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THE INFLUENCE OF PHYSICAL ACTIVITY, NUTRITIONAL STATUS, AGE, AND GENDER ON THE HEALTH-RELATED QUALITY OF LIFE AMONG ADOLESCENTS IN BOLAANG MONGONDOW REGENCY

Citra Kumala Dewi[1], Fatimawali[2], Jimmy Posangi[3]
Universitas Sam Ratulangi, Sulawesi Utara, Indonesia
E-mail: citraqdewi@gmail.com

KEYWORDS

Quality of Life Health, Physical Activity, Nutritional Status, Age, Gender.

ABSTRACT

This study analyzed the influence of Physical Activity, Nutritional Status, Age, and Gender on Adolescent Health and Quality of Life in Bolaang Mongondow Regency. This was an analytic study with a cross-sectional approach conducted in junior and senior high schools in Bolaang Mongondow Regency in October 2023 with a total sample of 406. The results of the study found that physical activity and nutritional status had a $p>0.05$ value in all domains, while the age variable had a $p<0.05$ value in the psychological and social domains, the gender variable had a $p<0.05$ value in the psychological domain, then to analyze the most influential variables, the researcher conducted a logistic regression test and obtained the results of the gender and age variables having the most decisive influence on the quality of life of adolescent health in the psychological domain by 8.6%. This study concludes that Physical Activity and Nutritional Status are unrelated and do not affect the quality of life of adolescents in the Bolaang Mongondow district. At the same time, the variables of age and gender influence only the psychological and social domains of quality of life health; gender and age variables have the most decisive influence. This study implies that Physical Activity and Nutritional Status are not the main factors that influence the quality of life of adolescents in Bolaang Mongondow Regency. However, Age and Gender have a more significant influence, especially on psychological aspects.

INTRODUCTION

Quality of life is one of the criteria used to evaluate healthcare interventions today (Post, 2014). Adolescents are one of the determinants of human development, and their purpose is to improve the quality of life in society. The World Health Organization (WHO) states that the second chance to improve one's quality of life is during adolescence (WHO, 2014).

Adolescents are a group of people who have successfully overcome the challenges and threats of health and illness during childhood. This illustrates that adolescent health is generally of good quality. WHO data states that mortality among scents in the world is 1.1 million deaths, or more than 3000 adolescents every day who die due to various health problems and morbidity due to mental disorders, accidents, violence, infectious diseases HIV, early pregnancy, alcoholism, cigarettes and drugs, and others (WHO, 2018). A global cooperation report states that most adolescent health problems originate from developing and poor countries (Kyu et al.,

2016). Adolescents also face many problems with information, access, health services, and misunderstandings from various parties (Patton et al., 2016)This can reduce the quality of life of adolescents.

Currently, the nutritional problem of overweight or obesity is categorized as a new threat in both the under-five age group and young adolescents (Ministry of Health, 2019). As many as 70% of children aged 5-17 years in 2011 who were obese tended to have at least one risk factor for cardiovascular disease, and 39% of other obese children had two or more risk factors for insulin resistance (Triana, 2016). The maturation rate of human reproductive organs between 10 and 24 is essential for young people (BKKBN & Ministry, 2018). During this time, adolescent boys experience physical changes that occur or accelerate, such as speech changes, development of Adam's apple, penis enlargement, weight gain, hair growth, pubic and armpit hair, wet dreams, and other body changes about men. In addition, physical changes in women include enlargement of the uterus and vagina, growth of breasts and hair on the buttocks and genitals, and the start of menstruation (Senja et al., 2020).

Based on the results of Riskesdas 2018, Bolaang Mongondow Regency, North Sulawesi Province, the prevalence of nutritional status (TB/U) in adolescents aged 13-15 years, with a very short category of 3.25% and a short category of 23.26%. In Bolaang Mongondow Regency, nutritional status (TB/U) prevalence among adolescents aged 16-18 was 7.13% concise and 24.33% in the short category. In Bolaang Mongondownv, the prevalence of nutritional status (IMT/U) among 13-15-year-olds15-year-olds was 1.03% underweight, 13.25% obese, and 4.85% obese, while among 16-18-year-olds,18-year-olds, it was 1.18% underweight, 13.85% obese and 3.05% obese.

