

# Impact of Nutrition on Mental Health and Wellbeing of Primary School Children in a rural suburb of Enugu State, Nigeria

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## Abstract

The purpose of this study was to investigate the impact of nutrition on mental health and wellbeing in a rural suburb of Nigeria among primary school children. The study was conducted using an ex post facto design. Using a multi stage and random sampling procedure, 197 primary school children were selected from five migrant farmers schools in a rural suburb in Nigeria. The researcher adapted two instruments: Children's Mental Health Questionnaire (CMHQ) and Children's Wellbeing Index (CWI). The Children's Mental Health Questionnaire (CMHQ) is a 15-item questionnaire which measures the children's level of depression, anxiety, suicidal thoughts and behaviour. Also, the Children's Well-being Index (CWI) measures six dimensions of wellbeing such as self-acceptance, life satisfaction, personal growth, positive inter-personal relations, adaptability, and quality of life. The results showed that nutrition significantly impacted on the mental health of primary school children ( $\beta = .915$ ;  $t = 31.1771$ ;  $p\text{-value} = 0.000$ ). Furthermore, the results showed that nutrition significantly impacted the well-being of primary school children ( $\beta = .949$ ;  $t = 42.014$ ;  $p\text{-value} = 0.000$ ). It is recommended that interventions targeted at alleviating the plights of these vulnerable children should be a top priority for the government and non-governmental organizations. It is also further recommended that laudable government programmes such as 'school feeding programme' in Nigeria should be revitalized to supplement the diets of school children who are exposed to malnutrition.

**Keywords:** *Nutrition, Mental Health, Wellbeing, Primary School Children*

## Introduction

Nutrition is a critical factor in childhood development (Black et al., 2020). Children of school age are actively undergoing a growing phase which involves both physical and mental development (Immordino-Yang et al, 2019). According to Black et al (2019), good nutrition during childhood stage of life does not only promote optimal health and wellbeing but also contributes to adequate mental and cognitive development. Research has shown that nutrition has been historically overlooked as a contributing factor in poor mental health and well-being (Kris-Etherton et al, 2021). Nevertheless, scholars have begun to study the subtle relationship existing between nutrition and mental health because not only does the entire body need adequate nutrition for healthy growth and development, but even the central nervous system need some important nutrients to function properly. Globally, malnutrition is linked with poor mental health outlook in the adolescent and adult population, whereas there seems to be a paucity of research linking nutrition and poor mental health and well-being among children (Akseer, et al, 2017). According to World Health Organization (WHO) (2016), malnutrition simply describes significant deficiencies, which manifests in excesses or imbalances in a child's nutrient base. Those who are undernourished, micronutrient deficient, overweight, and obese are at a higher risk of noncommunicable diseases and illnesses related to diet.

According to Adeyeye et al, (2023), there are more deaths caused by malnutrition than by violence, natural disasters, and diseases worldwide. It can result in stunting, wasting, and severe acute malnutrition in children (Ghimire et al., 2020). Malnutrition adversely affects the physical and mental development of children (De et al., 2019; Kirolos et al., 2022; Chattopadhyay & Saumitra, 2016). A study by Bourke et al, (2016) reveals that the immune system of malnourished children is more likely to be weakened, making them more susceptible to diseases and; it can also affect their ability to learn and develop intellectually. There is also concern that anxiety, depression, and other psychiatric symptoms are more likely to occur in malnourished children (Lin et al., 2021). It is also possible that the visual, auditory, and olfactory systems of children are all affected by malnutrition (Sethi et al, 2022). In a recent study, Bhutta et al. (2017) found that children with severe malnutrition have a 11-fold higher mortality rate than healthy children, mainly because they are more sensitive to infections.

It is possible for both adults and children to suffer from malnutrition. Globally, there are about 462 million underweight adults, and 1.9 billion overweight and obese adults (WHO, 2024). Further, the report points out that there are about 155 million stunted children under the age of five, 52 million wasted children, 17 million severely wasted children, and 41 million obese children. There are approximately 820 million people in the world who are hungry or malnourished, resulting in approximately 1 in 9 people suffering from hunger and malnutrition. There are 20 African countries responsible for 80% of the world's malnutrition, of which Nigeria is among the top 20. Furthermore, the report revealed that Nigerian children have traditionally suffered from two types of malnutrition: protein-energy malnutrition and micronutrient malnutrition.

