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**Krystel Godfrey Quadros**  
Student of MSc. Clinical  
Nutrition and Dietetics (Part II).  
Dr. B.M.N. College of Home  
Science, Rafi Ahmed Kidwai  
Road, Matunga, Mumbai,  
Maharashtra, India

**Dr. Rekha Battalwar**  
Associate Professor, Food  
Nutrition Department, Sir  
Vithaldas Thackersey College of  
Home Science (Autonomous),  
SNDT Women's University,  
Juhu Tara Road, Mumbai,  
Maharashtra, India

### Assessment of student awareness and effectiveness of planned teaching programme regarding adulteration of food

**Krystel Godfrey Quadros and Dr. Rekha Battalwar**

#### Abstract

**Introduction:** Food adulteration is the addition or removal of any substances to or from food, so that the natural composition and quality is affected. Adulterated food is impure, unsafe and not wholesome. Food can be adulterated intentionally and accidentally. Unintentional adulteration is a result of ignorance or the lack of facilities to maintain food quality. This may be caused by spill over effect from pesticides and fertilisers. Inappropriate food handling and packaging methods can also result in adulteration.

**Aim:** To assess student awareness and effectiveness of planned teaching programme regarding food adulteration.

**Methodology:** A comparative study was conducted between school and college students to assess the awareness and effectiveness of planned teaching programme regarding adulteration of food. The study was carried out with a total sample size of 100 participants in Mumbai city of which 50% were school students and the rest were college students. One group pre-test and post test design was used where the collection of data through self-administered questionnaire consisting of open and close ended questions was administered to students before conducting the nutrition educational programme. A session on food adulteration was undertaken. Food adulteration standardized tests as well as home-kit was developed and demonstrated to the students to detect food adulteration. A post questionnaire was administered to the students at the end of the programme to study the effectiveness of the Nutrition Education Programme. Data analysis was done using statistical package of social sciences (SPSS, version 16). ( $P < 0.001$ ) was considered to be statistically significant & Chisquare test was used to analyse the representation of cases.

**Results:** Post the Nutrition Education Programme, 18% seemed to have very good knowledge, 48% had good knowledge and 34% of school students had poor knowledge about the basics of food adulteration, whereas in case of the college students 52% seemed to have very good knowledge, 24% had good knowledge and 24% had poor knowledge. ( $p < 0.001$ )

It was observed that after the post awareness programme, 26% of school children had very good knowledge, 24% had good knowledge and 50% had poor knowledge regarding the health hazards associated with food adulteration whereas 58% of college children had very good knowledge, 34% had good knowledge and 50% had poor knowledge regarding the health hazards associated with food adulteration ( $p < 0.001$ ).

**Conclusion:** There is a significant association between the pre test awareness knowledge score and post test knowledge score among the students on food adulteration.

**Keywords:** food adulteration, nutrition education programme, home-kit, knowledge, awareness

#### Introduction

Food adulteration is the addition or removal of any substances to or from food, so that the natural composition and quality is affected. Adulterated food is impure, unsafe and not wholesome. (Aamna *et al.* 2016) [1]. Inappropriate food handling and packaging methods can also result in adulteration (Sudershan R, 2013) [11]. Intentional food adulteration is usually done for financial gain, whereas natural adulteration occurs due to the presence of certain chemicals, organic compounds or radicals naturally occurring in foods which are injurious to health and are not added to the foods intentionally or unintentionally (Zarina S, 2010). In spite of strict measures against adulteration, it is still practiced just for profit putting human lives in danger (Singh N, 2012) [9]. Where the quantity of the commodity gets reduced through addition of non-permitted foreign matter and/or removal of vital elements, and the process is defined as adulteration. (Arvind Gupta, 2006). Adulteration consists of a large number of practices e.g.

#### Correspondence

**Krystel Godfrey Quadros**  
Student of MSc. Clinical  
Nutrition and Dietetics (part II).  
Dr. B.M.N. College of Home  
Science, Rafi Ahmed Kidwai  
Road, Matunga, Mumbai,  
Maharashtra, India

Mixing, substitution, concealing the quantity, putting up decomposed foods for sale, misbranding or giving false labels and addition of toxicants (Park *et al.*, 2007). Some of the common adulteration practices are - ergot is mixed in cereals, chalk powder in flour, chicory and tamarind seed powder is mixed in coffee powder, papaya seeds in pepper, brick-powder is added to chilli powder, metanil yellow is added in turmeric for bright color and wood powder to dhaniya powder, etc (Lakshmi V, 2012) [6]. Adverse health effects of adulterants range from acute symptoms such as vomiting, abdominal pain, allergy, asthma, and headache and to even mental retardation, cardiac arrest and cancer (Alauddin, 2012). Any person whether by himself or any other person manufactures a food article with the knowledge of selling it to the consumer, sells unsafe food which can injure the person or lead to the death of the person shall be liable to pay the fine

which may exceed to ten lakh rupees and may be imprisonment for not less than seven years (Subba R, 2013) [10].

