

RESEARCH STUDY

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Factors Associated to Nutritional Status of Children with Autism Spectrum Disorder (ASD) at Special Schools in JABODETABEK Area 2023

Faktor yang Berhubungan dengan Status Gizi Anak dengan Autism Spectrum Disorder (ASD) di Sekolah Khusus Wilayah JABODETABEK Tahun 2023

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10.20473/amnt.v8i2.2024.206-213**Available online at:**<https://e-journal.unair.ac.id/AMNT>**Keywords:**ASD, Parenting Style,
Nutritional Status**ABSTRACT**

Background: The prevalence of Autism Spectrum Disorder (ASD) in Indonesia was predicted to increase by 500 people annually from 2010, and there are still many nutrition problems found in this group. Nutritional status in ASD is affected by several factors, including mother's education level, parenting style, knowledge of balanced nutrition and parental income.

Objectives: To analyze the relationship between mother's education level, parenting style, knowledge of balanced diet and parental income on the nutritional status of persons with ASD in Special Schools in the JABODETABEK (Jakarta, Bogor, Depok, Tangerang, Bekasi) area.

Methods: This study was an observational study with a cross-sectional design. The population in this study were people with ASD in Special Schools in the JABODETABEK area. Sampling was conducted using the Quota Sampling method, conducted in March-May 2023 with a total sample of 114 respondents. The data analysis used was the Spearman rank test.

Results: Results showed that children and adolescent with ASD in our study had a good nutritional status (average Z-Score=0.81). The bivariate test shows that there was a fairly strong relationship between parenting style (p-value=0.007; r=0.250) and the nutritional status of children and adolescent with ASD. However, there was no relationship between the mother's education level (p-value=0.949), knowledge of balanced diet (p-value=0.728), and parental income (p-value=0.976) with the nutritional status of people with ASD.

Conclusions: Parenting style shows a significant positive correlation with the nutritional status of people with ASD in Special Schools in the JABODETABEK area.

INTRODUCTION

Complex disorders such as verbal and non-verbal communication and social interaction disorders are common in children with Autism Spectrum Disorder (ASD)¹. Previously this condition was separated into 5 classifications namely Childhood Autism, Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS), Rett's Syndrome, Childhood disintegrative disorder, and Asperger Syndrome². However, these terms are now known as Autism Spectrum Disorder (ASD)³. Handling for people with ASD requires more attention and the role of parents in supporting their development⁴.

According to the World Health Organization (WHO) in 2018, it is estimated that one in 160 children in the world is diagnosed with ASD. Based on data from the Center for Control in 2014, it is estimated that 1 in 68 children in the United States is diagnosed with ASD⁵. However, the exact prevalence of ASD in Indonesia is unknown, but of the 237.5 million Indonesian population

with a growth of 1.14%, the estimated prevalence of ASD is 2.4 million people and is predicted since 2010 to increase by 500 people per year⁶. In people with ASD, there are many health problems, one of which is nutritional status⁷. Nutritional status is the result of measurements on the balance of intake with daily needs⁸. People with ASD are advised to have good nutritional status in order to get a good quality of life⁹.

Looking at the RISKESDAS data from 2013 to 2018, there is an increase in the prevalence of children's nutritional status in the obese category^{10,11}. According to research conducted at the Citra Anindya Bintaro school in South Tangerang City, it was found that of the total sample of 32 respondents, 40.6% of people with ASD were classified as obese. Another 12.5% were found to be overnutrition, while 9.4% were identified as undernutrition¹². Therefore, this problem needs to be considered by the government or local health workers.

The survival of people with ASD is related to the mother's education level, which affects the mother's behavior and attitude towards her child, and is an important factor in improving family nutrition¹³. The mother's education level and the nutritional status of ASD have a significant relationship, which is supported by one of the researchers¹⁴. It is said that mothers who have a high level of education are more likely to receive information related to nutrition for ASD¹³.

Parenting is an important role for the development and nutritional status of ASD children. According to one study, there is a relationship between parenting and the nutritional status of ASD children in the city¹⁵. People with ASD have limitations in terms of behavior, so eating parenting must be given more attention because it will affect the growth, development, and nutritional status of ASD children¹⁶. Parenting is closely related to parents' knowledge of the nutrition needed by people with ASD.

Knowledge, especially related to balanced nutrition, has a significant effect on the nutritional status of people with ASD. This can be influenced because parental knowledge related to balanced nutrition has an impact on the quality of food and the nutritional content of food consumed, so to improve the quality of nutritional status in people with ASD, knowledge of balanced nutrition has an important role¹⁷. Knowledge of balanced nutrition and nutritional status of ASD has a significant relationship, which is supported by one study¹⁸. Parents who have good balanced nutrition knowledge must also be supported by sufficient socio-economic so that parents can realize their knowledge¹⁹.

