Running on Supplements: Evaluating the Effects of Protein Supplements, Creatine, and Multivitamins on Adolescent Health

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Abstract

Background: Increasing popularity of nutritional or dietary supplements among adolescents, such as protein powders, creatine, and multivitamins. Nowadays, health experts are concerned and have raised their questions about safety, efficacy, and long-term health consequences. Adolescents are driven by the marketing purpose to boost their sports performance, the development of muscles, and overall well-being. Usually, many of the youngsters take these supplements on their own without concern about the safety, putting themselves at risk.

Objective: This research study aims to comparison of physiological and biochemical effects of creatine, protein supplements, and multivitamins on the health of adolescents in supplement users and non-users.

Methods: A cross-sectional study was implemented on 100 adolescents aged between 13 to 18 years. In the beginning, the participants were divided into four different groups of 25 each: protein supplement users, creatine users, multivitamin users, and non-users (control group). After that, a structured questionnaire was used to gather information about demographics, supplement usage trends, motivations, and side effects. After that, some test was conducted, such as Anthropometric measures and biochemical testing, including serum creatinine, alanine aminotransferase (ALT), 25-hydroxyvitamin D (25(OH)D), and hemoglobin, were performed. For statistical analysis, One-way ANOVA was used, at a significance level of $p<0.05$.

Results: During the investigation, we evaluated that significant difference in physiological and biochemical parameters across supplement user groups. In protein supplement users, minor increases in serum creatinine and ALT levels which specifies a possible stress on renal and hepatic function. After that, we evaluated multivitamin users, they had enlarged vitamin D levels, however, this was also related to greater variability in haemoglobin. Creatine users had higher creatinine levels but no substantial impact on liver enzymes. Includes all supplement groups, 17% of users experienced minor side effects such as stomach pain, tiredness, or cramping.

Conclusion: While protein supplements, creatine, and multivitamins may deliver some profits to adolescent users, uncontrolled and sustained usage without expert supervision may result in moderate but disturbing physiological changes. From these findings, it may highlight the significance of parental knowledge, healthcare oversight, and education around safe supplement usage, especially in teenagers. For future studies, research on longitudinal design is needed to examine the long-standing effects of supplement incorporation at this important developmental time.

Keywords: Adolescents, Protein Supplements, Creatine, Multivitamins, Biochemical Markers, Health Effects, Supplement Use

1. Introduction

Adolescence marked period of development that usually starts with the onset of puberty and ends in the mid-20s. It is a critical period marked by fast growth, expansion, and increased engagement in promoting heightened nutritional demands and physical activities. Over the several years, the routine of dietary supplements, specifically supplements of protein, creatine, and multivitamins, emerged and surged among adolescents, which is largely driven by the search for enhanced or development of muscles, performance of athletics, and overall health (Jagim & Kerksick, 2021) (Jagim, Stecker, Harty, Erickson, & Kerksick, 2018). As per the recent national surveys, a substantial part of adolescents, especially boys, consumption of protein supplements regularly, or may often be motivated by the desire to build muscles and improve sports performance (Jagim & Kerksick, 2021; Jagim et al., 2018). As far as concerns about protein supplements, it is essential for tissue repair and potential growth for adolescents. While excessive or unnecessary supplementation may pose health risks, including the potential strain on kidneys, and may be the displacement of other vital nutrients from the food (Ko, Rhee, Kalantar-Zadeh, & Joshi, 2020). A recent research study conducted on almost 230 adolescents in Seville reported that around 10.6% of adolescents used supplements of protein, and 18.5% of adolescents experienced some adverse effects, like hormonal imbalance and gastrointestinal discomfort. In overview, protein supplements, especially combined with anabolic steroids, are associated with some health complications, including avascular necrosis (Millán-Jiménez, Fernández-Fontán, Sobrino-Toro, & Fernández-Torres, 2023).

