

## Study on the Awareness of Antioxidant Potential and Health Implications of Super Foods among Students of Applied Medical Sciences College

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### Abstract

**Background:** This study was conducted to investigate the knowledge in super foods among the students of six colleges in university of Hail, Saudi Arabia using questionnaire with 17 questions in terms of super foods and health. Students from 6 colleges (100 undergraduate students, females) participated in this study.

**Methods:** As the objective was to investigate the basic knowledge about the concepts of super foods, the questions were kept general and simple. The data was analyzed using descriptive like frequencies and mean  $\pm$  SD, ANOVA and Chi square. Analysis was considered as significant at 0.05 level.

**Results:** Data of the present study revealed that the different colleges had significant variations in the reported student's knowledge level about super foods. The knowledge level in each concept of super foods varied randomly among different departments. The mean age of the participants was  $21.06 \pm 1.03$ . On an average the students of college of Applied medical science gained statistically greater score as compared to the college of medicine students. Around 50% of the students have proper knowledge regarding the content and benefits of super foods.

**Conclusion:** As this survey was conducted only in selected colleges and the outcome is based on the self-reported level of super foods knowledge, it may not be a strict indicator on the actual level of knowledge; however, it may be used as a broader guideline. Further intensive studies in this area are needed across the country.

**Keywords:** *Super Foods; Consumption of Fresh Fruits and Vegetables; Health Status; College Students*

### Introduction

Researchers all over the world have been suggesting for many years that the world is facing a serious healthcare crisis because of the increasing numbers of overweight and obese individuals, and the rising costs for treating the diet-related diseases. Researchers contend that unless we change our sedentary lifestyles and obesity epidemic, the healthcare system will go devoid [1]. Researchers also conclude that the present population of adults aged 30 - 45 many not live as long as their parents because of the incidences of diet-related diseases in this age group compared to the previous generations. The Robert Wood Johnson Foundation and Trust for America's Health September 2012 Report: *F as in Fat: How Obesity Threatens America's Future* (2012) also suggests that if the obesity line continues, more than 50% of Americans will be obese by the year 2030, and the expenses for treating new cases of chronic diseases like diabetes, coronary heart disease, and stroke could increase by \$66 billion per year [2]. Accelerating obesity rates may also become a national security issue because the military now reports that 25 percent of 17-to-24-year olds are too overweight for military service. Also, the Department of Defense has estimated an expenditure of about \$1 billion per year for overweight and obesity related health problems [3].

Non-nutritious diets, being overweight, and lack of physical activity have been associated with chronic diseases such as heart disease, cancer, Type 2 diabetes, hypertension, and stroke. Regular consumption of fresh fruits and vegetables is frequently recommended as a healthy way to attain appropriate diets and to reduce risk of diseases. Fruits and vegetables are low in fat and calories and are excellent sources of vitamins and minerals. Therefore, the dietary guidelines recommend eating a wide variety and colors of fruits and vegetables daily to provide the body with valuable nutrients such as fiber, folate, potassium, and vitamins A and C. Irrespective of these recommendations, only a little population (23.1 percent) of the U.S. population consumes the recommended five or more servings of fruits and vegetables per day.

Currently there is not an official definition for Super foods, or functional foods as they are sometimes referred. However, the term usually refers to foods that provide additional health benefits beyond basic nutrition; they promote optimal health and/or reduce disease risk [4]. Generally they contain significant amounts of omega-3 fatty acids or monounsaturated fats, they are high in dietary fibre, rich in

vitamins and minerals and are a rich source of antioxidants. They also tend to be very low in unhealthy substances such as saturated fats, trans fats and refined sugars. Though there is no legal or medical definition, superfoods are nutrient powerhouses that pack large doses of antioxidants, polyphenols, vitamins, and minerals. Eating them may reduce the risk of chronic disease, and prolong life, and people who eat more of them are healthier and thinner than those who don't. Read about several foods that are considered super, what health benefits they offer, and how to fit them into your diet. The truth, said nutrition expert Penny Kris-Etherton, Ph.D., RD, is that many so-called "super" foods are good for your heart and your overall health when incorporated into a heart-healthy diet that's balanced in lean protein, whole grains, fruits, vegetables and low-fat milk and dairy products. This diet also should include nuts, seeds and legumes, fish and liquid vegetable oils.

