ORIGINAL RESEARCH

The Predictive Model of the Fertility Pattern of Young Women (15-24 Years Old) In South Sulawesi, Indonesia

Bs. Titi Haerana[a], Lilis Widiastuty[a], Yudi Adnan[a], Ranti Ekasari[a], Rimawati Aulia Insani Sadarang[a], Dian Rezki Wijaya[a], Wisnu Fadila[b], Syahrul Basri[a*]

Abstract

Teenagers that have given birth have a high chance of a total fertility rate and prevalence. The study aimed to analyze the contribution of demographic and socio-economic factors, access to information, sexual activity, and literacy on family planning on the fertility pattern of young women (15-24 years old). This research uses 2017 data from the Indonesian Demography and Health

Bs. Titi Haerana,
Universitas Islam Negeri Alauddin, Makassar, Indonesia

Lilis Widiastuty
Universitas Islam Negeri Alauddin, Makassar, Indonesia

Yudi Adnan
Universitas Islam Negeri Alauddin, Makassar, Indonesia

Ranti Ekasari
Universitas Islam Negeri Alauddin, Makassar, Indonesia

Rimawati Aulia Insani Sadarang
Universitas Islam Negeri Alauddin, Makassar, Indonesia

Dian Rezki Wijaya
Universitas Islam Negeri Alauddin, Makassar, Indonesia

Wisnu Fadila
Badan Koordinasi Keluarga Berencana Nasional, Indonesia

Syahrul Basri
Universitas Islam Negeri Alauddin, Makassar, Indonesia
Email: syahrul.basri@uin.alauddin.ac.id

Survey (IDHS). Data analysis performed multiple logistic regression with a predictive model. The predictors of young female fertility (15-24 years old) were marital status (aOR: 373.9, 95%CI 112.7-1239.8), age of 19-21 years old (aOR: 7.74, 95%CI 2.19-27.32), age of 22-24 years old (aOR: 4.79, 95%CI 1.61-14.32), a low education level (aOR: 2.53, 95%CI 0.94-6.82), unemployed (aOR: 2.73, 95%CI 1.14-6.55) or working in agriculture (aOR: 1.16, 95%CI 0.19-6.87), and low (aOR: 1.79, 95%CI 0.73-4.41) or medium (aOR: 1.58, 95%CI 0.42-5.87) wealth index, based on SKDI's 2017 data. There needs to be an improvement in the education access to increase job opportunities and improve the socio-economic conditions of the community. This improvement will have positive impacts in preventing adolescent marriage and decreasing the fertility rate of young women
Keywords: Predictive, fertility, young women, South Sulawesi

1. Introduction

Indonesia is the fourth most populous country in the world after China, India, and the United States. It is due to the high fertility rate of its population. A report from DHS shows that Indonesia's TFR (Total Fertility Rate) is 2.42 children per woman (BKBBN, 2018). Adolescent fertility highly contributes to TFR. Teenagers that have given birth have a higher chance of a TFR of four children per woman or higher (United Nations, 2013). Based on 2017 data from IDHS, the prevalence of sexual activity in teenagers is 49 per 1000 and the percentage of adolescent fertility of all teenagers (aged 15-19 years old) is 7%. Adolescent fertility has become a concern because, in the SDGs indicator, one of the requirements to manifest the indicator is decreasing the mother and newborn mortality rate in 2030 (Bappenas, 2017).

South Sulawesi government found that women spent 61% of their reproductive period during the marriage, which will expose them to pregnancy (BKBBN, 2018). These numbers are related to the contribution of adolescent fertility that affects the reproductive period. Some people in South Sulawesi still argue that teenage marriage is a part of the tradition. Teenage marriage is still prevailing due to its normalcy in the community, which regards it as a tradition that is difficult to end. Teenage marriage is an acceptable social act or behavior.

Adolescent fertility is an important issue from biological, psychological, social, and demographical standpoints. Adolescent fertility causes health problems such as low birth weight, premature birth, lesser frequency of exclusive breastfeeding, and childbirth complications (Cinar & Menekse, 2017).

