CHAPTER 3

EPIDEMIOLOGY
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3.1: INTRODUCTION

Epidemiology is the basic science of preventive and social medicine. Although of an ancient lineage, it made only slow progress up to the start of this century. Epidemiology has evolved rapidly during the past three decades. Its ramifications cover not only study of disease distribution and causation (and thereby prevention), but also health and health related events occurring in human population. Modern epidemiology has entered the most exciting phase of its evolution. By identifying risk factors of chronic disease, evaluating treatment modalities and health services, it has provided new opportunities for prevention, treatment, planning and improving the effectiveness and efficiency of health services. The current interest of medical sciences in epidemiology has given rise to newer off-shoots such as infectious disease epidemiology, chronic disease epidemiology, clinical epidemiology, serological epidemiology, cancer epidemiology, malaria epidemiology, neuro epidemiology, genetic epidemiology, occupational epidemiology, psychosocial epidemiology and so on.

Definition:
Epidemiology has been defined by John M. Last, 1988 as -

“The study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems”.
The wide variety of meanings attached to epidemiology is the expression of the wide ranging subject-matter. The diseases included in the subject matter have increased from those which occur in epidemics to include those infectious diseases which are endemic in nature, and more recently chronic diseases, accidents and mental health. Modern epidemiology has also taken within its scope the study of health related states, events and "facts of life" occurring in human population. This includes study of health services used by the population and to measure their impact.

Although there is no single definition to which all epidemiologists subscribe, three components are common to most of them. First, studies of disease frequency; second, studies of the distribution; and third, studies of the determinants. Each of these components confers an important message.
3.2: REVIEW OF LITERATURE

History:

Epidemiology began with Adam and Eve, both trying to investigate the qualities of the "forbidden fruit". Epidemiology is derived from the word epidemic (epi=among; demos=people; logos=study), which is a very old word dating back to the 3rd century B.C. The foundations of epidemiology were laid in the 19th century, when a new classic study made a major contribution to the saving of life. Mention is made of an Epidemiological Society in London in 1850s under the presidency of the Earl of Shaftsbury. The society's main concern was the investigation of infectious disease. The sudden growth of bacteriology had smothered the development of epidemiology in the universities.

In the United States, Winslow and Sedgwick both lectured in epidemiology in the early 1920s, although the subject was not given departmental status. In 1927, Frost became the first professor of epidemiology in US. Later major Greenwood became the first professor of epidemiology and medical statistics in the University in London. Epidemiology has grown rapidly during the past three decades. It is now become firmly established in medical education.

There appears to be almost as many definitions of epidemiology as there are authors who have written on the subject, ranging from Hippocrates to those of the present day. A short list is given below:

(1) That branch of medical science which treats of epidemics (Parkin, 1993).
(2) The science of the mass phenomenon of infectious diseases (Frost, 1927).

(3) The study of disease, any disease, as a mass phenomenon (Greenwood, 1937).


1. Disease frequency:

Inherent in the definition of epidemiology is measurement of frequency of disease, disability or death and summarizing this information in the form of rates and ratios (e.g., prevalence rate, incidence rate, death rate, etc). These rates are essential for comparing disease frequency in different populations or subgroups of the same population in relation to suspected causal factors.

Epidemiology is also concerned with the measurement of health related events and states in the community (e.g., health needs, demands, activities, tasks, health care utilization) and variables such as blood pressure, serum cholesterol, height, weight, etc. In this respect epidemiology has the features of a quantitative science. Much of the subject matter of measurement of disease and health related events falls in the domain of biostatistics, which is a basic tool of epidemiology.

2. Distribution of disease:

It is well known that disease, or for that matter health, is not uniformly distributed in human populations. The basic tenet of epidemiology is that the distribution of disease occurs in patterns in a community and that the patterns may lead to the generation of hypotheses about
causative (or) risk factors. An important function of epidemiology is to study these distribution patterns in the various subgroups of the population by time, place and person. That is, the epidemiologist examines whether there has been an increase or decrease of disease over time span; whether there is a higher concentration of disease in one geographic area than in others; whether the disease occurs more often in men or in a particular age group, and whether most characteristics or behavior of those affected are different from those not affected. Epidemiology addresses itself to a study of these variations or pattern, which may suggest or lead to measure to control or prevent the disease. An important outcome of this study is formulation of aetiological hypothesis. This aspect of epidemiology is known as “descriptive epidemiology”.