There is now convincing research suggesting that diets rich in fruits and vegetables can reverse, treat, or prevent diseases, and can add almost a decade to one's life. Further, vegans and vegetarians are shown to have lower incidences of heart disease, cancer, cholesterol, stroke, emphysema, dementia, Type 2 diabetes, kidney failure, and respiratory infections than the general population [5]. The challenge then is to get more Americans to move away from animal focused diets and adopt plant-based diets. We concur with other researchers that universities are excellent settings to study eating habits and help young adults to make healthier food choices.

In Saudi Arabia, overweight and obesity rates have been increasing in all age groups including the college going among 18 - 24-year olds. Given that all of the participants of this study are enrolled in colleges, our study assesses the knowledge of these students regarding the consumption of super foods. The results will provide another opportunity to help students develop better eating habits.

## Methodology

The study's data were compiled from a sample of 100 university students from the college of medicine and applied medical. A questionnaire with 17 questions was designed and developed based on the super foods and was translated in Arabic for the ease of understanding. In the first section, there were four questions (1 - 4) to collect demographic information such as age, college, department, year in program. The second section (question 5 - 17), contained healthy diet components and it was divided into basic concepts about foods regarded as super foods. As the objective was to investigate the basic knowledge about the concepts of super foods, the questions were kept general and simple. The data was analyzed using descriptive like frequencies and mean  $\pm$  SD, ANOVA and Chi square. Analysis was considered as significant at 0.05 level.

## Results

Data of the present study revealed that the different colleges had significant variations in the reported student's knowledge level about super foods. The knowledge level in each concept of super foods varied randomly among different departments.

Based on our study, most of the students believed that there is a relationship between super food and health.

Table 1 shows that the mean age of the participants was  $21.06 \pm 1.03$  with a range of 5 years (19 - 21 years). Six departments of two different colleges with almost equal percentage were studied.

Variables		Percentages
Age	19	5
	20	24
	21	39
	22	24
	23	8
	Mean age	$21.06 \pm 1.03$
College	Medicine	48
	Applied Medicine	52
Department	Nutrition	20
	Clinical Labs	9
	Radiology	20
	Physiotherapy	10
	General Medicine	30
	Surgery	13

**Table 1:** Descriptive statistics of the population.

Table 2 shows the mean total scores according to the college. It was found from the results of table 2 that on an average the students of college of Applied medical science gained more score as compared to the college of medicine students. The P value was found to statistically significant for total scores.

College	Mean age	Mean total score
Medicine	21.35 ± 1.1	10.7 ± 2.2
Applied medical Sciences	20.8 ± 0.8	11.08 ± 2.2
Total	21.06 ± 1.03	10.9 ± 2.3
ANOVA	P = 0.420	0.004***

Table 2: ANOVA for mean total score according to the college.

Table 3 shows the mean of total score according to different colleges. Results from the table depicted that department of clinical nutrition students gained the highest score followed by department of physiotherapy students, clinical lab, and department of surgery. Students from radiology and general medicine department gained approximately equal and least scores. The difference among the scores of different colleges was found to be highly significant (P < 0.001).

Department	Mean age	Mean total score
Clinical Nutrition	21.0 ± 0.8	11.75 ± 1.5
Clinical laboratory	19.5 ± 0.5	11.24 ± 2.2
Radiology	20.8 ± 0.5	10.60 ± 2.5
Physiotherapy	20.5 ± 1.0	11.5 ± 1.7
General medicine	21.03 ± 1.1	10.62 ± 2.3
Surgery	21.23 ± 0.9	11.0 ± 2.2
ANOVA	0.815	0.000***

Table 3: ANOVA for mean total score according to the department.

