Effectiveness of Game-Based Education on Nutritional Knowledge and Self- Efficacy among School Children

Abstract:

Background: Game-based education is an intervention that can be used to improve the nutritional knowledge among children. Game-based education is one of the cost-effective tool that enhance learning opportunities by positively affecting motivation and interest of participants. **Aims and Objectives:** The aim of the study was to evaluate the effectiveness of game-based education on nutritional knowledge and self-efficacy among school children. **Methods and Materials:** Quantitative research approach, pre-experimental one group pretest and post-test research design were used. 53 school children were selected using convenient sampling technique. The study was conducted at Vels Vidhyashram School, Chennai. Semi structured questionnaire and modified self-efficacy scale was used to assess the nutritional knowledge and self-efficacy. **Results:** The pretest mean score of nutritional knowledge was 10.77 ± 3 and the post-test mean score was 13.66 ± 3.27. The mean difference score was 3.89. The calculated paired "t" test value $t = 4.91$ was found to be statistically significant at $p<0.05$ level. The pretest mean score of self-efficacy was 31.51 ± 4.84 and the post-test mean score of self-efficacy was 32.19 ± 5.57 and the men difference score was 0.68. The calculated paired "t" test value of $t = 0.63$ was found to be non-significant at $p<0.05$ level. **Conclusion:** This study concludes that game-based education on nutritional knowledge and self-efficacy among school children was found to be effective in improving knowledge in the post-test.

***Keywords*:** Game-based education, level of knowledge, Self-efficacy, School children.

I INTRODUCTION

“Let food be thy medicine, thy medicine shall be thy food”.

- Hippocrates

Nutrition is a critical part of health and development, better nutrition is related to improved child health, growth and development, stronger immune system, and lower risk of adolescents who are in a pubertal phase of development and growth. Nutrition is the process of consuming, absorbing and using nutrients needed by the body for growth, development and maintenance of life.[1]

Good nutrition aims to achieve and maintain a desirable body composition, optimal health, prevention of disease and high potential for physical & mental work. Increasing nutrition knowledge and interest are typical strategies for nutrition intervention and important pre-requisites for eliciting diet-related behavior changes.[2]

Obesity is one side of the double burden of malnutrition. From 1975 to 2016, the prevalence of overweight or obese children and adolescents aged 5-19 years increased more the four-fold from 4% to 18% globally. Over 340 million children and adolescents aged 5 - 19 were overweight or obese in 2016.[3]

Self- efficacy refers to the confidence in ability to perform a particular action and is expected to influence the likelihood of the behavioral occurrence. Nutritional self-efficacy is achieved through knowledge, understanding and skills development, it is vital in facilitating healthy eating habits among school children.[4]

Game based education refers to borrowing of certain gaming principles and apply them in real life setting to use. The motivational psychology involved in game-based education allows student to engage with educational materials in a playful & dynamic way.[5]

Game based education may enhance learning opportunities by positively affecting motivation and interest of participants. A recent review found that game-based education, can have an impact on children's eating behaviour. As the investigators realized the urgent need

for educating the school children regarding nutrition in order to overcome inappropriate dietary behaviours.[5]

Statement of the problem

A pre-experimental study to evaluate the effectiveness of game-based education on nutritional knowledge and self-efficacy among school children at a selected school, Chennai.

Objectives

- To assess and compare the pretest and post-test level of nutritional knowledge and self-efficacy among school children.
- To evaluate the effectiveness of game-based education on nutritional knowledge and self-efficacy among school children.
- To associate the post-test level of nutritional- knowledge and self-efficacy among school children with their selected demographic variables.

Hypotheses

- **NH_1** - There is no significant difference between the pre and post-test level of nutritional knowledge and self-efficacy among school children.
- **NH_2** - There is no significant association between the post test score of nutritional knowledge and self-efficacy among school children with their selected demographic variables.

II MATERIALS AND METHODS

A quantitative research approach with pre-experimental design one group pretest and post-test design was adopted in the study. The independent variable was game-based

education and the dependent variables were nutritional knowledge and self-efficacy. The study was conducted at Vels Vidhyashram School, Chennai. The sample size was 53 school children who fulfilled the inclusion and exclusion criteria, selected using a non-probability sampling technique. The samples were selected based on the following:

Inclusion Criteria: School children

• who are studying in 7^{th} std.

• who are able to read and understand Tamil and English

Exclusion Criteria: School children

• who are not willing to participate in the study.

• who are sick during the data collection

Development and description of the tool

It consists of two sections.

Section A: Assessment of the Demographic variables

This consists of Age (in years), Gender, Degree of malnutrition,

Monthly family income, Maternal Education, Paternal education, Type of family &

Dietary pattern, history of food allergy, habit of taking junk food

Section B: A **Semi – structured knowledge questionnaire** formulated by the investigator was used to assess the nutritional knowledge. It consisted of 20 questions with one correct answer each. Ti was categorized under the following components: types of nutrients, functions, deficiency diseases and the sources of nutrients. Participants were asked to select a suitable answer from the four options given.

