5. METHODOLOGY AND EXECUTION OF RESEARCH PLAN

The present investigation, as mentioned earlier, is experimental in nature. This chapter contains a detailed outline of the methods and procedures followed for conducting the study. In general, the study has been designed with a view to identify the best possible community education strategy to solve the nutritional problems of rural masses. The investigation has been guided through several related hypotheses (as discussed in chapter 4) aiming towards that there is a significant difference in 'anaemia' of adolescent girls who receive iron-folate supplement with planned educational programme than those who receive iron- folate supplement without exposure to any educational programme.The experimental method of research has been found suitable in the study because it involved cause effect relationship. Tuckman (1972) also expressed same views while discussing the methods of research planning for such action oriented research programmes, as like that of present one.

For designing and executing the present research plan, following major aspects have been covered :

» Sampling

» Development of instructional tools

» Development of test tools

» Haemoglobin estimation

» Experimental design

» Execution of research plan

» Data analysis.

The ensuing text try to describe each of the above mentioned aspect in detail in a systematic manner. The efforts have also been made to include profilic data of selected villages in the first section i.e., 'sampling' so that general scenario of each village remains stark clear while interpreting the results.

5.I SAMPLING

Sampling in the study has been done to select a number of adolescent girls from rural communities of *Thar* desert in such a way that the girls

represent the larger group from which they were identified.The results of study are likely to be generalized in arid and semi arid areas of *Thar* desert region.Thus the total population in question belonged to 12 districts of western Rajasthan, which constitute the *Thar* desert. However, the study was limited to two districts of western Rajasthan viz., Jodhpur (arid) and Pali (semi-arid) for the suitability and convenience of investigator.Thus in the study the realistic population to whom the study can be generalizable is adolescent girl segment of 3.6 million population (i.e., combined population of Jodhpur and Pali district).

Since the study involved rural areas of two districts which are sub divided into Panchayat Samities (blocks) and villages, the random sampling was not find feasible. The stratified sampling was also not possible because it involved creating substratum of large population residing in *Thar* desert region, which would have not represented the target population truly.

The cluster sampling has been found suitable, as in this type of sampling the groups are selected randomly and not the individuals (Best 1977).Since all the members of selected group have similar characteristics, the whole population of the identified village has been considered for preliminary study.This has helped in selecting an unbiased sample from the population.

The process of multistage cluster sampling involved several steps in identifying the accessible and desired sample. A list of all the villages of district Jodhpur and Pali were collected from District Rural Development

Agency (DRDA) of respective districts.The villages were classified under different Panchayat Samities (Block/cluster) within a district. Two Panchayat Samities from Jodhpur district and two Panchayat Samities from Pali district were selected randomly using random number table.The identified Panchayat Samities from Jodhpur district were : Luni and Balesar and from Pali districts were Pali and Raipur.

After selecting Panchayat Samities, a cluster of two to three villages was identified in each Panchayat Samiti using random number table. The revenue records, village panchayat records and information available in DRDA of each selected district for identified cluster of villages were consulted. On the basis of the available information one representative village from each cluster in each Panchayat Samiti was selected.Thus village 'Mogra Kalan' and 'Shekhala' were selected from identified cluster of villages of Luni and Balesar Panchayat Samiti (Jodhpur district), respectively, and village 'Gundoj' and 'Nimmera kalan' from identified cluster of villages of Pali and Raipur Panchayat Samiti (Pali district), respectively. For final selection of villages, every effort was made to identify the villages in such a way that they should not be located near district headquarters\major towns. Chambers (1981) suggested that for rural appraisal and for other community based studies selected villages should be far from urban influence.

The proposed sample size in each village was 125 adolescent girls. For identifying this sample 150 households were taken for preliminary survey considering that a sample of 150 households will be sufficient to select 125 girls of 13-18years age. But due to inherent difficulty of sparsely distributed

population and difficult terrain it could be possible to access 120 adolescent girls in each selected village.Thus the sample size in the present study includes 120 girls of 13-18 years age in each village.

General profile of selected villages

The informations on general profile of villages considered for present study are based on the data collected by the investigator from revenue records, village panchayat records and informations available in DRDA of Jodhpur and Pali district.Some vital informations are incorporated through reconnaissance done by the investigator in all selected villages prior to conducting the study.

Mogra Kalan : Located in arid tract at a distance of 20 km east of Jodhpur city on Jodhpur-Pali road, the village has a population of 2664 of which 50.8% were males and 49.1% were females (Table 5.1). The village has a total land area of 2200 ha of which 75.3% was cropped land. The cropping is completely rainfed and majority of population is engaged in agriculture.Due to complete absence of irrigation of any kind only one crop i.e., Kharif crop is grown. Pearl millet, Moong bean and Mothbean are common crops.The majority of village population (77%) is illiterate. The village is electrified and has education facilities upto secondary school (10th standard) level.The medical facilities and other civic amenities are quite satisfactory.

Sekhala : Located around 60 km north-west of Jodhpur city, the village sekhala is relatively more arid than village Mogra kalan (Table 5.2). It

Table 5.1 General profile of village-Mogra Kalan.

