3 Research design, data and methods
3.1 Introduction

As set out in Chapters 1 and 2, indicators of adolescents’ reproductive health status that we consider are respectively the timing of reproductive transitions (menarche and spermarche), and reproductive knowledge and perceptions. We view adolescents’ reproductive health status from a lifecourse perspective, which entails a focus on both contemporary as well as early life conditions and contextual circumstances. The underlying mechanisms determining adolescents’ reproductive health status refer to processes or changes over time (nutritional status development, socialisation) whereby determinants are embedded within nested multi-level (micro, meso and macro) contexts. The overarching research question, formulated in section 1.3, reads as follows:

*What is the reproductive health status of adolescent girls and boys in Matlab, Bangladesh, and to what extent is this status associated with contemporary and early childhood nutritional anthropometry?*

The research set out to answer this question is guided by five research sub-questions broken down in two components that represent respectively the physical and mental well-being of adolescents’ reproductive health (see section 1.3).

This chapter describes the research design, data and methods and is organised as follows. We first formulate the respective hypotheses that guide us through the subsequent analyses (section 3.2), after which we present the operationalisation of the main variables (section 3.3). Studying adolescents’ reproductive health by taking a lifecourse approach requires a longitudinal design. Data collection took place in three villages belonging to the Matlab thana, in collaboration with ICDDR,B. We describe some of the features of this unique study site and the system of data collection by ICDDR,B (sections 3.4 and 3.5).

In order to gain insight into the two most important age-graded influences on adolescents’ reproductive health status - physical maturation and socialisation (see subsection 2.2.2) - we set up a database containing longitudinal data collected in two surveys conducted within a 13-year interval. Our study thus entails a so-called *fixed cohort design*, meaning that “no entries in the cohort are allowed during the follow-up period” (Kleinbaum et al. 1982, p. 3). The first survey, that serves as a baseline, was conducted in 1988-1989 among under-five children (n=707) by Baqui, a paediatrician affiliated with ICDDR,B at that time. We review some of the main characteristics of this survey (section 3.6). We undertook a second, follow-up, survey in 2001 among the same individuals in their adolescence (n=569), i.e. those still alive and living in Matlab according to the latest information routinely collected in the Health and Demographic Surveillance System (HDSS) of ICDDR,B. In order to learn more about prevalent perceptions about reproductive health, additional information was collected among a selection of the adolescents under survey, their parents and key persons through in-depth interviews. The follow-up survey and the in-depth interviews are described extensively (section 3.7). This chapter closes with a discussion of the conclusions (section 3.8).
3.2 Hypotheses

This section introduces the hypotheses that are derived from the literature review as presented in Chapter 2. Basically, the hypotheses referring to the physical well-being of adolescents’ reproductive health stem from the assumption that the timing of menarche is determined by contemporary as well as early childhood conditions, notably nutritional anthropometry (see subsections 2.3.1, 2.4.1 and 2.5.2). The mental well-being of adolescents’ reproductive health, indexed by reproductive knowledge and perceptions, is mainly analysed in the context of socialisation in rural Bangladesh (see subsections 2.3.2 and 2.4.3). Next, following the order of the main research questions (as laid out in section 1.3), some main findings from the literature review are evaluated (what is currently known, what is not equivocal and the gaps in knowledge), followed by the formulation of the respective hypotheses.

Principal research questions (menarche-related):

- **Question 1**: What is the reproductive health status of adolescent girls and boys as indicated by timing of menarche and spermarche respectively?

- **Question 4**: Is timing of menarche predisposed by contemporary and early childhood nutritional anthropometry, birth weight, as well as height and age at menarche of the adolescent girl’s mother?

Focus in literature review:

*Subsection 2.4.2 on timing of menarche and its contemporary and early childhood nutritional determinants.*

- Age at menarche of mothers and their daughters is positively correlated (Gray 1993, p. 220). However, the predictive power of age at menarche of a girl’s mother is small (Graber et al. 1995).
- Nutritional status is one of the most important non-genetic determinants of menarche (Riley et al. 1993, p. 50). In the early 1970s, timing of menarche was believed to be ‘triggered’ by a certain critical weight (Frisch and Revelle 1969; 1971) but the evidence for this relationship was weak (Trussell 1980). In later studies, other anthropometric indices such as adolescent height, MUAC and BMI were (also) positively associated with menarche (for instance, Delgado et al. 1985; Linhares et al. 1986; Maclure et al. 1991; Koprowski et al. 1999). More recently, there is growing support for the possibility that timing of menarche may be set in utero or early in life but may be modified by changes in body size and composition in childhood (Silva et al. 2003, pp. 405-412).
- However, one should exercise caution as only a handful of reports hint at fetal determinants of age at menarche (Rich-Edwards 2002, p. 27) and some studies did not find a detectable effect of in utero famine exposure on age at menarche (see, for instance, Lumey and Stein 1997, p. 1964; Khan et al. 1995, p. 1092).
- To date, there is no agreement regarding the relevant ‘critical period’ for determining menarche (Rich-Edwards 2002, p. 28).
- Girls born with a low birth weight for gestational age are more likely to have experienced menarche by the age of 14 years as compared to their peers with a birth weight appropriate to gestational age (Koziel and Jankowska 2002, pp. 268-
269). The impact of a smaller size at birth may be compensated by a higher postnatal weight gain (Cheung et al. 2002, p. 335; Silva et al. 2003, pp. 405-412).

Hypothesis 1: Timing of menarche of mothers and daughters is positively, though weakly, correlated.

Hypothesis 2: Adolescent girls who were malnourished according to anthropometry as an under-five child are more likely to reach menarche ‘late’ as compared to their well-nourished counterparts.

Hypothesis 3: Adolescent girls who were born with a low birth weight reach menarche earlier than girls with a higher weight at birth.

Principal research questions (related to nutritional status):

- **Question 2**: What is the contemporary nutritional status, as indicated by anthropometry, of adolescent girls and boys, and does this differ by sex?

- **Question 3**: Is nutritional anthropometry in adolescence predisposed by nutritional anthropometry in early childhood, birth weight, and height of the adolescent’s mother? And, related to this, is there any potential to catch up early childhood growth faltering in adolescence?

Focus in literature review:

*Subsections 2.3.1 and 2.5.2 on adolescent nutritional anthropometry and the predisposition by nutritional anthropometry in early life.*

Information on adolescent nutritional anthropometry is scarce (United Nations 2000, p. 2), particularly within the South Asian region including Bangladesh (WHO 2003, p. 6; p. 14). Adolescents in Bangladesh generally do not meet the necessary nutritional requirements and are chronically malnourished (Shahabuddin et al. 2000, pp. 93-98).

In Bangladesh, 50 per cent of children are born with a low birth weight (LBW, i.e. below 2500 grams) (WHO 2003, p. 8) and almost 60 per cent of the under-fives suffer from malnutrition (ICDDR,B 2002b, p. 36).

In the three villages that constitute our study area, in 1988-1989, 73 to 78 per cent of under-five children were underweight (<-2 SD) (depending on the three-month period considered during these two years), whereas the corresponding data for childhood stunting (<-2 SD) ranged from 68 to 76 per cent, respectively (Baqui 1990).

Apart from the period of gestation, growth velocity never becomes higher than in infancy. Consequently, growth faltering in infancy is most detrimental, in the sense that “stunting at this phase is more difficult to recover in the future than a delay during a later age” (Silventoinen 2000, p. 23). The potential for catch up faltering growth (stunting) in childhood is believed to be limited after the age of two years, particularly when such children remain in poor environments (Gillespie and Flores 2000, p. 2).

The potential for significant catch-up in adolescence is small and may be limited to the brief period of pre-pubertal growth spurt, some 18-24 months immediately preceding menarche (WHO 2003, p. 22).
Hypothesis 4: Nutritional status of adolescents as indicated by anthropometry is poor.

Hypothesis 5: Malnutrition, as indicated by the level of stunting, is more prevalent among adolescents who were stunted in early childhood as compared to adolescents who were not stunted as an under-five.

Hypothesis 6: Adolescents who were already stunted at the age of two years are more likely to be stunted as compared to their not stunted same-aged counterparts in early childhood.

Focus in literature review:

Subsection 2.3.1 on the intergenerational cycle of growth failure: adolescent nutritional anthropometry is in part predisposed by maternal nutritional status.

- An impaired nutritional status may be passed on from mother to child: birth weight of children and that of their mothers is associated (van der Veen 2001, pp. 53-58); mother’s stature is a predictor of a child’s height (Silventoinen 2000, p. 16); and mothers’ BMI is strongly positively related to height and BMI of her sons at ages between 7 and 15 years (Eriksson et al. 1999, pp. 427-431).

- Rural Bangladeshi women are considered to be chronically malnourished (Fauveau 1994, p. 111; Ross et al. 1996, p. 10; WHO 2003, p. 8).

Hypothesis 7: The likelihood of being stunted in adolescence is greater for adolescents whose mothers are stunted than for adolescents whose mothers are not stunted.

Focus in literature review:

Subsections 2.2.3, 2.3.1 and 2.3.2 on the differences between girls and boys in terms of nutritional anthropometry and potential to catch up early childhood growth faltering.

- Within the context of fetal programming boys are in general more sensitive to nutritional deprivation than girls (Barker 1998).

- However, during infancy and childhood the opposite - girls being more vulnerable than boys - may be true with regard to intra-household distribution of food and care within Bangladeshi society: by the time she reaches puberty a Bangladeshi woman has already experienced a lifetime of discrimination compared to males (Ross 1996, p. 5), including the nutritional and health domain (D’Souza and Chen 1980; Chen et al. 1981; Bhuiya et al. 1988; Razzaque 1989; Bairagi and Chowdhury 1994; WHO 2003, p. 15).

- Discrimination of girls is negligible in small families but much higher in families with more than two girls (Ross 1996, p. 5).

- Boys and girls have different rates of growth during adolescence (Bianculli 1985, pp. 49-53) and the spurt occurs two years later in boys than in girls, but is greater and lasts longer in boys (Lachance 1995, p. 7; WHO 2003, p. 10).

On the basis of the literature, different - even opposite - hypotheses could be formulated, whereby the focus could either be on the difference in growth spurt (which may result in girls seemingly having a greater catch-up potential than boys), or
differences in feeding patterns and care-giving behaviour of parents towards sons and daughters, causing the intergenerational cycle of growth failure to be gender-specific, affecting girls in particular, and possibly counterbalancing girls’ catch-up potential.

