General and reproductive health status of women in rural Bangladesh: observed and perceived measures

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Cover photo: one of the interviewed women, taken by the author during the fieldwork in Matlab in March 2005, taken with permission of the women.

Abstract

This study examines the general and the reproductive health status of women in Matlab, a rural area in Bangladesh, as indicated by observed and perceived measures. The general and reproductive health status is studied within the overall cultural meaning system on health. We compare the *observed* and *perceived general* health status of the women with their *perceived reproductive* health status to asses the relation between these statuses. In addition, we study the relation between *observed* and *perceived* measures of the *general health status*. The analysis comprises two parts. For the first (quantitative) part, data are derived from the Matlab Health and Socio-Economic Survey of 1996. The sample constitutes 6109 women of reproductive age (15 to 49 years). Correlation and regression analyses are used to examine the relation between the observed and perceived (reproductive) health status. For the second (qualitative) part, data are collected through interviews by means of the free-listing method among 6 researchers, 4 supervisors, 10 community health research workers and 14 women. Results revealed that the *general* and *reproductive* health statuses of the women are poor and that *observed* and *perceived measures of general health* indicate different aspects of their health status. The interviews revealed that (reproductive) health is especially related to self-reported (the absence of) diseases and perceptions on their physical appearance.

The study is part of a co-operation between the Population Research Centre of the University of Groningen (PRC) in Groningen, the Netherlands Interdisciplinary Demographic Institute (NIDI) in The Hague, and the Centre for Health and Population Research (ICDDR,B) in Dhaka, Bangladesh.

Samenvatting in Nederlands

Deze studie onderzoekt de algemene en de reproductieve gezondheidsstatus van vrouwen in Matlab, een landelijk gebied in Bangladesh, door middel van geobserveerde en ervaren maten. De algemene en reproductieve gezondheidsstatus is bestudeerd binnen de culturele context. We vergelijken de *geobserveerde* en *ervaren algemene* gezondheidsstatus van de vrouwen met hun *ervaren reproductieve* gezondheidsstatus om de relatie tussen deze statussen te bepalen. Daarnaast onderzoeken we de relatie tussen *geobserveerde* en *ervaren* maten van de *algemene gezondheidsstatus*. De analyse bestaat uit twee delen. Voor het eerste (kwantitatieve) deel komen data uit de 'Matlab Health and Socio-Economic Survey' van 1996. De steekproef bestaat uit 6109 vrouwen van reproductieve leeftijd (15 tot en met 49 jaar). Correlatie- en regressieanalyse zijn gebruikt voor het bepalen van de relatie tussen de geobserveerde en ervaren (reproductieve) gezondheidsstatus. Voor het tweede (kwalitatieve) deel zijn data is verzameld onder 6 onderzoekers, 4 leidinggevenden, 10 gezondheidswerkers en 14 vrouwen door ze te interviewen volgens de 'free-listing' methode. Resultaten wijzen uit dat de *algemene* en *reproductieve* gezondheidsstatus van de vrouwen onvoldoende is en dat de *geobserveerde* en *ervaren maten* van algemener gezondheid verschillende aspecten van de gezondheidsstatus aangeven. De interviews wijzen uit dat (reproductieve) gezondheid vooral wordt gerelateerd aan de zelf gerapporteerde (afwezigheid) van ziekte en aan percepties betreffende hun fysieke voorkomen.

De studie is onderdeel van een samenwerking tussen het Population Research Centre van de Universiteit van Groningen (PRC) in Groningen, het Nederlands Interdisciplinair Demografisch Instituut (NIDI) in Den Haag en de Centre for Health and Population Research (ICDDR,B) in Dhaka, Bangladesh.

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Preface

This Masters thesis has been written as part of my study 'Population Studies' at the Faculty of Spatial Sciences of the University of Groningen. The research described in this thesis is part of a collaboration between the Population Research Centre of the University of Groningen (PRC) in Groningen, the Netherlands Interdisciplinary Demographic Institute (NIDI) in The Hague, and the Centre for Health and Population Research (ICDDR,B) in Dhaka, Bangladesh.

I would like to thank my supervisors for their time, suggestions and support: Prof. dr. Inge Hutter for her suggestions especially during the initial period of this project, Dr. Alinda Bosch for her involvement, time and critical reviews on my writings, and Dr. Golam Mostafa for his nice co-operation and time during my stay at the Health and Demographic Surveillance System (HDSS) department of ICDDR,B.

I would also like to thank the people from the HDSS department and the Matlab Field Research Station for their help and support during my stay in Bangladesh. I would like to thank especially Dr. Kim Streatfield for his involvement in the project. I would also like to thank Mr. Taslim Ali for his help during the data collection in Matlab. He and many others made many things possible during my short stay at the Matlab Field Research Station. Further I would like to thank all the Community Health Research Workers, who made time free to show me 'their' villages and introduce me to the women for the interviews, and all the women in Matlab who were willing to participate in this research. Thanks also to Prof. dr. Jeroen van Ginniken (NIDI) for introducing the topic of this study to me and to Carel en Jotine for their help and hospitality in Bangladesh.