Geographical Features	
Eco-climatic zone	Arid
District	Jodhpur
Panchayat Samiti (Block)	Luni
Location	20 km east of Jodhpur city
Approach to village	Pucca road
Demographic Features	
Total population	2644.00
Male	1355.00
Female	1289.00
Number of households	374.00
Land use	
Total area	2200.00 ha
Forests/Plantations/Village commons,etc.	40.00 ha
Irrigated area	0.00 ha
Unirrigated area (including fallow)	1656.00 ha
Culturable waste	250.00 ha
Area not available for cultivation	254.00 ha

Occupational Pattern

Cultivators	771.00
Agricultural labourers	9.00
Livestock/Horticulture/Allied activities	21.00
Construction workers	61.00
Mining/quarrying	16.00
Commerce/Trade	15.00
Marginal workers	162.00
Other services	63.00
Non workers	1526.00

Literacy

Total literates	23.0%
Male literates	39.4%
Female literates	5.7%

Educational Facilities

Primary school	2
Middle school	1
Secondary school	1
Higher secondary school	0

Medical/Health care facilities

Primary Health Centre	1
Maternity home	0
Maternity & Child.Welfare centre	1
Hospital	0
Agan Wadi Centre	0

Other Facilities

Drinking water*	T(3),HP(3)
Electric supply**	EA
Govt. ration shop	1
Nationalized/Private Bank	0
Post Office	1

* T = Tap water; HP = Hand pump
** EA = All purpose electric connections.

has a total population of 2945, of which 5l.7% are males and 49.3% are females.The total land area of village is 4224 ha of which 80.2% is cropped area. As per Table **5.2**, of the total cropped area, 98.l% is rainfed and only l.9% is irrigated through tube wells.The major crops and cropping patterns of this village is similar to Mogra kalan, however in irrigated land 'Rabi' crops (mainly Rayda, wheat and groundnuts) are also grown. The majority of population is engaged in agriculture. Of the total population, 84.2% are illiterates, female literacy is only 2.3%. The village has education facilities upto middle school (8th standard)level.The village is partly electrified and medical\health care facilities are not upto mark.

Gundoj : Lying in semi arid tract of *Thar* desert, the village is situated 20 km north east of Pali and 100 km away from Jodhpur on Delhi-Ahmedabad National Highway (Table 5.3).The total population of village is 4634 of which 52.5% are males and 47.5% are females. The total area of village is 5417 ha, of which 4574 ha is devoted to agriculture. Of the total cropped area l6.8% is irrigated through one source or other and rest is rainfed. As far as occupational pattern is concerned, like other villages majority of population is engaged in agriculture. In rainfed land only one crop i.e., Kharif crop is grown and major Kharif crop is pearl millet, however, in irrigated land a good intensity of crop diversification exists. Both Kharif and Rabi crops are taken in irrigated areas. The major Rabi crops are :Rayda and wheat. In this village 73.4% population is illiterate, however female literacy is around l4.5% which is relatively much better than villages selected in arid tract. The education facilities are appreciable, and health care and medical facilities are much

Table 5.2 General profile of village - Sekhala

Geographical features	
Eco-climatic zone	Arid
District	Jodhpur
Pachayat Samiti (Block)	Balesar
Location	60 km north-west of Jodhpur city
Approach to village	Pucca Road
Demographic features	
Total population	2945.00
Male	1524.00
Female	1421.00
Number of households	464.00
Land use	
Total area	5224.00 ha
Forests/Plantations/Village commons, etc	150.00 ha
Irrigated area	80.00 ha(TW)*
Unirrigated area(including fallow)	4112.00 ha
Culturable waste	510.00 ha
Area not available for cultivation	372.00 ha.

Occupational Pattern

Cultivators	462.00
Agricultural labourers	278.00
Livestock/horticulture/allied occupation	1.00
Construction workers	1.00
Mining/quarrying	0.00
Commerce/Trade	17.00
Marginal workers	294.00
Other services	71.00
Non-workers	1821.00

Literacy

Total literates	15.8%
Male literates	27.7%
Female literates	2.3%

Educational Facilities

Primary school	1
Middle school	1
Secondary school	0
Higher Secondary school	0

Medical/Health care facilities

Primary Health Centre	1
Maternity Home	1
Maternity & Child Welfare centre	0
Hospital	0
Agan Wadi Centre	1

Other Facilities

Drinking water**	T(1),W(2),TW(1)
Electricity supply***	Ed, Eag
Govt. Ration shop	1
Nationalized/Private Bank	0
Post Office	0

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* TW = Tube wells
**T = Tap water; W = Wells; TW = Tube well
***Ed = Domestic connection; Eag = Electricity for agriculture.

Table 5.3 General profile of village - Gundoj

Geographical Features	
Eco-climatic zone	Semi-arid
District	Pali
Panchaayat Samiti(Block)	Pali
Location	20 km north-east of Pali city
Approach to village	Pucca road
Demographic Features	
Total population	4634.00
Male	2427.00
Female	2207.00
Number of Households	863.00
Land use	
Total area	5417.00 ha
Forests/Plantations/Village commons,etc.	130.00 ha
Irrigated area	769.00 ha(C,TK,W)*
Unirrigated area (including fallow)	3805.00 ha
Culturable waste	218.00 ha

Area not available for cultivation	495.00 ha

Occupational Pattern

Cultivators	962.00
Agricultural labourers	402.00
Livestock/Horticulture/Allied activities	37.00
Construction workers	55.00
Mining/Quarrying	0.00
Commerce/Trade	94.00
Marginal workers	307.00
Other services	512.00
Non workers	2265.00

Literacy

Total literate	26.6%
Male literates	37.6%
Female literates	14.5%

Educational Facilities

Primary school	2
Middle school	1
Higher secondary	1

Medical/Health Care Facilities

Primary Health Centre	1
Maternity Home	0
Maternity & Child Welfare centrelHospital	I
Agan Wadi Centre	I

Other Facilities

Drinking water**	CT,HP(10),,TW(1)
Electricity supply***	EA
Govt.Ration shop	1
Nationalized/Private Bank	1
Post Office	1

* C = Canal; TK = Tank; W = Well
** CT = Through city supply; HP = Hand pump,TW = Tube well
*** EA = All purpose electric connections.

better.The whole village is electrified and other civic amenities are quite satisfactory.

