International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

Impact of Nutritional Knowledge on Fruit and Vegetable Consumption of Young Collegiate Women (18-22 Years)

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Received: 24/06/2016 *Revised: 18/07/2016* *Accepted: 18/07/2016*

ABSTRACT

A diet deficient in fruit and vegetable is responsible for development of various diet related non-communicable diseases. This study assessed the fruit and vegetable consumption (FVC) among young collegiate women (18-22 years) and the impact of nutritional knowledge on FVC. A cross-sectional study was undertaken. Dietary assessment was done through 24-hour dietary recall and food frequency questionnaire (FFQ). The impact of nutritional knowledge was assessed through a scoring questionnaire on of knowledge and practice (KP). The study was done on collegiate women (n=200) from two different colleges of University of Delhi. Participants were selected using purposive sampling technique having Home science (HS; n=100) and non- Home science background (NHS; n=100). The mean FVC of the participants was 245.58 g/d. The intake of roots and tubers, green leafy vegetables (GLVs), other vegetables and fruits was 89.51g/d, 13.20g/d, 48.71g/d and 94.16g/d, respectively. The FVC of students with HS was significantly higher than students of NHS background (p<0.05). Information from FFQ revealed that roots and tubers were consumed more frequently whereas GLVs, beans and gourds were consumed 2-3 times or once a week. The KP of the two groups were also found to be significantly different (p<0.001). FVC was found to be insufficient. Improving nutritional knowledge may help in improving the intake.

Keywords: Fruit and vegetable; consumption pattern; nutritional knowledge; collegiate women.

INTRODUCTION

Optimal nutrition is a necessity for good health. Hence, consumption of a balanced diet which consists of various food groups and provides all the required nutrients is important. Fruits and vegetables are an important component of the balanced diet. Poor diet especially the one deficient in fruits and vegetables is one of the major epidemiological factors in development of these morbidities. Low consumption of fruits and vegetables was ranked as the fourth and seventh cause, respectively, of increasing disability-adjusted life years (DALYs) with 30% and 12% of deaths attributable to a low intake of fruits & vegetables respectively in Global Burden of Disease Study, 2010. [1] Eating sufficient amounts of fruits and vegetables can help in preventing these diet related health disorders. A survey on Diet and Nutritional Status of Rural Population [2] showed inadequate intake of fruits and vegetables among non-pregnant non-lactating sedentary females of ≥18 years of age. Similar results were also obtained by another survey on Diet and Nutritional Status of Population and Prevalence of Hypertension among Adults in Rural Areas. [3]

Young adulthood is a period when there is increased independence in terms of

decision-making and formation of health and lifestyle behaviors. Maintaining good physical and mental health in early adulthood has a large impact on life. Therefore, inculcating good dietary habits at this time may have a long and more sustainable impact on health over lifetime. [4] Nutritional knowledge is also one of the determinants of dietary intake. Several studies over decades have tried to assess the impact of knowledge regarding a healthy and balanced diet and dietary habits of college students pursuing nutritional and non-nutritional courses. Hence, this study targeted young collegiate women with both Home science (HS) and non-Home science (NHS) background.

MATERIALS AND METHODS

***Research design*:** A cross-sectional study was undertaken using a combination of qualitative and quantitative methods (Figure-1).

