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# Psychosocial Factors Influencing Fruit and Vegetable Consumption and the Nutrient Intake of Rural School Children in Vedaraniyam

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## Abstract

A cross sectional study was conducted to study the factors influencing fruit and vegetable consumption among five hundred school children aged 13 to 15 years. A structured questionnaire was administered to elicit data. Majority of boys had positive attitude towards health and physical outcome expectancy when compared to girls in fruit and vegetable consumption. When compared with the RDA, results indicated that the boys and girls consumed less quantity of energy, carbohydrate and protein.

**Keywords:** Adolescents, Consumption Pattern, Factors Fruits, Vegetables

## 1. Introduction

Good nutrition for children is an indispensable component of their healthy life. Eating sufficient fruits and vegetables in childhood and adolescence is essential as the body grows rapidly during this period, requiring many nutrients which fruits and vegetables can provide. Moreover, eating fruits and vegetables when young can be habit forming, promoting healthy eating behaviours for later life[1]. The nutrients in vegetables reduce disease risks and eating fruits instead of high-fat, sugar and salt products, can protect adolescents from obesity, diabetes, and heart problems in future.

According to Rasmussen et al.,[2] "A number of factors influence the amount of fruit consumed by adolescents, including family income, the cost of alternatives, preparation time, parents eating habit, and the availability of fresh fruit which can be linked to the country or local climate".

Perry[3] reported, "Adolescence is a time period of rapid physical maturation and growth combined with psychological and social development which is often accompanied by changes in social influences and as children move into adolescence, family influences often decrease due to competing influences from other social settings. It could therefore be hypothesized that differences in determinants of fruit and vegetable consumption exist between children and adolescents". Interventions to improve health-related behaviours should be tailored to the most important determinants or mediators of this behaviour.

Selawose[4] stated, "Globally, majority of people are consistently consuming less than the daily recommended fruit and vegetable requirement. Even in developed

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nations researchers have concluded that there is a large gap between actual and recommended consumption of both fruit and vegetable despite decades of concern and publicity while resultant outcomes were short-lived. In a study from 52 low and middle-income countries 77.6 percent of boys and 78.4 percent of girls consumed less than the minimum recommended servings of fruit and vegetable. The same study also reported 74 percent low fruit and vegetable consumption among Indian children". Increasing fruit and vegetable consumption to at least five servings per day during early childhood may be a good strategy for reducing the probability of developing chronic diseases by helping children develop a habit of healthy eating that will not only enhance their current diet, but also stay with them throughout their lives.

The present investigation empowers us to measure personal factors, social, environmental influences and parental control on fruit and vegetable consumption among school children aged 13 to 15 years.

## 2. Methodology

The study protocol was reviewed and approved by the Institutional Independent Ethics Committee of Women's Christian College, Chennai. A descriptive study was carried out in three government schools in Vedaraniyam. A structured questionnaire was administered to elicit data regarding knowledge, attitudes, self-efficacy, social, environmental and parental control that influences fruit and vegetable consumption among five hundred school children in the age range of 13 to 15 years studying in the 8th, 9th and 10th standards. Questions were constructed based on recent literature on psychosocial determinants of the consumption of fruit and vegetable among children. Three day 24 hr recall and food frequency questionnaire was used to assess the dietary pattern and dietary intake of the adolescent children.

The data elucidated was tabulated and subjected to statistical analysis using SPSS, conclusions were drawn and interpreted.

## 3. Results and Discussion

### 3.1 General Attitudes Influencing Fruit and Vegetable Consumption

General Attitude to fruit and vegetable consumption is presented in Table 1. From Table 1, it is clear that a greater percent of boys had a positive attitude towards fruit and vegetable consumption, while the reverse was noted for girls. Majority of the girls disagreed with the options given for benefits of fruits and vegetable consumption. About 70 percent of boys and girls agreed that fruits and vegetable promote normal laxation, thirst quenching and good for figure. Most of the girls disagreed that fruits are good for teeth, hunger allaying and easily digestible.

**Table 1.** General attitude to fruits and vegetables consumption among subjects

| Sl. No. | Particulars | Boys N=250 | | Girls N=250 | |
|---|---|---|---|---|---|
| | | Disagree | Agree | Disagree | Agree |
| | | Percent | | Percent | |
| 1 | Promote normal laxation | 30.8 | 69.2 | 8.4 | 91.6 |
| 2 | Good for teeth | 64.4 | 35.6 | 66.8 | 33.2 |
| 3 | Thirst quenching | 17.6 | 82.4 | 86.8 | 13.2 |
| 4 | Hunger allaying | 53.6 | 46.4 | 74.8 | 25.2 |
| 5 | Good for figure | 46.4 | 53.6 | 94.8 | 5.2 |
| 6 | Fruits are easily digestible | 18.4 | 81.6 | 84.4 | 15.6 |

