CHAPTER : III

MATERIALS AND METHODS
III. MATERIALS & METHODS

This hospital-based study was carried out to analyse various biological & socio cultural factors related to teenage pregnancy. Five hundred adolescent mothers below 20 years of age (cases) were compared with equal number of matched controls i.e. mothers aged 20 years or more who delivered in Sassoon General Hospitals, Pune during the study period.

3.1 : RESEARCH DESIGN
This was a retrospective observational analytical study with case control study design. Selected cases & controls were interviewed using a structured pretested questionnaire.

3.2 : SELECTION OF RESEARCH SETTING
The study was carried out in the Obstetrics & Gynecology department of Sassoon General Hospitals, Pune during October 95 to May 99. This medical college hospital provides medical services to lower & lower middle class people from urban & rural areas of Pune district. This is also a referral center for corporation hospitals, private hospitals, primary health centers, community health centers from Pune district & the adjoining districts.

3.2.1 : Cases
For the purpose of this study adolescence or teenage was defined as per World Health Organisation criteria i.e. those in the age group of 10 to 19 years.15

Criteria for inclusion
a. Five hundred consecutive adolescent mothers who delivered in the OBGY department of B.J.Medical College, SGH, Pune from Oct. 95 onwards.
b. Mothers irrespective of their gestational period i.e. preterm, fullterm & also postdated deliveries were included.
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c. Outcome of delivery was not the criteria for exclusion, all the adolescent mothers irrespective of their outcome were included in the study.
d. Adolescent mothers either at risk or with no risk were the cases for this study.
e. Marital status was not the criteria therefore married, unmarried & separated were included in the study.
f. Adolescents coming for MTP as outpatient or indoor patient were also included.

Identification of the cases

a. Admission register in the obstetric ward - Cases were identified from the register of all newly delivered mothers which was maintained in the obstetric ward of Sassoon General Hospitals, Pune.
b. Personal visits & interview of the delivered mothers – All the delivered mothers were visited daily & were interviewed to confirm the age so that not a single case was missed.
c. For the MTP cases out patient case papers & registers were the main sources.
d. Cases undergoing MTP were interviewed & were included in the study after confirming their age.

3.2.2 : Controls

There was one control for each case. Control was the mother 20-years or more of age. For selection of controls all consecutive deliveries that took place in the same hospital on the same date as the 'case' were scrutinised. They were matched for the parity. The first delivery matching in parity & date of delivery with the case was selected as a control for each case.

3.3 : SAMPLING

Since LBW was an important parameter to be studied as an outcome in adolescent mothers, calculation of sample size was based on prevalence of LBW babies in Maharashtra State.
According to recent statistics prevalence of LBW babies in general population is 30%. This proportion is more in adolescent mothers as compared to non-adolescent mothers. Considering an increase of 5% to be a significant observation, minimum sample size was calculated as follows -

\[
P_1 = 30\%. \ P_2 = 35\%.
\]

\[
SE = \sqrt{\frac{30 \times 70}{n} + \frac{35 \times 65}{n}}
\]

An increase of 5% to be statistically significant by application of one tailed test,

\[
Z = 1.64
\]

\[
\frac{5}{SE} = 1.64
\]

\[
SE = 3.04
\]

\[
3.04 = \sqrt{\frac{30 \times 70}{n} + \frac{35 \times 65}{n}}
\]

Solving the equation,

\[
n = 475.5
\]

475.5 was minimum sample size. It was rounded off to 500 & the sample size was set at 500 cases & 500 controls.
RECORDING OF WEIGHT

MEASUREMENT OF HEIGHT
3.4 : STUDY INSTRUMENTS

3.4.1 : Questionnaire

Structured questionnaire was prepared to minimise interviewer & respondent bias. The questionnaire was finalised after pretesting. It included information on the following aspects -

a. General information.
b. Family information.
c. Information about marital status.
d. Reproductive history.
e. Nutritional intake.
f. Social problems.
g. Knowledge of study population regarding various health aspects.
h. Sexual relationship (For unmarried adolescents).

3.4.2 : Other methods

Laboratory tests & examinations - Information about some important parameters like weight, height, hemoglobin was recorded from the case paper.

