Sociodemographic and Health Characteristics as Influencing Factors of Adolescent Marriage: A Cluster Analysis

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Abstract

Adolescent marriage, for those under 20 years old, in Indonesia is mainly due to early pregnancy. In Malang Regency, adolescent marriage has led to a high fertility rate among women aged 15–19 years old, reaching 46.3 births per 1,000 women in 2020. This study aims to create cluster areas with the highest incidence of female adolescent marriage based on similarities in sociodemographic and health characteristics. This study used a cross-sectional approach using data from the Central Statistics Agency (BPS), the Ministry of Religious Affairs, and Religious Courts, covering 33 subdistricts with 378 villages in Malang Regency, Indonesia. Sociodemographic and health characteristics were analyzed using a k-means cluster and analysis of variance utilizing ANOVA. Cluster maps were generated using the quantum geographic information system (QGIS) application. The clusters were divided into three groups. The results showed that the sociodemographic characteristics, including youth organization and rice assistance programs, and health characteristics, including the number of hospitals, community health centers, and health clinics, were the key indicators of cluster formation. The highest incidence of female adolescent marriage was observed in Cluster 2 (mountainous areas), followed by Cluster 3 (rural areas), while Cluster 1 (urban areas) had the lowest incidence.

Keywords

Adolescents; child; human and health; public health; rural

Introduction

According to data from the Population Census, adolescents (10–19 years old) in Indonesia account for 16.05% (44.3 million) of the total population (Central Statistics Agency, 2022). This significant proportion requires the Indonesian government to address various problems affecting adolescents, one of which is adolescent marriage due to pregnancy out of wedlock. Addressing teenage pregnancy remains the main focus of the Indonesian government, as the number of such cases is increasing annually. Data from the World Health Organization (WHO) (2024) indicated that one million females aged 15–19 years old give birth yearly. Several factors that influence the increasing prevalence of adolescent pregnancy include socio-economic factors, low educational status, culture, and family conditions (Raj et al., 2010). Therefore, it can be concluded that physical, psychological, mental, cultural, and social factors have a significant influence on the growing incidence of adolescent pregnancy.

Physically, adolescents are still undergoing growth and development. During pregnancy, they are compelled to undergo physical changes, affecting their health and the infant's. The immaturity of their reproductive organs makes young mothers vulnerable to various health problems, such as cervical cancer, breast cancer, obstetric hemorrhage, miscarriage, and fetal death (Sari, 2021). A study conducted by Raj (2010) in India demonstrated that young mothers have a higher risk of pregnancy complications, hypertension, miscarriage, and mortality than older mothers. Furthermore, adolescent pregnancy is associated with complications during pregnancy, such as preeclampsia, hyperemesis, low back pain, anemia, gestational diabetes mellitus, and swelling during late pregnancy. Additionally, there are risks during labor, such as preterm labor, obstructed labor, premature rupture of membranes, obstetric and postpartum hemorrhage, and infection of the birth canal (Calle et al., 2021; Mann et al., 2020). The Indonesian government has introduced policies to address adolescent marriage, including raising the minimum legal marriage age for prospective brides from 16 to 19, as stated in the 2019 Marriage Law. However, increasing the legal marriage age has not directly reduced the number of adolescent marriages.

In 2020, the Indonesian Population and Family Planning Agency reported an age-specific fertility rate (ASFR) of 26.6 births per 1,000 women aged 15–19 (Central Statistics Agency, 2023). The ASFR for the same age group in East Java Province 2020 was 31.3 births per 1,000 women, indicating that the adolescent pregnancy rate remains high. Similarly, the ASFR for the same age group in Malang Regency in 2020 was 46.3 births per 1,000 women, placing it in the high category (BPS-Statistics of Malang Regency, 2023). The marriage dispensation rate in Malang Regency in 2021 was classified as high, with 1,762 applications and 1,711 decisions made by religious courts (BPS-Statistics of Malang Regency, 2022). Marriage dispensation is the granting of permission to marry by the court to prospective brides and grooms who are under the age of 19 years. Data from the Ministry of Religious Affairs and the Religious Court of Malang Regency from 2016 to 2020 showed that the percentage of marriages among individuals aged under 19 years old increased annually. For males, the rate increased from 0.16% in 2016 to 1.35% in 2020, while for females, it increased from 1.38% in 2016 to 5.85% in 2020. The main reason for this increasing marriage rate is adolescent pregnancies.