3. Determinants of disease:

A unique feature of epidemiology is to test aetiological hypotheses and identify the underlying causes (or risk factors) of disease. This requires the use of epidemiological principles and methods. This is the real substance of epidemiology. This aspect of epidemiology is known as “analytical epidemiology”. Analytical strategies help in developing scientifically sound health programmes, inventions and policies.

Aims of epidemiology:

According to the International Epidemiological Association (IEA), epidemiology has three main aims:
(a) To describe the distribution and magnitude of health and disease problems in human populations
(b) To identify aetiological factors (risk factors) in the pathogenesis of disease; and
(c) To provide the data essential for the planning, implementation and evaluation of services for the prevention, control and treatment of disease and to the setting up to priorities among those services.

![Projection by 2025]

Projected burden in 2025 is estimated by applying current population forecasts for India and assuming that current mortality rates of cervical cancer are constant over time.

**Fig. 3 (a)**: Projection cervical cancer and death rate by 2025


In order to fulfill these aims, three rather different classes of epidemiological studies may be mentioned: descriptive studies, analytical studies, and experimental or invention studies. These studies are described in the following pages.
The ultimate aim of epidemiology is to lead to effective action:

- To eliminate or reduce the health problem or its consequences; and
- To promote the health and well being of society as a whole.

Epidemiology and clinical medicine:

The basic differences between epidemiology and clinical medicine is that in epidemiology, the unit of study is a "defined population" or "population at risk"; in clinical medicine, the unit of study is a "case" or "cases". In clinical medicine, the physician is concerned with disease in the individual patient. Whereas the epidemiologist is concerned with disease patterns in the entire population. Epidemiology is thus concerned with both the sick and healthy. It has been stated that clinicians are interested in cases with the disease, the statistician with the population from which the cases are derived and the epidemiologist is interested in the relationship between cases and the population in the form of a state.

In clinical medicine, the physician seeks a diagnosis from which he derives a prognosis and prescribes specific treatment. In epidemiology, an analogous situation exists. The epidemiologist is confronted with relevant data derived from a particular epidemiological study. He seeks to identify a particular source of infection, a mode of spread or an aetiological factor in order to determinate a future trend and recommend specific control measures. The epidemiologist also evaluates the outcome of preventive and therapeutic measures instituted which provides the necessary guidance and feed-back to the health care administrator for effective management of public health programmes.
In clinical medicine, the patient comes to the doctor; in epidemiology, the investigator goes out into the community to find the person who has the disease or experience of the suspected causal factor in question. Clinical medicine is based on biomedical concepts with an ever increasing concern for refining the technique of diagnosis and treatment at the individual level. The subject matter of clinical medicine is easily “perceived” by such techniques as clinical and laboratory examinations including post-mortem reports. In contrast, the subject matter of epidemiology is “conceptual” and can only be symbolized in the form of table and graphs.

Finally, it may be stated that clinical medicine and epidemiology are not antagonistic. Both are closely related, co-existent and mutually helpful. Most epidemiological enquiries could never be established without appropriate clinical consideration as to how the disease in question can be identified among individual comprising the group under scrutiny. Likewise, a knowledge of prevalence, aetiological and prognosis derived from epidemiological research is important to the clinician for the diagnosis and management of individual patients and their families.
3.3: MATERIALS AND METHODS

Epidemiological approach:

The epidemiological approach to problems of health and disease is based on two major foundations:

(i) Asking questions
(ii) Making comparison

(i) Asking questions:

Epidemiology has been defined as “a means of learning or asking questions and getting answers that lead to further question”. For example, the following questions could be asked:

Related to health events:
- What is the event? (The problem)
- What is the magnitude?
- Where did it happen?
- When did it happen?
- Who are affected?
- Why did it happen?

