



Blood Transfusion Incidence and Sociodemographics Relationship with Anxiety Levels of Thalassemia Major Parents

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ARTICLE INFO

Keywords:

Blood transfusion
Levels of anxiety
Parents
Sociodemography
Thalassemia major

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All authors have reviewed and approved the final version of the manuscript.

<https://doi.org/10.32539/BJI.v10i1.177>

ABSTRACT

Introduction. Thalassemia is inherited anemia in an autosomal recessive manner with a disruption in hemoglobin synthesis that causes a decreased amount of hemoglobin and anemia. Routine blood transfusions carried out by sufferers and parents' sociodemographic factors can cause an increased psychological burden on the patient's parents. This study investigated the relationship between the incidence of blood transfusions in pediatric patients and parents' sociodemographics with the anxiety level of parents in pediatric thalassemia major patients at RSMH Palembang. This study used an observational analytical method with a cross-sectional study design. **Methods.** This study used an observational analytical method with a cross-sectional study design. This study consisted of 42 respondents. This study used primary data from interviews and filling out the Z-SAS questionnaire and secondary data from medical records. **Results.** The distribution of blood transfusion found in thalassemia major children who had transfusions ≤ 1 time/month was 40.5%. Based on sociodemographics, 81% of respondents were women, 26.2% had a low level of education, 28.6% were in early adulthood, 61.9% had less income, 81% had 1 child, and 14.3% had thalassemia Major children diagnosed ≤ 1 year. The level of anxiety that dominated the results was normal/not anxious (72.8%) and mild anxiety (26.2%). (P Value= 0.305; 0.174; 1.00; 0.095; 0.158; 0.657; 0.644). **Conclusion.** There was no relation between blood transfusion incidence in children with thalassemia major and sociodemographic of parents with anxiety levels of children with thalassemia major parents in RSMH Palembang.

1. Introduction

Thalassemia is a type of hemolytic anemia in an early-life patient that is inherited by autosomal recessive from thalassemia carrier parents. This anemia is caused by abnormalities in the synthesis of α , β , and/or other globin chains so that their production decreases or does not exist at all. Due to these synthesis abnormalities, red blood cells are continuously destroyed, causing a short cell lifespan of less than 120 days (the normal lifespan of red blood cells).¹⁻⁷ A WHO report in 2008 stated that 40,000 babies would be born suffering from beta thalassemia every year throughout the world. From this number, an estimated 20,420 babies were born in Southeast Asia. Data from Riskesdas in 2007 shows Indonesia as one of the countries that has many thalassemia patients. In Indonesia, South Sumatra is one of the provinces that has the most thalassemia patients, namely 5.4%.^{3,4,8-10}

Death in thalassemia patients is mainly influenced by two factors. Those factors are the lack of adequate routine blood transfusions and complications caused

by excess iron in the body due to continuous blood transfusions. Blood transfusions and routine treatments carried out by thalassemia patients can cause an increased psychological burden on the patient's parents.¹¹ The anxiety faced by the patient's parents can be in the form of a financial burden.¹² Even though there is assistance from BPJS, there are still many supporting costs needed.¹

The burden of anxiety costs experienced by parents of pediatric thalassemia patients can also be influenced by various things, such as age, gender, level of education, and the number of children suffering from thalassemia. Parents of pediatric thalassemia patients can reduce their anxiety through age factors, such as increasing age, advice, and experience. Some researchers give the opinion that someone will experience anxiety more easily if they are younger than older. With gender factors, women are more likely to experience anxiety because they are considered more emotional than men. A person with a higher level of education can reduce the likelihood of anxiety because they have better

cognitive development than someone with a lower level of education.¹³ Parents who have more than one child as thalassemia patients certainly have an impact on their psychological burden. Parents who have previous experience caring for children with thalassemia from other siblings can have a big influence on their psychological condition.¹⁴

The psychological burden experienced by parents of Thalassemia patients can be overcome and reduced by using appropriate and effective coping strategies. Parents of pediatric thalassemia major patients need time to adjust to the situation they are experiencing using coping strategies. Therefore, research is needed to evaluate the relationship between the length of diagnosis of thalassemia major pediatric patients and the anxiety experienced by their parents. If anxiety continues to occur, it can cause stress and reduce the quality of life, such as social function, cognitive function, and so on.¹⁵⁻¹⁸

Routine blood transfusions in thalassemia patients can cause anxiety in parents of thalassemia patients resulting in a decrease in quality of life. Anxiety experienced by parents can be influenced by sociodemographics. To prove this problem, this research was conducted to analyze the relationship between the incidence of blood transfusions in pediatric patients and parental sociodemographic with the anxiety level of parents of pediatric patients with thalassemia major at RSMH Palembang. This research is important because anxiety is often experienced by parents of thalassemia patients and results in poor quality of life.