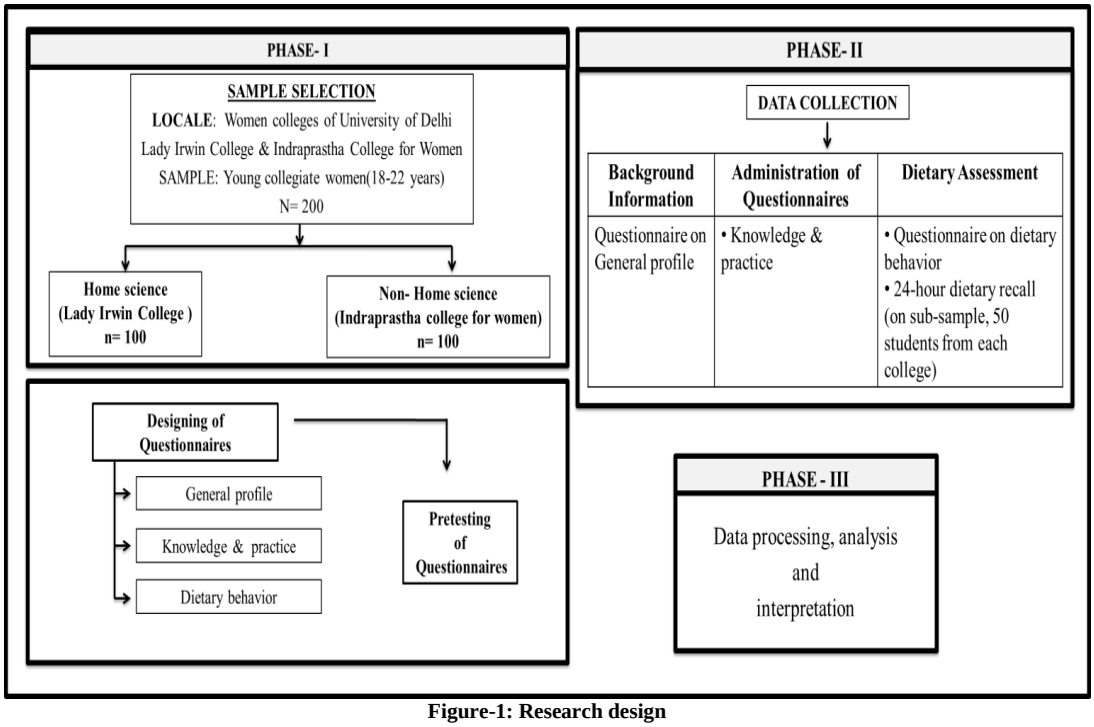

Figure-1: Research design

***Locale*:** The present study was conducted on young collegiate women (18-22 years) of two colleges of University of Delhi, Lady Irwin College (LIC; HS) and Indraprastha College for Women (IPCW; NHS), selected purposively.

***Sample selection*:** In both the colleges, information sheet having the details of this study was provided to the students. Students who agreed to participate were then enrolled in the study after taking their consent. Purposive sampling technique was used. The sample of this study consisted of 200 collegiate women who were pursuing humanities, commerce and science course. Equal numbers of samples were taken from both colleges: IPCW (n=100) and LIC (n=100). From IPCW, students who have studied HS were excluded.

Ethical clearance: This study was initiated after thorough review and obtaining clearance from Ethical review committee of Lady Irwin College, University of Delhi.

Period of investigation: The data was collected between October 2014 and February 2015.

***Tools and techniques*:** The questionnaires were developed to elicit information regarding the background information, dietary behavior and knowledge and practice related to fruits and vegetable consumption of the subjects. Dietary assessment was done through 24-hour dietary recall (24HR) (n= 100) and a short

food frequency questionnaire (FFQ) (n=200) which was focused on various categories of fruits and vegetables. The questionnaire on knowledge and practice (KP) included questions regarding balanced diet, sources, functions and deficiency of nutrients, habits related to intake of fruits and vegetables and cooking practices. The scoring was done on the basis of correctness of answers. All the tools were pretested and suitably modified before administration.

Statistical analysis

All data was analyzed using SPSS software version 22. Qualitative data was analyzed using frequencies and percentages & quantitative data using mean, median and standard deviation.

Comparison of fruit and vegetable intake and knowledge and practice scores was done using Independent *t*-test. ANOVA was used to see the effect of KP scores on fruit and vegetable consumption (FVC).

RESULTS

General profile: Most of the students were 20 years of age (29%). About 83% were day scholars and 17% lived in hostel and rented rooms. It was observed that majority of the students belonged to nuclear family (70%) and 60% of the families had a monthly income of greater than Rs.45, 000. There were more non-vegetarian students (44%) and a small percentage was ovo-vegetarian (14.5%).