A person's quality of health is associated with high levels of physical activity (Donoghue et al., 2016). (Donoghue et al., 2016).. Higher physical activity is associated with less sitting time, lower disability, lower BMI, higher grip strength, lower anxiety, and higher ability (McKee et al., 2015).

Sociodemographic factors that affect health and quality of life include living with family, education, age (Bica et al., 2020), social and economic factors of the family/parents (Smith et al., 2015), and gender. In line with the results of research conducted by (SURIATI, 2019), there is a relationship between age and quality of life scores. However, in their study, no relationship was found between gender and quality of life. However, (Prastika & Siyam, 2021) research, which researched the age category of the elderly, found that there was a relationship between age and quality of life.

Adolescents are in the transition period from childhood to adulthood, where, at this time, adolescents often face problems and challenges that can result in impaired quality of life and health. As in research (Porajow, 2021) the quality of health life of adolescents in Manado City has a relationship with physical activity and nutritional status because poor nutritional status can reduce environmental aspects in adolescents,

In the adolescent age category, it was found that their quality of life was still problematic, especially in the North Sulawesi area, as evidenced by the results of research from (Buleno et al., 2021) that the quality of life of adolescents in Kotamobagu City is dominated by the moderate and poor categories with a percentage of more than 80%.

Based on the description above, the purpose of this study is to determine and analyze the effect of physical activity, nutritional status, age, and gender on the quality of life of adolescents in Bolaang Mongondow Regency so that the benefits of this study to provide information to the public about adolescent health, especially about the quality of life of adolescent health, as well as a scientific basis for policy-making in adolescent health programs.

RESEARCH METHOD

This is an analytical observational study with a cross-sectional research approach; data collection is only done once on each respondent and selected to get a value for the independent and dependent variables. This research is planned to be conducted in October 2023. This research will be conducted in junior and senior high schools in Bolaang Mongondow Regency. The target population in this study are adolescents who attend schools with junior and senior high school education in Bolaang Mongondow Regency totaling 15,270 people, with a division of junior high schools totaling 8,363 students, senior high schools totaling 3,869 students, and vocational high schools totaling 3,038 students. The samples in this study were junior and senior high school students aged between 10-19 years in Bolaang Mongondow who met the inclusion and exclusion criteria. The sampling technique used in this research was simple random sampling. Data analysis techniques used univariate, bivariate, and multivariate analysis.

RESULT AND DISCUSSION

Univariate Analysis

Physical Activity

Table 1. Distribution of Respondents Based on Physical Activity

Physical Activity	N	%
Good	216	53,2
Simply	155	38,2
Less	35	8,6
Total	406	100

Based on Table 1, it can be seen that most respondents were in the Good physical activity category, namely 216 respondents (53.2%). The sufficient category comprised 155 respondents (38.2%), and the least had less physical activity, namely 35 respondents (8.6%).

Gender

Table 2. Distribution of Respondents Based on Gender

Gender	N	%
Male	188	46,3
Female	218	53,7
Total	406	100

Table 2 shows that most of the respondents with the most gender are female, namely 218 respondents (53.7%), and the most petite male, 188 respondents (46.3%).

Age

Table 3. Age Distribution of Respondents

Age	N	%
11-14 Years	139	34,2
15-20 Years	267	65,8
Total	406	100,0

The table 3 shows that most respondents with the age level of 1-14 years are 139 respondents (34.2%), and those aged 15-20 years are 267 respondents (65.8%).

Body Mass Index

Table 4. Body mass index

Physical Activity	N	%
Under	45	11,1
Ideal	326	80,3
Overweight	35	8,6
Total	406	100

Based on the table 4 shows that most of the respondents were under body mass, as many as 45 respondents (11.1%), ideal body mass as many as 326 respondents (80.3), and overweight body mass, namely 35 respondents (8.6%).

Quality of Life

Table 5. Distribution of Respondents Based on Quality of Life

Domain	High	Medium	Low	Total
Physical Domain	237	168	1	406
Psychological Domain	206	179	21	406
Social Domain	139	234	33	406
Environmental Domain	204	194	8	406

The study results in Table 5 show that most physical domains have a high quality of life, with as many as 237 respondents. Most respondents in the psychological domain have a high quality of life, namely, 206 respondents. For the social domain, most respondents with moderate quality of life were 234 respondents. For the environmental domain, most respondents with a high quality of life were 204 respondents.

