



Relationship Between Rights to Food, Nutritional Adequacy, Psychosocial Stress, and Health Status among Juvenile Inmates at LPKA Class II Bandung

Sherly Rizki Andriani^{1*}, Syifa F. Syihab¹, Asti Dewi Rahayu Fitrianiingsih¹, Muchamad Rizki Sentani¹

¹ Nutrition Department, Faculty of Sport and Health Education, Universitas Pendidikan Indonesia

Abstract: Juvenile inmates represent a vulnerable population under state care and are entitled to proper food and adequate nutrition throughout their rehabilitation periods. Inadequate fulfillment of these rights may exacerbate the risk of psychosocial stress, and negatively impact their overall health status. This study aims to examine the relationship between the fulfillment of rights to food, nutritional adequacy, psychosocial stress, and health status among juvenile inmates. A cross-sectional study design was employed using a purposive sampling technique. A total of 75 juvenile inmates aged 14–18 years from a juvenile detention center, Lembaga Pembinaan Khusus Anak (LPKA) Class II Bandung, were recruited as respondents. Data were analyzed by multivariate logistic regression test using IBM SPSS21 software. The findings revealed a significant association between psychosocial stress and health status ($p: 0.001$; OR: 6.9; 95% CI: 2.25–21.18), with rights to food, energy nutrition, and carbohydrate nutrition as confounding variables. Psychosocial stress was found to contribute to increased stress levels and negatively affect health status in juvenile inmates. Moreover, the fulfillment of food and nutritional rights played a vital role in supporting metabolic stability, enhancing immune resilience, and preventing maladaptive eating behaviors.

Keywords: health status, juvenile inmates, nutritional adequacy, psychosocial stress, rights to food

Article History:

Submitted: August 3, 2026; Received in Revised Form: August 18, 2026; Accepted: October 12, 2026.

Copyright © 2026 Nutri-Sains: Jurnal Gizi, Pangan dan Aplikasinya

Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution 4.0 International License.



To cite this article (APA Style):

Andriani, S. R., Syihab, S. F., Fitrianiingsih, A. D. R., Sentani, M. R. (2026). Relationship Between Rights to Food, Nutritional Adequacy, Psychosocial Stress, and Health Status among Juvenile Inmates at LPKA Class II Bandung. *Nutri-Sains: Jurnal Gizi, Pangan dan Aplikasinya*, 10(1), 15-32. <https://doi.org/10.21580/ns.2026.10.1.31572>

* Corresponding Author: Sherly Rizki Andriani (email: sherlyra34@gmail.com), Nutrition Department, Faculty of Sport and Health Education, Universitas Pendidikan Indonesia, Bandung, Indonesia.

INTRODUCTION

Adolescence is a developmental stage is characterized by significant physical, psychological, and social changes. Indonesian Ministry of Health, as stated in Kurniawan et al., (2024), describes adolescence as a transitional phase between childhood and adulthood, typically spanning the ages of 10 to 18 years. The health status of adolescents is a critical concern, as the profound transformations occurring during this period can substantially influence their overall well-being (Mytton et al., 2024). Several factors shape and influence adolescent health, including nutritional status, dietary intake, and living conditions (Brown et al., 2023).

Adolescents residing in Juvenile Detention Centers or Lembaga Pembinaan Khusus Anak (LPKA) represent a distinct and vulnerable population. In such institutions, custody and caregiving shift from the family to the state. Consequently, the responsibility for ensuring basic rights—including the right to food, nutrition, and health—is taken by the detention facility. Barnert & DeBaun (2024) noted that limited access to basic rights increases the risk of adverse health outcomes among adolescents in juvenile detention in Indonesia. Moreover, Vitagliano et al. (2024) reported that some prison detention centers lack support from professional nutritionists, raising concerns about the adequacy of nutritional standards provided.

Several studies have reported insufficient nutritional intake among incarcerated children and its implications for both physical and mental health. Tarekegn et al. (2025) state that juvenile inmates experienced notable levels of undernutrition, with prevalence rates of 19,4%. These nutritional deficits were associated with low protein and energy intake, frequent consumption of calorie-dens but nutrient-poor foods, and limited access to more nutritious alternatives. Such deficiencies negatively impact physical health and increase the prevalence of psychosocial problems. Emotional distress is common among detained adolescents and is often triggered by restricted personal freedom, a constant sense of insecurity, and a socially stressful environment, all of which contribute to psychosocial stress (Eyamu, 2024).

Healthcare services are one of the fundamental rights of prisoners, including juvenile inmates. Data from the LPKA Kelas II Bandung, a juvenile detention center, indicate that approximately 45.2% of juveniles sought clinical care between November 2024 and December 2025. The most frequent health complaints involved respiratory infections, dermatological conditions, dental problems, and scabies. These health problems may be linked to compromised nutritional status, weakened immune function, and psychological distress. Medical check-ups are one of the preventive measures used to reduce the incidence and transmission of diseases (Ningsih et al., 2022). As part of preventive efforts, the government collaborates with the nearest community health centers (Puskesmas) as supervising health centers for each of LPKA in Indonesia. These Puskesmas conduct routine medical screening every month as an early screening measure to monitor the health status of juvenile inmates (Indriastuti et al., 2026). LPKA Kelas II Bandung collaborates with Puskesmas Arcamanik to organize monthly medical screening. This collaboration with local health centers is necessary due to the limited availability of healthcare professional at LPKA's internal clinics (Fitrian & Anwar, 2022). The absence of doctors and the existence of nursing staff in LPKA Kelas II Bandung internal clinic-a condition where there is no doctor and only nursing staff-makes collaboration with Puskesmas essential for further medical examinations and treatment.

In addition to physical health concerns, the psychological well-being of juvenile inmates is also at risk. Silva et al. (2021) reported that 34,28% of adolescents aged 14 to 20 in a juvenile detention center exhibited moderate to severe levels of anxiety and stress. The findings by Nurwela & Rindu (2022) also revealed that the majority of adolescents at the LPKA Class I Kupang, another Indonesian juvenile detention center, experienced moderate levels of stress, with 13 adolescents (43.3%) experiencing mild stress, while 17 adolescents (56.7%) suffering moderate stress. In conclusion, Tasisa & Palanimuthu (2021) emphasized that environmental stressors are primary triggers of psychosocial stress among juvenile inmates. Although psychosocial stress has been widely studied, most research has focused primarily on its relationship with mental health, rather than overall health status.