There are various key factors that some argued are related to adolescent fertility, such as marital status, age (Ndahindwa et al., 2014; Raharja, 2014), education (Impicciatore & Tomatis, 2020; Jalovaara et al., 2019), profession (Malinda, 2012; M. Rahman & Kabir, 2014), wealth index (Malakar & Roy, 2017; Pan & Yang, 2020), residence (Maharani, Ramadhanty, Putra, Pratama, & Yuhan, 2020; Sahara, Idris, & Putri, 2019),age of first marriage (Christabel, 2019; Khattak, 2017), age of first sexual intercourse (Luo et al., 2020), access to mass media (Ajala, 2014), health insurance (Yuniarti & Setiowati, 2015), family planning messages/information (Agyemang, Newton, Nkrumah, Tsoka-Gwegweni, & Cumber, 2019; N Sari, 2017), knowledge of contraception tool/method (Agyemang et al., 2019; Skrzeczkowska, Heimrath, Surdyka, & Zalewski, 2015), knowledge of ovulation (Iyanda et al., 2020), and contraseption usage (Nurhalina Sari, 2017).

Population older than 15 years old are the most productive population and the working-age population. The age group of 15-24 years old is a young generation. In this group, there are teenagers aged between 15 and 19 years old. Around 43 million or 17% of Indonesia's total population are in this age group (BPS, 2019). The high numbers of this age group can cause alarming fertility-related problems if their sexual behaviors do not become a concern (Raharja, 2014). According to data released by the Ministry of Labour, this age group has the highest unemployment rate, where 56% of the people in this age group have low-level education. It is important to examine factors related to the fertility pattern of young women. This research will investigate further the factors that contribute to the fertility pattern of young women in South Sulawesi.

2. Material and method

2.1. Data

Data used in this analysis is 2017 data from the Indonesian Demographic and Health Survey (IDHS). IDHS holds a survey on households that represent their country in 90 countries every five years. The IDHS provides national and provincial level-information. This research analyzes data that fits the inclusion criteria: 1) data collected from a questionnaire on fertile women in IDHS 2017 2) young women in the aged 15-24 years old 3) final dataset available to download and analyze per 1 October 2020. Dataset of the research covers South Sulawesi. There is a total sample of 549 women from South Sulawesi.

2.2. Research Variable

The main variable of this research is fertility. The operational definition of fertility is fertility in women in the 15-24 age group who have given birth or are carrying their first child. The survey asked about their history of childbirth and pregnancy status. The research divided the samples into two categories. Young women with any fertility history are in category 1, and young women without fertility history are in category 0.

The research evaluates fifteen variables that might be a predictor of adolescent fertility: age (15-18 years old, 19-21 years old, 22-24 years old), education (secondary below, higher), education status during the survey (yes, no), occupation (unemployed, agriculture, other fields), wealth index (low, middle, high), residence (urban, rural), marital status (has been married, never married), exposure to mass media (low, medium, sufficient), internet usage (yes, never), health insurance (yes, no), the age of first marriage (never married, <19 years old, 19-24 years old), exposure to family planning (yes, no), knowledge

of family planning methods (yes, no), and knowledge of ovulation (yes, no).

Contraception usage before fertility (having children) variable is not included in this research, even when substantially it is clear that contraception prevents fertility. This research did not include this variable because previous analyses have shown that young women do not use contraception before having children. Therefore, this variable does not become a predictor.

2.3. Statistical Analysis

This research performs data analysis with frequency distribution, chi-square, and multiple logistic regression with a predictive model. In the predictive model analysis, candidates are selected based on their statistical and substantial definition. There are two predictors (exposure to family planning messages and knowledge of ovulation) from the bivariate analysis (p-value >0.250) not included for the candidates of the multivariate model. This research then checked the collinearity between the variables to confirm that the independent variable used in the model does not have a strong correlation. It found multicollinearity in the variables. Age of first marriage, age of first sexual intercourse, and awareness of family planning tools/method variables have strong correlations with marital status. The final model consists of statistically and substantially significant variables after the adjustment by the confounder variable.

