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# TEENAGE PREGNANCY PREDICTION INDEX DURING THE ONLINE LEARNING PERIOD OF THE COVID-19 PANDEMIC

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**ABSTRACT**

**Introduction**: The impact of the pandemic on adolescents' lives showed that 55.1% stress and 40% anxiety due to online learning along with an increase in teenage pregnancy. **Aims:** To determine the predictive index of risk variables for teen pregnancy throughout the COVID-19 pandemic's online learning period. **Methods**: This type of research is analytic observational utilizing a case-control design. Using simple random sampling, the case sample was 40 pregnant adolescents and 80 non-pregnant controls for the Indonesian Regency of Ngawi from July 2021 until January 2022. Once each variable was significant, multivariable logistic regression analysis was performed ($p < 0.05$) as predictors of teenage pregnancy. **Results**: The findings revealed that the variables as indicators of the risk of teenage pregnancy were courtship behavior, access to reproductive health media, and parenting. The predictive index of teen pregnancy risk factors was (-7.248 + 3.833 x low risk dating + 7.726 x severe risk dating + 2.773 x access 1 media + 2.773 x access 2/more media + 3.871 x authoritarian and permissive parenting). The high probability of teenage pregnancy with an opportunity value above 0.5 is in adolescents with dating behavior or parenting patterns that show the highest risk, namely high-risk dating behavior or adolescents with authoritarian and permissive parenting patterns. **Conclusion**: It is hoped that this index can be considered and used as a measuring tool in assisting in reproductive health programs, in screening adolescents so that it can be known early on that adolescents have an increased risk of pregnancy.

**Keywords:** Teenage pregnancy; COVID-19 pandemic; child marriage; courtship behavior; access & reproductive healthcare

## INTRODUCTION

In Indonesia, maternal mortality in 2019 was 4221 deaths, there was an increase in 2020 by 4627 deaths. The cause of maternal death due to bleeding was 1330 cases, pregnancy hypertension was 1110 cases, and blood system disorders were 230 cases (The Indonesian Ministry of Health, 2021). Teenage pregnancy raises maternal mortality because teenagers are not psychologically or physiologically prepared to get pregnant and give birth. Globally, maternal deaths between the ages of 15 and 49 in low- and middle-income countries are 99% attributable to complications during pregnancy and childbirth, which are the leading cause of death for girls between the ages of 15 and 19 (WHO, 2020). Indonesia's province of East Java is one that has not yet reached the national Age Specific Fertility Rate (ASFR) target (National Population and

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Family Planning Agency of East Java Province, 2020).

One of the regencies in East Java, Indonesia, Ngawi Regency, has a decrease of under 20 years in the age at first marriage. Namely, in 2017, it was 526 out of 5536 marriages (8.56%). In 2018 it was 190 out of 3136 marriages (6.06%), increased again in 2019 to 506 from 6148 marriages (9.14%). Meanwhile, based on the Ngawi Regency Religious Court, there were 65 submissions during the 2019 period, an increase in 2020 to 199 marriage dispensation applications; a marriage dispensation, which is a legal accommodation, may be given to those who do not meet the legal requirements for a legal marriage, which is that the bride and groom must both be at least 19 years old (206% increase) (The Statistical Center of Ngawi District, 2019; Liputan 6, 2021). In Ngawi Regency, East Java, Indonesia, the rise in this number contributes to an increase in the risk of teenage pregnancies.

Currently, Indonesia is in a phase of adapting to new habits; the education system is meant to deal with the COVID-19 age characterized by technology-based or online learning (Bender, 2020; Seage and Türegün, 2020). According to reports, the number of early marriages surged during the pandemic as a result of stressed teenagers who were under pressure from online schooling (Nizmadilla *et al.*, 2020). This is consistent with studies conducted in Brazil, Ethiopia, Nigeria, and Kenya that indicate a rise in child marriage instances during the epidemic, which had the impact of increasing cases of teenage pregnancy (Yukich, 2021; Zulaika, 2022).