The quality and quantity of food consumed by the family comes from parental income, so that the nutritional status of people with ASD is affected by parental income²⁰. This statement is supported by one researcher who said that there is a significant relationship between socioeconomic and nutritional status in ASD children²¹. Parents with low income tend to have poor nutritional status, this statement is associated with one of the arguments that parents with low income often face problems in providing and providing nutritious food²¹. Therefore, income greatly affect the choice of food and the greater the income, the greater the chances of people with ASD getting a quality life²².

Based on data from previous studies, it shows that factors such as maternal education level, parenting patterns, knowledge of balanced nutrition, and parental income are associated with the nutritional status of people with ASD. However, there are still rare studies conducted in the JABODETABEK area. Therefore, it is necessary to conduct further research which is expected to see factors associated with nutritional status in people with ASD in Special Schools in the JABODETABEK area. This study aims to describe and analyze the relationship between maternal education level, parenting patterns, knowledge of balanced nutrition, and parental income with the nutritional status of people with ASD in special schools in the JABODETABEK area.

METHODS

This study used observational research with a cross-sectional design. All students with ASD in in Special

Schools in the JABODETABEK are the population in this study. The research sample was calculated using the Lameshow formula (1990) and obtained a minimum sample size based on previous research of 101 respondents. Sampling was carried out using the Quota Sampling method, in which this method is used to determine a sample from a population that has certain characteristics until it reaches the desired number²³. The inclusion criteria in this study are guardians/parents/caregivers of students with ASD who are willing to fill out informed consent, guardians/parents/caregivers and children are willing to become respondents and follow the research until it is completed, guardians/parents/caregivers and children can cooperate in filling out questionnaires, and people with ASD aged 5-18 years which was carried out in March-May 2023.

The total number of respondents in this study was 114 respondents who were people with ASD in the JABODETABEK area (Jakarta, Bogor, Depok, Tangerang and Bekasi). The research location consists of several special schools, namely Sekolah Luar Biasa, Sekolah Khusus/Inklusi, and Pusat Terapi dan Layanan Pendidikan. Sekolah Luar Biasa (SLB) is a formal education institution that provides special education to children with special needs. These schools cater to students who experience challenges in the learning process. Special schools serve the educational needs of children with disabilities, including the blind, deaf, speech impaired, ASD and other disabilities²⁴. In this study, there were three special schools in the Depok and Jakarta areas.

Educational services that provide programs that match competencies and needs, and provide support for children are special schools, also known as inclusive schools. This education places children with low to severe levels of special needs in the classroom²⁵. In this study, the selected special schools are schools that specialize in children with special needs who attend these schools. There were seven schools sampled in the Jakarta, Depok, Tangerang and Bogor areas. The special schools taken as research locations have a larger number of students compared to SLB. Because the special schools which became the research locations are more likely to specialize in one group of people with special needs, namely people with ASD.

The therapy center has the main function as a place of therapy specifically for people with ASD which can be done in various ways²⁶. Educational services are services provided to fulfill the needs of children with special needs, so that they can develop their potential. In this research, there is one Therapy and Education Service Center in the South Tangerang area. The Center for Therapy and Education Services taken as the research location has a smaller number of students compared to Special Schools (SLB) and Special Schools. In addition, the schedule at the Center for Therapy and Education Services is different from the schedule of Special Schools, at the Center for Therapy and Education Services the learning schedule is more divided into several learning session times.

Data collection consisted of primary data based on respondent characteristics (child's name, parent's name, address, age, gender, place/date of birth, and

parent's phone number), dependent variables namely anthropometric data (height and weight), then independent variables such as socioeconomic (mother's education level and parent's income), parenting patterns, and knowledge of balanced nutrition. Data collection was done by distributing questionnaires to parents/caregivers/guardians.

Anthropometric measurements (body weight (kg) and height (cm) were carried out directly and assisted by school teachers. The measuring instruments used were digital scales to measure body weight with an accuracy of 100 grams or 0.1 kg and microtoice to measure height with an accuracy of 0.1 cm. After obtaining anthropometric data, the nutritional status of children was identified using IMT/U nutritional status with z-score for ages 5-18 years, then nutritional status was classified according to the Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2020 concerning the Determination of Child Anthropometric Standards which is divided into 5 categories, namely <-3 SD (malnutrition), -3 SD to <-2 SD (undernutrition), -2 SD to +1 SD (good nutrition), +1 SD to +2 SD (overnutrition), >+2 SD (obesity)²⁷.

