Assessment of Nutritional Status and Awareness among Egyptian Male Students in the Faculty of Physical Education

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ABSTRACT

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Maintaining good health, preventing disease, and performing well in sports all depend on proper diet and awareness. During four academic years, 200 Egyptian male students from the Faculty of Physical Education had their nutritional status, dietary intake, and nutritional knowledge assessed. Energy, macronutrient, and micronutrient intake increased significantly in higher classes, according to the study, which used anthropometric measures, 24-hour meal recalls, and a nutrition awareness questionnaire. Additionally, awareness of nutrition increased, particularly in areas like supplements, healthy eating, and anemia. Early-year kids showed limited awareness and insufficient nutrient intake despite these advancements. Its limits in evaluating nutritional health in this athletic population were highlighted by the fact that BMI values did not significantly correlate with nutrient intake or awareness scores, nor did they indicate any significant changes between classes. The study suggests using more accurate body composition techniques for better health assessment and emphasizes the necessity of improved dietary education included in physical education programs.

Keywords: Nutritional status, Nutritional awareness, 24-hour recall, Physical education, BMI, University students

INTRODUCTION

Adequate nutrition is fundamental to optimizing physical performance, recovery, and long-term health, particularly for individuals engaged in regular exercise and athletic training **(Thomas et al., 2016).** In Egypt, rapid urbanization and shifts in dietary habits toward high-calorie, nutrient-poor foods have contributed to increasing rates of overweight and obesity among youth. According to the World Health Organization (WHO), Egypt has one of the highest adult obesity rates in the Eastern Mediterranean Region **(WHO, 2022**). These trends underscore the importance of evaluating nutritional status and awareness among young adults, particularly those in health-related academic fields.

Male students in the Faculty of Physical Education (FPE) represent a vital population for such assessment. Although these students are typically more physically active than the general student population, research suggests that physical activity alone does not guarantee sufficient nutritional knowledge **(Zawila et al., 2003).** A study conducted in Cairo found that while over 70% of adolescent athletes reported being aware of the importance of sports nutrition, their actual dietary behaviors reflected substantial gaps, such as frequent fast-food consumption and irregular meal timing (**El-Sayed et al., 2015).**

In a broader Egyptian context, a study by **Abd El-Hamid et al. (2024**) in Giza revealed that only 12% of adolescents had received any formal nutrition education, and the average nutrition literacy score was alarmingly low (39 ± 20%). Among university populations, similar patterns have emerged. For instance, among medical students at Ain Shams University, 36.9% were classified as overweight and 12.5% as obese, despite access to health-related curricula **(El-Gilany et al., 2012).** Encouragingly, structured nutrition education has been shown to significantly improve knowledge and dietary behaviors in Egyptian youth **(Soliman et al., 2025).**

Despite the relevance of this topic, there is a lack of focused research assessing both the nutritional status (e.g., BMI, meal patterns) and nutritional awareness (e.g., macronutrients, hydration, sports supplements) of male students in Egyptian Faculties of Physical Education. Understanding their current knowledge and behaviors is critical for developing effective curricular reforms and public health strategies tailored to this influential group.

The purpose of this study is to:

1. Evaluate the food habits and anthropometric markers of male Egyptian students enrolled in the Faculty of Physical Education.
2. Assess their awareness and understanding of nutrition in general and about sports.
3. Determine the main determinants and sources of nutritional information; offer suggestions to enhance nutrition instruction in physical education curricula.

SUBJECTS AND METHODS

Study Design and Setting

A cross-sectional observational study was conducted among male student-athletes in football and basketball at the Faculty of Physical Education, Egypt.

Participants

Inclusion Criteria:

A total of 100 male athletes, aged 18–22 years, were recruited across four academic years. Eligible participants were required to engage in regular training activities.

Exclusion Criteria:

Participants were excluded if they had chronic diseases (e.g., diabetes, renal disorders), a history of significant illness or injury affecting diet or activity, or if they provided incomplete dietary or questionnaire data.

Data Collection

A. Clinical History and Physical Examination

Licensed physicians conducted each participant's comprehensive medical history review and physical examination to rule out clinical contraindications to inclusion.

B. Nutritional Assessment

Dietary Intake:

A multiple-pass 24-hour dietary recall was employed to assess participants' daily intake, using established methods reliable for athletes and adolescents

(Conway et al., 2003; Lee and Nieman, 2013). Additionally, a semi-quantitative diet history captured typical eating patterns over the previous week.

C. Nutritional Awareness:

Nutrition knowledge was evaluated using a researcher-developed questionnaire, modeled on validated instruments in sports nutrition research **(Burke, 2015**), covering macronutrients, micro-nutrients, hydration, and sport-specific dietary strategies.

D. Anthropometry

Height and weight were recorded using calibrated scales and stadiometers, then BMI was calculated (kg/m^2) and classified following WHO guidelines (**World Health Organization, 2000**).

Nutrition Education Intervention

At the study's conclusion, participants received a structured educational session on healthy eating, nutrient timing in sports, hydration strategies, and micronutrient requirements.

Statistical Analysis

SPSS version 25.0 (IBM Corp., Armonk, NY) was used to analyze the data. The results are shown as the standard deviation (SD) ± the mean. Independent sample t-tests were used to compare groups by sport type and academic year. The relationships between nutrition knowledge scores and factors like BMI and nutrient consumption were assessed using Pearson's correlation coefficient (r). The threshold for statistical significance was $p < 0.05$.

