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Knowledge, Attitude and Practice on Different Cooking Methods of Vegetables Among Working Women and Housewives

S. Ponne* and K. Mathumitha

Department of Foods and Nutrition, Vellalar College for Women, Thindal, Erode - 638012, Tamil Nadu, India; ponne@vcw.ac.in

Abstract

Vegetables are an important food and highly beneficial for the maintenance of health and the prevention of diseases. Cooking methods have a major importance on the nutritional values of vegetables. A cohort sample of 200 women (N = 100 working women and housewives each), residing in Erode, Karur, Salem and Tirupur were taken. Using the formulated questionnaire, the general information, KAP on different cooking methods of vegetables and their purchasing behaviour were collected. The frequency of vegetable intake is assessed from 20 sub-samples (N = 10 working women and housewives each) through the diet history method. The data was analyzed using statistical tools. The statistical analysis doesn't show any significant difference in the KAP of working women and housewives. The nutrient analysis of the selected vegetables showed variations in the results. Vitamin A (beta carotene) content decreased when carrots were boiled, and a further decrease was noted in pressure-cooked carrot samples. Potassium content was high in boiled carrot samples compared to the raw carrot whereas in the pressure-cooked sample, potassium content decreased compared to the raw sample. The vitamin C content of the raw sample of ridge gourd decreased when boiled and a further decrease was noted in pressure cooked sample. Potassium content increased from raw to boiled and further increased in pressure cooked sample in case of ridge gourd. The folate content of Indian broad beans decreased due to boiling. Potassium content increased from raw to boiled sample in the case of Indian broad beans. Irrespective of working women and housewives the awareness of the right cooking methods for vegetables was given to minimize cooking losses and a ready reckoner was developed for adopting the right cooking methods of vegetables that cause minimal nutrient losses.

Keywords: Cooking Methods, Housewives, Nutrient Analysis, Ready Reckoner, Vegetables, Working Women

1. Introduction

Vegetables are the fresh and edible portions of herbaceous plants. They are valuable in maintaining the alkaline reserve of the body. There are different kinds of vegetables. They may be edible roots, stems, leaves, fruits or seeds[1]. "Green leafy vegetables are one of the cheapest vegetables in the market and they could be rightly described as poor man's vegetables. Seeing the potential of green leafy vegetables as a cheap source of antioxidants and other nutrients[2]. "In India, a wide range of greens are consumed. The most popular ones are spinach, amaranth, gogu, fenugreek, drumstick leaves, mint etc. The inclusion of greens in daily diet would help prevent anaemia and promote good health. Green leafy vegetables are also a rich source of Calcium, Beta carotene and Vitamin C[3]. "A recent report by the World Health Organization stated that there is convincing evidence that vegetable consumption may decrease the risk of diabetes and obesity. The report recommended a minimum intake of 400 g of fruits and vegetables per day"[4]. "Cooking methods have major importance on nutritional values of vegetables. Vegetables are generally cooked by different cooking processes, including boiling in water or microwaving, before being consumed. These processes alter the physical and chemical properties of vegetables"[5]. "Women are central to the health of their families by contributing directly to the nutrition of

*Author for correspondence

their families through the production, processing and selection of foods for family consumption. In addition to producing foods, women are responsible for the selection and preparation of family meals"[6]. Working women experience time scarcity and people's eating patterns are largely altered due to time restrictions and most people do not have a lot of free time to cook meals and prepare food. "Time pressure the working women with regards to meal preparation and convenience food reflects a tendency to minimize the time and effort that is put into the preparation of meals"[7].

2. Methodology

2.1 Selection of Area

The present study was conducted in Erode, Karur, Salem and Tirupur districts. These areas were selected for the study because of the familiarity and convenience of the researcher.

2.2 Selection of Subject

Based on the purposive sampling method a cohort sample of 200 subjects was selected from Erode, Karur, Salem and Tirupur districts. A hundred subjects from working women and a hundred subjects from housewives were included in the study. Based on the convenience sampling method the frequency of vegetable intake of 20 sub-samples was recorded. It includes ten subjects from the working women category and ten subjects from housewives.

2.3 Formulation of Questionnaire

A questionnaire was developed by the researcher to collect data on general information, dietary patterns, knowledge, attitudes and practices of working women and housewives on different cooking methods of vegetables and their purchasing behaviour. The questionnaire was self-prepared, pilot tested, and it was specially designed for the study.

