



Analysis of Biopsychosocial Influence on Adolescent Emotional Problems Using Structural Equation Model

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Abstract. Adolescent emotional problems are prevented through biological, psychological, and social factors (biopsychosocial). The biopsychosocial model is used to understand children's mental health conditions in the community. This study aims to identify the effect of biological, psychological, and social factors on adolescents' emotional problems in Medan City. Data were analyzed using a quantitative approach with Structural Equation Modeling (SEM) and Partial Least Squares (PLS) version 3.0. A simple probability sampling technique was carried out, and randomization was obtained from a random number table generated by computer. The sample size was 150 adolescents, calculated using the rule of thumb in the SEM model application. The results showed that the biological, psychological, and social factors are significantly related to adolescent emotional problems because it has a p-value <0.05 . However, social variables affect mental health conditions at 6.567, and family support becomes the most dominant indicator since it has 37.342. Adolescent emotional problems are influenced by biological, psychological, and social factors. Meanwhile, a social variable such as family support greatly affects children's mental health.

Keywords: Biopsychosocial · Emotional Aspect · Adolescents

1 Introduction

According to the World Health Organization (WHO), adolescents or teenagers are between the ages of 10 and 19. Teenagers occupy about 29% of the total population in most developing countries. For instance, about 44 million (16.3%) people living in Indonesia are adolescents [1].

A previous study showed that one in five teenagers worldwide suffers from mental health conditions, 30% of which are due to dropping out of school, exposure to drug consumption, violence, and the negative impact of internet usage over a long time [2]. According to [3], adolescents with emotional and behavioural problems are patients that mostly visit the Cipto Mangunkusumo Hospital.

Emotional problems require proper prevention because they negatively affect adolescents' development [4]. This mental health condition causes a rebellious action that disturbs the peer's comfort. However, this prevalence rate continues to increase each

year since there are no promotive, preventive, curative, or rehabilitative approaches. These approaches are carried out comprehensively, sustainably, and integrate to achieve optimal mental health degrees for individuals, families, and communities. Emotional problems in adolescents show the challenges faced in the future. Hence, health services must prioritize promotive and preventive approaches [5].

Identifying biological, psychological, and social factors prevents this mental health condition. The biopsychosocial model obtained from SEM help to understand the emotional problems in adolescents. This model is designed to detect physical health, disability, personality, genetics, intelligence, drug use, self-concept, coping and social skills, trauma, and interaction with family, peers, family, and school supports. Therefore, this study aims to identify the effect of biological, psychological, and social factors on the emotional problems of adolescents in Medan City.

2 Methods

2.1 Study Design

This study used a quantitative approach to analyze the effect of biological, psychological, and social factors on emotional problems in adolescents. The result showed that the biopsychosocial model helps to understand the influence of mental health conditions.

2.2 Population, Samples, and Sampling

A total of 150 adolescents were selected as the participants using the probability and a simple random method identified through a table with the help of a computer. In the first phase of this study, the minimum number of indicators multiplied by 10 to 20 was evaluated using Structural Equation Modeling (SEM) [6].

2.3 Instruments

Data were evaluated using the Strengths and Difficulties Questionnaire (SDQ), consisting of 5 statement items, including headaches and stomach, many worries, often unhappy, crying, nervous or easily losing confidence, and easily scared. The alternative answers provided for the participants through a checklist include not true, quite true, and true. A score ranging from 0–5, 6, and 7–10 was categorized as normal, borderline, and abnormal, respectively.

However, the biopsychosocial questionnaire was prepared independently based on a theory consisting of 56 statements. The biological, psychological, and social factors are arranged using 6, 5, and 3 indicators, each comprising four statements.

2.4 Data Analysis

Data were analyzed using SEM and Partial Least Squares (PLS) version 3.0. SEM examines the causal relationship between biological, psychological, and social variables with adolescent emotional problems. Therefore, this help to obtain a comprehensive description of the biopsychosocial model to prevent mental health conditions [7].

3 Result

Respondents who are female are 79 (52.7%), with an average age of 14 years. Meanwhile, 67 (44.7%) participants were in the highest education of Junior High School. The PLS was evaluated in three stages: the measurement, the structural models, and the hypothesis test.