### Methodology

A cross sectional sample of total 100 male and female students of were selected. Purposive sampling technique was used. The target group for the study was children between 13-16 years & 16-18 years of both the sexes. The survey information was gathered using a questionnaire.

### Results and Discussion

The general information was assessed which included total no of persons in the family, level of education of mother, level of education of father, type of family, monthly income.

The data collected showed the following results:

**Table 1:** General information

Variables	Categories	School (Percentage)	College (Percentage)	Chisquare	p value
Total no of persons in the family	1-4 members	46%	30%	38.48	0.000**
	5-8 members	48%	60%		
	>8 members	6%	10%		
Level of education of mother	Illiterate	26%	8%	51.30	0.000**
	Primary	60%	28%		
	Secondary	8%	44%		
	Graduation	6%	16%		
Level of education of father	Illiterate	8%	0%	54.30	0.000**
	Primary	54%	14%		
	Secondary	16%	46%		
	Graduation	12%	38%		
	Others	10%	2%		
Monthly Income	Upto 25000	96%	54%	191.20	0.000**
	50000-75000	4%	14%		

\*( $p \leq 0.05$ ) findings considered to be significant and \*\*( $p \leq 0.01$ ) findings considered to be highly significant.

Table 1 presents the general information of the households of the students. Majority of the school students were from families which consisted of 5 to 8 members, whereas majority of the households of the college students consisted of 5 to 8 members ( $p < 0.001$ ). The data collected from the school students, it was observed that majority of parents completed their primary education whereas for the college students, majority of the parents completed their secondary education ( $p < 0.001$ ). 14% of the monthly income of the parents of the college students ranged between Rs 50000 to Rs 75000 whereas only 4% of the income of the parents of the school students ranged between Rs. 50000 to Rs.75000 due to the

low socio-economic status of the households of the school students ( $p < 0.001$ ). A study on impact analysis of knowledge and practice for food safety revealed that there was an association between knowledge on food adulteration and educational status. Education was interlinked with good awareness of food adulteration. To create awareness regarding food adulterants, group demonstration was conducted for the home makers regarding detection of food adulterants in selected food items i.e. pulses, red chili powder salt, milk, honey, asafetida, oil, ghee, black pepper, tea, sugar using standardized techniques (Vidya S *et al.*, 2015) [12].

**Table 2:** Consumer Awareness Information

Variables	Categories	School (Percentage)	College (Percentage)	Chisquare	p value
Checking the expiry date of items	Yes	38%	96%	11.56	0.000*
	No	62%	4%		
Checking of MRP of items	Yes	34%	96%	0.36	0.000*
	No	66%	4%		
Charges more than the MRP	Yes	56%	38%	12.96	0.000*
	No	44%	62%		
Checking of the weight of the products	Yes	14%	50%	0.16	0.000*
	No	86%	50%		
	No	30%	26%		
Exposure to adulterated items	Yes	58%	44%	519.06	0.15
	No	42%	56%		
Awareness of rights as a consumer	Yes	6%	82%	1.440	0.000**
	No	94%	18%		
Need to join consumer clubs	Yes	4%	50%	42.32	0.78
	No	96%	50%		
Awareness of consumer courts for redressal of grievances	Yes	0%	74%	12.960	0.000**
	No	100%	26%		

Table 2 presents the consumer awareness information. It was found that majority of the school students as compared to the college students did not check the expiry date and MRP before purchasing any food items. This could also be a significant reason for contacting various diseases ( $p < 0.001$ ). Majority of the school students felt that they were being charged more than the MRP, whereas the college students did not feel so as they checked the food-label before purchase. ( $p < 0.001$ ) Around 58% of the school students came across adulterated items but majority did not complain regarding it as compared to college students ( $p < 0.001$ ). Around 94% of

the school students were least aware of their rights as compared to 18% of the college students ( $p < 0.001$ ). The Buying Practices and Prevalence of Adulteration in Selected Food items in a Rural Area of Wardha District, Karnataka data revealed that 68.5% households bought the grocery. Majority of them never read the food labels. All the selected food items were adulterated ranging from 11% to 76%. Mean percentage of purity was highest in literates than illiterates. Food borne illness was prevalent in households with low purity of food. Association was found between per capita income and percentage of purity (Sheela J, 2012)<sup>[8]</sup>.