2.4 Data Collection

The data necessary for the study was collected through a structured questionnaire. The questionnaire was distributed to the selected 200 subjects.

2.4.1 General Information

Data on socio-demographic details including (name, age, religion, educational qualification, occupation, income, type of family, no. of family members and locality) were collected from all 200 subjects.

2.4.2 Dietary Pattern

Data regarding the number of meals per day and type of diet was collected from all the 200 subjects.

2.4.3 Knowledge, Attitude and Practices on Cooking Methods of Vegetable

To assess the knowledge, attitudes and practices, of all the 200 women a questionnaire consisting of four sections was administered. The first section consists of 6 questions to assess the knowledge based on a 5-point Likert scale (1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree). The second section includes 7 attitude questions that respondents need to answer based on the Likert scale (1-strongly disagree, 2-disagree, 3-neutral, 4-agree, 5-strongly agree). The third section includes 6 practice questions which require the respondents to answer by the frequency of the practice (1-never, 2- rarely, 3-sometimes, 4-often, 5-always). The fourth section includes questions on vegetable purchasing and cooking behaviour.

a) Criteria to Assess the Knowledge of the Selected Subjects

Irrespective of the difficulty of answering the question, a score of 2 was assigned against each of the questions (for a complete correct answer against each question the respondent would score 2, for partial i.e., half correct answer 1, and for no or incorrect answer 0). Thus, the whole set of questions comprised of 12 marks. Based on the accuracy of the answer the respondents were given marks. The total score of a respondent was determined by summing up all the scores obtained by the respondent against the selected 6 questions. The possible score of knowledge of a respondent on vegetable cooking could range from 0 to 12, where 0 indicates no knowledge and 12 indicates the highest knowledge. The respondents were categorized (based on three approximate equal divisions between the possible lowest and highest scores) based on their knowledge score on agriculture into low knowledge (0-4), medium knowledge (4-8) and high knowledge (>8).

b) Criteria to Assess the Attitude of the Selected Subjects

To evaluate the attitude of the respondents regarding vegetable cooking, 6 statements were included. A five-point Likert-type scale (highly agree, agree, neutral, disagree, highly disagree) was fit against each of the statements and a weight of 5, 4, 3, 2, 1 were assigned, respectively. The possible score of attitudes of a respondent could range from 7 to 35, where 7 indicates the least favourable attitude and 35 indicates the highest favourable. The attitude scores of respondents were determined by summing up all the scores against the seven statements. Based on attitude scores, the respondents were grouped into less favourable attitudes (7-16.5), moderately favourable attitudes (16.5-26) and highly favourable attitudes (>26).

c) Criteria to Assess the Practice of the Selected Subjects

To evaluate the practice of vegetable cooking by the respondents, 6 statements were included. Each respondent was asked to indicate the extent of her practice against a five-point scale as always, often, sometimes, rarely, and never on each statement and a weight of 4, 3, 2, 1, 0 was assigned to these ratings respectively. The practice scores could range from 0-16 where 0 indicates no practice and 16 indicates the highest extent of practice. Based on practice scores, the respondents were grouped (based on three equal divisions between the possible lowest and highest scores) into low practice (0-8), medium practice (8-16) and high practice.

From the 200 samples, based on the convenience sampling method 20 sub-samples which include ten working women, and ten housewives were taken and the frequency of vegetable intake and the method of cooking used for commonly consumed vegetables were recorded.

2.5 Frequency of Vegetable Intake

The diet history method is used to assess the frequency of vegetable intake and method of cooking among the selected twenty sub-samples which include ten working women and ten housewives. The sub-samples were followed for 7 days and the details regarding their vegetable intake are collected through phone calls. From the data collected, three vegetables frequently consumed were selected for the study, it included carrots, broad beans and ridge gourd and the cooking methods were also selected. Pressure cooking was preferred by working women for cooking carrots and ridge gourd and boiling broad beans whereas housewives preferred the boiling method for cooking all three vegetables. For cooking broad beans both working women and housewives prefer the boiling method.

2.6 Imparting Knowledge of Cooking Methods

The awareness regarding the impact of different pre-preparation and cooking methods on vegetable nutrient content and information regarding appropriate cooking methods for vegetables to prevent nutrient losses are given through Google Meet using PowerPoint to the selected twenty sub-samples through local language. A ready reckoner was developed for adopting the right cooking method for vegetables that cause minimal nutrient losses, and it was distributed to all the sub-samples.