Despite various dissemination programs and educational initiatives regarding the appropriate age for marriage and reproductive health, the expected outcomes have not been achieved. Understanding community characteristics, such as sociodemographic and health characteristics, is needed to ensure the community receives these efforts well. Community

acceptance plays a role in determining the success of such programs and initiatives in the community. Given the large area of Malang Regency and its diverse community conditions, an analysis of the sociodemographic and health characteristics based on regional patterns is necessary. This analysis aims to determine the factors influencing adolescent marriage in the community based on similarities in sociodemographic and health characteristics. While research on adolescent marriage has focused on economic and cultural factors, there is a lack of research on teenage marriage in relation to sociodemographic and health characteristics. This is particularly relevant following the policy that raised the minimum legal marriage age for males and females to 19 years old in Indonesia in 2019. Despite this policy, adolescent marriages continue to occur in circumstances where the individuals are not ready for marriage.

Methods

This study used a cross-sectional approach using data from the Central Statistics Agency, the Ministry of Religious Affairs, and the Religious Court of Malang Regency, Indonesia. The data covered 33 subdistricts and 378 villages across Malang Regency in 2021. These data were obtained from cross-sectional reports in 2021.

The data were analyzed using a k-means cluster and analysis of variance (ANOVA). Based on the observed variables, conditions among subdistricts in Malang Regency were similar, so a k-means cluster was employed to identify cluster centroids by calculating the average of the variables.

The map of Malang Regency was generated by extracting the map of Indonesia from an open-source website hosted by the Geospatial Information Agency (2025). Cluster maps were created using the quantum geographic information system (QGIS) application developed by the QGIS Development Team (2025). Since the clusters were arranged at the subdistrict level, adjustments were made to convert the initially obtained village-level map into a subdistrict-level map.

The analysis was carried out on the variable of sociodemographic characteristics, including the percentage of adolescent marriages (< 19 years old) among males in male adolescent marriage and females in female adolescent marriage, the number of youth organizations or Karang Taruna, the percentage of recipients of the government's rice assistance program (*program beras sejahtera* [Rastra]), and the percentage of senior high school students (*sekolah menengah atas* [SMA] & *madrasah aliyah* [MA]).

Meanwhile, health characteristics included the number of hospitals, community health centers, and health clinics. Cluster grouping was performed by identifying areas with similar sociodemographic and health characteristics where female adolescent marriages occurred, resulting in three clusters. In the cluster ANOVA test, comparing variation between and within clusters yielded the largest F-value when determining the clusters compared to other clusters.

This study only analyzed adolescent marriages officially registered at the Religious Court of Malang Regency, the authorized institution for marriage registration that grants marriage dispensation. Many adolescent marriages are not registered with the state, as they are conducted solely through religious ceremonies and are considered valid according to religious law.

Ethics statement

This study received ethical approval from the Health Research Ethics Committee, Faculty of Public Health, Airlangga University, Indonesia (Cert. No. 44/EA/KEPK).

Results

Sociodemographic and health characteristics

The-sociodemographic and health characteristics of Malang Regency are presented in Table 1. The number of female adolescent marriages, male adolescent marriages, youth organizations, the government's rice assistance program, and senior high school students was the highest in Cluster 2 (mountainous areas), followed by Cluster 3 (rural areas) and Cluster 1 (urban areas). The number of hospitals and health clinics was the highest in Cluster 1, followed by Clusters 2 and Cluster 3, while the number of community health centers was the highest in Cluster 3, followed by Clusters 2 and Cluster 1.

