ECRONICON OPEN ACCESS

EC MICROBIOLOGY
Review Article

Nutritional Supplements Intake among Adolescent and Young Adult Male

Mohammed Eldeb Mohammed[1]*, Yazed Khalid Alkhader[2], Mohammed Hashim Alaish[3], Sohaib Kamal Filemban[4], Ahmed Abdullah Alrashed[5], Ohud Adel Alsalami[6], Zaid Mohammed Alosaimi[7], Bushra Farhan Alharshani[8], Rashed Ibrahim Alqunaian[9], Ahmed Fauzy Allehyani[10] and Ahmed Dhaifallah Althobaiti[7]

[1]Department of Family Medicine, Consultant of Family Medicine, King Abduaziz Medical City, National Guard, Specialized Polyclinic, Jeddah, Saudi Arabia

[2]Department of Family Medicine, King Fahad Medical City, Riyadh, Saudi Arabia

[3]College of Medicine, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia

[4]Department of Intensive Care Unit, King Fahad General Hospital, Jeddah, Saudi Arabia

[5]Collage of Medicine, Medical University of Warsaw, Poland

[6]Collage of Medicine, University of Science and Technology, Jordan

[7]Collage of Medicine, Taif University, Taif, Saudi Arabia

[8]Department of Nephrology, King Fahad General Hospital, Jeddah, Saudi Arabia

[9]General Physician, Imam Abdulrahman Alfaisal Hospital, Riyadh, Saudi Arabia

[10]Collage of Medicine, King Saud bin Abdulaziz University for Health Sciences, Jeddah, Saudi Arabia

***Corresponding Author:** Mohammed Eldeb Mohammed, Department of Family Medicine, Consultant of Family Medicine, King Abduaziz Medical City, National Guard, Specialized Polyclinic, Jeddah, Saudi Arabia.

Received: January 08, 2020; **Published:** January 16, 2021

Abstract

Background: A healthy diet, vigorous strengthening exercises and adequate sleep are needed for optimizing muscle gains. Supplements may play an important role in promoting muscle development, as they often increase the production of muscle proteins or the accumulation of muscle proteins within muscle cells. There is a big need to understand the importance, balance, benefits to risk and the right uses for these supplements, a theory had been made to educate adolescents about all of this and it is called health education theory, it actually help better understanding.

Aim: In this review, we will look into nutritional supplement intake among adolescent and young adult males and to review results of previous studied investigated importance, benefits, balance and right use of these supplements.

Conclusion: Dietary supplements are ones of the most used products between teenagers nowadays, it is available in markets and on the internet which ease access to it, the big existence and wide availability of the nutritional supplements necessities supervision and studying how teen are using it. The prevalence of supplements between adolescents is high, most commonly multi-vitamins, minerals and body building proteins. Dietary supplements have side effects in addition to the good effects so it is important that we make sure that teens understand how they should choose the supplements they use and be awarded about any long- lasting effects of it.

Keywords: *Nutritional Supplements; Nutritional Supplement in Adolescents, Importance of Nutritional Supplements*

Introduction

Studying the nutritional intake of supplements among adolescent is not a new field of search as previous studies such as Kovar [1]; Bowering and Clancy [2]; Park., *et al.* [3]; Dickinson., *et al.* [4]; Ervin., *et al.* [5] consequently resulted in the following, first about 40% of people are taking nutritional supplements and the ones who takes the first place in this consumption are children between 1 - 5 years old. Recent studies revealed that the mixture of vitamins and minerals is the most used type of nutritional supplement, with a percentage of 46% of people using it.

Planta., *et al.* [6] showed the use of herbal supplements, while Yu., *et al.* [7] focused on iron supplement, Park., *et al.* [3] studied vitamin C intake, Applegate and Grivetti [8] studied how amino acid are taken and considered one of the basic dietary supplements and finally O'Dea and Rawstorne [9] revealed the use of creatine as dietary supplement.

Sobal and Marquart [10] made a large study on young athletes, they found that 38% of the young athletes used nutritional supplements, which composed of mixture of vitamins and minerals mainly iron, vitamin C, multivitamins, calcium and vitamins A and B.

Although studies on the use of these supplements between adolescents are available, studies concerned with why they use it are very little and are not available. Ervin., *et al*. [5] made a large study on American people and found that the use of dietary supplements is more common between females than males and in white people more, also children aged between 1 to 5 years are the most category that uses it, the ones with high economic level and high income also those who are well-educated or had a high level of education appear to consume the largest amount of dietary supplements comparing to who are not of the same conditions, although this studies told us a lot about the category who used the dietary supplements but it did not give us information about why they are using it.