Related to health action:
- What can be done to reduce this problem and its consequence? How can it be prevented in the future?
- What action should be taken by the community? By the health services? By other Sectors? Where and for whom these activities carried out?
What resources are required? How are the activities to be organized? What difficulties may arise, and how might they be overcome?

Answer to above questions may provide clues to disease aetiology, and help the epidemiologist to guide planning and evaluation.

(ii) Making comparison:

The basic approach in epidemiology is to make comparisons and draw inferences. This may be comparison of two (or more groups) - one group having the disease (or exposed to risk factor) and the other group (s) not having the disease (or not exposed to risk factor), or comparison between individuals. By making comparisons, the epidemiologist tries to find out the crucial differences in the host and environmental factors between those affected and not affected. In short the epidemiologist weighs balances and contrasts. Clues to aetiology come from such comparison.

One of the first considerations before making comparisons is to ensure what is known as “comparability” between the study and control groups. In other words, both the groups should be similar so that “like can be compared with like”. For facts to be comparable, they must be accurate, and they must be gathered in a uniform way. For example, the study and control groups should be similar with regard to their age and sex composition, and similar other pertinent variables. The best method of ensuring comparability, in such cases, is by randomization or random allocation. Where random allocation is not possible (as in case control and cohort studies) what is known as “matching” is done for selected characteristics that might confound the interpretation of results. Another
alternative is standardization which usually has a limited application to a few characteristics such as age, sex and parity.

**Cancer:**

Cancer may be regarded as a group of diseases characterized by an:

(i) Abnormal growth of cells,

(ii) Ability to invade adjacent tissues and even distant organs, and

(iii) The eventual death of the affected patient if the tumour has progressed beyond that stage when it can be successfully removed.

Cancer can occur at any site or tissue of the body any may involve any type of cells.

The major categories of cancers are:

(a) Carenomas, which arise from epithelial cells lining the internal surface of the various organs (e.g. mouth, oesophagus, intestines, uterus) and from the skin epithelium.

(b) Sarcomas, which arise from mesodermal cells constituting the various connective tissues (e.g. fibrous tissue, fat and bone); and

(c) Lymphomas, myeloma and leukamias arising from the cells of bone marrow and immune systems.

The term "primary tumour" is used to denote cancer in the organ of origin, while "secondary tumour" denotes cancer that has spread to regional lymph nodes and distant organs. When cancer cells multiply and reach a critical size, the cancer is clinically evident as a lump or ulcer localized to the organ of origin in early stages. As the disease advances, symptoms and signs of invasion and distant metastases becomes clinically evident.
Cancer screening:
In the light of present knowledge, early detection and prompt treatment of early cancer and precancerous conditions provide the best possible protection against cancer for the individual and the community. Now a good deal of attention is being paid to screening for early detection of cancer. This approach, that is, cancer screening may be defined as the “search for unrecognized malignancy by means of rapidly applied tests”.

Cancer screening is possible because:
(a) In many instances, malignant disease is preceded for a period of months or years by a premalignant lesion, removal of which prevents subsequent development of cancer;
(b) Most cancer begin as localized lesions and if found at this stage a high rate of cure is obtainable; and
(c) As much as 75 percent of all cancers occur in body sites that are accessible.

Screening for cancer cervix:
Screening for cervical cancer has become an accepted clinical practice. The prolonged early phase of cancer in situ can be detected by the Pap smear. Current policy suggests that all women should have a Pep test (cervical smear) at the beginning of sexual activity, and then every 3 years thereafter. A periodic pelvic examination is also recommended.

In England and Wales over 2 million smears are taken annually. It is conceded that some of these tests are unnecessarily frequent in women who need them least, e.g., annual tests in young educated women attending family planning clinics. This is because it is generally
regarded unethical not to offer the test when asked for. In fact, the Pap test should be directed at women in poor socio-economic circumstances who are at the greatest risk of developing the disease.

