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"Effect of a need based health education on health problem and its prevention among the farmers exposed to pesticides in a selected rural area, West Bengal."

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ABSTRCT : Pesticides despite their known toxicity are widely used in developing countries for agricultural purposes. A study to effect of a need based health education on health problem and its prevention among the farmers exposed to pesticides in a selected rural area, West Bengal. Objectives were to assess the learning need of the health problems and its prevention among the farmers exposed to pesticides. The study was conducted in two phases. Survey approach and Pre experimental research approach one group pre-test post test design were adopted from with non probability convenience sampling (phase I), and simple random sampling followed by lottery method (phase-II). Sample size was 100 and 40 respectively. Three tools were used for data collection. Findings showed that the farmers expressed their needs above 80% in the all areas of learning need assessment. The sample characteristics from demographic proforma was evident that 50% farmers are illiterate, most of the farmers 62.5% did farming from 3 years to 6 years, whereas 67.5% farmers are using pesticide for 3years to 6 years. Knowledge scores (52.5%) samples pre test knowledge score range was within 16 - 18 and where in the post test knowledge scores (75%) samples post test knowledge score range was within 25 – 27. The't' test was computed between the two means of pre test and post test knowledge scores and the t' value (t=24.6) was more than table value ('t' $_{(35)}$ =2.03 and't' $_{(40)}$ = 2.021p<0.05) at 0.05 level of significance at 39 df. From the chi square value it was evident that there was no significance association between pre test knowledge levels of farmers with all selected variables.

Keywords : Health education, health problems, farmers, prevention, pesticides.

INTRODUCTION : The word pesticide refers to any device, method of chemicals that kill pests or animals and to humanities food supply or are otherwise undesirable. Pesticides include insecticides, fungicides, herbicides, nematocides, and rodenticides[1]. According to 'Stockholom Convention on persistent Organic Pollutants', 9 of the 12 most dangerous and persistent organic chemicals are pesticides[2].

A pesticide may be a chemical, biological agent, antimicrobial, disinfectant or device used against any pest. Pesticides despite their known toxicity are widely used in developing countries for agricultural purposes. Occupational poisoning with pesticides is common in developing countries. Almost 80% of farmers are unaware of the patterns of hardware use for spraying of insecticides, prevalent storage practice, types of Personal Protective Equipments.[3]

Pesticides include substances intended for use as a plant growth regulator, defoliant, desiccant or agent for thinning fruit or preventing the premature fall of fruit and also used as substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport"[4].

In India 70% to 75%, of total population is living in rural area, out of which 80 % are farmers. In countries with low income, in order to find out better economical condition intensification of agriculture and control of vector borne diseases, there is an increase in the use of pesticides. Almost 900 active pesticides are used to manufacture 40,000 commercial preparations. The environmental agency estimates that the use of pesticides doubled between 1990-2010. Currently over 372 million kilograms of pesticides are used in India every year where 1.8 million kilograms per year are used worldwide[5].

Chain-Castro TJ, Barrón-Aragón R, Haro-García L. On 2007, the authors investigated pesticide poisoning in 200 seasonal farm workers employed in a small area in **northwest Mexico**. Of these workers, 45% were migrants from southern Mexico, and 70% were men. Most were about 20 years old; 59% could read at the third-grade level. Few had received information about pesticides; 30% did not wear personal protective gear; and 20% had experienced acute pesticide poisoning at least once during the season investigation.[6]

NEED OF THE STUDY :

By the 15th century, toxic chemicals such as arsenic, mercury and lead were being applied to crops to kill pests. In the 17th century, nicotine sulfate was extracted from tobacco leaves for use as insecticides. The 19th century saw the introduction of two more natural pesticides, pyrethrum which is derived from the roots of tropical vegetables.[7]

The World Health Organization and 'United Nations Environments Programme estimates that each year , 3 million workers in agriculture in the developing world experience severe poisoning from pesticides, about 18,000 of whom die[8].

