

**EPIDEMIOLOGICAL SURVEY
TO EVALUATE THE HEALTH STATUS
OF THE POPULATION AROUND
KODANKULAM ATOMIC POWER PROJECT**



LEARN, SEEK AND SERVE

Tirunelveli Medical College

Tirunelveli, Tamil Nadu

JULY 2001

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A Research project financed by
Nuclear Power Corporation of India Limited,
Mumbai.

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**EPIDEMIOLOGICAL SURVEY
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Certificate

The baseline epidemiological survey was conducted among the population residing within 5 kilometers radius of the proposed nuclear power plant at Kudankulam. The house-to-house survey was carried out by teams of medical officers and medico-social workers of Tirunelveli Medical College, Tirunelveli, under our guidance and supervision.


9/7/2001.


9/7/2001

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FOREWORD

Nuclear Power Corporation of India Limited, Mumbai (NPCIL) entered into a Consultancy Service Contract (No. NPCIL/KK/2000/M/694 dated December 12, 2000) with Tirunelveli Medical College and Hospital (TMCH), Tirunelveli to carry out epidemiological studies in the population living within 5 kilometers around Kudankulam Atomic Power Project site. The main objectives of the study were to investigate the socio-economic status and the health status particularly various types of cancer and congenital abnormalities which will form a data-base for future after the nuclear power plant has operated for a few years.

Experts committee from NPCIL comprising of Shri M.R. Sachdev and Shri S.K. Manjunatha had detailed discussions with the staff of the Department of Community Medicine about the modalities of the project. Several issues were debated and decisions were taken regarding the target population, the types of health indicators to be studied, details about the socio-economic status and lifestyle of the population and other technical issues. The proforma for data collection was designed by Shri M.R. Sachdev and field tested during the pilot survey carried out in March 2001, a few minor problems faced during the pilot survey were discussed and the minor adjustments to suit the local requirements in the proforma were carried out.

Ten medical teams from Tirunelveli Medical College, Tirunelveli, were involved to collect the data from house-to-house survey and suspected cancer cases are being referred to Tirunelveli Medical College & Hospital, Tirunelveli, for further investigation and follow up. The collected data were analysed by the

statistician Shri P. Arumugam. The study has generated reliable and useful information about the prevalent health and socio-economic status of the population.

Tirunelveli Medical College has been privileged to have been associated with this scientifically and socially important project. This report, I hope, will be of interest to a wide range of personnel concerned with these issues.

V.S. Balasubramanian
R.G. 7. 2001

Dr. V.S. Balasubramanian, M.S.

Dean,

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SUMMARY

Nuclear Power Corporation of India Limited, Mumbai entrusted the Department of Community Medicine of Tirunelveli Medical College, Tirunelveli carrying out the epidemiological survey about the health status of the persons living in villages within 5 kilometers around the Kudankulam Atomic Power Project site. The survey was conducted during April-June 2001 by the well trained medical teams from the medical college. The survey included 22256 persons comprising of 7799 males, 7961 females and 6496 children below 15 years of age from 5292 households in the villages of Kudankulam, Irakanthurai and Vijayapahti. The demographic, socio-economic and cultural profiles and lifestyle of the population were studied and the morbidity status of the population with specific reference to various types of cancers, congenital malformations and cataract was also evaluated.

The population consists of mainly Hindus (65.6%) and Christians(32.1%). Most of the families live in their own houses which are mostly pucca made with cement and concrete. They utilize tap water provided as community taps at convenient locations in the villages. 82.3% of the males and 74.61% of the females in the survey population are literate. Fishing and unskilled work form the major occupation of the males and bidi roling is the main occupation of the females. During the survey period about 4.4% persons were suffering from prolonged illness. Most prominent personal habits were chewing among the females and smoking and drinking among the males. About 20% of the males were consuming alcohol.

There were 33 confirmed cases of cancer, 15 among females and 18

among males. Breast cancer was most common (5) cancer followed by oral cancer (5). The cancer prevalent rate was 148.3 per 1,00,000 population. 503 cataract cases were observed among the survey population giving a prevalence rate of 2.3%. During the survey 45 cases of congenital abnormalities were observed in the survey population showing prevalence of 4.2/1000 population which does not seem to be high.

MEDICAL TEAMS

1. FACULTY MEMBERS, Tirunelveli Medical College

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2. SUPERVISORS

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Mr. N. KANDASAMY, M.Sc.

Mr. P. ARUMUGAM, M.A. M.P.S.

3. INVESTIGATORS

Sr. NO.	Name of the CRR I (Compulsory Rotatory Residential Internee)	Sr. No.	Name of the CRR I
1.	Dr.Asher Enniee Nayagam	23	Dr. Hemnath
2	Dr. Suganya	24	Dr. Karthiheyam
3	Dr. Sundara Sivam	25	Dr. Balamurugan
4	Dr. Sivakami	26	Dr. Anitha
5	Dr. Vikram	27	Dr. Ebanazer
6	Dr. Sara	28	Dr. Anuradha
7	Dr. Rengasamy Muthukuri	29	Dr. Elayaraja
8	Dr. Sarala Bharathi	30	Dr. Harish Goyal
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10	Dr. Viji	32	Dr. Deepa
11	Dr. Syed Ismail	33	Dr. Sanharavadivelan
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16	Dr. Nagalakshmi	38	Dr. Subhashini
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19	Dr. Muhilan	41	Dr. Muthu Prathiba
20	Dr. Uma Maheshwari	42	Dr. Sathish Kumar
21	Dr. Arumugam	43	Dr. Sukanya
22	Dr. Krishnamoorthy	44	Dr. Tina Nirwani Goel

4. Statistician

SHRI P. ARUMUGAM
M.A. M.P.S. PGDCA

5. Secretarial Assistance

Mrs. Swati Kane, NPCIL, Mumbai

EPIDEMIOLOGICAL SURVEY TO EVALUATE THE HEALTH STATUS OF THE POPULATION AROUND KUDANKULAM ATOMIC POWER PROJECT

INTRODUCTION :

Nuclear Power Corporation of India Limited (NPCIL) has, a few years ago, planned to build a nuclear power station near Kudankulam (KK) in Tirunelveli district of Tamil Nadu state. The proposed Kudankulam Nuclear Power Plant (KK-NPP) site is situated on the shore of the Gulf of Mannar, the Southern most tip of the Indian Peninsula. It is only 12 km. to the North-east of Kanyakumari and covers an area of about 1200 hectares. The immediate neighbouring area surrounding the site is semi-arid land, mostly shrubs and bushes grow around the site.

In December 2000, NPCIL awarded a Consultancy Service Contract to Tirunelveli Medical College (TVMC), Tirunelveli, a Government Medical College under the control of the Director of Medical Education, and in turn under the Health and Family Welfare Department of the Government of Tamil Nadu, to carry out a health survey of the persons living in the villages within 5 kilometres around the KK-NPP site. The purpose of the survey was to obtain baseline information regarding the health and social status of the population in a 5 km. radius of KK-NPP. The Department of Community Medicine, Tirunelveli Medical College was entrusted to carry out this survey. This epidemiological survey focussed on the prevalence of

- i) different types of cancer viz., oral cancer, skin cancer, lung cancer,

- cervical cancer, breast cancer, thyroid gland cancer, leukemia, etc.,
- ii) congenital malformations, and
 - iii) cataract.

This study was also intended to determine the social and living standards of the target population.

AIMS AND OBJECTIVES

The overall aim of this study was to assess the health status of the population living in villages within 5 kilometers radius of KK-NPP and compile the baseline data profile of their health status. It was also intended to study the demographic, socio-economic and cultural profile and practices prevalent in the region.

Specific objectives :

The specific objectives of this epidemiological studies were to :

- i) assess the morbidity status of the population with specific reference to various types of cancers,
- ii) assess the morbidity status of the population with specific reference to congenital malformations,
- iii) study the demographic, socio-economic and cultural profile and lifestyle practices relevant to morbidity with a view to find out the risk factors.

This report exclusively deals with the details of the baseline epidemiological survey that was conducted with the above specific objectives.

METHODOLOGY :

STUDY AREA :

The present study was carried out in a population of approximately 22,000 persons residing in 3 villages located within 5 km. from the KK-NPP site as shown in Fig.1 This map also shows the location of other villages around the site. All the villages have an access road. National Highway (NH-7) passes very close to the site and proposed residential colony (about 2 km. from residential colony and about 6 km. from the site). All the villages (three) are located within 5 km. radius from the site as shown in the map (Fig.1).

STUDY POPULATION :

The entire population of 21658 as given by 1991 census was considered for this epidemiological health survey on the presumptions that this population would probably be exposed to the risk of radiation, if any, after the KK-NPP starts operating. The population may get exposed to the radioactive materials discharged into environment through air and liquid routes. The present population (surveyed) for each village is given below.

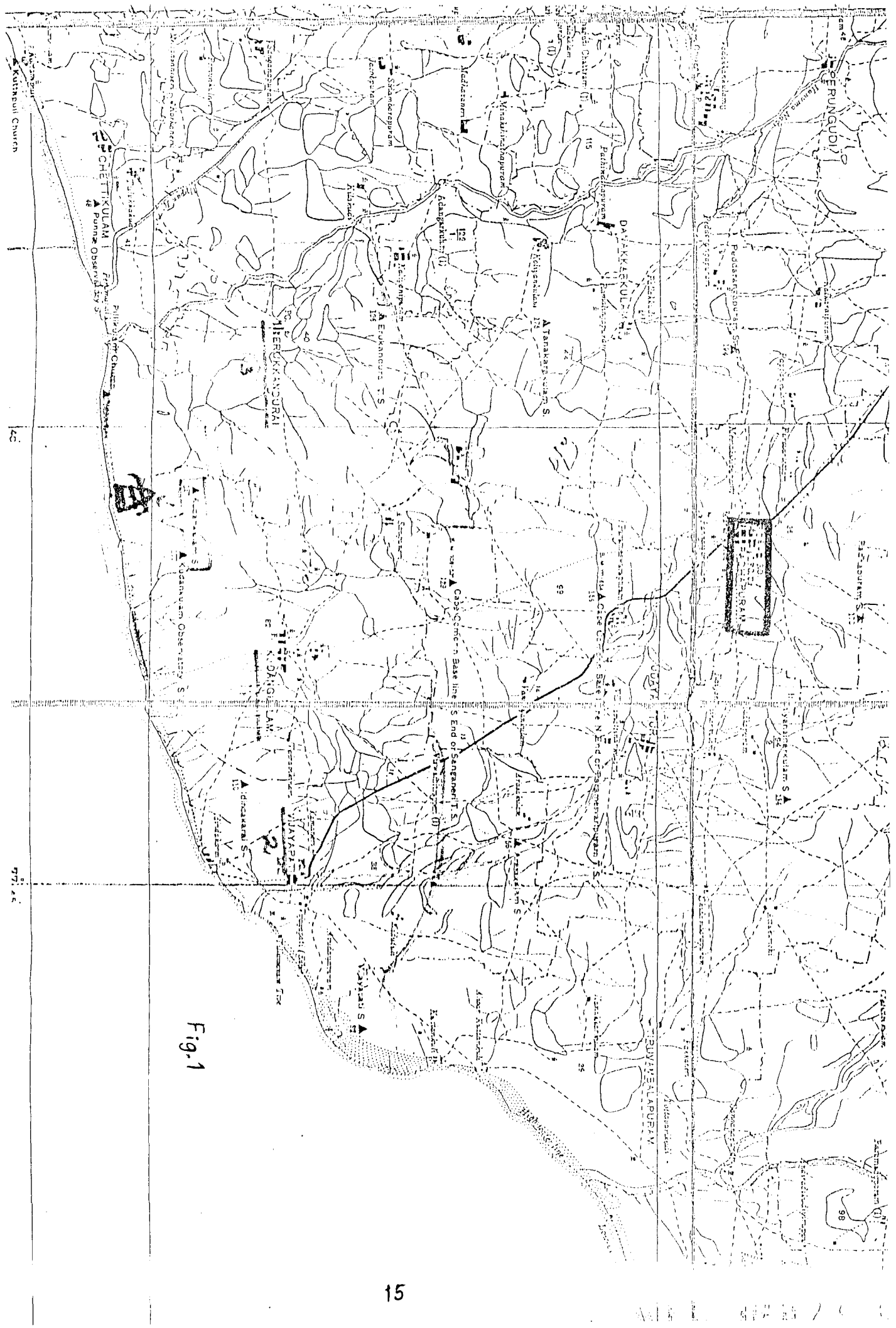


Fig. 1

Sr. No.	Village	Population
1	Kudankulam	9335
2	Irakkanthurai	3565
3	Vijayapathi	9352
	Total	22256

STUDY DESIGN :

It was essentially a prevalence study to assess the profile about the existing health and socio-economic status of the people living around the KK-NPP site. The profile will serve as the baseline for such studies in the future, if required. A team of the experts from NPCIL, Mumbai visited Tirunelveli Medical College & Hospital, Tirunelveli, and discussed with the authorities of Tirunelveli Medical College & Hospital, Tirunelveli, the proposed survey and its modalities.

PROFORMA DESIGN

To carry out the survey a simple and brief proforma was designed by Shri M.R. Sachdev, Senior Health Physicist, NPCIL and was extensively discussed with the members of the faculty of the Department of Community Medicine, Statistician, Medical Officers of Tirunelveli Medical College. The proforma was field tested during the pilot study and a few minor difficulties encountered were solved suitably by modifying the proforma after discussions with Shri M.R. Sachdev, Senior Health Physicist, NPCIL, Mumbai.

The proforma has only two pages and is meant for one household. It has common schedule consisting of family identification particulars, demographic details, socio-economic status, housing, morbidity and mortality statistics and health seeking behaviour of the family. The personal habits assessment, educational qualifications, medical history, birth defects, etc., for every member of the family are also included in the proforma. Investigation report and final diagnosis are also part of the proforma.

SURVEY PERIOD

The staff and the members of the medical teams from Tirunelveli Medical College to carry out the survey were briefed by Shri M.R. Sachdev, NPCIL and their queries were responded to before the pilot survey was undertaken.

The actual survey started on April 16, 2001 and the data collection work in villages covering almost entire study area was over on June 28, 2001. For further medical investigations, suspected cases are being referred to Tirunelveli Medical College, Tirunelveli.

