

## THE EFFECT OF NUTRITION EDUCATION ON NUTRITIONAL BEHAVIOR

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**ABSTRACT:** Regular engagement in physical activities helps students develop muscular strength, endurance, flexibility, and cardiovascular fitness. It also aids in the maintenance of healthy body weight, reduces the risk of obesity, and enhances motor skills and coordination. A vast number of researchers have investigated the impact of physical education on nutrition on children's and adults behavior and attitudes. In most of the studies, it has been revealed that physical exercises shows major impact on health and balanced life style, nutritional habits, body structure and academic achievement. Physical activity increases the need for some vitamins and minerals. A well-balanced diet will supply enough vitamins and minerals to cover any increased need due to activity. The aim of this study is to determine the physical education program has an effect on nutritional attitudes and behaviors, sports attitudes and performance, and academic achievement. For this purpose, an experimental research design with control group. Hence, this physical group shows better performance interms of stamina, immunity and mental-cognitive.

**KEYWORDS:** Nutrition Education, Nutritional Habits, Nutritional Behavior, Academic Achievement, Sports Achievement

### I. INTRODUCTION

Nutrition plays an important role in maintaining human health. It provides persons by energy needed to perform different activities, and helps the body to prevent diseases. Healthy food is essential for children as it helps them to form their body in a healthy way which in turn supports them in resisting different risks that threaten their health. Therefore, having healthy food supports the children to be able to have the enough energy for their daily life.

As information Technology is one of the vital fields that can support providing the children with the recommended health diet which preserve the required goal. Applying different information technology methodologies usually provide a trust and exciting output for the children. Different plans for healthy nutrition for children have been proposed, however, a need to support these plans with the new technology is now an essential step [1]. In an expert system prototype for nutrition is proposed, however, the proposed prototype did not focus on a determined age stage. Other systems are built for elderly people nutrition such as in an ontology-driven personalized food and nutrition planning system is introduced for the elderly.

They aimed to help the hospital staff in planning suitable diet and provide nutrition advices for the elderly with considering their physical condition and favorite food. Also a meal planning system for elderly is proposed to overcome the malnutrition problem. According to the special needs for observing the child growth, we believe that nutrition systems with more focus on children is more beneficial [2].

Recently an article published on The Lancet Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study stated that the relationship between dietary habits and a Non-Communicable Diseases (NCDs) has been widely investigated, and it shows that China's dietary structure is not better than that of the U.S. Also, the research in 2011 showed that the mean Body Mass Index (BMI) by age-adjusted was 23.8 (95% CI=23.7, 23.9) for men and 23.4 (95% CI=23.2, 23.5) for women.

The age-adjusted prevalence of obesity was 11.3% (95% CI=10.8%, 11.9%) overall, 11.8% (95% CI=10.8%, 12.6%) among men, and 11.0% (95% CI=10.3%, 11.8%) among women. Estimates of age-adjusted obesity prevalence among the Chinese population were significantly lower than those of the U.S. population (all  $p < 0.05$ ). Over the 20-years period, the prevalence of obesity increased from 2.88% to 11.8% among men (age-adjusted annual change in OR=1.08, 95% CI=1.07, 1.09,  $p < 0.001$ ) and from 4.55% to 11.0% among women (OR=1.05, 95% CI=1.05, 1.06,  $p < 0.001$ ). According to the World Health Organization (WHO), similar important findings have been observed for both men and women [3].

Over the last two decades, China has witnessed a great growth of economic development and the living standards have significantly improved. The choices of food are overly abundant, nonetheless, the popularization of the food nutrition knowledge of the Chinese did not keep up the pace with the economic development. When people are facing excessive options of different food, they usually feel lost, and make bad decisions in terms of health.