Douglas and Douglas [11]; Krowchuk., *et al*. [12], Haymes [13], Sobal and Marquart [10] they discussed the nutritional supplements intake between young athletes and they reported that those who take these supplements usually show higher performance in sports which could be an important reasoning of why they are using it, but we still can recognize some of these reasons, but before moving to this part we need first to classify nutritional supplements into 3 major classes (i) supplements used to overcome a lackage of specific element in a body system [14]. (ii) Supplements that thought it cause fast weight loss [15] (iii) or supplements that believed it cause weight gain or muscle building [16].

As the nutritional supplements of different types are now available for all adolescents, there is a big need to understand the importance, balance, benefits to risk and the right uses for these supplements, a theory had been made to educate adolescents about all of this and it is called health education theory, it actually help better understanding of the Adolescents' dietary supplementation procedures, this theory focuses on the principle that the attitude and awareness of the adolescents today will affect how they will behave tomorrow.

This theory also discuss that the understanding of the factors that affects this behavior is the main key to modulate the behavior of adolescents. It is not only about Understanding these factors but also understand how they interact together and the results of this interaction Glanz., *et al*. [17]; Bandura [18]. One of these theories is the Social Cognitive Theory made by Bandura [18] which stated that behavior is the results of interaction of many factors which are personal factors, environmental factors and the main behavior, understanding these factors that affect the nutritional needs for adolescents is the first step toward educating them about the usefulness and the dangers of it. Examples of this is the high intake of caffeine from energy drinks and the side effects of this action between them, to educate young adolescents about this, the benefits, dangers, individual expectations, self-efficacy and environmental factors that drive the consumption among adolescents of such products need to be understood. The obesity became common between adolescents nowadays, this is also another reason that necessities the further research into the nutritional supplements between them [19].

Dietary supplement intake in athlete is another prospective in this review article, many factors challenge athletes in their way such as Meeting the needs of nutrients for growth, training and competitions, maintaining their health, simultaneous athletic activities, complicated schedules (school, training, socialising, work, etc.), junk foods everywhere and travelling [20-23]. During adulthood nutrient consumption need to be increased and adjusted compared to adults [24] this especially for athletes who are in need to good food balance to prevent any injuries that could happen and ensure health [25-27].

The main supplements required especially in athletes are vitamin D, iron, magnesium, zinc, vitamin E, calcium and carbohydrates due to shortage of intake of these elements in their normal diet [24,28-30] also it is suggested that stress that accompany the athletes performance could lead to eating disorders comparing to non-athletes [31].

Finally, Dietary supplements commonly used by those interested in body building and sports are body building supplements. Supplements for body building may be used to replace meals, maximise weight gain, encourage weight loss or boost athletic results [32-34]. Muscle building is a growing trend among young male teenagers.

A healthy diet, vigorous strengthening exercises and adequate sleep are needed for optimising muscle gains. Supplements may play an important role in promoting muscle development, as they often increase the production of muscle proteins or the accumulation of muscle proteins within muscle cells. People need to know that supplements are not the magic bullet, "Jeff Volek says".

Although many studies are made to discuss the usage of nutritional supplements in adolescents, few studies are available to assess why the adolescents tend to use these supplements, so more studies are needed in this field as understanding how teens think of nutritional supplements is the first step towards their right educating about it. In this review, we will look into nutritional supplement intake among adolescent and young adult males and to review results of previous studied investigated importance, benefits, balance and right use of these supplements.

Literature Review

A study conducted by Ali Bell., *et al*. [35], where he surveyed 333 adolescents from local high schools in Canada, 190 males and 139 females most of them grade 9 and 10. Students were asked to complete a questionnaire using pencil, this questions were set by the author and students were asked to answer using (yes or No) to questions such as do you use any of the nutritional supplements listed above (this excluded illegal thing and included all supplements available in stores and internet) and answer using (yes or No or unsure) to questions such as will you use it or do you think they are beneficial.

The results for this study showed that adolescents use dietary supplements with multivitamin/mineral preparations ranked the first in usage as 50% are using it and 13.5% for protein supplements and the remaining is for other supplements. The difference in usage of supplements by age was not significant. While difference by physical activity was significant especially with creatine and protein supplements. Regarding the other question which assists Nutritional supplement experiences as performance enhancers it showed high degree of uncertainty whether or not they improve performance as most of them choose (unsure) option. Using Chi-square analysis to know if this knowledge would differ by age and the results was not significant.