The continuous effect from the predictors on the results is declared by Odd Ratio with a belief interval of 95%. All analyses used sample weighting adjustment by dividing the sample to 1000000 then normalizing it to make its size after weighting equal to the size before weighting (ICF, 2018). This research also analyzed complex samples with the developed survey designs such as population stratification, cluster sampling, or different probability in the respondent selection (some respondents have a higher probability than other respondents for study sample) (Sakshaug & West, 2014). Data were analyzed using do-file Stata.

2.4. Ethical Consideration

This research uses DHS data, downloaded after signing up on its site (https://dhsprogram.com). The procedure and questionnaire used in the DHS 2017 survey have been reviewed and approved by The Institutional Review Board (IRB) of ICF International. IRB representative of each country has ensured that the survey has complied with the regional laws and norms. The researcher did not include the names and addresses of the respondents when downloading the data. A separate ethical clearance is not needed to use the data for this research.

3. Results

3.1. A review of adolescent fertility and the researched variables

Adolescent fertility is defined as the fertility of young women aged 15-24 years old who had given birth or are pregnant with their first child. The percentage of young women who experienced fertility is 22.89%; 3.38% are pregnant, 15.85% have one living child, and 3,85% have two living children.

Table 1 presents the distribution of respondents based on the variables studied in this research. 15-18 age group (47.9%), last education in middle school or lower (71.5%), had not been married (74.1%), profession outside agriculture (32.5%), and low wealth index (47.9%) categories are more dominant than others in the table. The percentage of respondents in school is very low, at 11%. The difference in the numbers of respondents living in villages and cities is not large. Most respondents have little access to mass media (77.5%). Most respondents used the internet before (86.2%). The percentage of respondents who have either public or private insurance is 66.6%. The age group with the highest number of respondents is the < 19 years old group (18.3%). This number is close to the highest percentage in the age of first sexual intercourse group, which is <19 years old group (19,1%).

The number of respondents who have family planning messages and the number of respondents who have not are almost equal. 95.9% of the respondents know about the modern family planning tools/methods, while 81.5% know about female ovulation.

Table 1.

Distribution of Young female Fertility and the Researched Variables, in South Sulawesi Year 2017

Variable	Total	
	n = 491	%
Parity		
0	389	79.20
1	78	15.85
2	19	3.85
3	5	1.10
Currently pregnant		
Yes	16	3.38
No	475	96.62
Fertility		
Yes	112	22.89
No	379	77.11
Age		
15 - 18	235	47.9
19 - 21	134	27.3
22 - 24	122	24.8
Education level		
Middle school or lower	351	71.5
High school or higher	140	28.5
Education status		
In school	54	11
No	437	89
Profession		
Unemployed	274	55.9
Agriculture	57	11.6
Others	160	32.5
Wealth Index		
Low	235	47.9
Middle	89	18.1
High	167	34.0
Residence		
Rural	291	59.3
Urban	200	40.7
Marital Status		
Married	127	25.9
Never Married	364	74.1
Access to mass media		
Poor	38	7.7.5
Medium	343	70
Good	110	22.5
Internet usage		
Yes	428	87.2
Never	63	12.8
Health Insurance		
No	164	33.4
Yes	327	66.6
Age of First Marriage		
Never married	356	72.5
< 19 years old	90	18.3
19-24 years old	45	9.2
Age of First Sexual Intercourse		
Never married	354	72.1
< 19 years old	94	19.1
19-24 years old	43	8.8
Exposure to Family Planning related messages/information		
Yes	268	54.5
No	223	45.5
Knowledge of family planning methods		
Yes	471	95.9
No	20	4.1
Knowledge of ovulation		
Yes	91	18.5
No	400	81.5

3.2. Factors related to Youth Fertility

The results of the bivariate analysis show a significant relationship between age, education level, education status, occupation, wealth index, marital status, internet usage, age of first marriage, age of first sexual intercourse, and knowledge of family planning tools/methods variables and young female fertility variable (p-value < 0.05). Meanwhile, residence, access to mass media, health insurance, exposure to family planning-related messages/information, and knowledge of ovulation have an insignificant relationship to youth fertility (p-value > 0.05) (Table 2).