Thus, promoting the knowledge of dietary nutrition is becoming quite necessary and priority for our society. It has a significant influence on people's mental and physical health [4]. The university students are the group of people who are accepting a higher level of education. These groups have the openness for new knowledge, and at a critical point in building up the lifetime value of the world and a healthy lifestyle. As a result, the paper chooses this group of people as the sample which could represent the top level of present knowledge. And the students at this period who just graduated from high school and had a lot of free time to do anything they are interested in; thus, it is the perfect sample for studying this topic. Once the research figured out a method that works for the students of Chengdu University, then it means that it could be applied to most Chinese students in some ways. It signifies the health of Chinese people could be improved obesity and the diabetes rate could be decreased and the life expectancy would be longer [5].

Moreover, there have been a lot of studies assessing the level of a group of people nutrition knowledge, dietary habits, and various factors contributing to poor dietary habits. However, few studies exist that examine dietary nutrition from the perspective of college students or provide a contextual understanding of how college students perceive the role of food and nutrition in their lives. Furthermore, the absence of nutrition education in China is severe [6]. The purpose of this study was to elicit attitudes and beliefs of college students regarding their health, nutritional practices, perceived nutrition information needs and improve their dietary knowledge to improve the overall health of college students. There is a great variety of factors that influence the overall health of people to facilitate the qualitative and quantitative analysis of the factors that have on students in the tertiary setting. The factors can be classified into several categories (e.g. body image and weight concerns, healthy eating on a budget, expert nutrition, basic nutrition, healthy meal planning) which could have a different rating by experts or the research staff and students.

## II. LITERATURE SURVEY

F. Sun, et.al [7] optimization method for the food nutrition formula based on the consideration of the adaptive genetic algorithm as the core is put forward. The computer optimization of the food nutrition formula is generated by the matrix decomposition based on the consideration of the heterogeneous data. In this system, the food nutrition information and the sign-in data are combined in an effective manner; and at the same time, they are merged into the same system to achieve the complementary advantages. The system that takes the complementary advantages into consideration can make more accurate prediction about the preference of the users. It is found in this study through experiments that: Compared with the

other mainstream computer optimization of the food nutrition formula, the COFNF algorithm has relatively significant improvement in both the accuracy index and the recall rate index.

M. Hazman and A. M. Idrees, et.al [8] Healthy food is one of the most critical aspects for the family, especially for their children as healthy diet for children results in better life including the increase of their ability to learn, exercise, and even behaving. Therefore, a need for a full support for providing the children with healthy food is a vital target to reach. In this paper, we propose a prototype for a children nutrition expert system which aim is to provide its users with the nutrition expertise. It generates healthy meals for children in different ages according to different criteria including their growth stage, gender, and their health status. A web application is developed and two case studies are applied to demonstrate how the proposed prototype can be applied for determining child's nutrition.

R. R. Hariadi, W. N. Khotimah and E. A. Wiyono, et.al [9] People are constantly looking for ways to improve their health and one approach that could be taken in addition to exercising is managing daily nutrition intake. Even though to get fit and healthy we must manage our daily nutrition intake often we do not know what nutrients are present in food. Therefore, before eating we need to look for nutrition information of the food. The usual process of getting the food's nutrition information is by searching via the google or use some application such as Coach Noom, Calorie Counter, Lose It. In this paper we proposed to make this process smarter, faster, and more efficient by developing an android application that can shows the nutrition information by just taking the picture of the food. We develop an android augmented reality application to help users to get nutritional information in an easy and informative way. The information is displayed in the form of calorie, fat, carbohydrate, and protein per serving. Using this application, users can get the nutritional information simply by taking a picture of the food. From our experiments, the food recognition's accuracy level is 92%, while the average time required to identify the name and the nutrients is 9.295 seconds.

Lih-Juan ChanLin, R. . -F. S. Huang and Kung-Chi Chan, et.al [10] online lesson, entitled "Vitamins and Health" was developed for a basic food nutrition course. The Web-based instruction (WBI) was used as a self-study tool to complement formal instruction. Food sources and nutrition compositions of foods are also provided with fruitful visual information. The use of images, motions, and dynamic features of the learning tool, also makes the instructional content easily comprehended by learners. To optimize students' involvement and engagement with the learning materials, the task-oriented approach is employed in teaching. Web assignments were also given. Students were required to study the Web-based learning materials and complete the assignment on the Web. They were also encouraged to learn collaboratively through online discussion. Students' responses toward the learning experience were gathered.