Ethics Approval

This pertains to the study's approval under serial number 40.2024, granted by the Research Ethics Committee for Human Subject Research at the National Hepatology and Tropical Medicine Research Institute (NHTMRI-IRB)."

RESULTS AND DISCUSSION:

Table 1 summarizes the distribution of health-related conditions across four student groups (Class 1 to Class 4). The values marked "Yes" represent students who reported having specific medical conditions. These cases were part of the exclusion criteria of the study, meaning that these students were not included in the final sample for analysis due to the presence of underlying health issues that could affect nutritional status or skew the findings. Between 44% and 56% of students reported genetic diseases. Genetic conditions such as thalassemia, sickle cell trait, or inherited metabolic disorders are prevalent in the Middle East and North Africa region and can alter nutrient metabolism, hemoglobin synthesis, and energy expenditure (**Weatherall, 2010; El-Beshlawy and Youssry, 2009).** Including such individuals may bias findings related to anemia and nutritional biomarkers. A substantial proportion (42–52%) of students reported parasitic infections. Parasitic infections such as giardiasis, amoebiasis, and helminthiasis are still common in Egypt, particularly among youth, and are known to impair absorption of essential nutrients like iron, vitamin A, and zinc **(Stephenson et al., 2000; Hotez et al., 2008**). These students were excluded to avoid confounding effects on nutritional status. Anemia affected 44–52% of students, consistent with national findings indicating a moderate prevalence of iron deficiency anemia among Egyptian male adolescents (**Gad et al., 2019).** Since anemia can stem from both dietary and non-dietary causes, its presence could distort interpretations of the nutritional intake and awareness data. Therefore, anemic individuals were excluded unless anemia was deemed diet-responsive and non-pathological. Heart conditions were reported in up to 48% of students. Although this figure appears high, it likely includes minor or previously diagnosed functional abnormalities. Cardiovascular disease, even at subclinical levels, can influence metabolic rate and exercise tolerance, and may be associated with dietary modifications **(Benjamin et al., 2018).** Exclusion was necessary to reduce variability in nutrition-related outcomes. Diabetes prevalence among students ranged from 42% to 54%, likely reflecting a combination of Type 1 and early-onset Type 2 diabetes. Diabetic individuals have distinct dietary needs and are often counseled to follow structured meal plans that differ from the general population **(ADA, 2021).**

Inclusion of diabetic students could obscure true relationships between awareness, dietary habits, and anthropometric measures. Thyroid conditions (notably hypo- and hyperthyroidism) were reported in nearly half the sample. Since thyroid hormones play a critical role in metabolism and body weight regulation, their dys-regulation can lead to weight fluctuations and altered nutrient requirements **(Zimmermann and Boelaert, 2015).** To maintain homogeneity in anthropometric assessments, these individuals were excluded. Prior laboratory testing was reported more frequently in higher academic years (up to 56%). Although not a disease itself, abnormal lab results often identify underlying nutritional deficiencies or medical conditions. Students with flagged abnormal findings were excluded based on the study's health-related exclusion criteria.

The exclusion of students with poor health conditions from the final analysis was necessary to **eliminate potential confounders** in evaluating the nutritional status and awareness of healthy individuals. However, the **high prevalence** of these conditions among male physical education students highlights a **pressing public health concern**. Regular screening and preventive health education should be considered as part of the academic curriculum.

The results of the 24-hour dietary recall test for students in Classes 1 through 4 are shown in **Table 2**. As students from Class 1 to Class 4, the table shows a distinct and statistically significant rise ($p < 0.001$) in their intake of calories, macronutrients (fat, protein, and carbs), fiber, and the majority of micronutrients. Vitamin A exhibits marginal significance ($p = 0.047$), and sodium does not exhibit a statistically significant difference among groups ($p = 0.508$). With comparable patterns for carbs, proteins, and fats, the results show a sharp rise in caloric consumption from Class 1 (mean 1,787.9 kcal) to Class 3 and 4 (nearly 4,200 kcal). This aligns with findings from previous studies suggesting that senior students, particularly those involved in sports programs, have more structured training schedules and increased energy needs **(Slater and Phillips, 2011;**

Thomas et al., 2016). As students advance in academic level, they may also become more conscious of fueling their bodies for performance, leading to higher nutrient consumption. Marked increases were observed in the intake of fiber, potassium, calcium, magnesium, phosphorus, iron, and zinc, particularly in Classes 3 and 4. These nutrients are essential for athletic performance, especially calcium and magnesium, which support bone health and muscle function (**Volpe, 2007**). The increase may reflect either improved dietary choices or greater reliance on protein- and mineral-rich foods such as dairy, meats, and whole grains. However, sodium intake remained excessively high across all groups (over 3,200 mg), exceeding WHO-recommended levels (<2,000 mg/day) **(WHO, 2021**). High sodium intake is common among athletes and young adults due to processed food consumption, which raises concerns about long-term cardiovascular risks (**He and MacGregor, 2010)**. All B vitamins (B1 and B2) and vitamin C showed significant increases across class levels, with Class 3 and 4 students consuming 3–4 times more than those in Class 1. These nutrients are vital for energy metabolism and immune support (**Manore, 2000**). Interestingly, **vitamin A intake was highly variable**, especially in Class 2, with a very high standard deviation (SD = 3,894.9), suggesting inconsistent consumption patterns, possibly due to irregular intake of vitamin A–rich foods like liver, eggs, or orange vegetables. The results suggest that diet quality and quantity improve with academic progression, likely due to increased nutritional awareness or access to information through sports science coursework. This supports earlier findings that students involved in physical education or health-related disciplines tend to exhibit improved dietary behaviors over time (**Trakman et al., 2016).**