Table 4 and 5 shows the responses of the students regarding various questions about super foods. The results shows that on an average around 50% of the students have proper knowledge regarding the content and benefits of super foods. Majority of the students believe that Super foods are miracle foods with super powers that can guarantee long life, cure chronic diseases and take many years off your age.

Questions	Responses	Percentage
1. What are super foods	Foods full of nutrients	44
	ADA approved foods	1
	Foods that fight cancer	4
	Organic foods	51
2. Foods become super foods when	They are natural and unprocessed	21
	Help you maintain your weight	3
	Help you fight disease	13
	All of the above	63
3. Scientists declare chocolate to be as healthy as fruit, a super food'. they talking about	Milk chocolate	5
	Nut chocolate	2
	Dark chocolate	80
	Hot chocolate drink	13
4. Blueberries are considered superfood because	Full of antioxidants and phytoflavonoids	41
	Full of potassium	1
	Full of Vitamin C	8
	All of the above	50
5. Which superfood in a diet may help you if you are watching your weight	Whole Grains	8
	Beans	10
	Fruits and Vegetables	5
	All of the above	77
6. Which leafy food has the most cancer fighting potential	Spinach	36
	Cabbage	17
	Basil	4
	All of the above	43

Table 4: Responses of students regarding super foods.

Questions	Responses	Percentage
1. Super foods are miracle foods that guarantee youthful and long life	True	78
	False	22
2. Superfoods are miracle foods with super powers that can guarantee long life, cure chronic diseases and take 20 years off your age.	True	70
	False	30
3. Most superfoods are fruits and vegetables.	True	84
	False	16
4. Since superfoods are ultra nutritious, you can eat as much as you want of them.	True	55
	False	45
5. Dark chocolate is a superfood high in heart-healthy polyphenols	True	88
	False	12
6. Oranges are superfoods that fight cancer and stave off heart disease	True	60
	False	40
7. Tomatoes are a superfood, but the lycopene found in the fruit has been shown to cause cancer	True	20
	False	80
8. Broccoli is a superfood that combats cataracts	True	73
	False	27
9. Since walnuts are high in calories and fat, they are bad for the heart and should be eaten sparingly.	True	30
	False	70

**Table 5:** Knowledge of students regarding super foods.

## Discussion

The present study objectives were to examine the knowledge of university students about the superfoods. The results of the study revealed that a majority of the study participants know that most super foods are fruits and vegetables. 88% of the students believe that Dark chocolate is a super food high in heart-healthy poly phenols. 60% of them also believe that oranges are super foods that fight cancer and stave off heart disease.

80% of the study group considered the statement as false that tomatoes are a super food, but the lycopene found in the fruit has been shown to cause cancer and also that Since walnuts are high in calories and fat, they are bad for the heart and should be eaten sparingly. Our data shows that around 50% of the students had good knowledge about the importance of higher consumption of fruits and vegetables. Students should get educated about the need for higher servings of fruits and vegetables in daily menu. In a similar study conducted with Norwegians population, it was reported that 86% of the people viewed that vegetables are important in a healthy diet [6].

The United States spends a tremendous amount of its resources treating diet and health related illnesses [7]. These expenditures are predicted to continue to rise astronomically in the future unless we change our eating habits and lifestyles. Children and young adults are the country's future; therefore, they must be encouraged to eat better by expanding their consumption of fresh fruits and vegetables [8]. Freston (2012) suggests that in the past, conflicts of interest on the U.S. dietary guidelines committee may have prevented the government from recommending a plant-based diet for Americans [9]. However, as the healthcare crisis deepens, obesity epidemic widens, and children's health declines, each of us may be forced to adopt some of the ideas advanced by Food Day regarding healthy, affordable and sustainable foods. In other words, plant-based diet may become the norm rather than the exception [10].