M. Tanaka, A. Kanda, T. Matsuo and T. Terashima, et.al [11] nutrition education course in colleges and universities provides a license of nutrition specialist in Japan. Even such course, students must to get credits on practice of operations of information equipment including personal computer, presentation device and several other machines, because educational issue in Japan's law sets as complementary lectures for students to graduate and to get the license. After graduation, students sometimes advise nutritional issues for people as a specialist using information devices. Generally, in university, student learns the way how he/she can effectively present with group discussion. However, the weak point of group study includes that some students do not have any motivations of allocated roles. The problem is often pointed out by staffs in job office, including food factory, restaurant in school and medical

centers. To solve the problem, we propose a new teaching method by using information devices and a method to make students enhance their motivation to study.

İ. Berkan Aydılek, et.al [12] Controlled intake of nutrition is recommended as a condition for being a healthy individual. Knowing and monitoring how much food is consumed during the day, following the calorie and nutrition of these foods helps to control healthy nutrition. In this study, an attempt was made to approximate the nutrients of the food at the image level using the Food-pics dataset that contain nutrient images. Convolutional Neural Networks (CNN), a deep learning approach that has been used successfully in image recognition and classification tasks, has been trained with nutrition image training data, and a high classification success value has been achieved. The arithmetic average nutritional values of the five highest predicted nutritional results obtained from the net were taken as the approximate nutrient content.

H. Kalantarian, N. Alshurafa and M. Sarrafzadeh, et.al [13] appropriate levels of food intake and developing regularity in eating habits is crucial to weight loss and the preservation of a healthy lifestyle. Moreover, maintaining awareness of one's own eating habits is an important step towards portion control and ultimately, weight loss. Though many solutions have been proposed in the area of physical activity monitoring, few works attempt to monitor an individual's food intake by means of a non-invasive, wearable platform. In this paper, we introduce a novel nutrition-intake monitoring system based around a wearable, mobile, wireless-enabled necklace featuring an embedded piezoelectric sensor. We also propose a framework capable of estimating volume of meals, identifying long-term trends in eating habits, and providing classification between solid foods and liquids with an F-Measure of 85% and 86% respectively. The data is presented to the user in the form of a mobile application.

Nikolaou, C., Hankey, C. and Lean, M., et.al [14] study found out that the use of nutrition label may positively influence the food choice of the university dining hall patrons, which in their study shows that 58.5% (n=120) out of 204 people in total used the nutrition label, and with 45% of adults who use it to track macronutrient. Also, this study shows that women (79.1%; n=72) are significantly greater in using nutrition labels than men (42.1%; n=48). From this dietary outcome, it could be concluded that the nutrition labels have a significant gender difference, and the food labels do have a great impact on the choice of food by university students.

Bergen, D. and Yeh, M., et.al [15] states that nutrition information is highly associated with the higher rating for food quality for both the short and long term, and the food with nutrition information may stimulate the intentions of repurchase. And in this study, the selected of higher fat, higher-calorie entrées dropped from 67% to 47% and the lower fat, lower-calorie entrée increased from 33% total entrée sold to 53% in total of entrées with the nutrition facts labels posted on the counter with laminated card sold out of 150 participants.

### III. METHODOLOGY

This Program, which is developed for middle school students for balanced nutrition and physical, was prepared, a needs analysis study was conducted in order to ensure that the program was oriented to the needs of the participants. Participation in the study is completely voluntary. In this context, the children had their parents fill out the voluntary participation form for them. The criteria for participation in the Program were that the children in the experimental group, the student should not have any medical diagnosis, and the child and the

parent should be willing to participate in the education and ensure regular participation. The physical Education Program, which was developed within the scope of the study by conducting a needs analysis study, was applied once a week for a total of 8 weeks, for an average of 120 minutes. Before starting the applications of the program, pre-test applications were carried out for the children in the experimental and control groups. After the program was completed, post-tests were administered to the children in the experimental and control groups. After evaluating the data obtained from the physical group Needs Determination Form, the topics of the program were determined. In this direction, physical Program; energy and nutrient requirements of school-age children, adequate and balanced, healthy and physical activity, nutrition and increases the stamina, boost up the immunity, growth-development and mental-cognitive development.