Table 1: Sociodemographic and Health Characteristics

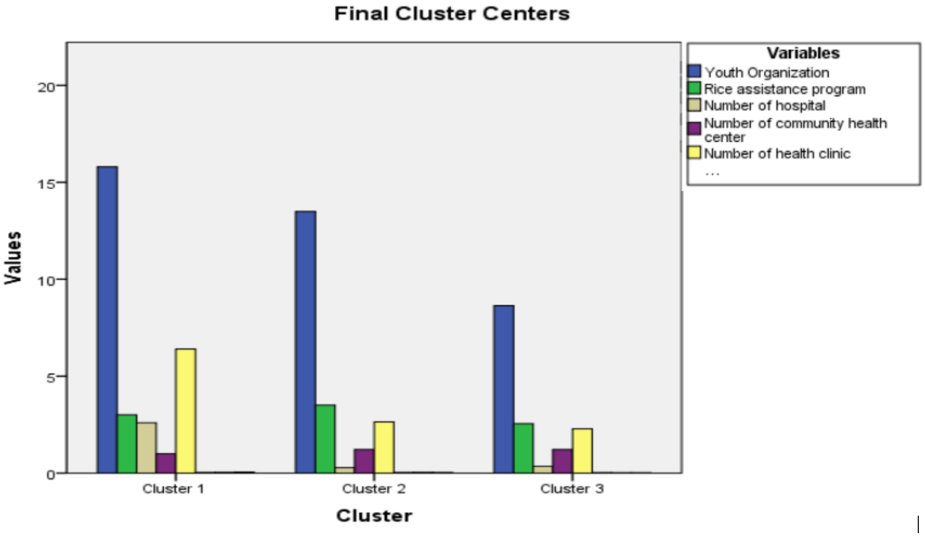
Variable	Characteristic (Number)		Cluster						*p* value
			1	%	**2**	%	**3**	%	
Sociodemographic	Married females (< 19 years old)	1–40	3	15.00	6	30.00	11	55.00	.008*
		41–80	2	16.67	7	58.33	3	25.00	
		>81	0	0	1	100.0	0	0	
	Married males (< 19 years old)	1–10	4	14.81	11	40.74	12	44.44	.282
		11–20	1	20.00	2	40.00	2	40.00	
		> 20	0	0	1	100	0	0	
	Youth organization	6–9	0	0	0	0	9	100.00	.000*
		10–14	1	6.25	10	62.50	5	31.25	
		> 15	4	50.00	4	50.00	0	0	
	Rice assistance program (kg)	1,000–2,400	1	11.11	2	22.22	6	66.67	.044*
		2,401–3,800	3	17.65	7	41.18	7	41.18	
		3,801–5,200	1	16.67	4	66.67	1	16.67	
		> 5,200	0	0	1	100	0	0	
	Senior high school students	100–1,700	2	7.41	11	40.74	14	51.85	.029*
		1,701–3,300	3	75.00	1	25.00	0	0	
		> 3,301	0	0	2	100.00	0	0	
Health	Hospitals	1–2	3	9.68	14	45.16	14	45.16	.000*
		3–6	2	100	0	0	0	0	
		> 6	0	0	0	0	0	0	
	Community health centers	1	5	18.52	11	40.74	11	40.74	.545
		2	0	0	3	50.00	3	50.00	
		> 2	0	0	0	0	0	0	
	Health clinics	0–3	0	0	10	47.62	11	52.38	.000*
		4–7	3	30.00	4	40.00	3	30.00	
		> 7	2	100.00	0	0	0	0	

*Note: *Significant at .05*

Cluster analysis based on sociodemographic and health characteristics

This cluster analysis facilitated the understanding of regional conditions based on the similarities of the characteristics of the variables.

Figure 1: Cluster Analysis Results Based on Sociodemographic and Health Characteristics



The bar chart in Figure 1 shows the average distance for each variable, which was calculated using the average linkage method. The chart indicates significant similarities in the variables contributing to cluster formation: youth organizations, the government's rice assistance program, senior high school students, female adolescent marriage, hospitals, community health centers, and health clinics. Among these, the youth organizations variable was the most dominant in each cluster.

The results of the ANOVA test, as presented in Table 1, indicate that female adolescent marriage, youth organizations, the government's rice assistance program, senior high school students, hospitals, and health clinics were significant indicators for cluster formation with a *p* value of less than .05. In contrast, male adolescent marriage and community health centers were not significant indicators for cluster formation with a *p* value of more than .05. These findings suggested that clusters were formed based on the number of female adolescent marriage with different sociodemographic and health characteristics across clusters. The cluster map is shown in Figure 2, while the cluster areas are detailed in Table 2. Areas with more youth organizations, senior high school students, and the government's rice assistance program tended to have lower adolescent marriage rates for males and females. Similarly, areas with more hospitals and health clinics tended to have lower marriage rates for both males and females.