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Idske de Jong
Weesp, August 31, 2005

1. Introduction

During the 1960s and 1970s researchers were focussing on the relationship between perceived and observed health. The few studies that have been done suggest that there is a difference between the health status obtained by *perceived* health measures and the health status obtained by *objective* health measures (Krueger 1957, Elinson and Trussel 1957, National Centre for Health Statistics 1967, Belcher et al. 1976). These comparative studies suggest that both measures may assess fundamentally different aspects of illness and disease. For decades little research has been done on this topic until in the 1990s the link was made between perceived health and mortality. Studies by for instance Borawski et al. (1996), Chipperfield (1993), Idler and Angel (1990) and Idler and Kasl (1991) suggest that the perceived health status has a prospective value on mortality for older adults. However, most research on this topic is focusing on older adults, for example recent studies by Rahman and Barsky (2003) and Rahman et al. (2004) on the perceived health status of older adults in Bangladesh. In this study we focus on the health status of women of reproductive age (15 to 49 years) because women's general health status (including their nutritional status) is closely intertwined with their reproductive health status. This is for example shown by Bosch (2005) who studied the nutritional status in relation to the age at menarche, and by Hutter (1998a) who studied birth spacing in relation to nutritional anaemia, maternal depletion and the risk of maternal deaths. During the last two decades more information about the health status of adults in the developing world has become available, but still little is known about the validity of survey data based on perceived health measures. That is why the aim of this study is twofold. We examine:

- the relation between the *observed* and the *perceived general* health status for 15 to 49 year old women in Matlab, rural Bangladesh, and
- the *perceived reproductive* health status of these women in relation to their observed and perceived *general* health status.

This study centres upon the following overall research question:
What is the observed and perceived general health status of the women in rural Bangladesh, and how are these statuses related to their perceived reproductive health status?

The study is divided into three parts:
Part A deals with the general health status and comprises the following research questions:

1. What is the general health status of the women of reproductive age…
    a. as indicated by observed measures?
    b. as perceived by the women themselves?
    c. according to ICDDR,B staff in Matlab and Dhaka?

2. What is the extent of correspondence between the women's observed general health status and their perceived general health status?

Part B, deals with the reproductive health status as perceived by the women themselves and comprises the following research question:

3. What is the reproductive health status of the women…
    a. according to self-reported reproductive health indicators?
    b. according to their perceived reproductive health problems?
    c. according to ICDDR,B staff in Matlab and Dhaka?

Part C includes the link between the general health status and the reproductive health status and is guided by the following research questions:

4. How does the anthropometry of the women relate to their self-reported reproductive health status?

5. Which indicators of the women's self-reported reproductive health status relate to their self-rated general health status?

The study uses quantitative data from the Matlab Health and Socio-economic Survey of 1996 and qualitative data collected by applying the free-listing method, for the analysis of the (reproductive) health status of the women.

This study is part of a collaboration between the Population Research Centre of the University of Groningen (PRC) in Groningen, the Netherlands Interdisciplinary Demographic Institute (NIDI) in The Hague, and the Centre for Health and Population Research (ICDDR,B) in Dhaka (formerly known as the International Centre for Diarrhoeal Disease Research, Bangladesh). The ICDDR,B is a well known institute with years of experience in (reproductive) health research. For years their focus was mainly on cholera and diarrhoeal diseases but the Centre has expanded its activities to health and population research in general.

The outline of this thesis is as follows. Chapter 2 presents theory and findings related to women's (reproductive) health status. The chapter is structured in the same way as the rest of the study. First the general health status is discussed, after which we elaborate upon the reproductive health status and then we discuss the role of culture on the perceived health status. Finally the conceptual model of this study is presented and explained. Chapter 3 describes the research design including the hypotheses, the operationalisation of the main variables and a description of the required data(sets) and methods of data collection. In the section about methods of data collection, a description of the experiences during the fieldwork in Matlab is described. Chapter 4 is devoted to the general health status. We present the results of the analysis on the observed general health status, the perceived general health status and the relation between these two statuses. Chapter 5 discusses results of the analyses on the self-reported and perceived reproductive health status. It focuses on the analyses of self-reported reproductive health indicators (based on survey data) and perceived reproductive morbidity of the women (based on data collected by means of the free-listing among women and ICDDR,B staff). Chapter 6 includes the cross-relations between the general health status (observed and perceived) and the reproductive health status. Chapter 7 summarises the main findings of the study and discusses its conclusions. At the end of this chapter we try to formulate some recommendations for further research in the field of (reproductive) health for women in Bangladesh.

2. Theoretical framework and background

In order to find an answer to the research questions as presented in chapter 1, theoretical models are discussed and findings from secondary literature on the general and reproductive health status of women are described. First the general health status is discussed (section 2.1), then the reproductive health status (section 2.2) after which we look at the influence of culture on the perception of health (section 2.3). Finally, the conceptual model which we adopted in this study is presented (section 2.4).

