

Original Article,

A Study of Fruit Consumption Patterns, Factors Influencing Consumption and Knowledge Regarding Its Health Benefits in Various Students of Maharashtra**Dr. S.A.Pratinidhi¹, Chaitanya Bhujbal^{2*}, Siddhi Bhalgat³ Mohak Tilokchandani⁴.**

1. Head of Department, Department of Biochemistry, Maharashtra Institute of Medical Education and Research Medical College, Talegaon (D)

2. Student, II/I M.B.B.S, Maharashtra Institute of Medical Education and Research Medical College, Talegaon (D)

3. Student, II/I M.B.B.S, Maharashtra Institute of Medical Education and Research Medical College, Talegaon (D)

4. Student, II/I M.B.B.S, Maharashtra Institute of Medical Education and Research Medical College, Talegaon (D)

Corresponding author: Chaitanya Rangnath Bhujbal

Mail id: chaitanyabhujbal18@gmail.com

Contact no: 8600238747

Accepted: 01 April 2020 | published: 02 April 2020

Abstract:

Introduction: Fruits are considered important in dietary guidance as they play key role in keeping every person fit and healthy. Fruits supply vitamins and minerals to the diet and also sources of phytochemicals that function as antioxidants, phytoestrogens and anti-inflammatory agents. They are rich in dietary fibers and potassium and help prevent constipation and cardiovascular diseases. Nutrient deficiency diseases like Scurvy and Anaemia can be prevented by adequate fruit consumption. Being rich in Calcium, they reduce the risk of osteoporosis. They also decrease the incidence of cancer, lipid disorders, obesity, respiratory disorders and problems of aging.

Objectives:

The study was carried to assess the pattern of fruit intake among the students and correlate various benefits of fruit consumption.

Methods: A cross-sectional study investigating fruit consumption among 331 students in Maharashtra. Validated questionnaire was given to assess pattern of fruit consumption. Data were analyzed using IBM SPSS software. Chi-square tests were used.

Results: The prevalence of fruit consumption was found to be 35.34% (n= 117). Of the 331 respondents, 21.75% (n= 72) consumed fruits for more than 3 days a week, 24.16% (n = 80) consumed less than 3 days a week and 40.48% (n = 134) took fruits occasionally. The concentration power, body mass index, prevention of flatulence was all found to be positively correlated to fruit consumption.

Conclusions: It is of paramount importance to promote fruit consumption among students and to increase awareness regarding health benefits of fruits. Detailed studies of factors that hinder fruit consumption are necessary

Key words: Fruit consumption, students

Introduction:

Fruit, normally means, the fleshy seed-bearing structures of a flowering plant that are sweet or sour, and edible in the raw state, such as apples, grapes, lemons, oranges. And formed from the ovary after flowering. On the other hand, in botanical usage, "fruit" includes many structures that are not commonly called "fruits", such as bean pods, corn kernels, tomatoes, and wheat grains. (1,2) Vegetables such as Green bean, Eggplant, Bell pepper, Cucumber, Okra, Pumpkin, Squash, Tomato and Zucchini used in culinary parlance are botanical fruits. (3) Olive fruit is pressed for olive oil. Spices like allspice, black pepper, paprika, and vanilla are derived from berries. (4)

Nutrients and health benefits:

- Fresh fruits are generally high in water. (5)
- Fruits supply vitamins and minerals to the diet and are sources of phytochemicals that function as antioxidants, phytoestrogens and anti-inflammatory agents through other protective mechanisms.
- Bananas, Prunes and prune juice, dried peaches and apricots, cantaloupes, honeydew melon, orange juice are rich in potassium and their consumption helps in maintaining healthy blood pressure. (9)
- Fruits are considered in dietary guidance because of their high concentrations of dietary fiber as they help reduce blood cholesterol levels and lower risk of heart disease. (5) They are also important for proper bowel function and contribute significantly to reduce constipation and diverticulosis. Fruits provide a feeling of fullness with fewer calories thereby lowering calorie intake.
- Nutrient deficiency disorders like Scurvy can be prevented by consumption of Vitamin C rich fruits because Vitamin C is important for growth and repair of all body tissues, helps heal cuts and wounds, and keeps teeth and gums healthy.
- Disorders such as anemia and others such as neural tube defects, spina bifida and anencephaly during foetal development due to folate deficiency requiring supplements can be easily prevented by consumption of fruits adequately because fruits are rich in folate.