Research findings have indicated that malnutrition among children of school age can manifest in a number of negative consequences such as low school enrolment, depression, anxiety and low academic achievement and others (Amoadu et al, 2024; Fynn-Sackey & Abdul Salam, 2015). It has been reported that children who eat healthy diets with vegetables, fruits and other nutritious foods have more sound mental health and better wellbeing than those who are exposed to other processed and unhealthy foods (Nekitsing et al, 2018). In children, unhealthy dietary patterns high in saturated fat, refined carbohydrates, and processed foods are associated with worse mental health outcomes (Orlando et al, 2022). The consumption of certain key nutrients during childhood is essential for proper brain development and functioning, with deficiencies in these nutrients linked to mental health problems (Muscaritoli, 2021). In the view of Anderson et al, (2018), breakfast and lunch, as well as the quality of the child's diet, can have a significant effect on the child's mental wellbeing and academic performance. It has been found that poorer mental health is associated with skipping breakfast and consuming energy drinks (Pengpid & Peltzer, 2020; Smiths & Richards, 2018). In extension, research in prenatal health indicates that there has been an association between a mother's diet during pregnancy and the child's diet in early childhood (up to age 7) and the child's personality traits and symptoms of depression and anxiety later in childhood (Pina-Camacho et al, 2015; Liu et al, 2017). A report by Bella-Awusah and Omigbodun (2020), indicates that about 10-20% of children in Nigeria have a mental health condition. It is imperative to note that there is a strong link between nutrition and children's mental health and wellbeing. Several research reports suggest that proper nutrition is crucial for supporting children's mental health, personality development, and overall wellbeing, particularly during the critical early developmental stages (Subramanyam et al, 2024; Rider et al, 2021). Optimizing child mental health outcomes requires access to healthy, nutritious foods especially in the rural suburbs of Enugu State, Nigeria.

Positive mental health and well-being guarantees children's optimal development and well-being. These can only be achieved when there is adequate nutrition for the growing

children. In the rural suburbs of Nigeria, malnutrition is common among children and this has resulted in the manifestations of different mental health issues such as stress, depression, anxiety and other debilitating mental health disorders. Furthermore, these children are found to be persistently having negative emotions, unable to have good relationships and can hardly engage in a meaningful activity or pursue life goals. Researchers have speculated that these conditions could be attributed to a lack of balanced diet or acute malnutrition. To this effect, the researcher tries to fill the gap of paucity of literature on the impact of nutrition on mental health and wellbeing of children in rural suburbs of Enugu State, Nigeria.

The general purpose of the study is to ascertain the impact of nutrition on the mental health and wellbeing of children in the rural suburbs of Enugu State, Nigeria. Specifically, the study sought to find out: (a) The impact of nutrition on mental health of primary school children. (b) The impact of nutrition on wellbeing of primary school children. The following research questions guided the study: i) What is the impact of nutrition on mental health of primary school children? ii) What is the impact of nutrition on wellbeing of primary school children?

## Method

This study utilized the ex post facto research design to examine how nutrition affects the mental health and well-being of children in rural suburbs of Enugu State, Nigeria based on quantitative research paradigms. Studies such as Anggarista and Wahyudin, (2022) and Goodman-Scott (2022) effectively utilized the ex post facto design to investigate variables after the fact has occurred without the interference of the researcher. The researcher obtained a copy of ethical approval letter from the Faculty of Education, University of Nigeria Ethical Committee. Also, written permission to carry out the study was obtained from the Local Education District. Prior to data collection, informed consent forms were given to the parents/guardians of the study participants. The researcher also adhered strictly to the stipulations of the American Psychological Association (APA) in conducting research involving human participants.

The study was conducted in a rural suburb of Uzo Uwani in Enugu State, Nigeria. The study area is known for its large arable land area predominantly used Agricultural activities. It is mostly populated by Igbo and Fulani tribes of Nigeria who engage in farming and cattle rearing respectively. The sample of the study involved 197 children (aged 8-12 years) from the migrant farmers schools in the study area drawn from a total population of 3488 children across all the primary schools across the entire study area.

