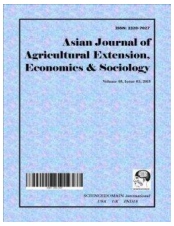

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Factoring of Attributes Influencing Consumption of Greens among Family Members in Selected Rural and Urban Families of Madurai District of Tamil Nadu State in India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

A study was conducted among sixty each of rural and urban female heads of family in Madurai to find out the underlying pattern or grouping of attributes which influence consumption of greens among family members. The results of Factor analysis revealed that 51.48 per cent of variation in the consumption of greens was explained cumulatively by the extracted four factors. The first factor account for 18.74 per cent variation in consumption of greens followed by 12.77 per cent, 10.44 per cent and 9.54 per cent of variation explained by second, third and fourth factor respectively. The analysis of pattern clearly revealed that in the first factor, the attributes related to drudgery involved in cooking and variety of greens were grouped together. The attributes pertaining to availability of greens dominated the second factor whereas the beliefs and values related factors were concentrated in the third factor. The fourth factor had grouping of attributes related to health benefits.

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1. RATIONALE OF THE STUDY

Greens are the cheapest of all the vegetables within the reach of poor man, being richest in their nutritional value. The problem of malnutrition is assuming seriousness in the vulnerable groups viz., adolescents, pregnancy, lactation and school children, not because of poverty but because of ignorance, illiteracy and callousness of the people. The lack of knowledge especially on the nutritive value of these green leafy vegetables among the public in general is the main drawback in their lower consumption [1].

Consumption pattern of greens tends to vary among different type of families. Families with working women may have a different consumption pattern when compared to families with house wives. About one-third of mothers (31.5% and 36% for urban and rural, respectively) opined that their children consumed three or more serves of vegetables per day. The consumption of greens bound to vary with respect to differences in families in terms of number of members, number of children, income status, working status of family members, and social networking status of family member's information availability about greens [2]. A study conducted in Palakkad district of Kerala showed that 51.4 per cent of families consumed greens once or twice a week whereas 48 per cent of families consumed thrice or four times a week [3]. Among Chinese adolescents aged 12-14 years, high socio-economic status and living in an urban area was positively associated with greater consumption of high-energy products, including unhealthy snacks [4].

Moreover, a plethora of factors would influence a family and its members to develop a liking to consume greens. It starts from accessibility, availability and to affordability. These factors, either solitarily or in combination would influence the consumption pattern of greens in a family. Previous studies have associated food consumption with behavioral attitudes such as health consciousness, environmental consciousness, trust of food claims and desirability of food attributes such as taste, texture, freshness [5,6]. Many researchers agree to say that determinants of the consumption of green products could be due to cultural orientation like value, belief or norm, psychological, economical or socio-demographic factors [7,8].

Price could also be seen as a determinant for many researchers. In fact, price, quality and convenience can have competitive advantage in buying decision of green product [9]. Though, the price is not an obstacle of the buying decision of green product and the sales of green products in Europe were predicted to double by 2015 according to perceived benefits of those products, consumers are not paying attention to the price [10,11]. Attitudes and beliefs are powerful predictors of sustainable consumption and positive attitudes toward environmental protection, fair trade, and local production are also major facilitators of sustainable consumption [12,13].

The foregoing discussion substantiated that despite the importance of consumption of greens, it has been influenced by several factors. Notwithstanding, the previous studies have attempted to find out the factors responsible for consumption of green, very limited studies did focus on the underlying pattern and grouping of these factors to understand the consumption pattern in a holistic way. Hence, a study has been contemplated with the objectives of studying the determinants of consumption of greens among family members and to analyse the underlying pattern among the determinants of consumption of greens.

2. RESEARCH METHODOLOGY

Since this study is attempted to unearth the determinants of greens consumption, which was exploratory in nature, exploratory design was selected for study. Madurai district was purposively selected for the study as it is one of the backward rural district in southern Tamil Nadu with more number of people living below poverty line and ultimately with poor nutrition.