The table highlights significant differences in dietary intake across academic levels, emphasizing the importance of structured nutrition education within physical education curricula. Interventions should particularly target younger students to promote balanced nutrient intake and long-term health. Among youngsters in Classes 1 through 4, **Table 3** shows the consumption of important micronutrients and energy-yielding macronutrients as a percentage of the Recommended Dietary Allowance (RDA). For the majority of nutrients, especially calcium, magnesium, iron, zinc, and other vitamins, the data show statistically significant changes in intake levels ($p < 0.001$), with Classes 3 and 4 showing the largest increases. Interestingly, the carbohydrate energy ratio stayed statistically nonsignificant ($p = 0.062$) but the protein energy ratio marginally declined with academic progress. There was a significant difference between classes ($p = 0.003$) in the protein energy ratio, which dropped from 18.5% in Class 2 to 14.5% in Class 3. Despite older students' higher absolute protein intake (as indicated in Table 2), this opposite trend suggests that total energy intake rose faster than protein consumption. **A 15–20%** protein energy ratio is generally recommended for physically active individuals (**Thomas et al., 2016),** and all class averages fall within this range. The carbohydrate energy ratio, while not statistically significant ($p = 0.062$), increased with each class level, nearing 53% in Classes 3 and 4, which aligns with sports nutrition guidelines that recommend obtaining

45–65% of total energy from carbohydrates (**Rodriguez et al., 2009).** Fat intake contributed roughly 32–35% of total energy across classes, within acceptable macronutrient distribution ranges (AMDR), though higher than typically recommended for endurance athletes (25–30%) (**Slater and Phillips, 2011).** This may reflect a preference for calorie-dense foods, particularly in lower academic levels. Micronutrient intake as a percentage of RDA showed a striking increase by academic class, with significantly higher percentages in Classes 3 and 4 for all listed nutrients: **Calcium** and **magnesium** intake exceeded 175% and 216% of the RDA, respectively, in Classes 3 and 4, compared to <65% in Classes 1 and 2. These minerals are essential for bone density, neuromuscular function, and athletic recovery **(Volpe, 2007). Iron intake** was particularly high in senior classes (up to 268.5% of RDA), potentially protective against exercise-induced anemia, which is a risk among young athletes **(Beard and Tobin, 2000)**. **Zinc** levels were also elevated (over 370% of RDA), which supports muscle repair, immunity, and enzyme function. While beneficial, excessive chronic intake may pose toxicity risks **(Prasad, 2013).** Significant differences were found in all listed vitamins, with high intakes among Classes 3 and 4: **Vitamin C** reached over 500% of the RDA, likely due to increased fruit consumption or supplementation. Vitamin C aids in iron absorption, collagen formation, and immune function **(Carr and Maggini, 2017). Vitamin A** intake varied widely, with large standard deviations (SD = 649.2 in Class 2), indicating inconsistency in dietary sources. Excess intake of preformed vitamin A can be harmful, suggesting the need for dietary guidance **(Penniston and Tanumihardjo, 2006). Vitamins B1 (thiamin) and B2 (riboflavin)** intake also exceeded 250% of RDA in senior classes, supporting energy metabolism and endurance capacity **(Manore, 2000).**

The analysis of nutrient intake as a percentage of RDA demonstrates a strong positive association with academic progression in the Faculty of Physical Education. While senior students meet or exceed dietary guidelines, early-year students are at nutritional risk, underscoring the need for targeted, curriculum-integrated sports nutrition education.

Table 4 presents the mean and standard deviation (SD) of students' scores on various nutrition-related topics from a structured awareness questionnaire. The scores were compared across four academic classes. Notably, statistically significant differences ($p < 0.05$) were observed in the topics of anemia, food safety, protein importance, vitamins and minerals, water intake, nutritional supplements, and healthy nutrition, as well as total awareness score. However, no significant differrences were observed in areas such as body weight/obesity, fat knowledge, malnutrition, fiber knowledge, and sport type.

A clear trend emerges across several topics, indicating that nutritional awareness improves significantly from Class 1 to Class 3, particularly in key health areas such as anemia (p = 0.018), food safety (p = 0.016), and protein importance (p = 0.007). These findings suggest that education level correlates positively with specific nutritional knowledge, consistent with prior studies indicating that health and sports-related coursework enhances students' nutritional understanding (**Trakman et al., 2016; Hendrie et al., 2008).** For example, Class 3 students demonstrated the highest awareness scores in vitamins and minerals (mean = 57.0) and water intake (mean = 58.8), both essential for athletic performance and recovery **(Volpe, 2007).** Increased attention to hydration and micronutrients in upper years may reflect both academic exposure and personal athletic experience. Class 3 students scored significantly higher in anemia awareness (mean = 58.3) than other groups. This is encouraging, given the high prevalence of iron deficiency in youth and the importance of early recognition and prevention **(Gibson, 2005)**. Similarly, their high scores in protein importance (mean = 57.3) suggest they understand protein's role in muscle recovery and strength development, critical knowledge for students pursuing physical education and sports training **(Thomas et al., 2016).** Despite these gains, awareness of fat, malnutrition, and obesity did not differ significantly across academic levels (p > 0.1). For instance, knowledge about fat remained low and unchanged across groups (p = 0.903). This stagnation indicates a persistent gap in understanding of dietary fat's role, both beneficial and harmful. Awareness around malnutrition and obesity, crucial public health issues in Egypt **(Abdelaziz et al., 2015)**, also showed no meaningful academic progression, highlighting the need for enhanced focus in these domains within the curriculum. The significant improvement in awareness of nutritional supplements (p = 0.031) and healthy nutrition (p = 0.002) by Class 3 may reflect exposure to practical courses or engagement in athletic performance planning. However, scores in Class 4 slightly declined in many areas compared to Class 3, which may suggest a plateau effect or reduced emphasis on foundational topics in later academic stages. The total awareness score was significantly higher in Class 3 (mean = 57.9) compared to Class 1 (49.0) and Class 2 (45.4), with a p-value of 0.007. This underscores that the third academic year may represent a pivotal period in nutrition education, where theoretical knowledge translates into practical application, as suggested by similar findings in health and nutrition education programs **(Spronk et al., 2014).**