Section C: Modified Nutritional Self-efficacy scale consisted of 10 statements on healthy eating habits. School children were asked to mark their confidence level towards healthy eating on a 5-point Likert scale.

Data collection procedure:

After obtaining formal permission from the school Principal, oral assent from the school students and written informed consent from the parents, the investigator obtained demographic variables from the samples, following which pre – test level of nutritional knowledge and self-efficacy was assessed using the above-mentioned tools. Following this, game-based education was given using a PowerPoint presentation for 15mts followed by a connection game was conducted to recollect the content taught. Post-test was conducted after 7 days of intervention.

Ethical consideration

The study proposal and plans were granted formal ethical approval by Institutional Ethical Committee of Venkateswara Nursing College, Chennai, India. Oral assent from the school children and written informed consent from the parents were obtained after explaining the study purpose, type of data required, participants, procedure, potential benefits and right to withdraw from the study was explained. Confidentiality of data and anonymity of the study participants was assured.

III RESULTS

Distribution of demographic variables of school children

The study revealed that majority of the children, 45 (85%) were in the age between11-12 years, 31 (58%) were male, 24 (45%) children's mothers had post graduate education, 29 (55%) of children's father were post graduate 50 (94%) had a family monthly income of rupees above 20001, 43 (81%) belonged to the nuclear family, 37 (70%) had a normal nutritional status, 9 (17%) had no history of food allergies and 48 (91%) reported a habit of taking junk food.

Frequency and Percentage distribution of pre and post-test level of nutritional knowledge

N = 53

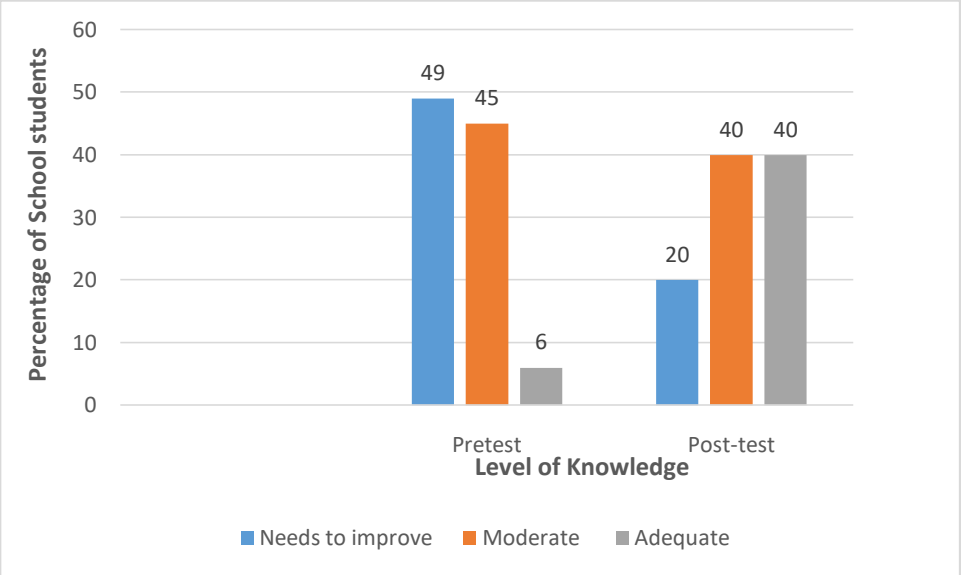

Figure 1: Percentage distribution of pre and post-test level of nutritional knowledge among school children

Figure 1 reveals that in the pre-test level of nutritional knowledge 49% of school children had needs to improve, 45% had moderate knowledge and only 6% had adequate knowledge

whereas in the post test, 20% had needs to improve, 40% had moderate knowledge and 40% had adequate knowledge.

Frequency and Percentage distribution of pre and post-test level of self-efficacy among school children