Creatine is a widely used supplement among adolescent athletes, primarily known for its role in increasing muscle mass and improving short-term performance. It is naturally produced in the kidneys, pancreas, and liver from the amino acids arginine and glycine through the action of the enzymes AGAT and GAMT. Once produced, creatine is elated to energy-demanding tissues such as the brain and muscles, where it facilitates rapid ATP regeneration by converting to phosphocreatine (PCr). Around 95% of the body's creatine, usually deposited in skeletal muscle, with a balance between free and phosphorylated forms. In addition to supporting energy production, creatine acts as a cellular buffer, aiding tissues during high-energy demands (Cooper, Naclerio, Allgrove, & Jimenez, 2012; Kreider et al., 2017). Creatine monohydrate, the most researched form, is commonly used in power-based high-intensity sports due to its ability to increase intramuscular PCr stores and enhance ATP resynthesis. When used appropriately and under professional guidance, creatine supplementation is considered safe for healthy adolescents, with minimal adverse effects reported. Emerging research also points to additional benefits beyond athletic performance, including potential roles in brain health, muscle recovery, and metabolic support (Gutiérrez-Hellín et al., 2025).

Multivitamin use among youth is also widespread to support growth, cognitive development, and overall health. Recent large-scale studies have highlighted both potential benefits and

risks associated with multivitamin supplementation in children and adolescents (Zhu et al., 2024). While certain vitamins may reduce the risk of specific growth and neurological disorders, excessive or inappropriate use has been linked to increased risks of conditions such as attention-deficit/hyperactivity disorder (ADHD), obesity, and malnutrition. The complex interplay between multivitamin intake and adolescent health underscores the need for nuanced guidance and further research to clarify optimal supplementation practices (Fekete et al., 2023). A clinical randomized, double-blind trial in Tanzania assessed the impact of multivitamins (vitamins C, E, and B-complex), and their combination on growth in 2400 infants from 6 weeks to 19 months of age. Despite supplementation, all groups experienced growth faltering, with restricting, deteriorating, and malnourished prevalence of 19.8%, 6.0%, and 10.8%, respectively at 19 months. The combined zinc and multivitamin collection presented a smaller decline in weight-for-age z scores compared to placebo, but zinc alone led to a greater decline in weight-for-height z scores. There were no substantial effects on height-for-age z scores or rates of stunting, underweight, or wasting. The study concludes that zinc, multivitamins, or their combination do not reduce growth faltering incidences in Tanzanian infants, indicating a need for alternative prevention strategies (Lindsey et al., 2016). The increased usage of supplement among adolescents raises alarms about the long-term health complications. A recent research study conducted on adolescents found that the routine of muscle building supplements, related to a higher likelihood of using steroids in the future, which may be highlighting the need for early intervention and awareness of supplements (Nagata et al., 2020). In spite of the benefits and popularity of dietary supplements, concerns exist regarding their requirements, safety, and potential for serious health effects in adolescents. Particularly, those supplements marketed for building muscles and performance of athletes are related with a advanced incidence of severe adverse outcomes as compared to vitamin use, which raises concerns about regulation, education, and importantly role of healthcare professionals in guiding the use of supplements (Junaura Rocha, Mara Alves da Cruz, & Crésio, 2024). Although this research article involves a systematic investigation of patterns of use of supplements, specifically protein supplements such as creatine and multivitamins among adolescents, and evaluates their potential biochemical and physiological impacts. We also comparing the supplement users with non-users through the structured questionnaire, anthropometric assessments, and clinical laboratory analyses. This study will provide evidence-based insights into the health implications.

2. Materials and Methods

2.1 Study Design

This mixed-method cross-sectional study applied, uses both methods qualitative and quantitative. For an exploration of patterns of supplement use and their associated physiological effects among adolescents. 100 participants are enrolled for the study, aged 13 to 18 years, residing in the Delhi region. Recruited through purposive sampling from various settings, including schools, fitness centers, and sports clubs. This strategy was employed to gather information from different genders, socioeconomic backgrounds, and activity levels (Pepe & Farina, 2023). This research study is designed on the basis of two stages: firstly, a

structured questionnaire, and the second stage involves assessment of biochemical parameters(Ahmed, Pereira, & Jane, 2024). On the basis of this, participants are divided into four different groups (n=25 per group):

- **Group 1:** Protein Supplement Users
- **Group 2:** Creatine Supplement Users
- **Group 3:** Multivitamin Users
- **Group 4:** Non-users (Control group)

This study is based on gathering information by self-reported data on the consumption of supplements, the motivation behind using and their side effects.

2.2 Questionnaire Survey

We gathered the information on the basis of these factors:

- Demographics (age, sex)
- Type and duration of supplement use
- Motivation for supplement use
- Source of information (coach, parents, online sources)
- Side effects experienced, if any (e.g., fatigue, cramps, digestive issues)

Data collected with the structured questionnaire was analyzed by using descriptive statistics, including percentages and frequencies, with Microsoft Excel and SPSS version 25.