3.1 Evaluation of the Measurement or the Outer Model

Based on the PLS calculation, the indicators were reliable because there is no loading factor <0.7 . The prosocial value was negative since the measuring method differed from other variables. Therefore, all of the statement items on the prosocial questionnaire were positive. The results of the study can be seen in Table 1.

The results of the validity test of the indicators on the variables can be seen in Fig. 1, which is equipped with the outer loading value. The outer loading output is obtained from the PLS Algorithm report on the Smart PLS software.

In addition to the results of convergent validity, the results of discriminant validity can be seen in Table 2, where the discriminant validity value is more than 0.5 so that it can be said that the construct is valid and meets the requirements of a good model.

Table 1. Outer Loading Model Penelitian

Variable		Outer Loading	Keterangan
Biological	Physical Health	0.797	Reliable
	Disability	0.944	Reliable
	Genetics	0.853	Reliable
	Personality	0.775	Reliable
	Intelligence	0.886	Reliable
	Drug Use	0.812	Reliable
Psychological	Self-concept	0.879	Reliable
	Coping Skills	0.813	Reliable
	Social Skills	0.884	Reliable
	Trauma	0.880	Reliable
	Family Interaction	0.813	Reliable
Social	Peer Support	0.859	Reliable
	Family support	0.870	Reliable
	School Support	0.777	Reliable
Adolescent Mental Health	Emotion	1.000	Reliable

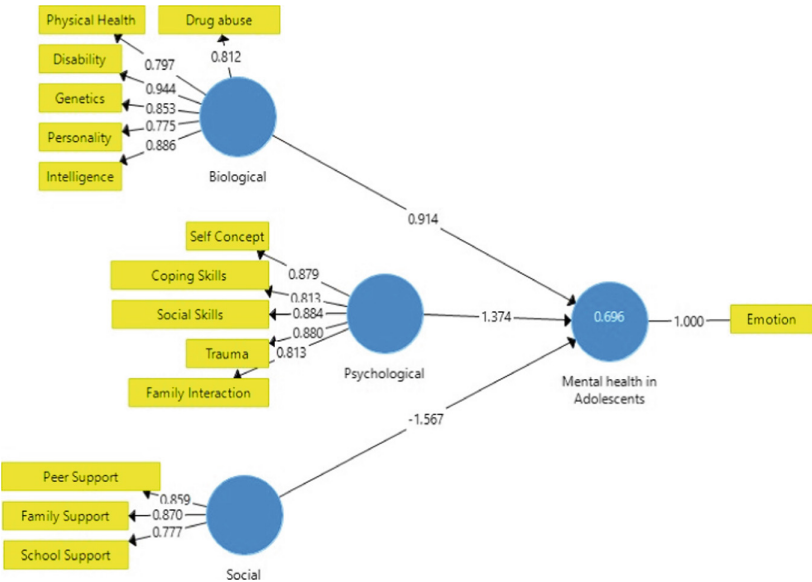


Fig. 1. Output Outer Loading

Table 2. Discriminant Validity Value

Variable	Discriminant Validity	Description
Biological	0.847	Valid
Psychological	0.854	Valid
Social	0.836	Valid
Adolescent Mental Health	1.000	Valid

3.2 Evaluation of the Structural or the Inner Model

The structural model was evaluated to predict the relationship between the value of a latent variable with $R > 0.05$. Strong, moderate, and weak methods are indicated as 0.70, 0.50, and 0.25, respectively. Based on Table 3, it can be explained as follows the value of R^2 on aspect emotional is 0.696. This value means that the magnitude of the influence of biological, psychological and social aspects on emotional aspects is 69,6%, while other variables outside the study explain the rest.

3.3 Hypothesis Testing

In order to measure the significance of the model evaluation, it can be seen from the value of t – statistic $> t$ -table ($\alpha = 5\%$) through the bootstrapping process. The results of the study can be seen in Table 4.