N = 53

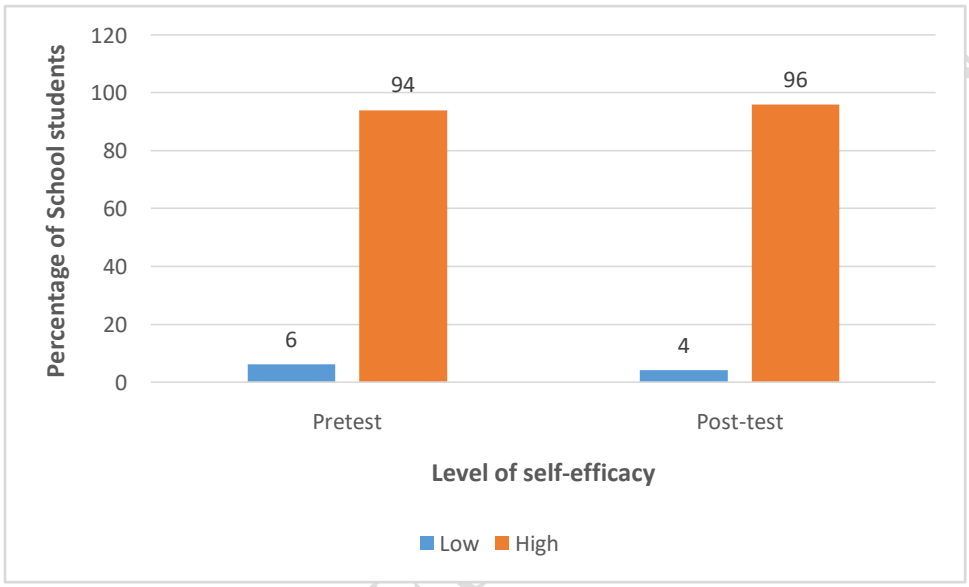

Figure:2 Percentage distribution of pre and posttest level of self-efficacy among school children

Figure 2 reveals that in the pre-test, 6% of school children had low self-efficacy level, 94% had high self-efficacy level whereas in the post-test 4% had low self-efficacy and 96% had high self-efficacy level.

Effectiveness of game-based education on nutritional knowledge and self- efficacy among school children.

TABLE- 1: Comparison of pretest and post-test nutritional knowledge and self- efficacy among school children.

N=53

Variables	**Test**	**Mean**	**SD**	**Mean Difference Score**	**Paired 't' Test Value**
Nutritional Knowledge	Pre-test	10.77	3	3.89	t= 4.91
	Post-test	14.66	3.27		P = 0.05*
					DF=52, S*
Self-Efficacy	Pre-test	31.51	4.81	0.68	t= 0.63
	Post-test	32.19	5.57		NS

* Significant at p< 0.05, S – Significant, NS – Non-Significant

Table 1 reveals that the pre-test mean score of nutritional knowledge was 10.77 with a standard deviation of 3 and the post-test mean score was 13.66 with a standard deviation of 3.27. The mean difference score was 3.89. The calculated paired "t" test value t = 4.91 was found to be statistically significant at p<0.05 level. The pretest mean score of self efficacy was 31.51 ± 4.84 and the post-test mean score of self-efficacy was 32.19 ± 5.57 and the men difference score was 0.68. The calculated paired "t" test value of t=0.63 was found to be non-significant at p<0.05 level.

Association of the post-test level of nutritional knowledge among school children with selected demographic variables

The demographic variables age ($\chi 2=2.28$, $p=0.455$) gender ($\chi 2=1.50$, $p=0.455$), history of food allergies ($\chi 2=2.40$, $p=1.386$) history of taking junk foods ($\chi 2=2.81$,$p=1.386$) had shown statistically significant association with post-test level of nutritional knowledge at $p<0.05$ level. The school children in the age of 11-12 years , male, has history of taking junk food and no history of food allergies had high level self-efficacy at $p <0.05$ level.

IV DISCUSSION

With regard to the demographic variables of school children, , 45 (85%) of the children were in the age between 11-12 years, 31 (58%) were male, 24 (45%) children's mothers had post graduate education, 29 (55%) of children's father were post graduate, 50 (94%) had a family monthly income of rupees above 20001, 43 (81%) belonged to the nuclear family, 37 (70%) had a normal nutritional status, 9 (17%) had no history of food allergies and 48 (91%) reported a habit of taking junk food.

The comparison of pretest nutritional knowledge mean score of 10.77 and standard deviation of 3 with the post-test mean score of 13.66 and standard deviation of 3.27 provided a mean difference score of 3.89. The calculated paired "t" test value $t = 4.91$ was found to be statistically significant at $p<0.05$ level which proved that the administration of game-based education was effective in enhancing the knowledge of the school children regarding nutrition.

The association of selected demographic variables of school children with the mean differed level of knowledge and self-efficacy showed that age, male gender, history of food allergies and history of taking junk foods were significantly associated, indicating that higher knowledge and self-efficacy in boys and children with good dietary practices. The other

demographic variables were not associated with mean differed level of knowledge and self-efficacy of school children.

V CONCLUSION

The study concluded that there is a significant difference in the level of nutritional knowledge and self-efficacy of school children after administration of game-based education. Thus, the study findings revealed that this intervention was found to be effective in improving the knowledge and self-efficacy level among school children. Hence the researchers recommend to utilize this game-based education in various settings to create awareness among children to adopt healthy eating practices.

VI REFERENCES

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VIII CONFLICT OF INTEREST: None declared

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