3.3. The multivariate model for the predictors of youth fertility

The results of the multivariate analysis show that the main predictor of young female fertility in South Sulawesi is married young women (OR=373,92 95% CI 112,76-1239,84). The predictor factors of young female fertility are marital status, low education, 19 years old or older, unemployed or working in agriculture, and low or medium wealth index.

After being controlled by other covariate variables, women in the 19-21 year age group and women in the 22-24 year age group are 7.7 and 4.7 times more likely to be fertile than women aged 15-18 years, respectively. Respondents working in the agriculture sector are 1.6 times odds, while unemployed respondents have 2.7 times odds when compared to women working in other sectors. Respondents with a low wealth index have 1.58 times odds, while respondents with a medium wealth index have 1.79 times odds when compared to women with a high wealth index.

Table 2.
Bivariate analysis of the variables influencing young female fertility in South Sulawesi year 2017

Variable	Fertility				OR Crude	P-value
	Yes n = 112	%	No n = 379	%	(95% Cl)	
Age						0.000
15 - 18	17	7.48	218	92.51	4,50 (2,67-7,58)	
19 - 21	36	26.74	98	73.26	11,51 (6,91-19.17)	
22 - 24	59	48.24	63	51.76	1	
Education level						0.000
Middle school or lower	99	28.31	252	71.69	3,86 (2,08-7,16)	
High school or higher	13	9.27	127	90.73	1	
Education status						0.021
In school	5	9.41	49	90.59	1	
No	107	24.56	330	75.44	3,13 (1,13-8,60)	
Profession						0.009
Unemployed	59	21.47	215	78.53	1.11 (0.70-1.77)	
Agriculture	22	39.11	35	60.89	2.62 (1.31-5.22)	
Others	31	19.68	129	80.32	1	
Wealth Index						0.0001
Low	73	31.21	162	68.79	2.87 (1,66-4,97)	
Middle	16	18.46	73	81.54	1.43 (0,75-2,74)	
High	23	13.62	144	86.38	1	
Residence						0.078
Rural	76	26.06	215	73.94	1	
Urban	36	18.3	164	81.7	1.57 (0,94-2,61)	
Marital Status						0.000
Married	107	84.13	20	15.87	450 (147-1380)	
Never Married	5	1.16	359	98.84	1	
Access to mass media						0.053
Poor	8	22.51	30	77.49	1.67 (0,68-4,05)	
Medium	88	25.53	255	74.47	1.97 (1,09-3,57)	
Good	16	14.8	94	85.2	1	
Internet usage	80	18.68	348	81.32		0.000
Yes	32	51.43	31	48.57	1	
Never					4.60 (2,53-8,37)	
Health Insurance						0.127
No	43	26.52	121	73.48	1.35 (0,91-1,99)	
Yes	69	21.08	258	78.92	1	
Age of First Marriage						0.000
Never married	0	0	356	100	1	
< 19 years old	77	85.16	13	14.84	1	
19-24 years old	35	79.18	10	20.82	0.66 (0,26-1,64)	
Age of First Sexual Intercourse						0.000
Never married	0	0	354	100	1	
< 19 years old	78	82.85	16	17.15	1	
19-24 years old	34	79.84	9	20.16	0.81 (0,33-2,03)	
Exposure to Family Planning related messages/information	59	22.21	209	77.79	1	0.694
Yes	53	23.71	170	76.29	1.08 (0,70-1,66)	
No						
Knowledge of family planning methods						0.007
Yes	112	23.85	359	76.15	1	
No	0	0	20	100	-	
Knowledge of ovulation						0.579
Yes						
No	23	25.07	68	74.93	1	
	89	22.4	311	77.6	0.86 (0,50-1,46)	

