CHAPTER II
2.1. INTRODUCTION:

Sampling plays a vital role in research design, involving human population. Sampling design has two main aspects; a selection process, the rule and operation by which some members of the population are included in the sample; and an estimation process (or estimator) for computing sample statistics which are sample estimates of population values. The other important aspects which a sample design of survey includes are:

(i) The definition of the survey variables should specify the nature of characteristics, the rule of classification into categories, and the unit for expressing them.

(ii) The method of observation (measurement) including both data collection and data processing, give operational meaning to the survey variables and determine the nature of survey data.

(iii) The method of analysis, statistical and substantive, reduce the survey data to result that can be comprehended and utilized.
(iv) The utilization of survey results may sometimes take the form of specified decisions, based on these results and other relevant information.

(v) This desired precision of survey results may be clearly stated for samples designed for a specified statistical decision.

The primary aim of sampling theory is to make sampling more and more efficient in order to get as much information as possible about the population. It attempts to develop procedures of sample selection and of estimation, that provide at minimum possible cost, the estimation that are precise enough for the purpose at hand, and also the selected sample should be a good representative of the population.

In the present study the sample was collected from the population of Allahabad. The sample units were selected from two sources -- (i) from medical care institution and (ii) from survey of dwellings i.e., selection of sample units from selected dwellings. A dwelling is generally defined as a group of rooms, or a single room occupied or intended for occupancy as separate living quarters by a family or some other groups of persons, living together or by a person living alone. Ordinarily a dwelling is one family house, or half of a 'duplex house' or an apartment or flat : when in doubt about how to divide a building
into different dwellings, possessions of separate cooking facilities may be used to distinguish separate dwellings. Though lacking in cooking facilities, an apartment or rented room with separate entrance is generally defined as a separate dwelling. The sample units selected from these two sources are expected to be good representative of the population i.e., the characteristics of the sample are expected to relate closely to that of population.

2.2. CHARACTERISTIC OF POPULATION:

The district of Allahabad lies at the tail of Allahabad division, in south east Uttar Pradesh. It lies between parallel of 24.47 and 25.47 North latitude and 81.19 and 82.21 East meridian of longitude. The total area of the district is 7,458.4 Square Km. and comprises of nine tehsils viz., Sirathu, Manjhanpur, Chail, Soraon, Phoolpur, Handia, Kerchana, Meja and Bara. The largest tehsil, in area, is Meja and smallest is Sirathu. The number of towns is only four, namely – Allahabad Municipal Corporation and Subedarganj Railway Coloney, Allahabad Cantt., Mauaima Town Area and Phoolpur Town Area.

Rivers Ganga and Yamuna divide the district into three parts. The portion inbetween the two rivers, comprising tehsils of Chail, Sirathu and Manjhanpur is rich and fertile. The trans Ganga (Gangapur) tract comprises tehsils of Soraon, Phoolpur and Handia. The
trans Yamuna tract known as Yamunapar, extending over tehsils Karcha-na, Meja and Bara is an extension of Bundelkhand or Hills and Plateau division of the state.

The population of Allahabad, according to 1981 census, was 37,97,000 out of which 20,08,000 were males and 17,88,000 were females. The urban and rural components of the population were 7,73,000 and 30,23,000 respectively. In the area the district occupies 7th position and in respect of population it stands 4th in state of U.P. There has been an increase of 105.4 Sq. Km. in area since 1951, partly due to revised demarcation of area by Board of Revenue. The density of population in district is 405 per sq.km. which is higher than the state average of 300 per sq.km. The most densely populated tehsil is Chail, the density being 999 per sq.km.

204 persons per 1000, live in town. Out of the total urban population (7,73,000) 93.1 % live in Allahabad Municipal Corporation including Subedarganj Railway Colony, 3.9 % live in Allahabad Cantt., 1.6 % in Phoolpur Town Area and 1.4 % in Mauaima Town Area. In 1921 the sex ratio i.e., number of females per 1000 males was 945, and in the year 1971 it stood as 898 per 1000 males. In the year 1981 the ratio was 890 per 1000 males. The sex ratio of Allahabad district is higher than the state average of 879
2.3. SOCIAL AND CULTURAL COMPLEXION OF THE POPULATION:

In addition to the aforesaid, the social and cultural characteristics of the population of Allahabad also reflect the following pattern.