Table 2: Areas in Cluster 1, Cluster 2, and Cluster 3

Cluster	Subdistrict	Number of Villages
Cluster 1	Kepanjen	18
	Lawang	12
	Pakis	15
	Singosari	17
	Turen	17

Cluster	Subdistrict	Number of Villages
Total	5	79
Cluster 2	Ampel Gading	13
	Bululawang	14
	Dampit	12
	Gondanglegi	14
	Jabung	15
	Ngantang	13
	Pakisaji	12
	Poncokusumo	17
	Sumbermanjing	14
	Tajinan	12
	Tirtoyudo	13
	Tumpang	15
	Wagir	12
	Wajak	13
Total	14	189
Cluster 3	Bantur	13
	Dau	14
	Donomulyo	12
	Gedangan	14
	Kalipare	15
	Karangploso	13
	Kasembon	12
	Kromengan	17
	Ngajum	14
	Pagak	12
	Pagelaran	13
	Pujon	15
	Sumberpucung	12
	Wonosari	13
Total	14	189

Cluster 1 comprises five subdistricts with 79 villages. It represents the urban areas of Malang Regency. Turen and Kepanjen subdistricts are geographically isolated from the other subdistricts. They are located in Clusters 2 and 3, as shown in Figure 2. Among all clusters, Cluster 1 (urban areas) had the lowest rate of female adolescent marriage.

Cluster 2 has mountainous areas, rice fields, 14 subdistricts, and 189 villages. Compared to the other clusters, it had the highest rate of female adolescent marriage.

Cluster 3 represents rural areas, with 14 subdistricts comprising 189 villages. Two subdistricts in Cluster 3 are geographically isolated from the others. Compared to Clusters 1 and 2, Cluster 3 had a moderate rate of female adolescent marriage.

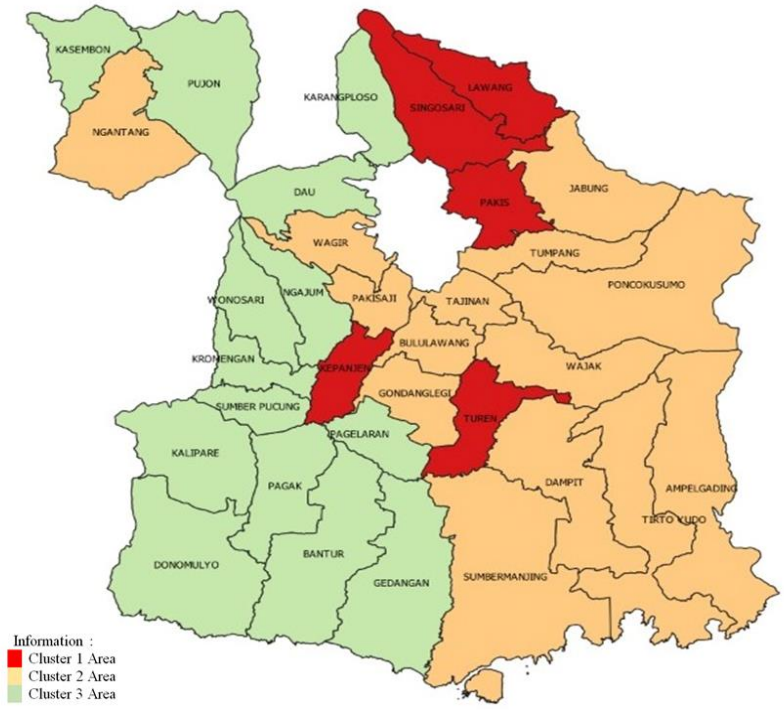
Discussion

Figure 2 illustrates that each cluster had different sociodemographic and health characteristics. The clusters can identify areas with similar characteristics regarding adolescent marriage. Additionally, these clusters can guide the implementation and evaluation of various programs. For example, educational initiatives on teenage pregnancy, adolescent marriage, and adolescent reproductive health can be tailored to align with the local sociodemographic

and health characteristics to achieve the programs' goals or objectives. These clusters can also prioritize specific goals due to limited resources.

The female adolescent marriage rate was the lowest in Cluster 1, indicating that individuals in urban areas tended to carefully consider marriage decisions. One factor influencing this decision was the high cost of living in cities, preventing adolescents from marrying early. The subdistricts and villages in Cluster 1 are located in the urban areas of Malang Regency, characterized by high mobility, especially in terms of economic and tourism activities. Urban populations are known for their open-mindedness, accepting individuals or groups different from themselves. They are also more receptive to information, technological advances, and social interactions. The main focus of urban populations is on economic improvement, which can lead many parents to prioritize work and not spend time with their children.