PILOT SURVEY :

A pilot survey was conducted on March 13, 2001 by the field teams from Tirunelveli Medical College under the supervision of Dr. Vairamani, Prof. & Head (in-charge), Department of Community Medicine (DCM), Tirunelveli Medical College and Shri M.R. Sachdev, NPCIL. 60 households in different villages were covered in this pilot survey.

The objective of this pilot study was to test the validity, reliability and practicability of the proforma and other survey instruments. The pilot study also helped the survey teams to get familiarized with the proforma. The results and problems encountered in the pilot study were again discussed on 14 March, 2001 with Shri M.R. Sachdev, NPCIL and required minor modifications were incorporated in the proforma..

MEDICAL TEAMS :

Ten medical teams on the advice from the Department of Community Medicine of the Tirunelveli Medical College were constituted for the data collection for this epidemiological study. Each team consisted of one medical officer and a medico-social worker. The district collector had a meeting with the representatives of the villages before starting the survey. These teams were stationed at Kanyakumari which is about 15 km. from the area of the survey. The teams started work early in the morning and continued till late in the evening which facilitated the work to be accomplished in such a short period.

EPIDEMIOLOGICAL SURVEY:

A house-to-house survey was carried out by the survey teams. Information regarding the socio-demographic characteristics, lifestyle practices, morbidity conditions with specific referencè to oral cancer, cervical cancer, breast cancer, skin cancer and cancer of thyroid gland, leukemia, congenital anomalies, cataract, any long term illnesses, etc., were documented by the survey teams in the duly pre-tested performa.

The doctors examined the members of the household to identify the specific morbidity conditions. Gynecologists will be taking pap-smear test during further clinical survey arranged later on.

REFERRAL SERVICES :

Suspected cases of cancer will be referred to Tirunelveli Medical College, Tirunelveli for confirmation of diagnosis and treatment. Similarly congenital malformations identified during the survey will also be referred for appropriate management. All these persons would be photographed for identification and referral treatment in the Tirunelveli Medical College.

QUALITY CONTROL :

The proforma which were filled up every day were scrutinised by the medical officers on a day-to-day basis. These proforma were further verified by the supervisor, a senior member of the faculty of Department of Community Medicine, Tirunelveli Medical College. Random visits were made to the field by the senior faculty members to check the validity of the information collected. Further NPCIL also on its own verified randomly the collected data.

DATA ANALYSIS :

The data was analysed by the statistician from Tirunelveli Medical College manually as per the format supplied by NPCIL. The results were expressed appropriately in terms of percentage prevalence, 95%

confidence interval, mean and standard deviation.

RESULTS AND DISCUSSION :

The observations of the epidemiological survey were classified under eight categories as follows :

1. General information about the survey
2. Socio-demographic characteristics
3. Environmental conditions
4. Educational and occupational status
5. Health assessment
6. Profile of personal habits
7. Health status of the adults
8. Health status of the children

1. GENERAL INFORMATION

The general details and information about the survey area are summarised in the following table :

Table : Information about survey coverage

Number of villages surveyed	3 (THREE)
Names of the villages	A) KUDANKULAM B) IRUKKANTHURAI & C) VIJAYAPATHI
Total number of houses visited	5717
Number of houses found locked	425
Total population covered	22,256

Table : General information about facilities available in the villages

Facilities	No. in each village		
	KUDANKULAM	IRUKKANTHURAI	VIJAYAPATHI
Hospital	NIL	NIL	NIL
Primary Health Centre	ONE	NIL	NIL
Health Sub. Centre	TWO	ONE	ONE
Central Govt. Dispensary	ONE	-	-
Primary & Middle School	FIVE	THREE	FOUR
Secondary & High School	TWO	-	ONE
Post & Telegraph Office	ONE	ONE	TWO
Police station/Chowky	ONE	NIL	NIL
Panchayat Office	ONE	ONE	ONE
Other Govt. Buildings	THREE	-	-
Worship places	Temples FIVE	THREE	THREE
	Churches TWO	ONE	THREE
	Mosques -	-	ONE

In general, the villages have good houses and all the houses are numbered by the grampanchayats. The villages have piped water supply system and good drainage for the rain water. The number of children in the schools is as follows :

Table : Number of children & teachers in schools

Name of the school	No of students	No. of Teachers	No. of rooms
A. Kudankulam			
1. TDTA - St. Andrews Middle School	876	25	10
2. Govt. High School	147	5	4
3. Salvation Army Primary School	62	2	3
4. Bharath Middle School	223	6	8
5. Hindu Middle School	690	16	12
6. St. Anne's Middle School	481	10	6
7. St. Anne's Hr. Sec. School	582	22	12
Sub Total	3061	86	55
B. IRUKKANTHURAI			
1. Govt; aided middle School	217	6	6
2. Private Middle school	141	6	8
3. Primary school	48	4	5
Sub Total	406	16	19

C. VIJAYAPATHI

1. TDTA middle school	187	6	6
2. Arul Primary School	73	3	6
3. St. Xavier Middle school	324	13	12
4. Private Hr. Sec. School	389	14	16
5. Panchayat Primary School	123	5	5
Sub total	1096	41	45

Grand Total	4563	143	119
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2. SOCIO-DEMOGRAPHIC CHARACTERISTICS

Basic social and demographic structure of the survey population is given in Table 1 to Table 5. Among the 22256 persons in the survey population, 11067 (49.7 %) were males and 11189 (50.3 %) were females as shown in Table 1 for each village. This gives a sex ratio of 1011 females per 1000 males which is comparable with Tamil Nadu's sex ratio of 986 females per 1000 males. The national sex ratio is 933 females per 1000 males (2001 census).

Table 1 : Village-wise distribution of surveyed population

Village	No. of houses visited		Persons		
	Surveyed	Locked	Male	Female	Total
KUDANKULAM	2269	145	4688	4647	9335
IRUKKANTHURAI	870	71	1770	1799	3569
VIJAYAPATHI	2153	209	4609	4743	9352
TOTAL	5292	425	11067	11189	22256

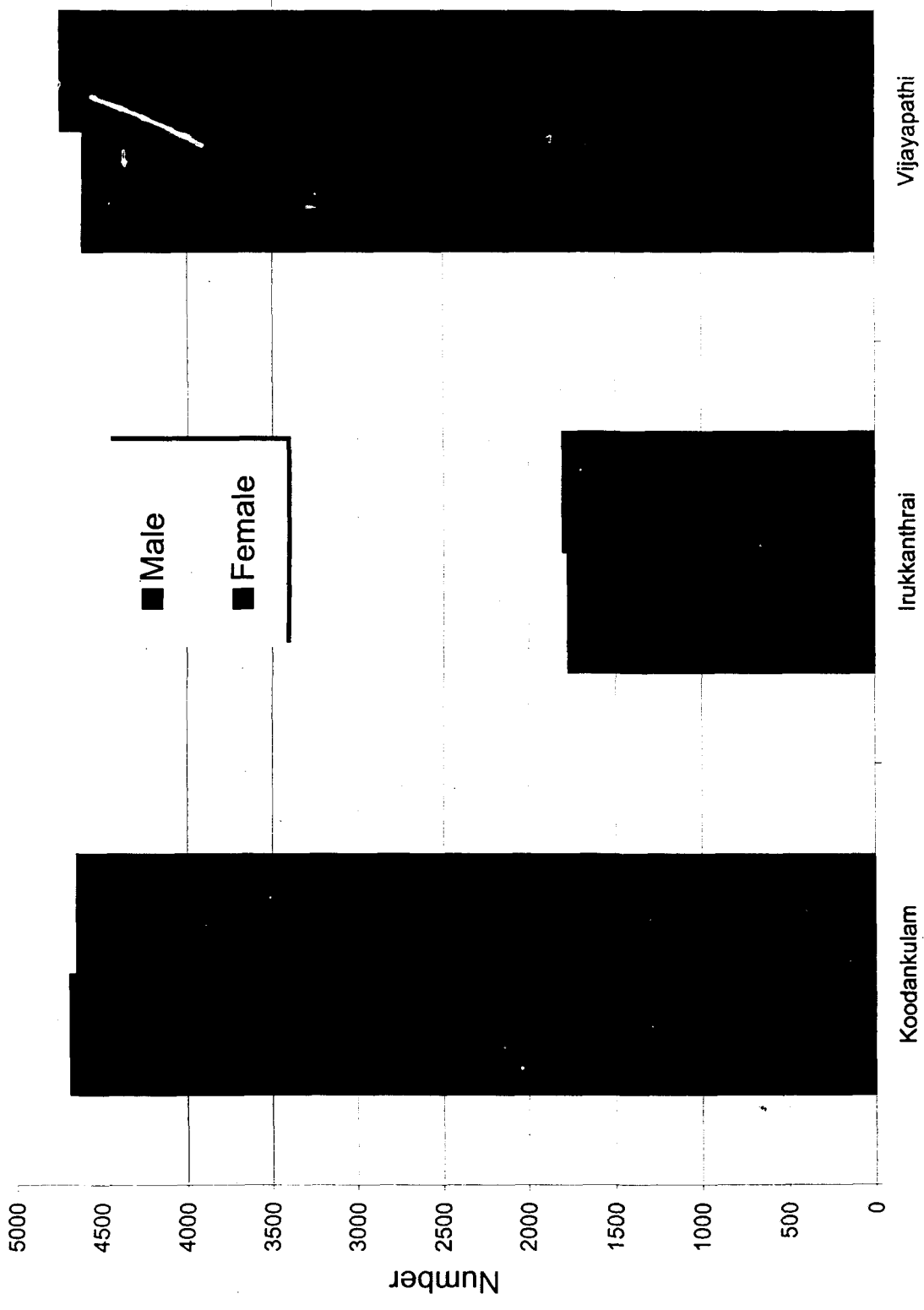


Fig. 2 : Sex-wise population

**Table 2A : Age and Sex distribution of the population in village A
(KUDANKULAM)**

Age (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
< 1	93	1.98	102	2.19	195	2.08
1 - 4	332	7.08	304	6.54	636	6.81
5 - 9	497	10.60	538	11.57	1035	11.08
10- 14	439	9.36	454	9.76	893	9.56
15 - 19	533	11.36	516	11.10	1049	11.23
20 - 24	477	10.17	440	9.46	917	9.82
25 - 29	402	8.57	431	9.27	833	8.96
30 - 34	387	8.25	358	7.70	745	7.98
35 - 39	309	6.59	326	7.01	635	6.80
40 - 44	281	6.00	260	5.59	541	5.79
45 - 49	228	4.86	223	4.79	451	4.83
50 - 54	186	3.96	205	4.41	391	4.18
55 - 59	160	3.41	156	3.35	316	3.38
60 - 64	147	3.13	158	3.40	305	3.26
65 - 69	98	2.09	80	1.72	178	1.90
70 - 74	63	1.34	58	1.24	121	1.29
75 - 79	28	0.59	25	0.53	53	0.56
80 - 84	20	0.42	7	0.15	27	0.28
85 - 89	6	0.12	4	0.08	10	0.10
90 - 94	2	0.04	2	0.04	4	0.04
95 - 100	-	-	-	-	-	-
Total	4688	100	4647	100	9335	100

**Table 2B : Age and Sex distribution of the population in village B
IRUKKANTHURAI**

Age (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
< 1	39	2.20	38	2.11	77	2.15
1 - 4	113	6.38	105	5.83	218	6.10
5 - 9	189	10.67	182	10.11	371	10.39
10- 14	175	9.88	159	8.83	334	9.35
15 - 19	183	10.33	215	11.95	398	11.15
20 - 24	148	8.36	165	9.17	313	8.76
25 - 29	172	9.71	193	10.72	365	10.22
30 - 34	99	5.59	128	7.11	227	6.36
35 - 39	151	8.53	109	6.05	260	7.28
40 - 44	98	5.53	96	5.33	194	5.43
45 - 49	100	5.64	91	5.05	191	5.35
50 - 54	80	4.52	75	4.16	155	4.34
55 - 59	67	3.78	75	4.16	142	3.97
60 - 64	53	2.99	59	3.28	112	3.13
65 - 69	48	2.71	30	1.66	78	2.18
70 - 74	24	1.35	35	1.94	59	1.65
75 - 79	12	0.67	15	0.83	27	0.75
80 - 84	9	0.50	16	0.88	25	0.70
85 - 89	9	0.50	4	0.22	13	0.36
90 - 94	1	0.05	6	0.33	7	0.19
95 - 100	-	-	3	0.16	3	0.08
Total	1770	100	1799	100	3569	100

**Table 2C : Age and Sex distribution of the population in village C
VIJAYAPATHI**

Age (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
< 1	145	3.14	137	2.85	282	3.01
1 - 4	315	6.83	350	7.29	665	7.11
5 - 9	439	9.52	430	8.96	869	9.29
10- 14	480	10.41	493	10.27	973	10.40
15 - 19	578	12.54	615	12.82	1193	12.75
20 - 24	473	10.26	508	10.58	981	10.48
25 - 29	394	8.54	395	8.23	789	8.43
30 - 34	281	6.09	291	6.06	572	6.11
35 - 39	300	6.50	340	7.08	640	6.84
40 - 44	253	5.48	237	4.94	490	5.23
45 - 49	258	5.59	250	5.21	508	5.43
50 - 54	189	4.10	184	3.83	373	3.98
55 - 59	146	3.16	150	3.12	296	3.16
60 - 64	134	2.90	129	2.68	263	2.81
65 - 69	107	2.32	94	1.95	201	2.14
70 - 74	61	1.32	77	1.60	138	1.47
75 - 79	26	0.56	36	0.75	62	0.66
80 - 84	14	0.30	14	0.29	28	0.29
85 - 89	8	0.17	8	0.16	16	0.17
90 - 94	3	0.06	4	0.08	7	0.07
95 - 100	5	0.10	1	0.02	6	0.06
Total	4609	100	4748	100	9352	100