According to research on how the pandemic affected teenage life, 55.1% of them reported stress and 40% anxiety. The pandemic puts them at risk of developing internet addiction, cybersexual addiction, cyber-relational compulsions, information overload, computer addiction, increased masturbation activity, accessing pornography, sexting, communicating on a website or phone, and talking on the phone or video chatting with their partner. These activities lead to an increase in teenage pregnancy. (Levani, Hakam and Utama, 2020; Li *et al.*, 2020; Lindberg, Bell and Kantor, 2020; Nelson *et al.*, 2020; Suryani, Sriati and Septiani, 2020; Fauziyyah, Awinda and Besral, 2021). The primary learning process policy on implementing Community Activity Restrictions (PPKM) in Ngawi Regency, Indonesia is by implementing teaching and learning activities at schools, colleges, academies, and online education/training places from July 2021 to January 2022 (Regent of Ngawi Regency, 2021a, 2021b). So with this online teaching and learning activity policy, teenagers in Ngawi Regency, Indonesia also have the potential to experience the same impact as previous studies.

Social determinants of teenage pregnancy are divided into three factors: household and individual socioeconomic elements, community-level socioeconomic factors, factors affecting social circumstances and individual behavior (Poudel *et al.*, 2018). Many factors influence the occurrence of pregnant teenager. Research conducted in Africa explain the causes of adolescent pregnancy, including education, income, place of residence, peer influence, family support, and parenting (Vincent and Alemu, 2016; Kassa *et al.*, 2018). Studies conducted in Nepal have found a link between adolescent pregnancy and media exposure and smoking behavior (Poudel *et al.*, 2018). While studies in several regions in Indonesia and in Bali explain that knowledge, income, and peer influence pregnancy in teenagers (Meriyani, Kurniati and Januraga, 2016). Meanwhile, a study in Malang explained the risk of teenage pregnancy, namely education, knowledge, age of marriage, and family history of teenage pregnancy (Setyaningsih and Sutiyarsih, 2020). Studies in Yogyakarta explain that income and religiosity are proven to be related to teenage pregnancy (Magdalena and Notobroto, 2016). Culture

is related to pregnancy in adolescents in Palangkaraya City (Lestari, Paramita and Bella, 2019). Also, a study in Pekanbaru explains that courtship behavior is related to the occurrence of teenage pregnancy (Qomariah, 2020).

Early marriage is more prevalent now, which has an effect on teenage pregnancies during the online learning period of the COVID-19 pandemic as an indirect impact because of youngsters who are under pressure from online learning (Nizmadilla *et al.*, 2020). It is necessary to pay attention to providing data related to factors that affect teenage pregnancy during the online learning period.

It is necessary to develop an index to measure the risk of teenage pregnancy. This study is about an index that assesses the prediction of the possibility of teenage pregnancy during the COVID-19 pandemic online education period. Predictors of teenage pregnancy are an effort to plan and evaluate adolescent health programs. The results of evidence-based research contribute to the optimization of reproductive health programs as an effort to prevent teenage pregnancy. Research plays a role in achieving the third SDGs 2030 goal, namely reducing maternal and infant mortality and smoking cessation, and the fifth SDGs goal, namely gender equality (The Ministry of National Development Planning of The Republic of Indonesia, 2020; SDGs Center Universitas Airlangga, 2021). This research set out to analyze the predictive index of pregnancy in teen's risk factors during the online learning period of the COVID-19 pandemic.

## METHODS

### Research design

Analytical observational case-control research is the f study being conducted. Considering that the case of teenage pregnancy is limited, selecting the most appropriate case-control design is complicated.

### Setting and samples

This research was conducted in Ngawi Regency, Indonesian Province of East Java. Ngawi Regency is situated next to Central Java Province in the western portion of East Java Province. The area of Ngawi Regency is mountainous and forest, so it has pretty unique characteristics. The cases in this research were teenagers between the ages of 15 and 19 who were pregnant, and teenagers in the Ngawi Regency region between the ages of 15 and 19 who were not pregnant between July 2021 and January 2022 made up the control group. The sample size is based on the odds ratio of previous studies, with < 0.05 and 80% power of the test, obtained a minimum sample size of 40 cases, 40 cases and 80 controls were chosen using a 1: 2 ratio. The following is the sample size formula.

$$n = \frac{\left(z_{1-\alpha/2}\sqrt{2p_2(1-p_2)} + z_{1-\beta}\sqrt{p_1(1-p_1)+p_2(1-p_2)}\right)^2}{(p_1-p_2)^2}$$