2. Methods

This research used observational analytical methods with a cross-sectional study design. The data needed is primary data from interviews and filling out the Z-SAS questionnaire as well as secondary data through medical records to determine the identity of parents and pediatric Thalassemia major patients at RSMH Palembang. Data collection was carried out at RSMH Palembang from May to October 2023.

The independent variables in this study were the incidence of blood transfusions in pediatric Thalassemia major patients at RSMH Palembang and the sociodemographics of the parents of pediatric thalassemia major patients which included gender,

age, education level and monthly income, number of thalassemia patient children, and length of diagnosis of patients. The dependent variable in this study was the anxiety level of parents of pediatric thalassemia major patients at RSMH Palembang. Respondents are categorized as experiencing anxiety if they have a Z-SAS questionnaire score of ≥ 45 or more.

The population in this study were all parents of pediatric thalassemia major patients at RSMH Palembang who were registered until 2023. The sample in this study were all parents of pediatric thalassemia Major patients at RSMH Palembang who met the inclusion criteria and did not meet the exclusion criteria and dropout criteria as follows:

Inclusion criteria:

Parents who have children under 18 years as thalassemia major patients who undergo blood transfusions at RSMH Palembang in 2023.

Exclusion criteria:

Data in medical records is incomplete, such as the age of patients, number of blood transfusions per month, length of diagnosis of patients, and contact of parents of pediatric thalassemia major patients and medical records show that pediatric thalassemia major patients are orphans.

Dropout criteria:

The subject withdrew from the research process, consumed antianxiety, antidepressant, and antipsychotic medication, had an anxiety disorder before the child was diagnosed with thalassemia major, and the subject is a family member other than the biological parents of pediatric thalassemia major patients

The minimum sample in this research is 35 samples. From 35 samples, 20% was added to anticipate dropouts. This research has used a sample of at least 42 samples.

The results of the data that have been collected will be processed using the SPSS application. Univariate and bivariate analyses will be carried out.

This research has been granted approval from The Ethics Commission of Dr. Mohammad Hoesin General Hospital Palembang (DP.04.03/D.XVIII.2.3/141/2023, DP.04.03/D.XVIII.2.3/155/2023, and DP.04.03/D.XVIII.6.8/ETIK/120/2023).

Table 1. Distribution of respondents based on parents' anxiety level

Anxiety level	Frequency	
	Total (N)	Percentage (%)
Normal	31	72.8
Mild anxiety	11	26.2
Moderate anxiety	0	0
Severe anxiety	0	0
Total	42	100

3. Results

Respondents in this study were parents of pediatric thalassemia major patients who were registered until 2023. The number of respondents of 42 has met the minimum sample size. Table 1 provides the results of the distribution of respondents based on parents' anxiety levels. It was found that 26.2% of the 42 respondents experienced mild anxiety (Z-SAS questionnaire scores between 45-59). Table 2 shows the distribution of blood transfusion incidence of pediatric thalassemia Major patients who performed blood transfusions, where 59.5% of thalassemia major children performed blood transfusions > 1 time/month.

Table 3 provides the results of the distribution of respondents based on sociodemographic status. The prevalence of female parents was 81% of the 42 respondents. The education level is divided into three categories, namely low, moderate, and high. Of the three categories, 26.2% of parents of thalassemia major children had low education. Parents' age is divided into five categories, namely early adulthood (26-35 years), late adulthood (36-45 years), early old

age (46-55 years), late old age (56-65 years), and elderly (≥ 65 years). Parents of pediatric thalassemia major patients who are categorized as early adulthood category are 28.6%. The prevalence of low family income category of parents gave a result of 61.9%. The distribution of parents who only had 1 child was 81%. The variable of length of diagnosis of pediatric thalassemia major patients gave a distribution with the results of children who had been diagnosed with thalassemia major ≤ 1 year was 14.3%.