Table 2 : Age and Sex distribution of the population in village A - C

Age (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
< 1	277	2.50	277	2.47	554	2.48
1 - 4	760	6.86	759	6.78	1519	6.82
5 - 9	1125	10.16	1150	10.27	2275	10.22
10- 14	1094	9.88	1106	9.88	2200	9.88
15 - 19	1294	11.69	1346	12.02	2640	11.86
20 - 24	1098	9.92	1113	9.94	2211	9.93
25 - 29	968	8.74	1019	9.10	1987	8.92
30 - 34	767	6.93	777	6.94	1544	6.93
35 - 39	768	6.93	775	6.92	1535	6.89
40 - 44	632	5.71	593	5.29	1225	5.50
45 - 49	586	5.29	564	5.04	1150	5.15
50 - 54	455	4.11	464	4.14	919	4.12
55 - 59	373	3.37	381	3.40	754	3.38
60 - 64	334	3.01	346	3.09	680	3.05
65 - 69	253	2.28	204	1.82	457	2.05
70 - 74	148	1.33	170	1.52	318	1.42
75 - 79	66	0.59	76	0.67	142	0.63
80 - 84	43	0.38	37	0.33	80	0.35
85 - 89	23	0.20	16	0.14	39	0.17
90 - 94	6	0.05	12	0.10	18	0.08
95 - 100	5	0.04	4	0.03	9	0.04
Total	11067	100	11189	100	22256	100

Table 3 : Number of persons in a family

Members	Families	
	Number	%
< 2	900	17.0
3 - 4	2071	39.1
5 - 6	1801	34.0
7 - 8	417	7.9
9 - 10	75	1.4
> 10	28	0.6
Total	5292	100.0

**Table 4A : Religion-wise population distribution (Village A)
(KUDANKULAM)**

Religion	Families	Population	
		Number	%
Hindu	1951	8034	86.1
Christian	316	1293	13.8
Muslims	2	8	0.1
Total	2269	9335	100.0

**Table 4B : Religion-wise population distribution (Village B)
(IRUKKANTHURAI)**

Religion	Families	Population	
		Number	%
Hindu	813	3300	92.5
Christian	57	269	7.5
Total	870	3569	100.0

**Table 4C : Religion-wise population distribution (Village C)
(VIJAYAPATHI)**

Religion	Families	Population	
		Number	%
Hindu	704	3264	34.9
Christian	1320	5573	59.6
Muslims	129	515	5.5
Total	2153	9352	100

Table 4 : Religion-wise population distribution (All Villages)

Religion	Families	Population	
		Number	%
Hindu	3468	14598	65.6
Christian	1693	7135	32.1
Muslims	131	523	2.3
Total	5292	22256	100.0

**Table 5A : Caste-wise distribution of population (Village A)
(KUDANKULAM)**

Caste	Families	Population
SC	134	524
ST	-	-
OBC	2135	8811
Others	-	-
TOTAL	2269	9335

**Table 5B : Caste-wise distribution of population (Village B)
(IRUKKANTHURAI)**

Caste	Families	Population
SC	410	1635
ST	6	29
OBC	407	1718
Others	47	187
TOTAL	870	3569

**Table 5C : Caste-wise distribution of population (Village C)
VIJAYAPATHI**

Caste	Families	Population
SC	204	849
ST	1	4
OBC	1939	8455
Others	9	44
TOTAL	2153	9352

Table 5 : Caste-wise distribution of population (All Villages)

Caste	Families	Population	
		Numbers	%
SC	748	3008	13.5
ST	7	33	0.2
OBC	4481	18984	85.3
Others	56	231	1.0

Age and sex-wise distribution of the population for each village is given in Table 2A to Table 2C and for the combined survey population is shown in Table 2. Fig. 3 shows the population of the survey area. It can be seen from Fig.4 that about 50.2% of the population is in the age group of 15-44 years, nearly 29.3% in the age group of less than 15 years and 7.9% were elderly persons (60 years and above) i.e. senior citizens.

Majority of the families (56.1%) in the study area had 4 or less members. However, about 2% of the families had 9 or more members where 2 or 3 generations are living together. These details are depicted in Table 3.

The distribution of the families according to religion and caste for each village is shown in Tables 4A-C and Table 5A-C and for the complete survey population in Tables 4 and 5 respectively. As can be seen from Fig. 5, the Hindus constituted about 65.6%, Christians 32.1%, and Muslim 2.3% Fig. 6 depicts the caste status of the population.

About 13.5% population (748 families) belonged to the scheduled caste (SC), about 0.2% to scheduled tribes (S.T.) and 85.3% to other backward classes (OBC) as notified by the state government of Tamil Nadu.