Placement in a juvenile detention facility may have profound effects on adolescents' mental and physical health, even during relatively short periods of confinement. The World Health Organization (WHO) emphasizes the importance of addressing the health needs of individuals in detention (Zorlu et al., 2023). Previous studies involving juvenile inmates have primarily examined psychosocial factors in relation to mental health outcomes (Ke et al., 2021; Silva-Junior et al., 2021), leaving the relationship between psychosocial stress and overall health status less well understood. Similarly, while juvenile inmates are entitled to adequate and nutritious food, evidence regarding the extent to which food rights are fulfilled and how this relates to their health status remains limited. Nutritional adequacy also warrants attention, as access to food alone does not necessarily ensure sufficient nutrient intake to support adolescents' growth, development, and health, yet this aspect has received limited attention in juvenile detention settings. Considering these factors together is particularly relevant because the detention environment may simultaneously shape adolescents' psychological well-being, access to food, nutritional intake, and overall health.

Therefore, this study aims to examine the relationship between the fulfillment of rights to food, nutritional adequacy, and psychosocial stress, and their collective impact on the general health status of juveniles at the LPKA Kelas II Bandung. The findings are expected to contribute valuable insights that support the development of improved policies and healthcare services for juvenile inmates and to provide a broader perspective on the health conditions of adolescents living in juvenile detention.

METHODS

Design, Time, and Place

A cross-sectional study design within a quantitative framework was employed to investigate the relationship between rights to food, nutritional adequacy, and psychosocial stress in relation to the general health status of juvenile inmates. The study assessed the fulfillments of rights to food, nutritional adequacy sufficiency (specifically: energy, protein, fat, carbohydrates, and key minerals such as potassium, calcium, magnesium, phosphorus, iron, and zinc), and psychosocial stress as independent variables. The dependent variables were the general health status of juvenile inmates. Data collection was conducted at the LPKA Class II Bandung during February 2025. The research protocol received ethical clearance from the Ethics Committee of the National Research and Innovation Agency (BRIN), with approval number 024/KE.03/SK/02/2025.

Population and Sample

From a total population of 180 juvenile inmates, individuals aged 14 to 18 years who had resided in the detention center for a minimum one-month period and were capable of effective communication were considered eligible. Exclusion criteria included those who declined to participate or were prohibited from participating by the detention center authorities. The minimum required sample size was calculated using Slovin's formula with a 10% margin of error. A total of 75 juveniles who met the inclusion criteria were selected as participants.

Research Procedure and Instrument

All research variables were measured using questionnaire instruments. The instrument has four sub-items, consisting of health status, rights to food, nutritional adequacy, and psychosocial stress sub-items. The health status, food rights to food, and psychosocial stress instruments used modified versions of previous study instruments and were tested for reliability and validity using SPSS and Aiken's V method, as well as expert judgment. The final categories for every variable mostly split by median and quartile-based categorization to classify participants according to the relative distribution of food-service satisfaction scores within the study population, as quantile-based and median-based cut points are a commonly used approach for categorizing continuous or ordinal measures when no established external threshold is available (Pinsky & Klawansky, 2023).

Health status data were obtained using a modified version of Shabat's student health-related behavior. The health status questionnaire consists of 5 items about inmates' health history in the past 3 months, including health condition, drug use, injuries, sleeping habits, and surgery history. Each item in the questionnaire was scored 1 point for "Yes" responses and 2 points for "No" responses. The total score was then converted into a categorical variable, with scores equal to or above the sample median classified as "Good" and scores below the median classified as "Poor."

The assessment of food service satisfaction used a 30-item questionnaire developed by Noviyanti (2021). The questionnaire used a 4-point response scale. For meal distribution punctuality, responses were scored as 4 for meals delivered on time, 3 for delays of 10–15 minutes, 2 for delays of 15–30 minutes, and 1 for delays of more than 30 minutes. The remaining items assessing food service satisfaction were scored using a 4-point Likert scale ranging from very satisfied (4) to very dissatisfied (1). Item scores were summed to obtain a total food-service satisfaction score. Since no established external cutoff was provided for the questionnaire, total scores were categorized using sample quartiles into highly fulfilled ($\geq Q3$), fulfilled ($Q2 < Q3$), unfulfilled ($Q1 < Q2$), and highly unfulfilled ($< Q1$).

The nutritional right fulfillment variable were assessed using a structured 24-hour dietary recall questionnaire developed by Fayasari et al. (2020). Macronutrient (energy, protein, fat, carbohydrates) and micronutrient (potassium, calcium, magnesium, phosphorus, iron, and zinc) intakes were calculated using Microsoft Excel and NutriSurvey software. The resulting total scores were then categorized as "Fulfilled" (equal to or above the sample median) or "Unfulfilled" (below the median). Psychosocial stress was measured using an 11-item instrument modified from the Inventory of Psychosocial Functioning Questionnaire by the National Center for PTSD (2019). The instrument comprised three subscales: relationships with family, social environment, and

participation in social-educational programs within the detention center. The total score was categorized as “High Stress Level” (equal to or above the sample median) or “Normal Stress Level” (below the median).

Data Processing and Analysis

Data analysis was performed using IBM SPSS version 21, following a structured three-step procedure. First, univariate analysis was conducted to describe the characteristics of the study population. Second, bivariate analysis was carried out using chi-square tests. This step aimed to identify candidate variables for inclusion in the multivariate model. Finally, multivariate analysis was conducted using multiple logistic regression, which was appropriate for categorical dependent variables. Since bivariate analysis that used was a forward method, that brought to 0,25 p-value cut off standard. Variables with a p-value < 0.25 in the bivariate analysis, as well as those deemed theoretically relevant, were included in the final model. A p-value < 0.05 was considered statistically significant. Odds ratios (ORs) were also calculated to assess potential confounding effects.

RESULTS

This study examines several aspects in juvenile inmate's, including demographic characteristics, health status, psychosocial stress, food and nutrition rights. First, the health status of juvenile inmates was assessed based on past medical reports, drug use, physical injuries, sleep disorders, and surgical history within the last three months. Secondly, the fulfillment of rights to food were assessed based on the inmates' level of satisfaction with food services provided over the past three months. The questionnaire covered various aspects, including meal distribution timing, organoleptic properties, nutritional composition, food quality, utensils, dining area conditions, and staff hygiene. Third, the fulfillment of nutritional rights which was assessed using a 24-hour dietary recall method. The recall captured food intake during breakfast, lunch, dinner, and snacks consumed within the past 24 hours at the detention center.