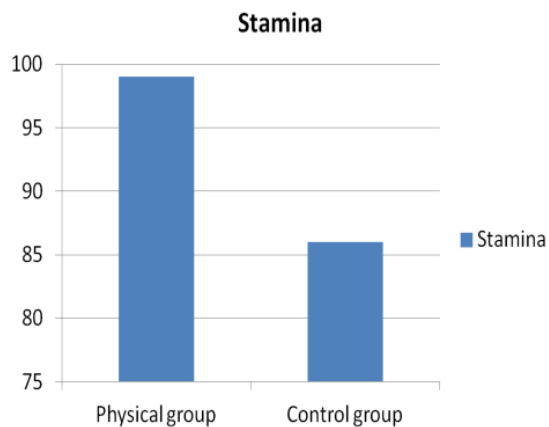
## VI. RESULT ANALYSIS

In this performance analysis physical exercises will improve the nutrition.

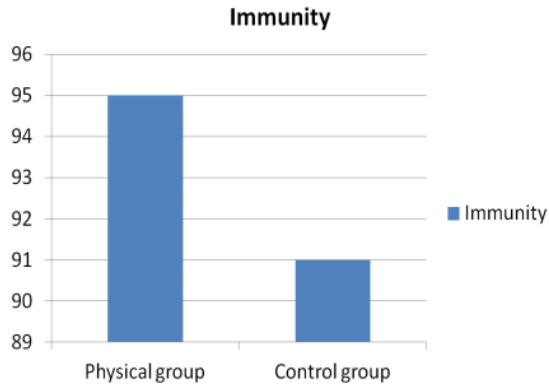
**Table.1: Performance Analysis**

Parameters	Physical group	Control group
Stamina	99	86
Immunity	95	91
Mental-Cognitive	96.7	87

In Fig.1 stamina comparison graph is observed between physical group and control group.

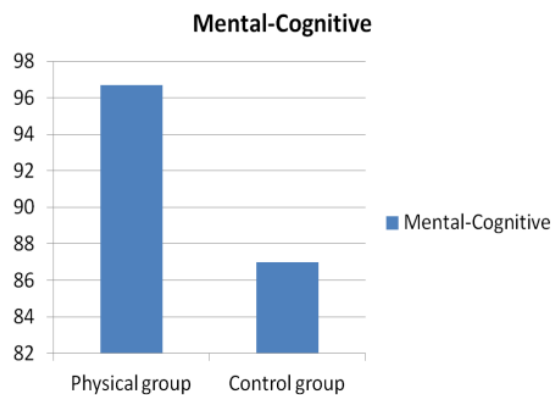


**Fig.1: Stamina comparison Graph**



**Fig.2: Immunity comparison Graph**

In Fig.2 immunity comparison graph is observed between physical group and control group.



**Fig.3: Mental-Cognitive comparison Graph**

In Fig.3 mental-cognitive comparison graph is observed between physical group and control group.

## V. CONCLUSION

Regular engagement in physical activities helps students develop muscular strength, endurance, flexibility, and cardiovascular fitness. It also aids in the maintenance of healthy body weight, reduces the risk of obesity, and enhances motor skills and coordination. Physical activity increases the need for some vitamins and minerals. A well-balanced diet will supply enough vitamins and minerals to cover any increased need due to activity. As experimental research with control group performed better results. Hence, this physical group shows better performance interms of stamina, immunity and mental-cognitive.

## VI. REFERENCES

- [1] Cholewa, J.M., Landreth, A., Beam, S., & *et al.* (2015). The effects of a sports nutrition education intervention on nutritional status, sport nutrition knowledge, body composition, and performance in NCAA Division I baseball players. *J Int Soc Sports Nutr*, 12(Suppl 1), 44-45.
- [2] De Groot, R.H., Ouwehand, C., & Jolles, J. (2012). Eating the right amount of fish: inverted U-shape association between fish consumption and cognitive performance and academic achievement in Dutch adolescents. *Prostaglandins Leukot Essent Fatty Acids*, 86(3), 113-7.