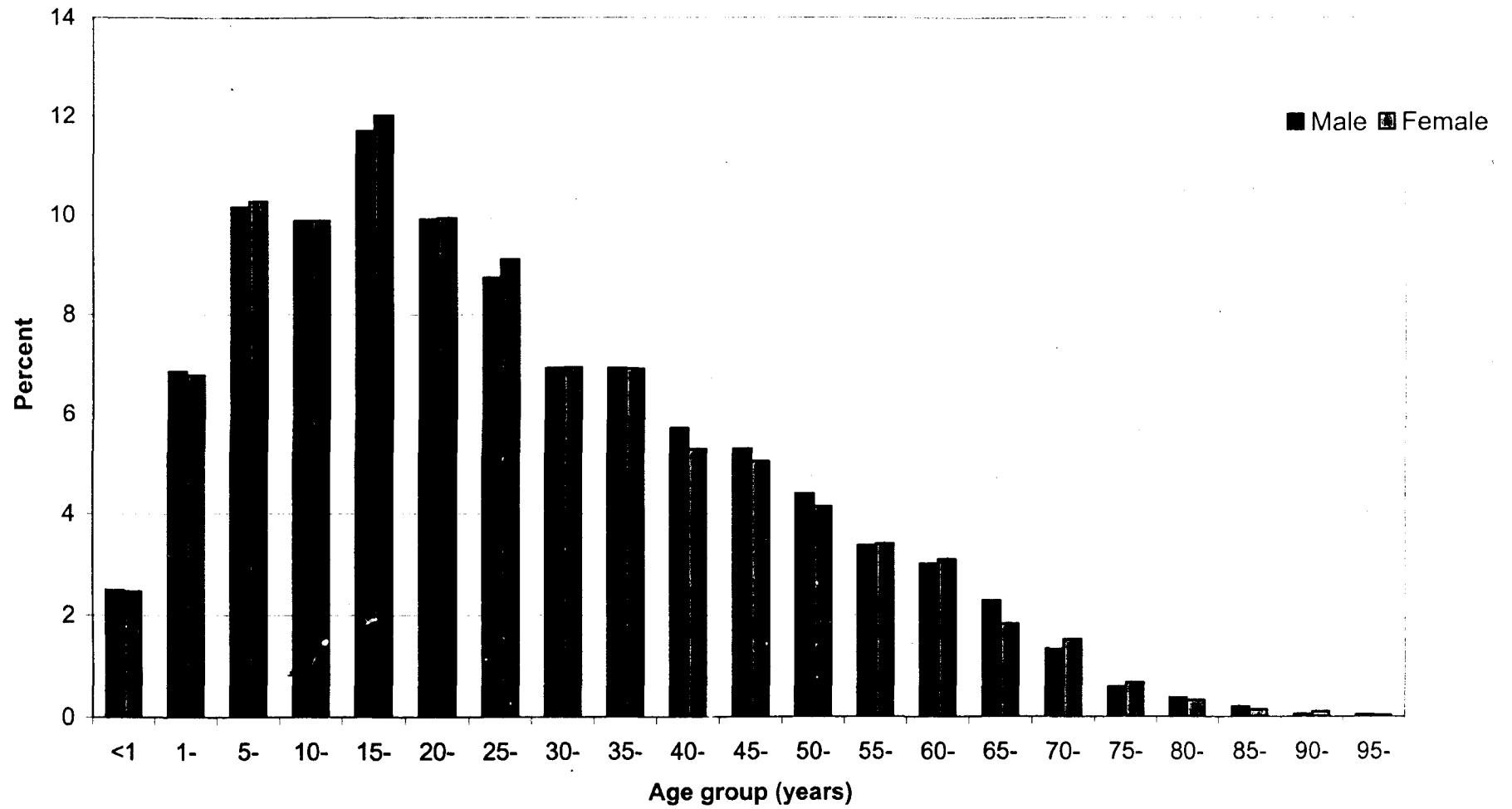


Fig. 3 : Age and sex-wise population distribution

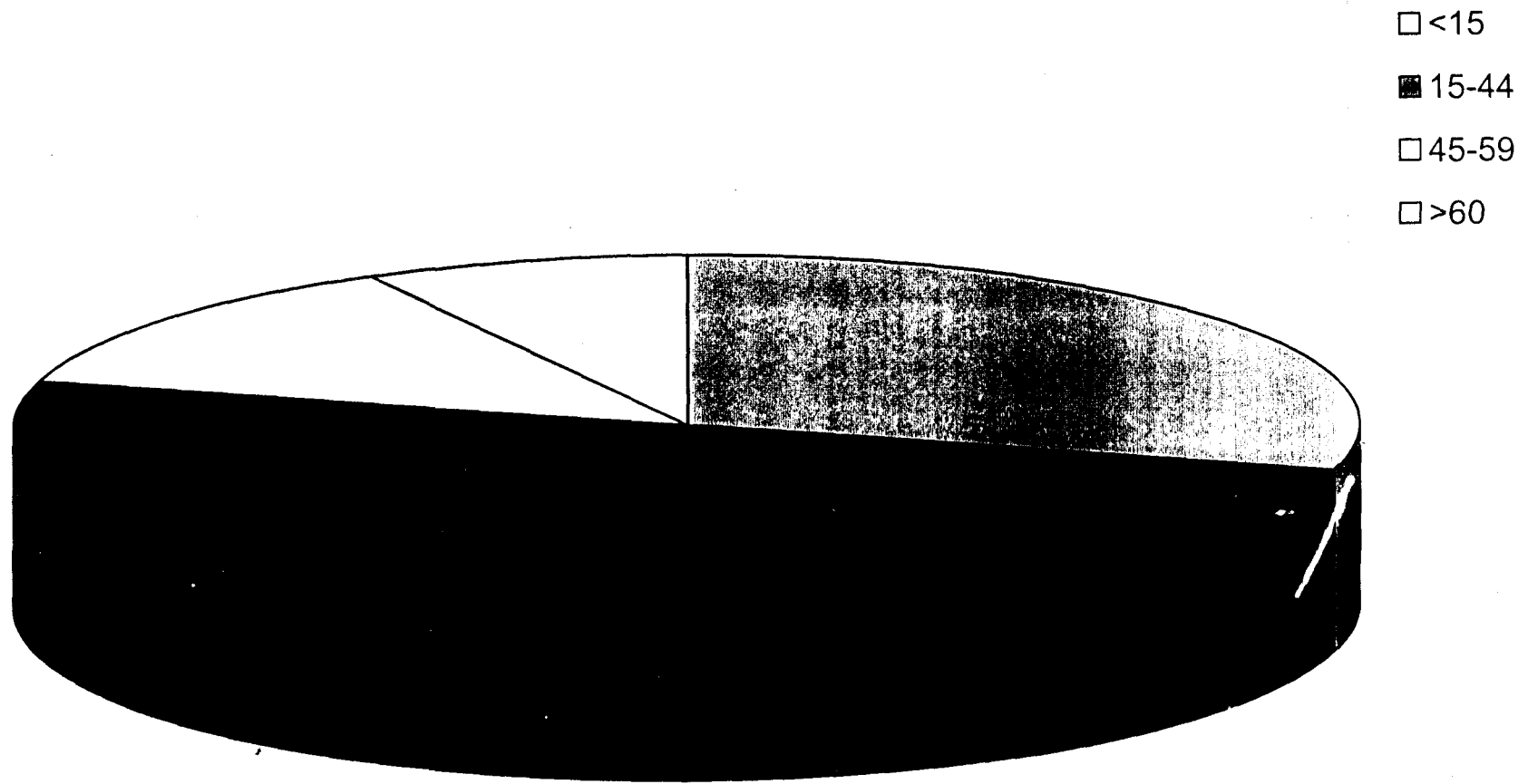


Fig.4:Population by Age

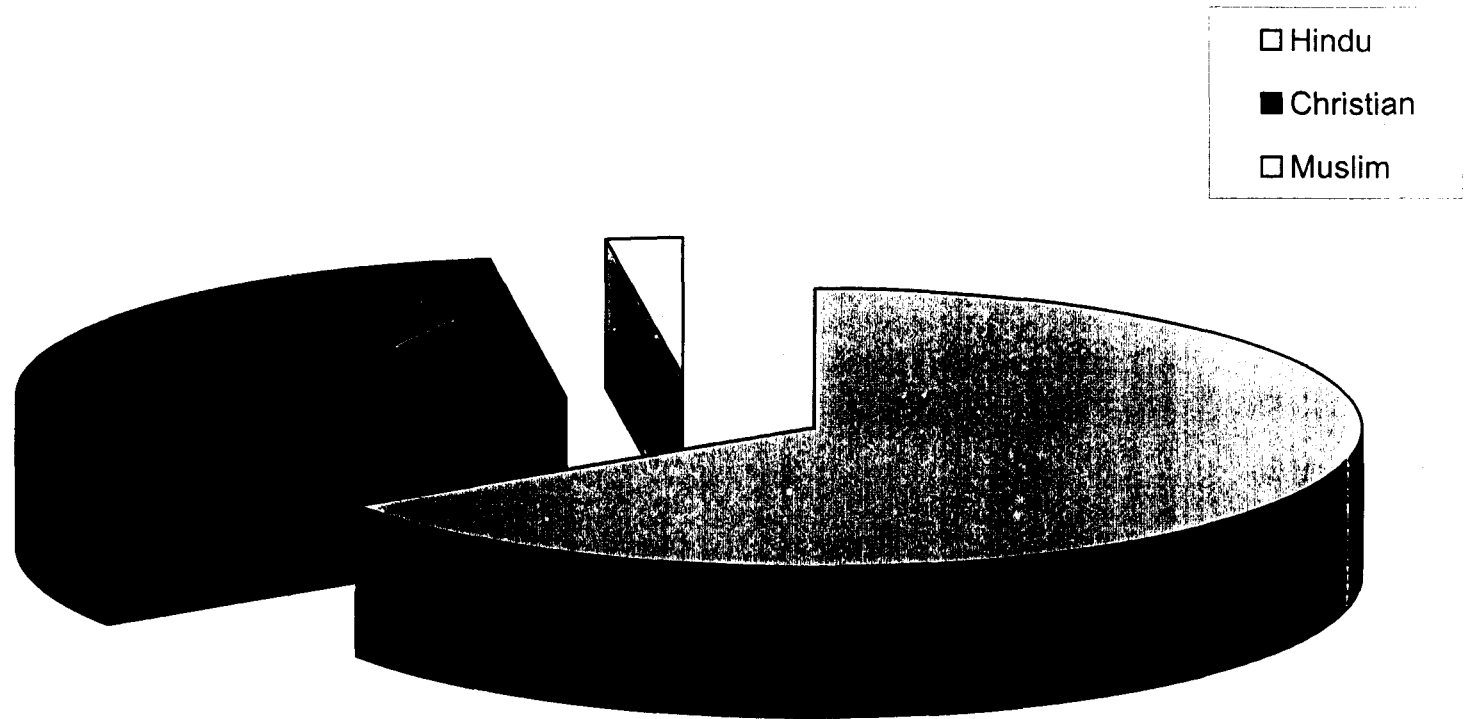


Fig.5: Religion-wise population distribution

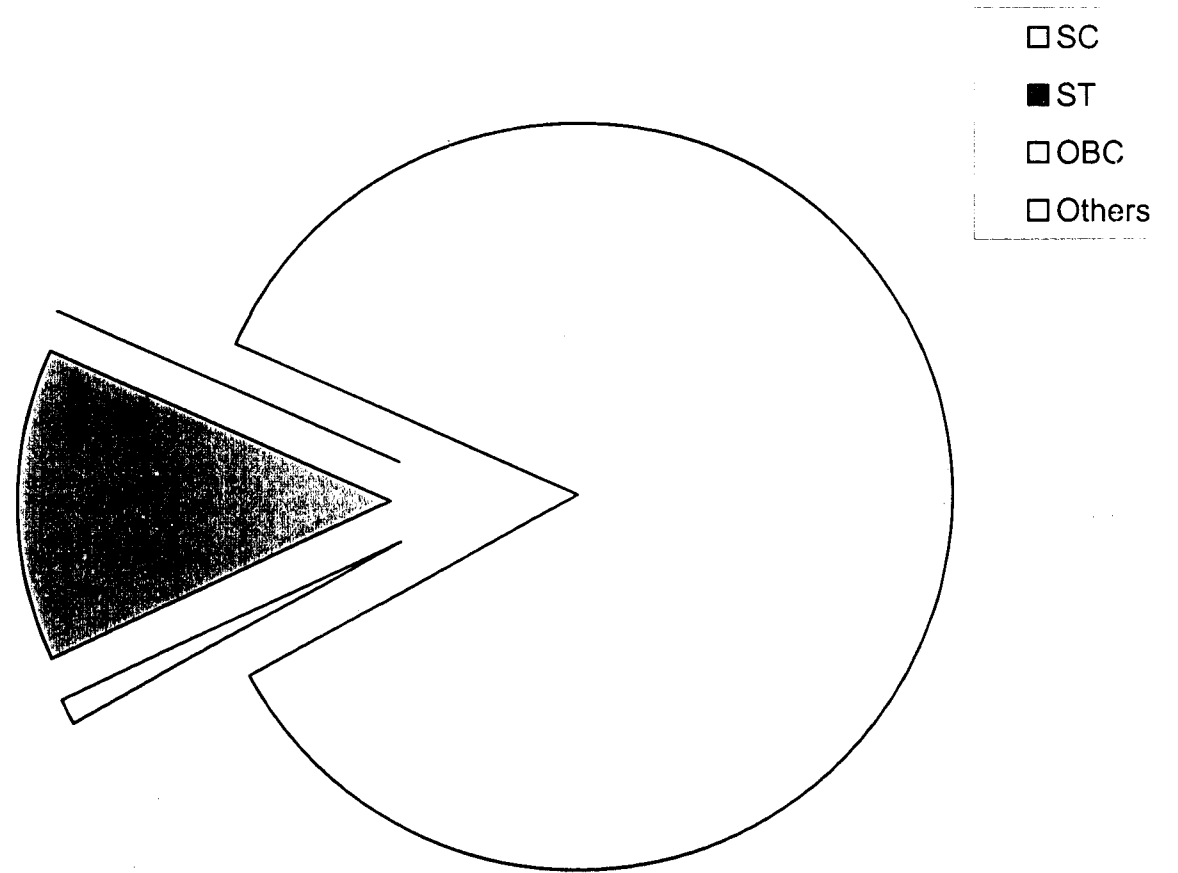


Fig.6: Caste-wise distribution of population

Regular dietary pattern of the survey population is analysed in Table 6. As far as food habits are concerned, majority of the people in this area eat mixed (non-veg) diet as the region is coastal area. Only 0.6% villagers are vegetarians.

Table 6: Dietary pattern of the population

Sex	Vegetarian	Non-veg.
Male	66	11001
Female	59	11130
Total	125	22131
%	0.6	99.4

Table 7 : Marital Status of the population

Sex	Single		Married		Widowed	
	No.	%	No.	%	No.	%
Male	2902	55.77	4658	48.88	239	23.22
Female	2301	44.23	4870	51.12	790	76.78
Total	5203		9528		1029	

There are 1576 persons above the age of 15 years. The marital status of this population is given in Table 7. About 60% of the people were married and 6.5% were widowed. The population of widows (5%) was more than that of widowers (1.5%)

3. ENVIRONMENTAL LIFESTYLE CONDITIONS

Tables 8 to 12 depict the environmental conditions and the lifestyle of the people living in these villages. About 38.2% of the houses are made from concrete and another 33% are of mixed nature i.e. partly made from concrete and partly tiled or asbestos roofing as shown in Fig.7. Hardly 5% people live in

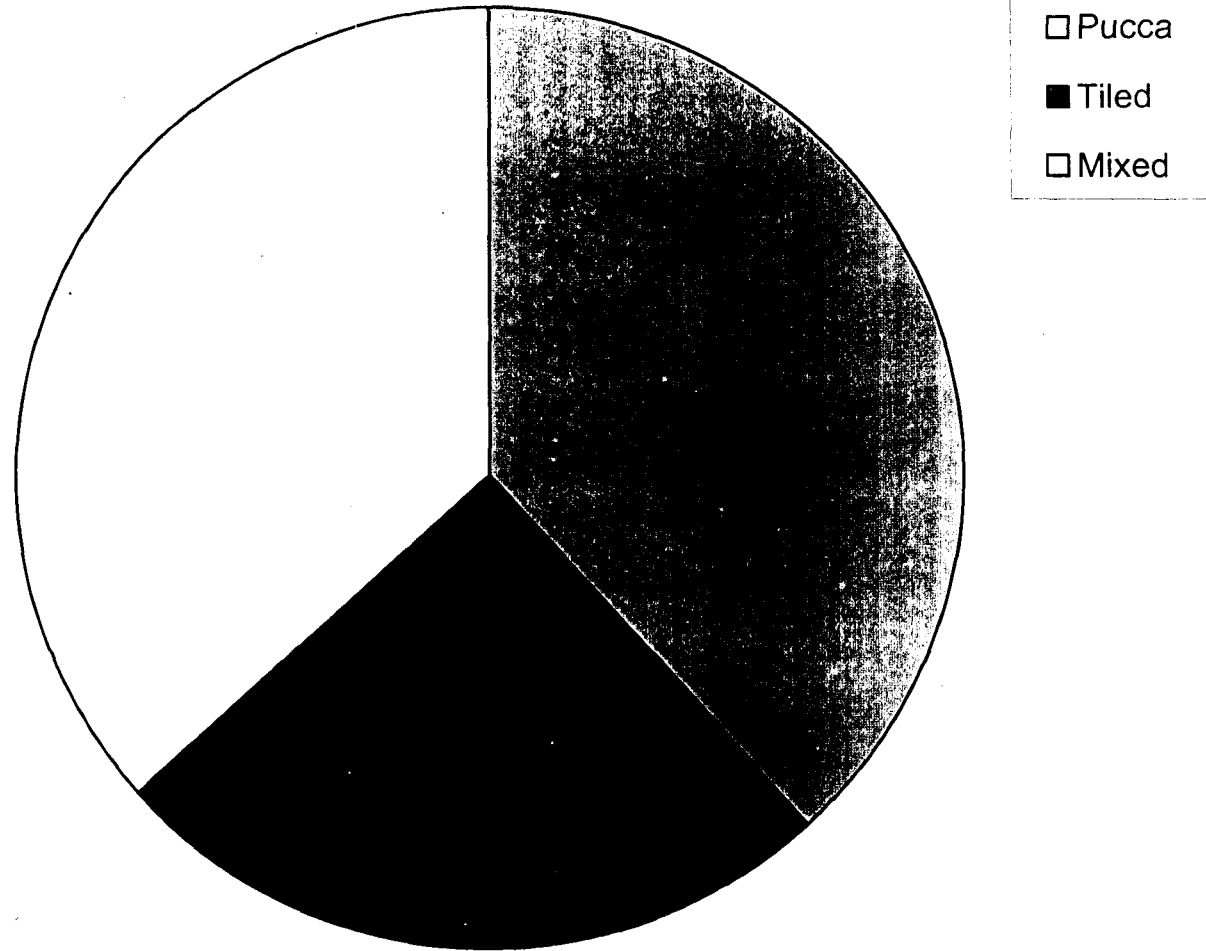


Fig.7: Types of houses in the area

kutchha houses. Most of the houses are owned by the people living in it, only about 10% people live in hired houses.

Table 8 : Population distribution according to type of dwelling

Type of Houses	No. of families	%
Hut	-	-
Pucca	20210	38.2
kutchha	1335	25.2
Tiled	1937	36.6
Total	5292	100.0

Table 9 : Ownership status of dwelling

Status	No.	%
Own	4928	93.1
Rented	314	5.9
Free	48	0.9
Temporary	-	-
Others	2	0.1
Total	5292	100.0

Table 10 : Cooking Fuel used

Type of fuel	No.	%
LPG	282	5.3
Kerosene	350	6.6
Electricity	-	-
Biogas	-	-
Cowdung	5	0.1
Wood	4655	88.0
Others	5292	100.0

Table 11 : Electricity connections

Village	No. of connections
KUDANKULAM	2269
IRUKKANTHURAI	870
VIJAYAPATTI	2153
Total	5292

Table 12 : Source of Drinking water

Source	No.	%
Tap (Public)	5224	98.7
Bore well	40	0.8
Well	28	0.5
Total	5292	100.0

The type of cooking fuel used by the people is shown in Table 10. Wood is the common cooking fuel used in about 88% households, followed by kerosene (6.6%) and LPG (5.5%). About 100% of the houses are having electrical connections as shown in Table 11. Only 10 households were found not electrified due to some technical reasons. Tamil Nadu government provides one lamp connection free to every rural household.

Many families own vehicles like cars, two wheelers and bicycles. There are in all about 152 business establishments in this area. These include grocery shops, bakeries, fruit and vegetable shops, meat shops and other small utilities which include workshops and garages for maintenance and repair of vehicles used in the area.

The main source of drinking water is piped-water. Each village is provided with common community (public) taps at convenient locations in the village.

4. EDUCATIONAL AND OCCUPATIONAL STATUS :

The details of the literacy status of the study population are shown in Table 13. In a population of 20243 above 4 years, only 4362 person are illiterate. They are mostly above 65 years of age or below 5 years of age. Out of these are 1774 males and 2558 females. 662 persons are just literate, they can both read and write as shown in Fig.8. There are 3934 persons having schooling of more than 10 years. The overall literacy is about 78.5% whereas 73.22 % literacy is for T N State. The literacy among the males, as expected, is slightly higher than that among the females as shown in Fig.9. There are 15 schools in this area and the number of children attending the schools is 4563.

Table 13 : Literacy Status of the Population (above age 5 years)

Literacy Status	Males	Females	Total
Illiterate	1774	2588	4362
Just Literate	362	300	662
1-4 yrs Schooling	3067	3639	6706
5-7 yrs Schooling	2417	2162	4579
Matric	1415	898	2313
Non-graduate	556	311	867
Graduate	349	258	607
Post Graduate	86	61	147
Total	10026	10217	20243