3.5 : SHORT DESCRIPTION ABOUT DATA COLLECTION

3.5.1 : Cases

a. Structured questionnaire was pretested in the same hospital during initial phase of the study & finalised after modifications (Annexure 1).
b. Interviewer (myself) visited & reviewed the admission register of obstetric ward & MTP OPD daily. If the delivered or the patient undergoing MTP fulfilled the criteria of a 'case' then detailed interview was taken & questionnaire was filled.
c. In order to avoid missing of cases all newly admitted women in the obstetric ward for delivery & new cases from MTP OPD were personally asked about age & age was confirmed.
d. In addition to interview, obstetric & neonatal record was also studied & information was collected from the case record.
3.5.2 : Controls
a. The study instruments & methodology used in the cases for data
collection was also applied for the controls.

3.6 : ANALYSIS OF THE DATA
The data was analysed with the help of a computer at the end of the study by
using various statistical packages. The effect of the independent variable i.e. age
on various factors was studied. The relationship between age of the mother &
various factors like marital status, consanguinity, anemia, use of contraceptives,
adequacy of antenatal care, nutritional intake, risk factors, outcome of delivery,
MBW of the newborn, mortality in the newborns, knowledge of the study
population about various health aspects etc. was studied. Different statistical
tests used were -

a. $\chi^2$ test / Fisher’s test for qualitative data.
b. ANOVA test for quantitative data.
c. Trend analysis for both qualitative & quantitative data.

3.7 : DEVELOPMENT OF A SCORING SYSTEM
After analysis of the data variables significantly associated with adverse outcome
were used for the development of a scoring system to identify high-risk mothers.
The variables were age of the mother, height, hemoglobin, per capita income,
caloric intake, antenatal care & presence of risk factor.
For per capita income arbitrary three-point scale of 0,1,2,3 & for remaining
variables arbitrary two-point scale i.e. 0,1 & 2 was used. The total score was of
15 points. '0' score indicated minimum risk & '15' score indicated maximum risk.
Ability of this score to predict adverse outcome of pregnancy was assessed.
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Adverse outcome considered was birth of LBW or VLBW baby. Prediction of LBW & VLBW babies was studied by applying this score to 100 mothers from this hospital. Sensitivity & specificity of the score was calculated.

Actual score system was as follows –

<table>
<thead>
<tr>
<th>No.</th>
<th>Factor</th>
<th>Details about score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age in years</td>
<td>( \geq 20 )</td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 - 19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \leq 15 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>Height in cm.</td>
<td>( \geq 145 )</td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>141 - 144</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \leq 140 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Hemoglobin in gm.</td>
<td>( \geq 11 )</td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7-10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(&lt; 7 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>Caloric intake - cases</td>
<td>( \geq 2065 )</td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1201-2064</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \leq 1200 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Caloric intake - controls</td>
<td>( \geq 1875 )</td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1001-1874</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \leq 1000 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>Antenatal care</td>
<td>Adequate</td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inadequate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>High risk factor</td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Single</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multiple</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>Income Rs.</td>
<td>( &gt;2000 )</td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1251-2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>501-1250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( \leq 500 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Maximum score - 15 points.
Minimum score - 0 point.
3.8 : VARIABLES

Following variables related to the study population were analysed -

a. General information - Name, age, religion, residence, education, occupation, income, school dropout, socio-economic status, nutritional intake.

b. Family information - Age of the husband, education & occupation of the husband & parents, type of family, number of siblings etc.

c. Marriage - Marital status, age at marriage, type of marriage, causes of early marriage, family H/O early marriage & early pregnancy.

d. Obstetric information - Age at menarche, parity, interpregnancy interval, use of contraceptives, unplanned/unwanted pregnancy, prenatal care, risk factor.

e. Outcome of delivery - Type of delivery, gestational period, sex of the baby, weight, Apgar score, congenital anomalies, mortality in child, postpartum maternal fetal complications.

f. Awareness about various health aspects - Age at marriage, immunisation, feeding of the child, FP methods, AIDS etc.

Following definitions were used -

3.8.1 : Adolescence

Adolescence was defined as the period of life spanning the ages between 10 to 19 years \(^{15}\).

3.8.2 : Rural / Urban areas

An urban area -

All places with a municipality, corporation, cantonment board or notified town area committee. All other places that satisfy following criteria -

a. Minimum population of 5000.

b. Density of at least 400 persons per square kilometer.

c. At least 75% of male working population engaged in non-agriculture activities.