2.3.1. LITERACY:

The percentage of literacy in the total population is 28.6% as against the state average of 21.8% and ranks 20th in literacy in the whole state. The literacy percentage among males is 36.7%, while that among females is 12.8%; as against the corresponding figures of 30.4% and 7.8% in 1961. Out of total numbers of literates, 63.8% are without any educational standard.

The percentage of literacy in rural population is 13.3% as against 47.6% in urban. In rural area 23.8% males and 2.5% females are literate, while in urban area 57.7% males and 34.6% females are literate.

2.3.2 AGE AND MARITAL STATUS:

Persons in age group 15 - 34 account for 31.3% of the population followed by age group 5 - 14 (26.4%), 35 - 54 (19.3%), 65 - 4 (15%) and 55 years and over (8%). The population in district is progressive as the percent of persons in younger age group is 41.4% as against a small percentage of 8.0% of the elder persons (55 years and above).

The percentages of never married, married and widowed or divorced persons are 41.6, 52.8, and 7.2
respectively. Corresponding figures for rural area are 39.9 %, 52.8 % and 7.2 % and for urban 49.6 %, 44.9 % and 5.4 %. Of married males, 7.6 % are in the age group 0 - 14, 44.7 % in age group 35 - 54 years and 34.3 % in the age group of 55 years and above. This shows that the early marriage is still prevalent in the society.

2.3.3 RELIGION:

Out of total population 87.7 % are Hindus and 11.9 % Muslims. Of the rural population 90 % are Hindus and 10 % are Muslims. The corresponding figures for urban area are 77.2 % and 20.5 %. The number of persons belonging to other religions is insignificant, both in urban and rural areas of the district.

2.3.4 HOUSING AND ESTABLISHMENT:

There are 116 registered factories in the district of which 56 are engaged in printing and publishing books. The major portion of industries are situated in Naini and this area has developed as an industrial area of the district.

2.3.5 HOUSEHOLD SIZE AND DENSITY OF PERSON PER ROOM:

The average size of household in rural area is 5 and in urban about 4.7. Household with two rooms predominate, accounting for 26.2% followed by those living in one room 23.2 % and those living in three rooms and four rooms 19.4 % and 13.2 % respectively.
Roughly 0.2% household have no regular accommodation to live. The percentage of households having five rooms and more is about 18.02.

Considering the household occupying one room only, the average size of family in rural area is 3.7 and in urban area it is 3.6, which speaks of acute congestion of living conditions.

2.4 SAMPLING FRAME:

Due to lack of financial assistance and problems of field staff, a very extensive survey could not be carried out, but a suitable sampling design was adopted so that the sample contains cross sectional population of Allahabad.

The sample of the present study was selected in two ways. A simple random sampling technique was adopted to select the subjects from hospital, and a multistage-stratified sampling design was utilized when the subjects of study were selected from a few mohallas of Allahabad City and from a village.

While selecting subjects from hospital, a list of hospital employees, medical and nursing students, medical and paramedical staff was prepared. From this hand prepared list, a sample of employees, students and staff was selected with the help of random numbers tables. If a selected person did not fulfil the criteria of normalcy or did not cooperate during
study, then that person was dropped and no replacement was made for that person.

For selecting subjects outside the hospital, a multistage-stratified sampling design was adopted. One person from each selected house was taken. Therefore, the first problem was to select a household. In first stage and in some cases in the first two stages, a sample of urban block or village was selected by method of stratified sampling. In the second stage or third stage or even more, a sample of household was chosen for each of selected blocks or village by the method of stratified sampling procedure. The urban area which comes under municipal limit, Subedarganj Railway Colony and Allahabad Cantt, are being given Family Welfare services through three postpartum centers and eight urban health centers. Each of these centers is serving nearly 50,000 to 80,000 population through subcenters and field staff of the center.

The three postpartum centers are under:

1. Motilal Nehru Medical College.
2. Kamla Nehru Memorial Hospital.
3. Duffren Hospital.

Similarly there are eight urban centers. Different urban areas are allotted to these centers to cater medical and family welfare services. For example four
areas, Keydganj, Bahadurganj, Mohasinganj and Northmalaka are allotted to the post partum center under Motilal Nehru Medical College and Dariyabad, Garihari Sarai and Nihalpur come under Kamla Nehru Memorial Hospital. As such, the urban population was divided into 32 blocks out of which three areas were selected to represent cross sectional population of the society. The area selected for study were:

(i) Keydganj, (ii) Allahapur, & (iii) Colonelganj.