Nimmera Kalan : This semi-arid village is located at a distance of 77 km north-east of Pali in Pali-Ajmer road (Delhi-Ahmedabad National High-way) (Table 5.4).The nearest town from this village is Raipur (18 km). The total population of the village is 3474, of which 51.5% are males and 49.5% are females.The village has total land area of 1957 ha, of which 85.7% is under agriculture. Of the total land devoted to agriculture, 32.4% is irrigated through well irrigation and rest 67.6% is rainfed.The cropping pattern and crop diversification is similar to that of village Gundoj.The major occupation of people is agriculture. Of the total population, 76.9% are illiterates, however female literacy is 13.7%. The whole village is electrified and has good education facilities. Medical/health care and other civic amenities are satis-factory.

5.2 DEVELOPMENT OF INSTRUCTIONAL TOOLS

If there is a single issue that need urgent national consensus, it is health but, this challenge can only be met, if a major stride is made in preparing community through continuous process of education and motiva-tion (Banerjee 1994).According to Nath (1982) the health related education for specific groups calls for much clearer definition of their problem, and perception of educator must be very clear for the problem on which health/nutrition education is intended for and also the type of education which can be imparted effectively to target groups to achieve desired goal.

Table 5.4 General profile of village - Nimmera Kalan

Geographical Features	
Eco-climatic zone	Semi-arid
District	Pali
Panchaayat Samiti(Block)	Raipur
Location	77 km north-east of Pali city
Approach to village	Pucca/Cucha road
Demographic Features	
Total population	3474.00
Male	1788.00
Female	1686.00
Number of Households	627.00
Land use	
Total area	1957.00 ha
Forests/Plantations/Village commons,etc.	91.00 ha
Irrigated area	543.00 ha(W)*
Unirrigated area (including fallow)	1134.00 ha
Culturable waste	95.00 ha
Area not available for cultivation	94.00 ha

Occupational Pattern

Cultivators	907.00
Agricultural labourers	290.00
Livestock/Horticulture/Allied activities	24.00
Construction workers	15.00
Mining/Quarrying	21.00
Commerce/Trade	19.00
Marginal workers	266.00
Other services	144.00
Non workers	1788.00

Literacy

Total literate	23.9%
Male literates	33.4%
Female literates	13.7%

Educational Facilities

Primary school	1
Middle school	1
Secondary school	1
Higher secondary school	1

Medical/Health Care Facilities

Primary Health Centre	1
Maternity Home	0
Maternity & Child Welfare centre	1
Hospital	0
Agan Wadi Centre	1

Other Facilities

Drinking water**	T(4),HP(6),TW(1)
Electricity supply***	EA
Govt.Ration shop	1
Nationalized/Private Bank	0
Post Office	0

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* W = Well
** T = Tap water; HP = Hand pump; TW = Tube well
*** EA = All purpose electric connections.

In the domain of rural communication, so far studies conducted are mainly on the impact of television on agricultural activities and farmers behaviour (Joshi and Mehta 1996).The studies have proved that television was instrumental in imparting knowledge on agriculture.Analysis of data revealed that television was also helpful to the people in retaining information.The audio and visual impact of television played great role in the life of illiterate persons also and in many instances illiterates gained more than literate viewers.

More than three decades back, a study team of Ministry of Information and Broadcasting observed that from point of view of its great appeal to the masses and its quality of touching the deepest emotions of the illiterate millions, the medium of folk songs and drama is matchless as means of mirroring popular responses to national challenges (Anonymous 1964). In fact, the regional folk musical patterns have a tendency to spread over the closeby cultures.These mods can afford to exist with extra- territorial musical motifs (Parmar 1975). New wordings provide many of these tunes a wider appreciation among the audiences. It is beyond doubt that electronic media like television and video are powerful tools for communicating messages but traditional folk media like folk songs are equally important. More over, they have some inherent advantages like (1) they are local and live, and able to establish direct rapport with audience; (2) they command an immense variety of forms and themes to suit the communication requirements of masses; (3) they are flexible to accommodate new themes; and (4) over all, they are low cost media as compared to the sophisticated mass media.

Owing to all above mentioned observations and as per the requirement of present study, investigator developed two educational tools i.e., an educative video programme and three educative songs in the popular folk music style of *Thar* desert's inhabitants to impart functional nutrition education on anaemia, (a widely prevalent iron deficiency disease in *Thar* desert's female population) to adolescent girls of rural communities.

5.2.1 Video Programme

A video programme on anaemia was specifically developed for this study.A detail of how the video programme was prepared is given in brief in the following text.

A good video programme required a strong technically sound hardware like camera, lights, vision mixer, sound equipment, computer, animation unit, etc. therefore educational media research centre (EMRC), Jodhpur was contacted for preparing video programme on anaemia.

A video script was prepared by the investigator on anaemia keeping several important points in mind.a video script is a previsualized description of the video and audio elements, was prepared for each scene/shot, and details of each shot were carefully arranged.With a vivid imagination of each shot, the complete picture of video programme in visual terms was prepared mentally. It was planed very precisely, because in video 'picture' is a dominating factor, often so dominating that the sound is pushed to the background.therefore, writing a video script require a perfect planning. If

the script is not well researched, this powerful medium may harm the message irreparably.

Since video programme could be easily copied and dissemination of message may be wide spread, an authentic upto date and well researched subject matter on anaemia was prepared. It was very clear in the mind of author since beginning that if a message is disseminated wrongly, it would take several years to brush off that impression from the mind of viewers.

In light of above mentioned facts, a careful survey of literature on anaemia was carried out.All the facts and figures concerning to anaemia were collected from libraries, NICNET and primary and secondary journals.All the usable informations were arranged in a presentable manner in an appropriate sequence.

In fact, video script enables other members of production team to understand the requirements of video programme so that each member can give off his/her best for achieving the overall objectives. Therefore, investigator first discussed every single point of the script with producer and camera man. It helped a lot in proper sequencing of the visuals and time management of various segments of the subject.The proper sequencing of the visuals with perfect time schedule in each segment of the subject is of crucial importance to harmonize audio and video (Singh 1992).