Hypothesis 8: Both in early childhood and adolescence, girls are more likely to be malnourished as compared to their male counterparts.

Hypothesis 9: Girls are more likely to catch up early childhood growth faltering in adolescence than boys.

Principal research question (related to mental aspects of reproductive health status):

- **Question 5**: Are adolescent girls and boys informed about and prepared for menarche and spermarche respectively, and reproductive development in general?

  Focus in literature review:

  *Subsection 2.4.3 about the way adolescent girls and boys in Matlab, Bangladesh, are socialised and the socio-cultural connotations attached to reproductive transitions in adolescence, notably menarche and spermarche.*

- For Bangladeshi girls, menarche is both an important event in their lives as well as a very private matter, generally looked upon negatively: menstruation in general is considered shameful (Begum 2000) as the blood is regarded as the greatest of all pollutions (Blanchet 1984, p. 33).

- In Bangladesh, adolescent boys do not have much knowledge about spermarche (Khan et al. 2003, p. 18) and they link masturbation to harmful ‘impairments’ such as gonorrhoea, impotency, early ejaculation, infertility or deformed children later in life, or to a general loss of health, charm and happiness (Aziz and Maloney 1985; Khan et al. 2003, p. 15).

- Mothers seldom talk to their daughters about menstruation (Blanchet 1984, pp. 38-39; Ross et al. 1996, p. 32; Akther et al. 1999, p. 5).

- Regarding sexuality, ‘innocence’ is expected from adolescent girls and guilt and punishment are consequences for not observing the role that is in accordance with the expected state of ‘understanding’, i.e. what it is they are expected to know as morally good and to practise it according to their life’s path and dhormo in life (Blanchet 1996, pp. 47-48).

- Particularly in late childhood and adolescence the worlds of boys and girls in Bangladesh become increasingly segregated. Girls contribute to child care, food preparation and other household tasks, and sons work for wages from a young age (Mukhopadhyay and Savithri 1998, p. 26). Being responsible for their family’s contact with the larger community, the focus or ‘world’ of boys becomes larger. When girls grow up, their lives are increasingly confined to the home yard of their family (and later family-in-law).

Hypothesis 10: Adolescent girls and boys are not or insufficiently informed or prepared for menarche and spermarche respectively, and reproductive development in general, and girls are less informed than boys.
3.3 Operationalisation of main variables

We consider adolescents’ reproductive health status to consist of a physical and mental component, whereby the outcome indicators are timing of menarche and spermarche on the one hand and reproductive knowledge and perceptions on the other (section 1.1). Timing of menarche is in part determined by genetic reproductive endowment but is moreover influenced by contemporary and early childhood nutritional status, and is possibly even set in utero (see subsection 2.4.2 and the conceptual model as presented in section 2.6).

In this subsection, operational definitions of the main variables included in the analyses are presented (Figure 3.1). Some of the variables pertain to the period of adolescence, for which data were collected in the follow-up survey in 2001 (primary data); some of the variables pertain to information about the childhood of the study population, for which data were collected in the baseline survey in 1988-1989 (to us, secondary data); and some variables pertain to the period of birth of the study population, for which data were collected retrospectively in the follow-up survey in 2001 (primary data). The methods of secondary and primary data collection are described in sections 3.6 and 3.7 respectively. This section is organised as follows. First the operationalisation of ‘timing of menarche and spermarche’ (physical component of adolescents’ reproductive health) is discussed (subsection 3.3.1), followed by the operationalisation of ‘nutritional status’ (subsection 3.3.2). After that, the topics selected to study adolescents’ reproductive knowledge and perceptions (mental component of adolescents’ reproductive health) are operationalised (subsection 3.3.3).

It should be noted that contextual variables (for instance those pertaining to the household in which the child or adolescent is growing up) as well as variables reflecting general demographic and socio-economic characteristics of the study population will be discussed and operationalised in Chapter 4.
Figure 3.1: Operationalisation of main variables

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Collected retrospectively in 2001</td>
<td>Baseline survey</td>
<td>Follow-up survey</td>
</tr>
</tbody>
</table>

**Constitution**
- Sex
- Recalled birth weight
- Recalled size at birth
- Recalled timing of birth

**Nutritional status**
- Weight, weight-for-age (*underweight*)
- Height, height-for-age (*stunting*)
- Mid-Upper Arm Circumference (*MUAC*)

**Nutritional status**
- Weight, weight-for-age (*underweight*)
- Height, height-for-age (*stunting*)
- Body Mass Index (*BMI*)

**Anthropometric and reproductive endowment**
- Height of mother
- BMI of mother
- (Recalled) age at menarche of mother

**Timing of reproductive transitions**
- (Recalled) age at menarche (girls)
- (Recalled) age at spermarche (boys)

**Knowledge and/or perceptions of:**
- Menarche (girls), spermarche (boys)
- Menstruation (girls)
- Other indicators of development
- Human procreation
- Future marriage and childbearing
- Contraceptives
- HIV/AIDS
3.3.1 Physical reproductive health status in adolescence

In this study physical reproductive health status is indicated by timing of menarche and spermarche. Data on menarche and spermarche were collected by retrospective recall among the adolescent respondents (see also section 3.7). The recall method of reporting age at menarche may not be optimal, but is usually the only source of available information (Graham et al. 1999, p. 259). Accuracy of short-term recall among adolescent girls was relatively high in a study of Koo and Rohan (1997, pp. 61-64), where 66 per cent was able to recall the age at menarche correctly. In addition, we asked every adolescent girl’s mother in retrospect to recall her age when she menstruated for the first time. An event such as the first menstruation is usually not easily forgotten, but having to recall an event over a long time is far from easy, although some - relatively old - studies of Damon et al. (1969) and Livson and McNeill (1962), referred to by Becker (1993, p. 23), point out that recall errors are fairly random, i.e. show “no systematic bias in retrospective reports”. Nevertheless, extra caution while analysing these data is needed.

We consider timing of menarche to be:
- Early, if reached at an age equal or younger than 11 years;
- On time, if reached at an age between 12 and 13 years; or
- Late, if reached at an age of 14 years or older.

We accommodated our data on menarche, which are recorded in full years\(^27\), to the cut-off points as fixed in a study of Ge et al. (1996) on psychological distress as a potential consequence of early physical maturity. In their study, the age boundaries for ‘on time’ and ‘late’ physical maturity are respectively between 12.5 to 13.5 years and older than 13.5 years. In our analyses, we also compared a girl’s age at menarche with the age at menarche of her mother. We accounted for censored cases, i.e. girls who were still premenarcheal at the moment of interview.

3.3.2 Nutritional status by anthropometry

*Basic anthropometric measurements*

Nutritional status can be measured in many ways, but in our study it is confined to anthropometry. Next, we devote a few words on the measurement of anthropometry in general, after which we describe which nutritional indicators have been generated for the study population in adolescence and in early life, and which nutritional indicators we applied to describe maternal nutritional status. Finally, we elaborate upon the choice of reference populations used.

- **Weight:**

  In the follow-up survey, weight of the adolescent respondents and their parents was measured on digital weighing scales that were accurate to the nearest 0.1 kg (following WHO guidelines), and which we borrowed from UNICEF. The scales were calibrated in the field against known weights (of 1, 2, 3 or 5 kg

\(^{27}\) Given that studies on spermarche are scarce (subsection 2.4.2), timing of spermarche is also operationalised by age (in years).
stones). The respondent was asked to stand on the scale without wearing shoes or jewellery (except for small items such as a nosering or earring) and to stand still for at least five seconds. Weight was measured twice, the second time with the scale placed on a different spot. Later a mean was calculated on the basis of the two measurements.

In Baqui’s survey (our baseline), under-five children were weighed without their clothes or with light clothes using a calibrated Salter-type spring scale to the nearest 0.1 kg following WHO guidelines (Jelliffe 1966). Their scales were standardised frequently against known weights (Zaman et al. 1996, p. 310).

- **Height:**

  In the follow-up survey, adolescent and parental height was measured by means of a wooden height-meter. One height-meter was available at the Matlab Field Research Station (see also section 3.5). For this study we had nine such meters made by a local carpenter. The respondent was asked to step on to the wooden platform of the meter, to stand up straight, with his or her heels together and touching the wooden stick, with bare feet, and looking at the horizon. The height-meter was accurate to the nearest millimeter. As a height-meter is not subject to ‘mechanical-errors’ and as height was usually read off from the stick by more people than the interviewer only (the porter, bystanders), the risk of errors was considered nil. For the sake of convenience height was therefore measured only once.

  In the baseline study, recumbent length of all children younger than 36 months was measured by using a locally constructed length board, whereas standing height of children aged 36 months or older was measured to within 0.1 cm with a height stick. In order to reduce observation errors, the under-fives’ anthropometric measurements were read by two observers independently, and the mean of the two measurements was recorded (Zaman et al. 1996, p. 310).

- **MUAC (mid-upper arm circumference):**

  In the follow-up survey, MUAC was taken for all respondents by means of the tape, which we borrowed from the Matlab Cholera Hospital. The tapes were accurate to the nearest millimeter. First, if necessary, the respondent was asked to raise his or her sleeve of the right arm. Then the interviewer put the tape on the bare upper arm, in linear direction, starting on the bulge (bone) of the shoulder up to the hinge joint on the outside of the elbow (the elbow was bent in the direction of the respondent’s abdomen). The part of the tape indicating the length between shoulder and elbow was folded equally into two. By halving the distance between the shoulder and tip of the elbow the mid-point of the left upper arm was found and marked with a red pencil. The actual measurement could be taken by wrapping the tape around the upper arm, while making sure that the small pencil-mark came into view in the window of the tape. After the tape was pulled tightly (but not too tight) around the upper arm, its circumference could be read off. Taking this measurement is a precise task and requires, apart from experience, a lot of patience from both the respondent and the interviewer. We considered the risk of reading off
the circumference wrongly, after being so precise with taking the measurement and in the presence of others (the porter, bystanders), to be small. Taking this measurement also demands a lot of co-operation from the respondent. We therefore measured the mid-upper arm circumference only once.

In the baseline survey, MUAC of the under-five children was also assessed, using a TALC tape, with measurements to the nearest two millimeter (Baqui 1990, p. 77).