Madurai district comprises of seven taluks, thirteen blocks and six hundred and sixty four revenue villages. Since, the respondents for this study are to be selected from rural and urban background, the secondary data collected from ICDS office, Madurai, pertaining to nutritional indicators in different blocks were analyzed. Three rural blocks namely Usilampatti, Melur and Thirumangalam were selected for rural respondents based on the criteria of more

number of moderately and severely underweight children in these three blocks.

In each of the selected block, one village was purposively selected based on the information obtained from Child Development Project Officer's and Agriculture Officers. In each of the selected village, 20 respondents were selected using snow ball sampling method wherein the word of mouth of one respondent to indicate another prospective respondent was considered.

For the selection of urban respondents for the study the researcher discussed with officials in Madurai Collectorate and Madurai Corporation. In order to ensure representativeness of the sample, the following yardsticks were used

1. The respondents should represent all the socio economic status namely upper, middle and lower class.
2. The representation of both of the housewives and working women should be ensured.

In accordance with the above yardsticks the residential areas namely Anna Nagar, Goripalayam and Alagappa Nagar in Madurai city were selected. The same procedure of snow ball sampling techniques was followed for selecting sixty urban respondents, twenty each from selected three areas.

In this study, factors influencing consumption of greens refer to the determinants that shapes the opinion of respondent towards consumption of greens. The determinants ranges from accessibility, availability, preferences of self and family members, environmental factors, economic factors, beliefs and other miscellaneous factors. Totally sixteen determinants or factors were identified and shortlisted based on discussion with food scientists and Extension workers.

An interview schedule was prepared which consists of the socio-economic profile of the respondents and the determinants of consumption of greens as items. The interview was conducted during September 2016 among the respondents with the help of interview schedule. The information on the basic socio-economic characteristics of respondents and their response for the determinants of greens consumption was collected. Based on the information collected, the respondents were categorized into three categories namely highly influenced, moderately influenced and not at all influenced based on their orientation in the respective factor and the responses were measured on a three point continuum with scores of 3,2 and 1 respectively.

The researchers of the study did explain the purpose of the research to the respondents and the respondents were not intimidated to give information. The researcher told the respondents about the nature of the research and took them into confidence and the data was collected with the full consent of the respondents.

Since, the purpose of the study was to group the factors based on underlying pattern and the data was amenable for factor analysis, the analysis was run with SPSS 16.00. The analysis revealed factor loadings and from the magnitude of factor loadings, one can interpret the grouping of the factors with greater precision.

3. FINDINGS AND DISCUSSION

As detailed in the methodology, sixty respondents from rural and urban areas were selected. Prior to the discussion on the factors influencing consumption of greens, it is appropriate to discuss the socio-economic characteristics of the sample. Majority of the respondents fell in the age group of 30 to 40 years and majority of them were working women. Many of them belonged to nuclear family with three to four family members. Most of the respondents belonged to backward community and their annual income ranges between Rs. 75,000 to Rs. 1, 50,000. Agriculture was the main income source for rural respondents whereas urban families employed in government jobs and private job.

The pattern of association among the factors influencing the greens consumption was analysed using factor analysis. Table 1 gives an account of number of factors extracted using principle component analysis with varimax rotation. It also indicated the total variance explained by the factors put together and the amount of variance explained by each factors.

Closer observation of the Table 1 revealed that 51.48 per cent of variation in the consumption of greens was explained cumulatively by the extracted four factors. The first factor accounted for 18.74 per cent variation in consumption of greens followed by 12.77 per cent, 10.44 per cent and 9.54 per cent of variation explained by

Table 1. Percentage of variance explained by extracted factors in principal component analysis (PCA)