**Table 2.** Comparison of attitudes to fruits and vegetables consumption between boys and girls

| General attitudes | | Boys | Girls | Total | Chi-Square value | p value |
|---|---|---|---|---|---|---|
| Fruits | Agree | 229 | 173 | 402 | 39.801 | 0.001* |
| | Disagree | 21 | 77 | 98 | | |
| Vegetables | Agree | 224 | 103 | 327 | 129.404 | 0.001* |
| | Disagree | 26 | 147 | 173 | | |

*significant at $p<0.05$

Factor analysis has been performed to identify the factor which contributes more to the attitudes of the children on their fruits and vegetable consumption. The extracted factors explain about 83% of the variable "promote natural laxation" and 79% of the variable "good for figure". So, we consider that as depending variables and performed the chi-square analysis to obtain any difference between the boys and girls on their attitude towards fruit and vegetable intake. From Table 2, the p-value is less than 0.05, so it may be considered that there was significant difference in the attitude between boys and girls towards consumption of fruits and vegetables. Majority of the boys have positive attitude towards fruit and vegetable consumption when compared to girls.

Study conducted by Sandwick et al.,[5] indicates 'children had positive attitudes towards fruit and vegetable consumption. They had more positive attitude towards fruits than towards vegetables'.

## 3.2 Health and Physical Ability Outcome Expectancy to Fruit and Vegetable Consumption

A comparison of health and physical ability outcome expectancy on fruits and vegetables consumption is presented in Table 3. Factor analysis has been performed to identify the factor which contributes more to the health and physical ability outcome expectancy. The extracted factors explain about 97% of the variable "I will become less ill" and 77% of the variable explains about "I can get more muscles". So, we consider that as a depending variable and performed the chi-square analysis to obtain any difference between boys and girls on their opinion health and physical ability outcomes.

From Table 3, the health and physical ability outcome expectancy to fruits and vegetables consumption among subjects was compared and since the p value obtained was <0.05, it may be concluded that there was significant difference between boys and girls in their health and physical outcome expectancy. Majority of the boys and girls had positive attitude towards health and physical outcome expectancy when compared to boys.

The WELL (Wellbeing, Eating and Exercise for a Long Life) study is a cohort study, which examines the nutrition and physical activity behaviours of Australian. A WELL study report says each additional serving of fruit and vegetable were associated with approximately 10% higher likelihood of reporting health as good or better among women and men[6].

## 3.3 Peer Influences on Fruits and Vegetables Consumption

Table 4 indicates that majority of the boys had peer support to eat fruits (62.4%) and vegetables (72%) almost every day. The percent of girls who had peer support to eat fruits (52.8%) and vegetables (58.8%) is low when compared to boys. As youth enter adolescence, concerns with their appearance, growing independence, peer social norms and the media influence their food choices. Although adolescents continue to consume the majority of meals and snacks at home, they also have considerably greater independence and autonomy when making food choices away from home[7].

**Table 3.** Comparison of health and physical ability outcome expectancy to fruits and vegetables consumption among subjects

| Health and physical outcome expectancy | | Boys | Girls | Total | Chi square value | p value |
|---|---|---|---|---|---|---|
| Fruits | Agree | 184 | 225 | 409 | 22.583 | 0.001* |
| | Disagree | 66 | 25 | 91 | | |
| Vegetables | Agree | 209 | 147 | 356 | 37.492 | 0.001* |
| | Disagree | 41 | 103 | 144 | | |

*significant at p<0.05

**Table 4.** Peer support ON fruit and vegetable consumption among the subjects

| S. No. | Particulars | Boys N=250 | | Girls N=250 | |
|---|---|---|---|---|---|
| | | Percent | | Percent | |
| | | Never | Almost everyday | Never | Almost everyday |
| 1 | Encouragement by friends to eat fruits | 37.6 | 62.4 | 47.2 | 52.8 |
| 2 | Encouragement by friends to eat vegetables | 28.0 | 72.0 | 41.2 | 58.8 |

## 3.4 Perceived Peer Behaviour

Perceived peer behaviour to fruit and vegetable consumption among the subjects is discussed in Table 5.