Bivariate Analysis

Relationship between Physical Activity and Quality of Life

Table 6. Relationship between Physical Activity and Quality of Life

Physical Health			Quality of Life Health Low	Medium	High	N	P
Physical Activity	Good	Number (n)	1	86	129	216	
		Percentage (%)	2	21,2	31,8	53,2	
	Simply	Number (n)	0	62	93	155	
		Percentage (%)	0	15,3	22,9	38,2	0,313
	Less	Number (n)	0	20	15	35	
		Percentage (%)	0	4,9	3,7	8,6	
	Total	Number (n)	1	168	237	406	
		Percentage (%)	2	41,5	48,4	100	
			Psychology Status				
	Good	Number (n)	11	93	112	216	
		Percentage (%)	2,7	22,9	27,6	53,2	
	Simply	Number (n)	7	67	81	155	
		Percentage (%)	1,7	16,5	20,0	38,2	0,522
	Less	Number (n)	3	19	13	35	
		Percentage (%)	7	4,7	3,2	8,6	
	Total	Number (n)	21	179	206	406	
		Percentage (%)	5,2	44,1	50,7	100	
			Social Relationships				
	Good	Number (n)	18	126	72	216	
		Percentage (%)	4,4	31	17,7	53,2	
	Simply	Number (n)	14	81	60	155	0,112
		Percentage (%)	3,4	20	14,8	38,2	
	Less	Number (n)	1	27	7	35	

Physical Health		Quality of Life Health Low	Medium	High	N	P
	Percentage (%)	2	6,7	1,7	8,6	
Total	Number (n)	33	234	139	406	
	Percentage (%)	8,1	57,6	34,2	100	
		Environment				
Good	Number (n)	6	98	112	216	
	Percentage (%)	1,5	24,1	27,6	53,2	
Simply	Number (n)	0	77	78	155	
	Percentage (%)	0	19	19,2	38,2	0,100
Less	Number (n)	2	19	14	35	
	Percentage (%)	5	4,7	3,4	8,6	
Total	Number (n)	8	194	204	406	
	Percentage (%)	2	47,8	50,2	100	

Table 6 above shows physical activity with physical health with a p-value = 0.313, so the p-value is> 0.05, which means there is no relationship between physical activity and the quality of life of the physical health domain. Physical activity with psychology has a p-value = 0.522, so the p-value is> 0.05, which means there is no relationship between physical activity and the quality of life in the psychological health domain. Physical activity with social with a p-value = 0.112 so that the p value> 0.05 means there is no relationship between physical activity and the quality of life of the social domain health. Physical activity with the environment with a p-value = 0.100 means that the p-value is> 0.05, which means there is no relationship between physical activity and the quality of life of the environmental domain health.

Relationship between Gender and Quality of Life

Table 7. Relationship between type and quality of life

Gender			Quality of Life Health Low	Medium	High	N	P
Physical Activity	Male	Number (n)	0	75	113	188	
		Percentage (%)	0	18,5	27,8	46,3	
	Female	Number (n)	1	93	124	218	0,541
		Percentage (%)	2	22,9	30,5	53,7	
	Total	Number (n)	1	168	237	406	
		Percentage (%)	2	41,4	58,4	100	
			Psychology Status				
	Male	Number (n)	12	68	108	188	
		Percentage (%)	3	16,7	26,6	46,3	
	Female	Number (n)	9	111	98	218	0,011
		Percentage (%)	2,2	27,3	24,1	53,7	
	Total	Number (n)	21	179	206	406	
		Percentage (%)	5,2	44,1	50,7	100	
			Social Relationships				
	Male	Number (n)	14	108	66	188	
		Percentage (%)	3,4	26,6	16,3	46,3	
	Female	Number (n)	19	126	73	218	0,870

Gender		Quality of Life Health				
		Low	Medium	High	N	P
	Percentage (%)	4,7	31	18	53,7	
Total	Number (n)	33	234	139	406	
	Percentage (%)	8,1	57,6	34,2	100	
		Environment				
Male	Number (n)	4	87	97	188	
	Percentage (%)	1	21,4	23,9	46,3	
Female	Number (n)	4	107	107	218	0,845
	Percentage (%)	1	26,4	26,4	53,7	
Total	Number (n)	8	194	204	406	
	Percentage (%)	2	47,8	50,2	100	

The table 7 above shows gender with physical health with a p-value = 0.541, so the p-value> 0.05 means there is a relationship between gender and the quality of life in the physical health domain. Gender with psychology with a p-value-value p-value = 0.011, so that the p-value-value p-value <0.05 means a relationship exists between gender and the quality of life in the psychological health domain. Gender with social with a p-value = 0.870 so that the p value> 0.05 means there is no relationship between gender and the quality of life of the social domain health. Gender with the environment with a p-value = 0.845 so that the p value> 0.05 means there is no relationship between gender and the quality of life of the environmental domain health.