MM, Abu Mourad TA, Safi JM (Sep 2002). A study was conducted to initial attempt to explore the knowledge, attitudes and practices of 123 farm workers on three irrigation project areas in the Accra Plains, Ghana, regarding the safe handling and use of pesticides, to assess the prevalence of symptoms associated with Organophosphorus Pesticides (OPs) and carbamates and to determine the prevalence of pesticide-related symptoms, and blood cholinesterase The results revealed moderate levels of knowledge of the routes of absorption of pesticides and of potential symptoms following exposure. Despite knowledge of some health risks associated with pesticides, the use of Personal Protective Equipment (PPE) was minimal primarily due to financial constraints. The prevalence of symptoms was higher and cholinesterase levels lower than in a control group of teachers. It is suggested that there is a need for more epidemiologic studies to investigate the problems associated with pesticide induced ill health as well as research into appropriate and affordable PPE. PPE needs to be subsidized. Training of agriculture and health workers in safety precautions, recognition, and management of pesticide-related ill health is a matter of urgency.[9]

A study was conducted to assess the health status, attitude and level of awareness of safe pesticide handling practices of farm workers engaged in the application of pesticides on agricultural farms. The results show that, the farm workers had respiratory symptoms of cough, phlegm and wheezing. Systolic and diastolic blood pressures did not show abnormalities. Liver function tests showed elevated values. Respiratory symptoms in the farm workers revealed that cough phlegm and wheezing at Ayehu farm were significantly ($p < 0.05$) higher than the controls. Alkaline Phosphates (ALP) at Birr Farm in the Sprayers and mechanics were significantly higher than the controls ($p < 0.05$). The ALP value in the sprayers, Glutamate Pyruvate Transaminase (GPT) in the assessors and Glutamate Oxaloacetate Transaminase (GOT) in the sprayers and mechanics at Ayehu were significantly higher than the controls ($p < 0.05$). From a total of 82 farm workers 35.7% at Birr and 75% at Ayehu

Farm described that they were not formally instructed about safe pesticide handling methods. The study concluded that, the farm workers health is affected by the unwise use of pesticides. The level of awareness and attitude on safe pesticide handling practices is low.[10]

Mills KT, Blair A, Freeman LE, Sandler DP, Hoppin JA. On 1998, a study conducted on Pesticides and myocardial infarction incidence and mortality among male pesticide applicators in the 'Agricultural Health Study'. In this study the authors analyzed self-reported lifetime use of pesticides reported at enrollment (1993-1997) and myocardial infarction mortality through 2006 and self- reported nonfatal myocardial infarction through 2003 among male pesticide applicators in the Agricultural Health Study. Using proportional hazard models, the authors estimated the association between lifetime use of 49 pesticides and fatal and nonfatal myocardial infarction. There were 476 deaths from myocardial infarction among 54,069 men enrolled in the study and 839 nonfatal myocardial infarctions among the 32,024 participants who completed the follow-up interview. Fatal and nonfatal myocardial infarctions were associated with commonly reported risk factors, including age and smoking. There was little evidence of an association between having used pesticides, individually or by class, and myocardial infarction mortality (e.g., insecticide Hazard Ratio (HR) = 0.91, 95% confidence interval (CI): 0.67, 1.24; herbicide HR = 0.74, 95% CI: 0.49, 1.10) or nonfatal myocardial infarction incidence (e.g., insecticide HR = 0.85, 95% CI: 0.66, 1.09; herbicide HR = 0.91, 95% CI: 0.61, 1.36). There was no evidence of a dose response with any pesticide measure. In a population with low risk for myocardial infarction, the authors observed little evidence of increased risk of myocardial infarction mortality or nonfatal myocardial infarction associated with the occupational use of pesticides.[11]

Investigator after an extensive literature research and experience from the community survey found that most of the farmers have inadequate knowledge regarding handling, storage, use of protective devices and harmful effects of pesticides. Creating awareness among farmers regarding prevention of ill effects of pesticides, handli storage is the need of the country. The researcher also found that, most of the farmers suffer from various sort of skin disease, inhalation disorder, eye irritation, inflammation of eye lids, excessive salivation etc. because of these reason investigator strongly feels to undertake this study, and to assess the effectiveness of need based health education on health problem related to exposure of pesticide among the agricultural worker.