The questionnaire related to the mother's education level consisted of no school up to college. The parental income questionnaire was distributed by means of parents filling out the questionnaire with the appropriate value obtained. The parenting questionnaire consisted of 9 questions which consisted of questions related to feeding parenting for people with ASD and 20 questions related to balanced nutrition knowledge. The indicators used by the ASD parenting pattern are divided into two, namely good and less good. Before the questionnaire was used, it was tested for validity and reliability. The results of the validity test of the parenting questionnaire showed that of the 9 questions, 5 questions were valid ($r_{\text{count}} > r_{\text{table}}$) and 4 questions were invalid ($r_{\text{count}} < r_{\text{table}}$). Then for the balanced nutrition knowledge questionnaire, it was found that out of 20 questions, 15 questions were valid ($r_{\text{count}} > r_{\text{table}}$) and 5 questions were invalid ($r_{\text{count}} < r_{\text{table}}$). Data collection for the parenting questionnaire was carried out using a guttman scale questionnaire, namely the answers "Yes" and "No" with 9 questions, the answer from the respondent was made the highest score was "2" while the lowest score was "1". For positive questions yes = 2 and no = 1. Whereas for negative questions yes = 1 and no = 2. Furthermore, the categorization process relies on the use of median values, namely value 1 = lowest score x number of questions assessed: $1 \times 9 = 9$ and score 2 = highest score x number of questions scored: $2 \times 9 = 18$. If the respondent's answer is greater than the median value of 13.5, it is classified as "good". Conversely, if the respondent's answer is less than the median value, it is classified as "not good"²⁸. Then for the balanced nutrition knowledge questionnaire, the value is determined from "the number of correct questions; number of questions x 100".

This study used univariate and bivariate data analysis. The description and distribution of respondent characteristics were analyzed by univariate analysis. Then the data were analyzed using bivariate analysis, namely using the Spearman Rank test with a ratio and ordinal

scale. The Spearman Rank test was conducted to see the strength between the dependent variable (nutritional status) and the independent variable (mother's education level, parenting patterns, knowledge of balanced nutrition, and parental income). Then it is said to be meaningful if the p-value <0.05. This study has received approval from the UPNVJ Health Research Ethics Committee, with the ethical approval number set as 56/IV/2023/KEPK.

RESULTS AND DISCUSSION

Gender and Age Characteristics

Table 1 shows that the gender of people with ASD was mostly male, which was 83.3%, where from each school boys participated more than girls. This finding is in line with research at the autism service center in Denpasar city where the respondents were more likely to be male than female⁹. ASD occurs in 1 in 2,500 children, with high prevalence rates often occurring in boys²⁹. This is due to increased testosterone production in males, which can inhibit brain function^{30,31}. The production of different hormones causes this to happen, with males having the hormone testosterone and females having the hormone estrogen. The gene responsible for regulating brain function, known as retinoic acid-related-alphatyp receptor-alpha (RORA), is influenced by the hormone estrogen, and results in increased gene performance, while the hormone testosterone inhibits the work of RORA³¹.

The frequency distribution of age characteristics shows that out of 114 respondents with ASD at Special Schools in 2023, the majority of respondents aged 8 years were 18 respondents with a percentage of 15.8%. In this study, the age category of preschoolers is 5-6 years old, children are 6-10 years old, and adolescents are 10-19 years old³².

Overview of Mother's Education Level

Healthy living behavior and family consumption behavior are related to the mother's education level. Based on table 1, the majority of mothers have the latest level of education, namely college. In addition, mothers will find it easier to obtain information, especially in the field of nutrition and child health¹⁴. Maternal education level has a positive correlation with access to information related to nutrition and health for people with ASD. There is a correlation between mothers' education level and their understanding of the composition of different types of food and the nutrients they contain.

The high or low education of the mother will play a role in the nutritional status of people with ASD³³. Mothers with higher levels of education show a greater tendency to make informed food choices, focusing on food quantity and quality, in contrast to mothers with lower levels of education¹³. One of the causes of abnormal nutritional status in ASD is the lack of maternal attention to the nutritional needs of the child, which may be due to low maternal education. In particular, it has been observed that higher education levels are associated with better nutritional status in children³⁴. Mothers with higher levels of education tend to have broader horizons³⁵, conversely, mothers with lower levels of education may face problems in understanding

instructions related to nutritional needs, making it possible for mothers to show reluctance or uncertainty about the importance of nutritional needs to facilitate the growth and development of their children³⁶.

Overview of Parenting

In the realm of parenting, providing proper care is an important role for parents, because if the wrong steps in this case are detrimental to the development of children, which has the potential to affect their nutritional status³⁷. Table 1 found that respondents tended to have good parenting patterns, amounted to 50.9%. Parenting refers to the attitudes and behaviors shown by parents during interactions with their children

in instilling discipline in children in order to control children³⁸.