There are few problems posed by screening for cancer cervix. These are related to the disease and the test.

(a) **The disease**: One of the criteria that must be fulfilled before a screening programme is initiated is that natural history of the disease and its development from latent to declared disease should be adequately understood. The crux of the matter is uncertainty about the natural history of cancer cervix, which has still many gaps. There is no firm evidence on two crucial points—the frequency with which carcinoma in situ progresses to invasive carcinoma, and the frequency with which invasive carcinoma is preceded by abnormal smears.

(b) **The test**: Regarding the screening test, two particular aspects deserve consideration, that is, the response rate and the sensitivity of the test. Numerous studies have shown that the response to an initial invitation to be screened is of the order of 50 to 60 percent in developed countries; the response rate being the least in women thought to be most at risk, as for example the poorest and the less educated women. The second factor influencing the benefit of screening is the sensitivity of the test in detecting neoplastic changes. It has been estimated that the false-negative rate is of the order of 20 percent (sensitivity 80 percent). The sensitivity will also depend upon whether the cervical smear is prepared from vaginal aspiration or direct cervical scraping— the latter is more reliable than the former. The question that arises is whether
improved quality of smear taking, proper laboratory handling and the pathologist’s diagnostic competence can reduce the number of false-negatives. Screening intervals and selection of age groups are matters which are under discussion continuously.

Unfortunately, there were no randomized controlled studies of the benefits of the Pap test when it was introduced. However, there is indirect evidence from certain countries (e.g., Norway, Sweden, Finland and Iceland) that early detection can reduce both incidence and mortality.

The Population Based Cancer Registry (PBCR) at Silchar Town started functioning from 1st August, 2003. The registry is located in the Department of Pathology of Silchar Medical College at Silchar Town of Assam. The registry covers approximate one & half lakh urban population of Silchar Municipal area.

Silchar town is the Head Quarter of Cachar District of Assam. For its strategic location, it is considered as the gateway to the states of Mizoram, Manipur & Tripura. There is one government Medical College, one Cancer Hospital, many private Nursing Homes and Diagnostic centres. The town caters the entire population of Southern Assam comprising of Cachar, Karimganj and Hailakandi Districts. In addition, it renders health care to a sizeable population of adjacent states of Tripura.

Silchar Town is located 27 meter above sea level and between latitude 25.8° N and longitude 93.15° E. The climate is moderate and average rain fall is 2400 mm. The town consists of 28 wares with an area of 20 sq. K.M. The overall literacy rate is 88.3%.

The registry staff comprises of one statistician and one social investigator. The registry is equipped with computer and internet facility.
Dr. S. Chakravarty, Professor & Head, Department of Pathology, Silchar Medical College, is the Principal Investigator and Dr. D. Dutta, Assistant Professor of Pathology is the co-investigator.

From 1st January, 2007 the registry has been expanded to cover entire Cachar District. The population of Cachar District, 14,44,921 (7,43,042 Males & 7,01,879 Females) as per 2001 census. Along with the expansion of the registry area, I SRF (Medical) and 2 Medical Social Workers have been appointed in the registry, this year.
Fig. 3 (b): Working of Registry

Clinical Department SMCH → PBCR in Silchar Town → Pathology Department, SMCH

Clinical Department, SMCH → PBCR in Silchar Town → Pathology Department, SMCH

Private Diagnosis Centres and Nursing Homes → Non Resident cases (Not covered by any PBCR) → Filling up of Core-Proforma coding → Kept separate file future use

Mortality data → Feedback

Pathology Department, SMCH → Resident cases → Follow-up → Filling up of Core-Proforma coding → Data entry in computer → Coordinating Centre for duplicate/consistency check

RMRC Dibrugarh
Statistical analysis:

All statistical analysis was done by:

Chi-square ($\chi^2$) Test for Independence of Attributes:

For test of independence in case of two attributes the test statistic under the hypothesis of independence is given by,

$$\chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{s} \left[ \frac{(A_{ij} - E(A_{ij}))^2}{E(A_{ij})} \right] \sim \chi^2 \text{ variate with } (r - 1)(s - 1) \text{ df.}$$

Where, $A_{ij}$ is the observed frequency in the $i^{th}$ row and $j^{th}$ column and $E(A_{ij})$ is the expected frequency in the $i^{th}$ row and $j^{th}$ column. (Dowdy et al., 2004).

