). The affective factors included interpersonal influences (X4.1) and situational influences (X4.2) that were assessed using 14 questions. The interpersonal influences refer to cognitions concerning behaviors, beliefs, or attitudes to maintain RH behavior that were assessed using 10 questions, including social support (7 items) and norms (3 items). The situational influences refer to personal perceptions and cognitions of any situation or context, which can facilitate or impede RH behavior maintenance, that were assessed using 4 items.

Commitment to a plan of action (X5). Commitment to a plan of action refers to commitment and strategies for eliciting, executing, and reinforcing RH behavior maintenance that were assessed using 10 questions, including interest (5 items) and awareness to action (5 items).

Immediate competing demands and preferences (X7). Immediate competing demands and preferences refer to alternative behaviors that intrude into consciousness as possible courses of action immediately prior to the intended occurrence of planned RH behavior maintenance that were assessed using 10 questions.

Health promoting behavior (Y). Health promotion behavior as the outcome in this study refers to the RH behavior maintenance of adolescents that was assessed using 15 questions, including

Table 1
Distribution of variable of health promotion model and empowerment model for adolescent in reproductive health ($n = 108$).

Sub variable model	Variable in this study	Indicators	Item[a]	M ± SD[b]	Cronbach's α[c]
Prior related behavior (X1)					
	Dating		5	16.22 ± 3.41	0.80
	Consumption of pornography		5	18.32 ± 2.39	0.83
Personal factors (X2)					
	Psychological				
		Self esteem	20	55.61 ± 7.47	0.70
		Motivation	8	15.14 ± 3.84	0.62
		Emotion status	5	17.64 ± 2.39	0.65
Cognitive factors (X3)					
	Perceived benefits of action (X3.1)		5	16.18 ± 2.95	0.72
	Perceived barrier to action (X3.2)		5	13.74 ± 3.08	0.81
	Perceived self-efficacy (X3.3)		10	28.31 ± 4.81	0.75
	Activity related affect (X3.4)				0.72
		Rewards	5	15.31 ± 4.42	0.63
		Punishment	4	12.52 ± 2.26	0.73
Affective factor (X4)					
	Interpersonal influences		10		
		Social support	7	14.74 ± 4.08	0.80
		Norms	3	11.22 ± 1.96	0.83
	Situational influences		4	12.34 ± 2.19	0.80
Commitment to a plan of action (X5)					
	Interest		5	16.31 ± 3.42	0.80
	Awarness to action		5	14.81 ± 4.68	0.74
Immediate competing demands and preferences (X7)			10	28.78 ± 6.34	0.60
Health promoting behavior (Y)					
	Personal hygiene on genetalia (Y1)		5	13.31 ± 4.02	0.70
	Health care menstruation (Y2)		5	14.02 ± 4.46	0.74
	Early detection of STDs (Y3)		5	12.67 ± 5.67	0.80
Empowerment based on self-efficacy (X6)					
	Participation		5	12.53 ± 3.55	0.65
	Control		5	13.36 ± 4.99	0.81

[a] Number of items.
[b] Mean ± Standard Deviation.
[c] Internal consistency for reliability test (Cronbach's α).

Table 2
Construct validity of factors based on HPM and empowerment model to maintain reproductive health among adolescent ($n = 108$).

Variable	Indicators	Loading Factors	*t*	*P*
Prior related behavior				
	Dating	0.449	6.942	<0.01
	Consumption of pornography	0.733	10.862	<0.01
Personal factors				
	Biological	0.459	2.335	<0.05
	Cultural	0.402	5.771	<0.01
	Psychological	0.247	2.517	<0.001
Cognitive factors				
	Perceived benefits of action (X3.1)	0.433	5.686	<0.01
	Perceived barrier to action (X3.2)	0.351	3.070	<0.01
	Perceived self-efficacy (X3.3)	0.291	4.570	<0.01
	Activity related affect (X3.4)	0.310	5.717	<0.01
Affective factor (X4)				
	Interpersonal influences	0.640	6.417	<0.001
	Situational factors	0.691	8.148	<0.001
Commitment to a plan of action (X5)				
	Interest	0.617	5.819	<0.01
	Awarness to action	0.605	7.065	<0.01
Empowerment based on self-efficacy (X6)				
	Participation	0.618	19.621	<0.001
	Control	0.499	19.169	<0.001
Immediate competing demands and preferences (X7)		1.000		<0.05
Health promoting behavior (Y)				
	Personal hygiene on genetalia (Y1)	0.391	7.097	<0.01
	Health care menstruation (Y2)	0.509	9.979	<0.01
	Early detection of STDs (Y3)	0.514	9.410	<0.01