2.1 General health status

Reproductive health is considered to be part of the general health status. That is why we look in this study at the general health status of women of reproductive age and at the reproductive health status of these women. The general health status can be indicated by *observed* general health measures and by *perceived* general health measures. These measures are derived from medical anthropology. Medical anthropology is the study about "how people in different cultures and social groups explain the causes of ill-health, the types of treatment they believe in and to whom they turn if they do get ill" (Helman 1984, p 34). The discipline makes further a useful distinction between disease and illness. Disease is an *observed* health measure and refers to bodily dysfunction defined by a medical expert (Hardon 2001, italics by author). Illness on the other hand is a *perceived* health measure; it refers to the individual's own experience of a health problem (Hardon 2001, Mahub and Ahmed 1997, iletics by author). The concept of illness is based on the emic approach and represents the perspectives of the individual. Illness may be present where disease is absent (Cassell 1976).

First observed general health measures are discussed (subsection 2.1.1), after which we look at the perceived general health measures (subsection 2.1.2) and at the end of this section we look at the discrepancies between these two measures of the general health status (subsection 2.1.3)

2.1.1 Observed general health measures

The health status of a population can be indicated by observed measures such as clinical test examinations, diagnostic tests, gynaecological examinations, medical history taking, physical tests and anthropometric measures (Zurayk et al. 1993). These measures are frequently used in the developed world, but for the developing world some of them are more difficult to apply because clinical test examinations are expensive to carry out, reliable diagnostic tests appropriate for field conditions are unavailable and gynaecological examinations have high refusal rates (Sadana 2000). On the other hand observed health measures such as the observed ability to perform Activities of Daily Living (ADL) and anthropometric measures as indicator of the nutritional status are easy and inexpensive to carry out (Kuhn et al. 2004). All of those measures are based on the biomedical model of medicine which is the predominant model used by physicians in the diagnosis of disease. The biomedical model focuses on physical processes, biochemistry and the physiology of disease (Zurayk et al. 1993). Medical experts try to make a diagnosis by narrowing the health problem to medically explained phenomena. Individuals on the other hand may relate the problem to their own perceptions and experiences, such as the ability to carry out Activities of Daily Living (ADL), misfortune and discomfort (Loustaunau and Sobo 1997).

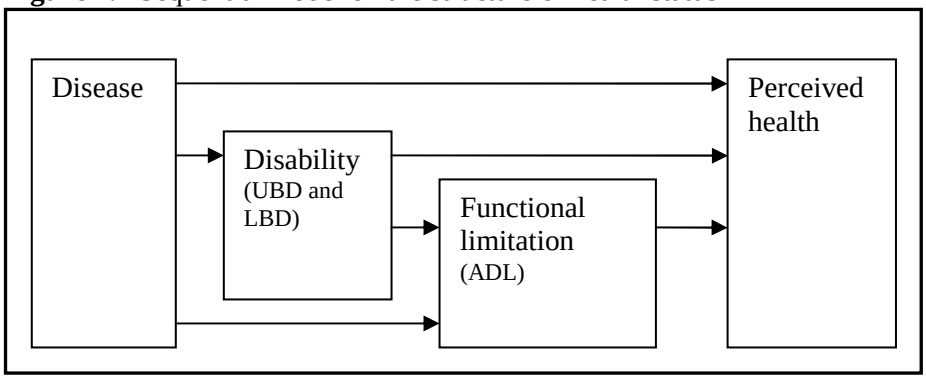
As suggested by Kuhn (2004), anthropometric measures as indicators for the nutritional status and the observed ability to carry out Activities of Daily Living (ADL) are measures available in developing countries to indicate the observed health status. In Bangladesh, more than 50 per cent of the women are underweighted (Gillespie and Flores 2000). According to Huffman (1985) and Ford and Huffman (1988), particularly women in rural Bangladesh are considered to be chronically malnourished. For instance, 57 per cent of the women are less than 147 centimetres in height as a result of stunting and almost all mothers' weight less than 50 kilogram (Ross et al.

1996). About 47 per cent of the women are underweighted according to Body Mass Index (Riley 1994)[1]. Low weight and short height are risk factors during pregnancy and especially childbirth. Women with a weight below 45 kg and a height less than 145 cm are considered to be at obstetric risk (WHO 2003). For women in Bangladesh, weight gain during pregnancy is often insufficient due to strenuous activities, infectious diseases (Fauveau and Chakraborty 1994), or taboos on food intake (Fauveau 1994). The physical ability can be observed by functional limitations and by disability (Johnson and Wolinsky 1993). Functional limitations can be indicated by the ability to carry out Activities of Daily Living (ADL). There are three ADL measures: basic ADL (bathing, dressing, walking, getting in and out a chair), household ADL (shopping, meal preparation, light housework) and advanced ADL (heavy housework, managing money) (Katz et al. 1963). Disability is measured by Lower Body Disabilities (LBDs), such as walking and standing, and by Upper Body Disabilities (UBDs), such as reaching over the head and reaching out (Wolinsky and Johnson 1991). Physical ability tests recently have been used to screen (elderly) populations for assistance eligibility, to determine the need for new social policies and to measure illness specific changes in the health status (Johnson and Wolinsky 1993). There are no data available on the physical health status of women of reproductive age in Bangladesh.