Chi-Square ($\chi^2$) Test for Goodness of Fit (Ott et al., 2010):

The test is performed in the following manner:

Step I : The random samples are classified into several categories (k, say) if they are not arranged.

Step II : Now, based on the definition of the theoretical frequencies they are computed. The theoretical frequencies are given the notation $e_i$ and the observed frequencies belonging to the $i^{th}$ class as $o_i$ ($i = 1, 2, ..., k$)

Step III : These $e_i$'s are then compared with the observed frequencies $o_i$'s for the different categories. Pearson suggested that the test statistic as,
If the value of $o_i$ and $e_i$ of each category is closer to each other and in such a case the calculated value of the $\chi^2$ statistic will be small, otherwise it will be large.
3.4: RESULTS & DISCUSSION

Table 3.1: Incidence of carcinoma of cervix

<table>
<thead>
<tr>
<th>Cases</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Gynae. admissions (for 48 months)</td>
<td>5597</td>
</tr>
<tr>
<td>Number of carcinoma cervix</td>
<td>100</td>
</tr>
</tbody>
</table>

Fig 3.1: The Pie Chart showing incidence of Carcinoma of Cervix

1.78% 98.22%

Other Gynaecology diseases  Carcinoma of cervix

Being a teaching hospital and major referral centre we had a total no. of 5597 Gynae admissions out of which 1.78% were cases of carcinoma of cervix.
Table 3.2: Relation of age of the occurrence of Carcinoma Cervix

<table>
<thead>
<tr>
<th>Age group (In years)</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-40</td>
<td>25</td>
<td>25%</td>
</tr>
<tr>
<td>41-50</td>
<td>35</td>
<td>35%</td>
</tr>
<tr>
<td>51-60</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>61-70</td>
<td>16</td>
<td>16%</td>
</tr>
<tr>
<td>&gt;70</td>
<td>04</td>
<td>04%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Fig 3.2: The Bar Diagram showing Relation of age of the occurrence of Carcinoma Cervix

3.4: DISCUSSION

Shyamsundar Rao (1959) have also noticed that incidence of carcinoma of cervix was highest in premenopausal period than of postmenopausal period.
3.5: CONCLUSION

We found that 60\% of patients are from age group of 30 to 50 years. The youngest patient was of the age of 30 years and the oldest one was of age of 70 years.

Analysis: The value of $\chi^2$ statistic is found to be 26.1 with corresponding p-value 0.00003. The p-value is less than 0.05 indicating that the numbers of cases are unevenly distributed across the different age groups. Thus, the disease is less probable in the higher age-groups.
Table 3.3: Religion wise distribution of cases

<table>
<thead>
<tr>
<th>Religion</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindu</td>
<td>90</td>
<td>90%</td>
</tr>
<tr>
<td>Muslim</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

3.4: DISCUSSION

Shyamsundar and Reddy (1959) have showed statistically significant low incidence of carcinoma cervix in Muslims which may be due to circumstances status.
3.5: CONCLUSION

In our hospital the numbers of Hindu patients suffering from carcinoma cervix are comparatively more than Muslim patients. 100 patients from age of 30 to 80 years it is found that cases of carcinoma cervix is three times less in Muslim population. It does not require statistical evaluation.
Table 3.4: Relation of Marital Status

<table>
<thead>
<tr>
<th>Years at marriage (In years)</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>06</td>
<td>06%</td>
</tr>
<tr>
<td>11-20</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>21-30</td>
<td>32</td>
<td>32%</td>
</tr>
<tr>
<td>31-40</td>
<td>28</td>
<td>28%</td>
</tr>
<tr>
<td>&gt;40</td>
<td>13</td>
<td>13%</td>
</tr>
<tr>
<td>Unmarried</td>
<td>01</td>
<td>01%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Fig 3.4: The Bar Diagram showing relation of Marital Status