2.3 Anthropometric and Clinical Assessment

The anthropometric and clinical assessment for all the adolescents, which included:

- Weight, body mass index (BMI), and Height
- Blood pressure and Heart rate

2.4 Biochemical Testing

Blood samples were collected to determine hemoglobin concentration and analyzed. The following biochemical parameters were measured:

- Liver function: Alanine aminotransferase (ALT)
- Kidney function: Serum creatinine
- Vitamin D status: 25-hydroxyvitamin D (25(OH)D) and
- Complete blood count (CBC)

2.5 Ethical Compliance

Obtained ethical approval from the Ethics Committee to conduct the study. Before collection, written consent was taken from all adolescents and their legal guardians before participation, ensuring adherence to ethical standards in research involving minors.

2.6 Statistical Analysis

SPSS was used to analyze data. The demographic and questionnaire responses were analyzed by descriptive statistics, and One-way Analysis of Variance (ANOVA) was also showed to compare the mean values of biochemical parameters (ALT, creatinine, 25(OH)D, and hemoglobin) among the four groups. A p-value of <0.05 was measured statistically significant.

3. Results

3.1 Demographic Characteristics of Population

A total of 100 adolescents aged 13–18 years participated in the study, categorized into four equal groups (n = 25 each) based on their supplement usage: Protein users, Creatine users, Multivitamin users, and non-users (control group). The demographic distribution was balanced in terms of gender and represented diverse socioeconomic backgrounds. The distribution of participants across the four groups is shown in Table 1.

Table 1: Demographic Distribution of Population (n = 100)

S.No.	Variable	Group 1 (Protein)	Group 2 (Creatine)	Group 3 (Multivitamin)	Group 4 (Non-users)	Total
1.	Males (n)	15	14	13	14	56
2.	Females (n)	10	11	12	11	44
3.	Mean Age (yrs)	15.8 ± 1.3	16.0 ± 1.2	15.6 ± 1.4	15.7 ± 1.3	-

3.2 Supplement Use Patterns

These findings align with existing literature suggesting that adolescents engaged in physical activities are often driven by aspirations of improved athletic performance and physique enhancement. The influence of peer groups, social media, and gym culture likely reinforces these motivations at a young age. As shown in Figure 1, the primary motivation reported by participants for supplement consumption was performance enhancement (42%), muscle gain (35%) and general health improvement (23%).

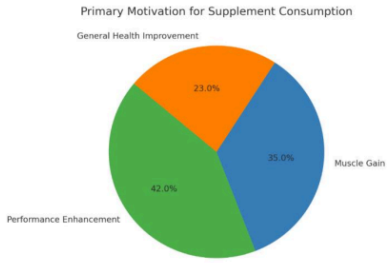

Figure 1: Motivation for Supplement Use Among Adolescents

3.3 Source of Information

The primary sources of information influencing adolescents' supplement usage varied across the three user groups, as shown in Table 2. Coaches and trainers were the most frequently cited source among protein (44%) and creatine users (48%), reflecting the role of athletic mentors in shaping supplement-related decisions. In contrast, multivitamin users relied more heavily on online sources (50%), followed by parental advice (30%), indicating a more self-directed or family-influenced approach. Interestingly, a significant proportion of adolescents across all groups—36% of protein users and 40% of creatine users—also reported online platforms as a key source of information. These findings suggest that informal and non-medical sources dominate the supplement information landscape among adolescents, potentially increasing the risk of misinformation and unsupervised use.

Table 2: Source of Information Regarding Supplement Use

S.No.	Source	Protein (%)	Creatine (%)	Multivitamin (%)
1.	Coach/Trainer	44	48	20
2.	Parents	20	12	30
3.	Online Sources	36	40	50

3.4 Reported Side Effects

Among supplement users, digestive issues were the most reported side effect (30%), followed by fatigue (18%) and muscle cramps (15%), as depicted in Figure 2. While most side effects were mild and self-limiting, the results underscore the potential health risks associated with unsupervised supplement use. Notably, creatine users reported a higher incidence of gastrointestinal discomfort, corroborating previous studies that highlight creatine's potential to cause bloating and digestive disturbances when consumed in excess.