2.1.2 Perceived general health measures

Perceived health is a multi facetted and nuanced indicator of the underlying health status and considers different dimensions of health, severity and co-morbidity (Johnson and Wolinsky 1993, Idler and Benyamini 1997). The perceived general health status can be indicated in different ways. There are a few studies that examine indicators and determinants of the perceived general health status. They tend to view the perceived general health status as a subjective component of health that is influence by more objective health measures (Zimmer et al. 2000). Johnson and Wolinsky (1993) show that perceived health is influenced by a variety of medical conditions and functional disorders that all have a unique influence on the perceived health status. This is viewed in their sequential model on the structure of health status to which we refer in figure 2.1. The model presents the interrelationship between disease, disability and functional limitation (subsection 2.1.1), and perceived health (as described in the current section).

Figure 2.1 Sequential model on the structure of health status



Source: Johnson and Wolinsky, 1993

It is a sequential model because it moves from the morbid or disease condition through physical disability, into behaviour or activity limitations, leading ultimately to the relative perception of health and illness. Figure 2.1 reflects the natural progression from body to mind when diseases are detected and take their physical toll and limit the ability and eventually result in a redefinition of the sense of well-being (Johnson and Wolinsky 1993).

[1] Body Mass Index below 18.5 indicates underweight

Background characteristics at the micro level which have shown that they have impact on the perceived general health status are: demographic characteristics (age, sex and rural/urban residence), the socioeconomic status (for example education) and the existence of a support network (marital status). Apart from this, the perceived health status may vary during the life course. Cocherham (1983) argues that ageing can result in deteriorating health. It is likely that the assessment of health is made with a reference group in mind. This means that older age-groups can experience an improvement in the self-perceived general health status despite the fact that there might be an age-related decline in physical performance and an increase in acute and chronic morbidity (Hoeymans and Feskens 1996, Laukkanen et al. 2000). Zimmer et al. (2000) argue that married individuals generally report better health than the unmarried and education, a socioeconomic status measure, may also have influence on the self-assessment of health. Generally, in the cultural context of Bangladesh, there is a tendency to report that someone is fairly healthy in case of a good health because people are afraid to attract the attention of evil spirits with saying that they feel healthy (Rahman and Barsky 2003)

2.1.3 Discrepancies between measures of the general health status

During the 1960s and 1970s researchers were focussing on the relationship between *objective* and *perceived* general health measures. The few studies that have been done suggest that there is a difference between the health status obtained by objective health measures and the health status obtained by perceived health measures (Krueger 1957, Elinson and Trussel 1957, National Centre for Health Statistics 1967 and Belcher et al. 1976). These comparative studies suggest that both types of measures may assess fundamentally different aspects of illness and disease. The above mentioned studies have been limited to developed countries because for a long time there was absence of available data about developing countries (Feachem et al. 1992, Rahman and Barsky 2003). During the 1990s Zurayk et al (1995) and Sadana (2000) and have carried out comparative studies between observed and perceived health in developing countries. Discrepancies have repeatedly been found by Zurayk et al. (1995) between women's perceptions and expressions of their needs and the biomedical assessment of their health status. Validation studies in Bangladesh, Egypt, India, Indonesia and the Philippines have shown that women's ability to recognize medical conditions and their potential complications and to seek the appropriate services is limited (Zurayk et al. 1995). Other studies from Bangladesh, Bolivia, China, Egypt, India, Indonesia, Nigeria, Philippines and Turkey provide empirical evidence that self-reported morbidity and observed morbidity measure different phenomena and therefore different aspects of reproductive health and illness (Sadana 2000). Sadana also suggest that rather than estimating the prevalence of morbidity, interview-based surveys may provide useful information about the disability or burden associated with reproductive health and illness. Obermeyer (1999) argues on the bases of these results that indicators based on women's own reports will not be sufficiently accurate; because earlier studies have show that women can not always recognize symptoms, put name to a malaise or seek appropriate health care for reproductive conditions. Important themes which recur in several studies about reproductive morbidity are a sense of fatigue, exhaustion, or deterioration of the reproductive organs. These themes are expressed in local languages by women in several places in de developing world (Obermeyer 1997). Those syndromes are closely related to poverty and correlate fairly well with anaemia, poor nutritional status, untreated reproductive tract infections and poor sexual life (Ibid. 1997).

2.2 Reproductive health status

The aim of this section is to discuss the reproductive health status in general and for the women in Bangladesh in particular. First reproductive health is discussed (subsection 2.2.1), then we elaborate upon the reproductive morbidity model (subsection 2.2.2) and finally the model on mother's reproductive and child's survival career is described and applied (subsection 2.2.3).