For deciding time, shot, audio and music, a story board was prepared in which video column described the images to appear on the television

screen.The audio column described the type of sound coming out along with a particular image.Audio may include music, sound effects, commentary, dialogue, etc.The script also contained information on the type of shot i.e., long, medium and close up; angle and placement of camera, and movement of camera, etc.

After writing and arranging the script, the format was decided.It included interview of experts, explanation by experts regarding disease anaemia and its prevention and control, teaching by doing through demonstrations on the use of green leafy vegetables, haemoglobin estimation, etc(Script is enclosed in appendix 1) . All these informations are incorporated in a story board. The basic format of story board was as under:

Shot No.	Time segment	Video	Shot Description	Audio/Music

The following description summarizes the contents of story board:

Time segment : In this column the exact time of shot was given in minutes and/or seconds. It is very important that time of a shot is judged very carefully. An activity seems to be of vital importance in context of the subject matter being discussed but, even a long duration shot could not be continued too long in a video programme because audience is well aware that they are looking at picture and not the actual event.

Video : In this column the type of shot like close up or extreme closeup

or long shot was picturized.A picture was drawn in the place provided or a still photograph was pasted. In case a shot sequence required 4-5 pictures for completion, different squares were used in the story board till the shot was completed.

Shot description: In this column the details of shot were included. It was clearly mentioned in the shot description that who is talking what and for why.

Audio : In this column what is being spoken in the script or by the person was written. The duration of a statement ran in such a manner that it coincided with the video picture.As long as picture remained on the screen the related statements were being spoken over sound track. It is an important art to exactly combine pictures with words. Sufficient time has to be given for moving the picture on the screen, where words may not or need not to be spoken, or the visual itself needs introduction and summing up. All such cares were taken while producing present video programme.

Music : It was one of the important fillers in a video programme, because some times the visuals were so clear and explanatory that words were hardly needed. In such time spans, appropriate music was incorporated on the sound track to keep the viewers engaged.

After finalization of script and format preparation, visual recording work was taken up. A village named 'Sar' located near Jodhpur was selected for interviewing ANM.and Aganwadi workers; measuring growth retardation

in children attending Aganwadi centre and interviewing patients for availability of medicine and other facilities.

Second schedule of shooting was done in Pali district to truly represent the situation of anaemia in the present study area. Village women were trained to identify the signs of anaemia themselves.Food demonstration on various ways of using green leafy vegetables was conducted for live shooting.

The third schedule of shooting was done in Satellite Hospital, Madore located near Jodhpur.The interview of medical experts were taken on anaemia.The haemoglobin of anaemic patients was estimated using Haemometer and process was recorded in close up shots, step by step.

The visual shooting was conducted for 20 hours. Many shots were repeated twice or thrice for better picture quality.After collection of visual material raw cassettes were viewed on the editing desk. A list of all shots to be included in programme was made. In editing the raw cassettes, shots were arranged in sequence according to the approved script and recording was done from 4-5 cassettes into one master cassette. Special effects were generated by light and moving the stills. The matter recorded finally for the video programme was of 14 minutes duration. After recording the programme in master cassette, the silent spaces in the programme were filled with music. The sound of commentary was incorporated with sound mixer. At last, subtitling was done with help of computer.As a matter of routine

colour bands were recorded before and after the video programme.The programme has both Hindi and English versions.

As the programme was developed with the close cooperation of EMRC, Jodhpur, impressed with content ad quality of the programme,Director,EMRC, Jodhpur recommended it for UGC country wide class room programme.The programme was accepted by the UGC country wide classroom cell in to and both Hindi and English version have been telecasted twice so far by Doordarshan under programme UGC Countrywide class room.

5.2.2 Folk Songs

All India Radio is the first to make special efforts to draw upon the available fund of folk tunes. In its endeavour to make use of the medium of folk music for publicising developmental activities in the country since independence, AIR used to invite folk singers from different parts of the country to present songs in traditional folk style, depicting the progress made in their respective regions (Parmar 1975).Today zonal broadcasting centres of AIR transmit folk music around one hundred dialects in their programmes meant for rural audience (Anonymous 1994).The very rich folk music of Rajasthan, especially that of Marwar region which constitute the larger chunk of *Thar* desert is acknowledged internationally. In general, the rural folk of Rajasthan have a great fascination for their folk songs (Dhama and Bhatnagar 1985).The *Mand, Panihari, Suvatio, Gorband* and many story telling forms like *Runi chhe Ra Dhania* are some of the predominant folk musical styles of Rajasthan and still their musical structures are unpolluted. Accord-

ing to Parmar (l967) their features are so chiseled that they appear to be more stable than the spoken languages to which they belong.

Bhattacharya (1968) in his book on Indian ethanomusicology elaborated how traditional folk music and tribal melodies can be used as communication channel to impart problem specific informal education to illiterate rural folk in India. In fact, if we take rural areas of *Thar* desert into consideration in context of folk music, we find that traditional folk songs are intricate part of life of inhabitants, this is probably more so because the population is predominantly illiterate and oral traditions are only way of passing on informations from one generation to other generation.

Investigator with an experience of more than twelve years in community extension education research and development in *Thar* desert region felt that if potential elements of local folk music can be utilized to communicate desired message (in a proper way) with certain modifications in wordings and presentation, it would definitely bear good results. Therefore, in the present study three songs on anaemia were composed, which were based on local folk music tunes.These songs contained message on prevention and control of Anaemia. Before composing the songs, author surveyed all the selected four villages to find out which were the most popular folksongs among teenage girls. First all the folk songs found to be popular among teenage girls of selected villages were listed. By comparing the list of songs identified from different villages, three common ones were chosen to utilize their tunes to compose the songs of anaemia as per requirement of present study.