Generating indicators of nutritional status for adolescents

Anthropometric assessment is more complex in adolescence than in childhood because of changes in body composition and the variable timing of the growth spurt (WHO 2003, p. 29). Adolescent growth is usually monitored by using the following anthropometric indices or combinations of measurements (WHO 2003, pp. 10-12):

- Underweight or low weight-for-age. A low weight-for-age may be difficult to interpret because it may be due to either acute or chronic undernutrition (FAO and WHO 1992, p. 11).

- Stunting or low height-for-age. A low height-for-age reflects chronic malnutrition or long-term nutritional deprivation (FAO and WHO 1992, p. 11). Stunting is also referred to as ‘shortness’ (CDC 2000, p. 85). Stunting is influenced by malnutrition over generations (Leemhuis-de Regt 1998, p. 111).

- Thinness or low BMI-for-age. Body Mass Index (BMI) indicates weight relative to height and is calculated by weight in kg divided by height$^2$ in metres (FAO and WHO 1992, p. 11). BMI ranges from underweight or thin to overweight or obese, where increased mortality rates are found in both underweight and overweight subjects (FAO and WHO 1992, p. 11). BMI is the same as the Quetelet Index and indicates CED or Chronic Energy Deficiency.

Generating nutritional indicators for under-five children

The growth of under-five children is usually also monitored by the indicators ‘underweight’ and ‘stunting’. However, research conducted in Matlab has led to the recommendation to use MUAC as a predictor for the risk of dying from malnutrition rather than weight-for-age (underweight) (Fauveau 1994, p. 444). We used underweight, stunting (see above) and MUAC to describe nutritional status in early childhood. Weight-for-age and height-for-age can be calculated for individuals up to 18 years of age (CDC 1999, p. 6).

---

28 The nutritional indicator ‘wasting’ or low weight-for-height (‘thinness’; CDC 2000) is not used in this study. Wasting reflects acute shortage of food and is a sensitive indicator, used for instance in emergency situations and in the event of a famine (Leemhuis-de Regt 1998, p. 111). Weight-for-height is only calculated for male children up to 138 months of age or 11.5 years and less than 145 cm tall, and for female children up to 120 months or 10.0 years of age and less than 137 cm tall (CDC 1999, p. 6). Given that this indicator cannot be applied to adolescents, and given our need to make nutritional comparisons over time and hence maintain consistency of indicators, we did not use this indicator to describe the nutritional status of the study population in childhood.
A low MUAC is an indicator of acute malnutrition or level of wasting. MUAC measures the amount of muscle, fat and bone in the arm. In 1 to 5-year-old children the average normal MUAC hovers around about 16 cm (Cameron and Hofvander 1983, p. 16). A MUAC of less than 12.5 cm shows severe malnutrition in children, a MUAC below 11 cm is very serious (‘emergency cut-off point’), and a MUAC below 22.5 cm indicates severe malnutrition in adults (Leemhuis-de Regt 1998, pp. 111-112).

**Generating nutritional indicators for the adolescents’ mothers**

In this study the nutritional status of the biological mothers of the adolescents is reflected by their weight, height and BMI.

**Generating nutritional indicators reflecting conditions at birth**

We take into account birth weight, size at birth and timing of birth for gestational age, all as perceived by the adolescents’ mothers by recall in the follow-up survey in 2001. Birth weight was measured in grams (as a continuous variable), and size and relative timing were measured on an ordinal scale.

<table>
<thead>
<tr>
<th>Conditions at birth, indicated by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recalled birth weight: normal (&gt;2000 grams) or light (≤2000 grams);</td>
</tr>
<tr>
<td>Recalled relative size at birth (perceived as small, normal or tall); and</td>
</tr>
<tr>
<td>Recalled relative timing of birth (perceived as early, on time or late).</td>
</tr>
</tbody>
</table>

**Reference populations**

The assessment of anthropometric measurements involves a comparison with a reference population (of same sex and age) that is known to be adequately nourished. We analysed nutritional status, as represented by weight-for-age and height-for-age, by using the nutritional anthropometry program ‘NutStat’ of EPI info 2000, version 1.1.2 (CDC 2000). The respective nutritional indices are expressed in Z-scores, also referred to as Standard Deviation (SD) units (CDC 1999, p. 5). The Z-score in the reference population has a normal distribution with a mean of zero and a Standard Deviation of 1 (CDC 2000).

---

29 We cannot guarantee that we measured anthropometry of the ‘genuine biological’ mothers (and fathers), since we relied on reports of the mothers (and fathers) themselves (confirmed by the HDSS household cards, which are discussed in section 3.5). Biological connections were not confirmed by, for instance, blood or DNA tests.

30 Though transmission to the child from the paternal side seems far less influential (Silventoinen 2001, p. 16; van der Veen 2001, pp. 53-58) - see also subsection 2.3.1 - we also attempted to collect anthropometric data of the adolescents’ fathers. However, anthropometry was assessed for only 18 per cent of them (corresponding to 124 fathers). Among the non-responses, 86 per cent of the fathers was absent because of work and 9 per cent of the fathers was no longer living. Absence because of work is related to the fact that within a Bangladeshi setting most men work and most women stay at home, whereas the follow-up survey was conducted during the day. Given that a) we do not know anything about anthropometry of the majority of fathers, and b) the related selection effects (fathers who did stay at home may have done so because of reasons such as nutritional-status-related sickness or handicap, and fathers who passed away may have died because of a cause directly or indirectly related to malnutrition), we decided not to consider paternal anthropometric data in our analyses.
The Z-score is calculated as follows (WHO 1995):

\[
\text{(observed value) - (median reference value)}
\]

\[
\text{(standard deviation of reference population)}
\]

We have purposely chosen to use Z-scores as they are most used worldwide (except for the United States where percentiles are generally used as cut-off points) and are favoured by the WHO (CDC 2000). NutStat allows for calculating Z-scores on the basis of two different reference populations of the United States Centre for Health Statistics (US NCHS): the CDC/WHO reference population of 1978 and the CDC reference population of 2000. We applied the reference population of 1978 to the nutritional analyses of the under-fives in 1988-1989 and the reference population of 2000 to the nutritional analyses of the same population in adolescence in 2001. The rationale for this selection was that these two reference populations are as close as possible in time to the year of measurement of anthropometry of the study population in childhood and adolescence respectively. Cut-off levels for grades of malnutrition are given in Figure 3.2.

In general, a level of minus 2 SD (or <3rd percentile) is taken as the cut-off point or threshold, below which the status is considered unsatisfactory, that is, undernutrition exists (FAO and WHO 1992, p. 11; WHO 1995, p. 271).

Four additional methodological notes should be made. First of all, it is necessary to consider what indicator should be used to assess an association between a given status in adolescence (for instance, menarche status or stunting or height-for-age status) and early life factors that have been operating during an assumed ‘critical’ period. Stunting, for instance, is known to have its origins earlier in life. The critical period for growth faltering in length is between 6 and 18 months (Liu et al. 1998, pp. 247-260). The early life origins may, however, extend back to “malnutrition over generations” (Leemhuis-de Regt 1998, p. 111). Similarly, height is largely determined by leg length, and leg length is in turn “a marker of early growth of the long bones at specific hormonally controlled phases of development” (Langenberg and Marmot 2003, pp. 614-616). Underweight (weight-for-age) may also be due to either acute or chronic malnutrition (Leemhuis-de Regt 1998, p. 111).
The second note pertains to the use of BMI. This indicator is more appropriately used to reflect adult underweight or overweight. BMI is not considered a suitable measurement for adolescents because of the rapid growth spurts typical of this stage in life. Within these growth spurts, increases in weight and height do not necessarily proceed in a balanced way. As a consequence, there are currently no accepted BMI reference curves available for children or adolescents (CDC 1999, p. 30). Scores for adolescent BMI would fall below the scales generally used (see Figure 3.2). Although BMI may not be an appropriate indicator for adolescent nutritional status as such, it is plausible to assume that across adolescent populations worldwide developments in weight and height develop in a comparable manner. We therefore expressed BMI scores of the adolescent boys and girls from Matlab in terms of Z-scores, with the reference population comprising a similar-aged and well-nourished population of the same sex (the CDC 2000 reference population of US NCHS). With this analysis, we aim to contribute to the exploration of appropriate reference curves for adolescents, with special reference to those from Matlab, Bangladesh.

Third, we should mention that in this study menarche and nutritional status (indexed by anthropometry) are conceptualised as lying on a causal pathway, where nutritional status determines timing of menarche. The data on menarche status of the adolescent girls were, however, collected on the same day as the anthropometric measurements. This brings us to the concept of ‘reversed causation’. Given that among postmenarcheal girls, the anthropometric data were collected after menarche took place, the pathway could equally be the other way around: timing of menarche (which we consider the dependent variable) may influence nutritional weight and height (which we consider the independent variables). It is relevant to note in this respect that 31 per cent of the postmenarcheal girls in our sample reached menarche within the preceding 12 months, whereas the other postmenarcheal girls reached menarche on average 2.6 years earlier.

Fourth, it should be noted that in Baqui’s survey (our baseline) anthropometry of the under-five children was assessed a variable number of times, with a maximum of 14, within approximately two years time. We first determined the weight-for-age and height-for-age values (expressed in Z-scores) for each measurement that was available by comparing it to the body measurements of well-fed and healthy persons of the same sex and age (using the CDC/WHO 1978 reference population of US NCHS), where age was expressed in months. Given our main research goal to study the association between nutritional status in childhood and adolescence, we needed to construct a kind of ‘summary’ reflecting the under-five child’s weight-for-age and height-for-age profiles. We constructed this ‘summary profile’ by calculating a mean based on the maximum number of weight-for-age and height-for-age values available for each child.