- Various reviews have associated that sufficient intake of fruits have been related epidemiologically with reduced risk of many non-communicable diseases such as cancers, cardiovascular diseases, blood pressure, hypercholesterolemia (reduce oxidative damage and cause increase in LDL oxidation resistance), osteoporosis (rich in Calcium and Vitamins), chronic obstructive pulmonary diseases, respiratory problems as well as mental health.
- Berries, Grapes and Pomegranates containing high amount of anthocyanins, flavonols and procyanidins are effective in decreasing cardiovascular incidences whereas citrus fruits and apples help maintaining Blood pressure and Blood lipid levels. (6)
- Gooseberry is known to be protective against lens damage occurring due to hyperglycemia. (6)
- By suppressing growth of adipose tissue fruits help tackle the problem of obesity. (6)
- Fruit consumption on regular basis is associated with reduced risk of several diseases and functional declines associated with aging. (7,8)

Materials and Methods:

Study design:

A cross sectional study was conducted among various students in Maharashtra, India from different streams of education including commerce, science and arts. Informed and Written consent was obtained from the students who volunteered to participate in the study by using google forms. Confidentiality of the obtained information was maintained throughout the conduct of the study.

The sample size calculated using the Krejcie and Morgan's formula for a population of 331, the population proportion of 0.5, at a confidence level of 95% with an estimation error of 0.05 was 178.

Study Instrument:

We used a self-administered questionnaire comprising three sections. The questionnaire was circulated online using Google forms to ensure the

completeness of the information. Section 1 included information on socio demographic variables such as age, gender, ethnicity, and year of study, parents' level of education, monthly household income, and living arrangement. Information about height, weight was obtained and on that basis BMI was calculated. Information regarding allergies, health issues was obtained. Section 2 comprised information with relation to fruit consumption habit. Problems such as flatulence, heart burning (acidity), constipation were also accessed. Section 3 was based on Counselling, how likely were they to include whole grains in their diet.

Statistical Analysis:

The BMI was calculated as weight in kilogram divided by height in square metres (kg/m^2). Based on World Health Organization (WHO), BMI standards for Asian population, a BMI of less than 18.5 kg/m^2 was considered as underweight, 18.5 22.9 kg/m^2 as the normal range, 23.00 - 27.4 kg/m^2 as pre obese, 27.5 kg/m^2 or more as obese. Data was assessed using the Chi Square Test.

Operational Definition:

Fruit consumers: Respondents eating fruit for either more than 3 days a week or everyday.

Results:

Socio-demographic characteristics:

All of the 331 respondents were the students in the age group of 17-24 years with 62.3% ($n=207$) females and 37.6% ($n=125$) males. All Students were native of Maharashtra state, of which majority were from Rest of Maharashtra 78.9% ($n=262$), followed by Marathwada region 12.04% ($n=40$) and Vidharbha region 9.03% ($n=30$). 76.51% ($n=254$) students were of medical field, 12.65% ($n=42$) students of engineering and remaining 10.84% ($n=36$) students were of other fields. About 30.4% ($n=101$) of the participants mothers and 38.9% ($n=129$) of the participants father had attained post-graduate education. 49.7% ($n=165$) participants reported that their monthly household income was above ₹100,000 (INR) 29.2% ($n=97$) reported it as ₹50,000-100,000 (INR). Of all respondents 52.4% ($n=154$) were hostelites, 34.00% ($n=113$) were Day scholar and

remaining 13.6% ($n=45$) were paying guests/living in flats.

Fruit Consumption:

The prevalence of fruit consumption was found to be 35.34% ($n=117$). Of these about 13.59% ($n=45$) consumed fruits everyday, 21.75% ($n=72$) ate fruits for more than 3 days a week while 24.16% ($n=80$) were found to eat fruits at a frequency of less than 3 days a week and 40.48% ($n=134$) ate fruits only occasionally.