3. Results and Discussion

3.1 General Information of the Selected Subjects

Regarding the general information (Table 1) Majority (41 per cent) of the working women and (46 per cent) of housewives were in the age group of 40-50 years and most of them belonged to the Hindu religion. Most of

Table 1. General information on the selected subjects

Variables		Working women	House wives
Age in years	20-30	14	8
	30-40	36	29
	40-50	41	46
	50-60	9	17
Religion	Hindu	95	95
	Christian	4	-
	Muslim	1	5
Type of family	Nuclear	21	21
	Joint	79	79
Income classification	Upper class	22	16
	Upper middle class	44	44
	Middle class	18	21
	Lower middle class	16	19
	Lower class	-	-
Total		**100**	**100**

the selected subjects (79 per cent) of the working women and housewives belonged to the nuclear family type. Most of the subjects (44 per cent) in working women and housewives belonged to the upper-middle-class category according to BG Prasad's income classification. The majority of 58 per cent of working women and 53 per cent of housewives belonged to rural areas.

3.2 Dietary Pattern of the Selected Subjects

The majority (91 per cent) of working women and (92 per cent) of housewives consumed three meals per day. About 85 per cent of working women and housewives were non-vegetarians.

3.3 Knowledge of the Selected Subjects on Cooking Methods of Vegetables

It was noted that both working women and housewives highly agreed on the importance of regular vegetable consumption and washing of vegetables after cutting. However, statistical analysis did not show any difference. Regarding soaking vegetables after cutting and pre-preparation of vegetables, both groups generally disagreed that soaking vegetables after cutting had no impact on nutrient content. Housewives were more inclined towards pre-preparing vegetables, but statistical analysis didn't show a significant difference. There was some uncertainty or lack of knowledge about the impact of cutting/grating on nutrient content. Additionally, both groups moderately agreed on the importance of minimizing losses by storing vegetables in airtight containers in the refrigerator, but there wasn't a strong consensus.

3.4 Attitude of the Selected Subjects on Cooking Methods of Vegetables

It was evident that both working women and housewives showed favourable attitudes towards increasing vegetable consumption, adopting healthy cooking techniques, and minimizing cooking losses. However, statistical analysis didn't show any difference. Similarly, there were no significant differences in their attitudes towards family preferences in vegetable preparation, cooking durations for green leafy vegetables, or the impact of market distance on vegetable purchases. While working women tended to prioritize time management in choosing cooking methods more than housewives, this difference was not statistically significant. Overall, the analysis suggests that both groups had similar attitudes towards vegetable consumption and cooking techniques.

3.5 Practice of the Selected Subjects on Cooking Methods of Vegetables

It was found that both groups had similar levels of planning vegetable purchases, meal planning, purchasing green leafy vegetables, and considering health factors in cooking. While there were slight differences in some practices, such as cooking duration and health considerations, these differences were not statistically significant according to the "t" test.

3.6 Comparison and Distribution of the Subjects according to their Knowledge, Attitude and Practice of Vegetable Cooking

It is evident from Table 2 that both working women and housewives exhibit similar levels of knowledge, attitude and practice, with the majority falling into the medium category across all three characteristics.

3.7 Purchasing Behavior of the Selected Subjects

The majority 54 per cent of working women and 47 per cent of housewives purchased vegetables only once a week. The majority 61 per cent of working women and 65 per cent of housewives purchased green leafy vegetables only once a week. The majority 33 per cent of working women and 28 per cent of housewives store vegetables for 4-5 days. Seasonal availability significantly influences vegetable purchases irrespective of the two groups. Housewives tend to be more influenced by price, whereas working women are more influenced by the need for vegetables. The majority 48 per cent of working women and 30 per cent of housewives reported pre-preparing vegetables. A higher proportion of working women pre-prepare vegetables compared to housewives. This could be attributed to working women's potentially busier schedules, leading them to pre-prepare vegetables to save time during meal preparation. Housewives show a higher preference for sauteing compared to working

Table 2. Comparison and distribution of the subjects according to their knowledge, attitude and practice of vegetable cooking

Characteristics	Categories and scores	Respondents		Mean + SD	
		Working women	Housewives	Working women	Housewives
Knowledge	Low (0-4) Medium (4-8) High (>8)	18 50 32	15 58 27	1.19±0.87	1.15±0.89
Attitude	Low (7-16.5) Medium (16.5-26) High (>26)	- 86 14	- 84 16	3.69±1.09	3.66±1.00
Practice	Low (0-8) Medium (8-16) High (>16)	7 68 25	10 68 22	2.29 ± 1.29	2.30 ± 1.31

