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A study to evaluate the effectiveness of structured teaching programme on knowledge regarding the 5F's disease transmission (food, finger, fluid, fomites and faeces) among primary school students at selected primary schools of rural areas of Dharwad district

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Abstract
Good health is crucial for both personal development and the creation of a healthy society. Children, representing a significant portion of the global and Indian populations, are particularly vulnerable to preventable diseases due to inadequate knowledge about disease transmission. This study evaluates the effectiveness of a structured teaching program aimed at enhancing primary school students' understanding of the 5F's of disease transmission (food, fomite, fluid, flies, and feces) in rural Dharwad district.

An evaluative approach using a one-group pre-test-post-test design was employed, involving 60 primary school students selected through purposive sampling. Knowledge was assessed using a self-administered questionnaire before and after the intervention. Post-test results showed a significant increase in knowledge, with mean scores rising from 13.96 (SD = 4.41) pre-test to 20.18 (SD = 3.38) post-test. Statistical analysis confirmed the significance of this improvement (paired t-test, t = 19.07, $p < 0.05$). Chi-square analysis indicated a significant association between knowledge levels and religion, but no significant relationships with other demographic variables.

The study concludes that while initial knowledge about the 5F's disease transmission was inadequate, the structured teaching program substantially improved students' awareness. These findings underscore the effectiveness of targeted educational interventions and highlight the need for further research in this area, particularly in the Indian context where such studies are limited.

Keywords: 5 F's disease, knowledge, prevention

Introduction

"A disease is caused due to a specific organism or by its toxic products. It is transmitted from man, animal, or from environmental agents like food wastes, air, soil and dust, fluid, flies, faeces and fomite which is called communicable disease". These infectious agents may transmit through 5 F"s i.e., Food, Fingers, Fluids, Flies and Fomites. As a result of the growing prevalence of communicable diseases and the related cost burden, health promotion and illness prevention is increasingly important [7]. As the name suggests, feco-oral diseases are diseases that occur when the causative organisms which are excreted in the stools of infected persons (or less commonly animals) gain entry into the human host via the mouth. Therefore, the organisms have to pass through the environment from the faeces of an infected person to the digestive system of a susceptible person. This is known as the faeco-oral transmission route. Faeco-oral transmission of organisms causing disease occurs mostly through fecal contamination of food, water and hands which is not at all apparent. Very small amounts of feces can carry, enough organisms to establish infection. Seemingly sparkling clear harbour infective organisms. Clean-looking hands may carry and transmit enough micro- organisms to spread diseases. Human excreta and the lack of adequate personal and domestic hygiene have been impacted in the Transmission of many infectious diseases like cholera, typhoid, hepatitis, polio, cryptosporidiosis and ascariasis. The world Health Organization (WHO) estimates that 2.2 million people die annually from diseases and 10% of the population of the developing world are severely infected with intestinal worms related to improper waste and excreta management).