3.3.3 Mental reproductive health status in adolescence

Apart from the physical component, we also distinguish a mental component of adolescents’ reproductive health status, in which the outcome indicators reflect the adolescents’ reproductive knowledge and perceptions, including emotions (section 1.1). More specifically, based on studies reviewed in particular in section 2.4.2, the following topics were selected for analysis: adolescents’ knowledge and perceptions about reaching menarche and spermarche; postmenarcheal girls’ perceptions about
menstruation in general; perceptions about other indicators of adolescence apart from menarche and spermarche; adolescents’ knowledge of human procreation; adolescents’ knowledge and perceptions about future marriage and the risks associated with early childbearing; adolescents’ knowledge of contraceptives, and finally their knowledge and perceptions about HIV/AIDS. Some of these topics pertain directly to the period of adolescence (for instance, perceptions about reaching menarche), whereas others specifically refer to future reproductive health events for which adolescents need to be prepared. The focus on future reproductive health involves, for instance, taking marriage and childbirth into consideration, but also the maintenance of reproductive and sexual health status by knowing how to protect oneself against HIV/AIDS.

- **Perceptions of menarche and spermarche**, indicated by:
  - the first reaction on reaching menarche and spermarche respectively.

- **Preparedness for the reaching of menarche and spermarche**, indicated by:
  - awareness of menarche and spermarche before its onset; and
  - perceived possibilities to discuss these events with others afterwards.

- **Social significance of menarche and spermarche**, indicated by:
  - changes due to reaching menarche and spermarche.

- **Perceptions of menstruation in general**, indicated by:
  - regularity of menstrual cycle;
  - reports of pain or complaints ascribed to the menstrual cycle; and
  - perceived excessive bleeding.

- **Perceptions and knowledge about (self-reported) indicators of adolescent development other than menarche and spermarche**, indicated by:
  - self-reported indicators of development; and
  - sources of information about development in adolescence.

- **Knowledge about human procreation**, indicated by:
  - the ability of adolescents to explain about becoming a parent; and
  - the ability to estimate at what time of the month conception is most likely.

- **Knowledge and perceptions of future marriage and childbearing**, indicated by:
  - perceived ‘best’ age for marriage and childbirth; and
  - knowledge about problems associated with early (adolescent) childbearing.

- **Knowledge about contraception**, indicated by:
  - awareness of contraception;
  - the ability to explain methods of contraception;
  - knowledge about where to obtain contraceptive methods; and
  - the ability to estimate prices of contraceptive methods.

- **Knowledge and perceptions about HIV/AIDS**, indicated by:
  - awareness of sexually transmitted diseases (STDs) and HIV/AIDS;
  - perceived likelihood of being infected in the absence of physical signs; and
  - perceived modes of transmission of the HIV virus.

---

31 Also tested among men in India: 21 per cent of them knew at what time of the month conception is most likely, i.e. about 2 weeks after menstruation (Bloom et al 2000, p. 244).
3.4 Study site: Matlab
The fieldwork was situated in three villages: Charmasua, Saidkharkandi and Baluchar, all administered by the Farazikandi Union. These villages are all located in the larger Matlab thana, or ‘upazila’, a subdivision of Chandpur District (former Comilla District). The central town of the thana, Matlab, is situated about 50 km southeast of Dhaka, the national capital (see Figure 3.3).

Figure 3.3: Map showing the location of Matlab in Bangladesh

Over 88 per cent of the population in Bangladesh is Muslim; in 1988 Islam was declared the state religion (Amin et al. 1997, pp. 270-271). The population density in Bangladesh was about 755 per km$^2$, and hence the highest in the world (Islam and Mahmud 1995, p. 22). It increased to about 982 per km$^2$ in 1994 (CIA The World Factbook 2004). Population density becomes higher during the monsoon season when water levels may rise up to four metres as compared to the dry winter period, and most of the villages and hamlets become crowded clusters of islands (Fauveau 1994, 33)

---

32 Also tested among men in India: 29 per cent of them believed that asymptomatic STD is possible (Singh et al. 1998, p. 392).

33 A dramatic example of a monsoon flood is the one that occurred in July 2004, one of the worst floods in years, and it made approximately 20 million people in Bangladesh homeless (Moszynski 2004, p. 247).
Chapter 3: Research design, data and methods

It is estimated that no less than 70 per cent of the country’s surface is covered by water. The whole Matlab thana is located in a delta, which is intersected by numerous canals and the tributaries of two major rivers, the Padma (or Ganges/Gumti) and the Meghna, respectively. The population of Matlab numbered just over 218,000 in 2000 (ICDDR,B 2002a, p. 21). Given the climatological characteristics, from a logistical point of view the fieldwork was scheduled during the most favourable seasons: in late winter, spring and early summer, long before the monsoons and accompanying floods begin, so that it was still possible to reach the study villages within a reasonable time.

In the Matlab thana a so-called Treatment area is distinguished from a Comparison area (see also section 3.5). Our three study villages are located in the Comparison area. A year before the baseline study, in 1987, the three study villages were different in size: Baluchar was the smallest with 1453 inhabitants; Charmasua had a total population of 1900 and Saidkharkandi had 3416 inhabitants (Baqui 1990, pp. 54-55). Just before the follow-up survey, in 2000, the population had increased to 2039 in Baluchar, 2119 in Charmasua and decreased to 1417 in Saidkharkandi (ICDDR,B 2002a, pp. 95-97). As the three villages are very near each other, the geographical and environmental conditions of these villages can generally be considered the same. One difference, however, is that Baluchar and Charmasua are located near the river Dhonogoda. Both villages are intersected by the river embankment. Saidkharkandi is located away from the river (Baqui 1990, pp. 54-55).

The main occupations in Matlab are to be found in the agricultural domain, and, not surprisingly in such a water-rich area, many people earn their living from fishing. The methods of both agriculture and fishing are traditional, characterised by techniques that have been in use for centuries. The common crops that are cultivated are rice, millet, jute, pulses, oil seeds, potatoes, wheat, onions, chillies, turmeric and others, with the cultivation of rice occupying most of the arable land. Jute, as a cash crop, is grown only in small quantities by a few well-to-do agriculturists (Fauveau 1994, p. 14). The number of people earning a living by means of traditional occupations is declining, while more and more have occupations in business and services (Razzaque et al. 1998, p. 1). In 1996, about 12 per cent of the household heads in the Comparison area derived their main income from a (small) business. As in most rural areas in Bangladesh, women generally do not have an occupation but stay in the bari34, where they do the housework and look after the children. In the study villages overall socio-economic status is low, although it is somewhat higher in Baluchar and Charmasua compared to Saidkharkandi.

3.5 Data collection by ICDDR,B

In the absence of a national vital registration system, demographic information on the population of Bangladesh has historically come from two primary sources, i.e. surveys and sample vital registration surveillance systems (Ross et al. 1996, p. 9). Health and Demographic Surveillance Systems hardly exist on their own but are always related to (public) health or epidemiological studies (for instance medical

34 (Kin-related) ‘homestead’ organised around a common courtyard (see Appendix A).
trials), for which it is also necessary to collect vital statistics that mainly serve as denominators. For nearly four decades (since 1966), ICDDR,B has collected data in Matlab. The Matlab Field Research Station has done successful research in the field of large-scale trials of the efficacy of population-based health interventions, including several cholera vaccine trials, population-based epidemiological studies on diarrhoea, and behavioural and demographic studies. Each individual living in the Matlab area has a permanent registration number, i.e. the Registration IDentification (RID) number. The RID number enables researchers to link information about a large population over time. This makes the Matlab data unique: the complete demographic life history of every individual born in the research area has been recorded. Although data have been collected for almost four decades, longitudinal data sets have been analysed to a limited extent only.

At present, a population of approximately 210,000 is under observation in 142 villages\textsuperscript{35} in Matlab, Bangladesh. In this Health and Demographic Surveillance System (HDSS), Community Health Workers (CHWs) collect data on all vital events (birth, death, marriage and migration) as well as on the occupations and education of all individuals. CHWs visit each household once a month (formerly fortnightly). The head of the household identifies those he (a female head of the household is rare) considers to be a member of the household. The CHW registers every demographic event concerning the household and reports these once a month to one of the Health Assistants (HA) at the Matlab Field Research Station. The data are entered in Matlab and subsequently transferred to the HDSS-department of ICDDR,B in Dhaka (Ross 1996, p. 22).

In 1977, the Matlab area was divided into two parts: one \textit{Comparison} area and one \textit{Treatment} area. In both areas health services of the government are available but in the \textit{Treatment} area special and extra services for Maternal and Child Health and Family Planning (MCH-FP) are provided by ICDDR,B. In this \textit{MCH-FP} area, a programme was initiated which provides health services to \textit{married} women (14-49 years) and under-five children (Ross 1996, p. 11). Additionally in 70 villages situated in the \textit{Treatment} area, information on reproductive events and status (lactating, menstruating, pregnant), maternal morbidity and under-five morbidity are collected in Record Keeping Systems (RKS). The RKS covers approximately 16,000 women (RKS-M, operative since 1978) and 18,000 under-five children (RKS-C operative since 1986). Malnourished children in the RKS-C can be hospitalised in the nutritional rehabilitation centre of the Matlab hospital (Fauveau 1994, p. 53). RKS data are updated every month by CHWs and the procedures on data processing are similar to that of the HDSS (Ross 1996, p. 23).

\textit{Representativeness of data collected in Matlab}

Data collected in Matlab may suffer from selectivity: the intensive MCH-FP projects mean that inhabitants of Matlab have relatively more access to health care and are more exposed to Western cultures (through researchers), compared to inhabitants of other rural parts of Bangladesh. Accordingly Ross (1996, p. 13) notes that “the number of interventions within the study population has led to a widespread perception that the population is no longer representative of rural Bangladesh, let

\textsuperscript{35} Due to river erosion the number of villages decreased by seven in 1987 (ICDDR,B 2002a, p. 3).
alone rural areas of developing countries as a whole”. Our study was conducted in the Comparison area, in which far fewer studies are being conducted and which is not exposed to services provided by ICDDR,B within the framework of the MHC-FP programme. The birth and death rates in 2000 in the three main study villages were respectively 27.8 and 8.5 (Charmasua), 27.5 and 7.8 (Baluchur) and 26.8 and 5.6 (Saidkharkandi) per 1,000 of population and hence do not differ much from the overall figures for the Comparison area (respectively 27.7 and 7.2), but are slightly higher than those for the MCP-FP area (respectively 24.9 and 6.8) (ICDDR,B 2002a, pp. 95-97). In terms of number of persons enrolled, our sample is relatively small: 707 under-five children were enrolled at baseline in 1988-1989, 569 of them were followed up in 2001 and we subsequently succeeded in interviewing 482 adolescents. Our sample is thus not representative for Matlab, let alone Bangladesh.

