Journal of
Health Education Research & Development

Tewani and Saranyan, J Health Edu Res Dev 2015, S1
DOI: 10.4172/2380-5439.S1-002

Research Article Open Access

An Evaluation of a Project Regarding the Acceptance of Value Addition to Nutrition in Primary and Higher Secondary School Children in Bairagarh, Bhopal, Madhya Pradesh

Gulab Rai Tewani* and Saranyan P

Sant Hirdaram Medical College of Naturopathy and Yogic Sciences, Bhopal-462030, Madhya Pradesh, India

Abstract

The quantitative and qualitative aspects of dietary intake are important factors influencing the nutritional status in young children in a developing country. The type of food pattern determines the dietary bulk and nutritional intake in young children. The need for care and value addition to the routine food pattern is increasingly felt as an important component in child health and nutrition. In a developing country like India, ensuring optimal food safety, healthy environment and availability of health services is a target still to be achieved. This project was done to understand the acceptance of low cost, effective and healthy dietary intervention among school children as they are the most vulnerable group to experience health problems related to under nutrition, malnutrition or simple childhood obesity.

The aim of study is to examine the acceptance of dietary intervention in primary and higher secondary school children. The value addition was done by providing a dietary intervention of sprouted green gram in quanti ty of 50 gms and 100 gms at a cost INR 2/- and INR 4/- respectively. The dietary intervention was implemented in schools after assessment of their nutritional status, eating habits environmental factor such as parent level of education, commonly preferred food types by children and their parents. Six schools were identified and awareness campaign for a total population of 7200 students was conducted, following which and 2000 children consented to adopt this dietary supplement.

The program was monitored for 5 months. The result revealed that 1900 students were consuming sprouted green gram on the regular by adopting it in their daily routine which 95% adoption rate. These school children were interviewed by a team of 8 doctors from Sant Hirdaram Medical College of Naturopathy and Yogic Sciences over a period of 15 days. 45% of the children revealed their liking for sprouts because of its health benefits. 27% of the children revealed the motivation and monitoring of patents as the reason of their regular consumption, and the remaining 28% stated that they were partially influenced by their friends but were unable to describe correctly what influenced them to consume sprouts.

Keywords: Nutrition; School children; Nutritional intake; Child health and nutrition; Health problems

Background

India is home to the largest number of under nourished people in the world. In the state of Madhya Pradesh despite the government's efforts to address malnutrition, the issue is largely prevalent. According to the National Family Survey-III malnutrition in the State has increased from 54%-60%, making Madhya Pradesh children the most undernourished in India. With incessant problems raised in various steps of execution of the Integrated Child Development Scheme, the effectiveness of addressing this issue has become a major concern. This very situation the major factor to conceptualize this study and project of distribution of green gram sprouts in primary and secondary schools catering the educational needs of lower and middle socio-economic strata of society.

As per the 2012 report of the statistical appraisal on Children in Indian the prominent findings relevant to nutritional status is described as,

1) 48% of children under age five years are stunted (too short for their age) which indicates that, half of the country's children are chronically malnourished.

2) Acute malnutrition, as evidenced by wasting, results in a child being (too thin for his or her height). 19.8% of children less than five years in the country are wasted which indicates that, one out of every five children in India is wasted.

3) 43% of children under age five years are underweight for their age.

4) Prevalence of stunting and underweight was highest in age group 11 yrs. to 13 yrs. whereas prevalence of wasting was highest in age group 5 yrs. to 7 yrs.

With the revelation of the above findings, it is reassured that malnutrition is not the result of a single cause; the problem is multifaceted, the causes acting singly or in combination with other complex factors like poverty, purchasing power, health care, ignorance on nutrition and health education, female illiteracy, social convention etc.