Relationship between Age and Quality of Life

Table 8. Age with quality of life

Age			Quality of Life Health				
			Low	Medium	High	N	P
Physical Activity	11-14 Years	Number (n)	0	57	82	139	
		Percentage (%)	0	14	20,2	34,2	
	15-20 Years	Number (n)	1	111	155	267	0,763
		Percentage (%)	2	27,3	38,2	65,8	
	Total	Number (n)	1	168	237	406	
		Percentage (%)	2	41,4	58,4	100	
			Psychology Status				
	11-14 Years	Number (n)	0	59	80	139	
		Percentage (%)	0	14,5	19,7	34,2	
	15-20 Years	Number (n)	21	120	126	267	0,002
		Percentage (%)	5,2	29,6	31	65,8	
	Total	Number (n)	21	179	206	406	
		Percentage (%)	5,2	44,1	50,7	100	
			Social Relationships				
	11-14 Years	Number (n)	5	73	61	139	
		Percentage (%)	1,2	18	15	34,2	
	15-20 Years	Number (n)	28	161	78	267	0,002
		Percentage (%)	6,9	39,7	19,2	65,8	
	Total	Number (n)	33	234	139	406	
		Percentage (%)	8,1	57,6	34,2	100	

Age		Quality of Life Health Low	Medium	High	N	P
		Environment				
11-14 Years	Number (n)	2	56	81	139	
	Percentage (%)	5	13,8	20	34,2	
15-20 Years	Number (n)	6	138	123	267	0,064
	Percentage (%)	1,5	34	30,3	65,8	
Total	Number (n)	8	194	204	406	
	Percentage (%)	2	47,8	50,2	100	

The table 8 above shows age with physical health with a p-value = 0.763, so the p-value> 0.05 means there is no relationship between age and the quality of life of the physical health domain. Age with psychology with a p-value = 0.002, so the p-value <0.05 means a relationship exists between age and the quality of life in the psychological health domain. Age with social with a p-value = 0.002 so that the p-value <0.05 means a relationship exists between age and the quality of life of the social domain health. Age with the environment with a p-value = 0.064, so the p-value> 0.05 means there is no relationship between age and environmental domain health quality of life.

Relationship between BMI and Quality of Life

Table 9. BMI with quality of life

Body Mass Index		Quality of Life Health Low	Medium	High	N	P
Physical Activity	Under Number (n)	0	17	28	45	
	Percentage (%)	0	4,2	6,9	11,1	
	Ideal Number (n)	1	131	194	326	0,376
	Percentage (%)	2	32,3	47,8	80,3	
	Overweight Number (n)	0	20	15	35	
	Percentage (%)	0	4,9	3,7	8,6	
	Total Number (n)	1	168	237	406	
	Percentage (%)	2	41,5	48,4	100	
		Psychology Status				
	Under Number (n)	3	24	18	45	
	Percentage (%)	7	5,9	4,4	11,1	
	Ideal Number (n)	17	138	171	326	0,547
	Percentage (%)	4,2	34	42,1	80,3	
	Overweight Number (n)	1	17	17	35	
	Percentage (%)	7	4,2	4,2	8,6	
	Total Number (n)	21	179	206	406	
	Percentage (%)	5,2	44,1	50,7	100	
		Social Relationships				
	Under Number (n)	4	23	18	45	
	Percentage (%)	1	5,7	4,4	11,1	
	Ideal Number (n)	25	189	11	326	0,686
	Percentage (%)	6,2	46,6	27,6	80,3	