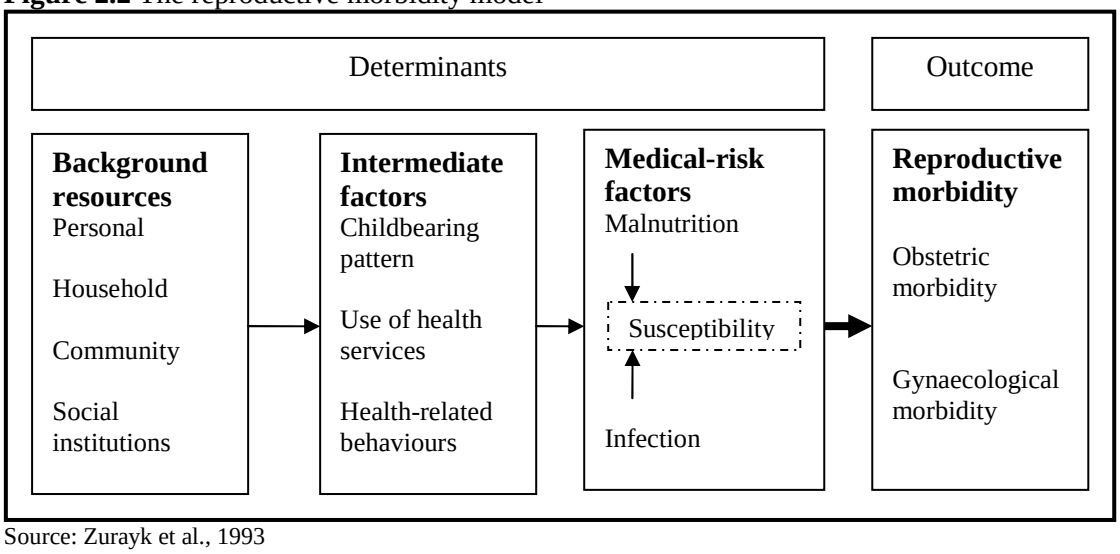
2.2.1 Reproductive health definition

Reproductive health is defined by as "the state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes" (ICPD 1994, p.45). It implies that people are able to have a satisfying and safe sex life, have the capability to reproduce and that they have the freedom to decide if, when and how often to do so (Cohen and Richards 1994). The key determinants of women's health are, according to Fauveau and Chakraborty (1995), nutritional status and reproductive morbidity because they influence pregnancy outcome and child health.

2.2.2 Reproductive morbidity model

Various conceptualizations of reproductive health (Evans et al. 1987, Germaine 1987, Fathalla 1988, Zurayk 1988) consider that reproductive morbidity comprises physical conditions of ill-health related to childbearing and gynaecological risks and diseases. Reproductive morbidity, as defined by the WHO (1990, cited from Sadana 2000 p. 643) comprises "any morbidity or dysfunction of the reproductive tract, or any morbidity which is a consequence of reproductive behaviour including pregnancy, abortion, childbirth or sexual behaviour (and) may include those of a physiological nature". Davis and Blake (1956) and Bongaarts (1978) developed an approach for the analysis of the determinants of various conditions of ill-health in population groups. Their approach categorizes these determinants according to their mode of operation or distance from the outcome of ill-health. Mosley and Chen (1984) adopted this approach and introduced it in the field of health when they tried to synthesize in one model the medical and socio-economic determinants of child survival. The determinants are divided into two categories: intermediate variables which have a biological link to the outcome variable of interest (reproductive morbidity) and background variables which operate through the intermediate variables (socio-cultural context of ill-health). Van Norren en van Vianen (1986) and Winikoff (1987) have added medical risk factors to the model. These factors are more proximate than the intermediate variables and are also known as susceptibility factors. Zurayk et al. (1993) combines these different types of determinants into a reproductive morbidity model (see figure 2.2). The model presents the issues surrounding women's health based on the biomedical model of health. The determinants of reproductive morbidity are divided into three layers.

Figure 2.2 The reproductive morbidity model



Source: Zurayk et al., 1993

The first layer comprises the background resources like the personal resources (education, urban or rural origin, work experience), household resources (resources of husband, housing condition, amenities), community resources (accessibility to health services, support network for health related matters), and social institutions (values related to reproduction and reproductive health

care in the community). The second layer constitutes of intermediate factors such as childbearing pattern (number of pregnancies and births, child spacing, age at childbearing), use of health services (perception of need, as well as availability and quality of services), and health related behaviours (diet, physical workload and personal hygiene practices). The third layer is that of medical risk factors, which includes the general health condition or susceptibility status of the women. Examples within this layer are malnutrition (for instance indicated by anthropometric measures) and infections. The outcome of these three layers is the reproductive morbidity as indicated by obstetric morbidity and gynaecological morbidity. The first includes conditions during pregnancy, delivery and the post-partum period. The second includes conditions of the reproductive tract which are not associated with a particular pregnancy such as reproductive tract infections, anaemia, high blood pressure, obesity, anorexia and syphilis (Zurayk et al. 1993).