Human excreta-transmitted diseases predominantly affect children. Most of the deaths due to diarrhea occur in children at developing countries.[15] A UNICEF study found hand washing with soap to be among most effective and in exposure ways to prevent diarrheal disease and pneumonia, which together account for 3.5 million child die annually. In addition, improved hygienic practices will contribute to reduce the malnutrition in children, improving quality of life, protecting the environment and improving the economic benefits for communities and nation [16]. The Intestinal parasitic infections are among the most common infections of School are children in developing countries Poverty, low literacy rate, poor hygiene, lack of access to potable water and hot and humid tropical climate are the factors associated with high prevalence of intestinal parasitic infections in developing countries**.** Intestinal parasitic infections of humans are important threats to healthy living in developing Intestinal parasitic infections are responsible for considerable morbidity and occasional mortality among infected population throughout the world. It is estimated that around 2 billion people are infected with Intestinal parasites globally [14]. Children are particularly vulnerable to food borne illnesses due to their immature immune system. Worldwide food borne diseases are major health burden leading to high morbidity and mortality, occurring mainly to young children caused by contaminated food. The food borne diseases are increased more than twice compared to previous years. Food safety progress report shows that there is a 14% increase in outbreak of Campylobacter compared to the previous year and Vibrio increased to 43%, other organisms such as E.Coli, listeria, salmonella, yersinia has no change. There were estimated 582 million cases of 22 different food borne endemic diseases responsible for more deaths. Salmonella typhi (35,000) and 40% suffer from endemic disease caused by contaminated food. Keeping this in mind the WHO announced the theme for World Health Day, 2015 as "Farm to plate", "Make food safe" [18]. Food borne diseases causes an estimated 48 million illnesses each year in the United States, including 9.4 million caused by known pathogens. Food borne disease outbreak surveillance provides valuable insights into the agents and foods that cause illness and the settings in which transmission occurs. CDC maintains a surveillance program for collection and periodic reporting of data on the occurrence and causes of food borne diseases outbreaks in the United States. This surveillance system is the primary source of national data describing the numbers of illness, hospitalizations, and deaths; etiologic agents; implicated foods; contributing factors; and settings of food preparation and consumption associated with recognized food borne disease outbreaks in the United States [19].

The Project

"A study to evaluate the effectiveness of structured teaching program on knowledge regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) among Primary school students at selected Primary schools of rural areas of Dharwad district"

Aims of the study

1. To assess the knowledge among Primary school students regarding the 5F's disease transmission (food, finger, fluid, fomites and faeces) in terms of pre-test knowledge scores.
2. To evaluate the effectiveness of structured teaching program by comparing the pre- test and post- test knowledge scores on 5F's disease transmission (food, finger, fluid, fomites and faeces) among Primary school students.
3. To determine the association between pre-test level of knowledge of Primary school students regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) with their selected socio demographic variables.

Hypotheses

The following hypotheses are formulated for the study and will be used at 0.05 level of significace.

- **H_1:** The mean post test knowledge scores of Primary school students exposed to structured teaching program on 5F's disease transmission (food, finger, fluid, fomites and faeces) will be significantly higher than the mean pre-test knowledge scores at 0.05 level of significance.
- **H_2:** There will be statistical association between the mean pre-test level of knowledge of Primary school students regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) and their selected demographic variables at 0.05 level of significance.

Conceptual/Theoretical Framework

The conceptual frame work selected for the present study was based on General system theory by Ludwig Von Beratnlafy, it defines system as "science of wholeness and its purposes is to unite scientific thinking across disciplines and which provide frame work for analysing the whole of any given system." He further defines system "as a complex interaction "which means that system consists of two or more converted elements which form an organized whole and which interact with each other rather than loss of single function. In all system activity can be resolved into an aggregation of feedback, circuits such as input, through put and output. In this conceptual framework, in this study, input includes Input is any form of energy or information, material or human that enters into a system through its boundary. This input includes learner's background, level of knowledge and interest. For a system to work well, input should contribute to achieve the purpose of topic. In the present study, input refers to primary school students demographic data (Age, gender, year of study, religion, family income, type of family and previous knowledge regarding 5F transmission of diseases**.** Throughput or the process focuses on primarily upon actually delivery of the structured teaching programme. Output refers to an information, once passed on to the sample, are reassessed by a post-test and released in an altered state. Output usually focuses upon the learning outcome of the participants.

Methodology

- **Research Approach:** Evaluative Approach.
- **Research Design:** Pre-experimental one group pre-test posttest research design.
- **Samples:** Primary School Students.
- **Sampling Technique:** Non -Probability Purposive sampling technique.
- **Sample Size:** 60 students.

Plan for Data Analysis: Descriptive statistics (frequency,

percentage, mean, median and standard deviation) and inferential statistics were used for analysis and interpretation of data.