Simple random sampling is the sampling method employed. Teenagers who became pregnant for the first time and attended school in the Ngawi Regency between July 2021 and January 2022 met the inclusion criteria for the case group. Teenagers who became pregnant after being subjected to sexual abuse and those who had been married for more than a year were excluded from the study. In comparison, the inclusion criteria in the control group were teenagers in schools between July 2021 and January 2022 in the Ngawi Regency. The exclusion requirements were teenagers who had been married for more than one year. Primary data collection was with questionnaires. The dependent variable is teenage pregnancy. Age, educational attainment, parental wealth, the history of adolescent pregnancies in the family, parenting styles, cultural norms, access to media on reproductive health, dating habits, smoking status, urine cotinine levels, and the use of reproductive health services are independent variables.

### Measurement and data collection

This study employed a questionnaire to collect data adopted from the Indonesia Demographic and Health Survey (IDHS) 2017 questionnaire for the variables of reproductive health media access, use of reproductive health services, dating habits, and cigarette smoking (National Population and Family Planning Agency, 2018). Variable history of teenage pregnancy in family, culture, and parenting was obtained using a questionnaire from previous studies. The Cronbach's alpha value for each variable in this questionnaire is an average of 0.74, while Pearson's correlation coefficient ranges from 0.4 to 0.8 (Aryati, Suwarni and Ridha, 2019; Krisylva, Joewono and Maramis, 2019; Setyaningsih and Sutiyarsih, 2020).

The research has met the licensing requirements of the National and Political Unitary Bodies of East Java, Ngawi Regency, Indonesia, and the Ngawi District Health Office. Respondents who agreed to be research subjects filled out the informed consent. For respondents aged 15 – 17 years who are not married, then obtained informed consent with parental consent. Next a structured interview with a questionnaire was conducted, to collect primary data. The teenage pregnancy data used secondary data from the maternal register at the Public Health Centers for July 2021 to January 2022 (online learning period) and was confirmed by structured interviews. In the examination of urine samples, unmarried adolescents (under 18 years of age) carried out informed consent or parental consent, except those already married. A urine cotinine examination was carried out after obtaining permission from the Public Health Centers and the Ngawi District Health Office.

### Data analysis

Bivariable analysis was used to determine the variables that qualify as candidates for the index model by using a simple regression test. Suppose the significant value of $p < 0.25$, the variable is declared eligible to be a candidate and can be continued with the multivariable analysis test. The multivariable analysis is used to simultaneously analyze the relationship of more than one independent variable to the dependent variable to see which independent variable has the most influence on the dependent variable. The test used is logistic regression. This test aims to eliminate variables that are not significant until the final model is obtained. Multivariable analysis was completed utilizing the logistic regression method to determine the multivariate related variables. All candidate variables were analyzed simultaneously in the analysis process. The variables with a p-value greater than 0.05 were removed gradually until no more $p > 0.05$ were found. The independent variable p-value less than 0.05 after logistic regression analysis was stated to be related to the dependent variable. All significant variables ($p < 0.05$) on the incidence of teenage pregnancy were included in the predictive index formula. Then an assessment of the interaction between the independent variables included in the predictive index formula on the incidence of teenage pregnancy was carried out.

### Ethical considerations

The research has cleared the ethics review by the ethics committee of the Faculty of Public Health at Airlangga University, with a certificate of ethical decency No. 141/EA/KEPK/2022. The researcher provides an explanation of essential information for prospective research respondents by the 2016 WHO-CIOMS guidelines.

## RESULT

Table 1 shows that pregnant adolescents are mainly in the late adolescent category (17-19 years) (67.5%), high school education (72.5%), parental

earnings are below the local minimum wage (80.0%), there is no history of teenage pregnancy in the family (75.0%), authoritarian and permissive parenting (55.0%), the culture of living together (92.5%), access to at least one reproductive health media (62.5%), dating behavior with severe risk (65.0%), never smoking (87.5%), urine cotinine negative (97.5%), and not using reproductive health services (95.0%).