Component	Initial eigen values			Extracted sum of squared loadings			Rotation sums of squared loadings		
1.	Total	% of var	Cum %	Total	% of var	Cum %	Total	% of var	Cum %
2.	2.999	18.743	18.743	2.999	18.743	18.743	2.780	17.373	17.373
3.	2.043	12.767	31.510	2.043	12.767	31.510	1.866	11.662	29.035
4.	1.670	10.436	41.946	1.670	10.436	41.946	1.805	11.282	40.317
5.	1.526	9.536	51.482	1.526	9.536	51.482	1.786	11.165	51.482
6.	1.368	8.547	60.030						
7.	1.075	6.717	66.747						
8.	0.962	6.011	72.758						
9.	0.952	5.951	78.710						
10.	0.757	4.730	83.439						
11.	0.580	3.627	87.066						
12.	0.517	3.229	90.294						
13.	0.467	2.917	93.211						
14.	0.339	2.119	95.330						
15.	0.318	1.984	97.315						
16.	0.270	1.690	99.005						

% Var – Percentage Variation, Cum % - Cumulative percentage

second, third and fourth factor respectively. The following Table 2 showed the factors loaded into four components and the magnitude of factor loadings.

3.1 Factor I

The highest factor loading in the 'component I' was for the factor "drudgery involved in preparing greens for cooking" with 0.735. This was closely followed by a high negative loading (-0.715) for the factor 'taste of greens'. A factor loading of 0.704 was attributed to the factor "time taken for cooking certain types of greens". The factor "variety of dishes prepared from greens" got a factor loading of 0.671 under component one.

The examination of factor loadings clearly painted a picture that drudgery and time taken was a concern which has already been reported in the findings in the previous section. Though there existed scope for variety of dishes from greens endorsed by majority of urban respondents reported elsewhere due to the increasing exposure to recipes shown in Television shows, the drudgery involved and time taken for preparation of dishes, given the attitude of people that they wanted everything quickly would have affected the consumption pattern.

Taste of greens wasn't found to be a predominant influencing factor among rural respondents, but it did influence an appreciable number of rural respondents as has been evident from Table 2. Most of the rural respondents opined that rather than actual taste, be it good or bad, the custom that they inherited and the local availability was the more influencing factor. Hence, the three factors namely, drudgery, time taken and variety whose loadings are high and positive might have suppressed the loading for taste and hence the negative loading was recorded for taste of greens as an influencing factor. Since this component involves on the one side drudgery and time taken which were negative points for consumption and on the other side positive points like taste and variety on the other side, assigning a name **'Drudgery and Variety'** factor, would be appropriate.

3.2 Factor II

Four factors were extracted into the 'component II'. Among the four, the factor 'availability at an accessible place' got the highest positive loading of 0.663. This was followed by the positive loading of 0.643 for the factor 'seasonal availability of greens'. Availability of favourite greens as a factor also influenced consumption

Table 2. Rotated component matrix and factor loadings

S. no	Factors influencing consumption of greens	Component			
		1	2	3	4
1.	Drudgery involved in preparing greens for cooking	0.735			
2.	Taste of greens	-0.715			
3.	Time taken for cooking	0.704			
4.	Variety of dishes prepared from greens	0.617			
5.	Information about the good qualities of greens given in mass media				
6.	Children's liking towards junk foods				
7.	Availability at an accessible place		0.663		
8.	Seasonal availability of greens		0.649		
9.	Availability of favourite greens		0.587		
10.	Information given to children in schools		-0.550		
11.	Prejudices/ beliefs that prevent consumption			0.846	
12.	Expenditure incurred for greens			-.554	
13.	Consumption of greens as a value inherited from forefathers			0.531	
14.	Ability of greens to cure specific health ailments				0.822
15.	Availability of variety of greens at a time				0.526
16.	Motivated by neighbours cooking greens				

with a positive loading of 0.587. The information given to children in schools was loaded with a negative loading of -0.550.

A closer examination of component II revealed that it was the availability of greens that overwhelmed the component. Availability in easily accessible place, seasonal availability and availability of favourite greens were obviously and logically would influence the consumption. These findings are in line with the findings of similar studies wherein the seasonal availability was found to be a major factor influencing green consumption [2,3]. No doubt their contribution would definitely have a say in the consumption pattern. But the negative loading of information given to children in school could be attributed to, the reason of more children either failed to pass on the information to their parents or not given with such information, especially in rural areas. Though it is a factor to reckon with, the high positive loadings of availability factors suppressed this factor and projected it to be negative. This indicated that despite the influence of information given in schools to children it was the availability that matters.