Table 3. Nilai R-Square (R^2)

Variable	R - Square
Emotional Aspects	0.696
- Biological	
- Psychological	
- Social	

Table 4. Path Coefficients and T-statistics values

Path chart	Original Sample (O)	Mean	SD	t-value	p-value	Description
Biological -Emotional Aspects	0.914	0.876	0.243	3.490	0.000	Significant
Psychological-Emotional Aspects	1.374	1.439	0.418	3.178	0.001	Significant
Social-Emotional Aspects	-1.567	- 1.588	0.253	6.567	0.000	Significant

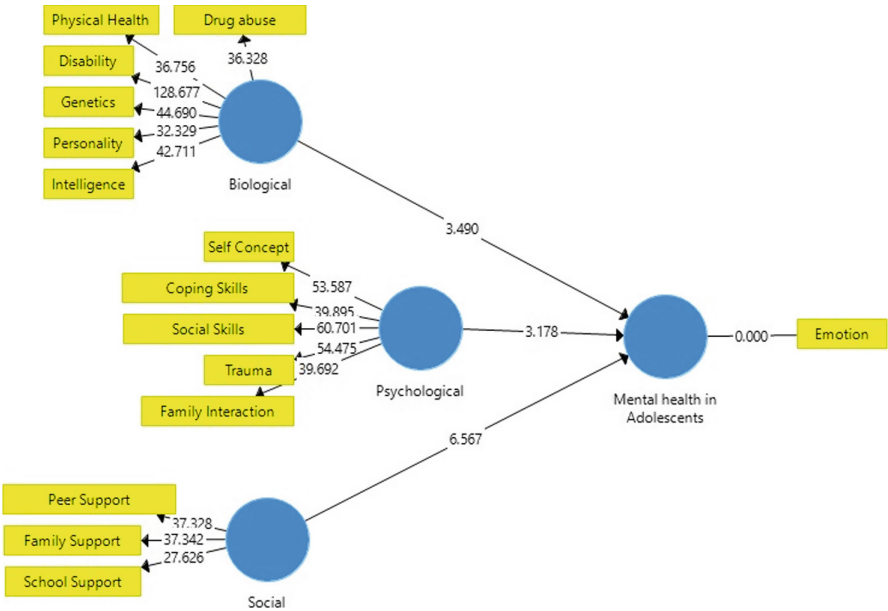


Fig. 2. Influence between variables

From Table 4, it can be seen that the relationship between the two variables has a significant relationship ($p\text{-value} < 0.05$). The influence between indicators and variables and the influence between variables can be seen in Fig. 2.

4 Discussion

This study's results showed that there is a significant relationship between the variables because of the $p\text{-value} < 0.05$. Biological, psychological, and social factors affect the adolescent emotional problems with 3.490, 3.178, and 6.567, respectively. Meanwhile, social variables where family support becomes the most dominant indicator influence the mental health conditions with 37.342.

According to [8], emotional problems are influenced by the social support from parents that use adaptive coping for children. This shows parenting patterns significantly affect adolescents' physical and mental development. Therefore, the treatment provided since childhood influences psychosocial development in adulthood [9].

Family support is another important indicator because it helps to prevent adolescent psychological problems. This kind of support tends to assist families in preventing serious challenges in the community [10]. Families are expected to easily detect and educate adolescents to suppress the future emergence of emotional problems. The role of the mother becomes important because it helps regulate children's mental health conditions [11]. Furthermore, the relationship quality between parents and adolescents tends to reduce emotional problems, depression, and antisocial behavior [12].

Mental health is influenced by support from parents. Parents are the figures who contribute the most to supporting mental health in adolescents because they are considered the closest people to adolescents who can help use adaptive coping when emotional problems occur. Parenting style will have a lasting impact on the continuity of the physical and mental development of adolescents. This parenting style will shape the character and character of adolescents in their adulthood. That is, the treatment of parents towards their adolescents from childhood will have an impact on psychosocial development in adulthood.

Family support is important because the family is a social component that can provide improvements to adolescent psychological problems. Family support in identifying problems that arise in adolescents will help families in more serious prevention. Through empowerment, families are expected to be able to detect problems early and provide appropriate education to adolescents to suppress the emergence of many emotional problems later in life [13].

Family social support can be categorized into four types, namely emotional support, instrumental support, informational support, and appraisal support [14]. Emotional support is the treatment given by the family in the form of love, care, sympathy, and other positive feelings, manifested by listening, offering praise, and always being present when needed. The treatment received from the family will create a feeling of comfort and lead the individual to believe that he is cared for, respected, and loved [15].