The relationship between parents' anxiety levels and the incidence of blood transfusion in thalassemia major patients is presented in Table 4. Table 4 shows the results that of the 17 thalassemia major patients who performed blood transfusions >1 time/month, there were 5 (11.9%) respondents who experienced mild anxiety and 20 (59.5%) normal respondents. Table 5 presents the relationship between anxiety levels and parents' gender. It was found that out of 34 female respondents, 7 (16.7%) respondents experienced mild anxiety and 27 (64.3%) respondents were normal.

Table 2. Distribution of respondents based on the incidence of blood transfusion

Incidence of blood transfusion	Frequency	
	Total (N)	Percentage (%)
> 1 time/month	25	59.5
≤ 1 time/month	17	40.5
Total	42	100

Table 3. Distribution of respondents based on sociodemographic status

Variable	Frequency	
	Total (N)	Percentage (%)
Gender		
Female	34	81
Male	8	19
Education level		
Low	11	26.2
Moderate	21	50
High	10	23.8
Age		
Early adulthood	12	28.6
Late adulthood	22	52.4
Early old age	7	16.7
Late old age	1	2.4
Elderly	0	0
Family income		
Low income	26	61.9
Sufficient income	16	38.1
Length of diagnosis		
≤ 1 year	6	14.3
> 1 year	36	85.7
Number of Thalassemia patient children		
> 1	8	19
1	34	81

Table 4. Relationship between anxiety level and education level of parents of pediatric thalassemia major patients

Blood transfusion incidence	Anxiety level		N (%)	P value	PR (CI 95%)
	Mild anxiety	Normal			
> 1 time/month	5 (11,9%)	20 (47.6%)	25 (59.5%)	0.305	0.458 (0.113-1.852)
≤ 1 time/month	6 (14,3%)	11 (26.2%)	17 (40.5 %)		
Total	11 (26.2%)	31(37.8%)	42 (100%)		

Table 5. Relationship between anxiety level and gender of parents of pediatric thalassemia major patients

Gender	Anxiety level		N (%)	P value	PR (CI 95%)
	Mild anxiety	Normal			
Female	7 (16.7%)	27 (64.3%)	34 (81%)	0.174	0.259 (0.052-1.305)
Male	4 (9.5%)	4 (9.5%)	8 (19%)		
Total	11 (26.2%)	31 (73.8%)	42 (100%)		

Table 6. Relationship between anxiety level and education level of parents of pediatric thalassemia major patients

Education level	Anxiety level		N (%)	P value	PR (CI 95%)
	Mild anxiety	Normal			
Low	4 (9.5%)	7 (16.7%)	11 (26.2%)	0.095	1.959 (0.442-8.687)
Moderate	7 (16.7%)	24 (57.1%)	31 (73.8%)		
High	0 (0%)	10 (23.8%)	10 (23.8%)		
Total	11 (26.2%)	31 (73.8%)	42 (100%)		

Table 7. Relationship between anxiety level and age of parents of pediatric thalassemia major patients

Age	Anxiety level		N (%)	P value	PR (CI 95%)
	Mild anxiety	Normal			
Early adulthood - late adulthood	9 (21.4%)	25 (59.5%)	34 (81%)	1.00	1.080 (0.184-6.356)
Early old age - late old age - elderly	2 (4.8%)	6 (14.3%)	8 (19%)		
Total	11 (26.2%)	31 (73.8%)	42 (100%)		

Table 8. Relationship between anxiety level and family income

Family income	Anxiety level		N (%)	P value	PR (CI 95%)
	Mild anxiety	Normal			
Low income	9 (21.4%)	17 (40.5%)	26 (61.9%)	0.158	3.706 (0.685-20.035)
Sufficient income	2 (4.8%)	14 (33.3%)	16 (38.1%)		
Total	11 (26.2%)	31 (73.8%)	42 (100%)		

Table 9. Relationship between anxiety level and length of diagnosis of pediatric thalassemia major patients

Family income	Anxiety level		N (%)	P value	PR (CI 95%)
	Mild anxiety	Normal			
≤ 1 year	2 (4.8%)	4 (9.5%)	6 (14.3%)	0.644	1.500 (0.234-9.611)
> 1 year	9 (21.4%)	27 (64.3%)	36 (85.7%)		
Total	11 (26.2%)	31 (73.8%)	42 (100%)		

Table 10. Relationship between anxiety level and the number of thalassemia patient children

Number of thalassemia patient children	Anxiety level		N (%)	P value	PR (CI 95%)
	Mild anxiety	Normal			
> 1	1 (2.4%)	7 (16.7%)	8 (19%)	0.657	0.343 (0.037 - 3.161)
1	10 (23.8%)	24 (57.1%)	34 (81%)		
Total	11 (26.2%)	31 (73.8%)	42 (100%)		

Table 6 shows the relationship between anxiety levels and parents' education levels which gives the results that out of 11 respondents with low education level, there are 4 (9.5%) respondents who experienced mild anxiety and 7 (16.7%) normal respondents. The relationship between anxiety levels

and age is presented in Table 7.