Table 1
Demography of Subject Characteristics Distribution

Characteristics	Frequency (n)	Percentage (%)
Age (years)		
14-16	25	33.3
17-18	50	66.7
Educational Backgrounds		
Elementary school	10	13.3
Junior high school	37	49.3
Senior high school	28	37.4
Detention periods		
< 1 year	36	48.0
≥ 1 year	39	52.0
Caffeine consumption		
Yes	28	37.3
No	47	62.7
Total	75	100.0

Nutrient intake was calculated for both macronutrients (energy, protein, fat, carbohydrates) and micronutrients (potassium, calcium, magnesium, phosphorus, iron, and zinc). In addition, the study also assessed the psychosocial stress conditions of juvenile inmates by analyzing their social interactions with family members and peers, as well as their involvement in both formal education and non-formal programs (including courses, physical exercise, or artistic activities) provided at LPKA Class II Bandung over the preceding 30 days.

Table 2

Health Status, Stress Levels, Food & Nutrition Rights Fulfillment of Subject

Characteristics	Frequency (n)	Percentage (%)
Health Status		
Good	35	46.7
Poor	40	53.3
Food Right Fulfillment		
Highly fulfilled	18	24
Fulfilled	16	21.3
Unfulfilled	19	25.3
Highly unfulfilled	22	29.4
Nutritional Adequacy		
Energy		
Fulfilled	38	50.7
Unfulfilled	37	49.3
Protein		
Fulfilled	37	49.3
Unfulfilled	38	50.7
Fat		
Fulfilled	38	50.7
Unfulfilled	37	49.3
Carbohydrates		
Fulfilled	38	50.7
Unfulfilled	37	49.3
Potassium		
Fulfilled	38	50.7
Unfulfilled	37	49.3
Calcium		
Fulfilled	37	49.3
Unfulfilled	38	50.7
Magnesium		
Fulfilled	37	49.3
Unfulfilled	38	50.7
Phosphorus		
Fulfilled	38	50.7
Unfulfilled	37	49.3
Iron		
Fulfilled	33	44.0
Unfulfilled	42	56.0
Zinc		
Fulfilled	36	48.0
Unfulfilled	39	52.0
Psychosocial Stress		
Normal stress level	30	40.0
High stress level	45	60.0
Total	75	100.0

Table 1 presents the demographic characteristics of the respondents in LPKA Class II Bandung, comprising a total of 75 juvenile inmates. Based on age distribution, the majority of participants were aged 17–18 years (66.7%), but they were mostly still in junior high school (49.3%) due to delayed education before entering the LPKA. In terms of detention periods, 52.0% of the respondents had been detained for one year or more, indicating a long enough detention period. Furthermore, the majority of participants reported not consuming caffeinated beverages (62.7%) due to both limited and rarely provided caffeine serving at LPKA. Overall, the demographic profiles provided important contextual information for understanding the characteristics of juvenile inmates in LPKA Class II Bandung.

Table 2 indicates that more than half of juvenile inmates (53.3%) were having a poor health status. This reflects a notable occurrence of health issues among respondents during the last three months. From food and nutrition aspects, juvenile inmates at the LPKA Class II Bandung had a highly unfulfilled rights to food, as seen that more than fifty percent (54.7%) unfulfilled and highly unfulfilled. These results suggest that the institution had not achieved optimal standards in the provision of food rights. They also had adequate intake of energy, carbohydrates, and fat (each at 50.7%). However, the proportion of inmates with inadequate protein intake remained relatively high at 49.7%. Regarding micronutrients, deficiencies were particularly notable for calcium (50.7%), magnesium (50.7%), iron (56%), and zinc (52%). Only potassium and phosphorus were found to be adequately consumed by half of them (both at 50.7%). In addition to health status, rights to food, and nutritional adequacy, most of the juvenile inmates (60%) at LPKA Class II Bandung also were classified as having a high psychosocial stress. This highlights psychosocial stress as an issue among the juvenile inmates for over the past 30 days.

Table 3

Specific Diseases of Juvenile Inmates in LPKA Class II Bandung

Disease / Illness	Frequency (n)	Percentage (%)
Respiratory	9	43
Digestive	5	24
Dermatological	4	19
Dental	3	14
Total	28	100.0

As shown in Table 3, that a large percentage of inmates experienced respiratory conditions, including influenza, coughs, and asthma, during the past three months. These factors further explained why the majority of juvenile inmates in LPKA Class II Bandung were found to have poor health status. Aside from the descriptive analysis, this study also assessed bivariate analysis to identify the cross-sectional relationships between the independent and dependent variables. Table 4 shows a bivariate chi-square test was employed to assess the association between the fulfillment of food rights and health status. Variables with p-value less than 0.25 were considered eligible for further step testing through multivariate logistic regression analysis.

Table 4
Bivariate Analysis Results

Independent Variables	Health Status				Total		p-value
	Good		Poor				
	n	%	n	%	n	%	
Food Rights Fulfillment							
Highly fulfilled	8	10.6	10	13.3	18	24	Baseline
Fulfilled	11	14.7	5	6.7	16	21.3	0.046
Unfulfilled	6	8	13	17.3	19	25.3	0.127
Highly unfulfilled	10	13.3	12	16	22	29.3	0.892
Nutrition Adequacy							
Energy							
Fulfilled	22	29.3	16	21.3	38	50.7	Baseline
Unfulfilled	13	17.3	24	32	37	49.3	0.048*
Protein							
Fulfilled	18	24	19	25.3	37	49.3	Baseline
Unfulfilled	17	22.7	21	28	38	50.7	0.734
Fat							
Fulfilled	17	22.7	21	28	38	50.7	Baseline
Unfulfilled	18	24	19	25.3	37	49.3	0.734
Carbohydrate							
Fulfilled	14	18.7	23	30.7	37	49.3	Baseline
Unfulfilled	21	28	17	22.6	38	50.7	0.130*
Potassium							
Fulfilled	17	22.7	21	28	38	50.7	Baseline
Unfulfilled	18	24	19	25.3	37	49.3	0.734
Calcium							
Fulfilled	16	21.3	21	28	37	49.3	Baseline
Unfulfilled	19	25.4	19	25.3	38	50.7	0.558
Magnesium							
Fulfilled	16	21.3	21	28	37	49.3	Baseline
Unfulfilled	19	25.4	19	25.3	38	50.7	0.558
Phosphorus							
Fulfilled	19	25.4	19	25.3	38	50.7	Baseline
Unfulfilled	16	21.3	21	28	37	49.3	0.558
Iron							
Fulfilled	15	20	18	24	33	44	Baseline
Unfulfilled	20	26.7	22	29.3	42	56	0.852
Zinc							
Fulfilled	17	22.7	19	25.3	36	48	Baseline
Unfulfilled	18	24	21	28	39	52	0.926
Psychosocial Stress							
Normal stress level	22	29.3	8	10.7	30	40	Baseline
High stress level	13	17.4	32	42.6	45	60	0.001*
Total	35	46.7	40	53.3	75	100	

*) Statistically significant data ($p < 0.05$).