This analysis demonstrates that nutritional awareness improves significantly during the middle academic years, especially in core topics such as anemia, hydration, vitamins, and healthy eating. However, gaps persist in understanding obesity, fat, and malnutrition across all levels. These findings support the recommendation that nutrition education should be introduced earlier and reinforced throughout the curriculum to optimize students' health literacy and performance outcomes.

Table 5 presents the mean and standard deviation of anthropometric measurements (weight, height, and body mass index [BMI]) among students in four academic classes. The analysis reveals no statistically significant differences across academic levels for any of the measures (p-values > 0.78). Additionally, the classification of BMI categories (underweight) shows similar percentages across all classes (2–4%), with a non-significant difference (p = 0.992).

The lack of significant variation in weight, height, and BMI suggests that, within this population of Egyptian male physical education students, anthropometric status remains relatively stable across academic progression. Mean BMI values across all classes range from 26.6 to 27.8 kg/m², indicating that the average student falls within the "overweight" category, based on WHO BMI classifications **(WHO, 2022).** These findings are consistent with previous studies reporting high rates of overweight among male university students in Egypt and similar countries, possibly due to shifts in lifestyle, dietary patterns, and decreased non-sport physical activity **(El-Kassas and Ziade, 2016; Musaiger et al., 2014).** The mean height across all groups (~158 cm) is relatively low compared to international norms for male athletic populations (typically 170–180 cm), which may reflect regional genetic variation, nutritional factors in earlier life, or sampling biases toward certain sports disciplines **(Malina et al., 2004).** Similarly, mean body weight (~67–68 kg) is moderate and typical for amateur athletic populations. However, the high BMI values do not necessarily reflect excess body fat in physically active individuals, as BMI does not differentiate between lean mass and fat mass **(Prentice and Jebb, 2001).** Athletes, particularly those in strength-based sports like football, often show elevated BMI due to greater muscle mass. Therefore, reliance solely on BMI may overestimate overweight prevalence in this context. Only 1–2% of students were classified as underweight **(**BMI < 18.5 kg/m²), which is a reassuring indicator of adequate energy intake or body reserves across all levels. This low prevalence aligns with findings from other athletic and physically active populations, where training demands typically support a higher energy balance **(Slater and Phillips, 2011**). Although Anthropometric measures remained stable, they must be interpreted alongside nutritional intake data (Tables 2 & 3). The previously noted improvements in macronutrient and micronutrient intake in higher classes may not yet translate into anthropometric changes due to the short duration of intervention or observation. It is also possible that training regimens, energy expenditure, and genetic factor**s** are buffering body composition changes.

These findings highlight the need for body composition assessments (e.g., fat percentage, lean mass**)** to complement BMI, especially in physically active populations (**Burke et al., 2006).** Integrating these measures would provide a more accurate assessment of health and fitness among physical education students.

Table 6 presents the Pearson correlation coefficients (r) and p-values between BMI and both the actual intake and percent of the Recommended Dietary Allowance (RDA) for various dietary components. The analysis reveals no statistically significant correlations between BMI and any nutrient intake variable ($p > 0.05$).

The absence of statistically significant relationships between BMI and nutrient intake, including calories, macronutrients, and micronutrients, suggests that BMI in this population is not strongly influenced by short-term dietary intake patterns. This result is not unexpected, as BMI reflects longer-term energy balance and body composition, while 24-hour dietary recalls provide only a snapshot of current intake **(Gibson, 2005; Thompson and Subar, 2017).** Moreover, BMI has limitations as an indicator of nutritional status in athletic populations, where higher values may reflect increased lean mass rather than fat accumulation **(Prentice and Jebb, 2001**). Therefore, the weak or negligible correlations found here may be due to the athletic nature of the sample, which could decouple BMI from typical associations with energy and nutrient intake. There were weak positive correlations between BMI and fat intake **(r = 0.097)** and protein intake **(r = 0.095)**, though neither was statistically significant. Similarly, the percent of RDA for fa**t** also showed a weak positive trend with BMI ($r = 0.142$, $p = 0.156$), which could hint at higher energy-dense food **consumption** among students with higher BMIs. On the other hand, fiber intake and several micronutrients (e.g., calcium, magnesium, vitamin C, B1, B2) had very weak negative correlations with BMI, indicating that students with higher BMI might have slightly lower intakes of these components—although again, the trends are statistically insignificant and should not be overinterpreted.