The target couple register (T.C.R.), which the field staff of these centers prepared for providing family welfare services, were taken. Target couple register was prepared by conducting door to door survey. This contained name and address, number of family members and their age, income, immunization status etc. Also, it contained information regarding number of schools, number of markets etc. Now, the three selected areas were divided into two categories - (i) Residential and (ii) Commercial. Residential area was further divided into:

(i) Residential upper, (ii) Residential middle, and
(iii) Residential lower.

Thus, in all, each area was divided into four strata and eight blocks were chosen, selecting one from residential upper, three each, from residential middle and
lower and one from commercial. In all, 24 blocks were chosen from urban area of Allahabad. The households in the blocks were divided into three strata consisting of richest 25%, middle 50% and lower 25% of the households. The households were selected by means of simple random sampling technique. From each of the selected house, one person was chosen. If more than one family lived in a house, then one dwelling was selected and one person from the selected dwelling was chosen. Field worker of that area was taken at the time of survey, to motivate the subjects. As far as possible, a lady social worker, also accompanied during the time of survey so that she could take measurements on females, specially of mid thigh and chest. Care was taken to include adequate proportion of subjects of different adult age-group in the sample, consistent with the proportion reflected in the census report.

Rural population of Allahabad is being surveyed through twenty nine primary health centers, but due to lack of funds a primary health center "Chaka" was selected for the study. The primary health center "Chaka" was chosen because some part of it, is the industrial belt. This primary health center covered sixty nine villages. Out of the 69 villages eight are besides the main road. Two out of these viz. Maghwari
and Rampur were selected for study purpose.

From Target Couple Registers (TCR) of these villages, houses were chosen by simple random sample. Thus at first stage, primary health center was chosen and in the second stage villages beside the main road were chosen. In the third stage villages under study were selected. From these two selected villages, houses were selected. One person was selected from the household, randomly from the TCR, who was asked to report at the primary health center on the day of visit. Services of field workers were taken in this respect. If the selected person fulfilled the criteria of normalcy the lung function test was carried out. If however, the person failed to report, he was asked to come to the primary health center on the day of our subsequent visit.

From industrial area a glass factory was chosen and subjects were randomly selected from the list of employees.

2.5 DATA COLLECTION:

The number of subjects of the present study were 687 males and 533 females. All the cases under study were normal and capable of adequate cooperation during the study. A detailed interrogation was made regarding their personal data i.e. (age, sex & religion). The age was recorded in years at the last date.
of birth. In every case a detailed enquiry was made about the personal history, with special reference to their occupation, socio-economic status, number of family members, number of living rooms in their house etc.

2.5.1 NEIGHBOURING ATMOSPHERE:
The neighbouring atmosphere of residence was arbitrarily divided according to Bose (1970), on the basis of density of population. For urban population, areas with less than 500 persons per square km. were labelled as open and more than 1000 persons per square km. as crowded. For rural population, those with less than 250 persons per square km. were grouped as open and more than 500 persons per square km. as crowded areas. In between these limits the areas were labelled as moderately open.

2.5.2. ATMOSPHERIC POLLUTION:
The pollution in the atmosphere were classified under three main groups (1) Open (11) Moderately smoky and dusty and (111) Smoky and dusty. No simple procedure was available to determine the atmospheric pollution. Lack of such procedures led to classification of the area arbitrarily, under the above three categories, simply by observing the amount of dust and smoke in the atmosphere.
2.5.3. OVER-CROWDING:

As indicated by Park, et.al. (1979) in their textbook of social and Preventive Medicine. The degree of overcrowding inside the house can be explained by number of persons in the house divided by the number of rooms in the dwelling. The accepted standards in this respect are as follows:

(a) 1 room: 2 persons.
   2 rooms: 3 persons.
   3 rooms: 5 persons.
   4 rooms: 7 1/2 persons.
   5 rooms: 10 persons (additional two persons for each further room).

It is to be noted that a baby under 12 months was not counted, while children between 1-10 years were counted as half unit.

The overcrowding was also assessed by floor-space and sex separation, the accepted norms for which are as follows:

(b) Floor Space: The accepted standards are:

- 100 sq ft or more: 2 persons.
- 90-100 sq ft: 1 1/2 persons.
- 70-90 sq ft: 1 person.
- 50-70 sq ft: 1/2 person.
- Under 50 sq ft: nil.
(c) Sex Separation: Overcrowding is considered to exist if 2 persons over nine years of age, not husband and wife, of opposite sex are obliged to sleep in same room.