According to Table 4, most categories of the chi-square test examining the relationship between food rights fulfillment and health status yielded p-values ≤ 0.25 , except for the "highly unfulfilled" category, which had a p-value > 0.25 . Regardless, the food rights variable was included in the multivariate model due to its well-established relevance to health outcomes. Previous studies have emphasized the importance of fulfillment rights to food in improving health status. As a basic human

need, the right to access nutritious and high-quality food plays a crucial role in maintaining health (Setyorini et al., 2021); nutritious food consumption supports overall well-being (Forde & Decker, 2022), while insufficient access to adequate food may result in various health problems (Butler et al., 2024).

Meanwhile, the analysis of the relationship between the fulfillment of nutritional rights (macronutrients and micronutrients) and health status revealed that only two nutrients—energy and carbohydrates—met the criteria for inclusion in the multivariate logistic regression analysis. The results of the bivariate analysis indicated a significant correlation between the fulfillment of energy and carbohydrate intake and health status. In addition, the analysis of the relationship between psychosocial stress and the health status of juvenile inmates resulted in p-value 0.001. This indicates eligibility for multivariate logistic regression analysis ($p < 0.25$). These bivariate analysis results confirm a significant correlation between psychosocial stress and health status.

In the next step, the relationships between the fulfillments of both rights to food and nutritional adequacy, psychosocial stress condition, and health status were assessed using multivariate logistic regression based on the variable selection during the bivariate analysis to identify statistically significant independent variables. This method was chosen due to the categorical nature of all variables involved. Variables with a p-value < 0.05 were considered to be a statistically significant correlation. A confounding test was also performed on variables with p-values > 0.05 following the first step of the regression analysis.

Table 5
Multivariate Regression Analysis Final Result

Variable	Health Status				Total		p-value	OR	95% CI
	Good		Poor						
	n	%	n	%	n	%			
Psychosocial Stress									
Normal stress level	22	29.3	8	10.7	30	40	Baseline	Baseline	Baseline
High stress level	13	17.4	32	42.6	45	60	0.001*	6.9	2.25 – 21.18
Rights to Food									
Highly fulfilled	8	10.6	10	13.3	18	24	Baseline	Baseline	Baseline
Fulfilled	11	14.7	5	6.7	16	21.3	0.316	0.4	0.09 – 2.18
Highly unfulfilled	6	8	13	17.3	19	25.3	0.282	2.4	0.49 – 11.6
Unfulfilled	10	13.3	12	16	22	29.3	0.472	1.7	0.38 – 7.8
Energy Intake									
Fulfilled	22	29.3	16	21.3	38	49.3	Baseline	Baseline	Baseline
Unfulfilled	13	17.3	24	32	37	50.7	0.238	2.4	0.55 – 10.8
Carbohydrate Intake									
Fulfilled	14	18.7	23	30.7	37	49.3	Baseline	Baseline	Baseline
Unfulfilled	21	28	17	22.6	38	50.7	0.717	1.3	0.30 – 5.74
Total	35	46.7	40	53.3	75	100			

*) Statistically significant data ($p < 0.05$).

Table 5 shows the final results of the logistic regression analysis and indicates that only the psychosocial stress variable had a p-value < 0.05 , indicating the significant association with health status. The remaining independent variables—food rights, energy intake, and carbohydrate intake fulfillment—had p-values > 0.05 . A confounding test was then performed by sequentially excluding

variables with p -values > 0.05 , from the multivariate analysis model beginning from variable with the largest p -value, starting from excluding carbohydrate fulfillment, rights to food, then energy fulfillment for the last. Variables were retained in the model if their exclusion resulted in an odds ratio change greater than 10%.

First step of the confounding test indicates that excluding the carbohydrate intake fulfillment variable led to an odds ratio change of more than 10%. This confirmed carbohydrate intake fulfillment role as a confounder, associated to both the independent and dependent variables. As a result, these variables were re-entry in the next step of the confounding analysis model. Second step of the confounding test indicates that excluding the food rights fulfillment variable led to an odds ratio change of more than 10%. This confirms food rights fulfillment role as a confounder, associated with both the independent and dependent variables. As a result, this variable was re-entry in the next step of the confounding analysis model.

Third step the of confounding test denotes that excluding the energy intake fulfillment variable led to an odds ratio change of more than 10%. This confirms energy intake fulfillment ruled as a confounder, associated to both the independent and dependent variables. As a result, this variable would be re-entered in the final step of the multivariate regression analysis model to identify the most significant correlation between independent variables and the dependent variable, with a p -value > 0.05 and the largest odds ratio. The final multivariate analysis was performed to examine the most significant independent variable associated with health status. Based on statistical analysis results presented in Table 5, psychosocial stress is the most significant independent variable correlated with health status (OR: 6.9; 95% CI: 2.25–21.18), followed by food rights fulfillment (OR: 0.4; 95% CI: 0.09–2.18), energy intake fulfillment (OR: 2.4; 95% CI: 0.55–10.8), and carbohydrate intake fulfillment (OR: 1.3; 95% CI: 0.30–5.74) take role as confounding variables.

DISCUSSION

Juvenile inmates in LPKA Class II Bandung experience conditions that differ significantly from their prior environments. The predominance of older adolescents in this study is consistent with the developmental stage in which young people experience substantial physical, cognitive, and psychosocial changes, making their social environment particularly relevant to health and well-being (WHO, 2024). The variation in educational attainment is also relevant, as education and health are closely interconnected during adolescence, with educational experiences contributing to both health knowledge and health-related behavioral development (Ribeiro et al., 2023; WHO, 2024). Differences in the length of detention may further reflect varying levels of exposure to the institutional environment; research among justice-involved youth indicates that the duration and intensity of incarceration can have implications for later psychosocial functioning, while detained youth commonly present with substantial mental health needs (Thomas et al., 2026; Whitley et al., 2022). The relatively low proportion of participants reporting caffeine consumption may nevertheless be relevant because caffeine intake during adolescence has been associated with sleep problems and anxiety, particularly at higher levels of consumption (Cho et al., 2024). Taken together, these characteristics provide important contextual considerations for interpreting the relationships

between food rights, nutritional adequacy, psychosocial stress, and health status among juveniles in detention.

The juvenile inmates are subject to multiple restrictions—physical, psychological, and social—that cumulatively impact their overall health status. The health conditions identified in this study indicate that they experienced health concerns across both physical and psychosocial dimensions. The presence of respiratory, digestive, dermatological, and dental conditions, together with the relatively poor overall health status observed in this population, is consistent with evidence that detained adolescents have substantial and diverse physical and mental health needs (Whitley et al., 2022). At the same time, the inadequate fulfillments of rights to food and several nutrient intakes are of concern because adolescence is a period of rapid growth in which adequate energy and micronutrient intake are essential for physical development and health (Soliman et al., 2022).