Table 7 shows the results that of the 34 respondents who were categorized as early adulthood-late adulthood category, there were 9 (21.4%) respondents who experienced mild anxiety and 25 (59.5%) normal respondents.

Table 8 shows the results of the relationship between anxiety levels and family income. Of the 26 respondents who fell into the category of low family income, there were 9 (21.4%) respondents who experienced mild anxiety and 17 (40.5%) normal respondents.

The relationship between anxiety levels and length of diagnosis is presented in Table 9. Table 9 shows the results that out of 6 pediatric thalassemia major patients who have been diagnosed ≤ 1 year, there are 2 (4.8%) respondents who experienced mild anxiety and 4 (9.5%) normal respondents.

The relationship between anxiety level and the number of thalassemia patient children is presented in Table 10. From Table 10, it was found that out of 34 respondents who had 1 major thalassemia child, there were 10 (23.8%) respondents experiencing mild anxiety and 24 (57.1%) normal respondents.

4. Discussion

Only normal anxiety and mild anxiety were found in the results of this study. Of the 42 respondents, 11 (26.2%) respondents experienced mild anxiety. Research by Renylda (2018) at RSUD H. Abdul Manap Jambi City gave results that there is mild anxiety (18.2%), moderate anxiety (78.8%), and severe anxiety (3%). Research by Hastuti (2015) at Ahmad Yani Metro Lampung Hospital gave results that there was mild anxiety as much as 36.7% and moderate-heavy anxiety as much as 63.3%. The results of this study indicate that there were no respondents who experienced moderate anxiety and severe anxiety. This can occur due to the many factors that influence anxiety. Factors that affect anxiety can be intrinsic factors and extrinsic factors. Some intrinsic factors are age, gender, and education level. Extrinsic factors can include diagnosis, health-related facilities, family support, environment, communication, and sources of information.^{19,20} Some of these factors will be discussed further in the results of this study.

The incidence of blood transfusions more than 1 time/month is higher than in pediatric Thalassemia major patients who only do blood transfusions less than 1 time/month, namely 59.5% >1 time/month and 40.5% >1 time/month. Aqilla's research (2020) at Al-Ihsan Hospital found that Thalassemia patients who performed blood transfusions ≥ 12 times per year were 65% (more than patients who only performed blood transfusions 1 time/month or more).²¹ Research conducted by Purba (2019) in Central Java stated that there were 69.2% of Thalassemia patients who performed blood transfusions ≥ 6 times in 6 months.²² The high frequency of blood transfusions can be attributed to the theory that as a child gets older, the frequency of blood transfusions will increase to support their life.²³

The gender distribution of parents of pediatric thalassemia major patients was dominated by female gender, with as many as 34 respondents or 81% of 42 respondents. This shows that mothers are parents

who often accompany pediatric thalassemia major patients to do blood transfusions. Research by Renylda (2018) at H. Abdul Manap Hospital shows that female is the most common gender found (78.8%).¹¹ Rani's research (2022) at RSMH Palembang gave results that were in line with this study, which found that the gender of parents who more often accompanied children to do blood transfusions was female (82.7%).¹⁸ The tendency for mothers to have a stronger bond and closer relationship with their children than fathers may be one of the reasons.²⁴ From this, mothers are parents who accompany their children for blood transfusions more often than fathers because mothers are usually closer to their children than fathers.

The distribution of low education levels was less than moderate education levels, with 26.2% of low education levels and 50% of moderate education levels. Moderate education means parents with a high school education or who did not graduate from college/academy.²⁵ The results of this study are in line with research by Renylda (2018) at H. Abdul Manap Hospital and Setiawati (2019) at Dr. H. Abdul Moeloek Hospital which gave the results that the parents of Thalassemia patients mostly had high school education (58.3%).^{11,26} This is supported by data stating that in Indonesia, the population generally attains secondary education.²⁷ From the results of this study, parents of pediatric Thalassemia Major patients at RSMH Palembang are mostly categorized into moderate education level which is the most common education level in Indonesia.