Out of the above three criteria of overcrowding, the first criterion is considered in this study, which is similar to that adopted in census reports.

2.5.4. OCCUPATION:

Occupation of the subjects was divided into three groups: (1) Sedentary work, (11) Hard manual Work and (111) Moderate Work, depending upon physical activity and type of job in which the person was engaged as described by Kamat, et al. (1977).

(1) Sedentary Workers: Sedentary workers are those who do mild physical activity for more than two hours per day. The persons who are engaged in studying, doing clerical job, teachers, and retired persons come under this group.

(11) Hard Manual Workers: The persons who are engaged as

(a) Full time labourer, doing hard work for over 4 hours daily.

(b) Full time armed service personnel with daily physical work routine.

(c) Athletes in training are labelled as hard manual workers.
and (iii) Moderate Workers:— The remaining persons who took exercise (walking over three miles daily) or whose work involved more than sedentary activity are grouped under moderate workers.

2.5.5. SOCIO—ECONOMIC STATUS:

Categorization of socio-economic status was done according to Kuppuswamy’s scale (1975) which is mentioned below:

<table>
<thead>
<tr>
<th>Items</th>
<th>Weight Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Education</td>
<td></td>
</tr>
<tr>
<td>1. Professional degree of Hons.</td>
<td>7</td>
</tr>
<tr>
<td>M.A. and above</td>
<td></td>
</tr>
<tr>
<td>2. B.A. or B.Sc. degree</td>
<td>6</td>
</tr>
<tr>
<td>3. Intermediate and post High School Diploma</td>
<td>5</td>
</tr>
<tr>
<td>4. High School Certificate</td>
<td>4</td>
</tr>
<tr>
<td>5. Middle-School Certificate</td>
<td>3</td>
</tr>
<tr>
<td>6. Primary School or Literate</td>
<td>2</td>
</tr>
<tr>
<td>(Who can write their name)</td>
<td></td>
</tr>
<tr>
<td>7. Illiterate</td>
<td>1</td>
</tr>
<tr>
<td>Item</td>
<td>Weight</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td>(B) Occupation</td>
<td></td>
</tr>
<tr>
<td>1. Professionals</td>
<td>10</td>
</tr>
<tr>
<td>2. Semi-Professionals</td>
<td>6</td>
</tr>
<tr>
<td>3. Cleri-cal, Shop-owners, Farm-owners, Students etc.</td>
<td>5</td>
</tr>
<tr>
<td>4. Skilled Workers</td>
<td>4</td>
</tr>
<tr>
<td>5. Semi-Skilled Workers</td>
<td>3</td>
</tr>
<tr>
<td>6. Unskilled Workers</td>
<td>2</td>
</tr>
<tr>
<td>7. Unemployed</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(C) Income</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Above Rs. 2000/- per month</td>
<td>12</td>
</tr>
<tr>
<td>2. Between Rs. 1000/- and Rs. 1999</td>
<td>10</td>
</tr>
<tr>
<td>3. Between Rs. 750/- and Rs. 999</td>
<td>6</td>
</tr>
<tr>
<td>4. Between Rs. 500/- and Rs. 749</td>
<td>4</td>
</tr>
<tr>
<td>5. Between Rs. 300/- and Rs. 499</td>
<td>3</td>
</tr>
<tr>
<td>6. Between Rs. 100/- and Rs. 299</td>
<td>2</td>
</tr>
<tr>
<td>7. Below Rs. 100/-</td>
<td>1</td>
</tr>
</tbody>
</table>

**TOTAL SCORE** (Add A, B and C)

<table>
<thead>
<tr>
<th>Total Score</th>
<th>S.E.S. class</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-29</td>
<td>1 Upper</td>
</tr>
<tr>
<td>16-25</td>
<td>11 Upper Middle</td>
</tr>
<tr>
<td>11-25</td>
<td>111 Lower Middle</td>
</tr>
<tr>
<td>5-15</td>
<td>1V Upper Lower</td>
</tr>
<tr>
<td>Below 5</td>
<td>V Lower</td>
</tr>
</tbody>
</table>
2.6. SMOKING HABIT:

Smoking history was recorded in detail. Non-Smokers were those who had never smoked. One beeri was taken as equivalent to one cigarette. A single index of smoking was calculated, assuming that one packet contains 20 cigarette or beeri. Pack year was calculated.