Several studies have tested the correlation between personal and geographical characteristics and reproductive morbidity (Sadana 2000). Women are particularly susceptible for ill health due to both their reproductivity and their position in the society. Life styles and specific customs, dietary restrictions and other culturally determined health practices may also contribute to ill health (Hardon et al. 2001). Pickin and St Leger (1993) link this susceptibility for ill health to the life course. They say that the various periods in the life course have specific ramifications in terms of our risk to and possibilities of illness. According to Bathia and Cleland (1995), for example, there is a relation between educational level and reported morbidity. The higher the educational level of the women the higher the reporting of morbidity during the antenatal and natal period. For rural Bangladesh Yunus et al. (1994) state that mother's education, even at elementary level, plays a key role in the development of healthful practices related to disease prevention and the seeking of health services. Culture determines the classification and name giving of illnesses. An Indian study by Patel et al. (1994) asked woman to make a classification of gynaecological illness into four major groups according to their own idea. The first group contained fever and night blindness during pregnancy. The second included miscarriage and heavy bleeding during delivery. The third consisted of heavy bleeding and irregular menstruation and the last group was comprised of urinary tract infections, white discharge, backache and weakness. The women made a link between urinary tract infections and white discharge and considered that they result in backache and weakness. The classification by the women is influenced by (cultural) schemata on health. A study on self-reported gynaecological morbidity by Bathia and Cleland (1995), also in India, shows that approximately one third of the women in the survey (n=3600) reported at least one current symptom of gynaecological morbidity. The most common problems were a feeling of weakness and tiredness (suggestive anaemia), menstrual disorders, white or coloured vaginal discharge (suggestive of lower reproductive tract infections) and lower abdominal pains and discharge with fever (suggestive of acute Pelvic Inflammatory Disease, PID). Bhuiya et al. (1997) carried out a study in rural Bangladesh to examine the local names of the sexual and reproductive health problems of men and women and to get an idea about their perceptions on these problems. They found out that people in the community were aware of reproductive and sexual health problems and that most of the health problems had local names. Among the women *sada srab* (white discharge) scored highest on the salience index, followed by *mashikey gulmal* (menstrual problem) and *sutika* (post partum diarrhoea and burning in the hand and feet). We need to take into account that these names may have regional variation within the country and that they may not be universally accepted.

2.2.3 Model of mother's reproductive and child's survival career

The reproductive morbidity model, as described above (subsection 2.2.2) is amongst others based on the model on child survival by Mosley and Chen (1984) which was elaborated by Van Norren and Van Vianen (1986). Hutter (1998a, 1998b) also adopted this child survival model together with the fertility model by Bongaarts and Potter (1983) and some new variables for the development of a model on reproductive health about mother's reproductive and child's

survival career. The central element of the model is the link between health and the survival of the child and health and the reproductive health status of the mother (Den Draak 2003). The model adopts a life course perspective by including the time component. Figure 2.3 presents the model of mother's and child survival career.