**Table 1**. Factors that influence teenage pregnancy

| Variable | Teenage Pregnancy | | OR (95%CI) | p-value |
|---|---|---|---|---|
| | Pregnant f (%) | Non-pregnant f (%) | | |
| **Age** | | | | |
| Early adolescent (15 – 16 years) | 13 (32.5) | 45 (56.2) | 0.37 (0.16 – 0.83) | 0.01* |
| Late adolescent (17 – 19 years) | 27 (67.5) | 35 (43.8) | ref | |
| **Education** | | | | |
| Junior School | 11 (27.5) | 17 (21.2) | 1.40 (0.58 – 3.37) | 0.44 |
| High School | 29 (72.5) | 63 (78.8) | ref | |
| **Parent's income** | | | | |
| < Area-Specific Minimum Wage | 32 (80.0) | 40 (50.0) | 4.00 (1.64 – 9.74) | 0.00* |
| ≥ Area-Specific Minimum Wage | 8 (20.0) | 40 (50.0) | ref | |
| **Family history of teenage pregnancy** | | | | |
| Yes | 10 (25.0) | 9 (11.2) | 2.63 (0.97 – 7.12) | 0.05* |
| None | 30 (75.0) | 71 (88.8) | ref | |
| **Parenting** | | | | |
| Authoritarian and permissive | 22 (55.0) | 7 (8.8) | 12.74 (4.71 – 34.46) | 0.00* |
| Democratic | 18 (45.0) | 73 (91.2) | ref | |
| **Culture** | | | | |
| Living together | 37 (92.5) | 1 (1.2) | 974.33 (98.02 – 9685.24) | 0.00* |
| Traditional values | 3 (7.5) | 79 (98.8) | ref | |
| **Access to reproductive health media** | | | | |
| No access | 5 (12.5) | 5 (6.2) | 5.80 (1.41 – 23.74) | 0.00* |
| Access to 1 media | 25 (62.5) | 17 (21.2) | 8.52 (3.43 – 21.21) | |
| Access to 2 or more media | 10 (25.0) | 58 (72.5) | ref | |
| **Courtship behavior** | | | | |
| Serious risk | 26 (65.0) | 2 (2.5) | 507.00 (43.69 – 5882.41) | 0.00* |
| Mild risk | 13 (32.5) | 39 (48.8) | 13.00 (1.62 – 104.24) | 0.01* |
| No risk | 1 (2.5) | 39 (48.8) | ref | 0.00* |
| **Smoking status** | | | | |
| Now smoking | 1 (2.5) | 0 (0.0) | 3.60 (0.00 - .) | 1.00 |
| Not a smoker | 4 (10.0) | 2 (2.5) | 4.45 (0.78 – 25.48) | 0.09* |
| Avoid smoking | 35 (87.5) | 78 (97.5) | ref | 0.24* |
| **Cotinine urine** | | | | |
| Positive | 1 (2.5) | 0 (0.0) | 3.31 (0.00 - .) | 1.00 |
| Negative | 39 (97.5) | 80 (100.0) | ref | |
| **Utilization of reproductive** | | | | |

| Variable | Teenage Pregnancy | | OR (95%CI) | p-value |
|---|---|---|---|---|
| | Pregnant f (%) | Non-pregnant f (%) | | |
| **health services** | | | | |
| Not utilizing | 38 (95.0) | 76 (95.0) | 1.00 (0.17 – 5.70) | 1.00 |
| Utilizing | 2 (5.0) | 4 (5.0) | ref | |

*Note:* cross-tabulation, OR, and p-value using simple regression test, *p < 0.25 fulfills as a candidate predictor.

**Table 2.** Logistic Regression of Teenage Pregnancy Risk

| Variable | Coefficient (B) | OR | 95% CI | |
|---|---|---|---|---|
| | | | *Lower* | *Upper* |
| **Courtship behavior** | | | | |
| No risk | | ref | | |
| Mild risk | 3.833 | 46.22 | 2.78 | 769.81 |
| Serious risk | 7.726 | 2265.64 | 66.61 | 77064.31 |
| **Access to reproductive health media** | | | | |
| Access to 2 or more media | | ref | | |
| Access to 1 media | 2.773 | 16.00 | 2.66 | 96.21 |
| No access | 2.773 | 16.01 | 1.09 | 234.76 |
| **Parenting** | | | | |
| Democratic | | ref | | |
| Authoritarian and permissive | 3.871 | 47.97 | 6.03 | 381.42 |
| Constants | -7.248 | .001 | | |