Cereal grains form a major source of dietary nutrients for all people, particularly those in the developing countries. However, the nutritional quality of cereal grains and sensory properties of their products are inferior due to lower protein content, deficiency of certain essential amino acids, lower protein and starch availabilities, presence of certain anti- nutrients, and the coarse nature of the grains. The consumption of sprouted cereals is becoming popular in various parts

***Corresponding author:** Dr. Gulab Rai Tewani, Sant Hirdaram Medical College of Naturopathy and Yogic Sciences, Bhopal-462030, Madhya Pradesh, India, Tel: 0755-4283545; E-mail: drgulabtewani@gmail.com

Received March 28, 2014; **Accepted** June 23, 2015; **Published** June 25, 2015

Citation: Tewani GR, Saranyan P (2015) An Evaluation of a Project Regarding the Acceptance of Value Addition to Nutrition in Primary and Higher Secondary School Children in Bairagarh, Bhopal, Madhya Pradesh. J Health Edu Res Dev S1: 002. doi:10.4172/2380-5439.S1-002

of the world. Sprouting of grains for a limited period causes increased activities of hydrolytic enzymes, improvement in the contents of certain essential amino acids, total sugars, and B-group vitamins, and a decrease in dry matter, starch, and anti-nutrients. The digestibility of storage proteins and starch are improved due to their partial hydrolysis during sprouting [1].

The practice of sprouting of cereal grains has become popular in both western and eastern world. Sprouted grains are thought of as having exceptional nutritive value. Sprouting is easy and can be done without sophisticated equipment. Untreated seeds of good quality and high germination percentage are placed in an environment of adequate water, a desirable temperature, and a certain composition of gases in the atmosphere for several days for sprouting. The sprouts can be kept for a few days to over a week under refrigeration. They can be used in many different foods including breakfast items, salads, soups, casseroles, pasta, and baked products. Sprouting of grains causes increased enzyme activity, a loss of total dry matter, an increase in total protein, a change in amino acid composition, a decrease in starch, increases in sugars, a slight increase in crude fat and crude fibre, and slightly higher amounts of certain vitamins and minerals. Most of the increases in nutrients are not true increases, however. They simply reflect the loss of dry matter, mainly in the form of carbohydrates, due to respiration during sprouting. As total carbohydrates decreases, the percentage of other nutrients increases. There are no nutritional evaluations of cereal sprouts in humans [2].

Green gram or mung bean (Vigna radiata) is an important food legume grown under tropical and subtropical conditions. It is an excellent source of protein and is almost free from flatulence-causing factors. Because of this, green gram seeds are preferred for feeding babies and those convalescing. The seeds contain a higher proportion of lysine than any other legume seeds. The seeds are processed and consumed as cooked whole beans or splits (dhals), sprouts, immature seeds, and flour and are used in various recipes [3].

Germination of mung beans dramatically increased increases vitamin C content in mung bean sprouts in a time-dependent manner and reached reaches the peak on day 8 of germination up to 285 mg/100 g DW, almost 24 times higher than the initial concentration in mung bean seeds ($p < 0.05$). On fresh weight basis, one serving of mung bean sprouts (about 104 g) provides 21.6 mg of vitamin C, which could meet 36% of Daily Value (DV). In addition, the germination dramatically increased increases total phenolic compounds and total flavonoids in mung bean sprouts in a time-dependent manner, up to 4.5 and 6.8 times higher than the original concentration of mung bean seeds, respectively.

The purpose of this study is to evaluate the acceptance levels of value addition to nutrition by green gram sprouts in school children along with their regular food consumed at school.

This study aims to understand the effectiveness of the sprouts distribution program undertaken as a voluntary step. The major objectives of this study were,

1) To emphasis on the nutritional importance and health benefits of sprouts to school children

2) To create awareness among the parent and teachers of the school children to contribute positively to developing the habit of consuming sprouted green gram in school children.

3) To improve the nutritional status of children by providing economically viable, easily and regularly available optimal nutrition [4].

Methodology

A clear implementation strategy for distribution of sprouts to schools within the range of 10 kilometers was designed with people assigned specific jobs in the procurement, processing, packaging and distribution of green gram sprouts. The sprouts were packages in two formats, like 50 grams and 100 grams with a nominal cost of Rupees two and four crude fibre, and slightly higher amounts of certain vitamins and minerals. Most of the respectively. Our doctors conducted a series of awareness programs in the schools identified in the range of ten kilometers from our Centre and explained about the health benefits of green gram sprouts through a specific awareness module for teachers, parents and students. The age group of children educated for adopting daily consumption of sprouts was between the ages of 5 to 15 years. The entire process of production of green gram sprouts and distribution of packets was monitored on a daily basis as explained in Figure 1 with specific formats, daily accounts and feedback from the personnel in-charge in every school (Table 1).