**Table 5.** Perceived peer behavior to fruit and vegetable consumption among the subjects

| Sl. No. | Particulars | Boys N=250 | | Girls N=250 | |
|---|---|---|---|---|---|
| | | Percent | | Percent | |
| | | Disagree | Agree | Disagree | Agree |
| 1 | Friends like to eat fruits | 49.2 | 50.8 | 64.0 | 36.0 |
| | Friends like to eat vegetables | 16.4 | 83.6 | 70.4 | 29.6 |
| 2 | Friends consume fruits daily | 22.8 | 77.2 | 14.8 | 85.2 |
| | Friends consume vegetables daily | 35.2 | 60.8 | 80.4 | 19.6 |
| 3 | Best friends consumption of fruits | 13.6 | 86.4 | 7.2 | 92.8 |
| | Best friends consumption of vegetables | 24.0 | 76.0 | 5.6 | 94.4 |

Table 5 indicates that majority of the boys agreed that their friends like to eat fruits (50.8%) and vegetables (83.6%), and also their friends consume fruits (77.2%) and vegetables (60.8%) daily and best friends consumed fruits (86.4%) and vegetables (76%). Greater percent of girls disagreed that friends like to eat fruits (64%) and vegetables (70.4%), most of the girls agreed that greater percent of their friends consume fruits daily, and majority of the girls disagreed that their friends consume vegetables daily. Most of the girls agreed that their best friends consumed fruits (92.8%) and vegetables (94.4%).

**Table 6.** Perceived parental behaviour to fruit and vegetable consumption among the subjects

| S. No. | Particulars | | Boys N=250 | | Girls N=250 | |
|---|---|---|---|---|---|---|
| | | | Percent | | Percent | |
| | | | Rarely/ Never | Almost every day | Rarely/ Never | Almost every day |
| 1 | Parents consumption of fruits | Mother | 16 | 84 | 2.8 | 97.2 |
| | | Father | 4.8 | 95.2 | 2.8 | 97.2 |
| 2 | Parents consumption of vegetables | Mother | 3.6 | 96.4 | 2 | 98 |
| | | Father | 1.2 | 98.8 | 2.8 | 97.2 |

Table 6 indicates that majority of parents both mother (97.2%) and father (95.2%) of the girls consume fruits every day. Likewise, majority of parents both mother (97.2%) and father (98.8%) of the subjects consume vegetables every day.

Study conducted by Brug et al.,[8] reported 'Parental fruit and vegetable intakes had a positive association with children's intake. Parental fruit and vegetable consumption was a strong predictor of children's fruit and vegetable consumption'. Results of the present study are in line with the study conducted by Wardle et al.,[9], in which results predict that increased exposure to foods that parents are eating is likely to lead to greater acceptance on the part of the child through exposure based modifications of preferences.

## 3.5 Obligation Rules by Parents

Table 7 presents the obligation rules of parents to fruit and vegetable consumption of girls and boys.

**Table 7.** Obligation rules of parents

| Sl. No. | Particulars | Boys N=250 | | Girls N=250 | |
|---|---|---|---|---|---|
| | | Percent | | Percent | |
| | | Rarely/ Never | Most of the time/ Always | Rarely/ Never | Most of the time/ Always |
| | My parents oblige me | | | | |
| 1 | To eat fruits | 24.8 | 75.2 | 24.4 | 75.6 |
| 2 | To eat vegetables | 10.8 | 89.2 | 8.8 | 91.2 |
| 3 | To eat all my vegetables | 11.6 | 88.4 | 6.4 | 93.6 |
| 4 | I must at least taste the vegetables that are prepared | 7.6 | 92.4 | 16.0 | 84.0 |
| 5 | I have to eat my vegetables even when I don't like them | 40.0 | 60.0 | 41.2 | 58.8 |

Table 7 indicates the rules laid down by parents towards consumption of fruits and vegetables. With regard to boys and girls, majority of the parents insisted that their children consume all the fruits and vegetables given to them, a greater percent insisting on vegetables compared to fruits. The proportion of parents who

insisted most of the time and rarely to consume vegetable even if the children did not like them was less compared to the other variables.

In a study conducted by Carine et al.,[10] indicated that 'Mere verbal encouragement was not associated with child's consumption of fruits and vegetables, while obligation rules were significantly associated with vegetable consumption'.

A comparison of obligation rules by parents to fruits and vegetable consumption among boys and girls is presented in Table 8.

Factor analysis has been performed to identify the factor which contributes more to the obligation rules among subjects. The extracted factors explain about 83% of the variable "To eat all my vegetables" So we consider that as a depending variable and performed the chi-square analysis to obtain any difference between boys and girls on their obligation rules.

**Table 8.** Comparison of obligation rules by parents to consumption of fruits and vegetable among boys and girls

| Particulars | Boys | Girls | Total | Chi square value | p value |
|---|---|---|---|---|---|
| Rarely/never | 29 | 16 | 45 | 4.127 | 0.06* |
| Most of the time/ always | 221 | 234 | 455 | | |

*significant at p>0.05

Since the p value is 0.06, results indicate that there is no significant difference between parents of boys and girls in the rules to consume fruits and vegetables.