\[
\text{Pack year} = \frac{\text{No. of cig or beeri} \times \text{No. of years (consumed per day)}}{20}
\]

2.7. TOBACCO CHEWING:

Similar to smoking index, a single index for tobacco chewing (pouch year) was also defined. It is a very crude index. We assume that the amount of tobacco consumed by a person at a time is same in each case and a pouch contains 5 gm. of Tobacco. Thus the pouch year is

\[
\text{Pouch year} = \frac{(\text{No. of times Tobacco consumed per day}) \times \text{No. of years}}{5}
\]

However, an improvement in the index would be called for further studies.

2.6. SELECTION OF NORMAL SUBJECTS:

The normal subjects were both non-smokers and symptom free smokers who fulfilled the criteria of normalcy.
Figure (c.f. Page 34)
Overleaf
Procedure for measurement of height
Showing the effect of posture

Initial posture

Corrected posture

Fig. 1
Criteria of normalcy:

(1) They denied the history of recurrent or persistent expectoration.

(11) They were not subject to wheeze or had an episode of acute bronchitis.

(111) They had no asthma or recurrent bronchitis during their childhood.

(1IV) They had no serious respiratory disease.

(V) No evidence or history of disease which could be expected to affect pulmonary function was found in them.

(VI) They were capable of adequate co-operation during the study.

2.7. MEASUREMENT OF ANTHROPOMETRIC PARAMETERS:

The following anthropometric parameters of each subject under study were measured.

2.7.1. MEASUREMENT OF HEIGHT:

Standing height of each subject was measured in cms. without shoes as described by Cotes. 1975 (Figure 1).

2.7.2. MEASUREMENT OF WEIGHT:

A single portable weighing machine was used and its standardization was done by checking with other machines. The weight was measured without shoes, with normal light clothing. No correction was made for clothing.
Figure (c. f. Page 35)
Overleaf
Determination of BSA

(DuBois Linear Formula)
2.7.3. MEASUREMENT OF BODY SURFACE AREA:

The body surface area (BSA) is usually calculated by means of DuBois nomogram, using the directly measured height and weight readings. This nomogram was prepared by DuBois by taking measurements on subjects and relating it to height and weight, but the study of DuBois was carried out in western countries. Body Surface Area which depends on physical built of individuals and physical built in Indians is quite different than that of persons belonging to western countries. Therefore, it is possible that BSA of Indians may be different than that calculated from DuBois nomogram. In this study, therefore, the following formula was used to calculate body surface area.

\[ \text{BSA} = (\text{Height} \times 2) \times (\text{Mid Thigh Circumference}) \]

Where the circumference of mid thigh is measured at a point 10 cm below greater trochanter (hip joint).

The reliability of this formula was checked by taking linear measurements on Twenty Seven highly motivated subjects. Measurements on different parts of body were taken with subjects lying on a flat surface as explained by DuBois (1916) (Figure 2).

(1) Head : (A.B.) C

A- Around the vertex and point of chin.
B- Coronal Circumference around occiput and forehead just above eyebrows.
(11) Arms F(\(G+H+I\)) \(C_2\)

F- Tip of acromial process to lower border of radius, measured with forearm extended.

G- Circumference at the level of upper border of axilla.

H- Largest circumference of forearm (just below elbow).

I- Smallest circumference of forearm (just above head of ulna).

(111) Hands (J.K) \(C_3\)

J- Lower posterior border to tip of second finger.

K- Circumference of open hand at the metacarpophalangeal joints.

(IV) Trunk (Including neck and external genitals in males, breasts in females.) L(\(M+N\)) \(C_4\)

L- Suprasternal notch to upper border of pubes.

M- Circumference at the level of umbilicus.

N- Circumference of thorax at the level of nipples in males and just above breast in females.

(V) Thighs O(P+Q) \(C_5\)

O- Superior border of great trochanter to lower border of patella.

P- Circumference of thigh just below the level of perineum.

Q- Circumference of hips and buttocks at the level of great trochanter.
Figure (c.f. Page 37)
Overleaf
THE WRIGHT PEAK FLOW METER
(V1) Legs (R.S) C₆

R- From sole of foot to lower border of patella.
S- Circumference at level of lower border of patella.

(VII) Feet T(U+V) C₇

T- Length of foot including great toe.
U- Circumference of foot at base of little toe.
V- Smallest circumference of ankle (just above malleoli).