HYPOTHESES :
All hypotheses were tested at 0.05 level of significance.

H_1-The mean post-test knowledge score is significantly higher than the mean pre test knowledge score.
H_2- There is a significant association between pre-test knowledge level on health problems and its prevention among the farmers exposed to pesticides and selected demographic variables.

ASSUMPTION :
The farmers who are using the pesticides may have health problem related to exposure of pesticide.
Health education may be an effective means of teaching.

VARIABLES :
Dependent variables : Knowledge on health problem and its prevention among the farmers exposed to pesticides.
Independent variables : Health education on health problems and its prevention among the farmers exposed to pesticides.
Other variables : Age, education, frequency of health check up, total year of exposure to pesticides.

REVIEW LITERATURE :
This chapter deals with the literature which is reviewed and relevant to the present study, and organized under the following headings -
--- Studied related to use of pesticides and its health problem among farmers,
--- Studies related to health education regarding health problem and its prevention related to use of pesticide.

RESEARCH METHODOLOGY :

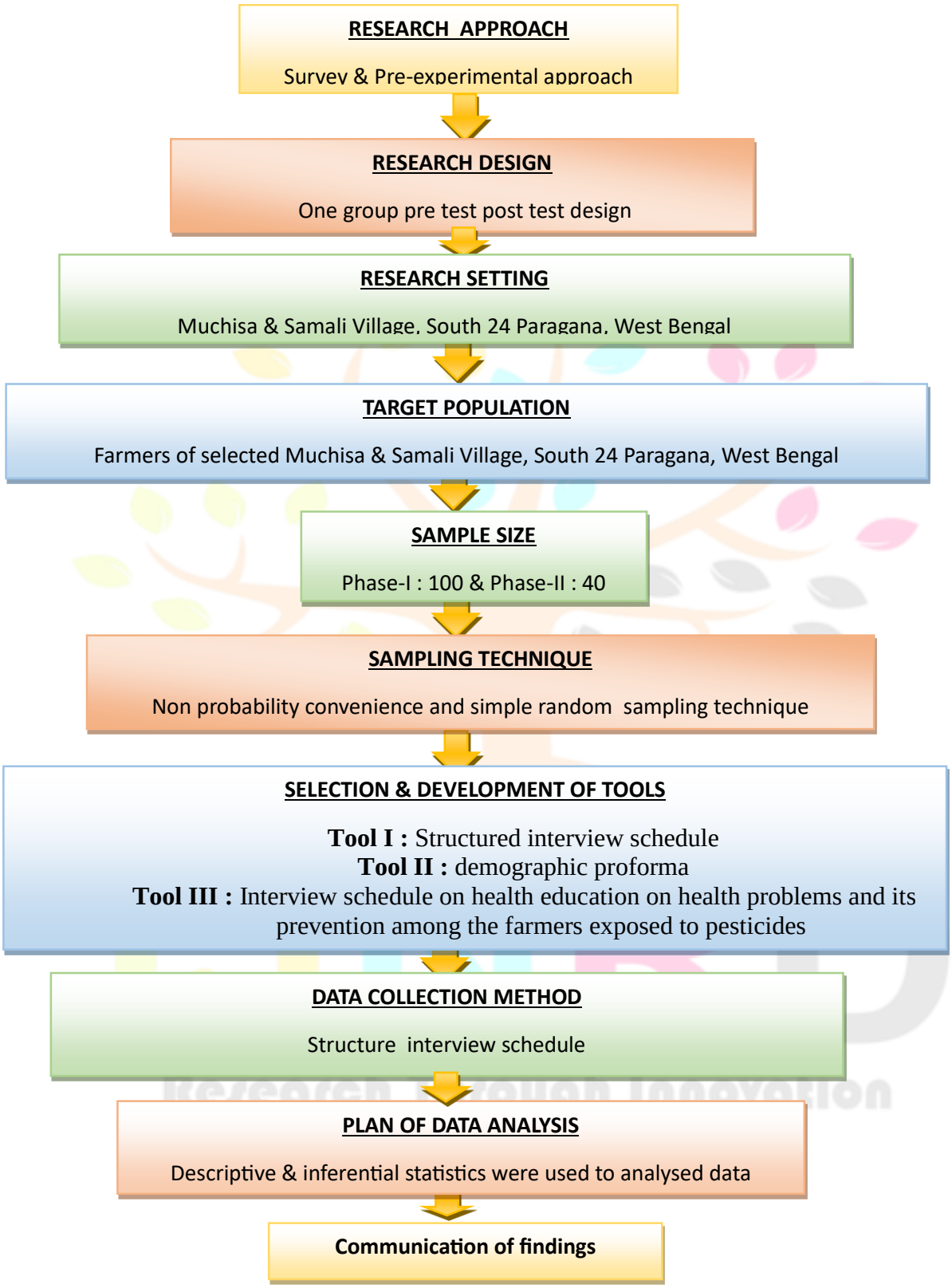

Fig-1 : SCHEMATIC REPRESENTATION OF REAEARCH METHODOLOGY

VALIDITY OF THE TOOLS :

To establish the content validity, the learning need assessment tool was given to seven experts. Experts were from the field of nursing. They were requested to give their opinions and suggestions regarding items in their tools.

Tool I out of 4 items, 3items (1, 2, and 4) had 100%, 1 item (3) had 80% agreement. All items were retained after necessary grammatical correction; two items was modified as per suggestion of experts and guides.
Based on learning need the constructed tools, content and lesson plan on health problem and its prevention among the farmers exposed to pesticides were given to same seven experts for opinion and suggestions.