3.6 Under-five children: baseline (secondary) survey

Neither HDSS nor RKS contains detailed information on anthropometry. However, data of this kind are occasionally collected in so-called Special Studies, which are studies carried out for specific purposes. In order to obtain information about the nutritional status of adolescents during their childhood, several databases for Special Studies were explored during a feasibility study conducted from March to June 1997 at ICDDR,B in Dhaka and Matlab (Bosch and Hutter 1998).

Given that our research focuses on the early life determinants of adolescents’ reproductive health, we selected a study entitled “Epidemiology of persistent diarrhoea in Bangladeshi children” to act as a baseline. This study was conducted by Baqui, a paediatrician affiliated to ICDDR,B, among under-fives in three villages (Charmasua, Saidkharkandi and Baluchur) located in the Matlab thana in the period January 1988 to December 1989. More specifically, we selected his study because of the following two criteria:

- as the study was conducted in 1988-1989 (all children were born after 1 April 1984; Baqui 1990, p. 56), the subjects would be aged 12 to 16 years in 2001; and
- the information collected provided enough possibilities to assess the nutritional status of children.

The prospective study by Baqui aimed to describe and quantify the problem of persistent diarrhoea in under-five children in rural Bangladesh and to identify some of its most important risk factors. Results have been published in several leading journals (Baqui 1990; Baqui et al. 1992; 1993a; 1993b; Zaman et al. 1996; 1997). The three villages in which Baqui carried out his study “were chosen and no scientific sampling techniques were applied” (Baqui 1990, pp. 53-54). The main criterion for selection was that the villages were believed to be representative of the Matlab Comparison area (Baqui 1990, p. 54). Other criteria were that the villages were located at least five km away from the Matlab hospital and that “the population was reasonably cooperative” (Ibid. 1990, p. 54). Before commencing the survey, consent for the study was obtained from the formal and informal community leaders, whereas during the survey signed consent was obtained from the parents (Baqui 1990, p. 57).

36 Except for the death rate in Saidkharkandi, which is slightly lower when compared to the figure for the MCP-FP area.
Initially 707 children were enrolled (387 boys and 320 girls) in Baqui’s study, between 0 and 59 months old. Of these, 696 children were followed up prospectively from May 1988 to April 1989 (Zaman et al. 1996, p. 310; Zaman et al. 1997, p. 923). At the beginning of the study 575 children were recruited, whereas 121 newborns were added during the survey. A total of 512 children were followed up for the full year. The remainder of the children were not followed up for the full year due to prolonged absence, migration and refusals (Zaman 1996 et al., p. 310). Three children died (Zaman et al. 1997, p. 923). The children who dropped out of the study did not differ from the others in their nutritional status (Zaman et al. 1997, p. 923). The under-five mortality rate in the Comparison area decreased between 1988 and 2000 from approximately 150 to 80 per 1000 live births (ICDDR,B 2002a, p. 13). The same period was characterised by out-migration. Net migration rates in 1988 and 2000 were approximately -17 and -16 per 1000 population for men and -12 and -9 per 1000 population for women (Ibid. 2002a, p. 16). Given these statistics on mortality and migration we had to account for loss of follow-up in 2001.

In Matlab, deaths and causes of death have been registered over a period of almost 40 years. Consequently, children who died before reaching the stage of adolescence can be traced by their RID number. By cross-checking various HDSS data sets of ICDDR,B, we were able to select only those households for interviewing where we knew in advance that the adolescent-respondent had not passed away or migrated since early childhood. Analysis of mortality by cause of death and migration of the individuals who were lost for follow-up is presented in Chapter 4.

### 3.7 Adolescents: follow-up (primary) survey

In this section, we briefly highlight some features directly related to the fieldwork carried out between November 2000 and May 2001.

#### 3.7.1 ICDDR,B’s review boards

In accordance with the research protocols of ICDDR,B the fieldwork could only start after the study and the proposed method of data collection had been approved by ICDDR,B’s Research Review Committee (RRC) and Ethical Review Committee (ERC). Defences before the RRC and ERC took place in November 2000. While during the defence before the RRC the social and scientific relevance and the design of the study were emphasised, the ERC members were mainly concerned about the type of questions, the phrasing of the questions and the rights of the study population. In particular the consent form (prepared according to ICDDR,B standards; Appendix B), along with the procedures for obtaining consent (both in English and Bangla), and the Questionnaire (Appendix C) were thoroughly reviewed by the ERC.

Both for the survey and the in-depth interviews consent was required from the individuals involved. For adults we assumed that they were capable of providing informed consent, unless there was evidence to the contrary. For children and adolescents, however, the issue was not capacity but autonomy. Acquiring parental consent before starting the interview was especially important because confidential information was collected. It should be noted in this respect that reproductive health research, especially among (unmarried) adolescents, is relatively new in Bangladesh.
and therefore followed critically. After having made some minor adjustments to our proposed plan, both the RRC and ERC committee gave approval for the study.

### 3.7.2 Project staff

Knowing the travel time to and from the study villages and assuming that it would also take some time to trace a particular adolescent, we expected that only two interviews could be conducted per interviewer per day. With a six-day working week, this meant that in order to follow up 569 adolescents (see subsection 3.7.7), eight to nine interviewers would have to be hired for three months. Given the sex distribution of the study population (387 boys versus 320 girls, see section 3.6) the aim was to recruit five male and four female interviewers. Considering the Bangladeshi cultural context, adolescent girls can only be interviewed by female interviewers and adolescent boys by male interviewers. The advertisement that was posted on the notice board of the Matlab Field Research Station listed the following requirements (according to what we thought would be most important) for the post of junior interviewer. He or she would have to:

- be a resident of the Matlab ICDDR,B project area\(^{37}\) (the candidates were asked to be stationed in Matlab);
- be aged between 20 and 40 years on 31 January 2001;
- have at least two years of practical experience in a similar job;
- have passed the Secondary School Certificate (SSC) examination; and
- be capable of reading and writing basic English.

During this week a research assistant was also hired in Matlab and she came to work for the study as a Field Research Officer (FRO). As the PI (Principal Investigator, author of the current thesis) lacked sufficient knowledge of Bangla - the national language of Bangladesh - or the dialect of Bengali spoken in Matlab, the FRO also functioned as an intermediary between her and the Bangladeshi staff. During the course of the fieldwork, the FRO proved to be an invaluable source of information about the Bangladeshi way of life in the area of study.

As in the research history of Matlab most of the projects are focused on maternal and child health, there is in general a greater need for female than male interviewers. While reviewing the letters of application we saw that there was a higher number of female applicants. The quality of the letters of women and the relevance of their working experiences reflected their suitability as compared to their male counterparts who were relatively more educated.

The shortlisted candidates were invited for a written test to ascertain their understanding of the English language and to test their comprehension of the subject of research, namely adolescents’ reproductive health, followed by an interview. At the interviews, emphasis was placed on the applicant’s communicational skills, personality (‘open-minded’ with respect to the discussion of reproductive health and related issues) and enthusiasm expressed for the study’s objectives. It became clear that despite the applicants’ relatively high educational levels, their ability to speak and

\(^{37}\) This requirement complied with the outcome of negotiations between ICDDR,B and the local council who were concerned with opportunities for the employment of inhabitants of Matlab.
understand English was minimal. Finally, four male and four female applicants were invited to join the ‘Adolescents’ reproductive health’ (ARH) team. During the course of the survey an additional female interviewer was hired while one of the male interviewers, who did not fulfil his duties adequately, was dismissed. All interviewers ranged in age between 26 and 37 years. Three men and two women had passed the pre-Masters examination (comparable to a Bachelors degree) that follows the Higher Secondary Certificate (HSC) examination. All other interviewers recruited had passed the HSC examination.

Three of the interviewers, two men and one woman, were not married. Of boys or young unmarried men it is accepted that they talk about ‘things’ they are not expected to have experienced, given their marital status. For the female interviewer, on the other hand, the marital status is very important, as only married women or women who have been married are usually considered to be no longer ‘ignorant’ with respect to reproductive health matters. Initially there was therefore some hesitation to hire the unmarried female interviewer. This female candidate was, however, accepted because she declared that her marital status had never been a problem in previous research on contraceptive use. Her experience was that many respondents simply assumed that she was married because she was talking about contraception. To the few who did question her marital status, she tended to reply that she might not have any practical experience since she was unmarried, but that she did have sufficient theoretical knowledge, ‘just like a doctor who studies things from the books’. This was generally accepted. Still, in order to avoid questions about her marital status this female interviewer often wore a sari, the ‘dress’ that is generally worn by married women only, while conducting the interviews. A shalwar kamiz, the ‘dress’ worn by teenage girls and unmarried women, is however also worn by married women more and more for convenience’s sake, so even wearing this outfit did not directly raise questions while she was carrying out her job.

In addition, nine male porters, or logistical assistants who accompanied the interviewers in the field, were recruited. The porters were selected mainly on the basis of their domicile: seven of the eight porters were living in one of the three study villages. Apart from saving costs of transportation, this selection was made in view of the idea that these men would know the study area and its inhabitants best and would therefore most likely be able to help with tracing the adolescents. The tasks of the porters were threefold. Firstly, they helped to trace the adolescents and prevented the interviewer from getting lost in the paddy fields. Secondly, they carried heavy materials such as the height-meter and the weighing scale. And thirdly, they accompanied the interviewer for safety reasons. In particular, for female interviewers it was necessary to be accompanied by a man.

During the course of the survey the porters were given an additional role: that of ‘caller to order’ within a bari while the interview was being conducted. It was very important that the adolescent respondent be interviewed in a private setting, either outside or inside the house. Often, however, curious neighbours and relatives of the adolescent tried to listen in and interfere with the interview. The porters kept these people at a distance from the interview and ‘entertained’ (read: distracted) them with gossip and small talk. Also, in the case of a refusal, which fortunately did not happen too often, a porter - being a fellow villager - occasionally went to the sceptical household in the evening hours to explain over a cup of tea once again the purpose of
the study and to remove possible misunderstandings. Often in this way he succeeded in setting up a date for the interview after all.