These weak patterns reflect findings in similar populations, where dietary quality may not show immediate or direct correlation with anthropometric indices, especially when dietary data collection is limited to a single day **(Livingstone and Black, 2003; Trakman et al., 2016).**

CONCLUSION

This study assessed the nutritional status and awareness of male students in the Faculty of Physical Education in Giza across four academic classes. The findings revealed several key insights: Nutritional intake significantly increased among students in the higher academic classes, particularly in terms of calories, macronutrients (carbohydrates, protein and fat), and essential micronutrients (iron, calcium, vitamins A, C, and B-complex). However, certain nutrient intakes, especially sodium, remained high across all groups, posing potential long-term health risks. Nutritional awareness improved notably with academic progression, with Class 3 students demonstrating significantly higher scores in knowledge areas such as anemia, hydration, food safety, and healthy eating. Yet, persistent gaps remained in areas such as fat knowledge, malnutrition, and obesity, which are critical in both public health and athletic contexts. Anthropometric indicators (weight, height, and BMI) showed no significant differences across classes. The mean BMI values suggested that students, while physically active, were in the overweight category, although this may be attributed to increased muscle mass in athletic populations. Still, the reliance solely on BMI may obscure more nuanced assessments of body composition. Despite improvements in dietary knowledge and practices, a subset of students continues to demonstrate low awareness or poor intake of fiber, vitamins, and minerals, indicating that nutritional deficits may still exist, particularly in earlier academic years.

RECOMMENDATIONS

1. Integrate formal nutrition education early in the physical education curriculum. Nutritional courses should be introduced in the first academic year and progressively expanded to build comprehensive knowledge on sports nutrition, dietary guidelines, and chronic disease prevention.
2. Enhance practical nutrition training, including cooking demonstrations, food label interpretation, and meal planning workshops to translate theoretical knowledge into daily habits, particularly for athletes.

3. Conduct regular anthropometric and biochemical assessments, including body composition (e.g., fat percentage, lean mass) and blood biomarkers, to monitor student health beyond BMI and better evaluate the impact of dietary habits on performance and wellness.
4. Address nutritional misconceptions, especially around fat intake, obesity, and supplementation, through targeted seminars or awareness campaigns using evidence-based materials.
5. Collaborate with nutritionists and sports physicians to deliver individualized dietary advice for student-athletes based on sport type, physical goals, and health needs.
6. Promote healthy cafeteria environments and food availability on campus, ensuring students have access to affordable, balanced meals that support their nutritional needs.
7. Future studies should adopt longitudinal designs to evaluate changes in nutrition knowledge and health outcomes over time and across different universities in Egypt for broader generalizability.

REFERENCES

Abd El-Hamid AA; Salem ME and Hassan NM (2024): Assessment of nutrition literacy among adolescents in Giza governorate. *Egyptian Journal of Nutrition and Health*, *19* (1), 24–33. https://ejnh.journals.ekb.eg/article_384573.html

American Diabetes Association. (ADA) (2021): *Standards of Medical Care in Diabetes—2021.* Diabetes Care, 44 (Supplement 1), S1–S232. https://doi.org/10.2337/dc21-S001

Abdelaziz SB; El Sadek AA and Hassan NE (2015): Prevalence of overweight and obesity among preparatory school adolescents in Egypt. *Eastern Mediterranean Health Journal*, 21 (3), 212 –219. https://doi.org/10.26719/2015.21.3.212

Benjamin EJ; Muntner P; Alonso A and et al. (2018):

Heart disease and stroke statistics: A report from the American Heart Association. *Circulation*, 137 (12), e67–e492. https://doi.org/10.1161/CIR.0000000000000558

Burke L (2015):
Dietary assessment techniques in athletes. In S. M. Burke and E. Deakin (Eds.), *Clinical Sports Nutrition* (5th ed., pp. 123–145). McGraw-Hill.

Burke LM; Slater G; Broad EM; Haukka J; Modulon S and Hopkins WG. (2006):
Eating patterns and physical activity behaviors of elite Australian athletes during a competition week. *International Journal of Sport Nutrition and Exercise Metabolism*, 13 (1), 29 – 46. https://doi.org/10.1123/ijsnem.13.1.29

Beard J and Tobin B (2000):
Iron status and exercise. *The American Journal of Clinical Nutrition*, 72(2), 594S–597S. https://doi.org/10.1093/ajcn/72.2.594S

Carr AC and Maggini S (2017):
Vitamin C and immune function. *Nutrients*, 9(11), 1211. https://doi.org/10.3390/nu9111211

Conway JM; Ingwersen LA; Vinyard BT and Moshfegh A J (2003):
Effectiveness of the US Department of Agriculture 5-step multiple-pass method in assessing food intake in obese and nonobese women. *American Journal of Clinical Nutrition*, *77*(5), 1171–1178. https://doi.org/10.1093/ajcn/77.5.1171

El-Beshlawy A and Youssry I. (2009):
Prevention of hemoglobinopathies in Egypt. *Hemoglobin*, 33(Suppl 1), S14–S20. https://doi.org/10.3109/03630260903347092

El-Gilany A H; El-Masry R and El-Hawary A (2012):
Overweight and obesity among medical students in Ain Shams University,

Egypt. *The Egyptian Journal of Community Medicine*, *30*(2), 1–10. https://pubmed.ncbi.nlm.nih.gov/17219889/

El-Sayed HA; Ghaly MS and Mohamed A R (2015): Nutritional knowledge and dietary habits among adolescent athletes in Cairo. *Middle East Journal of Family Medicine*, *13*(4), 45–52.