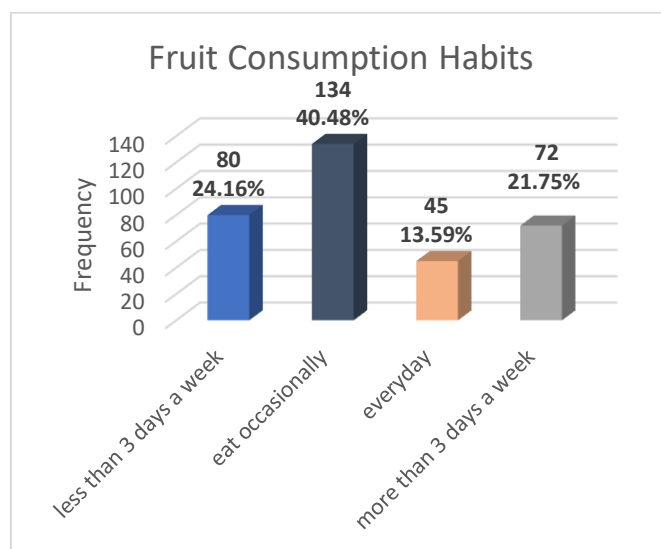


Figure 1- Fruit Consumption Habits In students

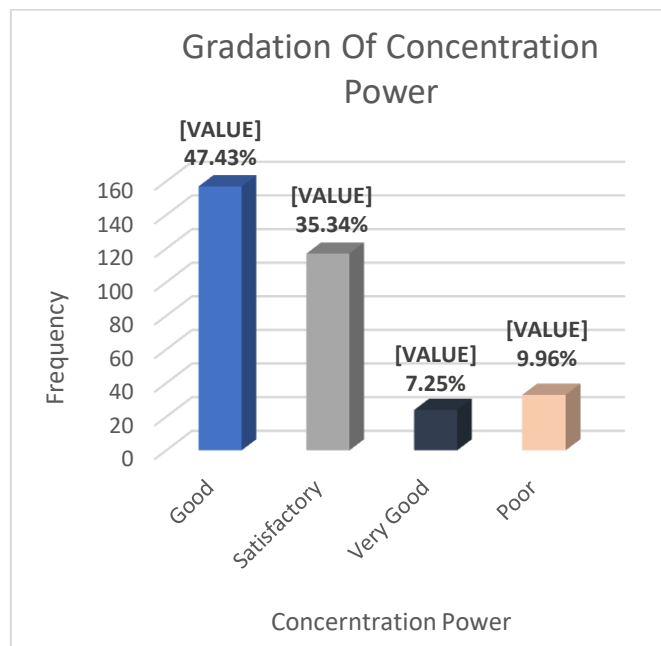


Figure 2 – Gradation of Concentration Power in Academics ($n=331$)

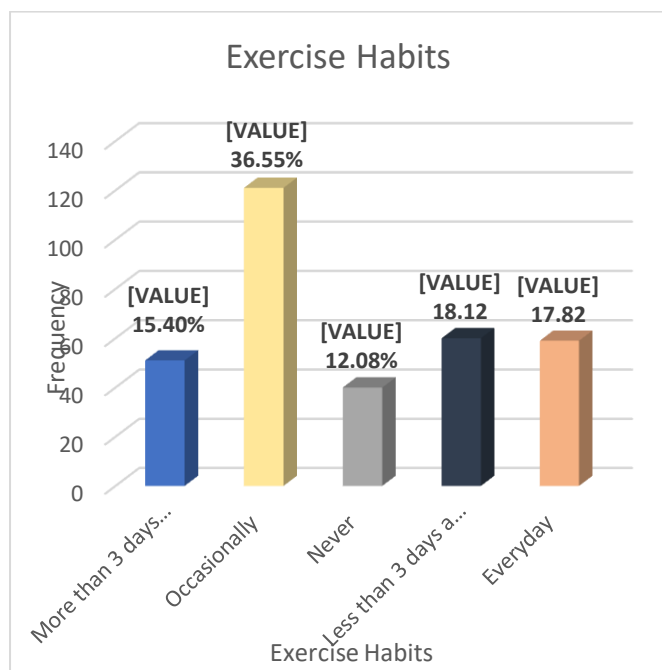


Figure 3- Exercise Habits in Students (n=331)

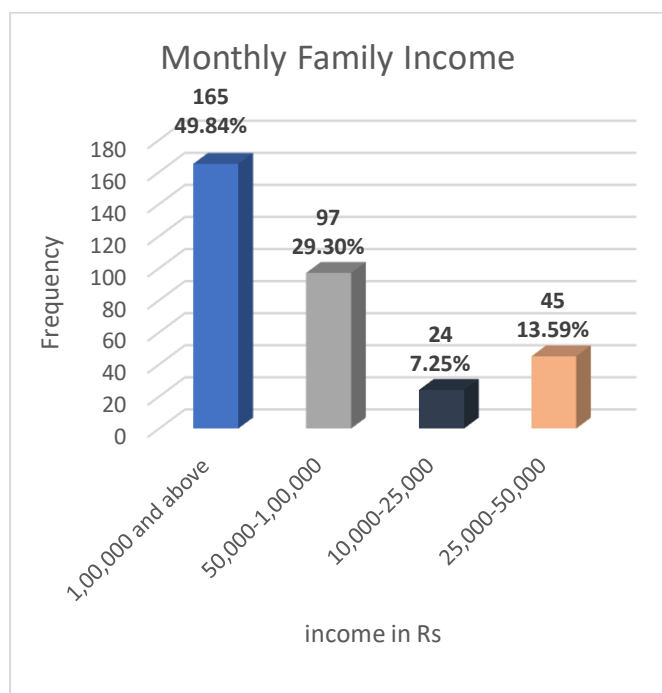


Figure 4 - Monthly Family Income of the Respondents (n=331)

Discussion:

Socioeconomic Determinants:

Living arrangements: An individual's eating habits, other than being influenced by the family which plays a very significant role in shaping the diet are also affected by the individual's peers [9]. The present study also revealed that the living

arrangements of an individual (Hostellite, Day scholar, Flat/paying guest) played a significant role in determining the fruit consumption habits of the respondents. ($p < 0.05$)