In this study, the researcher adopted two instruments: Children's Mental Health Questionnaire (CMHQ) and Children's Wellbeing Index (CWI). The Children's Mental Health Questionnaire (CMHQ) was adapted from Lukat et, (2016), and it contains 15 items which measures the children's level of depression, anxiety, suicidal thoughts and behaviour and others. The CMHQ has a Likert scale of 4. Similarly, the Children's Well-being Index (CWI) was adapted from Dyrbye et al, (2016), which was designed to measure six dimensions of wellbeing such as self-acceptance, life satisfaction, personal growth, positive inter-personal relations, adaptability, and quality of life. The Children's Wellbeing Index has 'yes/no' response options. The researcher subjected the questionnaire to a thorough modification to reflect the context of Nigerian children.

To ensure the reliability of the Children's Wellbeing Index (CWI), the questionnaire was trial tested and it yielded a score 0.78 using Kuda Richardson 20. The researcher engaged two primary school teachers who served as research assistants during the data collection stage. Two structured questionnaires were used to ascertain information on mental health and wellbeing of primary school children. The Children's Mental Health Questionnaire (CMHQ) and the Children's Wellbeing Index (CWI) were administered simultaneously and data collected at

the same spot. Linear regression was used to analyse the relationships between variables in this study. Most importantly, regression has been extensively used to ascertain the pattern, direction and relationship strengths in ex post facto paradigms (Fox, 2015).

## Results

### *Demographic information of the participants*

The biodata of the study participants is gender. The male primary school children constituted 45.7% while females constituted 54.3% of the sample size.

**Research questions 1:** What is the impact of nutrition on mental health of primary school children?

**Table 1:** Linear regression analysis of the impact of nutrition on mental health of primary school children.

Model		R	r <sup>2</sup>	Standardized Coefficients	T	Sig.	Decision
				Beta			
1	(Constant)	-12.470	2.017		-6.183	.000	
	CNC	.915 <sup>a</sup>	.838	.915	31.771	.000	Sig.

a. Dependent Variable: CMHQ

In Table 1, the data shows that nutrition had positive impact on the mental health of primary school children since correlation coefficient of  $R = .915$  was positive and high. In the coefficient of determination shows that nutrition explained 83% variation in mental health of primary school pupils. Hence, the 17% variation on the mental health of pupils could be attributed to other variables that were not included in the model. Hence, Nutrition positively and highly impacted on the mental health of primary school children.

**Hypothesis 1:** The impact of nutrition on the mental health of school children is not significant. In table 1, linear regression analysis was conducted to examine the impact of nutrition on the mental health of primary school children. The results showed that nutrition significantly impacted on the mental health of primary school children ( $\beta = .915$ ;  $t = 31.1771$ ;  $p\text{-value} = 0.000$ ). Therefore, nutrition is a significant factor that impacts primary school pupils' mental health.

**Research question 2:** What is the impact of nutrition on wellbeing of primary school children?

**Table 2. Linear regression of the impact of nutrition on wellbeing of primary school children.**

Model		R	r <sup>2</sup>	Standardized Coefficients	T	Sig.	Decision
				Beta			
1	(Constant )	-16.650	1.504		-11.071	.000	
	CNC	.949 <sup>a</sup>	.901	.949	42.014	.000	Sig

The data table 2 shows the impact of nutrition on wellbeing of primary school children. The results revealed that nutrition had positive impact on the well-being of primary school children since correlation coefficient of  $R = .949$  was positive and high. The coefficient of determination shows that nutrition explained 90% variation in well-being of primary school children. Hence, the 10% variation on the well-being of primary school children could be attributed to other

variables that were not included in the model. Hence, nutrition positively and highly impacted on the well-being of primary school children.

**Hypothesis 1:** The impact of nutrition on the wellbeing of primary school children is not significant.

In table 2, linear regression analysis was conducted to examine the impact of nutrition on the well-being of primary school children. The results showed that nutrition significantly impacted the well-being of primary school children ( $\beta = .949$ ;  $t = 42.014$ ;  $p\text{-value} = 0.000$ ). Therefore, nutrition is a significant factor that impacts on primary school pupils' well-being.

## Discussion

The results showed that nutrition significantly impacted on the mental health of primary school children. Specifically, the result shows that nutrition had positive impact on the mental health of primary school children. Further analysis shows that nutrition explained a greater percentage of variation in mental health of primary school children. Thus, primary school children who suffered malnutrition or lacked balanced diets were more likely to be susceptible to some mental health issues. This finding supports the findings of the study conducted by Lucarelli et al., (2018) who reported that children who suffered malnutrition exhibited an increase in internalizing and externalizing emotional problems.