3.4: DISCUSSION

Gagnon (1950) showed low incidence in unmarried/single women and Nuns. Higher incidences have been demonstrated in married of more than 30 years. (Lulla Maya et al., 1980).
3.5: CONCLUSION

In our study 74% patients have marital life of more than 20 years. Analysis: The value of $\chi^2$ statistic is found to be 22 with corresponding p-value 0.0002. The p-value is less than 0.05 indicating that the numbers of cases are unevenly distributed across the different years at marriage. Thus, the disease is less probable at the early years of marriage and during the very late years.
Table 3.5: Relation of age at Marriage

<table>
<thead>
<tr>
<th>Age (In years)</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;13</td>
<td>16</td>
<td>16%</td>
</tr>
<tr>
<td>13-16</td>
<td>52</td>
<td>52%</td>
</tr>
<tr>
<td>17-20</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>21-24</td>
<td>05</td>
<td>05%</td>
</tr>
<tr>
<td>&gt;25</td>
<td>07</td>
<td>07%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Fig 3.5: The Bar Diagram showing relation of age at Marriage

3.4: DISCUSSION

Ferguson, 1961, has also shown that development of condyloma, dysplasia and carcinoma is significantly associated to women who married at age of less than 18 years.
3.5: CONCLUSION

There are 88% females who got married before the age of 20 years. 13 to 16 years of age at marriage is common in our country.

Analysis: The value of $\chi^2$ statistic is found to be 65.05 with corresponding p-value 0.000. The p-value is less than 0.05 indicating that the numbers of cases are unevenly distributed across the different 'Age at marriage'. Thus, the disease is more probable if the marriage takes place at a very early age.
### Table 3.6: Age at first Pregnancy

<table>
<thead>
<tr>
<th>Age (In years)</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 15</td>
<td>22</td>
<td>22%</td>
</tr>
<tr>
<td>16-18</td>
<td>43</td>
<td>43%</td>
</tr>
<tr>
<td>19-20</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>21-23</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>&gt;24</td>
<td>05</td>
<td>05%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

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**Fig 3.6: The Bar Diagram showing age at first Pregnancy**

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#### 3.4: DISCUSSION

*Boyd and Doll (1964)* showed similar result with increased risk of developing carcinoma cervix in women who got pregnant before the age of 18 years.
3.5: CONCLUSION

65% patients got pregnant before the age of 18 years and only 15% patients got their first child above the age of 20 years.

**Analysis**: The value of $\chi^2$ statistic is found to be 42.9 with corresponding p-value 0.000. The p-value is less than 0.05 indicating that the numbers of cases are unevenly distributed across the different ‘Age at first Pregnancy’. Thus, the disease is more probable if the marriage takes place at an early stage.
Table 3.7 : Relation of Parity

<table>
<thead>
<tr>
<th>Parity</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>28</td>
<td>28%</td>
</tr>
<tr>
<td>4-6</td>
<td>62</td>
<td>62%</td>
</tr>
<tr>
<td>&gt;7</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

3.4 : DISCUSSION

Study done by Shyamsundar Rao et al., (1959) and Winder (1954) showed that increase risk is directly proportional to parity, which may be because of high number of pregnancies leads to repeated trauma to the cervix.
3.5: CONCLUSION

In our study we had >72% of females with multiparity with cervical carcinoma.