Economic determinants: An Australian study found that lower-income adults consumed a smaller variety of fruits than their higher-income counterparts which is in contradiction to the results of the current study wherein it was found that the economic status of the family, being estimated by monthly household income, was not significantly related to fruit consumption [10]

Physical determinants:

Education- Parental/Self: A study conducted among junior students in Hangzhou showed that education was positively correlated to fruit and vegetable intake [11]. Kearney et al. proved that the dietary pattern in adulthood is influenced by level of education [12]. The present study found that self-education significantly impacted fruit consumption in a positive manner. Individuals in fields related to healthcare and nutrition were found to consume more fruits ($p < 0.05$)

Association between concentration power and fruit consumption: Many fruits like blueberries among others, have been found to help in increasing the concentration power and attention span. [13] These findings are well supported by the current study wherein concentration was positively correlated with fruit consumption ($p < 0.05$). Very good concentration power being found to be less prevalent could be attributed to occasional fruit consumption being common.

Association between BMI and fruit consumption: A possible association between fruit consumption and body mass index was noted in the present study. A study conducted by Eunah Ham and Hyun-Jin Kim also showed that there was a significant association between the said parameters thereby giving results which are in concert with the present study. [15]

Conclusions: The study showed that a majority of the students did not consume fruits regularly and occasional consumption is more prevalent in Maharashtra student population. Fruit consumption being influenced majorly by the social setting in which the individual lived and the

level of education of the respondent was found to be significantly associated with the individual's concentration power, body mass index. Fruit consumption was found to be helpful in decreasing problems like flatulence. The need of formulating interventions to increase awareness about health benefits of fruits and promoting fruit consumption is imperative

References:

- Schlegel, Rolf H J (2003). Encyclopedic Dictionary of Plant Breeding and Related Subjects. Haworth Press. p. 177. ISBN 978-1-56022-950-6.
- Mauseth, James D. (2003). Botany: An Introduction to Plant Biology. Jones and Bartlett. pp. 271–72. ISBN 978-0-7637-2134-3.
- McGee (2004). On Food and Cooking. Chapter 6: A Survey of Common Vegetables. ISBN 978-0-684-80001-1.
- Farrell, Kenneth T. (1999). Spices, Condiments and Seasonings. Springer. pp. 17–19. ISBN 978-0-8342-1337-1.
- HulmeHulme, A.C (editor) (1970). "The Biochemistry of Fruits and their Products". 1. London & New York: Academic Press.
- PEM Dhandevi, Rajesh Jeewon :Fruit and vegetable intake: benefits and progress of nutrition education interventions-narrative review article Iranian journal of public health 44 (10), 1309, 2015
- Lim, Stephen S.; Vos, Theo; Flaxman, Abraham D.; Danaei, Goodarz; Shibuya, Kenji; Adair-Rohani, Heather; Amann, Markus; Anderson, H. Ross; Andrews, Kathryn G. (2012-12-15). "A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010". *Lancet*. 380 (9859): 2224–60. Doi: 10.1016/S0140-6736(12)61766-8. ISSN 1474 547X. PMC 4156511. PMID 23245609.
- Wang X, Ouyang Y, Liu J, Zhu M, Zhao G, Bao W, Hu FB (2014). "Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective cohort studies". *BMJ*. 349 (Jul 29):g4490. Doi:10.1136/bmj.g4490. PMC 411 5152. PMID 25073782.
- Lappalainen R, Saba A, Holm L, Mykkanen H, Gibney MJ, Moles A. Difficulties in trying to eat healthier: Descriptive analysis of perceived barriers for healthy eating. *Eur J Nutr* 1997;51 Suppl2: S36-40
- Giskes K, Turrell G, Patterson C, Newman B. Socio-economic differences in fruit and vegetable consumption among Australian adolescents and adults. *Public Health Nutr*. 2002;5(5):663–669. doi:10.1079/PHN2002339
- Ren YJ, Liu QM, Cao CJ, Lü J, Li LM. *Zhonghua Liu Xing Bing Xue Za Zhi*. 2013; 34(3):236–240.
- J Am Diet Assoc*. 2010 Oct; 110(10):1461-8 doi:10.1016/j.jada.2010.07.012 Whole grain consumption is associated with diet quality and nutrient intake in adults: the National Health and Nutrition Examination Survey, 1999-2004. O'Neil CE, Nicklas TA, Zhanovec M, Chi S
- Chris Bailey 9 brain foods that will improve your focus and concentration June 6, 2013
- Eunah Ham and Hyun-Jin Kim Evaluation of Fruit Intake and its Relation to Body Mass Index of Adolescents 2014 Jul; 3(2): 126–133.