A study suggest that parents may continue to play a role in determining their child's consumption of fruits and vegetables as well as dairy foods during adolescence. According to Nichole et al.,[11] "Among 902 adolescences and their parents, many parents (44.5%) were not consuming fruits and 69.9 per cent were not able to meet the minimum daily recommended vegetables. While most parents reported that fruits and vegetables were available at home (90.3%) and vegetables were usually served at dinner (87.0%). Among girls, household availability was positively associated with fruit and vegetable intake. Parental intakes were positively associated with dairy intake for boys, vegetable and fruit intakes for girls[11].

## 3.6 Nutrient Intake of the Subjects

Table 9 indicates that when compared with the Recommended Dietary Allowance, the boys and girls consumed fewer quantities of energy, carbohydrate and fat. Analysis between the boys and girls in the intake of nutrients indicate there is a statistically significant difference between the subjects. Many researchers have reported that on an average, teens have diets that are too high in fat, saturated fat and sodium as well as too low in fruits and vegetables, fiber and calcium.

Table 10 indicates that when compared with Recommended Dietary Allowance, the boys and girls consumed less quantities of beta carotene, thiamine, riboflavin, ascorbic acid, calcium and iron. Analysis between the boys and girls on the intake of nutrients indicate there is a statistically significant difference between the subjects.

**Table 9.** Principle nutrient intake of subjects compared with the RDA

| Nutrients | Group | n | RDA** | Mean±SD | Std. Error Mean | t' value | p value |
|---|---|---|---|---|---|---|---|
| Energy (Kcal) | Boys | 50 | 2750 | 2067.21±165.88 | 23.45 | 2.757 | 0.007* |
| | Girls | 50 | 2330 | 1989.15±112.07 | 15.84 | | |
| Carbohydrate (g) | Boys | 50 | 615 | 108.25±9.02 | 1.25 | 2.014 | 0.032* |
| | Girls | 50 | 515 | 95.20±11.25 | 1.68 | | |
| Protein (g) | Boys | 50 | 54.3 | 61.38±3.70 | 0.52 | 1.962 | 0.053* |
| | Girls | 50 | 51.9 | 60.10±2.77 | 0.39 | | |
| Fat (g) | Boys | 50 | 45 | 21.53±1.53 | 0.21 | 2.835 | 0.006* |
| | Girls | 50 | 40 | 20.64±1.63 | 0.23 | | |

* Significant at p<0.05
**ICMR (2010)

**Table 10.** Vitamins and minerals intake of subjects compared with the RDA

| Nutrients | Group | N | RDA** | Mean±SD | Std. Error Mean | 't' value | p value |
|---|---|---|---|---|---|---|---|
| Beta-carotene (µg) | Boys | 50 | 4800 | 2173.42±247.35 | 34.98 | 3.274 | 0.001* |
| | Girls | 50 | 4800 | 1989.32±311.32 | 44.02 | | |
| Thiamine (mg) | Boys | 50 | 1.4 | 1.03±0.25 | 0.03 | 3.004 | 0.003* |
| | Girls | 50 | 1.2 | .88±0.23 | 0.03 | | |
| Riboflavin (mg) | Boys | 50 | 1.6 | 1.16±0.19 | 0.02 | 3.061 | 0.003* |
| | Girls | 50 | 1.4 | 1.04±0.19 | 0.02 | | |
| Ascorbic acid (mg) | Boys | 50 | 40 | 38.88±2.41 | 0.34 | 2.922 | 0.004* |
| | Girls | 50 | 40 | 37.60±1.96 | 0.27 | | |
| Iron (mg) | Boys | 50 | 32 | 27.44±3.39 | 0.47 | 2.334 | 0.022* |
| | Girls | 50 | 27 | 26.07±2.37 | 0.33 | | |
| Calcium (mg) | Boys | 50 | 800 | 571.07±3.57 | 4.74 | 3.209 | 0.02* |
| | Girls | 50 | 800 | 548.77±35.87 | 5.07 | | |

* Significant at $p<0.05$
**ICMR (2010)

Adolescents of both sexes and in all income and racial groups can be at risk for dietary excesses and deficiencies. Many boys and girls in developing countries enter adolescence as undernourished, making them more vulnerable to disease. On the other hand, dietary excesses of total fat, saturated fat, cholesterol, sodium and sugar occur leading to overweight and obesity - another form of malnutrition with serious health consequences - is increasing among other young people in developed and underdeveloped countries.

## 4. Conclusion

Adolescent children attending high schools in this study demonstrated unhealthy dietary patterns. Frequent consumption of energy rich foods and sweetened carbonated beverages leads them to develop degenerative disease at an earlier age itself. In the light of the research, actions should be initiated to enable adolescents eat more healthy foods. Nutrition awareness can be created in the form of health campaigns and health education by introducing them in their curricula to inculcate healthy eating habits.

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