**Analysis**: The value of $\chi^2$ statistic is found to be 41.8 with corresponding p-value 0.000. The p-value is less than 0.05 indicating that the numbers of cases are unevenly distributed across the different Parity values. Thus, carcinoma of the cervix increases with the increase of Parity.
Table 3.8: Relation of Symptoms

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red white discharge PV</td>
<td>56</td>
<td>56%</td>
</tr>
<tr>
<td>Irregular bleeding</td>
<td>42</td>
<td>42%</td>
</tr>
<tr>
<td>Post coital bleeding</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>Post menopausal bleeding</td>
<td>36</td>
<td>36%</td>
</tr>
<tr>
<td>Backache</td>
<td>48</td>
<td>48%</td>
</tr>
<tr>
<td>Weight loss</td>
<td>36</td>
<td>36%</td>
</tr>
<tr>
<td>Urinary symptoms</td>
<td>32</td>
<td>32%</td>
</tr>
</tbody>
</table>

3.4: DISCUSSION

Ahuja (1963) have reported that red white discharge per vagina (89%) is the most important symptoms.
3.5: CONCLUSION

Red white discharge being the commonest symptom. Also the postmenopausal bleeding backaches are the common complaints. Patients usually do not come out with the history of post coital bleeding due to illiteracy and reservation in their mind.

This is a case where a subject can have multiple symptoms and hence $\chi^2$ test cannot be performed.
Table 3.9: Duration of Symptoms

<table>
<thead>
<tr>
<th>Duration (In months)</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3</td>
<td>41</td>
<td>41%</td>
</tr>
<tr>
<td>4-6</td>
<td>35</td>
<td>35%</td>
</tr>
<tr>
<td>7-9</td>
<td>03</td>
<td>03%</td>
</tr>
<tr>
<td>9-12</td>
<td>14</td>
<td>14%</td>
</tr>
<tr>
<td>&gt; 12</td>
<td>07</td>
<td>07%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Fig 3.9: The Line Diagram showing duration of Symptoms

3.4: DISCUSSION

Winder (1954) showed a similar series of more than 50% of the patients having onset of symptoms of 6 months duration.
3.5: CONCLUSION

76% of patients have acute onset and symptoms of short duration of less than 6 months.

Analysis: The value of $\chi^2$ statistic is found to be 55 with corresponding p-value 0.000. The p-value is less than 0.05 indicating that the numbers of cases are unevenly distributed across the different ‘Duration of Symptoms’. Thus, in 93% of cases the duration of symptoms is for one year.
Table 3.10 (a): Clinical Presentation

<table>
<thead>
<tr>
<th>Presentation</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal cervix</td>
<td>16</td>
<td>16%</td>
</tr>
<tr>
<td>Growth</td>
<td>52</td>
<td>52%</td>
</tr>
<tr>
<td>Hypertrophy</td>
<td>64</td>
<td>64%</td>
</tr>
<tr>
<td>Hard cervix</td>
<td>68</td>
<td>68%</td>
</tr>
<tr>
<td>Bleeding cervix</td>
<td>72</td>
<td>72%</td>
</tr>
<tr>
<td>Friable cervix</td>
<td>32</td>
<td>32%</td>
</tr>
<tr>
<td>Involvement of vagina</td>
<td>24</td>
<td>24%</td>
</tr>
<tr>
<td>Parametrial involvement</td>
<td>50</td>
<td>50%</td>
</tr>
</tbody>
</table>

3.4: DISCUSSION

Chauhan et al., 1987 also found hypertrophied and hard cervix is the commonest mode of presentation. Macgregor et al., (1971) also shown 2.4% of carcinoma in normal looking cervix which is quite low then our series.
3.5: CONCLUSION

Hypertrophied hard cervix which bleeds on touch is the commonest clinical presentation of the cervix which makes the diagnosis of carcinoma cervix easy. 16% of normal looking cervix were picked up by routine cytology screening and were confirmed by histopathology.

This is a case where a subject can have multiple presentations and hence $\chi^2$ test cannot be performed.
Table 3.10 (b): Relation of stages of Disease

<table>
<thead>
<tr>
<th>Clinical stages</th>
<th>No. of cases</th>
<th>Percentage</th>
<th>Intra operative stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>20</td>
<td>20%</td>
<td>I 1 1 2</td>
</tr>
<tr>
<td>II</td>
<td>30</td>
<td>30%</td>
<td>_ _ 2 4</td>
</tr>
<tr>
<td>III</td>
<td>40</td>
<td>40%</td>
<td>_ _ _ 1</td>
</tr>
<tr>
<td>IV</td>
<td>10</td>
<td>10%</td>
<td>_ _ _</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
<td>_ _ _</td>
</tr>
</tbody>
</table>