Setting of the Study
Selected Primary schools of rural areas of Dharwad district The rationale for selecting this setting was as follows:

- Familiarity with this setting
- Availability of study samples
- Expected co-operation from the students of this schools

Sampling Criteria
Sampling criteria involves selecting sample that meets some predetermined criteria of importance. The criteria for selection of sample were mainly depicted under two headings, which includes the inclusion criteria and exclusion criteria.

Inclusion criteria

- Who are studying in selected primary schools at rural areas of Dharwad.
- Who are willing to participate in the study.
- Who are available at the time of data collection.
- The study includes students in the age group 10-12 years.

Exclusion Criteria

- Primary school students who are below 10 and above 12 years of age.
- Primary school students and parents who are not willing to participate in this study.
- Primary school students who are not available during this study.
- Sick and not able to co-ordinate during the study.

Content validity
Content validity of the tool was ensured by 9 experts in the field. The suggestions were considered and modified.

Reliability of the tool
In order to establish the reliability of the tool split-half method was used. The tool was administered to 10 subjects who are studying in govt Primary school tadkod, and the test was first divided into two equivalent halves and correlation of the half test was found by using Karl Pearson correlation co-efficient formulae and the significance of the correlation was tested by using probable error. The reliability coefficient of the whole test was then estimated by Spearman's Brown Prophecy formulae. Reliability of the questionnaire was 0.86, so the tool was found to be highly reliable for the data collection. After pilot study tool was finalized form main study.

Data collection Instrument
Section I: Socio-demographic profile: This study consists of 7 numbers of questions those will help in obtaining information about the selected background factors such as age, gender, year of study, religion, family income, type of family, previous knowledge regarding 5F's disease transmission.

Section II:Distribution of knowledge scores during pre-test and post test: It consists 30 items of multiple-choice questions on knowledge regarding 5F's disease transmission (food, finger, fluid, fomites and faeces).
Process of data collection was as follows Selection of the subjects was done after applying the predetermined inclusion criteria.

- Written consent was obtained from subjects to participate in the study
- Samples are selected by Non-Probability purposive sampling technique.
- On day 1 the pre-test was conducted, later structured teaching program was administered to the participant and post test was conducted on day 8.
- Data analysis was done using descriptive and inferential statistics.

Results
Organization of Findings
The analysis of the data is organized and presented under following sections;

Section 1: Findings related to distribution of socio-demographic data of selected primary schools of rural areas of dharwad district.

Section 2
(A): Findings related to distribution of knowledge scores during pre-test and post

(B): Distribution respondents pre-test and post test scores according to their level of knowledge.

(C): Findings related to effectiveness of structured teaching program.

(D): Findings related to association between level of knowledge and selected socio demographic variables.

Section I: Socio-Demographic Profile
Study comprised of 60 participants. The socio demographic scores of participants were tabulated and frequency and percentage were calculated. The findings are presented in following table and graphs.

Table 1: Socio-Demographic Variables of Primary School Students in Rural Dharwad District

S. No	Socio Demographic variables	Frequency(f)	Percentage (%)
1.	Age (in years) 9 - 10	16	26.7
	11 -12	2	48.3
	13 -14	15	25
2.	Gender		
	Male	35	58.3
	Female	25	41.7
3.	Year of study		
	4th std	32	53.3
	5th std	13	21.7

	6th std	6	10
	7th std	9	15
4.	Religion		
	Hindu	34	56.7
	Muslim	17	28.3
	Christian	6	10
	other	3	5
5.	Family income / month		
	Below 10,000/-	9	15
	10,001-20,000/-	26	43.3
	20,001-30,000/-	20	33.3
	30,001& above	5	8.3
6.	Type of family		
	Nuclear	34	56.7
	Joint	22	36.7
	Extended	4	6.7
7.	Previous knowledge regarding 5F' s of disease transmission		
	Yes	35	58.3
	No	25	41.7

Section 2(A): Findings related to distribution of knowledge scores during pre-test and post.