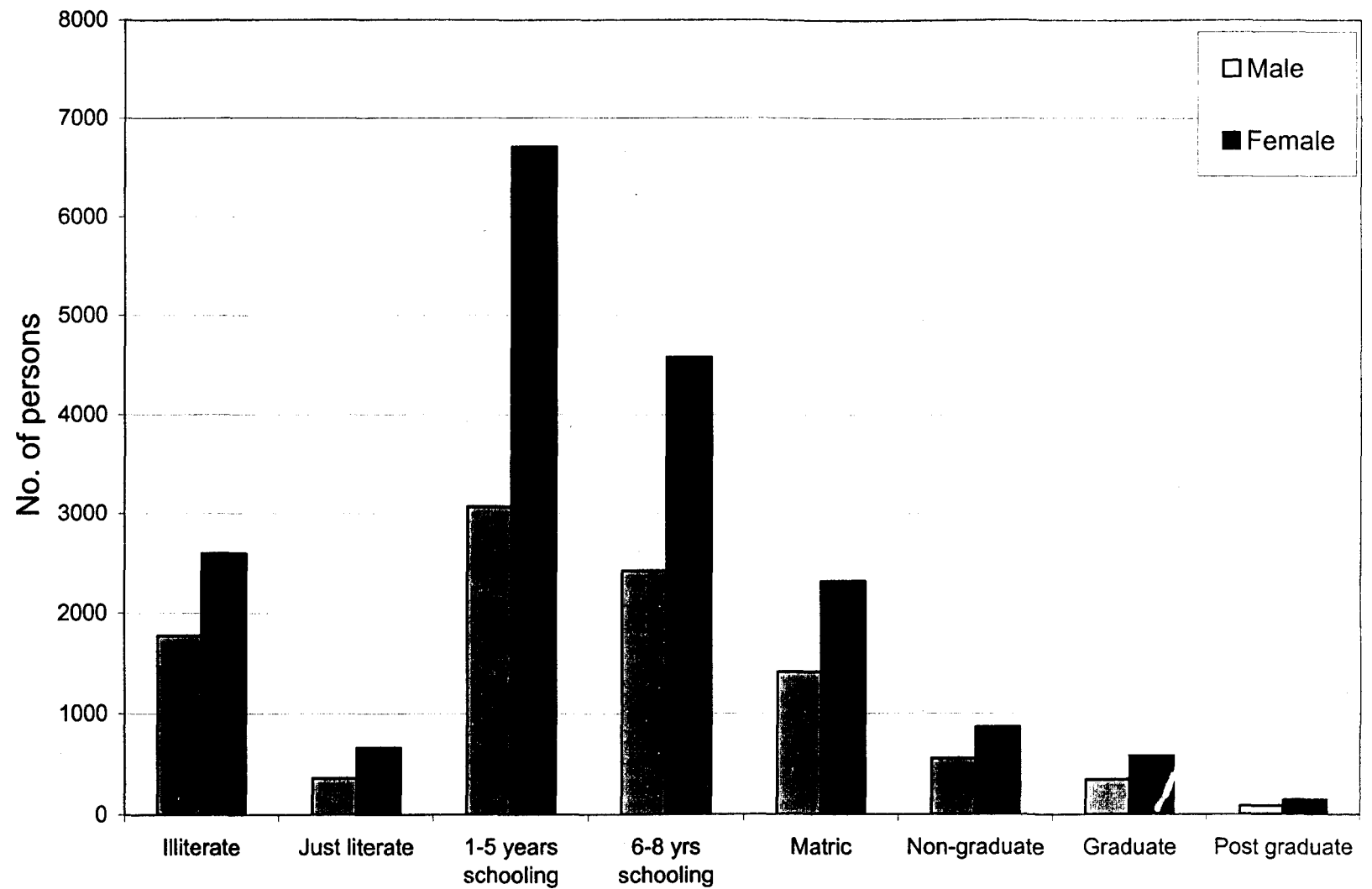


Fig.8: Literacy status of the population

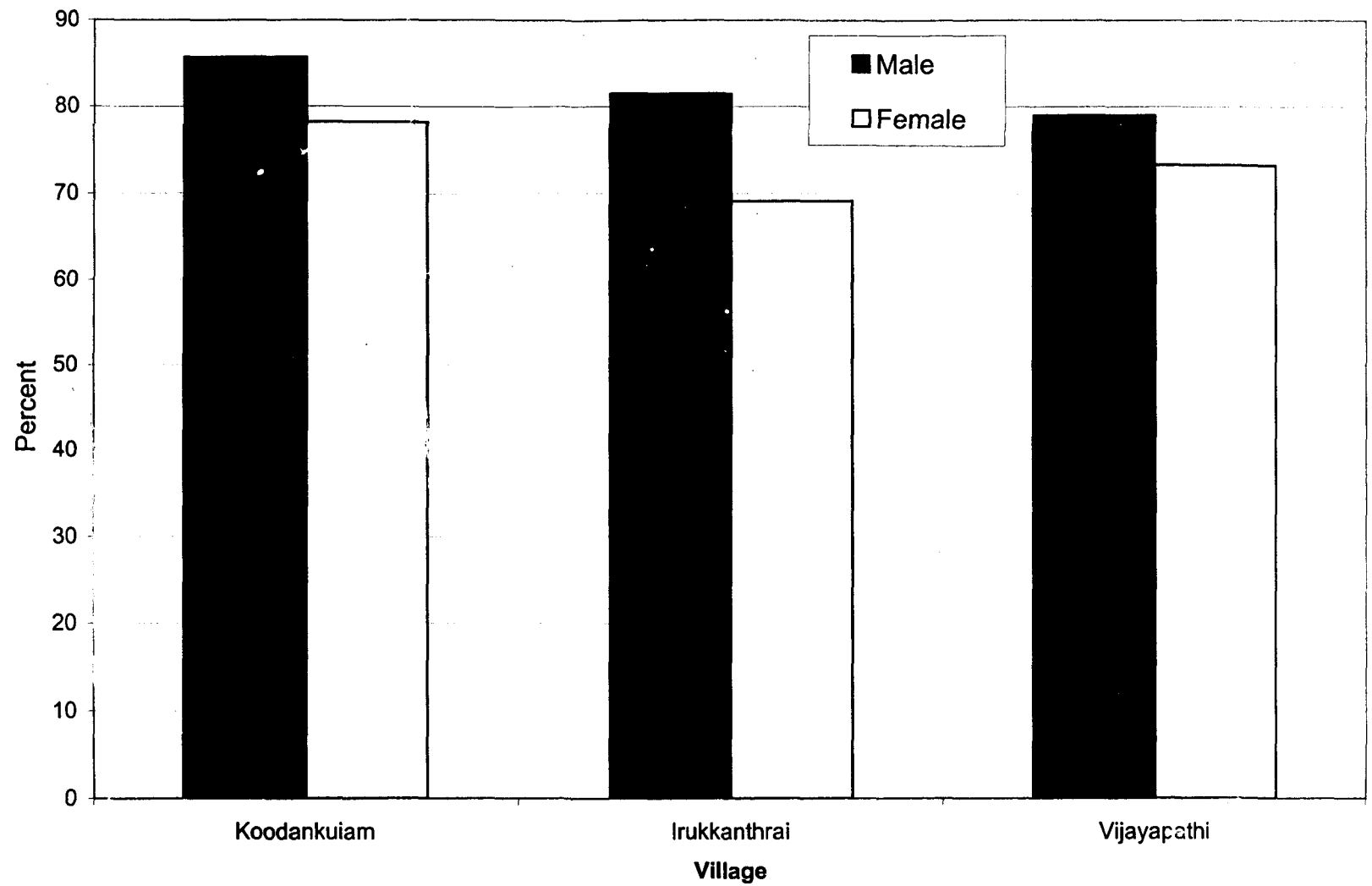


Fig.9: Literacy status sex-wise

Table 13A : Literacy status sex-wise (Literacy rate)

Village	Male	Female	Total
Kudankulam	85.7%	78.2%	81.8%
Irukkanthurai	81.5%	69.1%	75.2%
Vijayapathi	79.0%	73.3%	76.1%
TOTAL	82.3%	74.6%	78.5%

Table 14 : Occupational Distribution of the Study Population

Occupation	Male	Female	Total
White Collar	173	46	219
Skilled	202	21	223
Farmers	709	69	778
Business	481	27	508
Unskilled	2733	1255	3988
Housewife	-	2029	2029
Unemployed	839	772	1611
Students	910	1033	1943
Teachers	126	91	217
Fishing	967	7	974
Beedi workers	197	988	1185
Total	7287	7415	14702

13675

**Table 14A : Occupational Distribution of the
Study Population in village KUDANKULAM**

Occupation	Male	Female	Total
White Collar	92	16	108
Skilled	112	4	116
Farmers	326	13	339
Business	335	16	351
Unskilled	1414	835	2249
Housewife	-	840	840
Unemployed	351	257	608
Students	119	124	243
Teachers	47	52	99
Beedi Workers	173	752	925
Total	2969	2909	5878

**Table 14B : Occupational Distribution of
the Study Population in village IRUKKANTHURAI**

Occupation	Male	Female	Total
White Collar	32	10	42
Skilled	72	10	82
Farmers	224	43	267
Business	51	-	51
Unskilled	602	204	806
Housewife	-	427	427
Unemployed	120	158	278
Students	312	302	614
Teachers	12	3	15
Beedi Workers	21	325	346
Total	1446	1482	2928

**Table 14C : Occupational Distribution of
the Study Population in village C- VIJAYAPATHI**

Occupation	Male	Female	Total
White Collar	49	20	69
Skilled	18	7	25
Farmers	159	13	172
Business	95	11	106
Unskilled	717	216	933
Housewife	-	762	762
Unemployed	368	357	725
Students	479	607	1086
Teachers	17	36	53
Beedi workers	3	988	991
Fishing	967	7	974
Total	2872	3024	5896

The occupational status of the persons in the study area is shown in Table 14. The village-wise occupations are shown in Tables 14A to 14C. As the area is arid, agriculture is negligible and hence very few (5.3%) persons are engaged in agriculture related activities. 13.3% of the females in the villages are engaged in bidi rolling as shown in Fig.10.

4. HEALTH ASSESSMENT :

The primary health centre located at Kudankulam village is the main health facility that the study population utilises in minor illness. As far as major illness is concerned, the people are mainly depending on private hospitals or nursing homes. There are 4 private medical facilities available in these villages as shown in Table 15. During the study period, the study teams came across 986 (4.4%) people who were suffering from prolonged illness. Information regarding people

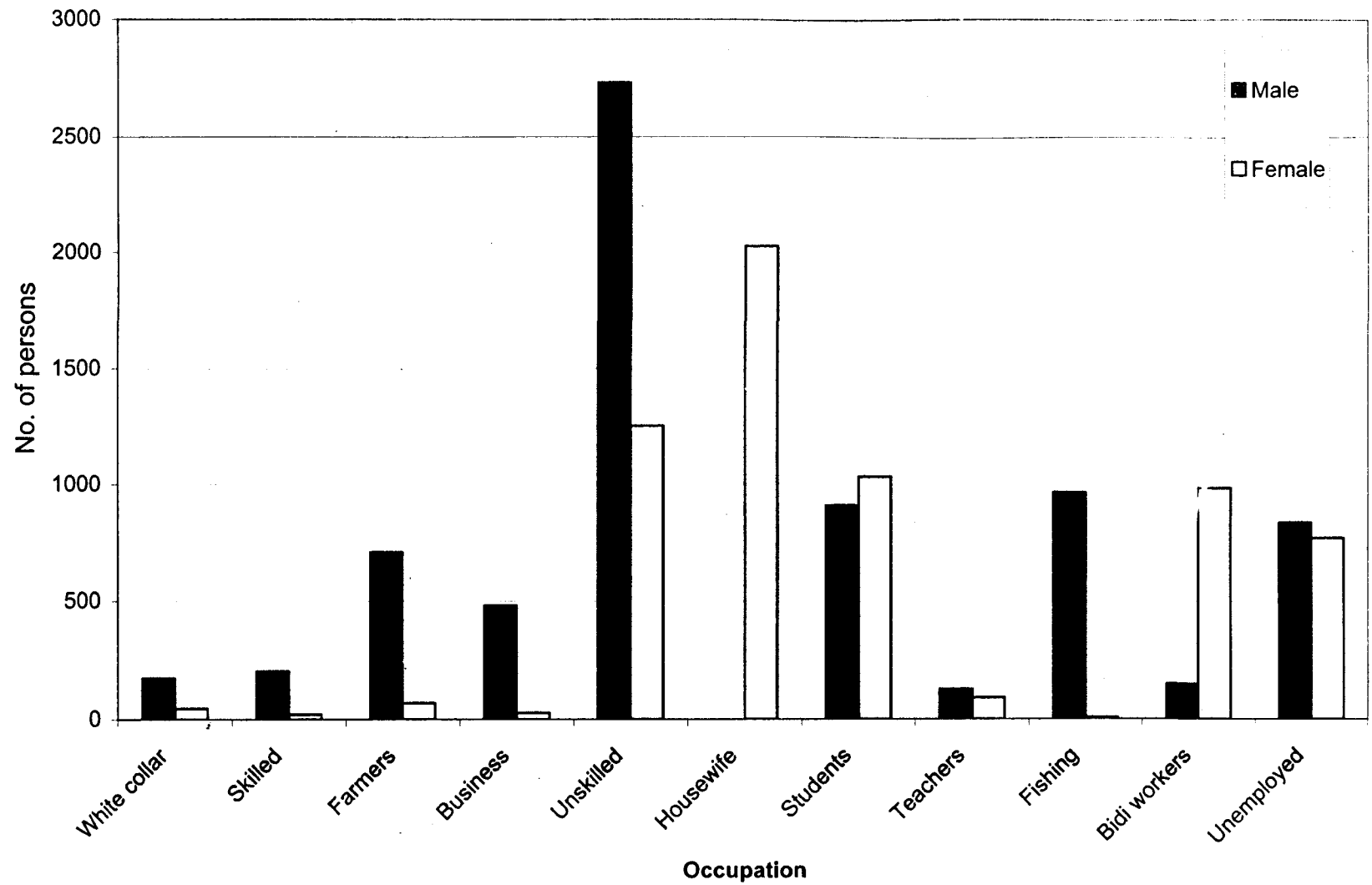


Fig.10: Occupational distribution

suffering from prolonged illness is given in Table 16. The major types of diseases were high fever, cough, cold, etc.,

Table 15 : Availability of medical facilities

Village	PHC	CGD	HSC	Nursing homes	Physicians
KUDANKULAM	1	1	2	2	5
IRUKKANTHURAI	-	-	1	-	-
VIJAUAPATHI	-	-	1	2	1

PHC - Primary Health Centre

CGD - Central Govt. Dispensary

HSC - Health Sub Centre

Table 16: Information about persons suffering from prolonged illness

Age Group	Number	
	Male	Female
0 - 4	14	11
5 - 9	19	21
10 - 14	21	24
15 - 19	21	20
20 - 24	26	29
25 - 29	35	50
30 - 34	33	44
35 - 39	38	55
40 - 44	34	49
45 - 49	41	56
50 - 54	39	44
55 - 59	38	40
60 & ABOVE	107	80
TOTAL	463	523

Table 17 : Information about the deaths in the study since 1-1-2000

Age group	Male	Female	Total
0-4	20	16	36
5-9	3	2	5
10-14	2	2	4
15-19	1	1	2
20-24	3	-	3
25-29	1	1	2
30-34	1	1	2
35-39	3	-	3
40-44	2	3	5
45-49	-	1	1
50-54	5	6	11
55-59	6	6	12
60 & above	16	15	31
Total	63	54	117
Median age :		Male : 35.8 years Female :50.0 years	
Death rate		5.26/1000	

There were 117 deaths since January 2000 among the study population which gives a death rate of 3.53/1000 persons per year. Sex and age-wise information about death rate is given in Table 17. The death rate for the state of Tamil Nadu is about 6.3/1000 per year.

5, ASSESSMENT OF PERSONAL HABITS

In the present study we assessed the personal habits of the study population. The habits evaluated were smoking, chewing of tobacco, use of snuff and consumption of alcohol. The quantity consumed for each habit was also assessed. These habits are considered as probable determinants of diseases

like cancer and birth defects. This conforms with the objectives of the study. The whole study population was covered for personal habits.

There were 15760 persons above the age of 15 years comprising 49.5 % males and 50.5 % females as given in Table 18-A. The details of prevalence of various personal habits among the males and females are given in Table 18.

Table 18A : Number of persons above 15 years age

Village	Male	%	Female	%
A. KUDANKULAM	3333	42.7	3243	40.7
B. IRUKKANTHURAI	1236	15.9	1333	16.0
C. JAYAPATHI	3230	41.4	3385	42.5
TOTAL	7799	100	7961	100

Table 18 : Prevalence of personal habits

Habit	Male	Female	Total	%.
Smoking	1369	5	1374	24.0
Chewing	510	964	1474	25.8
Snuff	274	75	349	6.1
Combination	776	192	968	16.9
Drinking	1551	1	1552	27.2

As seen from Fig.11 the main personal habits prevalent among male population were smoking, chewing tobacco and drinking. Bidi smoking is very popular. Persons consumed 6 to 20 bidi/cigarettes in a day and the average consumption was 10 bidi/cigarette per day. Nearly 27.2% of the adult males are habituated to alcohol consumption and on an average consume 375 millilitre (ml) per day (range 100 ml to 600 ml).