In general, men and women have different opinions in characterizing food in terms of health were documented [11]. For example, female students in Oklahoma State University differed significantly from male students with their concern of food labels, diet, health and nutrition, nutritional values, caloric content and appearance [12].

There are no standard criteria or approved list of super foods, said Kris-Etherton, also Distinguished Professor of Nutrition at The Pennsylvania State University in University Park, Penn [13].

"Eating 'super foods' won't hurt you. Most are very healthy," Kris-Etherton said. "As a registered dietician, I'd like to see people eat more of the super foods like whole grains, legumes, nuts and seeds, fish, fatty fish and all fruits and veggies".

Most myths about super foods are perpetuated by marketing efforts, said Kris-Etherton, which is why most nutrition experts prefer not to use the term.

"A lot of people have unrealistic expectations about these foods, thinking they'll be protected from chronic diseases and health problems," she said. "They may eat one or two of these nutrient-dense foods on top of a poor diet".

Eating too much of one type of food may prevent you from getting the nutrients you need, Kris-Etherton said. According to the U.S. Department of Agriculture, many people in the U.S. don't get enough of the potassium, dietary fiber, calcium and vitamin D found in fruits, vegetables, whole grains, milk and milk products. In addition to essential vitamins and nutrients, many fruits, vegetables, nuts and seeds provide phytochemicals - chemical compounds found in plants - that may help reduce the risk of atherosclerosis, the buildup of fatty deposits in artery walls. Research has shown that bioactive compounds in dark chocolate may have health benefits, but watch out for ingredients like sugar and fat that up the calories. "Don't eat so much dark chocolate that you overshoot your daily calorie goal and gain weight," said Kris-Etherton, who is also an American Heart Association volunteer [13-15].

The idea of foods having exceptional health benefits is an attractive one, and has surely fuelled the public interest in super foods. Indeed, the science in this area has demonstrated that certain components of foods and drinks may be particularly good for you. This is also reflected in the existence of approved health claims, for which the European Food Safety Authority has found the scientific evidence base to be sufficiently convincing [16]. At the same time, it is unrealistic to expect a narrow range of 'super foods' to significantly improve our well-being. When looking at the evidence behind super foods, we need to be realistic about how this translates into real diets.

Labeling some foods as 'super' in the media may also give the impression that other foods in our diets are not as healthy when, in reality, these foods often provide nutrients just as valuable as those found in super foods. Carrots, apples and onions, for example, are packed with health-promoting nutrients such as beta-carotene, fiber, and the flavonoids [17]. Wholegrain varieties of cereal-based starchy foods such as bread, rice and pasta are also high in dietary fibre. In adults, dietary fiber intake should be at least 25g per day [18]. These foods often have the added benefit of being cheap and readily available. This means we can easily consume them in large enough quantities and on a regular basis to get the most from their nutrient content. Given that most people in Europe are not eating enough fruit and vegetables to meet dietary recommendations, upping our daily intakes of a variety of fruits and vegetables will go a long way towards generally improving our well-being [19].

## Conclusion

When it comes to ensuring a balanced nutrient intake for good health, we need to increase the range of nutritious foods in our diets rather than focusing solely on a handful of foods claimed to be 'super'. Importantly, this should include a greater quantity and variety of fruits and vegetables. Many European countries provide food-based dietary guidelines to help people reach this goal [20].

In general, the university medical and applied medicine students in Hail, Saudi Arabia, had reasonable knowledge in different components of healthy diet regarding super foods. However, the dietary habit of these students is not measured in this study. The actual eating behavior must be studied in detail to get more information about consumption pattern of healthy diet in the form of fruits and vegetables. The knowledge level and eating behavior of overall population across the nation should be warranted to obtain more accurate information. The results presented in this paper are solely based on the self-reported survey from selected college students in Hail. Therefore these data may not be the representative information for the college student's healthy diet knowledge in Saudi Arabia.

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