The age category of parents of pediatric thalassemia major patients in early adulthood is lower than in late adulthood, with 28.6% in early adulthood and 52.4% in late adulthood. Late adulthood is the age category between 36-45 years old.²⁸ These results are in line with several studies that provide results that the proportion of Thalassemia parents' age ranges between these figures, such as research by Renylda (2018) at H. Abdul Manap Hospital which gave result that the most age results is 31-40 years old (48.2%) and research by Setiawati (2019) at Dr. H. Abdul Moeloek Hospital which gave result that the most age results is 36-58 years old (68.3%).^{11,26} Data from Badan Pusat Statistik in 2022 states that Indonesia's population is dominated by the productive age population (15-44 years old).^{29,30} In a study by Setyowati (2017) in Medan, mothers and fathers had an average age of marriage that fell into the early adulthood category, while the average age of Thalassemia patients according to Sawitri's research (2018) at RSU Cut Meutia was 9.82 years.^{12,31} The age category of parents of pediatric Thalassemia Major children at RSMH Palembang is influenced by the average age of marriage and the average age of Thalassemia patients.

The distribution of family income gave the results of less income category were found in as many as 26

respondents or 61.9% of 42 respondents. This is in line with the results of Rani's research (2022) that parents of Thalassemia children at Dr. Mohammad Hoesin Palembang Hospital in 2022 had more income below the minimum wage (69.3%).¹⁸ In 2018, data from the Badan Pusat Statistik stated that the Indonesian population categorized as poor was still considered high (25.95 million people).³² The economic situation of parents of pediatric Thalassemia major children at RSMH Palembang who are less or below the minimum wage is influenced by the poverty rate in Indonesia which is still high.

The distribution of the number of thalassemia patient children showed the results of parents who only had 1 child with thalassemia in 34 respondents or 81% of the 42 respondents. Hijriani's research (2018) at Majalengka Hospital gave results that were in line with this study (88.1% only had 1 thalassemia child).³³ This can be attributed to the percentage of thalassemia passed on to children from both parents who both carry the thalassemia gene, which is only 25% who will suffer from thalassemia major.³⁴ Parents of pediatric thalassemia major patients who mostly only have 1 child with thalassemia major are influenced by the nature of the thalassemia gene decline.

Pediatric thalassemia major patients who were newly diagnosed with thalassemia major for less than 1 year were fewer in number than children who had been diagnosed for more than 1 year. The number of thalassemia major pediatric patients who have been diagnosed with thalassemia major for more than 1 year is 36 pediatric patients or 85.7% of 42 respondents. Research by Fendri (2018) showed that only 3.3% of thalassemia pediatric patients were newly diagnosed for 1 year. This is in line with the increasing life expectancy of thalassemia major patients through supportive therapy that supports life, such as routine blood transfusions, iron chelation drugs, and others.¹ More pediatric thalassemia major patients who have been diagnosed with thalassemia major for more than 1 year are certainly inseparable from the success of routine treatment.

The result that there is no significant relationship between the level of anxiety and the incidence of transfusion of thalassemia major pediatric patients was obtained in this study. The prevalence of mild anxiety according to the incidence of transfusion was most prevalent in the category ≤ 1 time/month, which was 14.3% compared to the category > 1 time/month, which was 11.9%. The researcher has not found any previous research on the relationship between anxiety levels and the incidence of transfusion, so the results of this study cannot be compared. The frequency of parents meeting each other every time their children have blood transfusions can be related to the results of this study. In Asis' research (2021), it was found that there was a significant effect between community and decreased anxiety.³⁵ The researcher concluded that the small number of transfusions

would be related to the small number of times parents socialize and support each other so that parents with children who fall into the category of blood transfusion incidence ≤ 1 time/month are more at risk of experiencing mild anxiety.