All other areas were categorised as rural \(^{16}\).
3.8.3 : Socio-economic status
Kuppuswamy's (urban) socio-economic scale - Education, occupation & monthly income of husband were weighed by giving score. Maximum score for education was 7, for occupation was 10 & for income was 12. Highest score was 29 & on the basis of this scale families were grouped into 5 classes.\(^\text{17}\)

3.8.4 : School dropout
Children were designated as dropouts, if the child was leaving the school before passing 4th standard from primary school or 10th standard from secondary school or not attending for 3 months or more in succession.\(^\text{18}\)

3.8.5 : Type of family
a. Nuclear family - It consisted of the married couple & their dependent children.

b. Joint family - It consisted of number of married couples & their children who live together in the same household.\(^\text{19}\)

3.8.6 : Consanguineous marriage
These were the marriages where blood relatives married each other.\(^\text{20}\)

3.8.7 : Anemia
Hemoglobin level less than 11 grams/dl.\(^\text{21}\)

3.8.8 : Antenatal care
For the purpose of this study following working definition was used-

   - Complete tetanus toxoid immunisation.
   - Consumption of IFA tablets or iron supplementation in any other form for minimum 100 days.

b. No care - Not a single antenatal check up.
   - No T.T. immunisation.
   - No IFA supplementation.

c. Inadequate care - Any other combination which did not cover adequate care or no care.
3.8.9: Sedentary, moderate & very active (heavy) occupation

a. Sedentary occupation - Office workers, drivers, pilots, teachers, journalists, clergies, doctors, lawyers, architects, shop workers, students.

b. Moderate active occupation - Light industry & assembly plants, railway workers, postmen, joiners, slaters, bus conductors, most farm workers.

c. Very active occupation - Coal miners, steel workers, dockers, foresters, army recruit, some farm workers, builders' laborers & unskilled laborers.

3.8.10: Caloric requirement during pregnancy

Mothers were classified according to their activity as those engaged in sedentary, moderate & heavy work for calculating caloric requirement according to their working pattern as per ICMR recommendations for daily allowance.

<table>
<thead>
<tr>
<th>Activity category</th>
<th>Caloric requirement as per age (Cases)</th>
<th>Extra as per activity (Cases)</th>
<th>Extra for pregnancy (Cases)</th>
<th>Total caloric requirement (Cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary</td>
<td>2065</td>
<td>1875</td>
<td>300</td>
<td>2365</td>
</tr>
<tr>
<td>Moderate</td>
<td>2065</td>
<td>1875</td>
<td>350</td>
<td>2715</td>
</tr>
<tr>
<td>Heavy</td>
<td>2065</td>
<td>1875</td>
<td>700</td>
<td>3065</td>
</tr>
</tbody>
</table>

3.8.11: Protein requirement during pregnancy

Adolescent mothers - 60 + 15 (Additional for pregnancy) = 75 grams/day.
Non adolescent mothers - 50 + 15 (Additional for pregnancy) = 65 grams/day.

3.8.11: Birth weight: The weight of the fetus or newborn recorded within 24 hours of birth.

3.8.12: Gestational age: Duration of gestation from first day of the last normal menstrual period in completed weeks.

3.8.13: Term baby: Baby born from 37 completed weeks to less than 42 completed weeks of gestation (259 to 293 days).
3.8.14: Preterm baby: A baby born before 37 completed weeks of gestation calculated from first day of last menstrual period\textsuperscript{25}.

3.8.15: Low birth weight baby: Birth weight less than 2500 grams (upto & including 2499 grams)\textsuperscript{24}.

3.8.16: Very low birth weight baby: Birth weight of the baby less than 1500 grams\textsuperscript{26}.

3.8.17: Small for gestational age (SGFA) or intra uterine growth retardation (IUGR): Babies with birth weight below the 10th percentile of the average for gestational age\textsuperscript{25}.

3.8.18: Stillbirth (late fetal death): Death of a fetus weighing 1000 grams (equivalent to 28 weeks of gestation) or more\textsuperscript{20}.

3.8.19: Stillbirth rate:

\[
\text{Fetal death weighing over 1000 grams at birth} \times 1000 \\
\text{Total live + stillbirths weighing over 1000 grams at birth}
\]

3.8.20: Perinatal death: Perinatal mortality includes both late fetal deaths (stillbirths) & early neonatal deaths. Perinatal period is from 28th weeks of gestation to 7th day after birth.

Or - Birth weight of the newborn above 1000 grams.

Or - If birth weight is not available, a gestation period of at least 28 weeks.

Or - If above is not available then body length of at least 35 cms.\textsuperscript{20}

3.8.21: Perinatal mortality rate:

\[
\text{Late fetal deaths + early neonatal deaths in one year} \times 1000 \\
\text{Live births during the same year}
\]

3.8.22: Gynecologic age: It is defined as chronological age at delivery minus age at menarche\textsuperscript{10}. 