This study also found that most juvenile inmates struggle to maintain social relationships, both with their families and peers, during their period of incarceration. Common familial issues include infrequent communication (either in-person or via phone), perceived lack of emotional support, and difficulty sharing personal concerns. Peer-related challenges were also evident, as many inmates reported difficulties in forming social connections within the detention environment. These psychosocial stressors may lead to heightened anxiety and contribute to increased levels of stress (Humaedi, 2025). This is reflected in the study's findings, which showed that a significant proportion of juvenile inmates at LPKA Class II Bandung experience high levels of psychosocial stress.

A study by Nurwela & Rindu (2022) at LPKA Class I Kupang also supports these findings, reporting that over half of the juvenile inmates experienced moderate to high stress levels, primarily due to strained familial relationships. The adolescent stage of development amplifies these stress responses, as adolescents are especially vulnerable to psychological distress resulting from social disruptions, such as those encountered in detention settings (Aguilar, 2022). Furthermore, the all-male population within the detention center may also contribute to elevated stress levels. Research suggests that males generally have lower emotional regulation capacities than females and face greater challenges in expressing emotions, making them more susceptible to psychological distress (Kaur et al., 2024).

Lazarus and Folkman (1984) explained that stress arises when individuals perceive that environmental demands exceed their coping abilities, as described by Obbarius et al. (2021). Juvenile inmates at LPKA Class II Bandung encounter numerous stressors, including limited social interaction, separation from family, restricted communication, and uncertainty surrounding their reintegration process. The policy of allowing contact only with nuclear family members further restricts access to external social support. Limited psychological services and challenges in social adaptation further contribute to elevated stress levels among the inmates.

Additional data indicate that the most common crimes committed by juvenile inmates at LPKA Class II Bandung include theft, followed by the use of sharp weapons, murder, and sexual misconduct. These offences are often associated with greater anxiety about the future, especially concerning reintegration and the fear of social stigma (Lundqvist, 2024; Humaedi, 2025). As noted by Candeias et al. (2024), stress negatively impacts both physical and psychological well-being.

This study identified psychosocial stress as having the strongest and most statistically significant correlation with health status among juvenile inmates. Those experiencing high stress levels were nearly seven times more likely to report health problems (OR: 6.9; 95% CI: 2.25–21.18) than those with lower stress levels. Biologically, this can be explained by the activation of stress-related hormones such as cortisol, adrenocorticotrophic hormone (ACTH), and adrenaline, which influence immune function and metabolic regulation. Chronic stress is linked to increased inflammation and dysfunction of the cardiovascular, digestive, and nervous systems (Seiler et al., 2019; Halimah et al., 2023).

The biopsychosocial model stated by Engel in Lugg (2021) serves as an appropriate framework for analyzing the relationship between psychosocial stress and health status in juvenile inmates. This model posits that health is shaped by the dynamic interaction of biological factors (e.g., nutrition, physical health), psychological components (e.g., stress, emotional regulation), and social elements (e.g., interpersonal relationships, social support). Unlike biomedical models that focus solely on physical causes, this approach emphasizes the combined influence of mental, social, and environmental factors, offering a more holistic understanding—particularly relevant to incarcerated adolescents.

LPKA Class II Bandung has implemented several initiatives, such as art programs, physical activities, and psychoeducational sessions aimed at supporting emotional well-being. However, a lack of professional psychologists presents a significant challenge to the effective implementation of these programs. Establishing collaborations with NGOs, universities, and other institutions could help enhance the delivery and sustainability of psychosocial interventions (Troup, 2021).

In addition to psychosocial stress, this study also examined three biological variables—food rights, energy intake, and carbohydrate intake—as potential confounders. While these variables did not show statistically significant associations with health status, they remain contextually relevant within the biopsychosocial framework. Confounding variables were statistically controlled through purposive sampling and multivariate logistic regression using categorical variables, allowing for the simultaneous evaluation of multiple factors. The odds ratios (ORs) indicated a higher health risk among inmates with inadequate intake.

These findings suggest that the social context of meals may influence both psychological and biological health. Eating in isolation, lack of communal dining spaces, and limited social interaction during meals may worsen stress levels and reduce appetite (Nielsen et al., 2025). Additionally, the absence of a certified nutritionist has resulted in dietary plans that do not fully consider the specific nutritional needs of adolescent inmates, including age, activity level, and mental health. According to the Basic Health Care Service Standards for Detention Centers, each facility should have at least one nutritionist to ensure dietary quality and nutritional balance. Furthermore, the Regulation of the Minister of Law and Human Rights No. 18 of 2015 mandates that juvenile inmates in state care are entitled to high-quality food that meets national nutritional standards. Given the important role of the adequate rights to food in supporting both psychological well-being and physical health, it may be reflected not only in overall food provision but also in the adequacy of specific nutrient intakes or nutritional intakes, particularly energy and carbohydrates.

Adolescents who consume lower-quality carbohydrates may have a higher risk of experiencing stress, depression and anxiety. The quality of carbohydrate intake may influence glycemic responses, metabolic processes, and neurobiological pathways, including insulin and cortisol, which play a major role in stress response involved in brain function or emotional regulation (Ülger et al., 2025). Besides stress, the glycemic response and index could also influence the body physically. Carbohydrate intake can, therefore, affect health status through its effects on glucose regulation, insulin sensitivity, and body composition, with poor-quality carbohydrate patterns potentially increasing metabolic risk over time (Bonsembiante & Targher, 2021 & Mohebbati et al., 2024). Carbohydrate with a high glycemic index or high glycemic load can produce greater and more rapid increases in blood glucose, then will be followed by greater insulin secretion (Campos et al., 2022).

Energy intake plays an important role in adolescent health because it provides the energy needed for metabolism, physical activity, growth, tissue development, and puberty (Soliman et al., 2022). Adequate energy availability supports hormonal regulation through pathways involving leptin, insulin, ghrelin, and growth hormone, which are important for growth and development (Novita, 2025). Inadequate energy intake may disrupt these hormonal pathways and impair growth, pubertal development, and bone health. In contrast, excessive energy intake relative to energy expenditure can lead to positive energy balance, increased adiposity, overweight, obesity, and metabolic health problems (Savarino et al., 2021; Soliman et al., 2022). From a physiological perspective, inadequate energy intake may adversely influence psychological well-being through alterations in energy availability, appetite-regulating hormones, HPA-axis activity, metabolic function, and brain energy supply, potentially increasing vulnerability to psychological distress (Areta et al., 2021).