Where Ci's are constants, when multiplied by the measurements of one side give the surface area of both sides. The surface area of the whole body can be obtained by adding the area of all these seven parts.

2.7.4. MEASUREMENT OF CHEST CIRCUMFERENCE AND CHEST EXPANSION:

Chest circumference of subjects were taken in a standing position. The subjects were first asked to exhale all air in the lung, and a measurement was taken, and then they were asked to take deep breath, so that the chest expanded fully, another measurement of chest was taken. The difference of these two measurements gave the chest expansion.

2.8. MEASUREMENT OF PEAK EXPIRATORY FLOW RATE:

A single Wright Peak Flow Meter (Figure 3) was used for the whole study and calibration of the meter was checked with a standard flow ratameter as well as on healthy individuals whose Peak Expiratory
Flow Rate (PEFR) values were used as known constants. All the peak expiratory flows were taken in sitting positions.

The purpose and technique of test was explained to every subject followed by demonstration of its performance. Each subject held the instrument in such a way that the calibrated dial faced to the right and was in vertical plane, and due care was taken that the vent holes were not obstructed. The subjects were asked to place the mouth-piece in their mouth (gripping it lightly with teeth and sealing it with lips). He then asked to blow out as hard as possible in a short sharp blast, using all the muscular force of the chest to do so. During the test the subjects were carefully watched to ensure that no leaks occurred between the mouth piece and his lips. After one or two trial attempts, the highest value of PEFR achieved in five successive satisfactory attempts were recorded.

2.9. CHARACTERISTICS OF THE SAMPLE:

A sample of 1220 subjects was drawn from a population of Allahabad. Out of which 687 were males and 533 were females. 401 resided in rural area while 819 (68.75%) belonged to urban population. Lesser number of representative of rural population in sample was due to fact that only one village 'Chaka' was chosen,
but the proportion of sample unit selected from rural and urban area, to the rural and urban population respectively, was in accordance to the 1981 census report of Allahabad.

2.9.1. SEX-RATIO:

Out of 1220 adult subjects 687 were males and 533 were females of different age groups ranging from 18 to 70 years and above. The sex ratio in the sample was 776 females per 1000 males, which was less than the sex-ratio of Allahabad. The lesser number of females in the sample was due to the fact that the female subjects were less cooperative during the study and no replacement was made for a person who did not cooperate. The following table shows the sex distribution.

<table>
<thead>
<tr>
<th>Sex Ratio in Population</th>
<th>No. of Subjects</th>
<th>Sex Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>890</td>
<td>533</td>
</tr>
<tr>
<td>Males</td>
<td>1000</td>
<td>687</td>
</tr>
</tbody>
</table>

2.9.2. RELIGION:

According to religion, the cases were classified into four categories i.e. Hindus, Muslims, Christians and others. Out of 1220 cases 1140 were Hindus, 63
were Muslims, 16 were Christians and only one was Sikh. The following Table shows the distribution of cases according to religion.

Table 2.2: DISTRIBUTION OF CASES ACCORDING TO RELIGION.

<table>
<thead>
<tr>
<th>Religion</th>
<th>% of cases in Population</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindus</td>
<td>87.7%</td>
<td>648</td>
<td>492</td>
<td>1140</td>
<td>93.52</td>
</tr>
<tr>
<td>Muslims</td>
<td>11.9%</td>
<td>35</td>
<td>28</td>
<td>63</td>
<td>5.16</td>
</tr>
<tr>
<td>Christians</td>
<td>0.4%</td>
<td>4</td>
<td>13</td>
<td>17</td>
<td>1.32</td>
</tr>
<tr>
<td>&amp; Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>687</td>
<td>533</td>
<td>1220</td>
<td>100</td>
</tr>
</tbody>
</table>

The percentage of Hindus was slightly higher in the sample and that of Muslims lower than the percentage of population. The lesser number of Muslims representation in sample was due to the fact that they were of low socio-economic status and it was difficult to motivate them, especially females. The large number of Christians in females was due to the fact that most of the nursing staff were Christians.

2.9.3. AGE - WISE DISTRIBUTION:

The main idea of the study was to develop regression models for respiratory function in adult population, therefore the adult subjects were selected by means of multistage stratified sampling design.
and by simple random sampling technique. The minimum age in the sample was 18 years and the subjects of age, 70 years and above also found place in it, the maximum age of a subject being 74 years. Keeping in view the report of 1981 census, the adult population was divided into three groups i.e. 15-34 years, 35-54 years and 55 years and above. Following table shows the age wise distribution.