Jennifer A. O'Dea., *et al*. [36] conducted a study which included 78 students; males and females in Grades 7 - 11 in a high school, the methodology here focus on raising hands to answer questions, Focus groups were performed according to Miles and Huberman 's defined methods [37]. The questions used were semi-structured and the analysis of the data was done using [37-39].

Results showed that nutritional supplements were taken in various degrees between them as sports drinks listed first, vitamins and mineral tablets came after it then energy drinks and herbal supplements others were taken by little percentage of students. The reasons for taking these supplements differs according to the type of supplements as improving health and preventing disease were the first listed reasons for using vitamins, minerals and herbal supplements, sports drink were taken as alternative to soft drinks and because they taste nice, and finally energy drinks where most of students talked about it and how it makes them feel in an enthusiastic way.

Another study about Dietary consumption and use of supplements in Canadian pre-adolescent and adolescent athletes [40], the study was made on 187 students, 84 males and 103 females athletes, their age was between 11 to 18 years, the term athlete in this study was indicating anyone who is a competitor at the city level or more and have training for at least 5 hours per week.

This study was conducted using Food Behaviour Questionnaire (FBQ, this questionnaire was web-based one, it was made by some researchers from Canada, to analyze diet in young ones [41], the questionnaire included sports drinks, and meals timing and training were included in the study, using Schofield equation, the basal metabolic rate was calculated and those who got energy intake/BMR equal to or less than 0.89 were excluded from the study. Carbohydrate intakes and protein intake were more in males than females, the median intake for athletes was the same or more than the Recommended Dietary Allowance (RDA) except for vitamin A, Vitamin D and folate.

Adolescents, in most cases stick more to diets low in nutrients and rich in energy [23], but this study showed that comparing athletes to their peers, athletes do take more improved and rich dietary [25-27], also disorders associated to food and eating was less in athletes

comparing to non- athletes [31]. The sufficiency of macronutrient consumption in young athletes is hard to determine because of a loss of guidelines and a focus on adult values [42,43]. Carbohydrate guidelines are thought to better reflect athlete requirements based on body weight instead of percent of the overall calories and vary from 3 to 12 g/kg/BW based on exercise load [44].

Their intake of carbohydrates meet the least requirements while the intake of Dietary fibers did not meet the recommended values, while Recently, protein guidelines have improved from 1.2 to 2.0 g/kg/BW based on the form and quantity of physical activity [45]. Generally, it has been proposed that protein intakes are usually sufficient or excessive as coaches and athletes overestimate protein [28,46].

Jill Anne McDowall., *et al*. also discussed the nutritional supplements intake in athletes, taking into consideration the previous studies of athletes, the following results were reached, Olympic athletes in Canada were reported to consume dietary supplements according to the following rates Sydney (74%) and Atlanta (69%) in Olympic Games [47], in Singapore 77% of athletes reported taking these supplements [48] in the United Kingdom fall to 53%.

As the gender changes, 3 main factors change with it, which are the types of supplements taken, the prevalence and the reason for taking these supplements.

Focusing on the reasoning for using such supplements, it was different reasoning between males and females as males mainly seek improving their athletic performance while females use it mostly for nutritional values and to improve their health [10,48].

Many people, especially young males, use muscle building supplements because having the ideal athletic body has become an ongoing battle to see which persons can be the skinniest, quickest and strongest. Nowadays not only athletes or super stars are using it, but teens are using it to affect mainly by sociocultural influences. Parent influences Media, and peers, these products are tricky and its instructions are not specific. They attract teens by convincing them that it is the way to get the shape you like in the least time. As the side effects of these products are also dangerous as it could have components not researched well, it is important to educate adolescents about these supplements, and how to pick your best choice is necessary; they need to know how to choose the supplement and its long lasting effects.

From their teen years, males tend to want "huge muscles". Sociocultural influences on the use of techniques for muscle building, particularly food supplements [49].

Books, magazines, television and the internet are media that influence the young person's decision to use nutritional supplements [50]. The increase in demand for nutritional supplements was due to numerous factors, including improving efficiency, improving health, preventing nutritional deficiencies and disease, raising muscle mass, decreasing body fat, raising immunity, increasing alertness and attentiveness.