Parenting includes a range of practices to control children's food habits and circumstances³⁹. It is important to take into account and strategically plan the quality and quantity of food required for a child's consumption, as this has the potential to significantly impact a child's nutritional well-being⁴⁰. It is essential to recognize the relevance of implementing parenting strategies in ASD due to their significant impact on language acquisition, cognitive abilities, and social and emotional development¹⁵. Implementing a healthy lifestyle serves as a means for families to ensure the well-being of a child, thus underscoring the importance of parental influence in the growth and development of a person with ASD.

Table 1. Characteristics of gender, age, mother's education level, and parenting styles of ASDs

Characteristics	n	%
Gender		
Male	95	83.3
Female	19	16.7
Age		
5 – 6 Years	13	11.4
7 – 10 Years	47	41.2
11- 19 Years	54	47.4
Mother's Education Level		
Not/not yet graduated from elementary school	2	1.7
Elementary school/equivalent	1	0.9
Junior high school/equivalent	0	0
High school/equivalent	26	22.8
University	66	57.9
Parenting Style		
Good	58	50.9
Less Good	56	49.1

Overview of Nutritional Status

Nutritional status is the result of measurements on the balance of intake with daily needs⁸. Nutritional intake affects the growth and development of a person, as it can affect the immune system⁴¹. Nutrition is a necessity for every individual⁴². Nutritional status is classified into five categories: malnutrition, undernutrition, good nutrition, overnutrition and obesity. In general, undernutrition that occurs in ASD children is caused by sensory problems, such as people with ASD who do not like the taste and texture of certain foods. Meanwhile, overweight in ASD children is usually caused by incorrect consumption patterns and decreased physical activity⁴³. Table 2 shows that the minimum value of nutritional status is -5.48 (malnutrition), the maximum value is 6.79 (obesity), and the median value of nutritional status of ASD is 0.52, which means it is classified as good nutrition.

Overview of Balanced Nutrition Knowledge

Knowledge of balanced nutrition is a factor that can be related to the nutritional status of people with ASD. When parents' knowledge is low, it will potentially hinder the process of child growth and development, especially brain development. Therefore, parents' knowledge is very important, especially mothers, to ensure the provision of nutritious food intake for their children. Maternal behavior in choosing the type of food

is influenced by knowledge, especially related to nutrition. Table 2 shows that the minimum score on balanced nutrition knowledge of parents is 40.00, the maximum score is 100.00, and the median score of balanced nutrition knowledge of parents with ASD is 77.11.

Mothers with high knowledge are more likely to provide nutritious and healthy food to their children. However, in contrast to the case with mothers who have limited nutritional knowledge, mothers tend to provide foods that are tasty and uncomplicated, without considering the nutritional value or portion size⁴⁴. The impact of maternal nutrition knowledge plays an important role in shaping and determining the overall prevalence of nutritional status at the national level. Malnutrition is most common among mothers with limited knowledge⁴⁵.

Overview of Parental Income

Providing adequate nutrition in the family is closely related to the parental income⁴⁶. The nutritional status of people with ASD is affected by parental income. Families who have limited income, will affect in terms of less fulfilled nutrient intake⁴⁷. To fulfill the intake needs, the role of parents is needed, especially in sufficient income so that the nutritional needs of people with ASD can be fulfilled⁴⁸.

Some theories state that parental income affects children's nutritional status. Parental income greatly affects the adequacy and primary and secondary needs²¹. Where, families who live with middle to upper income conditions, the fulfillment of nutritional needs will be

better than families with middle to lower income³⁹. Table 2 shows that the amount of parents' income each month has a minimum value of Rp800,000, a maximum value of Rp85,000,000, and a median value of parents' income each month for people with ASD of Rp9,000,000.

Table 2. Overview of Nutritional Status, Balanced Nutrition Knowledge, Income of Parents with ASD

Variable	Median ± SD	Min	Max
Nutritional Status	0.52 ± 2.19	-5.48	6.79
Balanced Nutrition Knowledge	80.00 ± 10.86	40.00	100.00
Parental Income (IDR)	9.000.000 ± 11.885.413,4	800.000	85.000.000

Relationship between Mother's Education Level and Nutritional Status of Children with Autism Spectrum Disorder (ASD)

Based on the results of the analysis of the level of knowledge of balanced nutrition with the nutritional status of ASD, table 3 shows that the p-value obtained is 0.949, which means that there was no significant relationship (p-value>0.05) between the level of maternal education and the nutritional status of people with ASD who attend Special Schools in the JABODETABEK area. Maternal education level is a significant determinant that can affect the nutritional status of children, one of which is healthy living behavior and family consumption¹⁴. Mothers with higher levels of education tend to have better access to information, especially related to nutrition. This increased access allows mothers to change their attitudes, behaviors and knowledge, thus facilitating the achievement of good nutritional status for ASD children. However, this can only happen if mothers implement their knowledge in their daily lives²¹.