**Table 3.** Prediction Index of Teenage Pregnancy Risk in Ngawi Regency, East Java

| Courtship behavior | Access to Reproductive Health Media | Parenting | Opportunities Teenage Pregnancy |
|---|---|---|---|
| Severe risk | No access | Authoritarian & permissive | 0.999 |
| Severe risk | Access 1 media | Authoritarian & permissive | 0.999 |
| Severe risk | Access 2/more media | Authoritarian & permissive | 0.988 |
| Severe risk | No access | Democratic | 0.963 |
| Severe risk | Access 1 media | Democratic | 0.963 |
| Low risk | Access 1 media | Authoritarian & permissive | 0.962 |
| Low risk | No access | Authoritarian & permissive | 0.962 |
| Severe risk | Access 2/more media | Democratic | 0.617 |
| Low risk | Access 2/more media | Authoritarian & permissive | 0.612 |
| No risk | Access 2/more media | Democratic | 0.416 |
| No risk | Access 1 media | Authoritarian & permissive | 0.353 |
| No risk | No access | Authoritarian & permissive | 0.353 |
| Low risk | No access | Democratic | 0.345 |
| Low risk | Access 1 media | Democratic | 0.345 |
| No risk | Access 2/more media | Authoritarian & permissive | 0.033 |

| Courtship behavior | Access to Reproductive Health Media | Parenting | Opportunities Teenage Pregnancy |
|---|---|---|---|
| Low risk | Access 2/more media | Democratic | 0.032 |
| No risk | No access | Democratic | 0.011 |
| No risk | Access 1 media | Democratic | 0.011 |

The results of a simple logistic regression test on 11 independent variables with a p-value < 0.25 show these variables are candidates that can be entered for further analysis with multiple logistic regression analyses. The multiple logistic regression test variables included age, parental income, parental involvement, parenting, cultural norms, access to media on reproductive health, courting practices, and smoking habits. Simultaneous testing using multiple logistic regression tests by including eight candidate variables that meet the requirements aims to determine what variables are included in the predictive index of the risk of teenage pregnancy.

Table 2 shows three significant variables and indicators of teenage pregnancy risk: dating behavior, access to reproductive health media, and parenting patterns. The predictive index of teenage pregnancy risk factors was factors was (-7.248 + 3.833 x low risk dating + 7.726 x severe risk dating + 2.773 x access 1 media + 2.773 x access 2/more media + 3.871 x authoritarian and permissive parenting). The adolescent pregnancy risk prediction model is used to predict the risk of teenage pregnancy.

Table 3 displays the high probability of teenage pregnancy with a probability value above 0.5 if the adolescent has high behavior dating or parenting, one of which shows a high risk, namely adolescents with high-risk dating behavior or adolescents with authoritarian and permissive parenting patterns.

## DISCUSSION

Adolescence is a transitional period. Physical changes occur rapidly and are not balanced with psychological changes. The COVID-19 pandemic has resulted in social restrictions implemented by the Government (The Indonesian Ministry of Health, 2020). This causes COVID-19 stress which is associated with sexual-compulsive symptoms in adolescents (Jianjun *et al.*, 2020). This research attempts to analyze the predictive index of teenage pregnancy during the time spent learning online in the COVID-19 pandemic. Three significant and predictive indicators of the risk of pregnancy in adolescents are courtship behavior, access to reproductive health media, and parenting patterns.

Courtship behavior is a predictor of teenage pregnancy. In this study, teenage pregnancies are more common in adolescents with high-risk dating behavior (kissing, hugging, sex) compared to those with no risk (not dating). Teenagers who have high curiosity without being based on long-term thoughts can have an impact on irresponsible behavior, such as courtship behavior that leads to premarital sexual relations causing unwanted pregnancies. These findings are consistent with research showing that mild to extremely dangerous courting activities, such as cuddling and kissing are common during dating, where teenage pregnancy is still caused by dangerous dating activities including hugging and kissing, which are premarital sexual practices (National Population and Family Planning Agency, 2018; Purnamawati and Aritonang, 2020; Ahinkorah *et al.*, 2021).