Similarly, the study by Florentino (2015) further showed that malnutrition was a serious and debilitating public health issue among school-aged children and adolescents in Senegal and Cambodia. This shows that the manifestation of some mental health concerns such as anxiety and extreme stress among school children could be attributed to malnutrition and a lack of adequate nutrients needed for growth, emotional stability and all round well being. In line with the finding of this current study, Fadare et al., (2019) has equally affirmed that there a strong link between children's nutrition and their mental health in developing countries like Nigeria. The study by Fadare et al, further reported that the level of mothers' education in the rural suburbs of Nigeria is still low and consequently affects the mental health outcomes of children.

Furthermore, results also revealed that nutrition had high and positive impact on the well-being of primary school children. In extension, linear regression analysis was conducted to examine the impact of nutrition on the well-being of primary school children. The results showed that nutrition significantly impacted the well-being of primary school children. This finding is in line with the findings of Hailegiorgis et al, (2018) who reported that orphaned primary school children scored very low on psychological wellbeing which may have been caused by severe malnutrition. Similarly, a study by Govender et al (2016), corroborates the findings of this study. According to Govender et al., the access to good nutrition, balanced diets and diverse nutrients could serve as a major boost for general human health and well-being especially children when constantly need them for growth. It has been found that malnutrition adversely affects the physical, cognitive, and emotional wellbeing of school-aged children.

## Conclusion

The findings of the current study clearly indicate that nutrition is a critical determining factor in children's mental health and wellbeing. Many children around the world suffer malnutrition and a large body of literature indicates that malnutrition adversely affects the physical growth as well as the mental health and wellbeing of children of school age. It is recommended that interventions targeted at alleviating the plights of these vulnerable children. It is also further recommended that laudable government programmes such as 'School feeding

programme' in Nigeria should be revitalized to supplement the diets of school children who are exposed to malnutrition.

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## References

- Adeyeye, S. A. O., Ashaolu, T. J., Bolaji, O. T., Abegunde, T. A., & Omoyajowo, A. O. (2023). Africa and the Nexus of poverty, malnutrition and diseases. *Critical Reviews in Food Science and Nutrition*, 63(5), 641-656. <https://doi.org/10.1080/10408398.2021.1952160>
- Akseer, N., Al-Gashm, S., Mehta, S., Mokdad, A., & Bhutta, Z. A. (2017). Global and regional trends in the nutritional status of young people: a critical and neglected age group. *Annals of the New York Academy of Sciences*, 1393(1), 3-20. <https://doi.org/10.1111/nyas.13336>
- Amoadu, M., Abraham, S. A., Adams, A. K., Akoto-Buabeng, W., Obeng, P., & Hagan Jr, J. E. (2024). Risk Factors of Malnutrition among In-School Children and Adolescents in Developing Countries: A Scoping Review. *Children*, 11(4), 476. <https://doi.org/10.3390/children11040476>
- Anderson, M. L., Gallagher, J., & Ritchie, E. R. (2018). School meal quality and academic performance. *Journal of Public Economics*, 168, 81-93. <https://doi.org/10.1016/j.jpubeco.2018.09.013>
- Anggarista, S., & Wahyudin, A. Y. (2022). A correlational study of language learning strategies and English proficiency of university students at EFL context. *Journal of Arts and Education*, 1(2).
- Bella-Awusah, T., & Omigbodun, O. (2020). Schools and their potential to promote mental health for children in Nigeria. *The Lancet Child & Adolescent Health*, 4(3), 175-177. [https://doi.org/10.1016/s2352-4642\(19\)30427-4](https://doi.org/10.1016/s2352-4642(19)30427-4)
- Berasategi Sancho, N., Idoiaga Mondragon, N., Dosil Santamaria, M., & Picaza Gorrotxategi, M. (2022). The well-being of children with special needs during the COVID-19 lockdown: Academic, emotional, social and physical aspects. *European Journal of Special Needs Education*, 37(5), 776-789. <http://dx.doi.org/10.1080/08856257.2021.1949093>
- Bhutta, Z. A., Berkley, J. A., Bandsma, R. H., Kerac, M., Trehan, I., & Briend, A. (2017). Severe childhood malnutrition. *Nature reviews Disease primers*, 3(1), 1-18. <https://doi.org/10.1038/nrdp.2017.67>
- Black, M. M., Pérez-Escamilla, R., & Rao, S. F. (2015). Integrating nutrition and child development interventions: scientific basis, evidence of impact, and implementation considerations. *Advances in Nutrition*, 6(6), 852-859. <https://doi.org/10.3945/an.115.010348>
- Black, M. M., Trude, A. C., & Lutter, C. K. (2020). All children thrive: integration of nutrition and early childhood development. *Annual Review of Nutrition*, 40(1), 375-406. <https://doi.org/10.1146/annurev-nutr-120219-023757>
- Bourke, C. D., Berkley, J. A., & Prendergast, A. J. (2016). Immune dysfunction as a cause and consequence of malnutrition. *Trends in immunology*, 37(6), 386-398. <https://doi.org/10.1016%2Fj.it.2016.04.003>