Tool II out of 9 items, 7 items (1, 2, 4, 6, 7) had 100%, 1 item (3) had 72%, 1 item (5) had 60% agreement. All items were retained after necessary grammatical correction; one item was added on total no of family members and per capita income as per suggestion of experts and guides.

Tool III out of 30 items, 24 items (1,3,4,5,6,8,9,11,13,15,16,17,19 to 30) had 100%, 1 item (12) had 90%, 3 items (3,14,18) had 70%, 2 items (7, 10) had 65% agreement. All items were retained after necessary grammatical correction; one item was added i.e. total no of family members and per capita income as per suggestion of experts and guides.

TRANSLATION OF TOOL :

The tools and content of health teaching in English was translated to regional language (Bengali) and Validated by Sourav Dutta Assistant teacher, Nadia. And again retranslate and validated from English to Bengali by Sisir Biswas, Principal, Asanagar High School Nadia.

RELIABILITY OF TOOLS :

Reliability is the degree of consistency or accuracy with which an instrument measures the attributes. It is designed to measure. After validation and translation of the tool it was suggested to test for it reliability. The structured knowledge questionnaire was administered to twenty farmers. The reliability of internal consistency was computed by Spearman Brown Prophecy formula followed by split half technique. The reliability was found 0.8 and hence the structured knowledge questionnaire was considered highly reliable.

ITEM ANALYSIS :

Item analysis was done to find out the difficulty index and discriminative index of each items of structured knowledge questionnaire. In the difficulty index out of 30 items all items falls between 30-70%. In the discrimination index, out of 30 items 15 items were excellent and 15 items were good items. As a result all items were retained in structured knowledge questionnaire.