After selecting the tunes, investigator composed the wordings. Then contact was made with the local unit of Rajasthan Sangeet Natak Academy.A thorough discussion was made with singers and other artists explaining the purpose of present study and on their turn they suggested some modifications in lyric, which was incorporated accordingly.This was followed by the singing and recording of the songs. All the three songs (lyrics) are given in Appendix 2.

The songs composed on the basis of musical style of three prominent folk songs.The first one is based on story telling form, highlighting life style, bravery and public service of *Baba Ramdev Ji*, a *Lok Devata* of Marwar region, which is sung throughout the length and breadth of *Thar* desert region.The initial wordings of this folk song are as :

Runi Chhe Ra Dhania

Ajmal ji Ra Kanwara....

The second song followed musical style of *Suvatio (Suva)* which is very much liked by women folk. The initial wordings of this folk songs are as:

Udio Re Udio

Do Do Re Do Jai

Maharo Suvatio ....

The third song followed the famous musical style of *Gorband*, initial wordings of which are as :

Ladli Luma Jhuma

Maharo Gorband Nakharalo....

After recording of the educational songs on Anaemia in above mentioned folk songs, styles, they were played before a medical specialist and village health workers to ascertain whether the content of message is perfect or is there any distortion. This panel approved the composed songs in toto.

5.3 DEVELOPMENT OF TEST TOOLS

Majority of the individuals who formed the target groups were illiterates. However, few adolescent girls had attended primary school at one time or other. Thus in general the subjects of present study were basically illiterates.

For the collection of data two different schedules were prepared :

» Primary survey schedule

» Pre and post knowledge test schedule.

5.3.1. Primary Survey Schedule

The study involved illiterate adolescent girls, therefore it was highly desirable to prepare a simple but comprehensive primary survey schedule. Thus, a number of studies carried out in community nutrition aspect were consulted and schedules developed in those studies were reviewed thoroughly. The schedule to collect primary information on community nutrition, developed by Kashyap and Young (1989) was found to be applicable in the context of present study. However, many informations sought in said schedule had no relevance in context of present study as well as the socio economic, cultural and farming situations of *Thar* desert region. Therefore, a number of educational practitioner, researchers and other knowledgeable persons were consulted and schedule was reconstructed according to priorities of present study and successfully pretested for its suitability.The finally developed primary survey schedule, which has been used in present study is enclosed in appendix 3.

The primary survey schedule contained questions on following five major aspects :

General informations of the family: It contained general questions relating to head of the family; age, occupation; education and income of family members; and caste, religion, family type and family size, etc. These informations later paved the way to identify and select adolescent girls for educational intervention.

Agriculture related informations: It contained questions on land holding size in rainfed and irrigated conditions; cropping pattern; animals of mulch and other types a family possess, and contribution of women in agricultural and other related activities. The agriculture related information was important in the study because in a rural family the food eaten is often the food grown on the field. Purchasing food from outside is generally not practiced.The amount, type and availability of food are amongst the important factors determining the health status of people in rural areas.

Food habits: In this part questions on food habit of people were asked in an indirect manner. Special care was taken to collect data on food grown on farmers' field, foods being purchased from market, quality of food purchased, any special food given to infants, children, young adolescent girls, and pregnant and lactating mothers, questions were also asked on food alternatives during draught, adjustment made to cope up with food scarcity during adverse climate years.

Health related informations: Information on health was covered in this part of schedule commonly occurring symptoms of various diseases were enlisted and asked separately. Questions related to breathlessness, weakness, etc. were asked to assess the magnitude and prevalence of problem of anaemia. Medical facilities available at the village level were also surveyed personally by the investigator.

Education related informations : In this section questions were targeted on female literacy and awareness. Questions were asked from girls

on their desire to study, constraints in continuing study, methodological problems in education of girls, medium of instruction, non formal functional knowledge of health related aspects. Questions were also asked on whether some audio/visual aid is available for education e.g., access to radio and television.

The above mentioned primary survey schedule served as a vital tool to obtain information on agricultural patterns, food habits, educational trend and literacy, and nutrition/health related informations, especially of women folk.

5.3.2 Pre and Post knowledge test schedule:

This was the basic tool which guided the study and therefore, to develop this tool investigator made repeated interactions with selected adolescent girls in each identified village before initiating present investigation programme.These interactions involved informal group discussion with a number of respondents in all the four selected villages for gathering the informations on their ability to what extent they can respond to the questions framed in the schedule. Later on the format of schedule was discussed with the specialist in various disciplines including education, nutrition, sociology and agricultural sciences. Thus the final pre and post test schedule was formulated with inputs from the participants of present investigation and specialists from various related discipline. The developed schedule was informally pre tested before initiating the study and found effectively applicable.

Even after formulating this effective but very simple and comprehensive pre and post test schedule as per the need of participants, the investigator faced with difficulty of filling the questionnaire as majority of responders were even functionally illiterate.Therefore, as last resort investigator individually asked each respondent the questions given in this schedule (the schedule is set in appendix 4) by explaining each alternative answer as given.The questions in said schedule broadly covered four major aspects viz.:

I. What is anaemia?
II. What are the reasons responsible for anaemia?
III. What are the symptoms of anaemia?
IV. What is the treatment of anaemia?

In each major aspect three questions were asked and these questions were placed in order of their importance one by one. Each question had six multiple choices (answers), in which one was correct. Thus in each broad aspect, first question if answered correctly was given 3 scores.The second question if answered correctly was given 2 scores and the third if answered correctly was given a score of one. In each question out of six answers only one was correct and thus for all incorrect answers the score given was zero. Therefore, the scoring ranged between 0 and 24 in both pre and post knowledge test.