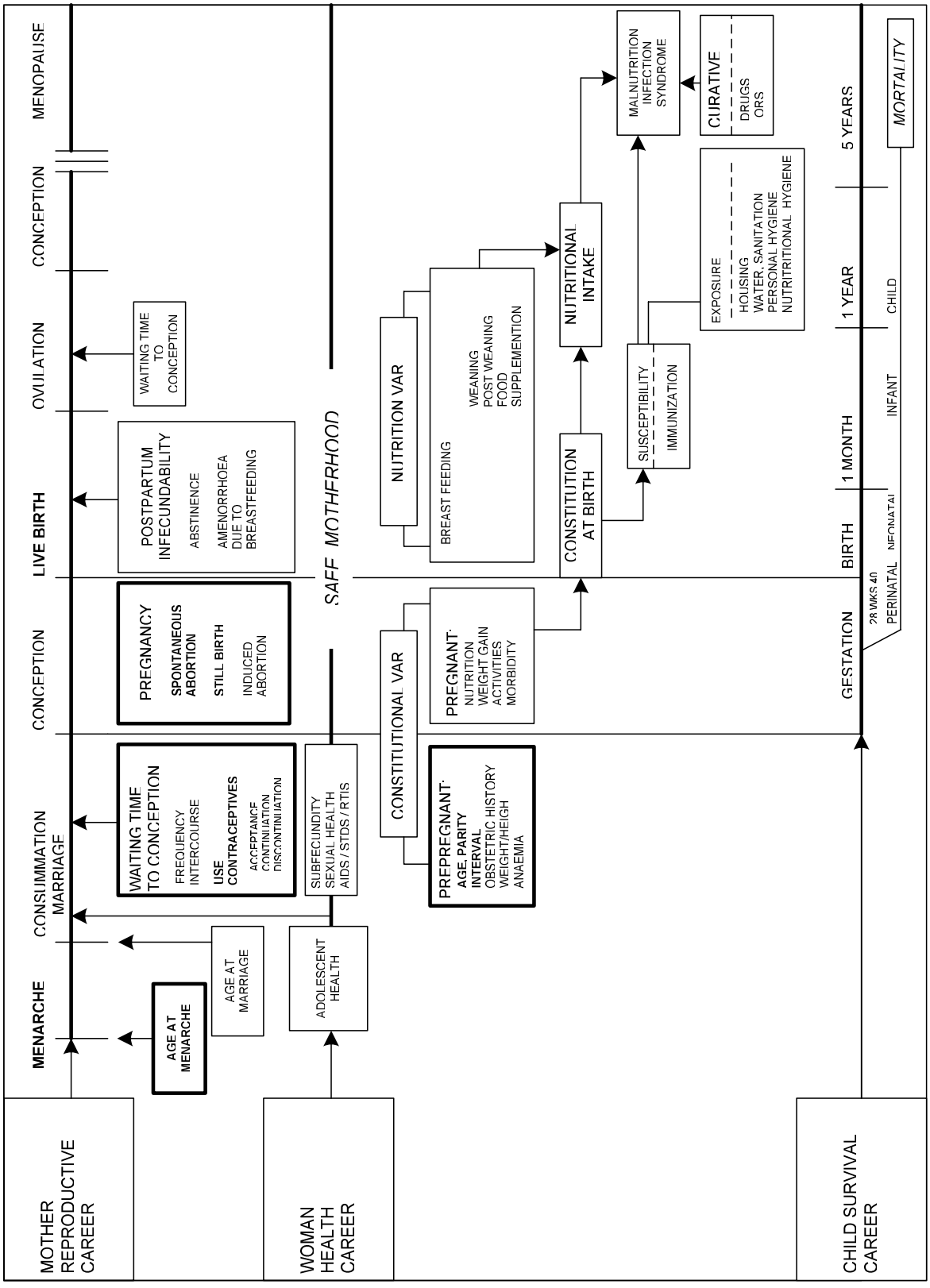


Figure 2.3: Model of mother's reproductive and child's survival career

Source: Hutter 1998a

Three different careers are distinguished: the mother's reproductive career, the child's survival career and the women's health career. The reproductive career starts with menarche and ends with menopause and is further divided into three time periods: pre-pregnancy, pregnancy and post-pregnancy. The child survival career distinguishes the perinatal, neonatal, infancy and childhood period, each with its own morbidity pattern. During pregnancy the mother's reproductive career and the child's survival career interact. Safe motherhood plays an important role in this period. The third career, women's health career, "views women's health for its own sake rather than as an instrument to improve child survival" (Hutter 1998a, p.18). This career contains adolescent health, the health and nutritional status of the women and factors of sexual health such as Sexual Transmitted Diseases (STDs) and Reproductive Tract Infections (RTIs). Because in our study we focus on the interaction between women's general and reproductive health status, we will further describe and discuss the mother's reproductive career and the women's health career below. The concepts used in this study are presented bold and italic in model 2.3.