The one porter who lived in Matlab travelled with the team to the villages every day and brought with him all eight (borrowed) weighing scales that were housed at the Matlab Field Station. For the sake of convenience, the big wooden height-meters were stored in the houses of two families who lived in baris that were closest to the riverside in Charmasua and Baluchar, where they were picked up every morning by the interviewers and their porters. During the fieldwork several occasional staff members were recruited, mainly from Matlab. They either worked on a daily basis or were hired to complete a certain job, for instance entering data obtained from the survey.

3.7.3 Fieldwork logistics
The three study villages were relatively near the Matlab Field Research Station, at a distance of about ten kilometres (as the crow flies), but because they were located across rivers the total travel time to reach them was about 30 minutes. Depending on the weather and political situation, the team made use of various means of transportation (by foot, rickshaw, car or speedboat), thus crossing various rivers and paddy fields.

A note should be made about hartals, or national strikes, as there were so many - more than 20 days during the entire period of fieldwork - and they therefore impacted on the progress of the work. Most hartals were declared by the opposition (political) party in order to press the governing party to call for national elections. Sometimes relatively small groups of Muslim fundamentalists also called for hartals. On hartal days it is generally believed to be too dangerous to travel, including travelling over water, as this is interpreted as a public rejection of the strike. In a rural area like Matlab, the population is in general more relaxed and most work continues on hartal days. Despite this, ICDDR,B’s policy on hartals days is to be on the safe side by explicitly disallowing any use of their motorised transportation, except for ambulances. Because of this, on these days the team of interviewers hired a local ‘tempo-boat’ for as long as the hartal lasted or they travelled by rickshaw. The only drawback was that in this way the travel time to the respective baris was doubled.

3.7.4 Questionnaire
The English questionnaire was translated into Bangla and is accompanied by a corresponding instruction manual (Bosch 2001). The questionnaire is module-structured and consists of thirteen modules, indicated by a letter (not in alphabetical order). The modules that generated the data on which this dissertation is based are included in Appendix C. On the cover page, the administrative and logistical information pertaining to the adolescent and the interview were noted. Name, address and date of birth were checked by means of the Family Visiting Card (FVC) to make sure that the adolescent in question was indisputably the adolescent selected. When the interview was finished, the interviewer filled in an evaluation form.

The interview began with interviewing the adolescent’s mother (Module I). Information about the conditions of the birth of the adolescent were collected from the
mother by retrospective recall. The mother was also asked about her age at menarche. In cases when the biological mother could not be interviewed, an attempt was made to interview another close relative or neighbour, provided that this proxy could give the information at first hand (for instance if the proxy was present at the birth of the adolescent).

Thereafter the adolescent respondent was interviewed. Central to Module A is the general profile of the adolescent. Module B followed with questions about his or her living conditions. Module D dealt with the whole process of the marriage match, from the first proposal onwards, to the ultimate decisions taken with regard to the price of the dowry (if a dowry was exchanged). This module, as well as the next one (Module E) about contraception, was considered potentially sensitive. Extra tact and understanding were asked of the interviewers when they interviewed the adolescent about these topics. It should be noted that if an adolescent girl was married, a special version of Module D was used that was tailored to her particular status. The succeeding Module F on ambitions and expectations was initially believed to be less stressful, apart from the questions about the adolescent’s childbearing preferences. Core information about reproductive health and development was collected in Module K and in Module X which involved taking anthropometric measurements: height, weight38, and mid-upper arm circumference (MUAC). Given the topic, Module K was made sex-specific (adolescent boys and girls were asked different questions).

### 3.7.5 Training and pilot survey

**Training**

The interviewers were trained for one week in order to make sure that they had mastered the most elementary techniques of interviewing and learned about the background, aim and design of the study on the basis of the (anonymous) results of the written test. The manager of the Matlab Field Research Station was also invited; he elaborated on the working rules and ethics of ICDDR,B. A small tour around the Matlab Field Research Station was made, not only to show where specific divisions of the ICDDR,B hospital were located, but also to introduce the ARH team to the other ICDDR,B staff members.

To facilitate locating the respondents, a brief training session was conducted to familiarise the interviewers with the HDSS of ICDDR,B. Emphasis was placed on the role of the RID and the CID number. Apart from these numbers the HDSS computer printouts also provided us with the names and sex of the adolescents and their date of birth. However, all this information was not enough for locating a particular person. We also needed to have the corresponding name of the bari, the name of the neighbouring bari (as not every bari is known to everyone, the more names of baris the better) and the names of the adolescent’s father and mother. The latter information was all to be found in the HDSS books that are stored in the HDSS room of the Matlab Field Station.

On the basis of copies of recently completed HDSS forms the interviewers were asked to look up specific information (the current address of person X with CID number Y)

---

38 Pregnant women were excluded from the analyses of nutritional status.
in the HDSS room. Even for the experienced interviewers, who worked with the HDSS forms before, this turned out to be a useful exercise. Furthermore, several aspects of the interview and interview techniques were discussed, in particular with reference to the introduction and the end of the interview, the consent form and ethical aspects of interviewing. It was stressed that the consent form needed to be read aloud to the respondent, his or her mother (if present) or one of the guardians. Only when the potential participant indicated that he or she fully understood the explanations about the study and his or her rights as a participant, would he or she be asked to sign or thumbprint the consent form. In the consent form it was also emphasised that all information obtained would be handled with care and regarded as strictly confidential.

Most of the training week was devoted to a discussion of the questionnaire and practice with taking anthropometric measurements. In many aspects it was important to discuss the questionnaire thoroughly with the team. Firstly, obviously the interviewers needed to have a good understanding of the questionnaire. They needed to know exactly what the aim of a particular question was, how the question should be asked, and when to exercise extra tact in the case of sensitive questions, for instance. Secondly, the discussion was a valuable check on the quality of the translation. It became apparent that there is some difference between ‘Dhaka-Bangla’ and ‘Matlab-Bangla’, as spoken by the inhabitants of Matlab. The proposed questions and answer categories were sometimes formulated too academically, with the result that they would not be understandable to the people in the villages, or would have inadvertently resulted in a social distance between the interviewer and the respondent. Many suggestions for simplification and justification of the questionnaire were brought up by the interviewers and the FRO, who were - as noted earlier - all residents of Matlab. In addition, the knowledge and experiences of the interviewers and the FRO were utilised to adjust or update questions and the answer-categories, and to shorten the questionnaire as a whole. Other staff members of the Matlab Field Research Station were also consulted on this point.

**Pilot survey**

A pilot survey was carried out among 24 adolescents and their mothers in order to pre-test the quality of the questionnaire in the field. The pilot survey was conducted in Dighaldi, a village relatively far from the Matlab Field Research Station, in the MCH-FP area. The rationale for selecting this village, instead of one of the adjacent villages, was that the latter villages are selected for the purposes of pilot surveys far too often. Pre-tests need to be conducted on people very much like those sampled. Having never or seldom been interviewed before, we expected that adolescents from Dighaldi would be comparable to the adolescents in our study villages in the Comparison area. In terms of educational level and socio-economic status, the inhabitants of Dighaldi were believed to be comparable to those of the study population; the 2000 birth and death rates in Dighaldi (23.0 and 6.4 respectively; ICDDR,B 2002a, p. 93) were, however, lower compared to those in the three study villages (see section 3.4).

On the basis of the valuable comments made by the interviewers, insights gained during the training and the pilot survey, a new English questionnaire was prepared, and this was considerably shorter (the respective modules lasted 20 minutes at the most). Before the follow-up survey began, a group of senior researchers from ICDDR,B, chaired by the manager of the Matlab Field Research Station, took another
critical look at the questionnaire. The aim was to formulate all questions and pre-coded answers in such a way that they would relate to the ‘world’ of adolescents in rural Matlab. After that, the questionnaire was back-translated from Bangla into English by the FRO to the PI. This enabled the PI to ensure that questions and answer categories had been correctly and appropriately translated into Bangla.

3.7.6 Reflections on the survey

Start of the interview

During the pilot survey and the actual survey, it became evident that illiterate women sometimes refused to sign or thumb print the consent form because they associated this with landowners who had in the past tricked people out of their lands. Many husbands, who were in most cases absent, had impressed upon their wives not to sign any document without their permission. We therefore added the following instruction: If a woman (mother of adolescent) agreed to participate in the research but refused to sign or thumb print the consent form, the porter was asked to sign on her behalf. This signature that was placed in front of two witnesses was regarded as approval of participation. In this way, the woman’s fear of signing or thumb printing any document was circumvented, and we did have in black and white a signature of approval, witnessed by at least two people.

In the introduction, the interviewers referred to ICDDR,B (they could also be recognised by their bags that carried the ICDDR,B logo), which is a well-known institute in this area. In order to ensure that the adolescent who had to be interviewed was indeed a member of the household as indicated on the basis of the HDSS information, the RID and CID numbers on the so-called Family Visiting Cards (FVC) were checked (the adolescent’s name was also checked, but names appeared to be less useful as many adolescents have a nickname). These FVCs are updated once a month by ICDDR,B’s Community Health Workers, and can therefore be considered accurate. Occasionally inconsistencies were found between the RID/CID and the extra HDSS information collected from the HDSS record books and the information at the FVCs. In these cases extra checks were made and the findings were discussed with the HDSS researchers at the Matlab Field Station, so that the information in either the HDSS record books or at the FVC could be adjusted.

When it was certain on the basis of the FVCs that the adolescent in front of the interviewer really was the individual concerned, the aims of the study and the purpose of the questionnaire could be explained. Here a reference was made to the study conducted by Baqui. Although the adolescent respondent did not remember having been enrolled in this study (they were too young at that time to remember), their mothers often did. Saying that we wanted to see how their son or daughter was doing, both physically and socially, after so many years made it easier to explain the rationale for the follow-up survey. Our request to sign the consent form was hardly ever turned down.

Specific instructions were given if it happened that the adolescent was found not to be at home, had moved, or died, or was too busy to be interviewed. It is worth noting that the chance of the interviewer knocking on the door of a house in which an adolescent had recently died was minimal, because of pre-checking the HDSS database. If
interviewers came across a severely malnourished or ill respondent, they were instructed to inform the PI and FRO as soon as possible, after which, depending on the severity of the illness, it was decided what kind of medical help was required. Interviewers were also instructed to make a note about married adolescents, as these respondents would get a different questionnaire that was tailored to their specific status.