For example, in case of major aspect - I. what is anaemia?, the following questions were asked :

A. What is called anaemia?

Answer:

1. Old age
2. Fever age
3. Diarrhoea
4. Deficiency of iron
5. Graying of hairs
6. None of above.

B. In anaemia following may occur to blood

Answer

1. Blood does not clot
2. Thick blood oozes out when hurt externally
3. Blood becomes black
4. Bleeding from nose
5. Deficiency of blood
6. None of above.

C. What happens in anaemia ?

Answer

1. Inability to see in darkness
2. Weakness in whole body
3. Ears become deaf
4. Sores in mouth
5. 2 and 3 both are correct
6. None of the above

Similarly the questions were set in rest of the three major aspects mentioned earlier and same pattern of scoring was followed.

5.4 HAEMOGLOBIN ESTIMATION

Nutritional deficiency as a result of inadequate intake of food is major contributing factor in iron deficiency anaemia in women and children. Iron deficiency in blood is major cause of anaemia, as 60-70% of total iron content of the body is contained in haemoglobin of red cells (Firkin et. al.,1990). Therefore, in present study, haemoglobin estimation was a major factor for investigation. There are several methods available for haemoglobin estimation but, for present investigation Sahli's method (Firkin et. al., 1990) was found to be most suitable.

In Sahli's haemometer method only 0.2 ml blood has to be taken, which is very less in comparison to other methods.When a large number of samples (as in present case) have to be taken, only Sahli's method appeared to be viable proposition to get precise data. To analyse the blood haemoglobin before and after the treatments, the middle finger tip of left hand of each participating adolescent girl was cleared with cotton containing medicinal spirit. The finger was held tightly for pricking with lancet. One stroke pricking was done.Care was taken that lancet should not go very deep.After pricking, finger grip was loosened so that blood oozes out.The Sahli's pipette was used for collecting 0.2 ml blood.All the care was taken to avoid air bubble, while sucking the blood in pipette.

The blood collected, as mentioned above, was transferred to Sahli's

test tube and mixed with pre-prepared N/10 HCl upto 2 g%.This was followed by addition of distilled water drop by drop till the column of the test tube matched with the column in Sahli's haemometer.The reading was noted on the test tube which was already marked in g%.The normal acceptable limit of blood haemoglobin is as follows :

Age group	Category	Haemoglobin(g/100 ml of blood)
6 months-6 years	Children	11.0
6 years-14 years	Children	12.0
> 14 years	Adults (men)	13.0
> 14 years	Adults (women)	12.0

Source : Davidson and Passmore (1975).

To interpret the data obtained in the present study, above mentioned normal acceptable limits of blood haemoglobin was taken into consideration.

5.5 EXPERIMENTAL DESIGN

The study was designed for four villages of *Thar* desert.As mentioned earlier, of the selected four villages two were located in arid area and two in semi arid area.The treatments given in selected villages of arid area and semi arid area were same.The details of treatments are given in Fig. 1. The treatments given were based on educational interventions and iron folate supplementation.

Fig. 1: Summary of Experimental Design.

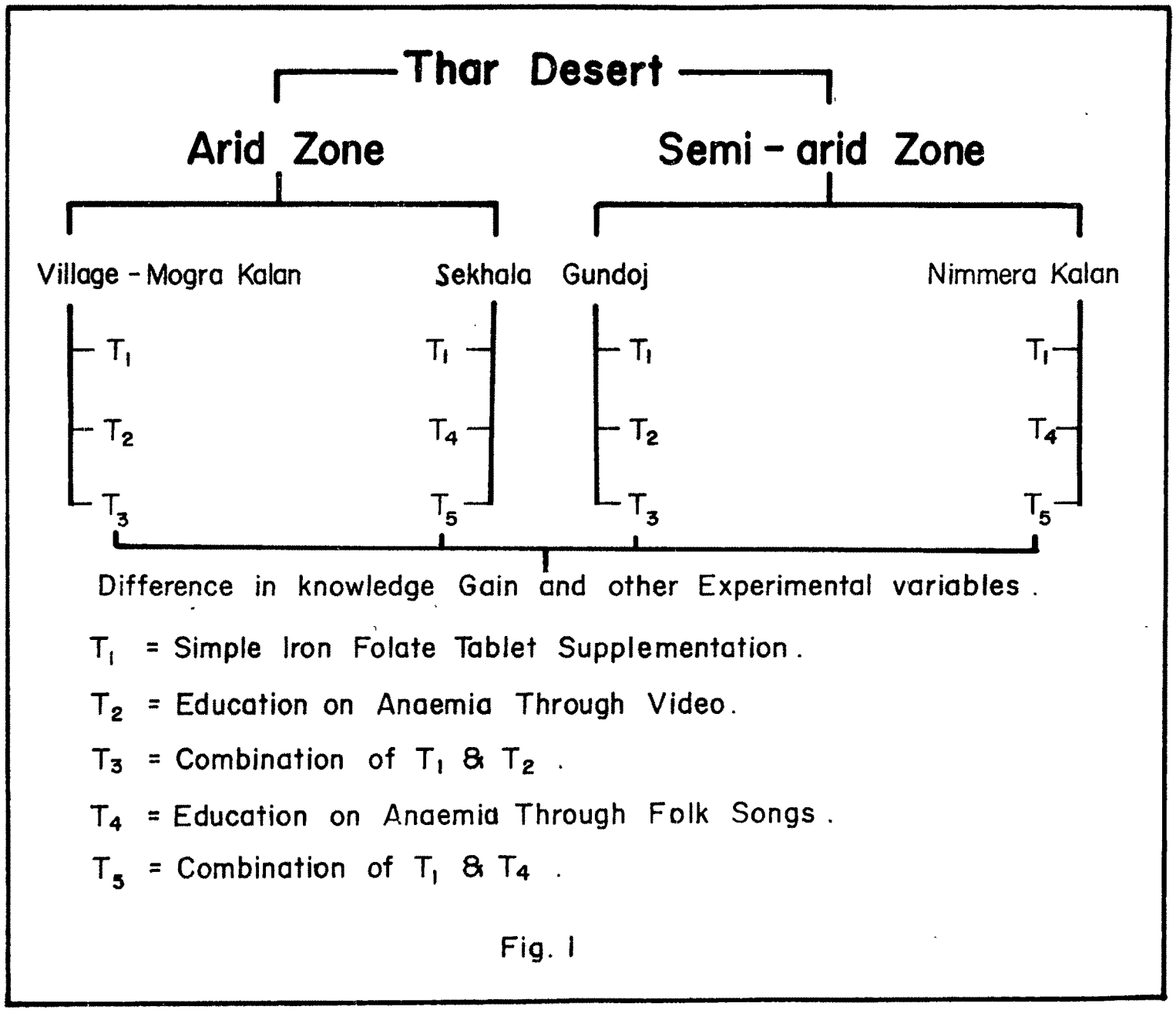
Thar Desert
Arid Zone
Semi - arid Zone
Village - Mogra Kalan
Sekhala
Gundoj
Nimmera Kalan
T1
T2
T3
T1
T4
T5
T1
T2
T3
T1
T4
T5
Difference in knowledge Gain and other Experimental variables .
T1 = Simple Iron Folate Tablet Supplementation .
T2 = Education on Anaemia Through Video .
T3 = Combination of T1 & T2 .
T4 = Education on Anaemia Through Folk Songs .
T5 = Combination of T1 & T4 .