Table 2.3. :: - AGE - WISE DISTRIBUTION OF CASES

<table>
<thead>
<tr>
<th>Age Group</th>
<th>% of cases in population</th>
<th>In Sample</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total %</td>
</tr>
<tr>
<td>15-35</td>
<td>53.42%</td>
<td>355</td>
<td>296</td>
<td>651</td>
</tr>
<tr>
<td>35-55</td>
<td>32.93%</td>
<td>270</td>
<td>172</td>
<td>442</td>
</tr>
<tr>
<td>55 and above</td>
<td>13.65%</td>
<td>62</td>
<td>65</td>
<td>127</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>687</td>
<td>533</td>
<td>1220</td>
</tr>
</tbody>
</table>

The above table shows that the percentage of cases in various adult age groups were more or less same as that in the population (1981 census).

2.9.4. HOUSE HOLD SIZE AND DENSITY OF PERSON PER ROOM:

To study the atmosphere in the house, the household size and number of family members were noted during the survey. The 1981 census report indicates that
about 26.20% of cases were having two rooms followed by 23.2% having one room only. The following table illustrates the household size in the sample.

Table 2.4: HOUSEHOLD SIZE IN SAMPLE.

<table>
<thead>
<tr>
<th>No. of rooms</th>
<th>% of cases in population</th>
<th>In Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of cases</td>
</tr>
<tr>
<td>One room</td>
<td>23.20</td>
<td>338</td>
</tr>
<tr>
<td>Two rooms</td>
<td>26.20</td>
<td>369</td>
</tr>
<tr>
<td>Three rooms</td>
<td>19.40</td>
<td>165</td>
</tr>
<tr>
<td>Four rooms</td>
<td>13.20</td>
<td>122</td>
</tr>
<tr>
<td>Five and above</td>
<td>18.00</td>
<td>226</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>1220</td>
</tr>
</tbody>
</table>

In the sample selected 369 out of 1220 cases i.e. (30.24%) having two rooms, followed by 338 (27.70%) having one room. The household size in the sample gave the same picture i.e. households with two rooms were predominant, as was in 1981 census report.

The over-crowding in the house was assessed by density i.e. number of persons per room. In our sample the atmosphere in the house of 748 out of 1220 cases was congested, which too is in conformity with the 1981 census, indicating the acute congestion in the living conditions.
2.9.5 SOCIO-ECONOMIC CHARACTERISTICS:

The economic status was divided into five categories i.e. upper, upper middle, lower middle, upper lower and lower. Following table shows the distribution of cases according to socio-economic status.

Table 2.5: - SOCIO-ECONOMIC STATUS OF CASES.

<table>
<thead>
<tr>
<th>Socio-economic Status</th>
<th>No. of cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>108</td>
<td>8.85</td>
</tr>
<tr>
<td>Upper Middle</td>
<td>493</td>
<td>40.40</td>
</tr>
<tr>
<td>Lower Middle</td>
<td>311</td>
<td>25.49</td>
</tr>
<tr>
<td>Upper Lower</td>
<td>308</td>
<td>25.26</td>
</tr>
<tr>
<td>Lower</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1220</td>
<td>100</td>
</tr>
</tbody>
</table>

Out of 1220 cases 493 (40.40%) were in upper middle and 311 (25.49%) were in lower middle categories. This showed that large number of cases in the sample were from middle socio-economic status. It has, perhaps, been so because of the fact that it is easier to motivate cases from this group as compared to those from high as well as low socio-economic status groups. Furthermore, as indicated in sampling plan the households in the blocks were divided into three strata; considering the richest 25%, middle 50% and lower 25%.
The aim of the sampling theory is to make sampling more efficient, in order to get as much information as possible about the parent population. It attempts to develop procedures of sampling selection and of estimation that are precise enough for the purpose in hand. The aim of the present study is to develop suitable regression models for estimating lung functions of healthy adult population of Allahabad so the sampling should be such that it reflects all the characteristics of the population. The design of the survey should be such that it produces the prescribed precision at the lowest possible cost with personnel and physical facilities, likely to be available. In this study the sample was drawn by multistage stratified sampling procedure and simple random sampling procedure, and characteristics of the sample selected indicate that it was reasonably good representative of the population.