Statistical analysis revealed odds ratios of 2.3 (95% CI: 0.49–11.6) for food rights fulfillment, 2.5 (95% CI: 0.55–10.8) for energy intake fulfillment, and 1.3 (95% CI: 0.30–5.74) for carbohydrate intake fulfillment. Although these associations were not statistically significant, they indicate potential trends toward increased health risks. These results may be attributed to the study's limited sample size, possible response bias, population homogeneity, or the overriding impact of psychosocial stress as a dominant mediating variable. Future research using longitudinal mixed-method designs is recommended to yield a more comprehensive and statistically robust understanding.

Despite these limitations, food and nutrition remain essential elements to examine in context. Although juvenile inmates receive three meals per day, concerns about dietary quality persist, including limited menu variety and inconsistent access to fruits and plant-based proteins. Psychologically, a structured and positive dining environment has the potential to improve emotional regulation and reduce stress.

From a physiological perspective, proper food hygiene and adequate nutrition are crucial for preventing infections (e.g., *Salmonella*, *Escherichia coli*) and supporting immune function (Mirzay-Razaz, 2022). Psychologically, consistent mealtimes and a supportive eating environment are important for emotional stability. Socially interactive meals can enhance psychological well-being by promoting feelings of safety, reducing loneliness, and strengthening social bonds (Ong et al., 2024). The relationship between stress and nutritional status is bidirectional. Poorly managed stress can lead to disordered eating behaviors, such as emotional eating or cravings for sugary foods (Tsofliou et al., 2022). Conversely, insufficient nutrient intake can impair immune responses, disrupt cognitive function, and hinder emotional regulation (Yuliadi, 2021; Zulfa et al., 2024).

Given the complex interrelationship between stress, nutrition, and health status, an integrated intervention strategy is urgently needed. Efforts to improve psychosocial support and food systems should be coordinated through partnerships with universities (e.g., student internships in psychology and nutrition), as well as NGOs that focus on mental health and juvenile rights (Ariadi & Tomalili, 2023). The biopsychosocial framework thus provides a comprehensive and holistic understanding of health among juvenile inmates. While psychosocial stress is the predominant health determinant, nutritional and dietary factors play vital supporting roles in maintaining biological balance. Cross-sectoral and interdisciplinary collaboration is essential for creating a rehabilitative environment that is not only effective, but also compassionate and transformative.

CONCLUSION

This study found a significant association between psychosocial stress and the health status of juvenile inmates ($p:0.001$; OR: 6.9; 95% CI: 2.25–21.18). Although rights to food, energy intake, and carbohydrate intake were not significantly associated with health status, they remained important potential confounders, as inadequate nutritional fulfillment may affect both mental and physical health. Most participants experienced unmet food rights, inadequate macronutrient intake, and high psychosocial stress. Juvenile detention centers should strengthen food service systems and stress management programs, while future longitudinal and mixed-method studies with larger samples are needed to address the limitations of the cross-sectional design and establish causal relationships.

Acknowledgment

The authors would like to express their sincere gratitude to the Ministry of Law and Human Rights of the Republic of Indonesia and the LPKA Class II Bandung for their cooperation and support in facilitating this research. We also extend our heartfelt appreciation to the juvenile inmates of LPKA Class II Bandung for their willingness to participate in the study and complete the required assessments.

Author Contribution Statement

Sherly Rizki Andriani: Conceptualization, Data Curation, Analysis, Funding Acquisition, Methodology, Project Administration, Resources, Validation, Visualization, Writing – Review & Editing. **Syifa F. Syihab:** Conceptualization, Data Curation, Analysis, Funding Acquisition, Methodology, Resources, Validation, Visualization, Writing Original Draft. **Asti Dewi Rahayu Fitrianiingsih:** Conceptualization, Data Curation, Analysis, Methodology, Resources, Writing Original Draft. **Muchamad Rizki Sentani:** Conceptualization, Data Curation, Analysis, Methodology, Resources, Writing Original Draft.

REFERENCES

Aguilar, L. E. (2022). Combating Mental Health Stigma: A Graphic Novel for Latinx Adolescent Males (Doctoral dissertation, Alliant International University).

- Areta, J. L., Taylor, H. L., & Koehler, K. (2021). Low energy availability: history , definition and evidence of its endocrine , metabolic and physiological effects in prospective studies in females and males. *European Journal of Applied Physiology*, 121(1), 1–21. <https://doi.org/10.1007/s00421-020-04516-0>
- Ariadi, A., & Tomalili, R. (2023). Pelaksanaan Rehabilitasi dan Reintegrasi Anak Korban Serta Anak Saksi Yang Berhadapan Dengan Hukum di Kabupaten Konawe Provinsi Sulawesi Tenggara. *Jurnal Serambi Hukum*, 16(02), 187–198. <https://doi.org/10.59582/sh.v16i02.833>
- Barnert, E., & DeBaun, M. R. (2024) Increasing access to quality healthcare for children who are incarcerated: American Pediatric Society issue of the year (2023–2024). *Pediatric research*. 95(3), 610–612. <https://doi.org/10.1038/s41390-023-02739-3>
- Bonsembiante, L., & Targher, G. (2021). Type 2 Diabetes and Dietary Carbohydrate Intake of Adolescents and Young Adults : What Is the Impact of Different Choices ? *Nutrients*, 13(10), 1–18. <https://doi.org/https://doi.org/10.3390/nu13103344>
- Brown, C., Ravallion, M., & van de Walle, D. (2023). Child Health and The Housing Environment. *World Development*. 1;168, 1–8. doi: <https://doi.org/10.1016/j.worlddev.2023.106265>
- Busch, E. L. (2021). Cut Points and Contexts. *Cancer*, 127(23), 4348–4355. <https://doi.org/10.1002/cncr.33838>
- Butler, J. L., Johnson, C. M., Hardison-Moody, A., & Bowen, S. K. (2024). Food Insecurity Associated with Higher Stress, Depressive Symptoms, and Lower Diet Quality among Women Caregivers in North Carolina. *Nutrients*, 16(15), 2. <https://doi.org/10.3390/nu16152491>
- Candeias, A. A., Galindo, E., Reschke, K., Bidzan, M., & Stueck, M. (2024). The interplay of stress, health, and well-being: unraveling the psychological and physiological processes. *Frontiers in Psychology*. 15: 1471084. <https://doi.org/10.3389/fpsyg.2024.1471084>
- Campos, V., Tappy, L., Bally, L., Sievenpiper, J. L., & Lê, K. (2022). Importance of Carbohydrate Quality : What Does It Mean and How to Measure It ? *The Journal of Nutrition*, 152(5), 1200–1206. <https://doi.org/https://doi.org/10.1093/jn/nxac039>
- Cho, J. A., Kim, S., Shin, H., & Kim, H. (2024). The Association between High-Caffeine Drink Consumption and Anxiety in Korean Adolescents. *Nutrients*, 16(794), 1–13. <https://doi.org/10.3390/nu16060794>
- Eyamu, S. (2024). The Psychosocial Effects of Parental Imprisonment on the Lives of Young People and their Families in Soroti-Uganda. (Master's thesis, ISCTE-Instituto Universitario de Lisboa (Portugal)).
- Fitrian, A., & Anwar, U. (2022). Optimalisasi Pelayanan Kesehatan pada Rumah Tahanan Negara Class II B Banjarnegara. *Jurnal Humani (Hukum Dan Masyarakat Madani)*, 12(2), 266–274. <https://doi.org/10.26623/humani.v12i2.5024>
- Fayasari, A. (2020). Buku Penilaian Komsumsi Pangan. *Penerbit: Kun Fayakun*. Anggota Ikapi.
- Forde, C. G., & Decker, E. A. (2022). The importance of food processing and eating behavior in promoting healthy and sustainable diets. *Annual Review of Nutrition*. June 7; 42(1), 377–399. <https://doi.org/10.1146/annurev-nutr-062220-030123>
- Halimah, S., Inayati, A., & Dewi, N. R. (2023). Penerapan Relaksasi Otot Progresif Terhadap Tingkat Stress Pada Pasien Hipertensi Di Ruang Jantung Rsud Jendral Ahmad Yani Kota Metro. *Jurnal Cendikia Muda*, 3(2), 300–306. ISSN : 2807-3469.