Since this component was dominated by availability of greens, be it seasonal availability or availability of favourite greens or accessibility, this component could be appropriately named as **'availability of greens factors'.**

3.3 Factor III

The third component extracted three factors. The first factor which got highest factor loadings (0.846) was "beliefs that prevent consumption". This was followed by impressive negative loading (-0.554) for the factor expenditure incurred for the greens. A factor loading of 0.531 was obtained by the factor "consumption of greens as a value inherited from forefathers".

The analysis of factor loading for the component III revealed that the beliefs and values did have an influence on consumption of greens. Since greens consumption is an age old practice, the people got to know several beliefs and values from their forefathers which might have influenced their consumption pattern of greens. The discussion on how beliefs prevent consumption of greens elsewhere could be corroborated here. Similarly, values could have an indelible impact on how people behave including consumption. Since the beliefs got a higher loading and it prevents consumption, which is a negative factor it accompanied another negative factor called 'expenditure incurred due to greens'. Though the expenditure incurred due to greens was meager, the common

attitude of the people is to get everything free. This attitude has been reflected in the negative factor loading for this factor.

Since, beliefs and values did occupy a predominant position under component III it is pretty appropriate to name this component as **'beliefs and values factor for greens consumption'.**

3.4 Factor IV

The fourth component extracted two factors namely 'curing specific health ailments' and 'availability of variety of greens at a time' with positive factor loadings of 0.822 and 0.526 respectively.

Greens are known for their medicinal properties and people irrespective of rural and urban domicile have been eating greens for specific health ailments, the details of which has already been discussed elsewhere in this report. Further this factor depends on availability of different types of greens at a time, since certain ailments requires a consortium of greens to be consumed. Hence, these two factors were extracted together under component IV.

Since this factor is specifically meant for curing health ailments, it is appropriate to name this factor as **'Health benefits'.**

4. CONCLUSIONS AND RECOMMENDATIONS

A study was conducted in Madurai district among sixty rural and sixty urban families to identify the factors influencing consumption of greens and to identify the underlying pattern among the factors through factor analysis. The results revealed that 51.48 per cent of variation in the consumption of greens was explained cumulatively by the extracted four factors. The first factor account for 18.74 per cent variation in consumption of greens followed by 12.77 per cent, 10.44 per cent and 9.54 per cent of variation explained by second, third and fourth factor respectively. The analysis of pattern clearly revealed that in the first factor, the attributes related to drudgery involved in cooking and variety of greens were grouped together. The attributes pertaining to availability of greens dominated the second factor whereas the beliefs and values related factors were concentrated in the third factor. The fourth factor had grouping of attributes related to health benefits.

From the findings of the study, the following recommendations were suggested.

1. The respondents were concerned about availability of variety of greens at a time and hence the planners at helm of affairs may think of establishing 'green shops' which can fully made functional using Self Help Group women. Already in Tamil Nadu, Government has initiated 'Kaikani angadi' in selected cities. In such already established centres, a separate place for greens may be set up.
2. Availability and accessibility has been the factors which were predominantly endorsed by many respondents and hence the policy makers and planners need to evolve strategies to make it available for consumers.
3. Drudgery involved in cooking had been indicated by many respondents as one of the factor determining the consumption and hence the food scientists along with processing engineers may evolve some technologies/tools to reduce the drudgery involved in cooking of greens.
4. Similarly time taken for cooking was also considered as one of the factor influencing consumption and hence the food scientists should evolve technologies to reduce the cooking time for certain greens
5. Taste and appearance are the foremost factors which were found to influence children to take greens. Hence food scientists should try new products from greens with good taste and appearance without affecting the nutritional qualities of greens.
6. Value of eating greens was one of the influencing factor indicated by respondents which got eroded day by day and hence the parents are suitably sensitized to inculcate the value of eating greens among their children
7. Several beliefs inhibit the eating of greens and hence from the school itself children need to be informed about getting rid of such beliefs. Mass media can be used for this purpose also.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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