Fig. I

Though the Government sponsored free iron supplementation scheme for women and children under National Iron Prophylaxis Programme is in operation throughout the rural areas of Rajasthan since last so many years but, it does not have any significant positive effect so far. Moreover, despite free distribution of iron folate tablets and extending medical advice for prevention and control of anaemia, the programme failed to gain popularity with masses.When investigator contacted with a number of field health workers to know their views regarding the reasons of failure of such novel scheme the most common reply was that the people consider iron folate tablets as contraceptives and therefore, are reluctant to take the benefit of service. Another misbelief among rural population confirms that use of iron folate supplementation is harmful for their fertility as the programme is especially running for women. This state of affair clearly reflects that the programme is not delivering any good due to ignorance of masses regarding the disease - Anaemia and its consequences.

The present study, therefore include educational interventions based on novel and traditional methods for educating adolescent girls.The group of adolescent girls was selected because, if this segment of population is properly educated regarding consequences of iron deficiency, they can better take care off their health,when they will become mothers in future.The health of mother is vital for survival of foetus and infant, because during pregnancy and lactation the foetus and infant, respectively is solely dependent on mother for food and vis-a-vis survival.

As the majority of area under *Thar* desert is environmentally arid and

only a small part has semi arid environmental condition, therefore independent variable arid zone was manipulated by selecting semi arid zone.Such manipulation of independent variable serves as a powerful tool to compare the impact of treatments in two different situations (Gay 1987). In this study, iron folate supplementation was given in all the villages to one treatment group so that it serves as a treatment as well as blind control. In selected arid zone villages, besides iron folate supplementation group, education through video formed one treatment in a village and combination of video education and iron folate supplementation constituted another treatment group. Likewise, in second village besides iron folate supplementation group, education through folk songs constituted one treatment group, and combination of iron folate supplementation and education through folk songs formed another group. Same treatments were replicated in selected villages of semi arid zone. In each treatment forty adolescent girls were taken as subject in each selected village.Thus total 480 adolescent girls participated in present investigation.

The factors affecting internal and external validity of the study were controlled. Controlling History was very simple in present investigation because the villages selected were located far off from one another.The villages selected in arid zone had a distance of 90 km between them and the selected villages in semi- arid zone were located l00 km apart.Thus there was no chance of interaction among the subject of one village with another.The factor testing was controlled by keeping a difference of three months between pre test and post test. Instrumentation was controlled by keeping the same schedule of pre test and post test.To control the statistical

mortality only those adolescent girls were selected for the study who had no plan to leave the village in a period of three months and were motivated sufficiently to cooperate during the study period.

5.6 EXECUTION OF RESEARCH PLAN

After development of instructional and experimental tools, the experiment was started in the identified villages. As the study involved the taking of blood samples of target population i.e., selected adolescent girls, therefore chief medical health officer (CMHO) of Jodhpur and Pali districts were contacted for seeking permission and assistance.The purpose and approach of research programme was explained to CMHO of respective districts.Though, they appreciated the goodness of study but it took three months to obtain the formal permission from the CMHO of Jodhpur and Pali district. Only after that the action programme as per need of the study was initiated.

After obtaining the formal permission from CMHO of Jodhpur and Pali district, the whole experimental plan was rediscussed with them. It was advised by the CMHO of both Jodhpur and Pali district that to avoid any risk, it would be desirable to use lancet (disposable needles) for each individual subject participating in the study. As all the villages selected for the study have government primary health care facilities in one form or other, the technicians of health care agencies in respective villages were issued orders to assist the investigator in present study. Moreover, the CMHO of Jodhpur district provided the full time assistance of a doctor (as and when required) throughout the entire course of study. In addition of expertise provided by

Rajasthan State Government Medical and Health Department (as mentioned above), Iron folate tablets, and charts and posters on 'Anaemia - its consequences, prevention and control' were also provided free of cost for present study.The doctor, whose assistance was provided by CMHO, Jodhpur helped the investigator in selected villages of both Jodhpur (arid zone) and Pali (semi arid zone) villages.