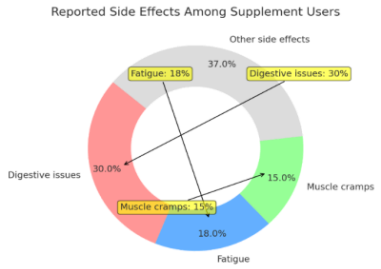

Figure 2 Reported Side Effects Among Supplement Users

3.5 Anthropometric and Clinical Parameters

As summarized in Table 3, there were no statistically significant differences in anthropometric (BMI) and clinical (blood pressure and heart rate) parameters among the four study groups: protein supplement users, creatine users, multivitamin users, and non-users. The mean BMI ranged from 21.3 ± 1.7 kg/m² in non-users to 23.1 ± 1.9 kg/m² in creatine users, suggesting a slight variation that may reflect differences in physical activity levels or body composition, but not enough to be statistically meaningful. Similarly, diastolic and systolic blood pressure values, as well as heart rate, remained within normal clinical ranges across all groups. These findings suggest that short-term or moderate supplement use may not produce immediate alterations in basic physiological or cardiovascular markers. However, the potential cumulative effects of long-term usage, especially with substances like creatine or protein powders, require further investigation in longitudinal studies.

Table 3: Mean Anthropometric and Clinical Measurements Across Groups

S.No.	Parameter	Protein Users	Creatine Users	Multivitamin Users	Non-users	p-value (ANOVA)
1.	BMI (kg/m²)	22.5 ± 1.8	23.1 ± 1.9	21.8 ± 2.0	21.3 ± 1.7	0.084 (NS)
2.	Systolic BP (mmHg)	118 ± 10	120 ± 8	115 ± 9	112 ± 7	0.069 (NS)
3.	Diastolic BP (mmHg)	75 ± 6	76 ± 5	74 ± 6	72 ± 5	0.122 (NS)
4.	Heart Rate (bpm)	78 ± 6	80 ± 7	76 ± 5	74 ± 6	0.091 (NS)

3.6 Biochemical Analysis

The analysis of biochemical parameters revealed distinct group-wise patterns as summarized in Table 4 and depicted in Figure 3. Serum creatinine levels were highest among creatine users (1.3 ± 0.3 mg/dL), likely reflecting increased creatine phosphate metabolism. Although

still within clinical reference ranges, this elevation supports the known physiological effect of creatine supplementation on renal biomarkers. Protein users also showed slightly higher creatinine (1.1 ± 0.2 mg/dL) than non-users (0.9 ± 0.2 mg/dL). Liver enzyme ALT levels followed a similar trend, with creatine users (34.5 ± 6.1 U/L) and protein users (32.1 ± 5.2 U/L) displaying marginally elevated values compared to multivitamin users (28.3 ± 4.8 U/L) and non-users (26.4 ± 5.0 U/L). While still within normal clinical limits, these elevated values may indicate a mild hepatic stress or increased metabolic load due to supplement intake.

Vitamin D levels were notably higher in multivitamin users (34.5 ± 4.3 ng/mL), confirming the efficacy of supplementation. However, despite this advantage, a few participants in each group, including multivitamin users, displayed suboptimal levels, possibly due to lifestyle factors such as inadequate sun exposure or poor absorption. Hemoglobin levels, measured as part of a complete blood count (CBC), remained consistent across all groups (range: 13.4–14.2 g/dL), indicating that short-term supplement use did not significantly affect hematological status in the adolescent population. Overall, these results suggest that while supplementation, particularly creatine and protein use, may subtly affect certain biochemical markers, no clinically alarming deviations were observed.

Table 4: Biochemical Parameters in Each Group

S.No.	Parameter	Protein Users (Mean ± SD)	Creatine Users (Mean ± SD)	Multivitamin Users (Mean ± SD)	Non-users (Mean ± SD)	ANOVA p-value
1	ALT (U/L)	32.1 ± 5.2	34.5 ± 6.1	28.3 ± 4.8	26.4 ± 5.0	0.09
2	Creatinine (mg/dL)	1.1 ± 0.2	1.3 ± 0.3	1.0 ± 0.2	0.9 ± 0.2	0.03
3	25(OH)D (ng/mL)	28.7 ± 4.5	29.2 ± 5.0	34.5 ± 4.3	31.6 ± 4.0	0.007
4	Hemoglobin (g/dL)	13.8 ± 1.2	14.2 ± 1.3	13.6 ± 1.1	13.4 ± 1.0	0.21