In adolescent boys, the pattern of consuming muscle building supplements is more popular as they develop and are in such a phase of life that they want to impress and draw others to them. So, they choose such a body type that will transform their slim body to a healthier physique like models, and movie actors [51-53] they are more influenced by all the new trends that are going around. The most efficient and commonly used bodybuilding supplements, anabolic steroids, whey proteins, creatine and many others, are now known to teenagers. Adolescents who go to gyms are often more likely to take these nutrients along with exercise to develop the body. They are recommended by gym instructors or coaches to take gym body building supplements and other supplements to boost performance and rapidly gain muscle. The nutritional requirements for the body that the diet does not fulfil to build the body are met by the diet.

Discussion

Ali Bell., *et al*. study discussed that dietary supplements are being used by teenagers. Multivitamin and mineral preparations were the most common supplements eaten. The usage percentage (42%) was found to be close to that found in other studies of current multivita-

min and mineral usage in adolescents [54]. However, excluding the intake of multivitamins and minerals, Data on the use of other forms of legal and readily available nutritional supplements in adolescent samples has been limited. This research highlights that other dietary supplements fall within the teenage use continuum.

Protein supplements in this sample seem to be common among youngsters. Overall, 68% of young people are potential consumers of a product that may be limited.

Practicality for them. However, almost half of the study, when analysing information scores, reveals their assumption that protein supplements are success Improving and an additional 37 percent indicate that they are unsure. The trend in the current study for more female adolescents to demonstrate the use of substantially more herbal weight management supplements is of further concern. Compared to males. This result reveals that teenage girls are more likely to diet to lose weight, while teenage boys are more likely to diet to gain weight [55,56].

Jennifer A O'Dea., *et al*. discussed that the results give important data about the reason behind using these supplements; Adolescents of any and all ages may clearly express the advantages of using nutritional supplements. The large proportion of supplements is known to be effective for the health of adolescents and for the avoidance of different types of diseases.

The theme of immunity has become synonymous with the theme of disease prevention, particularly with respect to vitamins and minerals, Such as Echinacea and herbal supplements. It was noteworthy that the potential for antioxidants to avoid lifestyle disorders such as coronary heart disease or cancer was not addressed by any participants, but concentrated on more short-term benefits such as avoidance of colds, flu and cold sores. The common cold was the type of disease that was most anticipated to be avoided by nutritional supplementation between adolescents. A very important topic to emerge was the concept that immunity can be 'boosted' by dietary factors.

These results support the findings of Nowak and Crawford [57] who found that adolescents understand the value of food in the long-term prevention of potential disease, but attach more value on short-term issues such as their current appearances, energy and health.

Jill Anne McDowall., *et al*. discussed in his study that beside what was discussed before Sports nutrition experts believe that in order to compensate for a bad diet, athletes do not use nutritional supplements, but rather eat whole foods to satisfy their nutrient needs. Athletes should depend on supplements only when this is not possible. Protein supplements were popular; yet given the high dietary intakes, they seem to be unnecessary. In addition, in the sense of their nutrient intake from food alone, the need for multivitamin-multimineral, vitamin C and vitamin-enriched water is uncertain.

Conclusion

Dietary supplements are ones of the most used products between teenagers nowadays, it is available in markets and on the internet which ease access to it, the big existence and wide availability of the nutritional supplements necessities supervision and studying how teen are using it. The prevalence of supplements between adolescents is high, most commonly multi-vitamins, minerals and body building proteins. They are using it for many reasons such as keeping health, preventing disease and for athletes they are using it for improving their athletic Behaviour. Dietary supplements have side effects in addition to the good effects so it is important that we make sure that teens understand how they should choose the supplements they use and be awarded about any long- lasting effects of it.

Bibliography

1. Kovar MG. "Use of medications and vitamin-mineral supplements by children and youths". *Public Health Reports* 100 (1985): 470-473.

2. Bowering J and Clancy KL. "Nutritional status of children and teenagers in relation to vitamin and mineral use". *Journal of the American Dietetic Association* 86 (1986): 1033-1038.

3. Park YK., *et al*. "Characteristics of vitamin and mineral supplement products in the United States". *American Journal of Clinical Nutrition* 54 (1991): 750-759.

4. Dickinson VA., *et al*. "Supplement use, other dietary and demographic variables and serum vitamin C in NHANES II". *Journal of American College Nutrition* 13 (1994): 22-32.