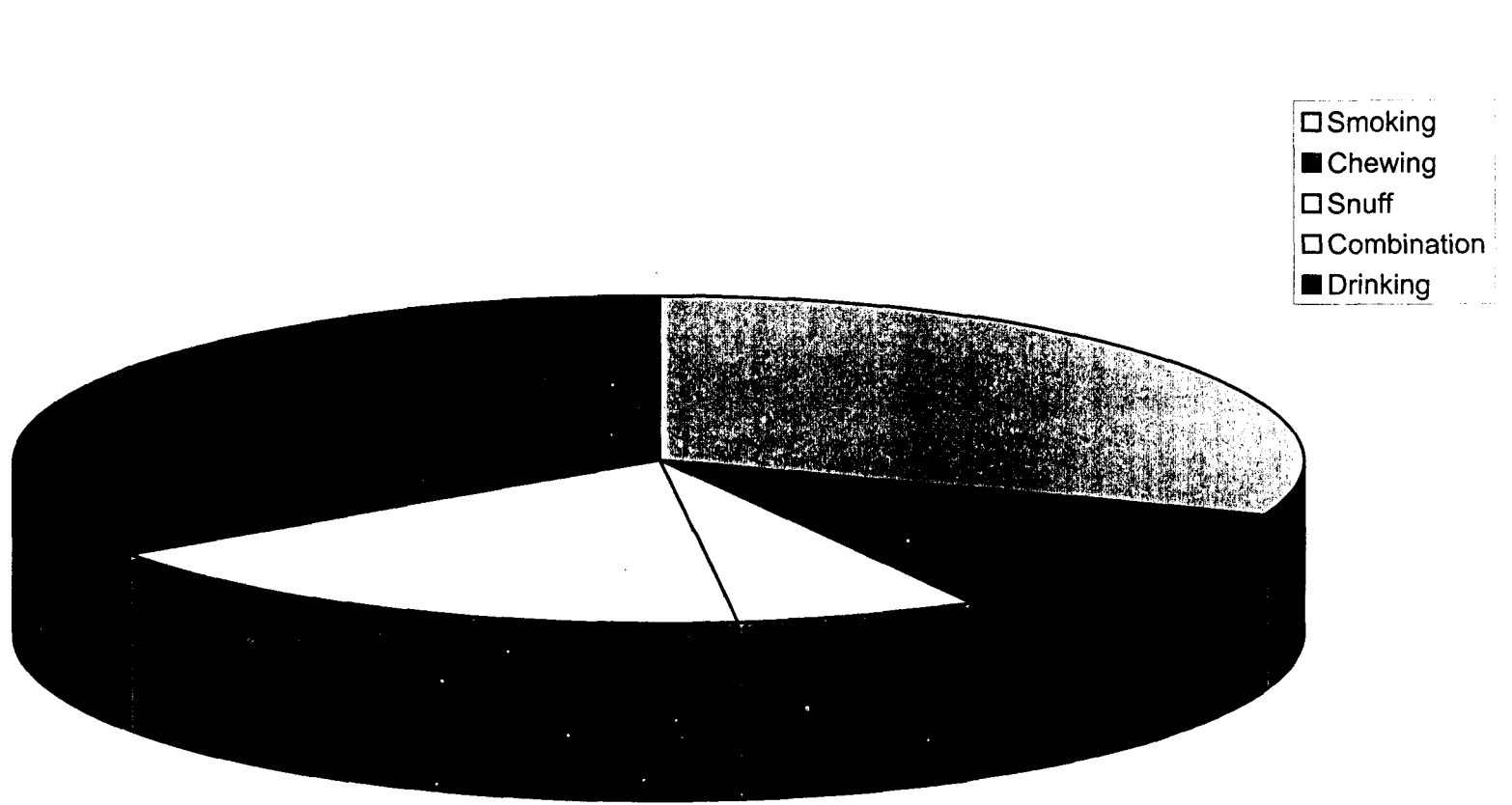


Fig. 11: Prevalence of personal habits (Males)

As shown in Fig.12 chewing tobacco is the major personal habit among the female population. Women chew supari and pan also but number is quite small. A few female were found to be consuming liquor and smoking bidis.

6. HEALTH STATUS OF ADULTS :

Health status of all the family members from the study area was ascertained by the medical teams during the house to house survey and a brief medical examination was also carried out. During the medical examination, medical officers specifically looked for cancer cases, suspected cancer cases, danger signals of cancer, abnormalities of various organs and cataract. The findings are summarised below :

Table 19 : Prevalence of cancer

Total number of persons	22256
Total number of adults	15760
Family history of cancers	5
Number of confirmed cancers	33
Cancer prevalence per100,000	148.3
Number of suspected cancers	101

Among the total subjects surveyed 5 persons had family history of cancer and 4.4% had history of concomitant illness.

A total number of 134 persons were found to show presence of danger signals of cancer. White discharge (134.8/100,000) and menorrhagia and intermenstrual bleeding (116.8/100,000) were the main signals observed among the

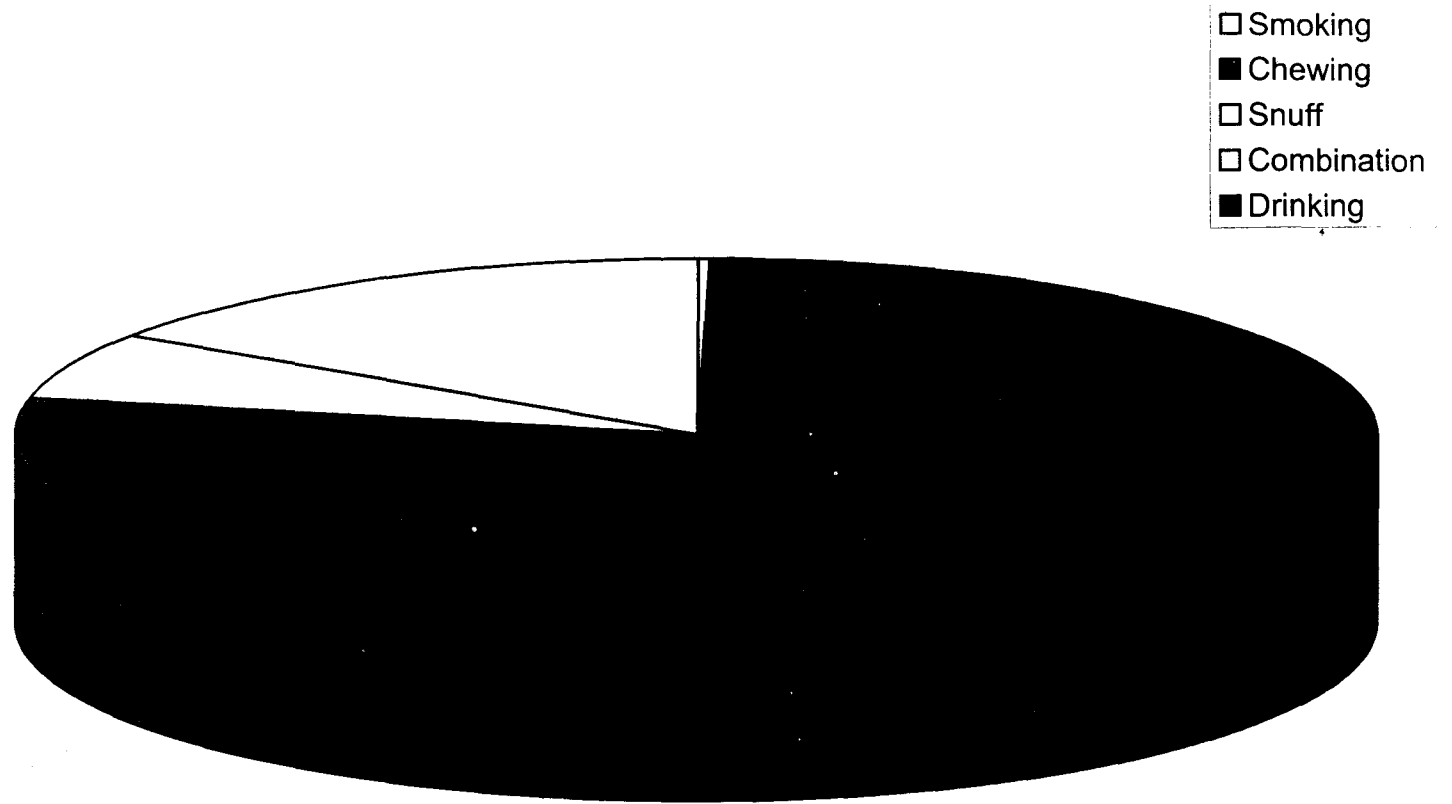


Fig.12: Personal habits (Females)

female population. The most common signal indicated was "a swelling or sore that does not get better" with a prevalence rate of 134/100,000 persons. This was followed by an unexplained loss of weight with a prevalence of 99/100,000 persons as given in Table 20.

Table 20 Presence of danger signals of cancer

Danger Signals	No. of persons	Rate per 100, 000
1. A Lump or hard area in the breast	6	27.00
2. A change in wart or mole	NIL	-
3. A persistent change in digestive or bowel habits	13	58.41
4. A persistent cough or hoarseness	15	67.20
5. Menorrhagia, Inter-menstrual Bleeding	26	116.82
6. Blood loss from any natural orifice	8	36.00
7. Unexpected loss of weight	22	98.85
8. Swelling	14	62.9
9. White discharge	30	134.8
Total	134	601.9

Prevalence of cancer :

There were, in all, 33 confirmed cases (18 males and 15 females) of cancer (Fig.13 and Fig.14) in the study population giving a prevalence of 148.3/100,000 persons. Sex-wise cancer distribution and various types of cancer cases are given in Table 21 and Table 22 respectively. The complete details of all the confirmed cancer cases are given in Table 23.