- [3] Egg, S., Wakolbinger, M., Reisser, A., Schätzer, M., Wild, B., Rust, P. (2020). Relationship between nutrition knowledge, education and other determinants of food intake and lifestyle habits among adolescents from urban and rural secondary schools in Tyrol, Western Austria. *Public Health Nutr.*, 23(17), 3136-3147.
- [4] Follong, B.M., Prieto-Rodriguez, E., Miller, A., Collins, C.E., & Bucher, T. (2020). An Exploratory Survey on Teaching Practices Integrating Nutrition and Mathematics in Australian Primary Schools. *International Journal of Research in Education and Science (IJRES)*, 6(1), 14-33.
- [5] Hawley, J.A., Burke, L.M., & Phillips, S.M. (2011) Nutritional modulation of training-induced skeletal muscle adaptations. *J Appl Physiol.*, 110, 834–845.
- [6] Hurley, K.M., Yousafzai, A.K., & Lopez-Boo, F. (2016). Early Child Development and Nutrition: A Review of the Benefits and Challenges of Implementing Integrated Interventions. *Adv Nutrition*, 7(2), 357-63.
- [7] F. Sun, "Computer Optimization of Food Nutrition Formula Based on the Consideration of Adaptive Genetic Algorithm," *2019 International Conference on Intelligent Transportation, Big Data & Smart City (ICITBS)*, Changsha, China, 2019, pp. 552-555, doi: 10.1109/ICITBS.2019.00138.
- [8] M. Hazman and A. M. Idrees, "A healthy nutrition expert system for children," *2015 E-Health and Bioengineering Conference (EHB)*, Iasi, Romania, 2015, pp. 1-4, doi: 10.1109/EHB.2015.7391367.
- [9] R. R. Hariadi, W. N. Khotimah and E. A. Wiyono, "Design and implementation of food nutrition information system using SURF and FatSecret API," *2015 International Conference on Advanced Mechatronics, Intelligent Manufacture, and Industrial Automation (ICAMIMIA)*, Surabaya, Indonesia, 2015, pp. 181-183, doi: 10.1109/ICAMIMIA.2015.7508027.
- [10] Lih-Juan ChanLin, R. . -F. S. Huang and Kung-Chi Chan, "Applying Web-based instruction to food nutrition course," *International Conference on Computers in Education, 2002. Proceedings.*, Auckland, New Zealand, 2002, pp. 608-609 vol.1, doi: 10.1109/CIE.2002.1186018.
- [11] M. Tanaka, A. Kanda, T. Matsuo and T. Terashima, "An Improvement of Instructional Methods for Nutrition Education," *2010 IEEE/ACIS 9th International Conference on Computer and Information Science*, Yamagata, Japan, 2010, pp. 550-551, doi: 10.1109/ICIS.2010.137.
- [12] İ. Berkan Aydilek, "Approximate estimation of the nutritions of consumed food by deep learning," *2017 International Conference on Computer Science and Engineering (UBMK)*, Antalya, Turkey, 2017, pp. 160-164, doi: 10.1109/UBMK.2017.8093588.
- [13] H. Kalantarian, N. Alshurafa and M. Sarrafzadeh, "A Wearable Nutrition Monitoring System," *2014 11th International Conference on Wearable and Implantable Body Sensor Networks*, Zurich, Switzerland, 2014, pp. 75-80, doi: 10.1109/BSN.2014.26.
- [14] Nikolaou, C., Hankey, C. and Lean, M. (2014). Preventing weight gain with calorie-labeling. *Obesity*, 22(11), pp.2277-2283.
- [15] Bergen, D. and Yeh, M. (2006). Effects of Energy-Content Labels and Motivational Posters on Sales of Sugar-Sweetened Beverages: Stimulating Sales of Diet Drinks among Adults Study. *Journal of the American Dietetic Association*, 106(11), pp.1866-1869.