- Chattopadhyay, N., & Saumitra, M. (2016). Developmental outcome in children with malnutrition. *Journal of Nepal Paediatric Society*, 36(2), 170-177. <https://doi.org/10.3126/jnps.v36i2.14619>
- De, P., & Chattopadhyay, N. (2019). Effects of malnutrition on child development: Evidence from a backward district of India. *Clinical Epidemiology and Global Health*, 7(3), 439-445. <https://doi.org/10.1016/j.cegh.2019.01.014>
- Dyrbye, Liselotte N.; Satele, Daniel; Shanafelt, Tait (2016). "Ability of a 9-Item Well-Being Index to Identify Distress and Stratify Quality of Life in US Workers". *Journal of Occupational and Environmental Medicine*. 58 (8): 810–7. doi:10.1097/JOM.0000000000000798. PMID 27294444. S2CID 1835584.
- Fadare, O., Amare, M., Mavrotas, G., Akerele, D., & Ogunniyi, A. (2019). Mother's nutrition-related knowledge and child nutrition outcomes: Empirical evidence from Nigeria. *PLoS one*, 14(2), e0212775. <https://doi.org/10.1371/journal.pone.0212775>
- Fiorentino, M. (2015). *Malnutrition in school-aged children and adolescents in Senegal and Cambodia: public health issues and interventions* (Doctoral dissertation, Université Montpellier). [https://www.researchgate.net/publication/319188059\\_Malnutrition\\_in\\_school-aged\\_children\\_and\\_adolescents\\_in\\_Senegal\\_and\\_Cambodia\\_public\\_health\\_issues\\_and\\_interventions](https://www.researchgate.net/publication/319188059_Malnutrition_in_school-aged_children_and_adolescents_in_Senegal_and_Cambodia_public_health_issues_and_interventions)
- Fox, J. (2015). *Applied regression analysis and generalized linear models*. Sage publications.
- Fynn-Sackey, U. A., & Abdul Salam, M. (2015). Effects of malnutrition among children in Sub-Saharan Africa and Southern Asia. [https://www.theseus.fi/bitstream/handle/10024/96769/Abdul%20Salam\\_Mawiya%20pdf.pdf?sequence=1](https://www.theseus.fi/bitstream/handle/10024/96769/Abdul%20Salam_Mawiya%20pdf.pdf?sequence=1)
- Ghimire, U., Aryal, B. K., Gupta, A. K., & Sapkota, S. (2020). Severe acute malnutrition and its associated factors among children under-five years: a facility-based cross-sectional study. *BMC pediatrics*, 20, 1-9. <https://doi.org/10.1186/s12887-020-02154-1>
- Govender, L., Pillay, K., Siwela, M., Modi, A., & Mabhaudhi, T. (2017). Food and nutrition insecurity in selected rural communities of KwaZulu-Natal, South Africa—Linking human nutrition and agriculture. *International journal of environmental research and public health*, 14(1), 17. <https://doi.org/10.3390/ijerph14010017>
- Immordino-Yang, M. H., Darling-Hammond, L., & Krone, C. R. (2019). Nurturing nature: How brain development is inherently social and emotional, and what this means for education. *Educational Psychologist*, 54(3), 185-204. <https://psycnet.apa.org/doi/10.1080/00461520.2019.1633924>
- Kirolos, A., Goyheneix, M., Elias, M. K., Chisala, M., Lissauer, S., Gladstone, M., & Kerac, M. (2022). Neurodevelopmental, cognitive, behavioural and mental health impairments following childhood malnutrition: a systematic review. *BMJ Global Health*, 7(7), e009330. <https://doi.org/10.1136/bmjgh-2022-009330>
- Kris-Etherton, P. M., Petersen, K. S., Hibbeln, J. R., Hurley, D., Kolick, V., Peoples, S., ... & Woodward-Lopez, G. (2021). Nutrition and behavioral health disorders: depression and anxiety. *Nutrition reviews*, 79(3), 247-260. <https://doi.org/10.1093/nutrit/nuaa025>
- Liu, Y., Kaaya, S., Chai, J., McCoy, D. C., Surkan, P. J., Black, M. M., ... & Smith-Fawzi, M. C. (2017). Maternal depressive symptoms and early childhood cognitive development: a meta-analysis. *Psychological medicine*, 47(4), 680-689. <https://doi.org/10.1017/s003329171600283x>
- Lucarelli, L., Sechi, C., Cimino, S., & Chatoor, I. (2018). Avoidant/restrictive food intake disorder: a longitudinal study of malnutrition and psychopathological risk factors from 2 to 11