Figure 2: Cluster Map of Sociodemographic and Health Characteristics in Malang Regency



Note: Source of original map: https://tanahair.indonesia.go.id/portal-web/

As a result, it is not uncommon for juvenile delinquency to emerge in urban areas. Experts agree that family conditions contribute to juvenile delinquency. A lack of attention and affection from parents can lead adolescents to have behavioral and relational abnormalities (Jamaludin, 2017). When adolescents feel unsupported or neglected within their families, they may seek attention and validation elsewhere. A previous study by Massa et al. (2020) found that adolescents with family-related problems tend to be easily influenced by the environment because their friends become their primary source of escape. Unfortunately, the influence may be negative, exposing them to risky behaviors such as drugs, promiscuity, and violence. The phenomenon of adolescent promiscuity is closely related to the practice of early marriage, primarily due to pregnancy. A previous study by Husna (2017) found that respondents who engaged in promiscuity had a 13.5 times higher risk of pregnancy compared to those who did not engage in such behavior.

Turen and Kepanjen Subdistricts are isolated from the other subdistricts in Cluster 1. Although Cluster 1 consists of only five subdistricts with 79 villages, it had the highest number of hospitals and health clinics compared to other clusters. The increasing number of health facilities, such as hospitals and health clinics, positively impacts the surrounding community. The availability of these facilities supports the dissemination of information on adolescent reproductive health, thereby contributing to the lower number of teenage marriages. Additionally, the level of mobility in the two subdistricts is relatively high, considering that many offices and tourism facilities are located in Turen and Kepanjen Subdistricts, making them centers of community activities in Malang Regency.

The subdistricts and villages in Cluster 2 are located in the mountainous areas of Malang Regency. Despite having the highest rate of female adolescent marriage, Cluster 2 also had the highest number of youth organizations, the government's rice assistance program, and senior high school students. Mountainous areas have the potential for natural resources, especially in the form of vast and fertile land. In general, the main economic activities of communities in mountainous regions revolve around agriculture and horticulture. The communities on mountain slopes have the skills and expertise to manage land (Rahmaniah, 2016). However, the hilly topography creates inequality in infrastructure development, resulting in economic challenges for many farmers who remain poor. Consequently, adolescent females are trapped in adolescent marriages because they are perceived as a solution to alleviate family poverty.

The availability of education and transportation facilities in the mountainous areas was inadequate. Individuals seeking higher education often have to leave their hometowns due to insufficient funding and inefficient transportation. Although Cluster 2 had the highest number of adolescents receiving formal senior high school education, this did not guarantee that they were well informed about reproductive health and the risks of adolescent pregnancy. Reproductive health education is not comprehensively included in the school curriculum, although some materials are integrated into school subjects (Soenarnatalina et al., 2019; Sulistyorini et al., 2022). Moreover, existing health facilities in Cluster 2 remained limited, with supporting health centers far from residential areas (Saputra et al., 2022), although hospitals, health centers, and clinics were present in Cluster 2.

The lack of infrastructure, in terms of healthcare facilities and technological networks such as internet access, limits the community's knowledge about health. Access to information sources is crucial in increasing adolescents' knowledge influencing their reproductive health behaviors. Buaton (2019) found a significant relationship between media exposure to adolescent reproductive health and the level of knowledge about adolescent reproductive health in North Sumatra Province, Indonesia. The study found that greater media exposure to information on adolescent reproductive health resulted in more knowledge about adolescent reproductive health and vice versa. Solehati et al. (2019) further observed a relationship between the availability of information sources and adolescent reproductive health behaviors.

Many mountainous areas, including Malang Regency, have been developed into tourist areas. High mobility in tourist areas can foster stronger interregional relations, information exchange, cultural interaction, and social engagement. While these conditions can bring both positive and negative impacts, adolescents need to be able to adopt beneficial influences while avoiding harmful ones.