The Relationship of Parenting with Nutritional Status in People with Autism Spectrum Disorder (ASD)

Looking at the data in Table 3, the p-value is 0.007, which means that there was a significant relationship (p-value <0.05) between parenting and nutritional status in ASD children who attend special schools in the JABODETABEK area. The findings obtained revealed a correlation coefficient (r value) of 0.250, which indicates that there was a moderate strength correlation between the variables of parenting and nutritional status in respondents. There is a positive correlation between parenting and nutritional status, which means that, the better the value of parenting, the better the value of nutritional status in people with ASD.

There is a relationship between parenting practices and the status of people with ASD¹⁹. This is reinforced by other findings stating that there is a correlation between food/nutritional parenting and the nutritional status of autistic children in Pontianak City¹⁵. The findings reveal that parents who provide certain parenting patterns, especially those characterized by inadequate provision of nutritious food, tend to have children who are malnourished. Parenting in children with ASD aims to gain better eating habits and ways, as well as means that can influence children's behavior to implement these practices into their daily lives. However, this is different from the findings at Buah Hatiku Clinic Makassar, where there was no significant correlation between feeding patterns and nutritional status⁴⁹.

Parenting includes a range of practices to control eating habits and conditions³⁹. It is crucial to consider and strategically plan the quality and quantity of food required for a child's consumption, as this has the potential to significantly impact a child's nutritional well-being⁴⁰. It is important to recognize the relevance of implementing parenting strategies in ASD due to their significant impact on language acquisition, cognitive abilities, and social and emotional development¹⁵. Implementing a healthy lifestyle serves as a means for families to ensure the well-being of a child, thus the importance of parental influence in the growth and development of a person with ASD.

Relationship between Balanced Nutrition Knowledge and Nutritional Status of People with Autism Spectrum Disorder (ASD)

Based on the results of the analysis of the relationship between knowledge of balanced nutrition and the nutritional status of ASD in Table 3, a p-value of 0.728 was obtained, which means that there was no significant relationship (p-value> 0.05) between the level of knowledge about balanced nutrition and the nutritional status of people with ASD in Special Schools in the JABODETABEK area. This finding is in line with research that reveals that there is no significant correlation between maternal nutritional knowledge and the nutritional status of individuals diagnosed with ASD, which reveals that parents who have high nutritional knowledge tend to have a greater chance of having children with good nutritional status. This is also in line with researchers who confirmed that there is no significant correlation between maternal knowledge and children's nutritional status⁵⁰. However, in contrast to other findings, there is a correlation between parental knowledge and nutritional status¹⁹. These findings reveal that children with parents who have limited knowledge are more likely to express poor nutritional status. The impact of maternal nutrition knowledge plays an important role in shaping and determining the overall prevalence of nutritional status.

Parents who have a strong understanding of nutrition have the potential to influence the nutritional well-being of their children. Malnutrition generally occurs in mothers with low knowledge⁴⁵. The mother's behavior in choosing the food consumed by her child is influenced by her nutritional knowledge. Mothers who have a high level of knowledge tend to prioritize nutritious food⁴⁴.

The Relationship between Parental Income and Nutritional Status in People with Autism Spectrum Disorder (ASD)

Based on the the analysis of parental income with the nutritional status of ASD, as shown in table 3, the p-value obtained is 0.976, which means that there was no significant relationship (p-value> 0.05) between parental income and the nutritional status of individuals diagnosed with ASD who attend special schools in the JABODETABEK area. The findings also reveal that children with ASD who have parents with high income generally have good nutritional status, while children with parents with low income do not all have abnormal nutritional status (malnutrition, undernutrition, overnutrition, and obesity). However, due to the scarcity of studies related to variables associated with ASD, this is in line with

research on the relationship between parental income and children's nutritional status in general conditions which states that children raised from households with higher parental income are more likely to have good nutritional status. However, not all children who have parents with low income are under or overnourished⁴⁷.

The amount of intake to fulfill nutritional needs is inseparable from parental income⁵¹. Some theories state that the nutritional status of people with ASD is affected by parental income, this is because it is to support the adequacy and primary and secondary needs of children. High income can influence the selection of the type and amount of food and one study mentioned that high income tends to have a good and healthy environment²². Families with limited income will tend to affect the fulfillment of children's nutritional intake⁴⁷.