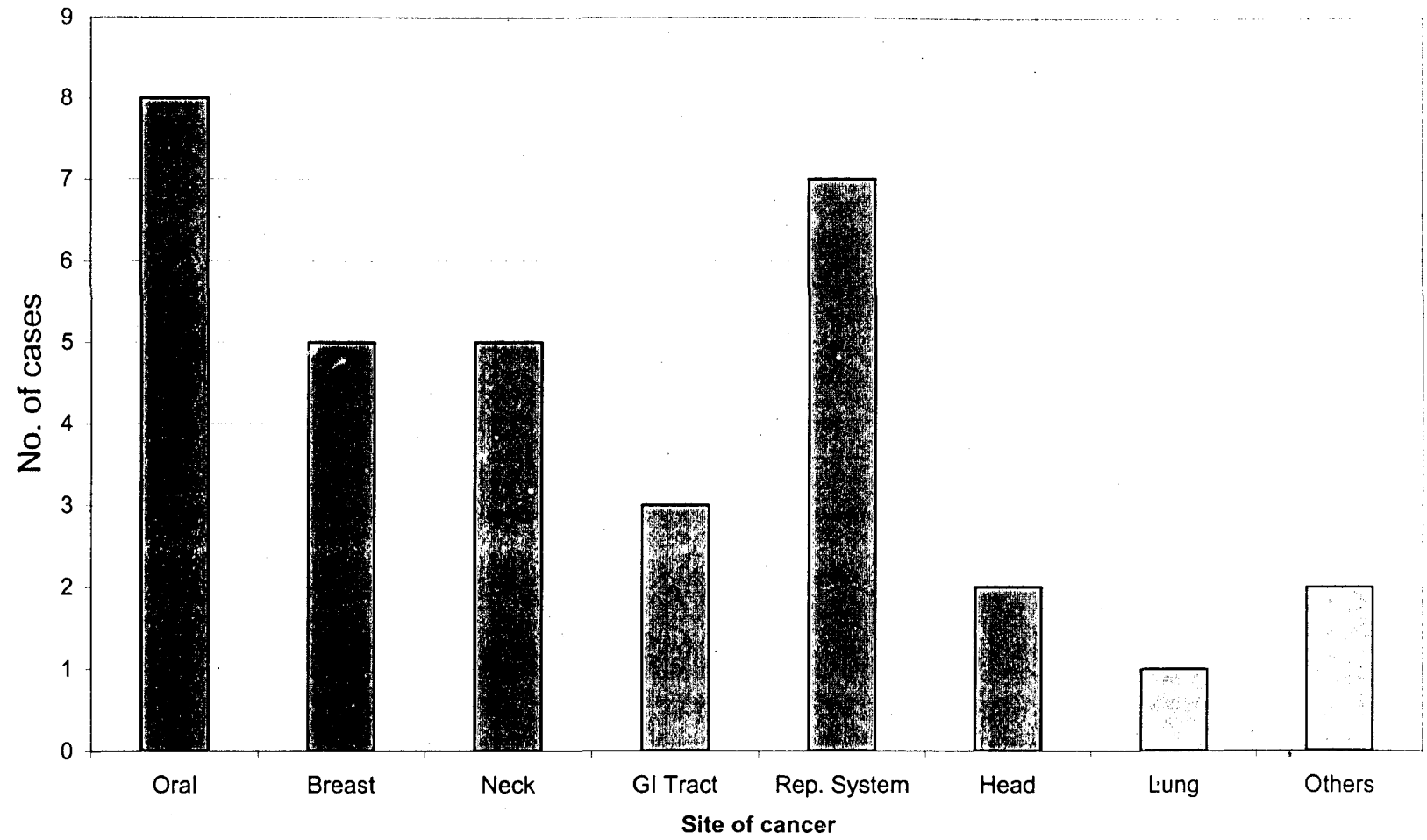


Fig.13:Types of confirmed cancer cases

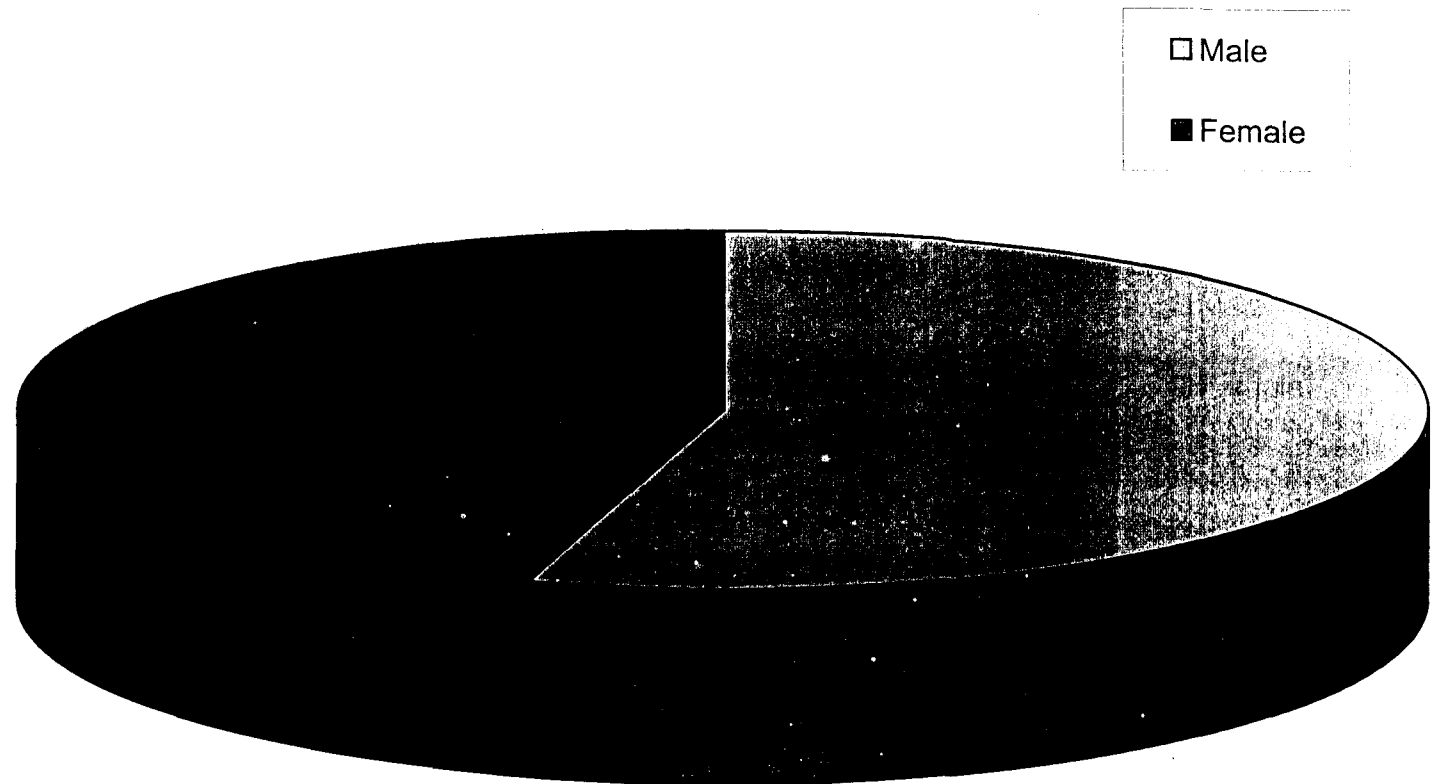


Fig.14: Distribution of confirmed cancer cases

Table 21 : Distribution of confirmed cancer cases

Sex	Number	%
Male	18	54.5
Female	15	45.5
Total	33	100

Table 22 : Types of confirmed cancers

Site of cancer	Number	%
Oral cavity	8	24.2
Breast	5	15.2
Throat (neck)	5	15.2
Head	2	6.1
Lung	1	3.0
Gastro-Intestine	3	9.1
Reproductive system	7	21.2
Others	2	6.0
Total	33	100.0

TABLE 23 : DETAILS OF CONFIRMED CANCER CASES

S. No.	Village	Name	Age Yrs.	Sex	Duration	Diagnosis	Treatment
1	A	Mariya Nadar	65	M	1.5Yrs	Cheek	-
2	A	Rajamani	53	M	-	Cheek	Radiotherapy
3	A	Sethumani	47	M	2 Yrs	Lymph-Oma	Radiotherapy
4	A	Rajamuthu	69	M	2 Mon	Brain	Chemotherapy
5	A	Murugan	24	M	10 Yrs	Acoustrine uroma	-
6	A	Suresh	54	M	3 Yrs	Lipona	-
7	A	Ganesan	39	M	3 Yrs	Rectal	Native treatment
8	A	Thangammal	38	F	4 Yrs	Breast	Surgery Chemotherapy
9	A	Chettathai	65	F	6 Mon	Cheek	Radiotherapy
10	A	Eswarakani	54	F	-	Overian Cyst.	Panhystrectomy
11.	A	Thirumuthu	43	F	-	Ovary	Surgery
12.	A	Therasammal	48	F	4 Yrs	Secondary neck	Surgery
13	A	Kurusumuthu	75	F	-	Breast	Operated
14	A	Puspamani	34	F	3 Yrs	Ovary	Operated
15	A	Kasimani	45	F	20 days	Stomach	Surgery
16	A	Yesuvadial	45	F	8 Mon	PCOD	DNC
17	B	Arumuganadar	52	M	-	2 neck	-
18.	B	Subbiach	62	M	5 Mon	Cheek	Radiotherapy
19.	C	Rajeswari	40	F	-	Uterus	Hystrectomy
20.	C	Lawrance	50	M	-	Cheek	CT&RT

S. No.	Village	Name	Age Yrs.	Sex	Duration	Diagnosis	Treatment
21.	C	Agnitha	40	F	10 Yrs	Endometrium	Hystrectomy
22.	C	Ilayaperumal	50	M	11 Yrs	Check	Surgery
23.	C	Sivanatchi	54	F	3.5Yrs	Thyroid	Surgery & RT
24.	C	Rayappan	72	M	6 Mon	Penis	Partial computation
25.	C	Lingudurai Nadar	62	M	-	Cheek	Death
26.	C	Ramasamy nadar	70	M	-	Lung	Death
27.	C	Sunkir	11	F	2 Yrs	Breast lump	Nil
28.	C	Parvathy	38	F	-	Breast	-
29.	C	Mikael	-	M	-	Bowel	-
30.	C	Salitemary	32	F	-	Breast	-
31	C	Thangappan	-	M	-	Thyroid	-
32	C	Anthony Siluwai	-	M	-	Cheek	-
33.	C	Sundaran	-	M	-	Thyroid	-

A total of 101 cases of suspected cancer were found out during the study as shown in Table 26. Among these are 77.2% females and 22.8% males. Oral cancer is common followed by cancer of uterus and cervix, thyroid among the suspected cancer cases. Third most common suspected cancer in the study population is the breast cancer. A summary of the suspected cancer cases in different age-groups is presented in table 26A and is shown in Fig. 15. Only 5 of the suspected cancer cases have family history of cancer.

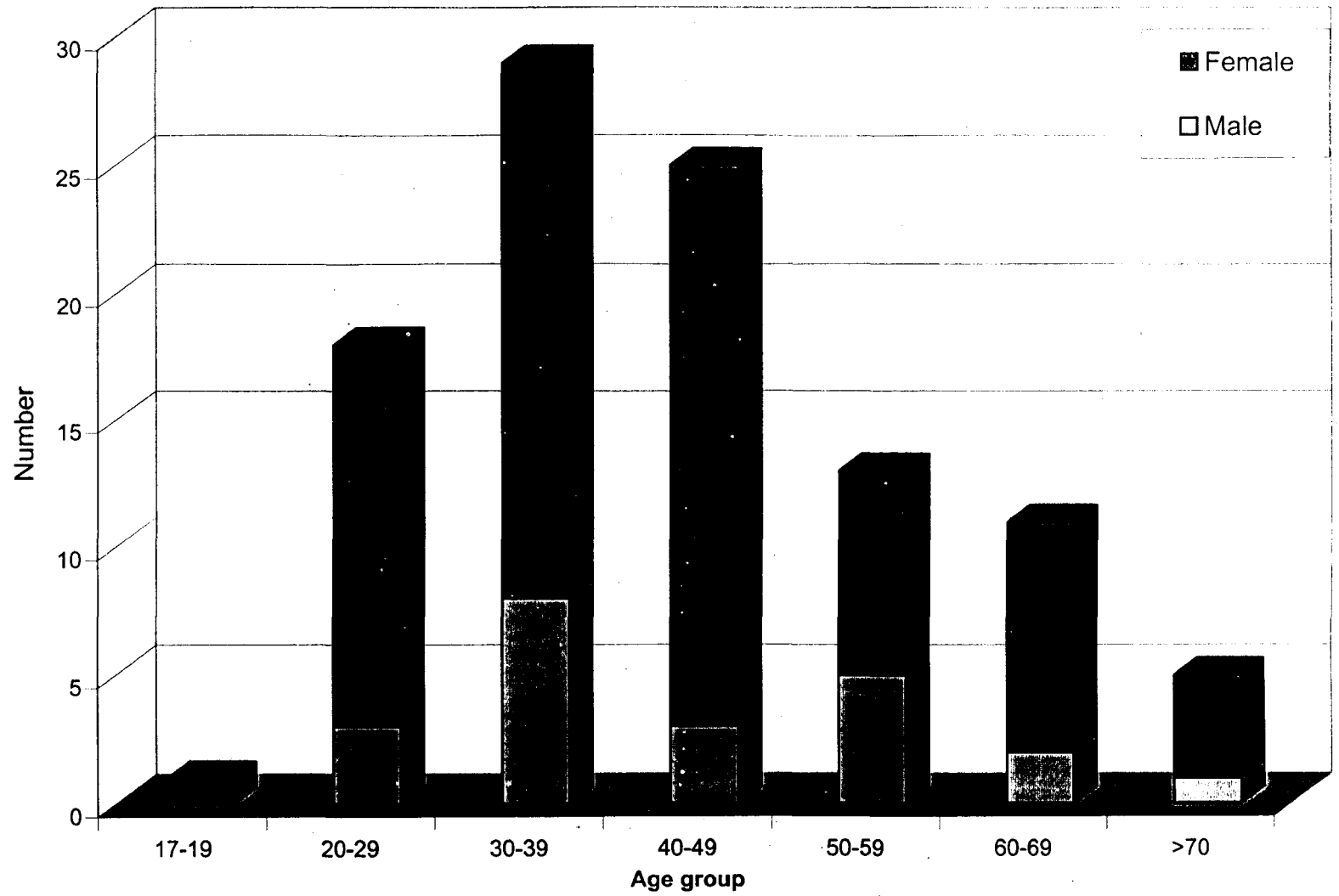


Fig.15: Suspected cancer cases

Table 26 : Details of suspected cancer cases

Sr. No.	Village	Name	Age Yrs.	Sex	Site of Cancer	Family History of Cancer
1.	A	Chellam	55	F	Uterus	
2	A	Uma	25	F	Sym 4,3,8	
3	A	Muthupillai	60	F	Sym 7	
4	A	Kannimarial	52	F	Sym 5,8,9	
5	A	Chandra	33	F	Ovary 3	
6	A	Pookani	25	F	Ovary	
7	A	Esakiammal	29	F	Sym 9	
8.	A	Rangammal	35	F	Sym 9	
9	A	Namakani	39	F	Uterus	
10	A	Chellam	70	F	Uterus	
11.	A	Annakili	60	F	stomach	
12	A	Ganesan	27	M	stomach	
13	A	Premavathy	39	F	Cervix	
14	A	Rajeswari	27	F	Ovary	
15	A	Ganapathy	32	M	Stomach	
16	A	Suyambukani	35	M	Cheek	
17	A	Margadham	21	F	Cervix	
18	A	Rajarathnam	32	F	uterus	
19	A	Suyambu	40	F	Cervix	
20	A	Laxmi	38	F	rectum	
21	A	Suseela	30	F	rectum	
22	A	Joymary	34	F	Cervix	
23	A	Suyambukani	40	F	uterus	
24	A	Shanmugakani	29	F	uterus	
25	A	Ponnusamy	34	M	Stomach	
26	A	Rathi	38	F	tongue	
27	A	Perumal	57	M	Tongue	
28	A	Leelavathy	41	F	uterus	
29	A	Lakshmi	58	F	tongue	
30	A	Thangapazham	63	F	tongue	
31	A	Thaiammal	46	F	breast	

Sr. No.	Village	Name	Age Yrs.	Sex	Site of Cancer	Family History of Cancer
32	A	Seethalakshmi	65	F	tongue	Yes Brother died
33	A	Thargapazham	60	F	tongue	
34	A	Jeyalakshmi	41	F	uterus	
35	A	Kalyani	56	F	tongue	Yes Brother died
36	A	Malar	30	F	uterus	
37	A	Annamuthu	70	F	tongue	
38	A	Velu	30	M	stomach	
39	B	Parvathy	35	F	cervix	
40	B	Lakshmi	41	F	cervix	
41	B	Valliamonal	38	F	Endometria	
42	B	Thillai	41	F	Cervix/uterus	
43	B	Ramiya	56	M	Testicles	
44	B	Prema	35	F	stomach	
45	B	Rajan	36	M	stomach	
46	B	Saraswathy	30	F	Uterus/ovary	
47	B	Jeyaseeli	46	F	cervix/uterus	
48	B	Jeyalakshmi	45	F	Bronchogenic	
49	B	Amaravathy	17	F	Cervix/uterus	
50	B	Muthulakshmi	30	F	Cervix	
51	B	Nalayira Thevar	80	M	Larynx	
52	B	Sornam	63	F	GIT	
53	B	Lakshmi	38	F	Uterus	
54	B	Annakili	40	F	Cervix	
55	B	Thanyakani	40	F	Cervix	
56	B	Kamraj	47	M	Lung	
57	B	Shanmuga vadivu	52	F	Cervix	
58	B	Jesubai	40	F	Cervix	

Sr. No.	Village	Name	Age Yrs.	Sex	Site of Cancer	Family History of Cancer
59	B	Arasikaryal	75	F	Branchog eni	
60	B	Parvathy	47	F	Female Genital Tract	
61	B	Thomas Nadar	59	M	Stomach	
62	B	Saraswathy	40	F	Female Genital tract	
63	B	Joyce Mary	29	F	Female Genital Tract	
64	B	Thalami	30	F	Female Genital Tract	
65	B	Grace	28	F	Female Genital Tract	
66	B	Albona	50	F	Cervix	
67	B	Muthulakshmi	25	F	Cervix	
68	B	Panshavarnam	48	F	Cervix	
69	B	Siluvaiammal	48	F	Cervix	
70	C	Arasikariyal	26	F	Female genital tract	
71	C	Rani	46	F	Swelling anti aspect of neck	
72	C	Mariyal	71	F	Larynx	Present
73	C	Jesurani	28	F	Uterus	
74	C	James	45	M	Tongue	
75	C	Rajammal	60	F	Cheek	
76	C	Sagyarami	25	F	Female genital tract	
77	C	Seyad Ali Fathim	36	F	Cervix	