Variable	Full Model		Final Model		Coefficient	SE
	Adjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value		
Age					0.770	0.26
15 - 18	1					
19 - 21	8.13 (2,10-31,45)	0,003	7,74(2,19-27,32)	0,002		
22 - 24	4.7 (1,55-14,77)	0,007	4,79(1,61-14,23)	0,005		
Education level		0,192			0.894	0.52
Middle school or lower	2.1 (0,68-6,50)		2,53(0,94-6,82)	0,066		
High school or higher	1					
Profession		0,037			0.500	0.21
Unemployed	2.68 (1,06-6,78)	0,934	2,73(1,14-6,55)	0,024		
Agriculture	1.08 (0,16-7,10)		1,16(0,19-6,87)	0,865		
Others	1					
Wealth Index		0,195			0.351	0.35
Low	1.85 (0,72-4,73)	0,555	1,79(0,73-4,41)	0,197		
Middle	1.49 (0,38-5,79)		1,58(0,42-5,87)	0,488		
High	1					
Marital Status		0,000			5.618	5.61
Married	373,21(107,17-1299,59)		373,92(112,76-1239,84)	0.000		
Never Married	1					
Access to mass media		0,581	-			
Poor	0,56(0,07-4,45)	0,948				
Medium	1,05(0,20-5,52)					
Good	1					
Internet usage		0,464	-			
Yes	1,52(0,48-4,80)					
Never						
Health Insurance			-			
No		0,514				
Yes	1,35(0,53-3,41)					
Education status		0,838	-			
In school	1,17(0,24-5,51)					
No						
Residence			-			
Rural	1					
Urban	0,80(0,33-1,90)	0,612				
Constanta					-6.638	0.74

The formula for the predictive model of young female fertility is as follows:

- The logit model for young female fertility = -6.638 + 0.77* age + 0.894* education + 0.500* occupation + 0.351* wealth index + 5.618*marital status

The simulation of the formula is as follows:

A 19-year-old woman has a primary school degree, never worked, from a family with a low wealth index, and is married.

The distribution of the formula for this case is as follows:

- The logit model of fertility-related events in young women = -6.638 + 0.77*(2) + 0.894*(1) + 0.500*(2) + 0.351*(2) + 5.618*(1)
- The probability of fertility-related events (1) = $1/1+EXP^{-(3.116)}$
- The probability of fertility-related events (1) = 1/1+0.044
- = 0.957

From this case, it can be concluded that the probability of fertility-related events in an unemployed, married, 19-year-old woman with a primary school degree and low wealth index is 95.7%.

4. Discussion

4.1. Young female fertility in South Sulawesi

This research found that the percentage of young female fertility in South Sulawesi is 22.89%. Almost 50% of young women in the province have experienced fertility-related events at 21 years old or younger. If the young female fertility rate is not decreased sooner, the number of pregnancies among young women will keep increasing even when they're 25 years old, where those women are still fertile. Young female fertility has demographical, social, economic, and health consequences.

The high fertility rate among young people might be related to the tradition of South Sulawesi people who assume that teenage marriage is natural and has been a tradition that is difficult to end in the community. Teenage marriage is an acceptable social act or behavior (Akhiruddin, 2016). The Bugis Makassar tribe is the majority of the South Sulawesi population. In this tribe, It is a tradition that parents have the control to marry their children. Parents will feel ashamed if their adult daughter has not married yet. This shame causes the parents to marry off their child as soon as possible so the child won't get labeled "perawan tua/old virgin." However, this research does not examine the tradition/custom/tribe variable in this research due to the scarcity of the available secondary data.