- Humaedi, S. (2025). Stres Dan Strategi Emotion-Focused Coping Anak Berkonflik Dengan Hukum Di LPKA Class II Bandung. *Work Journal*, 14(2), 126–134. <https://doi.org/10.24198/share.v14i2.56715>
- Indriastuti, D., Rangki, L., Kusnan, A., & K, I. M. A. (2026). Pemeriksaan Kesehatan Pada Anak Binaan di Lapas Pembinaan Anak Class II Kendari. *Karya Kesehatan Journal of Community Engagement*, 07(01), 87–91. <https://doi.org/10.46233/k2jce.v7i1.1697>
- Kaur, A., Kailash, S. Z., Sureshkumar, K., Sivabackiya, C., & Rumaisa, N. (2022). Gender differences in emotional regulation capacity among the general population. *International Archives of Integrated Medicine*, 9(1), 22–28.
- Ke, P., Ke, L., Liu B., Liu. X. (2021). The Relationship Between Mental Health and Psychosocial Stress of Reservoir Migrants in the Middle Route of China ' s South-to-North Water Diversion Project (SNWDP): The Mediating Role of Social Support. *Dovepress Journal: Psychology Research and Behavior Management*, 14, 299–306. <https://doi.org/10.2147/PRBM.S297416>
- Kurniawan, R., Khaira, N., Faisal, T. I., & Nurmiaty. (2024). Pendidikan Kesehatan Reproduksi Pada Anak Usia Remaja Di Pantoloan Boya, Kota Palu. *Jurnal Kreativitas Pengabdian Kepada Masyarakat (PKM)*, 7(12), 5285–5292. <https://doi.org/10.33024/jkpm.v7i12.16578>
- Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal, and Coping* (1st ed.). Springer US. ISBN: 0-8261-4191-9
- Lugg, W. (2021). Psychiatry Australasian The biopsychosocial model – history, controversy and Engel. *Australian Psychiatry*, 1(5), 1–5. <https://doi.org/10.1177/10398562211037333>
- Lundqvist, E. (2024). “It's a great depression being judged”: A qualitative study on former criminals' experiences of stigmatization after serving their sentences in Scotland. Thesis. Marie Cederschiöld University.
- Mirzay-Razaz, J., Hassanghomi, M., Ajami, M., Koochakpoor, G., Hosseini-Esfahani, F., & Mirmiran, P. (2022). Effective food hygiene principles and dietary intakes to reinforce the immune system for prevention of COVID-19: a systematic review. *BMC nutrition*, 8(1), 53. <https://doi.org/10.1186/s40795-022-00546-3>
- Mohebbati, S., Shakeri, M., Ranjbar, S., Jalali, M., Nouri, M., & Faghil, S. (2024). The association of dietary carbohydrate quality and quantity with obesity among Iranian adolescents : a case-control study. *BMC Pediatrics*, 24(276), 1–7. <https://doi.org/10.1186/s12887-024-0467-9>
- Mytton, O. T., Donaldson, L., Goddings, A., Mathews, G., Ward, J. L., Greaves, F., & Viner, R. M. (2024). Changing patterns of health risk in adolescence : implications for health policy. *The Lancet Public Health*, 2667(24), 1–5. [https://doi.org/10.1016/S2468-2667\(24\)00125-7](https://doi.org/10.1016/S2468-2667(24)00125-7)
- Nielsen, M., Werkander Harst de, C., & Sandgren, (2025). A. Eating Together but Often Feeling Lonely: Residents' Mealtime Experiences in a Nursing Home. *Journal of Clinical Nursing*, 34(1), 259–267. <https://doi.org/10.1111/jocn.17561>
- Ningsih, S. D., Silitonga, E., & Sinaga, T. R. (2022). Edukasi Pencegahan Kekerasan Remaja Pada Kader Posyandu Remaja Di Lembaga Pembinaan Khusus Class 1 Medan. *Jurnal Abdimas Mutiara*, 3(1), 50–61.
- Novita, K. D. (2025). JKKI : Jurnal Kedokteran dan Kesehatan Indonesia. *JJKI: Jurnal Kedokteran Dan Kesehatan Indonesia*, 16(3), 343–359. <https://doi.org/10.20885/JKKI.Vol16.Iss3.art3>