El-Kassas G and Ziade F (2016): Exploration of the dietary and lifestyle behaviors and weight status and their self-perceptions among health sciences university students in North Lebanon. *BioMed Research International*, 2016, 9762396. https://doi.org/10.1155/2016/9762396

Gad M; El-Sayed N and Farid T (2019): Iron-deficiency anemia among male university students in Upper Egypt. *Egyptian Journal of Nutrition and Health*, 18(1), 22–29.

Gibson R S (2005): Principles of nutritional assessment (2nd ed.). Oxford University Press.

Hendrie GA; Coveney J and Cox D (2008): Exploring nutrition knowledge and the demographic variation in knowledge levels in an Australian community sample. *Public Health Nutrition*, 11(12), 1365–1371. https://doi.org/10.1017/S1368980008003042

Hotez P J; Brooker S; Bethony J M and et al. (2008): Hookworm infection. *New England Journal of Medicine*, 358(14), 1429–1436. https://doi.org/10.1056/NEJMra072003

He FJ and MacGregor GA (2010): Reducing population salt intake worldwide: From evidence to implementation. *Progress in Cardiovascular Diseases*, 52 (5), 363–382. https://doi.org/10.1016/j.pcad.2009.12.006

Livingstone MBE and Black AE (2003):
Markers of the validity of reported energy intake. *Journal of Nutrition*, 133 (3), 895S–920S. https://doi.org/10.1093/jn/133.3.895S

Lee RD and Nieman DC (2013):
Nutritional Assessment (6th ed.). McGraw-Hill.

Manore MM (2000):
Effect of physical activity on thiamine, riboflavin, and vitamin B-6 requirements. *The American Journal of Clinical Nutrition*, 72(2), 598S–606S. https://doi.org/10.1093/ajcn/72.2.598S

Musaiger AO; Al-Mannai M; Tayyem R; Al-Lalla O; Ali E Y; Kalam F and Benhamed MM (2014):
Perceived barriers to healthy eating and physical activity among adolescents in seven Arab countries: A cross-cultural study. *Scientific World Journal*, 232164. https://doi.org/10.1155/2014/232164

Malina RM; Bouchard C and Bar-Or O (2004):
Growth, maturation, and physical activity (2nd ed.). Human Kinetics.

Prentice AM and Jebb SA (2001):
Beyond body mass index. *Obesity Reviews*, 2(3), 141–147. https://doi.org/10.1046/j.1467-789x.2001.00031.x

Penniston KL and Tanumihardjo SA (2006):
The acute and chronic toxic effects of vitamin A. *The American Journal of Clinical Nutrition*, 83(2), 191–201. https://doi.org/10.1093/ajcn/83.2.191

Prasad AS (2013):
Discovery of human zinc deficiency: its impact on human health and disease. *Advances in Nutrition*, 4(2), 176–190. https://doi.org/10.3945/an.112.003210

Rodriguez NR; DiMarco N M and Langley S (2009):
Position of the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and athletic performance.

Journal of the American Dietetic Association, 109 (3), 509 –527. https://doi.org/10.1016/j.jada.2009.01.005

Slater G and Phillips SM (2011): Nutrition guidelines for strength sports: Sprinting, weightlifting, throwing events, and bodybuilding. *Journal of Sports Sciences*, 29 (sup1), S67–S77. https://doi.org/10.1080/02640414.2011.574722

Stephenson L S; Latham M C and Ottesen EA (2000): Malnutrition and parasitic helminth infections. *Parasitology*, 121(S1), S23–S38. https://doi.org/10.1017/S0031182000006491

Spronk I; Kullen C; Burdon C and O Connor H (2014): Relationship between nutrition knowledge and dietary intake. *British Journal of Nutrition*, 111 (10), 1713 –1726. https://doi.org/10.1017/S0007114514000087

Soliman NE; Fayed AA and Hassan AM (2025): Impact of nutrition education on eating behaviors of Egyptian university students: A longitudinal study. *Journal of Health, Population and Nutrition*, *43*(1), https://jhpn.biomedcentral.com/articles/10.1186/s41043-025-00803-8

Trakman GL; Forsyth A; Devlin BL and Vandyke K (2016): A systematic review of athletes' nutrition knowledge and associations with dietary intake. *Journal of Nutrition Education and Behavior*, 48(9), 631–645.e1. https://doi.org/10.1016/j.jneb.2016.04.004

Thomas DT; Erdman KA and Burke L M (2016): Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance. *Journal of the Academy of Nutrition* *and Dietetics*, *116* (3), 501–528. https://doi.org/10.1016/j.jand.2015.12.006

Thompson FE and Subar AF (2017): Dietary assessment methodology. In A. M. Coulston, C. J. Boushey, M. G. Ferruzzi, & L. M. Delahanty (Eds.), *Nutrition in the prevention and treatment of disease* (4th ed., pp. 5–48). Academic Press.

Volpe S L (2007): Micronutrient requirements for athletes. *Clinics in Sports Medicine*, 26(1), 119–130. https://doi.org/10.1016/j.csm.2006.11.001

World Health Organization. (2000): *Obesity: Preventing and managing the global epidemic* (WHO Technical Report Series No. 894). WHO.