ANALYSIS AND INTERPRETATION OF DATA :

TABLE - 1

Comparison of frequency and percentage distribution of pre-test and post-test knowledge scores of the samples

n = 40

Score range	Pre test		Post-test	
	Frequency	Percentage (%)	Frequency	centage (%)
28 – 30	-	-	7	17.5
25 – 27	-	-	30	75
22 – 24	-	-	3	7.5
19 – 21	1	2.5	-	-
16 – 18	21	52.5	-	-
13 – 15	9	22.5	-	-
10 – 12	7	17.5	-	-
7 – 9	2	5	-	-
4 – 6	-	-	-	-
1 – 3	-	-	-	-

The data presented in table 1 shows that in the pre test knowledge score i.e. 21(52.5%) where as in the post-test knowledge score is 30 (75%). Thus there were gain in knowledge scores of farmers on health problems and its prevention exposed to pesticide after administration of need based health education.

TABLE-2

Comparison of range, mean, median, standard deviation of pre test and post-test knowledge scores of the samples

n = 40

Test	RangeMean	Median	Standard deviation
Pre – test 7 – 21	14.9	16.1	2.86
Post – test 22 – 30	26.3	26.2	1.86

The data presented in the table 2 shows that the pre test knowledge scores ranged from (87 – 21) and the post-test knowledge scores ranged from (22 – 30). The mean post-test knowledge score (26.3) was higher than the mean pre test knowledge score (14. 9). Further, the standard deviation of post-test knowledge score (SD = 1.86) seems to be less dispersed than the standard deviation of pre test knowledge score (SD = 2.86). So, post-test knowledge scores remain higher than the pre test knowledge scores.

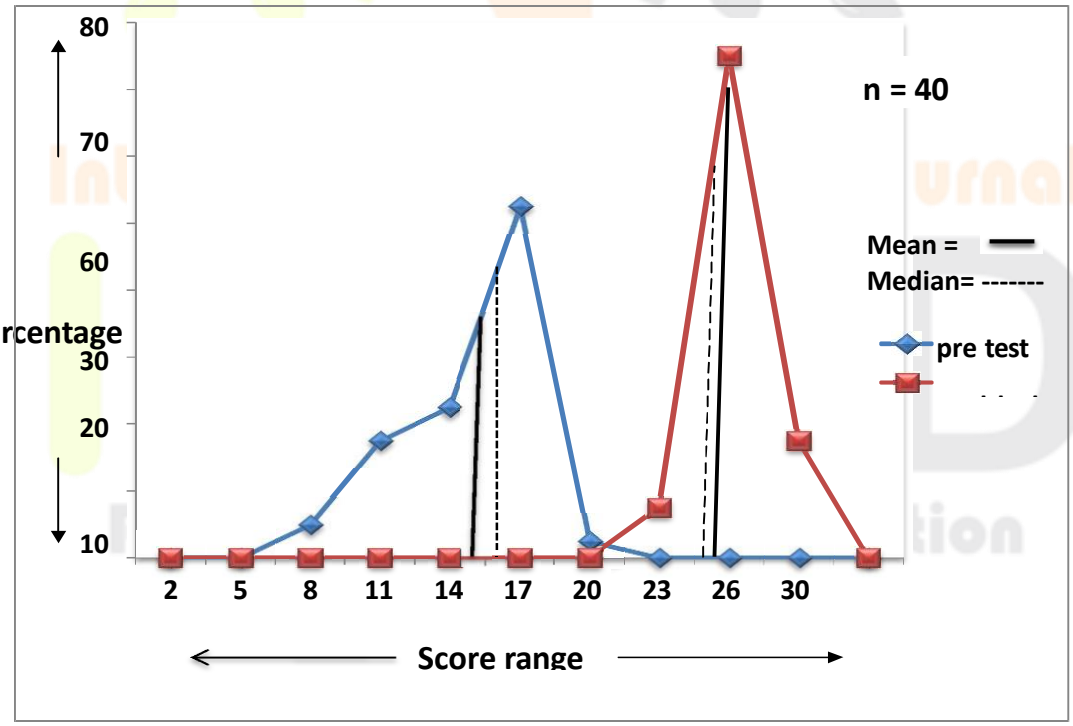

Fig 2 Frequency polygon showing pre test and post-test knowledge scores of the samples.