The overall nutritional status, eating habits and environmental factor such as parent level of education, commonly preferred food types by children and their parents was collected through interviews method and some minor modifications were implemented in the green gram sprouts packaging. To add texture, taste and variety to the value addition, few pieces of cucumber, carrots, pineapple and raisins were added to both packets of 50 and 100 grams of sprouts [5].

Then the green gram sprouts packets were then packaged on daily basis and distributed to the respective schools with the help of a log sheet of the students who have consented to adopt consuming sprouts, on a daily basis except on Sundays. This distribution pattern was observed for five months continuously from July to December 2011.

Outcome Measures: After five months, this entire exercise of value addition was analyzed on the basis of the regularity in the adoption of sprouts consumption at school. The reasons which attributed to

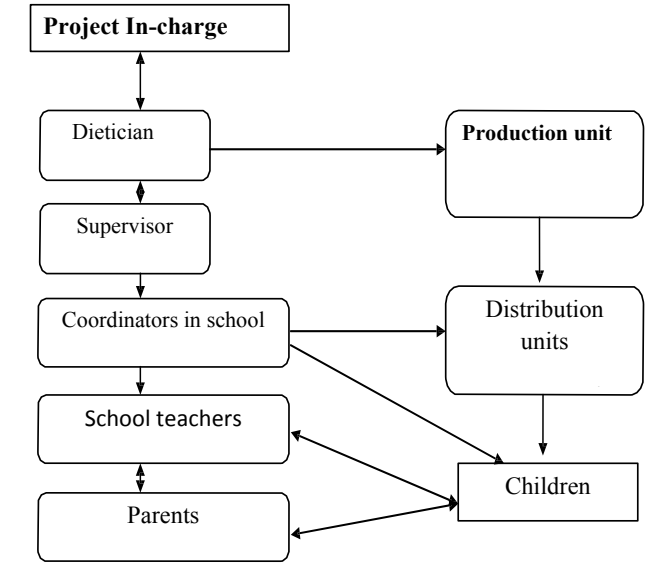

Figure 1: Conventional vs. Genetic engineering (Source Biotech Mentor's Kit, 2003)

S.No.	Name of Schools	Average no. of pkts distributed per day
1	Laxmi Devi Vikyomal Shroff School, Gandhinagar, Bhopal, Madhya Pradesh, India	500
2	Sadhu Vaswani School, Bairagarh, Bhopal, Madhya Pradesh, India	450
3	Mithi Gobindaram Public School, Bairagarh, Bhopal, Madhya Pradesh, India	450
4	Sanskar Public School, Bairagarh, Bhopal, Madhya Pradesh, India	200
5	Navnidh Hassomal Lakhani Public School, Bairagarh, Bhopal, Madhya Pradesh, India	200
6	Government Girls School, Bairagarh, Bhopal, Madhya Pradesh, India	200

Table 1: Distribution of packets of sprouts among school children.

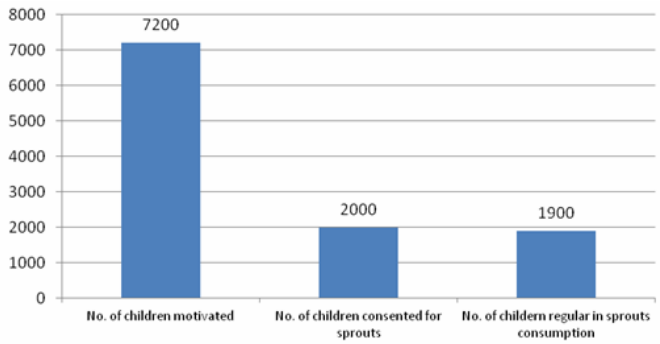

Figure 2: Details of children approached, consented and regular in sprouts consumption.