Fig 3.10 (b): The Bar Diagram showing relation of stages of Disease

3.4: DISCUSSION

*Pasteur et al., 1992* also shows role of paraaortic node sampling and underestimation of clinical staging.
3.5: CONCLUSION

Clinical staging showed that patients are following in advanced stages most commonly in stage II and III. But during surgery in some patients it is found that clinical staging was underestimated which affected the treatment modality.
Table 3.10 (c): Histopathology correlation

<table>
<thead>
<tr>
<th>Histopathology reports</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Squamous cell carcinoma</td>
<td>95</td>
<td>95%</td>
</tr>
<tr>
<td>(a) Well differentiated squamous cell</td>
<td>20</td>
<td>21.05%</td>
</tr>
<tr>
<td>carcinoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Moderately differentiated squamous</td>
<td>45</td>
<td>47.36%</td>
</tr>
<tr>
<td>cell carcinoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Poorly differentiated squamous cell</td>
<td>30</td>
<td>31.57%</td>
</tr>
<tr>
<td>carcinoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Adenocarcinoma</td>
<td>05</td>
<td>05%</td>
</tr>
</tbody>
</table>

Fig 3.10 (c): The Pie Chart showing Histopathology correlation

3.4: DISCUSSION

Jeffcoates, 2010 also described moderately differentiated squamous cell carcinoma is the commonest variety.
3.5: CONCLUSION

Squamous cell carcinoma is the commonest histological type which was observed and moderately differentiating type is more common. Analysis: The value of $\chi^2$ statistic is found to be 10 with corresponding p-value 0.006. The p-value is less than 0.05 indicating that the number of cases is unevenly distributed across the different groups, and moderately differentiated squamous cell carcinoma top the list.
Fig 3 (c): Microscopic picture of squamous cell carcinoma of cervix

Showing hyperchromatic and enlarged nucleus with increased nucleocytoplasmic ratio with mitotic figure.
Fig. 3 (d) : Scanning Electron Microscopic picture of squamous cell carcinoma of the cervix, low power magnification showing bundles of tonofilaments by arrow in paranuclear and cytoplasm (Magnification 4,000)

Fig. 3 (e) : Scanning Electron Microscopic picture of squamous cell carcinoma of the cervix, 10,000 magnifications showing endoplasmic retinoqulum by arrow
Fig. 3 (f) : Scanning Electron Microscopic picture of squamous cell carcinoma of the cervix, 20,000 magnification showing desmosomes by arrow.

Fig. 3 (g) : Scanning Electron Microscopic picture of adenomacarcinoma of the cervix, with 4,000 magnification showing 4 malignant epithelial cells arranged back to back. The cytoplasm shows organelles and lipid droplets. The cell membranes shows microvilli.
Fig. 3 (h) : Scanning Electron microscopic picture of parts of two adenoma carcinoma cells with back to plasma membrane attached by junctional complex shown by arrow (8,000 magnifications).

Fig 3 (i) : Close up picture of previous photograph with 30,000 magnification
Table 3.10 (d) : Treatment received by the Cases

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>Surgery + Radiotherapy</td>
<td>31</td>
<td>31%</td>
</tr>
<tr>
<td>Radiotherapy</td>
<td>49</td>
<td>49%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

3.4: CONCLUSION

Radiotherapy was given in 80% of cases due to advanced stage. Out of which 31% patients were given radiotherapy in addition to surgery as clinical staging affected the decision of surgical treatment.
Analysis: The value of $\chi^2$ statistic is found to be 12.86 with corresponding p-value 0.002. The p-value is less than 0.05 indicating that the numbers of cases are unevenly distributed across the different ‘Treatment types’. Thus, the diseased is mostly treated using either “Radiotherapy” or “Surgery + Radiotherapy”.

3.6: BIBLIOGRAPHY


7. Frost W.H., (1941), Commonwealth Fund, 340-58