Fruit and vegetable consumption: The information on dietary intake was collected through 24-hour dietary recall done for two days (working and non-working day). The FVC of the participants was compared with the Dietary Guidelines for Indians [5] recommendations (g/d) for sedentary adult female. The mean consumption for fruits and vegetables was 245.58 g/d. There was no significant difference in the vegetable consumption of IPCW and LIC. However, the fruit consumption of LIC students was significantly higher than students of IPCW (p<0.01).The mean intake of fruits and vegetables of the participants was also compared with the WHO recommendation i.e. a minimum 400g of fruits and vegetables per day (excluding potatoes and other starchy tubers). [6] There was a significant difference between the FVC of IPCW and LIC as per the WHO criteria (p<0.05)**.** However, both the colleges did not meet the WHO recommendation (table 1 and 2).

Table 1: Total consumption of Fruits and Vegetables

Food group	Consumption (g/d)								
	IPCW			LIC			TOTAL		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
FVs	225.20	91.79	90-412.82	265.96	117.25	65-525.0	245.58	106.74	65-525.0
FVs (excluding potatoes and other starchy tubers)	134.85*	70.96	45-312.5	177.29 *	104.20	15-425.0	156.07	91.22	15-425.0

FVs, Fruits and vegetables; g/d, gram/day; SD, standard deviation; IPCW, Indraprastha college for women; LIC, lady Irwin College; *mean values are significantly different (p<0.05)

Table 2: Food group intake of the participants

Food group	Recommendations[5] (g/d)	Consumption (g/d)								
		IPCW			LIC			TOTAL		
		Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
RT	200	90.35	41.86	17.5-182.5	88.67	41.53	5-191.0	89.51	41.49	5-191.0
GLVs	100	10.15	17.79	0-75.0	16.25	26.14	0-135.0	13.20	22.46	0-135.0
OV	200	55.02	39.78	0-192.5	42.40	43.25	0-185.0	48.71	41.83	0-192.50
Fruits	100	69.68**	55.59	0-217.5	118.64**	90.35	0-395.0	94.16	78.59	0-395.0

RT, roots and tubers; GLVs, green leafy vegetables; OV, other vegetables; g/d, gram/day; SD, standard deviation; IPCW, Indraprastha college for women; LIC, lady Irwin College; **mean values are significantly different (p<0.01)

***Food frequency questionnaire*:** The FFQ assessed the regularity with which the participants consumed the different categories and forms of fruits and vegetables. Information from FFQ revealed that the most frequently consumed vegetables were roots and tubers. Other categories of vegetables like green leafy vegetables (GLVs), beans and gourds were consumed 2-3 times or once a week. Only a

few participants consumed fruits and vegetables rich in vitamin A, vitamin C and phytochemical daily. However the weekly consumption was better. In all these three groups the frequency of consumption is better in participants of LIC than of IPCW. The consumption of sugary fruits (e.g. grapes, litchi, banana, and sapota) was similar in both the colleges. Consumption of processed fruits and vegetables was rare except for tomato sauce/ketchup.

***Meal pattern*:** The information regarding the meal pattern and its quality from the 24-HR revealed that most of the participants were consuming only milk with some cereal like biscuits, cornflakes, rice flakes, bread etc. Consumption of fruits and vegetables in the breakfast was seen in very few participants. The most commonly consumed vegetable preparation was potato in combination with other vegetables like beans, carrot, lady finger and cauliflower. Apple, banana and orange were the commonly consumed fruits. Most commonly eaten food in the main meals was a cereal- pulse combination. The commonly eaten pulses were red gram, green gram, bengal gram and kidney bean. In the packed lunch most of them carried cereal with vegetable preparation but it was often replaced by the canteen food. At tea-time consumption was more of energy dense foods like *namkeen* (salted fried snack), biscuit, pasta and noodles. A positive habit of consuming fruit *chaat* (salad) in the mid-morning and tea-time was observed in very few participants mostly from LIC. Consumption of salads (cucumber, beetroot, onion, and radish) and green chutneys was also more prominent in participants from LIC. In most of them if one meal was nutritionally substantial, the other was not. Some participants were having only fruit juices and no whole fruits which indicated the replacement of whole fruit with fruit juices now-a-days.