Table 3. Frequency of vegetable intake of the selected sub-samples

Frequency of vegetable intake of the selected sub-samples	Working women (N=10)	Housewives (N=10)
7 days	30	40
6 days	50	50
5 days	10	-
4 days	10	10
Total	100	100

women while working women have a higher preference for boiling. The differences in cooking method preferences could be attributed to factors such as time constraints. The majority of both working women 75 per cent and housewives 67 per cent are aware of different cooking methods. The overall awareness levels are high for both groups. However, then a higher percentage of working women had an awareness of different cooking methods compared to housewives.

3.8 Frequency of Vegetable Intake of the Selected Sub-Samples

From Table 3 it is evident that 50 per cent of the working women and housewives had the habit of consuming vegetables 6 days a week, similarly 40 per cent of the housewives and 30 per cent of the working women had the habit of consuming vegetables 7 days a week. Among them, 50 per cent of the housewives and 60 per cent of the working women consumed vegetables twice a day during breakfast and lunch.

Table 4. Nutrient analysis of the selected vegetables

Vegetable sample	Parameters (mg/100g)	Type I – Raw	Type II – Boiled	Type III- Pressure cooked
Carrot	Vitamin A (beta carotene)	869	846	767
	Potassium	369	383	303
Ridge gourd	Vitamin C	13.6	12.9	8.31
	Potassium	226	274	416
Indian broad beans	Folate	2.61	2.36	-
	Potassium	469	496	

3.9 Nutrient Analysis of the Selected Vegetables

From Table 4 it is noted that Vitamin A (beta carotene) content decreased when carrots were boiled, and further decrease was noted in pressure-cooked carrot samples. According to Anjum *et al.,*[8] boiling caused a reduction in the beta-carotene content of carrot from 14000µg/100g to 7900µg/100g, 43.6 percent of beta carotene decreased from raw to boiled sample. Potassium content was low in the boiled carrot sample compared to the raw carrot and further decrease was noted due to pressure cooking. The vitamin C content of the raw sample of ridge gourd was 13.6mg, it decreased to 12.9 due to boiling and when pressure was cooked the vitamin C content still dropped to 8.31mg. According to Lee *et al.,*[9] boiling destroyed vitamin C in almost all the samples, with nutrient retention ranging from 0 to 73.86%. According to Bham *et al.,*[10] pressure cooking resulted in a higher

loss of vitamin C as compared to microwave cooking. Potassium content increased from raw to boiled then further increased in pressure cooked sample in case of ridge gourd. According to de Castro *et al.*,[11] an increase in potassium and sodium is expected when vegetables are subjected to cooking processes that do not involve their leaching into the cooking water. The folate content of Indian broad beans decreased due to boiling. According to Delchier *et al.*,[12] there were no significant losses of folates from fresh green beans after either boiling or steaming. The concentrations found in the cooking liquid after boiling remained very low. Potassium content increased from raw to boiled sample in the case of Indian broad beans.

4. Conclusion

From the study, it was concluded that there was no significant difference between the two groups in terms of knowledge, attitude and practices regarding vegetable cooking methods among working women and housewives except for the usage of vegetable cutters. It was noted that 54 per cent of working women and 47 per cent of housewives purchased vegetables only once a week. Furthermore, when the factors that influence vegetable purchases were studied it was noted that housewives were more influenced by price and working women were more influenced by the need for vegetables. A higher proportion of working women pre-prepare vegetables compared to housewives. The commonly consumed vegetables were analyzed to determine the nutrient losses by different cooking methods. It was evident from the results that vitamin A content decreased when carrots were boiled, and a further decrease was noted in the pressure-cooked carrot sample. Potassium content was high in boiled carrot samples compared to raw carrots whereas in the pressure-cooked samples, potassium content decreased compared to the raw sample. While potassium content increased from raw to boiled then further increased in pressure cooked sample in case of ridge gourd. The folate content of Indian broad beans decreased due to boiling. Potassium content increased from raw to boiled sample in the case of Indian broad beans. Irrespective of working women and housewives the awareness of the right cooking methods for vegetables was imparted to minimize cooking losses and a ready reckoner was developed for adopting the right cooking methods of vegetables that cause minimal nutrient losses.

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