4.2. Predictive Model for Youth Fertility

The final predictive model shows that the predictors for fertility in young women are marital status, age of 19 years old or older, low education, unemployed or working in the agriculture sector, and low or medium wealth index based on SKDI South Sulawesi's 2017 data. The formulated model sets that if all predictors "Yes =1", it can predict 95.7%, which means the predictor variable has a high contribution in predicting the outcome, which is youth fertility.

The main predictor in this research is marital status. In eastern culture, marriage is very identical to the age of first sexual intercourse. Married teens could be an indicator of pregnancy and childbirth risks. Raising women's marriage age is very important to prepare them physically, socially, and economically for their marriage. Raising the marriage age is pivotal to decrease the fertility rate of young women.

Marital status has a significant relationship with the fertility of young women. Research in Malawi shows that 68% of young women age 17-24 had been married, and 72% had been pregnant (Dake et al., 2018). In the residence category, women living in villages tend to experience fertility-related events earlier than those in the cities. This finding corresponds with past research that states residence has a positive and significant influence on women's decision to marry (Sahara et al., 2019).

Education status, internet usage, the age of first marriage, the age of first sexual intercourse, knowledge of family planning tools/methods, residence, access to mass media, health insurance, exposure to messages/information related to family planning, and the knowledge of ovulation variables are not in the final multivariate model.

4.3. The relationship between demography and socio-economy

Based on age, young women in the 22-24 age group have a higher percentage of fertility-related experience (48.24%) than the 19-21 and 15-18 age groups (26.74% and 7.48%, respectively). Female teenagers show that the older they are, the higher the odds they have to experience fertility-related events (Raharja, 2014). This finding indicates a positive relationship between fertility-related events and the increase in a woman's age. The population's age of first marriage will influence their fertility rate (Ndahindwa et al., 2014).

Based on education level, the middle school or lower group has a higher percentage of women who have experienced fertility-related events (28.31%) than the high school or above group (9.27%). Theoretically, the higher the education level of a woman, the higher her age of first marriage Education also influences one's perspective in deciding the number of children to have. They tend to improve their child's quality by having fewer children, which will help in providing better childcare, guidance, and education (Impicciatore & Tomatis, 2020; Jalovaara et al., 2019).

Based on occupation, the proportion of respondents who have experience of fertility-related events and professions in the agriculture sector is higher (39.11%) than those who work in other sectors (19.68%) and are unemployed (21.17%). This finding corresponds with research that found young women who work in agriculture are 2.36 times more likely to have one or more children (Malinda, 2012). Women who work in agriculture do not face any difficulty in having many children; the children could even help them in their work. Work tends to protect women from teenage marriage because families are willing to delay marrying their daughter if she has a source of income. Working women will also focus on their work to get a promotion and higher salary and improve the welfare of their family. Women aspire to achieve things before (A. Rahman & Syakur, 2018).

Based on the wealth index, the proportion of respondents who have a low wealth index and experienced fertility-related events is higher than those with a middle and high low index. This finding corresponds with previous research, which states that the fertility rate of women from the lower social class is higher than the fertility rate of women from the higher social class (Malakar & Roy, 2017). The higher the income of a woman, the lower her birth rate. Bullinger states that a one-dollar increase in the minimum wage will decrease the teenage pregnancy rate by 2%. Research by Pan & Yang found that a high household income will decrease fertility. Women with higher income will spend much of their time working than being a mother.

In conclusion, demography and socio-economy variables are the predictors of fertility-related events in the final multivariate model. The demographical and socio-economic factors of age, low education, unemployed or working in agriculture, and low or very low wealth index are predictors. These variables will directly influence the level of access to information about ovulation, family planning, contraception methods, and the chance of marriage at a young age. Having sufficient social and economic resources will increase the opportunity of receiving more information about delaying sexual activities and marriage, increasing social power, and being exposed to mass media (Ndahindwa et al., 2014).

5. Conclusion

The predictors of young women's fertility are marital status, age 19 or older, low education, unemployed or working in agriculture, and low or middle wealth index based on SDKI South Sulawesi's 2017 data. The main factor of the predictors of young female fertility in South Sulawesi is married young women. Marriage is very identical to the age of first sexual intercourse, pregnancy, and childbirth in women.