- years of age. *Frontiers in Psychology*, 9, 1608. <https://doi.org/10.3389%2Ffpsyg.2018.01608>
- Lukat, J., Margraf, J., Lutz, R. *et al.* Psychometric properties of the Positive Mental Health Scale (PMH-scale). *BMC Psychol* 4, 8 (2016). <https://doi.org/10.1186/s40359-016-0111-x>
- Muscaritoli, M. (2021). The impact of nutrients on mental health and well-being: insights from the literature. *Frontiers in nutrition*, 8, 656290. <https://doi.org/10.3389/fnut.2021.656290>
- Nekitsing, C., Hetherington, M. M., & Blundell-Birtill, P. (2018). Developing healthy food preferences in preschool children through taste exposure, sensory learning, and nutrition education. *Current obesity reports*, 7, 60-67. <https://doi.org/10.1007/s13679-018-0297-8>
- Orlando, L., Savel, K. A., Madigan, S., Colasanto, M., & Korczak, D. J. (2022). Dietary patterns and internalizing symptoms in children and adolescents: A meta-analysis. *Australian & New Zealand Journal of Psychiatry*, 56(6), 617-641. <https://psycnet.apa.org/doi/10.1177/00048674211031486>
- Pengpid, S., & Peltzer, K. (2020). Skipping breakfast and its association with health risk behaviour and mental health among university students in 28 countries. *Diabetes, Metabolic Syndrome and Obesity*, 2889-2897. <https://doi.org/10.2147%2FDMSO.S241670>
- Pina-Camacho, L., Jensen, S. K., Gaysina, D., & Barker, E. D. (2015). Maternal depression symptoms, unhealthy diet and child emotional-behavioural dysregulation. *Psychological Medicine*, 45(9), 1851-1860. <https://doi.org/10.1017/s0033291714002955>
- Rider, E. A., Ansari, E., Varrin, P. H., & Sparrow, J. (2021). Mental health and wellbeing of children and adolescents during the covid-19 pandemic. *bmj*, 374. <https://doi.org/10.1136/bmj.n1730>
- Sancho, N. B., Mondragon, N. I., Santamaria, M. D., & Munitis, A. E. (2021). The well-being of children in lock-down: Physical, emotional, social and academic impact. *Children and Youth Services Review*, 127, 106085. <https://www.john-fox.ca/AppliedRegression/chap-25.pdf>
- Sethi, P., Prajapati, A., Mishra, T., Chaudhary, T., & Kumar, S. (2022). Effects of Malnutrition on Brain Development. In *Nutrition and Psychiatric Disorders* (pp. 75-88). Singapore: Springer Nature Singapore. [http://dx.doi.org/10.1007/978-981-19-5021-6\\_4](http://dx.doi.org/10.1007/978-981-19-5021-6_4)
- Smith, A. P., & Richards, G. (2018). Energy drinks, caffeine, junk food, breakfast, depression and academic attainment of secondary school students. *Journal of Psychopharmacology*, 32(8), 893-899. <https://doi.org/10.1177/0269881118783314>
- Subramanyam, A. A., Somaiya, M., & De Sousa, A. (2024). Mental health and well-being in children and adolescents. *Indian Journal of Psychiatry*, 66(Suppl 2), S304-S319. [https://doi.org/10.4103/indianjpsychiatry.indianjpsychiatry\\_624\\_23](https://doi.org/10.4103/indianjpsychiatry.indianjpsychiatry_624_23)
- World Health Organization. (2016). *The double burden of malnutrition: policy brief* (No. WHO/NMH/NHD/17.3). World Health Organization. <https://www.who.int/publications/i/item/WHO-NMH-NHD-17.3>