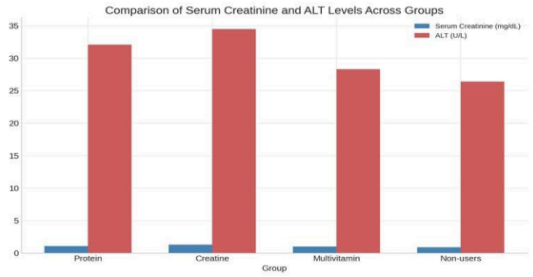

Figure 3 Comparison of Serum Creatinine and ALT Levels Across Groups

3.7 Statistical Analysis

One-way ANOVA was conducted to comparison of mean differences among the four clusters (Protein Users, Creatine Users, Multivitamin Users, and Non-users) for various clinical and biochemical parameters.

- A statistically significant difference in serum creatinine levels was detected between the groups ($p < 0.05$), with the highest levels noted in the creatine users, suggesting increased creatine metabolism.
- Vitamin D levels were initially significantly higher in multivitamin users compared to non-users ($p < 0.01$), reflecting the impact of supplementation.
- No statistically significant differences were found in ALT levels, hemoglobin levels, BMI, blood pressure, and heart rate across the groups ($p > 0.05$), indicating that short-term supplement use did not have a major impact on liver function, hematological parameters, or anthropometric and cardiovascular indicators.

4. Discussion

The study provides relevant insights into supplement usage patterns, motivations, side effects, and physiological impacts among adolescents. The findings reveal a widespread use of dietary supplements, especially among those actively engaged in sports and fitness activities. Protein supplements and creatine were particularly popular, with motivations largely driven by performance enhancement and muscle gain. These motivations reflect the growing influence of societal ideals and fitness culture on adolescent behaviour.

Notably, the study observed mild elevations in serum creatinine and ALT levels among creatine and protein supplement users. Although these values remained within normal clinical limits, they suggest a physiological response to increased metabolic demands or excessive intake of certain nutrients. These results are consistent with previous research indicating that high-protein and creatine supplementation may temporarily elevate renal and liver markers. However, it is unable to completely evaluate the long-term ramifications of this study

because it is cross-sectional. Supplement users reported side effects such as cramping, exhaustion, and stomach problems. Despite not being severe, these consequences highlight the necessity of sufficient supervision and assistance when it comes to adolescent supplement use. As evidenced by the questionnaire replies, using supplements without a doctor's recommendation raises questions regarding false information from unreliable internet sources or peer pressure. It's interesting to note that the multivitamin group had comparatively greater serum 25(OH)D levels, suggesting that it might be useful in treating vitamin deficiencies.

5. Conclusion

This study highlights the growing prevalence and patterns of dietary supplements, specifically protein supplements, creatine, and multivitamins, among adolescents. After the evaluation, findings revealed that enhancement in performance, gain of muscles, and improvement in general health are the main key factors that drive the consumption of supplements in adolescents. On the other hand, trainers, coaches, and some online platforms play a considerable part in influencing the adolescents choices regarding the use of supplements. Also, some of the gaps are filled by the lack of professional consultation of medical. Most of the participants experience some minor side effects as well, such as digestive discomfort, fatigueness, or may possibly of adverse outcomes due to unregulated or excessive use of the supplement also a valid concern. Specifically in the critical developments of growth of adolescence. From the findings, we also evaluated the anthropometric and biochemical, which revealed indirect yet worthy differences in indicators of health between those who use daily and those who did not. As far as concern, supplements also offer some benefits which we used appropriately, or in the absence of regulation, and may have some inconsistent information sources, and influence also plays an important role in the risk of misuse and associated health complications.

This study demonstrates that while supplement use is prevalent and often motivated by fitness and performance goals, its physiological impacts, although mild in the short term, warrant caution. The findings reinforce the importance of:

- Evidence-based education about supplements in adolescent populations.
- Routine monitoring of health markers in young users.
- Encouraging guidance from qualified healthcare professionals or nutritionists over informal advice.

Future research, particularly longitudinal studies, is vital to better understand the long-term implications of dietary supplement use during adolescence, especially regarding organ function and overall well-being.