personal hygiene on genitalia (5 items), health care during menstruation (5 items), and early detection of sexual transmitted diseases (5 items).

Furthermore, the EM is known as an empowerment variable (X6) (Fig. 1). Adolescent empowerment refers to the ability of adolescents to feel confident in resolving their problems during puberty to maintain RH behavior that was assessed using 10 questions, including participation (5 items) and control (5 items).

2.5. Data analysis

SPSS software package version 22.0 (SPSS, Chicago, IL, USA) was used in the statistical analysis. For calculating the characteristics of the participants, we used descriptive statistics (frequencies, range, mean, and standard deviation) to measure the distribution scores of the HBM and SE components. Moreover, SEM was employed to test the study hypotheses using the Analysis of Moment Structures (AMOS) software (version 22.0). SEM was employed to examine the correlation between the observed variable and the latent variable to formulate the model of health promotion and empowerment of adolescents to maintain RH behavior during puberty. Furthermore, we used $P < 0.05$ for determining the significance of findings.

A two-step approach was used to test the proposed hypothetical model. First, for the development of the construct validity of adolescent health promotion for maintaining RH behavior regarding the HPM and EM, a confirmatory factor analysis or measurement model was examined to assess how the observed measures reflect the latent constructs. Second, for the examination of a hypothesized model, SEM was employed to explore factors relating to the health promotion of RH among Indonesian adolescents, and the hypothesized SEM was tested to examine the relationships among constructs. The analysis aimed to identify the factors that are related to the health promotion of RH among Indonesian adolescents.

3. Results

Out of the 108 participants, 52.8% were aged 14, 78.7% were female, 98.2% were Muslim (Islam religion), 81.5% were Javanese, 89.8% were from families whose incomes were under the minimum regional income, and 57.4% did not have access to RH information. All the participants lived with both their father and mother (nuclear family). Out of the 84 females, 98.8% have had menstruation. Meanwhile, all of the males have experienced wet dreams.

Table 1 indicates the distribution score of the HPM and EM variables to maintain RH behavior among adolescents. The table presents the total item of question, mean, and standard deviation. The reliability test was also performed to examine internal consistency using Cronbach's alpha (Table 1).

Eight latent variables were specified in the measurement model, each of which contained one to four observable variables (Table 2). Variables from the HPM and EM had loadings ranging between 0.29 and 1.00. Factor loadings for all latent constructs were significant ($P < 0.05$, $P < 0.01$, $P < 0.001$).

With regard to the interrelationships among the independent variables, the observed associations were in the expected directions. The latent variables from the measurement model were significantly intercorrelated (Table 3). However, three interrelationships emerged among the independent variables ($P > 0.05$), including personal and cognitive factors ($r = -0.01$), cognitive factors and health promotion behavior ($r = 0.09$), and affective factors and health promotion behavior ($r = -0.17$). The strongest relationship was between empowerment factor and health promotion behavior ($r = 0.72$, $P < 0.001$).

The proposed structural model was conducted with hypothesized latent constructs, predicting its proposed manifesting indicators as follows: (a) all of the HPM factor variables had direct and indirect paths to health promotion behavior to maintain RH and were correlated, and (b) the EM factor had direct and indirect paths to health promotion behavior to maintain RH. Fig. 2 presents the initial SEM model after the three interrelationships among the independent variables ($P > 0.05$) were deleted. All of the variables on this structural model demonstrated relevance to the data. The affection (interpersonal and situational influences), immediate competing demands and preferences, and empowerment (participation and control) were directed to predict RH behavior maintenance. Meanwhile, the willingness of adolescents, prior-related behavior, personal factor, and commitment to a plan of action were indirect in predicting RH behavior maintenance. The final SEM model asserted that the identified predictors explained 43.9% of the variance in health promotion behavior to maintain RH. Fig. 2 demonstrates the breakdown of all indirect and total effects on maintaining RH behavior for each of the latent variables.