Body Mass Index		Quality of Life Health Low	Medium	High	N	P
Overweight	Number (n)	4	22	9	35	
	Percentage (%)	1	5,4	2,2	8,6	
Total	Number (n)	33	234	139	406	
	Percentage (%)	8,1	57,6	34,2	100	
		Environment				
Under	Number (n)	2	21	22	45	
	Percentage (%)	5	5,2	5,4	11,1	
Ideal	Number (n)	4	154	168	326	0,199
	Percentage (%)	1	37,9	41,4	80,3	
Overweight	Number (n)	2	19	14	35	
	Percentage (%)	5	4,7	3,4	8,6	
Total	Number (n)	8	194	204	406	
	Percentage (%)	2	47,8	50,2	100	

The table 9 above shows BMI with physical health with a p-value = 0.376, so the p-value> 0.05 means there is no relationship between BMI and the quality of life in the physical health domain. IMT with psychology has a p-value = 0.547, so the p-value is> 0.05, which means there is no relationship between IMT and the quality of life in the psychological health domain. IMT with social with a p-value = 0.686 so that the p value> 0.05 means there is no relationship between IMT and the quality of life of the social domain health. IMT with the environment with a p-value = 0.199, so the p-value> 0.05 means there is no relationship between IMT and the environmental health quality of life.

Multivariate Analysis

Table 10. Bivariate Selection Results of Independent Variables on Quality of Life of Each Domain

Variables	Quality of Life Health Physical Domain	Psychological Domain	Social Domain	Environmental Domain
Physical Activity	0,313	0,522	0,112	0,100
Gender	0,541	0,011	0,870	0,845
Age	0,763	0,002	0,002	0,064
IMT	0,376	0,547	0,686	0,199

Based on the results of bivariate selection in the table, some variables in the physical, psychological, social, and environmental domains cannot be continued to multivariate analysis because the results of bivariate selection show there are several variables in each domain that are not related to the results of the *chi-square* test or p value> 0.05.

Table 11. Multivariate Analysis Results

Variables		Sig.	R-Square
Psychological Domain	Gender	0,007	0,086
	Age	0,000	
Social Domain	Age	0,000	0,037

Based on table 11 shows that the variables of gender and age have the highest influence on the quality of life of the Psychological domain by 8.6%, and other variables influence the rest. The age variable influences the quality of life in the social domain by 3.7%, and other variables influence the rest.

Relationship between Physical Activity and Quality of Life

This study found no relationship between physical activity and quality of life among adolescents in Bolaang Mongondow Regency. This shows no difference in quality of life between adolescents with less physical activity, enough, or sound. This study is also in line with research conducted by (Kumayas et al., 2022) in South Minahasa, which found no relationship between physical activity and the quality of life of adolescents' health there.

This study is different from several other studies, such as those conducted by (McGuine et al., 2021), who found that low levels of physical activity reduce the quality of health life of students who are in grade 12, especially athletes during periods of face-to-face restrictions in schools and sports activities. Adolescent athletes who are in grade 12 experience more significant anxiety and depression due to decreased physical activity due to restrictions on sports activities. Research (Porajow, 2021) in Manado City states that physically active adolescents have a better quality of health, especially in the psychological and social domains. The value of health and quality of life shows that physical activity has more effect on adolescent girls than adolescent boys.

The results of this study do not mean that physical activity is unnecessary because there is no relationship between physical activity and adolescents' quality of life. Physical activity is perfect for daily activities and improves health.

Relationship between Nutritional Status and Quality of Life

This study found no relationship between nutritional status and adolescents' quality of life. This study is in line with the results of research conducted by Mira Kuyamas, which explains that there is no relationship between nutritional status and the quality of life of adolescents in South Minahasa. However, this study contradicts research conducted by (Porajow, 2021) There is a relationship between nutritional status and quality of life, where adolescents who are too thin experience a significant decrease in environmental aspects compared to other adolescents; other aspects of health quality of life tend to decrease, although not statistically significant.

Several previous studies have also found an association between nutritional status and quality of life. For example, a study conducted on junior high school students in Jakarta showed a strong correlation between nutritional status and quality of life, where overweight or obese subjects usually reported a lower quality of life than those with normal nutritional status. (Khodijah et al., 2013). Based on research conducted in Padang, the nutritional status of adolescents impacts their quality of life; the more abnormal the nutritional status of an adolescent, the lower their quality of life. (Susmiati et al., 2019). According to research (Muros et al., 2017) there is also a relationship between the quality of life of adolescents and overnutrition, where the quality of life of adolescents increases. Research (Muros et al., 2017) also stated that there is a relationship between overnutrition and the quality of life of adolescents, where the quality of life of overnourished adolescents becomes lower than the quality of life of normal adolescents with a value of ($p=0.0001$) (Muros et al., 2017).