Access to formal and non-formal education needs to be improved to increase work opportunities and improve the social and economic status of young women. This improvement will decrease the adolescent fertility rate. The population's knowledge of family planning needs to improve through massive communication, information, and education. These practices will normalize the norm to have a small family and decrease teenage marriage and childbirth rates in the community.

References

Agyemang, J., Newton, S., Nkrumah, I., Tsoka-Gwegweni, J. M., & Cumber, S. N. (2019). Contraceptive use and associated factors among sexually active female adolescents in Atwima Kwanwoma District, Ashanti region-Ghana. *Pan African Medical Journal*, *32*. https://doi.org/10.11604/pamj.2019.32.182.15344

Ajala, A. O. (2014). Mass Media Exposure and Intention to use Contraceptives in North-West Geo-Political Zone, Nigeria. *IISTE*, *4*(24), 101–114.

Akhiruddin. (2016). Dampak Pernikahan Usia

Muda (Studi Kasus Di Desa Mattirowalie Kecamatan Libureng Kabupaten Bone). *Mahkamah*, *1*(1), 205–222.

Bappenas. (2017). *Ringkasan Metadata Indikator Tujuan Pembangunan Berkelanjutan (TPB)/Sustainabale Development Goals (SDGs) Indonesia*. BAPPENAS.

BKBBN. (2018). *Survei Demografi dan Kesehatan 2017*. *Riset Kesehatan Dasar 2018*.

BPS. (2019). *Statistik Indonesia 2019*. *Statistik Indonesia 2019 (Indonesian statistics)*. Jakarta: Badan Pusat Statistik.

Christabel, G. A. (2019). *Socio-Economic Differentials in Adolescent Fertility in Kenya: Evidence from The 2014 KDHS*. University of Nairobi.

Cinar, N., & Menekse, D. (2017). Affects of Adolescent Pregnancy on Health of Baby. *Open J Pediatr Neonatal Care*, *3*(1), 12–16.

Dake, F., Natali, L., Angeles, G., de Hoop, J., Handa, S., & Peterman, A. (2018). Cash Transfers, Early Marriage, and Fertility in Malawi and Zambia. *Studies in Family Planning*, *49*(4), 295–317. https://doi.org/10.1111/sifp.12073

ICF. (2018). Demographic and Health Surveys Standard Recode Manual for DHS 7, 145. Retrieved from https://dhsprogram.com/pubs/pdf/DHSG4/Recode7_DHS_10Sep2018_DHSG4.pdf

Impicciatore, R., & Tomatis, F. (2020). The nexus between education and fertility in six European countries. *Genus*.

Iyanda, A. E., Dinkins, B. J., Osayomi, T., Adeusi, T. J., Lu, Y., & Oppong, J. R. (2020). Fertility knowledge, contraceptive use and unintentional pregnancy in 29 African countries: a cross-sectional study. *International Journal of Public Health*, *65*(4), 445–455. https://doi.org/10.1007/s00038-020-01356-9

Jalovaara, M., Neyer, G., Andersson, G., Dahlberg, J., Dommermuth, L., Fallesen, P., & Lappegård, T. (2019). Education, Gender, and Cohort Fertility in the Nordic Countries. *European Journal of Population*, *563–586*.

Khattak, S. W. (2017). Determinants of Adolescent Fertility in Pakistan: Evidence from PDHS 2012-13. *JHSS*, *25*(2), 95–108.

Luo, D., Yan, X., Xu, R., Zhang, J., Shi, X., Ma, J., … Sawyer, S. M. (2020). Chinese trends in adolescent marriage and fertility between 1990 and 2015: a systematic synthesis of national and subnational population data. *The Lancet Global Health*, *8*(7), e954–e964. https://doi.org/10.1016/S2214-109X(20)30130-3

Maharani, V., Ramadhanty, A. P., Putra, G. M., Pratama, I. M., & Yuhan, R. J. (2020). Penentuan Faktor-Faktor yang Mempengaruhi Tingkat Fertilitas di Indonesia Tahun 2017 dengan Metode Multiple Classification Analysis (Analisis Data SDKI 2017). *Business Economic, Communication, and Social Science (BECOSS) Journal*, *2*(3), 1–9.