Table 2: Mean, median, mode, standard deviation and range of pre-test knowledge scores of Respondents regarding 5F's disease transmission (food, finger, fluid, fomites and faeces), n=60

Area of Knowledge	Number of Items	Mean	Median	Mode	Standard deviation	Range
Pre-test scores	30	13.96	13	12	4.41	4-25
Post test scores	30	20.18	19	19	3.38	14-27

Table 2 reveals pre-test and post-test knowledge score of respondents regarding 5F's disease transmission (food, finger, fluid, fomites and faeces).

In pre-test knowledge score, respondents mean was 13.96, median was 13, mode was 12 with standard deviation 4.41 and score range was 4-25.

In post-test knowledge score, respondents mean was 20.18, median was 19, mode was 19 with standard deviation 3.38 and score range was 14-27.

Section 2(B): Distribution respondents pre-test and post test scores according to their level of knowledge.

Table 3: Frequency and Percentage distribution of respondents according to level of Knowledge regarding 5F's disease transmission (food, finger, fluid, fomites and faeces), n = 60

Level of Knowledge					
Pre-test			Post test		
Poor f (%)	Average f (%)	Good f (%)	Poor f (%)	Average f (%)	Good f (%)
12 (20%)	41 (68.3%)	7(11.7%)	00	32 (53.3%)	28 (46.7%)

The data presented in the Table 3 depicts the respondent's level of knowledge during pre-test and post test regarding 5F's disease transmission (food, finger, fluid, fomites and faeces);

With regard to pre-test level of knowledge it shows that, maximum 41(68.3%) respondents were having average knowledge, 12(20%) respondents were having poor knowledge and remaining 7(11.7%) of respondents were having good knowledge.

During post test maximum 32(53.3%) of respondents were having average knowledge and remaining 28(46.7%) of respondents were having good knowledge.

Section 2(C): Findings related to effectiveness of structured teaching program.

This section deals with the comparison of pre-test and post knowledge scores in terms of Mean, Median, Mode, Standard deviation and range. Also testing of H_1 for the finding effectiveness of the structured teaching program on knowledge regarding 5F' disease transmission. This finding will confirm the usage of this structured teaching programe in future for enhancing the knowledge of Primary school students.

H_1: The mean post test knowledge scores of Primary school students exposed to structured teaching program on 5F's disease transmission (food, finger, fluid, fomites and faeces) will be significantly higher than the mean pre-test knowledge scores at 0.05 level of significance

Table 4: Mean, standard deviation, standard error of difference and 't' value of pre-test and post-test knowledge scores regarding 5F's disease transmission (food, finger, fluid, fomites and faeces)

	Mean	Sd	SEMD	Paired t Test
Pre-test	13.96	4.41	0.32	19.07*
Post-test	20.18	3.38		

* Significant at 5% level

Table 4 indicates the overall mean knowledge scores of pre-test and post-test scores regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) among Primary school students.

The findings reveal that the post-test mean knowledge scores was found higher [mean=20.18, SD of 3.38] when compared with pre-test mean knowledge score value which was 13.96 with SD of 4.41.

The statistical paired 't' implies that the difference in the

pre-test and post-test value was found statistically significant at 5% level (p<0.05) with a paired 't' value of 19.07. There exists a statistical significance in the difference of knowledge score indicating the positive impact of structured teaching program.

Section 2(D): Findings related to association between level of knowledge and selected socio demographic variables.

Table 5: Chi-square values between levels of knowledge of respondents regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) and their selected demographic variables. n =60