However, this research is supported by (Sakti et al., 2019) in Manado City, which shows that obesity is not associated with quality of life, where most students have a poor quality of life compared to a good quality of life. Improved quality of life in obese children and adolescents can occur after lifestyle improvements (Hoedjes et al., 2018).. Adolescents who are too thin experience a significant decrease in environmental aspects compared to other adolescents; other aspects of health and quality of life tend to decrease, although not statistically significant. In addition, social media is also one of the causes that influence students to recognize modern foods and drinks with more sugar, salt, and fat content. Advertisements of fast food products and the latest lifestyles in the media can increase students' consumption patterns and lifestyles. A poor diet can increase BMI, causing nutritional problems for students. Students are vulnerable to nutritional problems because it is a transitional period characterized by rapid growth (Growth Spurt), so relatively more significant nutrients are needed.

Technology development has changed not only students' diets but also their physical activity. Students are more interested in using gadgets than doing physical activities. Students who play with gadgets engage in inactive physical activity, commonly called a sedentary lifestyle, and can increase calorie intake during gadget use. Sedentary behavior in students is one of the significant risk factors that cause students to experience obesity, daily disorders (sleeplessness, dizziness, and premature aging), and degenerative diseases.

Relationship between age and quality of life of adolescents in Bolaang Mongondow Regency

The results of this study indicate a relationship between age and the quality of life of adolescents in Bolaang Mongondow Regency in the social and psychological domains. This is inversely proportional to research in South Minahasa Regency conducted by (Kumayas et al. 2022), who stated that adolescent age was not related to the adolescent quality of life, especially in the psychological domain, social domain, and environmental domain. Research from (Porajow, 2021) in Manado City states that the age factor has a difference in the quality of life in adolescents.

Adolescence is a transitional period from childhood to adulthood. In adolescence, growth and development occur gradually. Increasingly autonomous development, identity formation, and emotional and psychosocial development occur in adolescence. These developments that occur create responsibility for themselves and their surroundings. This stage of development gives adolescents a sense of happiness and anxiety because they do not yet have the ability, like adults, to control and control themselves and their environment (Currie et al., 2015).

Relationship between gender and quality of life of adolescents in Bolaang Mongondow Regency

This study found a relationship between gender and adolescent health quality of life in the Bolaang Mongondow district, in line with research in Manado City (Porajow, 2021), which also states that gender is related to the quality of life of adolescent health. The difference in results with research conducted by (Kumayas et al., 2022) in South Minahasa Regency stated that gender was not associated with adolescent quality of life. Differences in the quality of health life in female and male adolescents may be related to different pubertal transitions in female and male adolescents. Modern life, in addition to advancing humanity in many ways, also has an impact on the emergence of menarche in adolescent girls earlier than in the past. This timing change impacts adolescents' unsynchronized biological development and psychosocial maturity, especially adolescent girls (Patton et al., 2017). These things may result in adolescent girls perceiving their physique less by their ideal conditions so that disturbances in the physical aspects of the quality of life of adolescent girls are greater than those of adolescent boys, as the concept of quality of health life (Wilson & Cleary, 1995) and Sawyer and colleagues (2012) framework theory of adolescent development.

CONCLUSION

This study illustrates that the age and gender of adolescents have a significant influence on their quality of life in the Bolaang Mongondow District. Data analysis shows that the age range of 11-19 years impacts adolescents' psychological and social domains, according to Wilson and Cleary's theory, which emphasizes the importance of psychological factors and social relationships in determining adolescents' health and quality of life. In addition, gender also played an important role, especially in the psychological aspect, where both female and male adolescents showed good psychological quality. This study provides suggestions for future research, including the need for more in-depth measurement of physical activity to understand its impact on adolescents' overall quality of life. In addition, further observation of nutritional status is also suggested to gain a more complete understanding of the factors that influence adolescents' quality of life. The implications of this study highlight the importance of considering differences in age and gender when designing programs or interventions to improve adolescents' quality of life in Bolaang Mongondow Regency, especially in the psychological aspect.

This can help identify areas that need more attention and development to improve the wellbeing of adolescents in the region.

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