The subdistricts and villages in Cluster 3 represent rural areas in Malang Regency. Rural communities are characterized by strong familial bonds and a collective sense of togetherness, with cultural values inherited from the ancestors deeply ingrained in daily life. Economically, rural communities rely heavily on natural resources, with a significant portion of the impoverished population. In rural areas, land and human resources remain the primary resource of rural communities (Rosyid & Rudiarto, 2014). Therefore, most residents work as farmers or agricultural workers. This is closely related to the low level of education in the community. Education, particularly for women, plays a role in preventing adolescent marriage. The International Center for Research on Women (ICRW) found a positive relationship between education and child marriage (Wodon et al., 2017). Similarly, Damayanti et al. (2022) suggested that lower education levels among adolescents increased the likelihood of adolescent pregnancy, while higher education levels reduced the probability of teenage pregnancy and marriage.

Rural areas are often described as underdeveloped, isolated, lacking technological advancement, and lagging in economy, health, and education (Husein, 2021). Rural communities generally have limited access to information, especially related to health. Consequently, improving health in rural communities is one of the main focuses of government development initiatives. One effort to improve adolescent health is providing reproductive health education to adolescents.

Although the number of adolescents attending senior high school was high, their reproductive health knowledge was inadequate. The availability of health facilities was also minimal, especially regarding access to hospitals and health clinics. This can be attributed to geographical challenges, financial constraints, and delays in obtaining health services.

Rural communities believed that discussions on topics related to sexuality were considered taboo, especially when involving adolescents. This is consistent with a study by Djama (2017), which found that parents were reluctant to discuss sexual and reproductive health issues with their adolescent children. Wiranto and Amalia (2021) also suggested that the phenomenon of teenage pregnancy out of wedlock was caused by factors such as promiscuity, peer pressure, and parental influence.

A study conducted by Thoharudin (2018) demonstrated that educational activities focused on adolescent reproductive health can have a positive impact on increasing adolescents' knowledge about sexuality and encourage them to act more cautiously regarding their reproductive health. Providing adolescent sexual education to adolescents is crucial for addressing reproductive health problems resulting from sexual impulses. In this context, parents play a vital role as the primary source of information for their adolescent children (Zakiah et al., 2022).

Conclusion

Sociodemographic and health characteristics were factors influencing female adolescent marriage. The sociodemographic characteristics of areas with the highest rates of female adolescent marriage were those with the highest youth organizations, government's rice assistance program, and senior high school students, namely Cluster 2 (mountainous areas), followed by Cluster 3 (rural areas) and Cluster 1 (urban areas). Health characteristics in regions with the highest rate of female adolescent marriage were those with the lowest

number of hospitals and health clinics, namely Cluster 3, followed by Cluster 2 and Cluster 1. Meanwhile, the number of male adolescent marriages and community health centers were not significant variables in the cluster formation of female adolescent marriage.

Furthermore, the results of this study can assist policymakers and program designers in designing interventions to reduce unplanned adolescent marriages and promote various reproductive health and public health programs. These policies and programs can be tailored to fit specific communities' sociodemographic and health characteristics so that the community more readily accepts them. In addition, the results of this study provide important insights into the dynamics of adolescent marriage that can be adopted in areas with similar sociodemographic and health characteristics within the Malang Regency.

References

BPS-Statistics of Malang Regency. (2022, February 25). *Kabupaten Malang dalam angka 2022* [Malang Regency in figures 2022]. https://malangkab.bps.go.id/publication/2022/02/25/0ce4694a8e6b6cbb1b351532/kabupaten-malang-dalam-angka-2022.html

BPS-Statistics of Malang Regency. (2023, February 10). *Hasil long form sensus penduduk 2020 Kabupaten Malang* [Results of the 2020 population census long form for Malang Regency]. https://malangkab.bps.go.id/en/publication/2023/02/10/df40daa5b87d2d5ebef4d49c/hasil-long-form-sensus-penduduk-2020-kabupaten-malang.html

Buaton, A., Sinaga, A. S., & Sitorus, M. A. (2019). Pengetahuan remaja dan keterpaparan informasi remaja tentang kesehatan reproduksi [Adolescent knowledge and exposure to information on reproductive health]. *Jurnal Contagion UINSU: Scientific Periodical of Public Health and Coastal Health, 1*(2), 97–107. https://jurnal.uinsu.ac.id/index.php/contagion/article/view/7210/3225

Calle, M. de la, Bartha, J. L., Lopez, C. M., Turiel, M., Martinez, N., Arribas, S. M., & Ramiro-Cortijo, D. (2021). Younger age in adolescent pregnancies is associated with a higher risk of adverse outcomes. *International Journal of Environmental Research and Public Health, 18*, Article 8514. https://doi.org/10.3390/ijerph18168514