6. References

Ahmed, A., Pereira, L., & Jane, K. (2024). Mixed Methods Research: Combining both qualitative and quantitative approaches.

Cooper, R., Naclerio, F., Allgrove, J., & Jimenez, A. (2012). Creatine supplementation with specific view to exercise/sports performance: an update. *J Int Soc Sports Nutr, 9*(1), 33. doi:10.1186/1550-2783-9-33

Fekete, M., Lehoczki, A., Tarantini, S., Fazekas-Pongor, V., Csípő, T., Csizmadia, Z., & Varga, J. T. (2023). Improving Cognitive Function with Nutritional Supplements in Aging: A Comprehensive Narrative Review of Clinical Studies Investigating the Effects of Vitamins, Minerals, Antioxidants, and Other Dietary Supplements. *Nutrients, 15*(24), 5116. Retrieved from https://www.mdpi.com/2072-6643/15/24/5116

Gutiérrez-Hellín, J., Del Coso, J., Franco-Andrés, A., Gamonales, J. M., Espada, M. C., González-García, J., . . . Varillas-Delgado, D. (2025). Creatine Supplementation Beyond Athletics: Benefits of Different Types of Creatine for Women, Vegans, and Clinical Populations—A Narrative Review. *Nutrients, 17*(1), 95. Retrieved from https://www.mdpi.com/2072-6643/17/1/95

Jagim, A. R., & Kerksick, C. M. (2021). Creatine Supplementation in Children and Adolescents. *Nutrients, 13*(2). doi:10.3390/nu13020664

Jagim, A. R., Stecker, R. A., Harty, P. S., Erickson, J. L., & Kerksick, C. M. (2018). Safety of Creatine Supplementation in Active Adolescents and Youth: A Brief Review. *Front Nutr, 5*, 115. doi:10.3389/fnut.2018.00115

Junaura Rocha, B., Mara Alves da Cruz, G., & Crésio, A. (2024). Use of dietary supplements by children and adolescents. *Jornal de Pediatria, 100*, S31-S39. doi:https://doi.org/10.1016/j.jped.2023.09.008

Ko, G. J., Rhee, C. M., Kalantar-Zadeh, K., & Joshi, S. (2020). The Effects of High-Protein Diets on Kidney Health and Longevity. *J Am Soc Nephrol, 31*(8), 1667-1679. doi:10.1681/asn.2020010028

Kreider, R. B., Kalman, D. S., Antonio, J., Ziegenfuss, T. N., Wildman, R., Collins, R., . . . Lopez, H. L. (2017). International Society of Sports Nutrition position stand: safety and efficacy of creatine supplementation in exercise, sport, and medicine. *Journal of the International Society of Sports Nutrition, 14*(1), 18. doi:10.1186/s12970-017-0173-z

Lindsey, M. L., Karim, P. M., Christine, M. M., Roland, K., Rodrick, K., Said, A., . . . Christopher, P. D. (2016). Effect of zinc and multivitamin supplementation on the growth of Tanzanian children aged 6–84 wk: a randomized, placebo-controlled, double-blind trial12. *The American Journal of Clinical Nutrition, 103*(3), 910-918. doi:https://doi.org/10.3945/ajcn.115.120055

Millán-Jiménez, A., Fernández-Fontán, I. M., Sobrino-Toro, M., & Fernández-Torres, B. (2023). Protein supplement consumption prevalence, habits and complications in adolescents. *An Pediatr (Engl Ed), 99*(4), 240-251. doi:10.1016/j.anpede.2023.08.014

Nagata, J. M., Ganson, K. T., Griffiths, S., Mitchison, D., Garber, A. K., Vittinghoff, E., . . . Murray, S. B. (2020). Prevalence and correlates of muscle-enhancing behaviors among adolescents and young adults in the United States. *Int J Adolesc Med Health, 34*(2), 119-129. doi:10.1515/ijamh-2020-0001

Pepe, A., & Farina, E. (2023). A mixed-method study on adolescents' well-being during the COVID-19 syndemic emergency. *Sci Rep, 13*(1), 871. doi:10.1038/s41598-022-24007-w

Zhu, J., Xu, P., Yan, W., Hu, Y., Guo, H., Chen, F., . . . Wang, X. (2024). The influence of multivitamins on neurological and growth disorders: a cross-sectional study. *Front Nutr, 11*, 1465875. doi:10.3389/fnut.2024.1465875

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