Table 3. Results of Analysis of Factors Associated with Nutritional Status of People with Autism Spectrum Disorder (ASD)

Variable	Nutritional Status	
	r	p-value
Mother's Education Level	0.006	0.949
Parenting Style	0.250	0.007
Knowledge of Balanced Diet	-0.033	0.728
Parental Income	0.003	0.976

CONCLUSIONS

Most people with Autism Spectrum Disorder (ASD) had good nutritional status. There was a significant relationship between parenting and the nutritional status of people with ASD. However, there was no significant relationship between mother's education level, knowledge of balanced nutrition, and parents' income with the nutritional status of people with ASD.

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Author Contributions

CR: conceptualisation, investigation, methodology, analysis, original draft writing, and editing; SFS: review writing, supervision, and editing; YCO: review writing, supervision, and editing; TM: review writing, supervision, and editing.

REFERENCES

- Christensen, D. et al. Prevalence and Characteristics of Autism Spectrum Disorder Among Children Aged 4 Years — Early Autism and Developmental Disabilities Monitoring Network, Seven Sites, United States, 2010, 2012, and 2014. *MMWR. Surveill. Summ.* **68**, 1–19 (2019).
- Pangestu, N. & Arulita, I. F. Faktor Risiko Kejadian

- Autisme. *HIGEIA (Journal Public Heal. Res. Dev.* **1**, 141–150 (2017).
- CDC. Autism Spectrum Disorder (ASD) | Autism | NCBDDD | CDC. <https://www.cdc.gov/ncbddd/autism/index.html> (2019).
- Maharani, A. P. & Panjaitan, R. U. Resiliensi dan Hubungannya dengan Tingkat Stres Orang Tua yang Memiliki Anak Penyandang Autism Spectrum Disorder. *J. Ilmu Keperawatan Jiwa* **2**, 47–54 (2019).
- Ananda, F. D. Pengaruh Terapi Musik Klasik (Mozart) terhadap Kemampuan Berbahasa pada Anak Autisme di SLBN Prof.DR.Sri.Sodewi.Masjchun. Sofwan, S.H Kota Jambi. (Universitas Jambi, 2023).
- Kementerian Pemberdayaan Perempuan dan Perlindungan Anak. Kementerian Pemberdayaan Perempuan dan Perlindungan Anak. <https://www.kemenpppa.go.id/index.php/page/read/31/1682/hari-peduli-autisme-sedunia-kenali-gejalanya-pahami-keadaannya> (2018).
- Mirahantini, S. Perbedaan Status Gizi antara Diet GFCF (Gluten Free Casein Free) dan Diet Kombinasi pada Anak Autisme di UPT Layanan Pendidikan Anak Berkebutuhan Khusus Kota Malang. (Universitas Brawijaya, 2019).
- Baidhowi, A. & Purwanto, S. Status Gizi Anak Autis di Sekolah Lanjutan Autis (SLA) Fredofios Sleman Yogyakarta. *PGSD Penjaskes* **8**, 1-7 (2019).
- Atmika, C. & Karina, I. A. Hubungan Penerapan Diet Gluten Free Casein Free dengan Perkembangan Motorik dan Status Gizi Anak Autis di Pusat Layanan Autis Kota Denpasar. (Poltekkes Denpasar, 2020).
- RISKESDAS. Riset Kesehatan Dasar. https://dinkes.bantenprov.go.id/upload/article_doc/Hasil_Riskesdas_2013.pdf (2013).