The fig 2 shows the frequency polygon of pre test and post-test knowledge scores of the farmers on health problems and its prevention exposed to pesticide. Both pre test and post-test frequency mean and median lie closed to each other. In the pre test mean lies to the left of the median and in the post-test the mean lies to the right of the median. The skewness of the pre test and post-test frequency polygon was at -1.2 and 0.1 respectively. This shows that, the pre test frequency polygon is positively skewed and post-test frequency polygon is negatively skewed. So, there was a considerable gain in knowledge scores after administration of a need based health education.

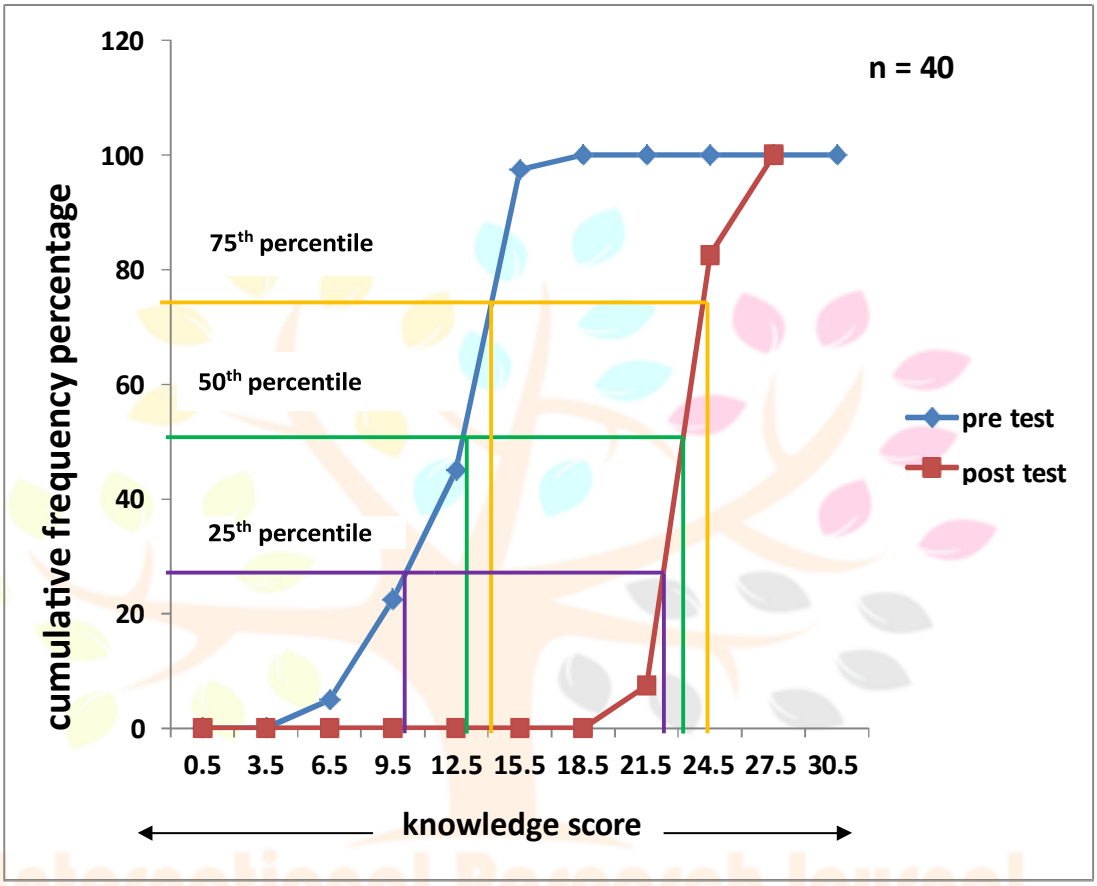

Fig 3 : O-give showing pre test and post-test knowledge scores with percentiles.