S. No	Demographic variables	Knowledge score			d(f)	Chi square value	Level of significance
		Poor	Average	Good			
1	**Age (in years)**				4	7.50	NS
	a) 9 - 10	1	14	1			
	b) 11 -12	5	19	5			
	c) 13 -14	6	8	1			
2	**Gender**				2	2.71	NS
	a) Male	9	21	5			
	b) Female	3	20	2			
3	**Year of study**				6	5.61	NS
	a) 4th std	5	24	3			
	b) 5th std	4	8	1			
	c) 6th std	0	5	1			
	d) 7th std	3	4	2			
4	**Religion**				2	14.21	S
	a) Hindu	6	23	5			
	b) Muslim	3	14	0			
	c) Christian	2	4	0			
	d) other	1	0	2			
5	**Family income / month**				2	6.33	NS
	a) Below 10,000/-	1	8	0			
	b) 10,001- 20,000/-	5	17	4			
	c) 20,001- 30,000/-	6	11	3			
	d) 30,001 & above	0	5	0			
6.	**Type of family**				4	4.26	NS
	a) Nuclear	5	24	5			
	b) Joint	7	13	2			
	c) Extended	0	4	0			
7.	**Previous knowledge regarding 5F's of disease transmission**				4	1.46	NS
	a) Yes	6	26	3			
	b) No	6	15	4			

$\chi^2(2) = 5.99, (6) = 12.59$ (p>0.05) NS – Not Significant

The data presented in the Table 5 shows that the computed Chi-square value for association between level of knowledge of Primary school students regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) and their selected demographic variables is found to be statistically significant at 0.05 levels for religion

H_2: There will be statistical association between the mean pre-test level of knowledge of Primary school students regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) and their selected demographic variables at 0.05 level of significance.

Discussion

The findings of the study were discussed under following

Sections. I: Description of demographic characteristics.

II: Analysis of knowledge score of respondents regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) among respondents

III: Analysis of effectiveness of structured teaching program

IV: Association between pre-test knowledge score with selected socio-demographic variables.

I: Findings related to socio- demographic variables

- Majority 29(48.3%) of the respondents belong to the age group of 11-12 years
- Majority 35(58.3%) of the respondents were males
- Majority 32(53.3%) of the respondents were studying in 4th standard
- Majority 34 (56.7%) of the respondents were belonged to Hindu religion
- Majority 26(43.3%) of respondents were had 10001-20000 income
- Majority 34(56.7%) of respondents were belonged to nuclear family
- Majority 35(58.3%) of respondents were had previous knowledge regarding 5F's of disease transmission

II: Findings related to Analysis of knowledge score of respondents regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) among participants

In pre-test knowledge score, respondents mean was 13.96, median was 13, mode was 12 with standard deviation 4.41 and score range was 4-25.

In post test knowledge score, respondents mean was 20.18, median was 19, mode was 19 with standard deviation 3.38

and score range was 14-27.

With regard to pre-test level of knowledge it shows that, maximum 41(68.3%) respondents were having average knowledge, 12(20%) respondents were having poor knowledge and remaining 7(11.7%) of respondents were having good knowledge.

During posttest maximum 32(53.3%) of respondents were having average knowledge and remaining 28(46.7%) of respondents were having good knowledge.

III: Analysis of effectiveness of structured teaching program regarding 5F's disease transmission (food, finger, fluid, fomites and faeces)

The findings reveal that the post-test mean knowledge scores was found higher [mean=20.18, SD of 3.38] when compared with pre-test mean knowledge score value which was 13.96 with SD of 4.41.

The statistical paired 't' implies that the difference in the pre-test and post-test value was found statistically significant at 5% level ($p<0.05$) with a paired 't' value of 19.07. There exists a statistical significance in the difference of knowledge score indicating the positive impact of structured teaching program.

IV: Association between pre-test knowledge score with selected socio-demographic variables.

the computed Chi-square value for association between level of knowledge of Primary school students regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) and their selected demographic variables is found to be statistically significant at 0.05 levels for religion and is not found significant for other selected socio demographic variables.

Conclusion

The findings revealed that Knowledge of Primary school students regarding 5F's disease transmission (food, finger, fluid, fomites and faeces) during pre-test was average and is increased as good after structured teaching program. structured teaching program was effective to enhance knowledge of Primary school students regarding 5F's disease transmission (food, finger, fluid, fomites and faeces). The study found that there is significant association between knowledge scores with their selected socio demographic variables like, religion.

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