Central Statistics Agency (BPS). (2022). *Jumlah penduduk menurut kelompok umur dan jenis kelamin, Indonesia, 2022* [Population by age group and sex, Indonesia, 2022]. https://sensus.bps.go.id/topik/tabular/sp2022/188/1/0

Central Statistics Agency (BPS). (2023, July 14). *Angka kelahiran hasil long form SP2020 menurut kelompok umur ibu (age specific fertility rate/ASFR) dan provinsi/kabupaten/kota, 2020* [Birth rates from the 2020 population census long form by maternal age group and province/regency/city, 2020]. https://www.bps.go.id/id/statistics-table/1/MjIxNSMx/angka-kelahiran-hasil-long-form-sp2020-menurut-kelompok-umur-ibu--age-spesific-fertility-rate-asfr--dan-provinsi-kabupaten-kota--2020.html

Damayanti, N. A., Sulistyorini, Y., Purnomo, W., Hargono, R., Hariastuti, I., Herowati, D., Mardiyono, Aziz, U. K., & Religia, W. A. (2022). Intrapersonal factors relationship in adolescent pregnancy. *Populasi, 30*(1), 50–60. https://jurnal.ugm.ac.id/populasi/article/view/75798

Djama, N. T. (2017). Kesehatan reproduksi remaja [Adolescent reproductive health]. *Jurnal Kesehatan, 10*(1), 30–34. https://doi.org/10.32763/q5yn5t37

Geospatial Information Agency. (2025). *Tanah Air Indonesia* [Indonesian Homeland]. https://tanahair.indonesia.go.id/portal-web/

Husein, M. (2021). Budaya dan karakteristik masyarakat pedesaan [Culture and characteristics of rural communities]. *Aceh Anthropological Journal, 5*(2), 187–202. https://doi.org/10.29103/aaj.v5i2.5624

Husna, N. (2017). Hubungan pergaulan bebas dan budaya dengan kejadian pernikahan usia dini di Kelurahan Pasie Laweh Kecamatan Lubuk Alung [The relationship between promiscuity and culture with the occurrence of early marriage in Pasie Laweh Village, Lubuk Alung District]. *Jurnal Kesehatan Prima Nusantara, 8*(2), 185–188.

http://ejurnal.stikesprimanusantara.ac.id/index.php/JKPN/article/view/339/pdf

Jamaludin, A. N. (2017). *Sosiologi perkotaan: Memahami masyarakat kota dan problematikanya* [Urban sociology: Understanding urban communities and their problems] (2nd ed.). Penerbit CV Pustaka Setia. https://digilib.uinsgd.ac.id/3652/1/SOSIOLOGI%20PERKOTAAN.pdf

Mann, L., Bateson, D., & Black, K. I. (2020). Teenage pregnancy. *Australian Journal of General Practice, 49*(6), 310–316. https://doi.org/10.31128/AJGP-02-20-5224

Massa, N., Rahman, M., & Napu, Y. (2020). Dampak keluarga broken home terhadap perilaku sosial anak [The impact of broken home families on children's social behavior]. *Jambura Journal of Community Empowerment, 1*(1), 1–12. https://doi.org/10.37411/jjce.v1i1.92

QGIS Development Team. (2025). *QGIS Geographic Information System (Version 3.40.3 'Bratislava')*. Open Source Geospatial Foundation. https://www.qgis.org/en/site/forusers/download.html

Rahmaniah, A. (2016). Etnografi masyarakat Gunung Kawi Kabupaten Malang [Ethnography of the Gunung Kawi community in Malang Regency]. *Jurnal Pendidikan Ilmu Pengetahuan Sosial, 2*(2), 161–179. https://ejournal.uin-malang.ac.id/index.php/jpips/article/view/6846/7125

Raj, A. (2010). When the mother is a child: The impact of child marriage on the health and human rights of girls. *Archives of Disease in Childhood*, 93, 931–935. https://doi.org/10.1136/adc.2009.178707

Raj, A. D., Rabi, B., Amudha, P., van Teijlingen, E. R., & Chapman, G. (2010). Factors associated with teenage pregnancy in South Asia: A systematic review. *Health Science Journal, 4*(1), 13–14. https://www.itmedicalteam.pl/articles/factors-associated-with-teenage-pregnancy-in-south-asia-a-systematic-review.pdf