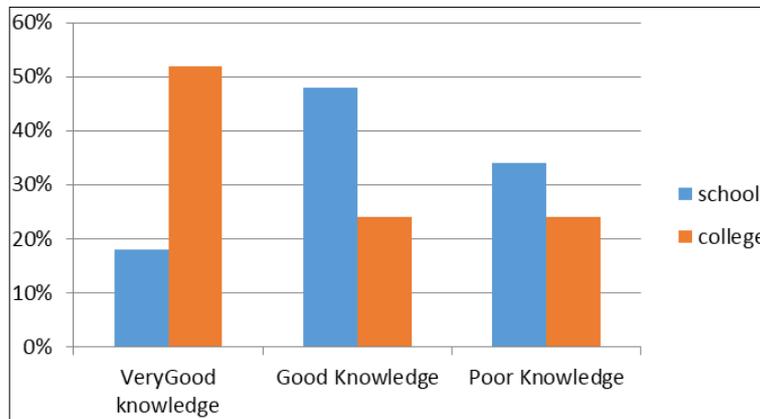


Fig 1: Food adulteration knowledge

Figure 1 presents the food adulteration knowledge between the school and college students post the nutrition education programme. 18% seemed to have very good knowledge, 48% had good knowledge and 34% of school students had poor knowledge whereas in case of the college students 52% seemed to have very good knowledge, 24% had good knowledge and 24% had poor knowledge ( $p < 0.001$ ). An Nutrition awareness programme was carried among 60 families of Mahadev village of Gujarat state was carried out

where out of 465 respondents, 15% of the sample had low awareness, 60% had moderate awareness and 25% had high awareness on food adulteration. The maximum possible score was 33. The mean score obtained by the participants was 23.151 with S.D of 2.77. After carrying out a training programme for housewives on detection of adulteration in food items, it enhanced their awareness level, skill and knowledge (Muday A *et al.*, 2013).

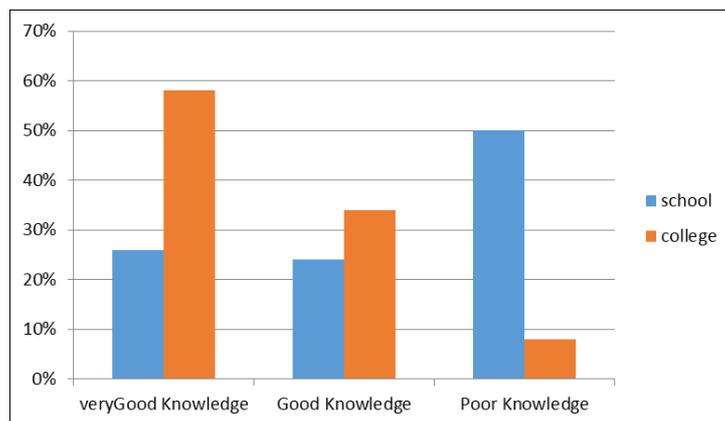


Fig 2: knowledge regarding health hazards associated with food adulteration

Figure 2 describes the knowledge regarding the health hazards associated with food adulteration in school and college students. It was observed that after the post awareness programme, 26% of school children had very good knowledge, 24% had good knowledge and 50% had poor knowledge regarding the health hazards associated with food adulteration. whereas, 58% of college children had very good knowledge, 34% had good knowledge and 8% had poor knowledge regarding the health hazards associated with food adulteration which depicts that the college students post-awareness score was higher than the school students

( $p < 0.001$ ). A study conducted in Kansas, Karnataka among 213 housewives revealed that majority of the housewives were least aware of the health hazards associated with food adulteration and its various health-effects (Aamna *et al.*, 2010).

**Conclusion**

There is a significant association between the pre test awareness knowledge score and post test knowledge score among the students on food adulteration. The Nutrition Education Programme helped to create awareness of food adulteration among the students especially about various food

adulteration laws and measures undertaken to prevent and eradicate food adulteration. The home-kit which was developed helped them in a significant way to detect food adulteration at the home level.

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