In fig 3 shows cumulative frequency percentage of pre test and post-test knowledge scores. The post-test ogive lies right to the pre test ogive over the entire range, indicating that the post-test knowledge scores were consistently higher than that of pre test knowledge scores. The gain in knowledge could be shown by comparing the pre test and post-test knowledge at the level of 25th percentile Q_1 were 9.8 and 21.8, at 50th percentile Q_2 were 12.6 and 23.6 and at the level of 75th percentile Q_3 were 13.4 and24.3. It was seen that the post-test Q_1, Q_2, Q_3 are higher than the pre test Q_1, Q_2, Q_3.Thus, the gain in knowledge of the farmers on health problems and its prevention exposed to pesticide after administering of a need based health education which was obvious by significant difference of pre test and post-test knowledge scores at various levels of ogive.

TABLE-3

Mean, mean difference and "t" value of pre test and post-test knowledge scores of the samples

n = 40

	Mean	Mean difference	' t' value
Pre test	14.9		
		11.4	24.6
Post-test	26.3		

't' $_{(35)}$ = 2.03 and 't'$_{(40)}$ = 2.021p<0.05

The data presented in the table 3 shows that the mean difference of pre test and post- test knowledge score was 11.4. In order to find out the significance difference between the two means of pre test and post-test knowledge score, the paired "t" test was computed and obtained "t" value (24.6) was found significant. ('t' $_{(35)}$ = 2.03 and't' $_{(40)}$ = 2.021p<0.05) at 0.05 level of significance. Hence the researcher rejected the null hypothesis and accepted the research hypothesis. So, there was significant gain in knowledge scores of farmers after administration of a need based health education.

ASSOCIATION BETWEEN THE PRE TEST KNOWLEDGE LEVEL ON HEALTH PROBLEMS AND ITS PREVENTION AMONG THE FARMERS EXPOSED TO PESTICIDES AND SELECTED DEMOGRAPHIC VARIABLES.

To find the association between the pre test knowledge levels of farmers with selected variables the null hypothesis is stated as –

H_{02} = There is no significant association between pre-test knowledge level on health problems and its prevention among the farmers exposed to pesticides and selected demographic variables.

Chi square was computed to determine the significance association between pre test knowledge level on health problems and its prevention among the farmers exposed to pesticides and selected demographic variables

MAJOR FINDINGS OF THE STUDY :

The findings of the analysis were summarized against each objectives of the study.

Phase I - The learning needs of the farmers were described on the basis of information obtained through learning need assessment tool. The findings showed that area XI (83%), area X (82%), area II (81%), area I, IV, VI, IX (80%), area III, VII (79%), area V, VIII (78%) expressed their needs that they must learn as "necessary" and they need to learn as "desirable" in all the learning need areas. The overall picture showed that, they need to learn all the aspect of learning areas on health problems and its prevention among the farmers exposed to pesticide.

Phase II - Based on the above findings a need based health education was developed.

Most of the farmer's (72.5 %) belongs to age group between 25 yrs -34 yrs of age.
Most farmers (75%) are belonging in male.
Maximum (60%) farmers are married.
Maximum (50%) farmers are illiterate.
Majority (75%) farmers are having income between Rs. 2000 – 5000
Maximum (70%) farmers are having family members between 2 to 4.
Majority (72.5%) farmers are having per capita income between Rs. 1001-1500.
Majority (62.5%) farmers did farming from 3 years 1 day to 6 years.
Maximum (67.5%) farmers are using pesticide for 3years 1 day to 6 years.