- Noviyanti, N. L. (2021). Hubungan Kepuasan Mutu Hidangan Dan Tingkat Kecukupan Energi Terhadap Status Gizi Santri Putri Pondok Pesantren Roudlotul Jannah Kudus. 1-140. Thesis. <https://eprints.walisongo.ac.id/id/eprint/16330/>
- Nurwela, T. S., & Rindu, Y. (2022). Tingkat Stress Pada Remaja Di Lembaga Pembinaan Khusus Anak Class 1 Kupang. *Flobamora Nursin Jurnal*, 1(2), 9–14.
- Obbarius, N., Fischer, F., Liegl, G., Obbarius, A., & Rose, M. (2021). A Modified Version of the Transactional Stress Concept According to Lazarus and Folkman Was Confirmed in a Psychosomatic Inpatient Sample. *Frontiers in Psychology*, 12(2), 1–12. <https://doi.org/10.3389/fpsyg.2021.584333>
- Ong, A. D., Uchino, B. N., & Wethington, E. (2024). Loneliness and health in older adults: A mini-review and synthesis. *Gerontology*, 67(1), 85–95. <https://doi.org/https://doi.org/10.1159/000512408>
- Pinsky, E., & Klawansky, S. (2023). MAD (about median) vs. quantile-based alternatives for classical standard deviation, skewness, and kurtosis. *Frontiers in Applied Mathematics and Statistics*, 9, 1–13. <https://doi.org/10.3389/fams.2023.1206537>
- Ribeiro, S. M., Basso, M. B., Massignan, C., & Leal, S. C. (2023). Playful educational interventions in children and adolescents' health literacy: A systematic review. *Health Promotion International*, 38(4). <https://doi.org/10.1093/heapro/daad089>.
- Savarino, G., Corsello, A., & Corsello, G. (2021). Macronutrient balance and micronutrient amounts through growth and development. *Italian Journal of Pediatrics*, 47(109), 1–14. <https://doi.org/10.1186/s13052-021-01061-0>
- Seiler, A., Fagundes, C. P., & Christian, L. M. (2019). The impact of everyday stressors on the immune system and health. In *Stress Challenges and Immunity in Space: From Mechanisms to Monitoring and Preventive Strategies*. 71–92. https://doi.org/10.1007/978-3-030-16996-1_6
- Setyorini, N., Sumastuti, E., & Utami, R. H. (2021). Urgensi Keamanan Pangan Rumah Tangga dalam Menghadapi Pandemi Covid-19. *Jurnal Sosial Ekonomi Pertanian*, 18(1), 15–26. <https://doi.org/10.20956/jsep.v18i1.13896>
- Silva-Junior, J. S., Cunha, A. A. da, Lourenção, D. C. de A., Silva, S. M. da, Silva, R. F. A. da, Faria, M. G. de A., Mininel, V. A., Almeida, M. C. dos S., Baptista, P. C. P., & Gallasch, C. H. (2021). Occupational Psychosocial Stressors and Mental Distress Among Healthcare Workers during COVID-19 Pandemic. *Einstein: Official Publication of the Instituto Israelita de Ensino e Pesquisa Albert Einstein*, 19, 1–8. <https://doi.org/10.31744/einstein>
- Silva, M. C. D., Cruz, A. P. M., & Teixeira, M. O. (2021). Depression, anxiety, and drug usage history indicators among institutionalized juvenile offenders of Brasilia. *Psicologia: Reflexão e Crítica*, 34, 17. <https://doi.org/10.1186/s41155-021-00184-x>
- Soliman, A., Alaaraj, N., Hamed, N., Alyafei, F., Ahmed, S., Itani, M., Elalaily, R., & Soliman, N. (2022). Nutritional interventions during adolescence and their possible effects. *Acta Biomed*, 93(1), 1–14. <https://doi.org/10.23750/abm.v93i1.12789>
- Tarekegn, A., Alemayehu, M., Temesgen, H., Derseh, H. A., & Tesfa, H. (2025). Undernutrition and associated factors among incarcerated people in Bahir Dar and Finote Selam prison site , Northwest Ethiopia: a cross- - sectional study. *BMJ Public Health*, 3(1), 1–7. <https://doi.org/10.1136/bmjph-2024-001152>

- Tasisa, Y. B., & Palanimuthu, K. (2021). Psychosocial Impacts of Imprisonment among Youth Offenders in Correctional Administration Center, Kellem Wollega Zone, *Ethiopia. Medical Update*, 21(2). <https://doi.org/10.37506/mlu.v21i2.2867>
- Thomas, S. E., et al. (2026). Incarceration and subsequent psychosocial outcomes: A 16-year longitudinal study of youth after detention. *Journal of the American Academy of Child & Adolescent Psychiatry*. 65(3), 432-444. <https://doi.org/10.1016/j.jaac.2025.04.004>.
- Troup, J., Fuhr, D. C., Woodward, A., Sondorp, E., & Roberts, B. (2021). Barriers and facilitators for scaling up mental health and psychosocial support interventions in low-and middle-income countries for populations affected by humanitarian crises: a systematic review. *International journal of mental health systems*, 15, 1-14. <https://doi.org/10.1186/s13033-020-00431-1>
- Tsofliou, F., Casey, C., & Hughes, C. (2023). Stress and Disordered Eating Patterns In Eating Disorders. *Cham: Springer International Publishing*, 51-73. https://doi.org/10.1007/978-3-031-16691-4_3
- Ülger, T. G., Sürücü, B., Menekşe, A. E., Çakmak, Y., Fidan, Ş., & İncekara, B. (2025). The effect of dietary carbohydrate quality on depression and anxiety levels in adolescents. *Frontiers in Nutrition*, 12, 1–12. <https://doi.org/10.3389/fnut.2025.1689004>
- Vitagliano, J., Shalev, T., Saunders, J. B., Mason, E., Stang, J., Schlafer, R., & Kotlar, B. (2024). Forgotten Fundamentals: A Review of State Legislation on Nutrition for Incarcerated Pregnant and Postpartum People. *Journal of Correctional Health Care*, 30(2), 113-130. <https://doi.org/10.1089/jchc.23.07.0063>
- Whitley, K., Tastenhoye, C., Downey, A., & Rozel, J. S. (2022). Mental health care of detained youth within juvenile detention facilities. *Child and Adolescent Psychiatric Clinics of North America*, 31(1), 31–44. <https://doi.org/10.1016/j.chc.2021.09.002>.
- World Health Organization. (2024). The adolescent health indicators recommended by the Global Action for Measurement of Adolescent health (GAMA): Guidance for monitoring adolescent health at country, regional and global levels. Geneva: WHO.
- Yuliadi, I. (2021). HPA Aksis dan Gangguan Psikosomatik HPA Aksis and Psychosomatic disorder. *Jurnal Ilmiah Psikologi Candradiwa*, 6(1), 1–22. ISSN: 2442-8051
- Zorlu, S., Ozdas, D. O., Koyuncuoglu, C. Z., Ozgur, T., Gaye, U., Guveli, D., & Karaduman, B. (2023). ORAL Health Status Of Juvenile Inmates In A Detention Center In Turkey. *Journal of Basic and Clinical Health Science (JBACHS)*. 7, 131–138. <https://doi.org/10.30621/jbachs.1230992>
- Zulfa, A., Putri, H., Pratama, S. A., Wahjuni, E. S., & Dini, C. Y. (2024). Hubungan asupan karbohidrat dan kadar glukosa darah terhadap VO2 Max pada atlet sepak bola non-elite *The. SAGO: Gizi Dan Kesehatan*, 5(3), 623–632. <https://doi.org/10.30867/gikes.v5i3A.1718>.