First of all, primary survey was done by contacting adolescent girls through the heads of the families in each selected village. Primary survey schedule was filled in each case by asking the questions set in it. On the basis of information available regarding the individual family, participant adolescent girls were identified. After identifying the adolescent girls, their groups were formed according to the design of the study. In village Mogra Kalan (arid zone, Jodhpur district) and Nimmera Kalan (semi-arid zone, Pali district) only 111 and 114 adolescent girls could be available for participation in present study, therefore, in said villages rest of the girls were selected from nearby areas to make the sample of 120. After making the sample of 120 girls in each selected village, the next task was the estimation of their haemoglobin.For carrying out this work the assistance of medical doctor and field health workers of respective villages were taken.The haemoglobin was estimated as per method described earlier in section 5.4 of this chapter.

In each village all the selected 120 adolescent girls were subjected to pre-test by using developed pre and post knowledge test schedule (the schedule is given in Appendix 4). As mentioned earlier that majority of girls were illiterate and even those who had attended primary school were not

able to read properly in y village. Therefore, pretest for knowledge was taken by individually asking the questions set in the schedule to each girl in all the four villages.All the alternative answers given after each question were explained thoroughly and then asked for making her choice for correct answer.

After the pre knowledge test was administered, the next step was to make the sub groups of the subjects. In each village, 120 selected girls (who had already pretested for knowledge on anaemia) were subdivided into three groups of 40-40-40 according to experimental design as follows :

Village Mogra Kalan (arid zone, Jodhpur district)

In this village, 40 girls of first group were given only iron folate supplementation without any kind of educational treatment.The second group consisted 40 girls who were only given education on anaemia through developed video programme without any iron supplementation.The third group of 40 girls were given education on anaemia through video programme along with iron folate supplementation.

Village Sekhala (arid zone, Jodhpur district)

In this village,likewise village Mogra Kalan, the first group of 40 girls were given only iron folate supplementation without any kind of education.The second group of 40 girls were given education on anaemia through composed songs in the tune of most common folk songs of *Thar* desert.This group was not given any iron supplementation. The third group of 40 girls

were given education on anaemia through songs in combination of iron folate supplementation.

Village Gundoj (semi-arid zone, Pali district)

In this village the treatments were same as that of in case of village Mogra Kalan of arid zone.

Village Nimmera Kalan (semi-arid zone, Pali district)

In this village treatments were same as that of in case of village Sekhala of arid zone.

As evident from above discussion that educational treatment employed in the present study were : education on anaemia through video programme and through educational songs. In video sessions (for the groups who were subjected to educational treatments through video alone and through video + iron folate supplementation) the TV and VCR were arranged (rented from near by township) and groups were given education by viewing Hindi version of developed video programme - Anaemia.This was followed by question-answer session between the participating girls and investigator.As it was very convenient with video to rewind and forward the tape, wherever found necessary the programme shot was shown again to satisfy the quest of participants.The video viewing was repeated in same fashion after first fortnight.

In sessions of educational songs on anaemia (for the groups who

were subjected to educational treatment through folk songs, and also through combination of folk songs and iron folate supplementation), the composed songs were sung as a group songs by the investigator, two/three female singers of Jodhpur unit of Sagit-natak Academy of Rajasthan (who volunteered for the present study) and participant group of adolescent girls. In the session, if participating girls wanted to sing other songs, they were encouraged to do so. This treatment was repeated after first fortnight in similar fashion. The folk song sessions were followed by question-answer sessions similar to that of video education programme. At the end of session, which was held after a fortnight from first one, a copy of educational folk songs was provided to subjects (according to treatment).

The educational treatments in all the four villages were given under more or less similar conditions. For instance the locale of each educational treatment had similar setting in each village.The education through video was given in a big room of the village school in evening hours.The mode of sitting was the same for all the participants i.e., 'dari' or a canvass cloth was spread on the floor. Investigator also herself sat on the floor with participants so that participants interact freely with investigator without any hesitation. In case of the education through folk songs (educational songs composed in famous folk tunes of Thar desert) the locale of experiment was courtyard of village temple in all the villages. For sitting of participants 'dari' or canvas cloth was spread on the courtyard of temple and songs were sung as group songs during the evening hours.

Once the educational treatments were repeated after a fortnight, it

was followed by the distribution of iron folate tablet next morning . The procedure was kept same in all the four villages. In each village all the selected 120 girls were asked to assemble at a specified place.The medical doctor explained them regarding anaemia, its consequences and ways to prevent and treat it.The girls were also shown charts and posters. Iron folate tablets (each containing exsiccated ferrous sulphate 335 mg equivalent to 100 mg of elemental iron and 0.5 mg folic acid) were given for three months with instructions to take one tablet per day after meals. In each village, only few participating girls who could not come that particular day, their houses were personally visited by the investigator to distribute the iron folate tablets.

After 90 days (three months) of educational intervention and distribution of iron folate tablets, haemoglobin of each participating girl in each village was estimated following the same procedure as mentioned earlier. Post intervention haemoglobin testing was followed by the knowledge test of participating girls. The post knowledge test was accomplished by using same schedule which was used for pre knowledge test.For filling the schedule the same procedure was adopted as was followed in case of pre-knowledge testing.

5.7 DATA ANALYSIS

Data gathered were subjected to various kind of mathematical and statistical analysis. From the primary survey schedule information on family, agriculture, food habits, education and health were tabulated. Data obtained through pre and post intervention (education, education + iron folate

administration and simple iron folate administration) were used to analyse the impact of intervention on haemoglobin level and knowledge gained by the participants. Computation of said data involved descriptive statistics, frequency distribution, t-test for significance between pre and post intervention on haemoglobin level and knowledge gained (between pre intervention and post intervention in individual treatment) and analysis of variance for testing the impact of interventions on individual village level.To analyse this voluminous data statistical package - MICROSTAT (Copyright (c) 1984 by ESCOSOFT, INC.) was used.

To test the hypotheses, the statistical package - TWFF. BKM (developed by social and information science division of CAZRI, Jodhpur, India) was used. To accomplish hypotheses testing the experimental design was slightly modified as per the need of said stastistical package.

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