The effect of a need based health education on health problems and its prevention among the farmers exposed to pesticides -
Frequency percentage distribution of pre test score showed that among 40 subjects farmers (52.5%) scored in the range of 16 – 18, 22.5% scored in the range of 13 – 15, 17.5% scored in the range of 10 – 12, 5% scored in the range of 7 –9, 2.5% scored in the range of 19 – 21.

Frequency percentage distribution of post-test score showed that among 40 subjects farmers (75%) scored in the range of 25 – 27, 17.5% scored in the range of 28 – 30, 7.5% scored in the range of 22 – 24. Hence there were marked increased in knowledge scores of farmers on health problems and its prevention among the farmers exposed to pesticide after administration of need based health education.

The findings of mean, median, and standard deviation of knowledge scores of the farmers showed that pre test knowledge scores ranged from (87 – 21) and the post-test knowledge scores ranged from (22 – 30). The mean post-test knowledge score (26.3) was higher than the mean pre test knowledge score (14. 9). The median of the post-test knowledge scores (26.2) was higher than the median of the pre test knowledge scores. (16.1). Further the standard deviation of post-test knowledge score (SD = 1.86) seems to be less dispersed than the standard deviation of pre test knowledge score (SD = 2.86). So, post-test knowledge scores remain higher than the pre test knowledge scores. It also showed that, mean difference of pre test and post-test knowledge scores was 11.4

In order to find out the significance difference between the two means of pre test and post-test knowledge score, the paired "t" test was computed and obtained "t" value (24.6) was found significant. ('t' $_{(35)}$ = 2.03 and't' $_{(40)}$ = 2.021p<0.05) at 0.05 level of significance. Hence the researcher rejected the null hypothesis and accepted the research hypothesis that need based health education helped in significant gain in knowledge scores of farmers after administration of a need based health education.

Further the post-test mean percentage scores in all areas were higher than the pre test mean percentage scores. The maximum modified gain was in the area of prevention of pesticide related illness (1) and minimum modified gain were (0.63) in the area pesticide and its spread. Hence, there was gain in knowledge in all areas. This indicates that need based health education was also affecting in increasing knowledge on health problems and its prevention among the farmers exposed to pesticide.
To determine the significance association between pre test knowledge level on health problems and its prevention among the farmers exposed to pesticides and selected demographic variables chi square was computed.

The study findings showed that there were no significant associations at 0.05 level of significance between pre test knowledge levels of farmers with selected variables. Thus, the researcher hypothesis was rejected and null hypothesis was accepted. So, evidence was enough that need bed health education was effective.

IMPLICATION :

The findings of this study have implications for nursing practice, nursing administration, nursing education and nursing research.

Nursing practice

Information regarding cause, effect and self protection from pesticide through health education will be useful with regard to nursing practice. The nursing students and staff will enable to provide holistic self care as well as comprehensive care to the society on harmful health effects from pesticide which is very feasible to practice. Nurses especially community health nurse are also well equipped and already prepared with the knowledge base on pesticide exposure and process of self protective measure. Thus, not only their knowledge of the behavioural, biological and nursing sciences helpful in teaching but nurses are also able to design different method of learning that account for the entry level of the learner and style of teaching needed for the nurses in society and community.

Nursing administration

The health education is an informative method of guideline for nursing administrators. Nurse administrators (like community health nurse, male or female health worker and other all health professionals working in P.H.C, S.C etc) can plan and organize ongoing in-service education and make use of this information guideline for their own nursing community. They can in turn use this information to deal with patients, who get admitted or come with the problem of pesticide exposure and to protect themselves from the exposure.

Nursing research

The findings and result of this research will motivate other nursing students to take up similar studies in different settings and this will serve as a guideline for further research. The outcome of such nursing measures can be evaluated and the report will be submitted to statutory bodies like Indian Nursing Council, Trained Nurses Association of India, National Rural Health Mission etc, who can utilize this evidence-based data for revising nursing education and practice, to develop effective teaching materials and improve nursing practice standards.

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