The duration of the interview was about 1-1.5 hours. This excluded the time needed for the introduction and explanation of the consent form. Finding a place where the adolescent could be interviewed alone also took some time. Private interviewing was, however, considered extremely important (in order to avoid ‘shyness’ or ‘socially acceptable or expected’ answers as much as possible).

**Attitudes of respondents towards the interview**

Most of the adolescents interviewed and their parents or guardians were more than co-operative. Adolescents often felt proud that an interviewer came especially for him or her alone and not for his or her mother or baby brother or sister, as is often the case in Matlab where most of the research involves mother and child health. Adolescents hardly ever objected to participating (see also subsection 3.7.7). However, many adolescents were shy and needed some encouragement (from their mother or from the interviewer). Within the Bangladeshi cultural setting shyness is regarded as a highly desirable trait for girls, related to modesty and obsequiousness (see, for instance, the description of purdah and the ‘female role’ in subsection 2.4.3). We also anticipated - given their age and the nature of the study - that many modules would generate extra shyness among the adolescents (such as the modules pertaining to the matchmaking and dowry\(^{39}\), friendship\(^{40}\), contraception, reproductive health and development). The interviewers exercised extra tact and understanding when these modules came up for discussion. As could be expected, during the course of the interview some adolescents lost concentration, despite the efforts of the interviewers (by telling jokes for instance) to keep them focused.

Some topics appeared to be sensitive because they raised painful memories. Some respondents brought up experiences such as the loss of family members, accidents, (attempts at) physical or sexual abuse and incest. This never resulted in the complete breaking off of the interview, although some questions that became inappropriate were skipped during the interview. It should be noted that in contrast to Baqui, who gave the mothers of the under-five children a towel and so on in the baseline survey, no benefits in terms of presents or money were given to the respondents in the follow-

---

\(^{39}\) Negotiations about the matchmaking and dowry are private. A rejection by either party is after all not something anyone wants to make public. Often even the adolescent girl herself does not know about the negotiations until the process has reached a final stage. There is a great difference in the timing of telling the adolescent: boys are often informed about their upcoming marriage earlier than girls. Many people denounce the (widespread though illegal) system of dowry but in practice it continues.

\(^{40}\) The importance of reputation is related to marriage and dowry. Avoiding ever becoming the subject of malicious gossip is one of the most important lessons Bangladeshi adolescents grow up with. Friendship between adolescent boys and girls hardly exists or is not made public. In rural Bangladesh such friendships carry a connotation with sex and are therefore considered inappropriate.
up survey. Instead the goodwill and good name of ICDDR,B, the hospital where many peoples’ lives have been saved from cholera, were emphasised.

Making the anthropometric measurements generally went well. Female interviewers interviewed the adolescent girls and their parents (mother and father) and, similarly, male interviewers interviewed the adolescent boys and their parents (thus also the mother and father). A few mothers of adolescents (n=7) refused (or the husband refused for her) to have their MUAC taken by a male interviewer because he would need to touch her upper arm. It was anticipated that this might happen but - for logistical reasons - it would have been too difficult (and expensive) to arrange for only female interviewers to make this measurement.

External interferences

In the course of the survey adolescents started talking to each other about the interview - being interviewed is of course an interesting event that needs to be shared with peers (some of whom were also selected for an interview). This probably influenced the responses of these selected peers. The quality of their answers, in terms of knowledge, for instance, might be higher. As also parents, brothers and sisters, and in particular neighbours kept their ears open, at the end of the survey period the interviewers were increasingly confronted with ‘negative’ reactions. On a few occasions, parents (or an elder brother who had been interviewed by another fellow interviewer the day before) refused to have their daughter (sister) exposed to ‘shameful’ questions. It is illustrative in this respect that the father of a premenarcheal girl considered his daughter to be ‘too ignorant’ to be interviewed about contraception:

Father: My daughter is so young, she cannot discuss confidential subjects. Ask me the questions, then I will reply.

Related to this, another question that now and then was perceived as ‘shameful’ was the one on preferred number of children. Such a question was believed to trigger bad thoughts in the presumably innocent minds of adolescent boys and girls. In Saidkharkandi the team received relatively more of these negative reactions than in Charmasua and Baluchar. One interviewer was threatened with a knife in this village.

Privacy

In order to reduce the ‘stress level’ as much a possible and to establish a good rapport with the respondents, the interviewers were asked to conduct the interviews as if they were informal discourses rather than interviews. The interviewers in general sat close to the adolescent respondents and made them feel at ease with small talk, making jokes, giving compliments and so on before the interview started. Sitting near each other implied that both could keep their voice down, which benefited the private nature of the interview. On some occasions, however, it appeared to be difficult to maintain the private setting as relatives, friends or neighbours kept on trying to sneak into the room where the interview was taking place. Mothers sometimes also kept their children around them while they were being interviewed. As described before, the porters also had a major task here as they ‘stood guard’ and ‘entertained’ the curious people outside. Once in a while, however, people did manage to sneak into the room and if the interviewers could not deal with this immediately they often moved
quickly through the questionnaire to the least sensitive modules. When they were alone again, the interview continued where it had stopped. In this way, embarrassing situations for both the interviewer and the respondent were averted.

**Alternative times and places, and proxies**

The interviewers were instructed to make appointments with respondents, if possible, when they crossed the respective baris. In this way the respondents were already prepared for the interview. Sometimes the porter was sent out half way through the first interview of the day to arrange a meeting for the second interview with a respondent in an adjacent bari. Although various national holidays took place in the first half of the year, coinciding with the fieldwork, these hardly impacted on the fieldwork. On some national holidays, and Fridays as well, the work even continued on a voluntary basis. On these days in particular there was a better chance of finding the adolescents at home (many adolescents who were for instance working in Dhaka also returned to their villages during the holiday for *Eid-ul Azha* on 7 and 8 March 2001).

Many of the adolescents went to school from about nine to three o’clock. No consideration was given to interviewing adolescents in the schoolyards, as a) this would have interfered with their classes too much; b) their parents or guardians would not be around to give permission for interviewing their son or daughter; and c) peers would probably have interfered too much as well. Even if peers had stayed in the classroom, the presence of friends and schoolmates in the neighbourhood may have influenced the adolescent’s responses. In general, interviewers had to make many repeat visits before he or she succeeded in interviewing the selected adolescent. Not to our surprise, adolescent girls were more often found at home as they tend to be engaged in household activities, whereas adolescent boys are generally roaming around the area.

For practical reasons only in rare cases were interviews conducted in the early mornings, and then only by the male interviewers. As all but one of the female interviewers were married and had to take care of children, they were, as most Bangladeshi women, very busy in the early mornings with household tasks before leaving for work. Conducting interviews in the evening would not have been safe for the female interviewers, but it was not possible any way as the weighing scales worked on solar cells and the sun set between five and six o’clock in the evening. If the interviewer came across a mentally handicapped (or deaf) adolescent it was decided to assess his or her anthropometry only (provided that the parents or guardians approved) and instead to ask the mother (or guardian) a selected number of questions. Considering the limitations of most of these adolescents, consent was only asked of their mother or father. If a handicapped adolescent clearly showed signs of objecting, this was of course accepted.

**Married adolescents**

When the survey started, it was known from HDSS files that three adolescent girls were married (and none of the adolescent boys). During the course of the survey, four other adolescent girls turned out to be married as well. Given the overall statistics on adolescent marriages in Bangladesh (see section 1.1 and subsection 2.5.1) the number of married adolescents found among our study population may be considered low.
Adolescents’ reproductive health in rural Bangladesh

(though the adolescents enrolled in our study are still aged 12 to 16 years). During the follow-up survey, it was evident that adolescent marriages were indeed being planned but details about this are rarely shared with the adolescents until the negotiations have reached a final stage. Consequently, only 15 (currently unmarried) adolescents (11 girls and 4 boys) already knew the person whom they are going to marry (half of them were going to marry a family member, mainly a cousin). In retrospect we have to conclude that in order to get a better insight into the stage which the matchmaking process was in, we should have interviewed the parents or male family members instead of the adolescent. However, it is questionable whether this would have yielded relevant information, given that matchmaking is highly sensitive - being related to the reputation of the adolescent and moreover to that of the entire family - and because of the controversial character of dowry in this.

All seven married adolescents were interviewed by the same (married) female interviewer. For these married adolescent girls, the module on the matchmaking and dowry was tailored to their particular status. One married adolescent girl appeared to be pregnant. The records of the married girls were left out of the qualitative analyses. As outlined in Chapter 2 (subsection 2.3.2), post-marital residence is largely patrilocal in Bangladesh. Demographic and socio-economic characteristics of the households in which these married adolescent girls live thus reflect the status of their family-in-laws and cannot be linked to conditions in their childhood. In-depth reports on some of the married girls are presented in Chapter 6.

3.7.7 Response and quality of the data

In November 2000, at the time of the RRC and ERC defences, the latest HDSS information available was the data of 1999. Of the records pertaining to the 707 under-fives who were enrolled at baseline, 690 records could be linked via the RID number to the HDSS database of 1999. Of 17 records the RID numbers were non-existent. Of the 690 individuals of whom we did have a record from 1999, a total of 110 (63 boys and 47 girls) were no longer living in the Matlab area (99 because of migration out of the HDSS area, 11 due to death). On the threshold of the follow-up survey, in January 2001, the update of the 2000 HDSS database had been completed. It became evident that of the 580 adolescents another 11 adolescents had (probably) migrated out of the HDSS area in the meantime (information on causes was not yet available). Consequently, our study population comprised 569 adolescents for follow-up, 307 boys and 262 girls. The number of 569 corresponds with 81 per cent of the original study population. The response of the 569 adolescents who were followed up in 2001 is shown in Figure 3.4.
At baseline, 1988-1989

- 707 records at baseline in 1988-1989
- 17 records without valid RID numbers

At preparatory stage, 1999-2000
- 690 records with stage
- 11 records lost valid RID in 1999

At start of follow-up, 2001
- 569 records for follow-up in 2001

After follow-up, 2001
- 562 records non-married 2001
- 470 interviews completed
- 92 interviews not or partly completed
  - 6 adolescents handicapped
  - 11 adolescents or parents refused
  - 57 adolescents migrated or absent
  - 12 adolescents broke off interview
  - 6 households completely absent
  - 5 interviews partly completed by proxy
  - 6 interviews partly completed (module I about the mother)
  - 53 interviews partly completed by proxy
  - 12 interviews partly completed
  - 3 interviews partly completed by proxy
  - 7 interviews completed

110 records lost for follow-up:
- 99 migrated (cause of migration is known for 95 of them)
- 11 died (all 11 cause of dead is known)

7 records (girls) married, among 1 pregnant

analysed separately (chapter 4, section 4.4)
A total of 470 interviews were completed by the adolescents, which equals 84 per cent of the 562 non-married adolescent population selected for follow-up. The distribution is as follows: 85 per cent in Charmasua, 81 per cent in Saidkharkandi and 92 per cent in Baluchar. Despite the fact that we had made use of relatively recent HDSS information, 57 adolescents still could not be interviewed as they were temporarily or permanently absent. The capital city appeared to be the most important trigger for migration, both for boys and for girls (80 per cent of this group left for Dhaka). Boys leave for Dhaka for study or work. More and more girls from rural areas work in the garment sector in Dhaka. Only 12 questionnaires were not completed, whereas 11 adolescents, their guardians or another member of the household (grandmother or elder brother) refused to give consent for the interview. Another 6 adolescents could not be interviewed due to a mental handicap. In the majority of the cases where an adolescent was handicapped or absent, the mother, father or other relative (elder sister, aunt, live-in grandmother or aunt) was interviewed by proxy to collect (part of) the information.