Research conducted by [16] shows that there is an effect of family emotional support on adolescent self-esteem. Family emotional support in the form of attention, trust, empathy, and concern for adolescents can make adolescents feel cared for, loved, comfortable, and valued. These positive feelings have an impact on the formation of adolescent self-esteem, namely a strong stance, optimism, and self-confidence.

Self-esteem is high when adolescents have good support, feel comfortable, and are cared for by others when they are in the environment. The closest environment for adolescents is the family. A family is a place for teenagers to tell stories, get advice, and a place to complain when teenagers experience a problem. Teenagers tend to think that the family is the most comfortable place to discuss problems, share happiness, and grow new, better hopes. Families can also be coping for adolescents who experience problems because they can solve adolescent problems [16].

Communication within the family is part of the interaction within the family and is the basis of family life and functions. Communication within the family is a medium for socializing with children, learning media for children, and media for cognitive and socio-emotional adjustments. Research conducted by [17], showed that communication is a predictor of mental health in adolescents. The existence of problems in family communication can be a source of significant psychological distress in adolescents. There is a link between family communication and psychological pressure where this impact is greater for women than for men. This shows that communication within the family affects the mental health of adolescents.

The family has a significant role in the physical, mental and social health of adolescents. Parents play a role in providing emotional support, role models, and protection, and can help adolescents go through important stages in their lives [18]. The family is the first place where children learn different behaviors and develop expectations for their social life. Communication in the family shows how to communicate that is done by each family member. Functions and communication within the family are closely related to the psychological well-being of adolescents [19].

Family support is a form of attention and affection given by the family, especially parents to adolescents, which can affect the mental health of adolescents. In line with research conducted by [20] regarding family support with the incidence of depression in adolescents, there is a significant contribution from parental support to student depression. The emotional support provided plays an effective role in overcoming the psychological pressure experienced by individuals during difficult times. This allows individuals to make efforts to solve the problems they face using problem-focused coping strategies. Thus it will minimize the occurrence of depression in adolescents.

Another support that can be provided by the family for the achievement of adolescent developmental tasks is instrumental. Instrumental support is real assistance in the form of tangible objects or energy provided by families to adolescents to support all the needs and activities needed by adolescents such as financial needs, eating, drinking, and resting [14]. This support can be realized by providing facilities according to the hobbies and interests of adolescents for self-potential development, providing transportation, treating them when sick, or helping adolescents with assignments.

[21] states that there is a significant relationship between family instrumental support and the occurrence of depression, the better the family's instrumental support, the lower

the occurrence of depression. Providing this support can help individuals in carrying out their activities to reduce feelings of individual inability to carry out their work. According to [22], providing financial and material support can facilitate adolescents' need to access knowledge with technology or meet nutritional needs to support their daily activities. Instrumental support in the form of providing facilities and infrastructure can support the achievement of children's competencies so that children will continue to feel optimistic in various ways.

The next support that teenagers need is informational. This support functions as a provider of information, and constructive suggestions from various sources such as books, the internet, or other people's experiences. This support can be applied to families by educating and providing information to adolescents about growth and development or providing suggestions, suggestions, and information that can be used to solve a problem [14]. [22], states that this support includes communication, responsibility providing solutions to problems, providing advice, direction, suggestions, or family feedback in directing children about growth and change in adolescence and offering good solutions. Inadequate information support from parents can cause adolescents to seek information from outside which will affect juvenile delinquency.

[23], states that there is a significant relationship between family social support and adolescent mental health, with moderate relationship strength. Social support provided in the form of verbal or non-verbal information or advice plays an effective role in overcoming the psychological pressure experienced by adolescents during difficult times. This allows adolescents to make efforts to solve the problems they face by using problem-focused coping strategies to minimize psychological distress. Adolescents who receive informational support from their families in the form of opportunities to tell stories, and ask for help, advice, or directions when facing personal problems can form a positive attitude of adolescents.

Appraisal or reward support is also needed by adolescents. Appreciation or appraisal support is a form of feedback provided by the family to individuals to help self-evaluate or assess a situation. Family ratings influence the behavior and attitudes of adolescents. Research conducted by [24] found that adolescents who received negative support from their families would also produce negative behavior. This study found that adolescents who received negative support from their families affected adolescent smoking behavior.

5 Conclusion

Emotional problems in adolescents are influenced by biological, psychological, and social factors. Meanwhile, a social variable such as family supports significantly affects children's mental health conditions.

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