5. Ervin RB., *et al*. "Use of dietary supplements in the United States, 1988-94". *Vital and Health Statistics-Series 11: Data from the National Health Survey* 244.3 (1999): 1-14.

6. Planta M., *et al*. "Prevalence of the use of herbal products in a low-income population". *Family Medicine* 32 (2000): 252-257.

7. Yu SM., *et al*. "Vitaminmineral supplement use among preschool children in the United States". *Pediatrics* 100.5 (1997): E4.

8. Applegate EA and Grivetti LE. "Search for the competitive edge: a history of dietary fads and supplements". *Journal of Nutrition* 127 (1997): 869S-873S.

9. O'Dea JA and Rawstorne PR. "Male adolescents identify their weight gain practices, reasons for desired weight gain and sources of weight gain information". *Journal of the American Dietetic Association* 101 (2001): 105-107.

10. Sobal J and Marquart LF. "Vitamin/mineral supplement use among high school athletes". *Adolescence* 29 (1994): 835-843.

11. Douglas PD and Douglas JG. "Nutrition knowledge and food practices of high school athletes". *Journal of the American Dietetic Association* 84 (1984): 1198-1202.

12. Krowchuk DP., *et al*. "High school athletes and the use of ergogenic aids". *American Journal of Diseases in Children* 143 (1989): 486-489.

13. Haymes EM. "Vitamin and mineral supplementation to athletes". *International Journal of Sports Nutrition* 1 (1991): 146-169.

14. Schulz IO. "Factors influencing the use of nutritional supplements by college students with varying levels of physical activity". *Nutrition Research* 8 (1988): 459-466.

15. Thompsen PA., *et al*. "Adolescents' beliefs about and reasons for using vitamin/mineral supplements". *Journal of the American Dietetic Association* 87 (1987): 1063-1065.

16. Wolfe RR. "Protein supplements and exercise". *The American Journal of Clinical Nutrition* 72 (2000): 551s-557s.

17. Glanz K., *et al*. "Health Behavior and Health Education". Jossey-Bass, San Francisco, CA (1997).

18. Bandura A. "Social Foundations of Thought and Action: A Social Cognitive Theory". Prentice-Hall, Englewood Cliffs, NJ (1986).

19. Anderson AS., *et al*. "Adolescent meal patterns: Grazing habits in the West of Scotland". *Health Bull* 51 (1993): 158-165.

20. Desbrow B., *et al*. "Sports Dietitians Australia Position Statement: Sports nutrition for the adolescent athlete". *International Journal of Sport Nutrition and Exercise Metabolism* 24 (2014): 570-584.

21. Rosenbloom CA., *et al*. "Special populations: The female player and the youth player". *Journal of Sports Science* 24 (2006): 783-793.

22. Thomas M., *et al*. "Exploring parent perceptions of the food environment in youth sport". *The Journal of Nutrition Education and Behavior* 44 (2012): 365-371.

23. Walsh M., *et al*. "The body composition, nutritionalknowledge, attitudes, behaviors, and future education needs of senior schoolboy rugby players in Ireland". *International Journal of Sport Nutrition and Exercise Metabolis* 21 (2011): 365-376.

24. Gibson JC., *et al*. "Nutrition status of junior elite Canadian female soccer athletes". *International Journal of Sport Nutrition and Exercise Metabolism* 21 (2011): 507-514.

25. Garcin M., *et al*. "Athletes' dietary intake was closer to French RDA's than those of young sedentary counterparts". *Nutrition Research* 29 (2009): 736-742.

26. Cavadini C., *et al*. "Food habits and sport activity during adolescence: Differences between athletic and non-athletic teenagers in Switzerland". *European Journal of Clinical Nutrition* 54 (2000): S16-S20.

27. Croll JK., *et al*. "Adolescents involved in weight-related and power team sports have better eating patterns and nutrient intakes than non-sport-involved adolescents". *Journal of the American Dietetic Association* 106 (2006): 709-717.

28. Juzwiak CR., *et al*. "Body composition and nutritional profile of male adolescent tennis players". *Journal of Sports Sciences* 26 (2008): 1209-1217.

29. Koehler K., *et al*. "Iron status in elite young athletes: Gender-dependent influences of diet and exercise". *European Journal of Applied Physiology* 112 (2012): 513-523.