11. RISKESDAS. Riset Kesehatan Dasar. <https://dinkes.kalbarprov.go.id/wp-content/uploads/2019/03/Laporan-Risikesdas-2018-Nasional.pdf> (2018).
12. Sopiandi, R. Maternal nutrition knowledge, food pattern, dietary intake and nutritional status of children with autism spectrum disorder (ASD) Redy Sopiandi. **2**, 45–53 (2017).
13. Adriani, M. & Wirjatmadi, B. Gizi dan kesehatan balita : peranan mikro zinc pada pertumbuhan balita (Nutrition and health of children: micro zinc role in toddler growth). (Penerbit Kencana, 2014).
14. Suryani, N., Magdalena & Aqbar, D. Faktor-Faktor yang Berhubungan dengan Status Gizi pada Anak Autis di Pusat Layanan Autis Banjarmasin Tahun 2014. *J. Kesehat. Indones.* **5**, 43-49 (2016).
15. Suharningsih, Marlenyaty & Budiastutik, I. Hubungan Antara Pola Asuh dan Kepatuhan Diet Bebas Gluten Bebas Casein dengan Status Gizi Anak Autis di Kota Pontianak. *Jumantik* **2**, 1-9 (2015).
16. Syafitri, I. L. Pengasuhan (Makan, Hidup Sehat, dan Bermain) Konsumsi dan Status Gizi Penderita Autism Spectrum Disorder (ASD). (Institut Pertanian Bogor, 2008).
17. Maisaroh, F. Hubungan Tingkat Pengetahuan Ibu Tentang Diet Autisme dengan Frekuensi Konsumsi Gluten dan Casein Pada Anak Autis Di Yayasan Talenta Semarang. (Universitas Muhammadiyah Semarang, 2018).
18. Syarifah, A. Hubungan Pengetahuan dan Sikap Ibu Tentang Gizi Terhadap Status Gizi Dengan Anak Autisme. *J. Keperawatan* **10**, 60–67 (2018).
19. Setyaningsih, R. Faktor-faktor yang Mempengaruhi Status Gizi pada Anak Berkebutuhan Khusus. *J. Kesehat. Holist.* **3**, 1–16 (2019).
20. Amirudin, M. M. Hubungan antara Pendapatan Orang Tua dengan Status Gizi Pada Siswa SDN II Tenggong Rejotangan Tulungagung. *J. Pendidik. Olahraga dan Kesehat.* **2**, 564–568 (2014).
21. Suwoyo. Faktor-Faktor yang Mempengaruhi Status Gizi Anak Autis di Sekolah Kebutuhan Khusus Kota Kediri. *J. Ilmu Kesehat.* **5**, 115–127 (2017).
22. Sijabat, R. Gaya Hidup yang Memengaruhi Kesehatan Anak Berkebutuhan Khusus di SLB Negeri Salatiga. *J. Keperawatan Muhammadiyah.* **2**, 103-117 (2018).
23. Widyawati, W., Hidayah, D. & Andarini, I. Hubungan Status Gizi dengan Angka Kejadian Infeksi Saluran Pernapasan Akut (ISPA) pada Balita Usia 1-5 Tahun di Surakarta. *Smart Med. J.* **3**, 59–67 (2020).
24. Nasution, F., Anggraini, L. Y. & Putri, K. Pengertian Pendidikan, Sistem Pendidikan Sekolah Luar Biasa, dan Jenis-Jenis Sekolah Luar Biasa. *J. EDUKASI Nonform.* **3**, 422–427 (2022).
25. Stainback, W. & Stainback, S. Support networks for inclusive schooling: Interdependent integrated education. *Uniw. ślqski* **7**, 343–354 (2013).
26. Pusaningrum, C. Pusat Terapi Anak Autis Di Yogyakarta. (Universitas Atma Jaya Yogyakarta, 2010).
27. Kementertian Kesehatan RI. Peraturan Menteri Kesehatan Republik Indonesia. (2020).
28. Rapar, V. L. et al. Hubungan Pola Asuh Ibu dengan Status Gizi Balita di Wilayah Kerja Puskesmas Ranotana Weru Kecamatan Wanea Kota Manado. *J. KEPERAWATAN* **2**, 1-7 (2014).
29. Sulistyorini, L., Gusti, A. & Wibawa, A. G. Hubungan Dukungan Sosial Keluarga dengan Penerimaan Diri Ibu Anak Autis Di Sdlb-B dan Autis. *J. Keperawatan Malang* **3**, 45–56 (2018).
30. Rosidi, A. & Sulistyowati, D. E. Peran Pendidikan Dan Pekerjaan Ibu Dalam Konsumsi Sayur Anak Prasekolah. *J. Gizi* **1**, 1-8 (2012).
31. Rahayuningrum, L. M. & Wahyuni, M. Terapi Bermain Playdough pada Perkembangan Motorik Halus Anak Autis di Rumah Sakit. *Journals Ners Community* **12**, 131–142 (2021).
32. Kemenkes RI. Peraturan Menteri Kesehatan Republik Indonesia. (2016).
33. Taruna, J. Hubungan status ekonomi keluarga dengan terjadinya kasus gizi buruk pada anak balita di Kabupaten Kampar Provinsi Riau tahun 2002 = The relationship between family economical status and the incidence of severe malnutrition cases among children of under five years in Kabupaten Kampar Riau Province 2002. (Fakultas Kesehatan Masyarakat Universitas Indonesia, 2002).
34. Lette, S., Wungouw, H. P. L. & Woda, R. R. Hubunga Pola Asuh dan Tingkat Pendidikan Ibu dengan Status Gizi Balita di Posyandu Melati Kelurahan Naimata Wilayah Kerja Puskesmas Penfui. *Cendana Med. J.* **7**, 35–43 (2019).
35. Mulianingsih, P. M. Factor Affecting Nutritional Status In Children With Autism. (2022).
36. Wati, S. P. & Subagyo, A. Hubungan Tingkat Pendidikan, Pengetahuan Ibu Dan Pendapatan Orangtua Dengan Status Gizi Anak Balita Usia 1- 5 Tahun Di Desa Duwet Kecamatan Wonosari Kabupaten Klaten. (Universitas Muhammadiyah Surakarta, 2019).
37. Syarfaini, S., Syahrir, S., Jayadi, Y. I. & Musfirah, A. A. Hubungan Tipe Pola Asuh dan Perilaku Makan dengan Status Gizi Anak Disabilitas Di SLB Negeri 1 Makassar Tahun 2020. *AI GIZZAI PUBLIC Heal. Nutr. J.* **1**, 36–49 (2021).
38. Trophina, S., Rompas, M. S. & Bataha, Y. B. Hubungan Pola Asuh dengan Status Gizi pada Anak di Taman Kanak-Kanak Kecamatan Pulutan Kabupaten Talaud. *J. KEPERAWATAN* **5**, 1-8 (2017).
39. Isnaini, N. L. Hubungan antara Pola Asuh Makan. (Universitas Negeri Semarang, 2019).
40. Anugra Indriyani, R. Hubungan Pola Asuh Makan dengan Status Gizi Usia Anak Sekolah Di SDN Teluk Pucung VI Bekasi. *JKKP (Jurnal Kesejaht. Kel. dan Pendidikan)* **2**, 77–83 (2015).
41. Atmika, C. & Karina, I. A. Hubungan Penerapan Diet Gluten Free Casein Free dengan Perkembangan Motorik dan Status Gizi Anak Autis Di Pusat Layanan Autis Kota Denpasar.