Findings from this research show access to reproductive health media as a predictor of teenage pregnancy. Adolescents who do not access reproductive health media show a higher

risk of teenage pregnancy than adolescents with access to two or more reproductive health media. These results align with research in Indonesia on adolescents under the age of 19, which stated that the lower the access to media, the greater the chance of pregnancy in adolescence. Teenagers' lack of knowledge about safe sexual conduct and the prevention of unintended pregnancy is a result of their limited access to informational media (Chotimah *et al.*, 2020; Ahinkorah *et al.*, 2021). Teenagers who have access to the news about public health concerns are shielded against teenage pregnancy, according to research conducted in Nepal. Teenagers with access to mass media are more likely to learn about crucial public health issues including family planning and the dangers of teen pregnancy and delivery (Poudel *et al.*, 2018; Kiani, Ghazanfarpour and Saeidi, 2019). This is in accordance with a research demonstrating that technology is beneficial in raising awareness of sexual health, positive attitudes about safe sex, and safer sex norms to reduce unintended pregnancies among adolescents (Widman *et al.*, 2018; Worku *et al.*, 2021). It is also in line with a study on Albanian adolescents that social media impacts increasing information (Tartari, 2015).

The study's findings are consistent with other studies showing that teenagers with democratic parenting are less likely than those with authoritarian and permissive parenting to become pregnant before marriage. With strong parental control, authoritarian parenting creates perfect children, which causes children to react by looking for independence elsewhere (Krisylva, Joewono and Maramis, 2019; Díaz-Sánchez, Lanchimba and Obaco, 2021). Authoritarian parenting tends to increase adolescent premarital sexual behavior, with parental authority in providing rules for children, including regarding premarital sexual behavior and considers it taboo to talk about sex. Adolescents are individuals with a high level of curiosity, the more prohibited, the more likely they will do this. This drives teenagers' desire to try to have premarital sex for curiosity (Chung, Kim and Lee, 2018; Kartika and Budisetyani, 2018). However, it differs from other studies that explain a reduction in hazardous sexual activity and the prevalence of adolescent pregnancy is highly connected with authoritarian and protective parents (Hoskins, 2014; Lawall, Tram and Kumar, 2022). Permissive parenting is closely related to premarital sexual behavior. Teenagers with less attention from their parents will be freer to do negative things that can harm themselves, including premarital sexual behavior. Adolescents with permissive parents are vulnerable to premarital sexual behavior because parents do not supervise their children's activities, so children feel free to do whatever they want to know (Novanti, Anasari and Khosidah, 2013; Smith, 2018). Democratic parenting is described as a parenting style that balances parental control with child independence to educate children. The study's findings indicate that children who have had a high level of democratic parenting have a lower rate of teenage pregnancies (Rodríguez-Gutiérrez, Martín-Quintana and Cruz-Sosa, 2016; Kartika and Budisetyani, 2018; Hart, Coates and Smith-Bynum, 2019). A high chance of teenage pregnancy with a probability value above 0.5 is if a teenager with one of the factors of dating behavior or parenting shows a high risk, namely adolescents with high-risk dating behavior (hugging, kissing, sex) or adolescents with authoritarian parenting and permissive.

## Implication and limitations

This research has implications for reproductive health program policies to reduce the risk of increasing cases of teenage pregnancy, impacting maternal mortality. It is hoped that this index can be considered and used as a measuring tool in helping nurses who hold reproductive health programs, especially in health centers, in screening adolescents so that it

can be known early on that adolescents have an greater likelihood of pregnancy. In this study, which was conducted online during the COVID-19 epidemic, the determinants of teen pregnancy are examined in Ngawi Regency, East Java, Indonesia, for the period from July 2021 to January 2022 with a case-control design. This has the potential to occur recall bias and information bias.

## CONCLUSIONS

The conclusion of this study is that of the eight variables age, parental income, parenting, culture, access to information about reproductive health, dating behavior, and smoking status are all factors that might affect adolescent pregnancy (p 0.25). Courtship behavior, access to reproductive health media, and parenting are predictor variables that affect the occurrence of adolescent pregnancy throughout the online learning phase of the COVID-19 pandemic.

From the findings of the study it is hoped that this index can be considered and used as a measuring tool in helping nurses holding adolescent reproductive health programs, especially in Public Health Centers, in screening adolescents so that it can be seen early on that adolescents have an increased risk of pregnancy in their teens. It is hoped that an evaluation of reproductive health programs on IEC indicators (Education Information Communication) by adding predictors and expanding targets not only for adolescents but also involving education for parents in improving parenting skills, access to reproductive health media, and education on proper healthy dating behavior.

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## Conflict of interest

Regarding this study's financing or methodology, there are no conflicts of interest for any of the authors.

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