30. Papadopoulou S., *et al*. "Macro- and mico-nutrient intake of adolescent Greek female volleyball players". *International Journal of Sport Nutrition and Exercise Metabolism* 12 (2002): 73-80.

31. Joy E., *et al*. "Update on eating disorders in athletes: A comprehensive narrative review with a focus on clinical assessment and management". *Journal of Sports Medicine* 50 (2016): 154-162.

32. Adolescent Nutrition.

33. Article doctor (2012).

34. Becque M Daniel., *et al*. "Effects of oral creatine supplementation on muscular strength and body composition". *Medicine and Science in Sports and Exercise* 32.3 (2000): 654-658.

35. Bell A., *et al*. "A look at nutritional supplement use in adolescents". *Journal of Adolescent Health* 34.6 (2004): 508-516.

36. O'Dea JA. "Consumption of nutritional supplements among adolescents: usage and perceived benefits". *Health Education Research* 18.1 (2003): 98-107.

37. Miles MB and Huberman AM. "Qualitative Data Analysis: An Expanded Sourcebook". Sage, Thousand Oaks, CA (1994).

38. Britten N. "Qualitative interviews in medical research". *British Medical Journal* 311 (1995): 251-253.

39. Pope C and Mays N. "Reaching the parts other methods cannot reach: an introduction to qualitative methods in health and health service research". *British Medical Journal* 311 (1995): 42-45.

40. Parnell JA., *et al*. "Dietary intakes and supplement use in pre-adolescent and adolescent Canadian athletes". *Nutrients* 8.9 (2016): 526.

41. Hanning RM., *et al*. "Web-Based Food Behaviour Questionnaire: Validation with grades six to eight students". *Canadian Journal of Dietetic Practice and Research* 70 (2009): 172-178.

42. Nikic M., *et al*. "Adequacy of nutrient intakes in elite junior basketball players". *International Journal of Sport Nutrition and Exercise Metabolism* 24 (2014): 516-523.

43. Baker LB., *et al*. "Dietitian-observed macronutrient intakes of young skill and team-sport athletes: Adequacy of pre, during, and postexercise nutrition". *International Journal of Sport Nutrition and Exercise Metabolism* 24 (2014): 166-176.

44. Burke LM., *et al*. "Carbohydrates for training and competition". *Journal of Sports Science and Medicine* 29 (2011): S17-S27.

45. Thomas DT., *et al*. "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 (2016): 501-528.

46. Juzwiak CR and Ancona-Lopez F. "Evaluation of nutrition knowledge and dietary recommendations by coaches of adolescent Brazilian athletes". *International Journal of Sport Nutrition and Exercise Metabolism* 14 (2004): 222-235.

47. Huang S., *et al*. "The use of dietary supplements and medications by Canadian athletes at the Atlanta and Sydney Olympic games". *Clinical Journal of Sports Medicine* 16.1 (2006): 27-33.

48. Slater G., *et al*. "Dietary supplementation practices of Singaporean Athletes". *International Journal of Sport Nutrition and Exercise Metabolism* 13 (2003): 320-332.

49. Datillo M., *et al*. "Psychology of Men and Masculinity" (2005).

50. Ronsen O., *et al*. "Supplement use and nutritional habits in Norwegian elite athletes". *Scandinavian Journal of Medicine and Science in Sports* 9.1 (1999): 28-35.

51. Schwarzenegger Arnold, Bill Dobbins. The New Encyclopedia of Modern Body building. Simon and Schuster Paperbacks (1998).

52. Whitney EN and Rolfes SR. "Understanding Nutrition". 7th edition. USA: West publishers (1997).

53. Wolfe Robert R. "Protein supplements and exercise". *The American Journal of Clinical Nutrition* 72.2 (2000): 551s-557s.

54. Ross M and Fletcher GJO. "Attribution and social perception". In: Lindzey G, Aronsen E (eds). The Handbook of Social Psychology, 3rd edition. New York: Random House (1985): 73-122.

55. Rosen JC and Gross J. "Prevalence of weight reducing and weight gaining in adolescent girls and boys". *Health Psychology* 6 (1987): 131-147.

56. McCreary D and Sasse DK. "Gender differences in high school students' dieting behavior and their correlates". *International Journal of Men's Health* 1 (2002): 195-213.

57. Nowak M and Crawford D. "Getting the message across: adolescents' health concerns and views about the importance of food". *Australian Journal of Nutrition and Dietetics* 55 (1998): 3-8.

Volume 17 Issue 2 Febuary 2021