It was found that there was no significant relationship between anxiety level and gender of parents of pediatric thalassemia major children in this study. The results of this study, there is no significant relationship, does not correspond with research by Suvera (2013) in India which states that there is a significant relationship between gender and anxiety level of parents of thalassemia major children.³⁶ This difference can occur due to the influence of factors other than gender that can affect anxiety. The results of this study provide a prevalence that parents with female gender found more mild anxiety, namely 16.7% than parents with male gender, namely 9.5%. This result is supported by the theory that states that women are more prone to anxiety than men.³⁷

It was found that there was no significant relationship between anxiety level and age of parents of pediatric Thalassemia major children in this study. The results in this study provide results that are in line with research by Hijriani (2018) at Majalengka Hospital, namely there is a non-meaningful relationship between anxiety level and age.³³ The prevalence of mild anxiety is more prevalent in the early adulthood-late adulthood age category, which is 21.4% compared to the early elderly-late elderly age category, which is 4.8%. The results of this study are supported by the theory that anxiety will decrease with age due to the increase in experiences and advice.¹³ This can be seen from the higher percentage of age in the younger group experiencing anxiety compared to the older group.

It was found that there was no significant relationship between anxiety level and education level of parents of pediatric thalassemia major children in this study. The results in this study provide results that are in line with research by Hijriani (2018) at Majalengka Hospital, namely the absence of a meaningful relationship between education level and anxiety level.³³ The result of this study provides the prevalence of parents of thalassemia major children who experience anxiety and have a low level of education is less (9.5%) than a moderate level of education (16.7%). This is not in line with the statement that a higher level of education can help a person to reduce and overcome the anxiety they face.¹³ This difference may occur due to the influence of other factors that can affect anxiety.

It was found that there was no significant relationship between anxiety levels and family income in this study. This result does not correspond with Hastuti's (2015) research at Ahmad Yani Metro Hospital which states that there is a significant relationship between income and anxiety levels.³⁸

This difference can be attributed to the influence of other factors that affect anxiety in a person. Parents with less income experienced more mild anxiety (21.4%) than parents with sufficient income (4.8%). This is in line with the anxiety theory where the costs of treatment and supportive costs for children with Thalassemia major are considered quite large even though they have been assisted by the existence of BPJS health.³⁸

In this study, it was found that there was no significant relationship between the level of anxiety and the length of diagnosis of pediatric thalassemia major patients. The percentage of mild anxiety in parents of pediatric thalassemia major patients who have children with a diagnosis duration of ≤ 1 year (4.8%) is lower compared to the category of diagnosis duration > 1 year (21.4%). The results in this study do not correspond with research by Vernon (2017) that showed that there is a significant relationship between anxiety levels and length of diagnosis.³⁹ Anxiety that is more common in children who have been diagnosed for > 1 year less can be related to the theory that the anxiety a person feels can be overcome or reduced through coping strategies. Coping strategies take time to begin to work as was done in Koizumi's study. From the time of the child's diagnosis, parents can begin to adapt to the diagnosis. This is aided by the existence of coping strategies. For a person, friends, family, and religion can be sources of effective coping strategies.⁴⁰⁻⁴² In contrast to this theory, the results of this study can be related to the theory that parents with children who experience chronic diseases do not experience a significant decrease in psychological burden compared to parents with children who do not experience chronic diseases.⁴³

This study provides results that there is a non-meaningful relationship between the level of anxiety and the number of thalassemia patient children. The results of this study are in line with research by Aziza (2018) in Central Java and East Java, namely the existence of a non-meaningful relationship in the number of children 1 and more than 1.⁴⁰ Research by Hijriani (2018) at Majalengka Regional Hospital gave the same results, which are in line with this study. The study found that there was no relationship between the variable number of thalassemia children in a family and anxiety.³³ This study provides prevalence results, namely more percentage of mild anxiety in parents who only have 1 child, which is 23.8% compared to parents who have > 1 child, which is 2.4%. This can be attributed to experience with previous children so that parents tend to have decreased anxiety. The theory comes from Anastasia (2021), namely the experience a person has will cause development in that person so that later when facing the same problem, the person will find it easier to control their anxiety level.⁴⁴

5. Conclusion

There was no relationship between the incidence of blood transfusion of pediatric thalassemia major patients and the level of anxiety of parents of pediatric thalassemia major patients at RSMH Palembang. There was also no relationship between the anxiety level of parents of pediatric thalassemia major patients at RSMH Palembang and the independent variables of gender, age, education level, family income, number of children with thalassemia, and length of diagnosis.

6. Acknowledgements

We would like to express sincere gratitude to all the mentors and supporters who always gave their support both advice and mental support, which makes it possible for us to complete this article.

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