Quality of the data

Every completed questionnaire was field-edited and office-edited (by the FRO and the PI) before data were entered by a data-entry typist of ICDDR,B and the PI. Data entry was done in a program developed in Blaise III (Statistics Netherlands 2000), which included several checks (internal consistency, range checks). Instead of double entering the PI checked the entry of all survey data manually. Figure 3.5 illustrates the procedure for processing the questionnaires.

Figure 3.5: Flow diagram illustrating how questionnaires are processed in the follow-up survey
In order to be able to review the quality of the data-collection process, and hence to have an impression of the reliability of the data, 10 per cent of the adolescents were re-interviewed (including assessment of anthropometry) at a later stage, ranging from a few days to a few weeks later. Although it was acknowledged that some answers are likely to be different a second time - because the adolescent has grown or the situation has changed - basically the answers to both interviewers should be the same. There were no differences of importance between the results generated by the first interview and those generated by the check interview. In addition, both the PI and the FRO accompanied the interviewers regularly - every other day - in the field so that they gained a good understanding of how they worked and could check whether the interviews were being conducted correctly and anthropometric measurements were being made correctly.

The team and also the PI herself had mixed feelings about the (perceived) influence of the PI’s presence on the interviews. On the one hand, it was extremely useful to be present as the PI could get a proper understanding of how the interviews were carried out. For the interviewers it was a reassurance and also stimulating to have the PI accompany them, as they could get feedback on their findings right away (and vice versa: the PI could directly ask questions or make comments). The villagers were in general friendly, gentle and hospitable. As the three study villages are all situated in ICDDR,B’s Comparison area they have been involved in (international) research projects relatively less often. Foreigners thus attract a lot of attention. This had two consequences. Firstly it seemed to encourage the potential respondents to participate in the research (they felt proud to invite a foreign woman into their house), but secondly - and here the drawbacks come into the discussion - all the attention made it difficult for the interviewer to organise a private place where the interview could take place. In order to give the interviewer and the adolescent respondent some privacy, the PI therefore sometimes had to leave the house and find a place somewhere else to sit where she could ‘chat’ with the villagers (and thus keep them at a distance from the interview). After some time the attention generally evaporated and this enabled the PI to observe the interview again. As it was made clear right from the start of the interview why ‘this foreign woman is present’ (observing, wanting to learn something), but that she also ‘does not understand any Bangla’, the adolescent respondents did not seem to be bothered by the presence of the PI.

3.7.8 In-depth interviews

Although the survey data yielded an enormous amount of information about adolescents’ reproductive health, there was a need to collect additional information that could not or hardly be collected by means of a survey, notably on perceptions about the menarche (adolescent girls and mothers), spermarche (adolescent boys), early marriage and childbearing (parents), and the meaning of adolescence (adolescents and parents). A total of six adolescent boys and twelve girls of whom were eight non-married and five married (we over-sampled married girls because they would, given their status, be able to tell us more about the consequences of ‘late’ menarche and reproductive health afterwards, notably the link with the first pregnancy

---

41 In the baseline survey, anthropometry of 10 per cent of the children was taken the following day. No significant differences were found between the first and repeat measurement (Zaman et al. 1996, p. 310; Zaman et al. 1997, p. 924).
and childbirth), three fathers and five mothers were interviewed in-depth during the last weeks of the follow-up survey. In addition, some professionals working in the reproductive health and marriage domain were interviewed in order to learn about the socio-cultural context in which adolescent marriages are arranged: two ghatoks, or matchmakers, who are operating in the study villages, and one Family Welfare Visitor (FWV) from the study area under the Farazikandi Union. The ghatoks were interviewed about early marriage and were asked to sketch the process of matchmaking. The FWV was interviewed about her work and the services she provides for adolescent clients. Due to time constraints it was not feasible to interview a religious leader, as planned.

A female interviewer interviewed adolescent girls and mothers, while a male interviewer conducted the interviews with the selected adolescent boys, fathers and the key informants. The in-depth interviews were recorded. On one occasion, the respondent refused to allow the conversation to be recorded as she was afraid it was going to be used in an inappropriate way (inviting strangers or people from neighbouring villagers, who would recognise her voice, to listen to the tape and make fun of it). Unfortunately, during the fieldwork it became apparent that the quality of the recorders was poor, and as a result of this we could not fully transcribe the in-depth interviews but had to rely on notes made by the interviewers instead. The reports have been translated into English by a translator from Matlab and were later transcribed. We have to take into consideration the fact that the quality of the data collected in the in-depth interviews may be less than optimal (in other words, information may be lost or conveyed slightly differently) due to the two extra links (the interviewer and the translator) between the respondent and the researcher.

The topics selected for in-depth interviews (Appendix D) were based directly on the questionnaire of the follow-up survey. Unmarried and married adolescent girls, adolescent boys and their parents were asked to describe the concept of adolescence: what does it mean, what indicates its boundaries, and so on. After that the circumstances, experiences and feelings as related to menarche came up for discussion with adolescent girls and their mothers. Similarly, adolescent boys were interviewed about spermarche. This topic was, however, not discussed with fathers as it could have been considered disrespectful to discuss this topic with an older man. For all respondents, the interview went on to deal with sexual matters and their opinions.

Given our focus on the social connotation of timing of the menarche and in particular the possible influence of that to future events situated in the reproductive and marital career (see also Figure 2.2 in subsection 2.2.2), we asked the married adolescent girls a few questions about how they look back on the timing of their marriage in view of their age at menarche. The adolescents’ fathers and mothers were also asked about their opinion with regard to the age of marriage of their son or daughter. This topic was embedded in a discussion about their own marital and fertility history (for fathers, the fertility history of their wives) in order to explore whether their own experiences with early marriage and childbearing may have impacted on the decisions they have to make (or have already made) with regard to the marriage of their children.
3.8 Conclusions and discussion

It goes without saying that the results of the analyses in the subsequent chapters rely greatly on the quality of the collected data. As has been described, several steps have been taken to guarantee the quality of the data. Reflecting on the whole period of fieldwork it can be concluded that solid foundations were laid, primarily by recruiting experienced and capable staff members. Both the FRO and the interviewers were selected by means of carefully planned procedures that involved among other criteria a written test and an interview. Except for one, all porters were living in the study villages, and this tremendously facilitated the process of tracing the selected adolescents, and also in persuading the respondents to participate in the study. Thanks to their efforts, knowledge and working spirit the week of training, the pilot survey and the regular survey interviews yielded the expected results. Furthermore, the expertise and co-operation of numerous experienced staff members of the Matlab Field Station and ICDDR,B Dhaka, including the translators and the typist who helped with the entry of all survey data, facilitated the smooth implementation of all fieldwork activities.

Apart from these ‘human capital’ influences, the quality of the data is believed to have profited from operational factors such as back-translating the questionnaire from Bangla into English in order to check the quality of the translation, the thorough discussion of the questionnaire with the ARH-team, the many spot-checks in which the PI and the FRO both accompanied interviewers while they were carrying out the interviews, and the ample time that was scheduled for the interviews - with two interviews scheduled per day there was no need to hurry through the interviews. On the contrary, there was plenty of time for small talk and making the adolescent respondent feel at ease, and this is believed to have improved the quality of both the survey and the in-depth interviews. Also the ten per cent ‘check interviews’ that were carried out among the adolescent population give us some insight into the quality of the information collected. Finally, by checking the data at various stages (instead of double-entering) the process of data entry is also believed to have been carried out adequately.

The fact that most of these adolescents were still living in villages that are situated in the Comparison area of Matlab is considered to be a positive factor, as these villagers (particular the adolescents) have not been interviewed before for studies other than Health and Demographic Surveillance System. For this reason, their responses may not have become ‘studied’ (knowing what answer needs to be given) or ‘social’ (knowing what answer is socially most acceptable) answers. Another positive aspect was the finding that adolescents often felt proud that an interviewer came especially for him or her (and not for his or her mother or baby brother or sister) and consequently displayed a lot of enthusiasm for the interview. It should be noted, though, that the very few adolescents who lived in villages situated in the Matlab MCH-FP area may therefore be relatively better off in terms of health and family planning facilities. However, it is also likely that cultural homogeneity is declining because of the influence of migration, spin-off effects such as occasional visits to their migrated family members in Dhaka for instance, and the introduction of mass media that facilitates the transmission and spread of knowledge. Also the presence of foreign researchers affiliated with ICDDR,B’s Field Research Station in Matlab and national and international NGOs operating in Matlab may have contributed to this development.
Next we will present the results of analyses. First a general demographic and socio-economic profile of the study population in early childhood and adolescence will be presented (Chapter 4). Then the adolescents’ nutritional status career will be analysed (Chapter 5), followed by an assessment of the (observed and expected) timing of menarche (and, briefly, spermarche) in relation to the nutritional status career (Chapter 6). Following this, data on the adolescents’ knowledge and perceptions of reproductive transitions and related topics relevant to reproductive development in adolescence will be analysed (Chapter 7). In this penultimate chapter the findings from the follow-up survey will be linked to results generated by the in-depth interviews.