- (Poltekkes Denpasar, 2020).
42. Waas, G. & Lawalata, I. V. Hubungan Pola Konsumsi Gluten dan Kasein dengan Perilaku Hiperaktif Anak Autis di Kota Ambon Tahun 2016. *Molucca Medica* **11**, 27–34 (2018).
 43. Wijayanti, A. P. & Mutalazimah, M. Hubungan Asupan Energi dengan Status Gizi Anak Autis di Yayasan Pembinaan Anak Cacat (YPAC) Kota Surakarta. *J. Kesehat.* **11**, 9–15 (2018).
 44. Afrinis, N., Indrawati, I. & Raudah, R. Hubungan Pengetahuan Ibu, Pola Makan dan Penyakit Infeksi Anak dengan Status Gizi Anak Prasekolah. *Aulad J. Early Child.* **4**, 144–150 (2021).
 45. Rahayu, I. & Jalinus, N. Kontribusi Pengetahuan Gizi Ibu dan Pola Asuh Gizi Terhadap Status Gizi Anak Balita Di Jorong Sungai Salak Kenagarian Koto Tengah Kecamatan Tanjung Emas Kabupaten Tanah Datar. *J. Ilmu Sos. dan Hum.* **8**, 235–241 (2019).
 46. Amirudin, M. M. Hubungan antara Pendapatan Orang Tua dengan Status Gizi pada Siswa SDN II Tenggong Rejotangan Tulungagung. *J. Pendidik. Olahraga dan Kesehat.* **2**, 564–568 (2014).
 47. Apriliana, W. F. & Rakhma, L. R. Faktor-Faktor yang Berhubungan dengan Status Gizi Balita yang Mengikuti TFC di Kabupaten Sukoharjo. *Profesi (Profesional Islam. Media Publ. Penelit.* **15**, 9 (2017).
 48. Aziza, N. & Mil, S. Pengaruh Pendapatan Orang Tua terhadap Status Gizi Anak Usia 4-5 Tahun pada Masa Pandemi COVID-19. *Golden Age J. Ilm. Tumbuh Kembang Anak Usia Dini* **6**, 109–120 (2021).
 49. Arief, M. Faktor-faktor yang Mempengaruhi Status Gizi pada Anak Autis di Klinik Buah Hatiku Makassar. (2010).
 50. Setiyaningrum, S. & Wahyani, A. D. Hubungan Pengetahuan dan Sikap Ibu Keluarga Sadar Gizi dengan Status Gizi Anak Balita. *J. Ilm. Gizi Kesehat.* **1**, 33–40 (2020).
 51. Suparti, S., Yulistika Handayani, D., Keperawatan Gawat Darurat Fakultas Ilmu Kesehatan, D. & Hipertensi, L. Screening Hipertensi pada Lansia Di Wilayah Puskesmas Banyumas. *Indones. J. Heal. Sci.* **2**, 84–93 (2019).