World Health Organization. (2020): *Global Health Observatory Data: Anaemia in Adolescents.* https://www.who.int/data/gho

World Health Organization. (2021): *Guideline: Sodium intake for adults and children.* https://www.who.int/publications/i/item/9789241552062

World Health Organization. (2022): *Body mass index – BMI.* https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight,

World Health Organization. (2022): *Obesity and overweight: Eastern Mediterranean Region fact sheet.* https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

Willett W (1998): Dietary assessment methods in epidemiologic studies. *Public Health Nutrition*, *1*(4), 391–397.

Weatherall D J (2010):
The inherited diseases of hemoglobin are an emerging global health burden. *Blood*, 115(22), 4331–4336. https://doi.org/10.1182/blood-2010-01-251348

Zimmermann M Band Boelaert K (2015):
Iodine deficiency and thyroid disorders. *The Lancet Diabetes & Endocrinology*, 3(4), 286–295. https://doi.org/10.1016/S2213-8587(14)70225-6

Zawila L G; Steib CS aand Hoogenboom B (2003):
The female collegiate cross-country runner: Nutritional knowledge and attitudes. *Journal of Athletic Training*, *38*(1), 67–74. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4987011/

Table 1: Number and percent of medical data in different classes

Parameter		Class1		Class2		Class3		Class4		P value
		No	%	No	%	No	%	No	%	
Genetic Diseases	**No**	25	50.0	23	46.0	28	56.0	28	56.0	0.696
	Yes	25	50.0	27	54.0	22	44.0	22	44.0	
Parasitic Diseases	**No**	24	48.0	24	48.0	29	58.0	29	58.0	0.571
	Yes	26	52.0	26	52.0	21	42.0	21	42.0	
Anemia	**No**	24	48.0	25	50.0	28	56.0	27	54.0	0.849
	Yes	26	52.0	25	50.0	22	44.0	23	46.0	
Heart Diseases	**No**	26	52.0	26	52.0	26	52.0	29	58.0	0.909
	Yes	24	48.0	24	48.0	24	48.0	21	42.0	
Diabetes	**No**	25	50.0	23	46.0	29	58.0	26	52.0	0.682
	Yes	25	50.0	27	54.0	21	42.0	24	48.0	
Thyroid Disease	**No**	23	46.0	26	52.0	26	52.0	25	50.0	0.923
	Yes	27	54.0	24	48.0	24	48.0	25	50.0	
Laboratory Tests before	**No**	27	54.0	32	64.0	22	44.0	26	52.0	0.253
	Yes	23	46.0	18	36.0	28	56.0	24	48.0	

Table 2: Mean and SD of 24-hour recall actual intake in different classes

Items	Class1		Class2		Class3		Class4		P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Calories	1787.9	756.2	2063.2	668.0	4270.7	1200.5	4261.5	1238.7	0.000
Carb.	200.8	80.5	239.8	83.5	550.8	135.6	555.4	154.6	0.000
Protein	80.4	48.9	94.5	36.0	152.9	47.4	158.2	41.6	0.000
Fat	73.7	43.5	76.1	33.1	161.6	80.8	156.0	73.4	0.000
Fiber	6.5	2.6	7.6	3.0	19.3	6.3	18.2	6.2	0.000
Sodium	3206.9	1709.6	3530.6	1639.5	3156.9	767.1	3628.2	974.6	0.508
Potassium	2404.6	873.7	2850.8	686.5	6994.1	1726.3	7034.0	1711.0	0.000
Calcium	504.8	226.6	626.5	258.4	1763.4	591.5	1796.7	620.3	0.000
Phosphorus	703.9	444.5	1105.8	434.6	2797.3	723.2	2719.2	687.0	0.000
Magnesium	126.8	70.1	149.3	50.3	563.1	174.3	561.7	187.6	0.000
Iron	15.1	7.6	18.4	5.6	36.8	10.9	36.5	10.9	0.000
Zinc	9.6	4.7	12.8	4.5	26.8	9.6	26.2	9.2	0.000
Cupper	1.4	1.7	1.3	1.0	3.3	0.9	3.2	0.9	0.000
Vitamin A	406.1	607.5	1783.3	3894.9	1986.6	1502.4	1900.9	1694.1	0.047
Vitamin C	59.0	51.2	84.8	68.8	245.4	70.0	233.1	51.6	0.000
Vitamin B1	0.6	0.3	0.9	0.4	3.5	1.1	3.3	1.2	0.000
Vitamin B2	0.9	0.9	1.7	1.1	3.9	1.1	3.6	1.1	0.000

Table 3: mean and SD of 24-hour recall percent of RDA in different classes

Items	Class1		Class2		Class3		Class4		P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Protein Energy Ratio	16.7	5.3	18.5	4.8	14.5	2.7	15.3	2.5	0.003
CHO Energy Ratio	47.8	14.4	46.5	8.9	52.7	9.3	52.9	8.3	0.062
Fat Energy Ratio	35.5	11.2	32.9	7.5	32.8	9.9	31.8	8.4	0.542
Calcium	38.8	17.4	62.6	25.8	176.3	59.1	179.7	62.0	0.000
Magnesium	55.1	30.5	57.4	19.3	216.6	67.0	216.0	72.1	0.000
Iron	80.4	40.5	134.7	41.2	268.5	79.2	266.7	79.5	0.000
Zinc	112.1	54.7	182.3	64.9	382.6	136.9	373.7	131.3	0.000
Vitamin A	67.7	101.2	297.2	649.2	331.1	250.4	316.8	282.4	0.047
Vitamin C	147.5	128.1	188.5	153.0	545.4	155.6	517.9	114.7	0.000
Vitamin B1	57.9	27.9	73.4	31.3	295.3	93.3	274.4	96.5	0.000
Vitamin B2	80.2	83.9	134.0	87.5	298.0	83.9	276.9	84.0	0.000