Sr. No.	Village	Name	Age Yrs.	Sex	Site of Cancer	Family History of Cancer
78	C	Henrida	41	F	Lung	
79	C	Bruceli	21	M	GIT	
80	C	Niyasiammal	48	F	Breast	
81	C	Rani	32	F	GIT	
82	C	Selvan	37	M	Growth nostril	
83	C	Parthrakali	35	F	Cheek	
84	C	Arummugam	67	F	Breast	
85	C	Natchathrum	28	F	Cervix	
86	C	Mary	43	F	Cervix	Present
87	C	Gladia mary	30	F	Breast	Present
88	C	Anthony	60	M	Lung	
89	C	Josephin	37	F	Breast	
90	C	Ambrose	63	F	Lung	
91	C	Mikael	44	M	Lung	
92	C	Barbara	53	F	Cervix	
93	C	Joseph	55	M	Lung	
94	C	Xavierammal	43	F	Female genital tract	
95	C	Mary	50	F	Stomach	
96	C	Sandhiagu Royappat	68	M	-	
97	C	Selvaraj	55	M	Larynx	
98	C	Michel Fielder	21	M	Throat	
99	C	Parimala	32	F	Throat	
100	C	Lilly Puspham	47	F	Breast	
101	C	Charkar	36	M	Stomach	

Table 26A : Age-wise summary of suspected cancer cases

Age Group(Years)	No. of suspected cancers		
	Male	Female	Total
17-19	-	1	1
20-29	3	15	18
30-39	8	21	29
40-49	3	22	25
50-59	5	8	13
60-69	2	9	11
70 & above	1	4	5
Total	21	80	101

Table 27 : Prevalence of cataract

Village	Population			Cataract cases		
	M	F	Total	M	F	Total
A. Kudankulam	4688	4647	9335	76	85	161
B. Irukkanthurai	1770	1799	3569	80	109	189
C. Vijayapathi	4609	4743	9352	71	82	153
TOTAL	11067	11189	22256	227	276	503

Another important health problem assessed was cataract. There were 503 cases of cataract (Fig.16) in the survey population as shown in Table 27. The prevalence of cataract is 2.3% and it is slightly higher in females (2.5%) than among males (2.05 %). Also the cataract being old age problem was mostly found among the persons above 50 years of age.

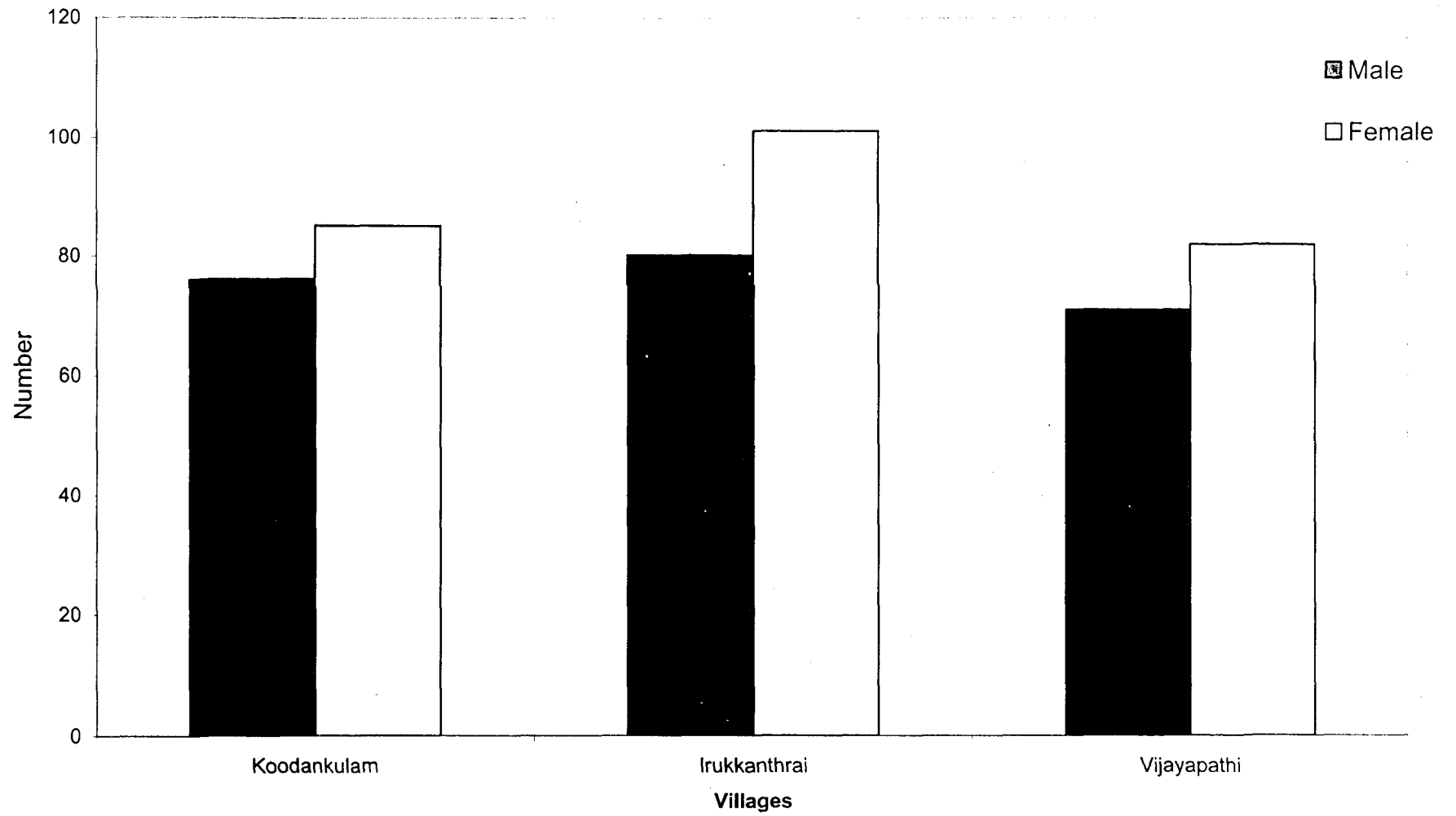


Fig.16: Prevalence of cataract

7. HEALTH STATUS OF CHILDREN,

The number of children was 6496 below 15 years of age as shown in Table 29. There were 3256 male children whereas 3240 were female children among the study population. The overall status of the health of the children was found to be satisfactory.

Table 29 : Details of children in the study population

No. of children (0 - 14)			
Village	Male	Female	Total
A	1361	1398	2759
B	516	484	1000
C	1379	1358	2737
Total	3256	3240	6496

8. CONGENITAL ABNORMALITIES :

Table 31 depicts the age-wise distribution of congenital anomalies in the study population. A total of 45 cases having birth defects were observed giving an overall prevalence of 2.02 per 1000 population. There were ²⁹(27) children below 15 years of age with birth defects which gave a prevalence of 4.2 per 1000 children in this age group.

Table 31 : Distribution of birth defects

Age Group (Years)	Number		Total	%
	M	F		
< 1	1	2	3	6.7
1 - 4	3	5	8	17.8
5 - 14	11	7	16	35.5
15 - 29	4	6	10	22
30 - 44	1	3	4	2
45 - 59	-	-	-	8.9
60 and above	3	1	4	8.9
Total	23	22	45	100

Table 32 : Details of birth defects among children(0 - 5 years)

S.No.	Village	Name	Age	Sex	Deformity
1	A	Ruba	1.5	F	Congenital cataract
2	A	Chitraselvan	8 months		Congenital absence of left radius, left ulna, right forearm, shortened humerus
3	A	Valarmathy	1.5 Yrs	M	Congenital hernia
4	A	Jeyalakshmi	4 Yrs	F	CTEV
5	A	Muthuraj	4.5	M	Handicapped
6	A	Salini	11 months	F	Caddiomegaly/CHD
7	A	Preethi	2 Yrs	F	Umbilical Hernia
8	A	Nanthioi	4 Yrs	F	Unilateral CTEV
9	B	Sindhu	9 Yrs	F	Ape thumb
10	B	Ramakrishnan	4 Yrs	M	Congenital Hernia
11	B	Ajit	4 Yrs	M	Deaf & Dumb
12	C	Nagaraj	1 Yr	M	Cerebral Palsy
13	C	Sharmila	5 Yrs	F	Congenital cataract

TERMINOLOGY

- Study Area : This epidemiological study was carried out among the persons residing in three villages within 5 kilometers of Kudankulam Atomic Power Project site.
- Study Population : The entire population of residing in the stipulated area was included by house-to-house survey.
- Study Design : This was a prevalence study, a baseline epidemiological survey about the health status of the population.
- Study Period : April-June 2001
- Survey Objectives :
- i) To assess the morbidity status of the different types of cancers, among the study population.
 - ii) To assess the malformations among the study population.
 - iii) To study the demographic, socio-economic and cultural profile and lifestyle of the study population.

SURVEY AT A GLANCE

Population covered : 22256

Number of villages covered : 3
Number of houses covered
in the study area : 5717

Adults: :
Males (>15 years of age) : 7799
Females (> 15 years of age) : 7961
Sub Total : 15760

Children :
Males (<15 years of age) : 3256
Females (< 15 years of age) : 3254
Sub Total : 6496

Literacy Status :

Number of children going to schools : 4563
Number of Schools : 15
Number of matriculates : 2313
Number of graduates : 607
Number of Post graduates : 147

Social Status :

Number of houses having electrical connections : 100%
Number of business establishments : 152
Number of medical practitioners : 6

Health Status

Number of confirmed cancers	33
Number of suspected cancers	101
Number of abnormalities	45

CONCLUSION

The house-to-house survey was conducted by well-trained medical teams who were specially trained for this work.

A total of 5717 houses spread over three villages were covered under this survey. The total population surveyed was 22256 consisting of 7799 males, 7961 females and 6496 children below 15 years of age. The majority of the families were Hindus (65.6%) and Christians (32.1%) and rest of the population comprised of Muslims. Most of the families lived in RCC houses and 100% of the houses are electrified. Public tap water is the main source of drinking water.

Fishing (6.8%) and bidi-rolling (8.1 %) were the major occupations of the population. Other important occupations were service and teaching. Majority of the population sought treatment for minor illness from the Primary Health Centre located at Kudankulam and for any major illness they take treatment from private hospitals and nursing homes. During the survey about 4.4% of the population was found to be suffering from prolonged illness. The death rate as observed was about 5.3/1000 population during the proceeding year of the survey (2000AD).

All the persons in the survey population were assessed for their personal habits. Among the females the most prevalent personal habit was chewing (14.4%) and among males 8.4% were chewers and 17.8% were smokers. Nearly 20% males were consuming alcohol.

There were 33 confirmed cases of cancer among the survey population giving a prevalence of 148.3/1,00,000 population. 5% of the families had some

family history of cancer. Oral cancer and breast cancer were the most common cancers observed. There were 101 cases of suspected cancer which are being followed up and further investigations are in progress. The very cataract cases numbered 503 giving a prevalence of 2.3%.

A total number of 45 cases of congenital abnormalities were observed among the survey population, which gives a prevalence of 4.2/1000 persons. There may be an under estimate in reporting congenital malformations. Any overt and obvious congenital malformations could be observed during the clinical survey. There is hardly any community based study in India giving the true prevalence of cancers and congenital malformation among the general population. The few hospital based studies seem to be biased by including high risk and complicated cases.

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ANNEXURE

TIRUNELVELI MEDICAL COLLEGE

The Tirunelveli Medical College and its teaching hospital are located in an extensive area of above 350 acres of land at High Ground, Palayamkottai and run by the Government of Tamilnadu.

In the year 1965, the Government of Tamilnadu decided to start the Tirunelveli Medical College and the University of Madras agreed to the proposal and 75 students were admitted for the I MBBS Course for the academic year 1965-66 and they had their 1st year of study in the local Arts and Science Colleges.

In July 1966 the 1st batch II MBBS students started attending the classes in the newly constructed Anatomy Block. Other departments like Pharmacology, Pathology, Microbiology and Social and Preventive Medicine started functioning in the subsequent years and the District Head-quarters Hospital was converted to Tirunelveli Medical College Hospital.

This College was affiliated to the Madurai Kamaraj University consequent to its inception in the year 1967, till the newly formed Tamil Nadu Dr. M.G.R. Medical University in 1988.

The college has been recognised by the Medical Council of India, New Delhi in the year 1978.

The number of seats for the MBBS Course has been increased from 75 to 100 since 1980 and in the same year Government has accorded sanction for the starting of Post Graduate Courses.

Hostel facilities are provided both for men and women students within the campus. Th college had celebrated its Silver Jubilee in the year 1990.

Three Primary Health Centres at Pathamadai, Thenthiruperai and Thisayanvillai are attached to this college under Rural Oriented Medical Education (ROME) Programme. Since 1980, for the exposure of the Medical Students and interneers to the rural atmosphere in turns, Specialists from various departments accompany the students to train them and treat the patients in the rural areas. The professor of Social and Preventive Medicine is in-charge of the programme.

Mobile ophthalmic unit attached to the Department of Ophthalmology renders free service to people in semi-urban and rural areas by organising eye camps in Tirunelveli and Tuticorin Districts.

The Government FRIEDA MONNIER HOSPITAL (FMH) in Kalakad Panchayat Union, which was established and managed by the representatives of Belgian Organisation, is attached to Tirunelveli Medical College which is suitable to be utilised as a Rural Social Service Centre for the Studies of this college.

The Tirunelveli Medical College Hospital has a bed strength of 946 with almost all special departments with necessary facilities like the Colour Doppler, Ultra Sound Scan, CT Scan and Dialysis Unit and with recent inclusion of 800 MA & IIT Image Intensifier TV).

The College has been provided with a new CRRI quarters, Library, Lecture halls from the last academic year.

There is a Central animal house with common laboratory animals for conducting research programmes in the various departments.

Thus Tirunelveli Medical College has become a full-fledged Institute of International Standards and will continue to grow further.