Malakar, B., & Roy, S. K. (2017). Effect of socio-economic characteristics on fertility and under-five mortality: Examples from the Santals of Birbhum district, West Bengal, India. *Anthropological Review*, *80*(3), 323–334. https://doi.org/10.1515/anre-2017-0023

Malinda, Y. (2012). Hubungan Umur Kawin Pertama Dan Penggunaan Kontrasepsi Dengan Fertilitas Remaja Berstatus Kawin (Analisis Riskesdas 2010). *Jurnal Kesehatan Reproduksi*, *3*(2 Ags), 69–81. https://doi.org/10.22435/kespro.v3i2Ags.3921.69-81

Ndahindwa, V., Kamanzi, C., Semakula, M., Abalikumwe, F., Hedt-Gauthier, B., & Thomson, D. R. (2014). Determinants of fertility in Rwanda in the context of a fertility transition: a secondary analysis of the 2010 Demographic and Health Survey. *Reproductive Health*.

Pan, J.-N., & Yang, Y.-J. (2020). The impact of economic uncertainty on the decision of fertility: Evidence from Taiwan. *The North American Journal of Economics and Finance*, *54*, 101090. https://doi.org/https://doi.org/10.1016/j.najef.2019.101090

Raharja, M. B. (2014). Fertilitas Remaja di Indonesia. *Kesmas: National Public Health Journal*, *9*(1), 6–13. https://doi.org/10.21109/KESMAS.V9I1.449.G415

Rahman, A., & Syakur, R. M. (2018). Menelusur Determinan Tingkat Fertilitas. *Jurnal Ecces*, (57–77).

Rahman, M., & Kabir, M. (2014). Knowledge of Adolescents, *28*(April 2005), 164–177.

Sahara, N., Idris, I., & Putri, D. Z. (2019). Faktor-Faktor yang Mempengaruhi Keputusan Wanita Menikah di Sumatera Barat. *Jurnal Ecogen*, *1*(3), 640–647.

Sakshaug, J. W., & West, B. T. (2014). Important considerations when analyzing health survey data collected using a complex sample design. *American Journal of Public Health*, *104*(1), 15–16. https://doi.org/10.2105/AJPH.2013.301515

Sari, N. (2017). Determinan Fertilitas melalui Pendekatan Total Fertility Rate (TFR) di Indonesia: Analisis Data Survei Demografi Kesehatan Indonesia (SDKI) Tahun 2007. *Jurnal Dunia Kesmas Volume*, *6*(2), 55–62.

Sari, N. (2017). Determinan Fertilitas melalui Pendekatan Total Fertility Rate (TFR) di Indonesia: Analisis Data Survei Demografi

Kesehatan Indonesia (SDKI) Tahun 2007. *Jurnal Dunia Kesmas*, *6*(2), 55–62.

Skrzeczkowska, A., Heimrath, J., Surdyka, J., & Zalewski, J. (2015). Knowledge of Contraceptive Methods among Adolescents/Young Adults. *Polish Journal of Public Health*, *125*(3), 144–148. https://doi.org/10.1515/pjph-2015-0042

United Nations. (2013). *Adolescent Fertility since the International Conference on Population and Development (ICPD) in Cairo (United Nations Publication)*.

Yuniarti, S., & Setiowati, T. (2015). Analisis Faktor yang berhubungan dengan tingkat fertilitas pada Ibu Pasangan Usian Subur (PUS) di Wilayah Kerja Puskesmas Melong Asih Kota Cimahi. *Prosiding IRONS: Industrial Research Workshop and National Seminar*, *6*.