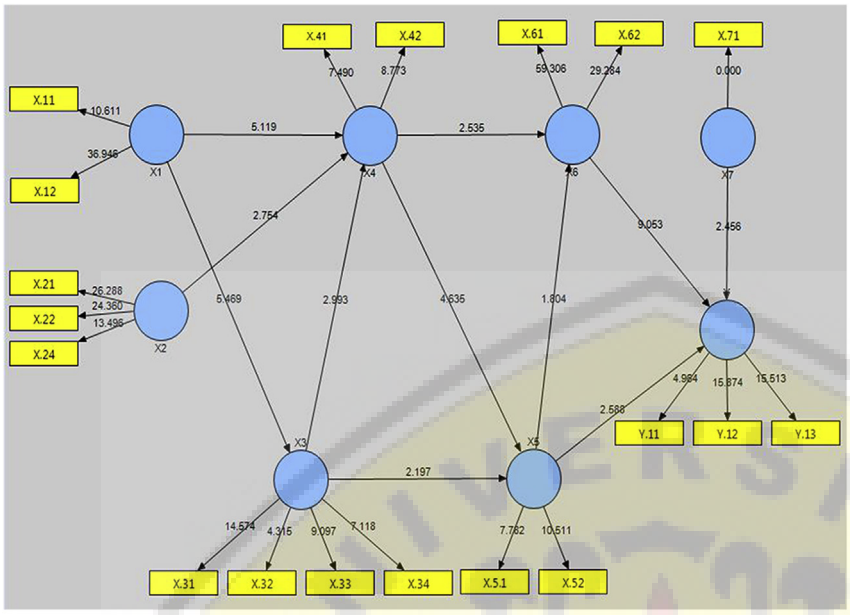
4. Discussion

This study is the first attempt to examine the structural interrelationship of maintaining RH behavior among the constructs in Indonesian adolescents. Significantly direct relationships were found among the affective factor, immediate competing demands and preference factors, the empowerment factor, and RH behavior maintenance. The empowerment factor was the strongest relationship in maintaining RH behavior.

The affective factor influenced the maintenance of RH behavior. These findings confirm that interpersonal and situational contexts are related to RH behavior and correspond with the findings of previous research in which family norms [28] and social and cultural contexts [3] were related to RH behavior among Indonesian adolescents. Parents and peers were interpersonal influences on adolescent development. Family communication was related to the RH of adolescents [29], whereas peers influenced adolescents' life in the environmental context [30]. Furthermore, the situational factor also influenced the maintenance of RH behavior. The adolescent life is continuously changing due to Westernization and globalization, causing adolescents to be liberal in terms of sexual behaviors [31] although discussing about RH in families and schools is prohibited in the Islamic context [4]. The health promotion behavior to maintain the RH program among adolescents should include parents, peers, and school components to enhance affective

Table 3
Model of health promotion based on the correlation between factors to maintain reproductive health among adolescent (n = 108).

Correlation of variable	*r*	*t*	*P*
(X1) Prior related behavior - (X3) Cognitive factors	0.471	3.661	<0.01
(X1) Prior related behavior - (X4) Affective factors	0.645	11.747	<0.01
(X2) Personal factors - (X3) Cognitive factors	−0.008	0.330	>0.05
(X2) Personal factors - (X4) Affective factors	−0.193	2.778	<0.05
(X3) Cognitive factors - (X5) Commitment to a plan of action	0.266	3.450	<0.01
(X4) Affective factors - (X5) Commitment to a plan of action	0.629	1.363	<0.001
(X3) Cognitive factors - (Y) Health promotion behavior	0.085	0.828	>0.05
(X4) Affective factors - (Y) Health promotion behavior	−0.173	1.363	>0.05
(X5) Commitment to a plan of action - (X6) Empowerment	0.201	5.491	<0.01
(X6) Empowerment - (Y) Health promotion behavior	0.720	9.137	<0.001
(X7) Immediate competing demands and preferences – (Y) Health promotion behavior	−0.228	3.463	<0.01