Rosyid, M., & Rudiarto, I. (2014). Karakteristik sosial ekonomi masyarakat petani Kecamatan Bandar dalam sistem livelihood pedesaan [Socio-economic characteristics of farmers in Bandar District in the rural livelihood system]. *Geoplanning, 1*(2), 74–84. https://doi.org/10.14710/geoplanning.1.2.74-84

Saputra, A. Y., Rustiadi, E., & Rindayati, W. (2022). Perkembangan dan karakterisasi desa-desa pegunungan Jawa Tengah [Development and characterization of mountainous villages in Central Java]. *Journal of Regional and Rural Development Planning, 6*(1), 1–13. http://dx.doi.org/10.29244/jp2wd.2022.6.1.1-13

Sari, A. P. (2021). Analisis faktor meningkatnya angka permohonan dispensasi kawin di Pengadilan Agama Jakarta Utara [Analysis of factors increasing the number of marriage dispensation applications at the North Jakarta Religious Court] [Undergraduate thesis, Universitas Islam Negeri Syarif Hidayatullah]. https://repository.uinjkt.ac.id/dspace/bitstream/123456789/55710/1/ALINDA%20PUSPITA%20SARI%20-%20FSH.pdf

Soenarnatalina, M., Sulistyorini, Y., Mahmudah, & Indriani, D. (2019). The importance of student health record books in school to realize children's health. *Opcion, 35*(Special Issue 22), 2899–2921. https://produccioncientificaluz.org/index.php/opcion/article/view/30838

Solehati, T., Rahmat, A., & Kosasih, C. E. (2019). Hubungan media dengan sikap dan perilaku TRIAD kesehatan reproduksi remaja [The relationship between media and attitudes and behaviors toward the reproductive health TRIAD in adolescents]. *Jurnal Penelitian Komunikasi dan Opini Publik, 23*(1), 40–53. https://jurnal.kominfo.go.id/index.php/jpkop/article/view/1768

Sulistyorini, Y., Mahmudah, & Fitriyah, N. (2022). Improving reproductive health knowledge and behavior of adolescents with hearing loss. *Southeast Asian Journal of Tropical Medicine and Public Health, 53*(Suppl2), 168–182. https://journal.seameotropmednetwork.org/index.php/jtropmed/article/view/774

Thoharudin, M. (2018). Pendidikan seks untuk mengurangi perilaku seks bebas remaja di Kecamatan Ketungau Hilir [Sex education to reduce adolescent promiscuity in Ketungau Hilir District]. *Peningkatan Kapasitas Hasil Penelitian dan Pengabdian kepada Masyarakat Menuju Revolusi Industri 4.0, 3*(September), 493–496. http://prosiding.unirow.ac.id/index.php/SNasPPM/article/view/153

Wiranto, W., & Amalia, N. (2021). Studi phenomena *married by accident* terhadap pencegahan risiko pernikahan dini pada remaja Samarinda [A study on the phenomenon of "married by accident" in preventing the risk of early marriage among adolescents in Samarinda]. *Borneo Student Research, 2*(2), 1229–1233. https://journals.umkt.ac.id/index.php/bsr/article/view/1961

Wodon, Q., Male, C., Nayihouba, A., Onagoruwa, A., Savadogo, A., Yedan, A., Edmeades, J., Kes, A., John, N., Murithi, L., Steinhaus, M., & Petroni, S. (2017, June 27). *Economic impacts of child marriage: Global synthesis report*. World Bank Publications.

https://documents1.worldbank.org/curated/en/530891498511398503/pdf/116829-WP-P151842-PUBLIC-EICM-Global-Conference-Edition-June-27.pdf

World Health Organization (WHO). (2024, April 10). *Adolescent pregnancy.* https://www.who.int/news-room/fact-sheets/detail/adolescent-pregnancy

Zakiah, L., Safitri, A. W., Karina, K., Sulistiani, S., Astuti, W., & Mutmainah, Z. (2022). Pendidikan kesehatan reproduksi: Pendidikan seksual pada remaja MA Al-Aulia [Reproductive health education: Sexual education for adolescents at MA Al-Aulia]. *Jurnal Pemberdayaan dan Pendidikan Kesehatan, 1*(2), 66–74. https://doi.org/10.34305/jppk.v1i02.429