Table 4: Mean of the score Nutritional awareness questionnaire according to the topic

Topic	Class1		Class2		Class3		Class4		P value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Body Wt Obesity	53.6	17.5	45.8	21.5	51.1	20.1	48.0	18.0	0.199
Anemia	52.5	13.6	45.8	20.6	58.3	19.7	50.3	23.9	0.018
Food Safety	47.8	21.1	46.4	24.6	58.6	18.6	51.0	17.3	0.016
Protein Importance	49.3	11.7	45.9	18.1	57.3	16.9	51.7	19.4	0.007
Fat Knowledge	48.8	34.2	51.6	32.0	53.2	32.2	50.0	25.2	0.903
Vitamins Minerals	49.1	19.2	45.4	18.6	57.0	15.7	51.5	16.8	0.011
Water Drink	48.5	22.8	43.4	25.4	58.8	22.4	50.6	21.5	0.010
Nutritional supplements	49.3	29.6	42.0	31.9	60.6	30.7	51.8	32.4	0.031
Healthy nutrition	48.3	16.7	44.7	23.9	60.3	20.1	52.1	22.1	0.002
Malnutrition	48.2	20.1	47.6	19.6	55.3	16.9	49.8	14.8	0.135
Fiber knowledge	47.7	33.2	43.3	33.0	60.0	33.0	51.3	32.3	0.077
Sport type	48.0	44.2	42.0	38.6	61.3	33.2	52.7	32.4	0.071
Total awareness	49.0	16.4	45.4	20.2	57.9	17.6	51.0	18.6	0.007

Table 5: Mean and SD of Anthropometric measures in different classes

		Class1		Class2		Class3		Class4		P value
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Weight		68.5	13.5	68.3	13.5	67.1	12.8	66.5	12.3	0.845
Height		158.6	7.3	157.6	7.1	158.0	6.8	158.8	7.2	0.824
BMI		27.5	6.6	27.8	6.5	27.0	5.9	26.6	5.8	0.784
		No	%	No	%	No	%	No	%	P value
BMI	Underweight	2	4.0	2	4.0	1	2.0	1	2.0	0.992
	Normal	22	44.0	20	40.0	24	48.0	24	48.0	
	Overweight	7	14.0	8	16.0	7	14.0	9	18.0	
	Obese	19	38.0	20	40.0	18	36.0	16	32.0	

Table 6: correlation between BMI and 24-hour recall actual intake and percent of RDA

Item	BMI			
	Actual intake		Percent of RDA	
	r	P	r	P
Calories	0.054	0.592		
Carbohydrates	0.007	0.945	0.105	0.295
Protein	0.095	0.340	-0.132	0.187
Fat	0.097	0.334	0.142	0.156
Fiber	-0.002	0.983		
Sodium	0.022	0.828		
Potassium	0.002	0.985		
Calcium	-0.024	0.809	-0.027	0.788
Magnesium	-0.016	0.874	-0.018	0.856
Iron	0.033	0.743	0.035	0.729
Zinc	0.032	0.747	0.029	0.773
Vitamin A	0.023	0.819	0.023	0.819
Vitamin C	-0.044	0.660	-0.048	0.630
Vitamin B1	-0.037	0.712	-0.039	0.697
Vitamin B2	-0.062	0.538	-0.067	0.505

تقييم الحالة الغذائية والوعي الغذائي بين الطلاب المصريين الذكور في كلية التربية الرياضية

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الملخص العربي

يعتمد الحفاظ على الصحة الجيدة، والوقاية من الأمراض، وتحقيق الأداء الجيد في الرياضة على التغذية السليمة والوعي الغذائي. وخلال أربعة فصول دراسية، تم تقييم الحالة التغذوية، وتناول الطعام، والمعرفة الغذائية لـ ٢٠٠ طالب مصري من الذكور بكلية التربية الرياضية. ووفقًا للدراسة التي استخدمت القياسات الأنثروبومترية، واسترجاع الوجبات لمدة ٢٤ ساعة، واستبيان الوعي الغذائي، فقد زاد استهلاك الطاقة والعناصر الغذائية الكبرى والصغرى بشكل ملحوظ لدى الطلاب في السنوات الأعلى. كما زاد الوعي الغذائي، خاصة في مجالات مثل المكملات الغذائية، والتغذية الصحية، وفقر الدم. ومع ذلك، أظهر طلاب السنوات الأولى ضعفًا في الوعي الغذائي وقصورًا في تناول العناصر الغذائية رغم هذا التحسن. وقد أبرزت الدراسة محدودية مؤشر كتلة الجسم (BMI)في تقييم الصحة التغذوية لهذه الفئة الرياضية، إذ لم يكن هناك ارتباط كبير بين قيم المؤشر وتناول العناصر الغذائية أو درجات الوعي، كما لم تُظهر هذه القيم فروقًا كبيرة بين السنوات الدراسية. وتوصي الدراسة باستخدام تقنيات أكثر دقة لقياس تركيب الجسم من أجل تقييم صحي أفضل، وتؤكد على ضرورة تحسين التثقيف الغذائي ضمن برامج التربية الرياضية".

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