Note:
X.11= Dating
X.12= Consumption of phornography
X.21= Biological factor
X.22= Psychological factor
X.24= Cultural factors
X.31= Perceived benefit of action
X.32= Perceived barrier to action
X.33= Perceived self-efficacy
X.34= Activity related affect
X.41= Interpesonal influence
X.42= Situational ifluence
X.51= Commitment to a plan of action (Interest)
X.52= Commitment to a plan of action (Awarness to action)
X.61= Empowerment (Participation)
X.62= Empowerment (Control)
X.71= Immediate competing demands and preferences
Y.11= Health promotion behavior (Personal hygiene on genetalia)
Y.12= Health promotion behavior (Health care menstruation)
Y.13= Health promotion behavior (Early detection of STDs)

Fig. 2. Model health promotion to maintain reproductive health among adolescents.

factors in the social, cultural, and religious context of Indonesia.

The immediate competing demands and preferences are related to the maintenance of RH behavior. These findings are consistent with the previous study indicating that adolescents need competencies to improve reproductive health [3]. This finding may elucidate that adolescents can access RH information easily; however, the standard of competencies based on the RH knowledge is not implemented in family and school environments. The RH knowledge includes prevention factors to reduce negative attitudes toward RH [8]. Nevertheless, the program promotion based on schools in Indonesia was focused on healthy lifestyle [7], and community-based programs to improve the life skill of RH are limited [6]in the cultural context of Indonesia. Thus, the RH behavior program must be designed on the basis of the characteristics of these adolescents, particularly to improve their life skills during puberty.

We identified that empowerment is related to the maintenance of RH behavior as the strength of this study. These findings verify that the participation and control of adolescent factors were correlated with RH behavior. Hence, adolescents should be involved in the health programs to achieve positive youth development. Previous research asserted that community participation improved healthy living [32] and that comprehensive sexual education can improve adolescents' RH [33]. The comprehensive sex education program involves adolescents, families, and the community. The parents' control of RH was related to RH behavior among adolescents [34]. Therefore, for the empowerment of adolescents, the health promotion program design should involve parents, schools, and the community in the Indonesian context.

Several limitations should be considered for understanding the results of this study. First, this study is based on a cross-sectional sample, and longitudinal studies are important to understand the direction of causality. Second, this study is based on the personal reports of adolescents related to their RH behavior. The students were aware that their participation and responses were anonymous; however, self-reporting may not generate accurate behavior and other variables, given that RH is a sensitive issue in the Indonesian context, particularly related to social, cultural, and religious aspects. Furthermore, future research should validate the measures, especially that the study that only involved participants from one region restricts the generalizability of the findings. Therefore, future studies should involve students from other areas or provinces and other ethnic backgrounds to confirm the findings and gain a highly comprehensive understanding of the relationship between the factors and behavior.

5. Conclusion

The findings of this study confirm that multiple factors are related to adolescents in maintaining RH behavior. Affective factors (personal and situational) affect the maintenance of RH behavior. Meanwhile, immediate competing demands and preferences (adolescents' competencies based on RH knowledge) influence the maintenance of RH behavior. Furthermore, empowerment (participation and control) plays an important role in maintaining RH behavior among adolescents. In addition, efforts for enhancing the empowerment of adolescents, which involve families, schools, and the community, are effective strategies for successfully promoting behavior to maintain RH programs. RH behavior promotion programs should also include components focusing on the parents of adolescents. Encouraging parents to participate and control the RH behavior of adolescents based on social and cultural contexts is important. Finally, to improve health promotion programs in maintaining RH behavior among adolescents, families, schools, and the entire community should work together in creating a healthy environment for adolescents through the empowerment of programs to achieve positive youth development.

Conflicts of interests statement

The author(s) declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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