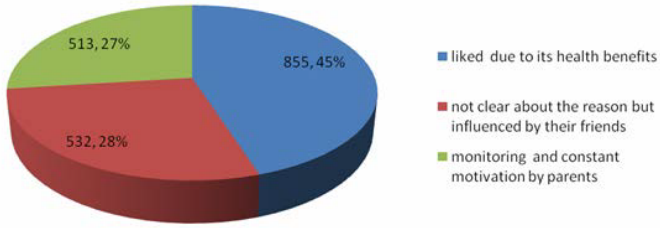

Figure 3: Factors which influenced to regularly consume sprouts.

the regularity and continuity of this practice among students were collected and analyzed [6].

Out of 2000 children who consented to adopt the sprouts consumption at school, 1900 children showed regularity in consuming sprouts in school, as shown in Figure 2. The detailed analysis showed predominant regularity among students between the age of 10 -15 years. The factors which influenced them to maintain regularity in consumption of sprouts were assessed based on interview method [7].

Results

The study showed that among the 2000 children who consented to adopt green gram sprouts in their daily diet, 1900 students showed regularity in consumption for and duration of 5 months. The various reasons which attributed for this regularity are 855 (45%) children liked the eating sprouts due to its health benefits, 532 (28%) children were not clear about the reason to follow by were influenced by their friends, hence regularly consumed sprouts and the remaining 513 (27%) were regular due to monitoring and constant motivation by their parents, as shown in Figure 3. The analysis shows 95% adoption rate of this practice of adding green gram sprouts to the regular food habits in school children. The result is very encouraging and reassuring that the issue of malnutrition can be gradually addressed with efforts focused on smaller cluster groups with the help of healthcare professionals and repeated counselling and awareness.

Conclusion

Green gram sprouts which has a significantly good nutritional value as shown in Table 2, can be the ideal choice for sprouting. The ease in the process of sprouting as well as training or teaching people to sprout green gram plays an important role in this entire project. The combination of awareness programs and involving a multi-disciplinary team of teachers, professionals, parents can show good results in this type of value addition in food habits, provided it is implemented in smaller clusters under systematic monitoring; (Figure 4) Madhya Pradesh, being a large state fighting this serious issue of malnutrition can seriously benefit from this practice of value addition of nutrition through sprouted green gram. With this study showing some encouraging results, there is a serious need to further study on the physiological, nutritional and biochemical parameters in these children to critically analyze the nutritional impact of this value addition.

Nutrients	Total 100 g (approximately)
Moisture (gms)	33.59
Protein (N×6.25)	15.01
Fat (gms)	7.3
Minerals (gms)	2.31
Crude fiber (gms)	2.73
Carbohydrates	39.01
Energy (Kcal)	282.05
Calcium (mg)	102.55
Phosphorus (mg)	273.8
Iron (mg)	3.38
Carotene (µg)	235.57

Table 2: Nutritional Value of 100 gms of sprouted green gram as per National Institute of Nutrition (ICMR), Hyderabad, India, 1989 (revised edition).

Figure 4: Awareness program involving healthcare professionals, teachers and parents.

References

1. Chavan JK, Kadam SS (1989) Nutritional improvement of cereals by sprouting. Crit Rev Food Sci Nutr 28: 401-437.
2. Lorenz K (1980) Cereal sprouts: composition, nutritive value, food applications. Crit Rev Food Sci Nutr 13: 353-385.
3. Adsule RN, Kadam SS, Salunkhe DK (1986) Chemistry and technology of green gram (Vigna radiata [L] Wilczek). Crit Rev Food Sci Nutr 25: 73-105.
4. Patgiri SJ, Borthakur AK, Borkakoty B, Saikia L, Dutta R, et al. (2014) An appraisal of clinicopathological parameters in Japanese encephalitis and changing epidemiological trends in upper Assam, India. Indian J Pathol Microbiol 57: 400-406.
5. Critical Reviews in Food Science Nutrition (1980).
6. Srivastava A, Mahmood SE, Srivastava PM, Shrotriya VP, Kumar B (2012) Nutritional status of school-age children - A scenario of urban slums in India. Arch Public Health 70: 8.
7. Children in India –A statistical appraisal (2012).

This article was originally published in a special issue, **Etiology of Diseases, Nutrition and Human Learning** handled by Editor(s). Dr. Miruka Conrad Ondieki, Kampala International University