***Knowledge and practice*:** To study the impact of nutritional knowledge upon the dietary habits of college students pursuing nutritional and non-nutritional courses, assessment of the KP of the participants was undertaken. This assessment was done by administering a scoring questionnaire that focused on fruits and vegetables. The KP scores of participants from LIC was significantly higher than of IPCW (p<0.001) (table 3).

Table 3: Independent t-test for the knowledge and practice scores

	IPCW		LIC		
	Mean	**SD**	**Mean**	**SD**	***t*-test**
Knowledge and practice scores	19.26***	3.88	22.72***	3.41	-6.691
Knowledge scores	10.67***	2.74	12.84***	2.52	-5.830
Practice scores	8.59***	1.87	10.11***	2.55	-4.799

SD, standard deviation; IPCW, Indraprastha college for women; LIC, lady Irwin College; ***mean values are significantly different (p<0.001)

Table 4: Knowledge and practice scores of the participants

Scores	**Category**	**Number of students**	
		Knowledge scores	**Knowledge-practice scores**
0 - <50%	Poor	1	1
50- <75%	Average	21	49
≥ 75%	Good	78	50
	Total	**100**	**100**

Impact of having good nutritional knowledge on FVC was analyzed by categorizing the scores (table-4). The similar classification was used to analyze the knowledge, attitude and practice scores of adolescent girls. [7]

On the basis of only the knowledge scores, there was no significant difference between the fruit and vegetable consumption of the participants (p=0.073). However, when both the KP scores were used as the basis, there was a statistically significant difference in the fruit consumption of the participants (p<0.05)**.** This shows that knowledge alone is not affecting the consumption but is beneficial

only when the knowledge is translated into practice.

DISCUSSIONS

The FVC of this group was found to be inadequate. In another study [8] on undergraduate college students (20-26 year old) the mean FVC was also found to be insufficient (267.75 g/d), similar to the consumption pattern of this group. In the same way, the FVC of medical students was also studied. [9,10] Here also students were not meeting the recommended intake. The mean FVC in female medical students was 232.42g/d. The most commonly consumed vegetables were roots and tubers and the least consumed vegetables were GLVs especially amaranth, fenugreek and gourds like bottlegourd and bittergourd. Most of the vegetables were consumed 2-3 times a week or once a week. The most commonly consumed fruits were banana, apple and mango. Analogous consumption pattern was seen in this group also.The current study also supported the probable influnce of nutritional knowledge on FVC. A study [11] done on female dietetics major, home economics and social science students showed that dietetic major students had higher scores on positive eating habits than students of other courses. Similar results were also obtained from a study [12] on students from nutritional and non-nutritional courses and it was established that the eating habits and food choices became healthier with increasing nutritional knowledge. Hence, it can be concluded that nutritional knowledge has impact on the dietary practices.

CONCLUSIONS

In this age group the FVC of the participants is low; especially the vegetable consumption. Better intake, variety and practices were seen in students with nutritional background. Improving nutritional knowledge may help in improving the intake. The study has been able to reiterate some of the findings of other researchers. Further research is required to identify the factors limiting the FVC of young adults.

ACKNOWLEDGEMENT

We would like to acknowledge the Department of Food and Nutrition, Lady Irwin College, University of Delhi. We extend our sincere thanks to Indraprastha College for Women and Lady Irwin College for giving permission to conduct this research in respective colleges.

Financial Support

This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

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How to cite this article: Sharma V, Thomas S, Shrivastav M. Impact of nutritional knowledge on fruit and vegetable consumption of young collegiate women (18-22 years). Int J Health Sci Res. 2016; 6(8):311-316.

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