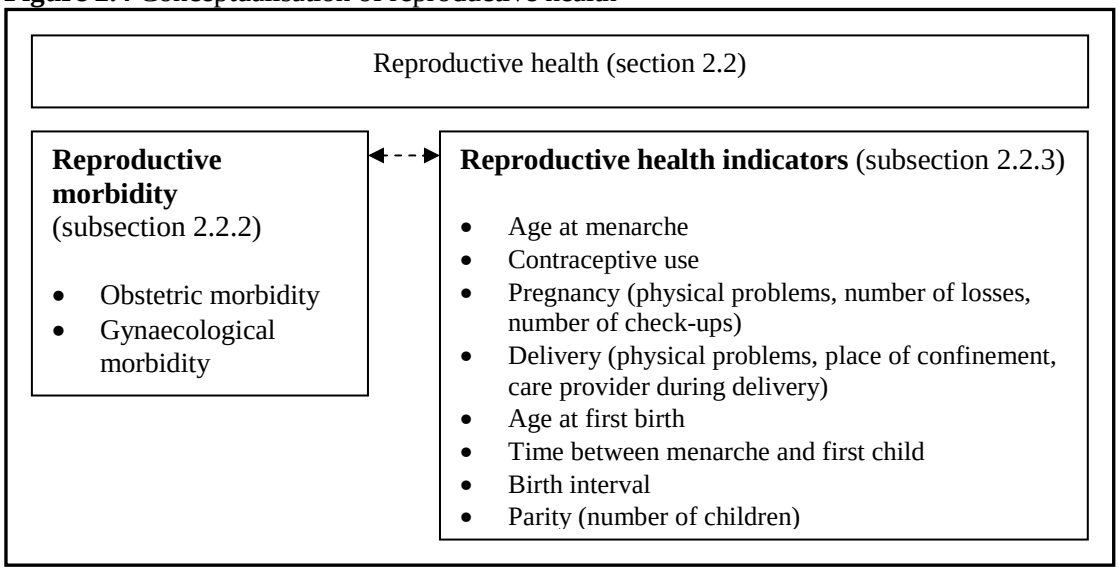
The reproductive career of women comprises reproductive events such as menarche, conception (and ways to prevent conception), pregnancy and interruptions of pregnancy (miscarriage, stillbirth, induced abortion). The average age at *menarche* ranges "from about 12.5-13.0 years in Western countries (Riley et al. 1993) to more than 15 years in developing countries" (Bosch 2005, p. 33). The age at menarche is among others related to the nutritional status of a girl (Chowdhury et al. 1977). Better nourished girls reach menarche earlier than undernourished girls (WHO 2003). The *contraceptive use* rate in Bangladesh is relatively high (53.4 per cent users among currently married women in 2002, including traditional methods) (ICDDR,B 2005) compared to surrounding countries (India 48 per cent, Myanmar 33 per cent and Nepal 39 per cent in 2002) (Population Reference Bureau 2003). The prevailing methods in Bangladesh in 2004 were oral pill (45.1 per cent), traditional methods (18.6 per cent) and injectables (16.7 per cent). The prevailing contraceptive methods in Matlab in 2003 (ICDDR,B area) were injectables (42.7 per cent) followed by oral pill (32.7 per cent) (ICDDR,B 2005). From the same data we reveal that the contraceptive use rate increases with the increase in women's age. Bathia and Cleland (1995) found that nonusers and users of reversible contraceptive methods were less likely to report gynaecological problems than sterilized women. When a woman gets *pregnant*, she needs more rest and more food during the pregnancy. More rest than usual is needed especially in the three months before birth. It also is important for pregnant women to gain weight during the pregnancy, with a total of eight to ten kilograms before the baby is born (UNICEF et al. 1993). *Interruptions of pregnancy* (maternal deaths) by miscarriages (early spontaneous abortion within less than 28 weeks after conception), stillbirths (28 weeks or more after conception) or induced abortions are also part of women's reproductive career. The majority of maternal deaths (about 75 per cent) can be attributed to obstetric causes such as haemorrhage, sepsis, abortion and toxaemias. An important indirect factor for maternal deaths is anaemia (about 15 to 20 per cent) (Mathai 1989). Untreated RTIs and STDs can also lead to miscarriages and stillbirths (Dixon-Mueller and Wasserheid 1991, Nataraj 1994). In 2003 about 81.4 per cent of all pregnancies in Matlab ended in a life birth. The miscarriage rate was 94.6 and the stillbirth rate 25.1 per 1000 pregnancies (ICDDR,B 2005). The stillbirth rate in Kerela (India) was according to the NFSH 1992-1993 lower (18.6 per 1000 pregnancies) than in Matlab in 2003 (Padmadas 2000). Very young women are at higher risk of spontaneous abortions (Roman and Stevenson 1983, cited by Becker 1993). While reviewing nine studies, Weinstein et al. (1993) found that the probability of foetal loss declines after the age of 24 and starts to increase from the late twenties onwards.

Women's (reproductive) health career comprises adolescent health, the health and nutritional status of women, safe motherhood and factors of sexual health such as STDs and RTIs. The pre-pregnant health condition is based on the women's age (at childbearing), parity, birth interval, obstetric history, weight and height and anaemia. UNICEF et al (1993) have formulated some messages about the timing of births and safe motherhood with the aim to safe lives of children and women and to improve their health statuses. One of the prime messages is that "becoming

pregnant before the age of 18 or after the age of 35 increases the health risks for both mother and child" (UNICEF et al, p.4). A woman is not physically ready to begin childbearing until about the age of 18 years, the birth itself is likely to be more difficult and the risks to the mothers' health are greater. Levels of adolescent childbearing for Bangladesh are among the highest in the world: 117 births per 1000 girls aged 15 to 19 in 2002 (UNFPA 2003). Mean ages at first conception in Matlab were 18.3 years in 1977, 19.5 years in 1982 and 20.3 years in 1985 (Fauveau 1994). The risks of pregnancy and childbirth increase again after the age of 35, especially when the women have had four or more previous pregnancies (UNICEF et al. 1993). The women's body can easily become exhausted by repeated pregnancy, childbirth, breastfeeding and looking after small children and after four pregnancies there is an increased risk of health problems such as anaemia and haemorrhage. Reproductive morbidity increases with the number of pregnancies and births and with shorter birth intervals (Dixon-Mueller and Wasserheit 1991, UNICEF et al. 1993). A birth interval of less than 24 months is a risk for both mother and child. The mother needs two years to recover completely from pregnancy and childbirth. Women's general health status is affected by close spacing, especially when the woman is living in poverty (WHO 1991). Some studies point to the prevalence of nutritional anaemia (Gopalan 1989, UNICEF 1991), "a disorder which is aggravated during pregnancy and delivery and perpetuated by repeated and rapidly succeeding pregnancies" (Hutter 1998a, p.101). A short birth interval might affect the maternal depletion syndrome; maternal depletion can be indicated by the nutritional status as indicated by Chronic Energy Deficiency (CED). The CED is reflected by the Body Mass Index. Safe motherhood can be enhanced by for example, regular pregnancy check-ups and assistance of a trained person at delivery. Risks of childbirth can be reduced by regular pregnancy check-ups by a health worker and by the assistance of a trained person during delivery. Pregnancy check-ups can prevent mother and child from health problems such as anaemia, tetanus and malaria and the care provider can advise the mother about the childbirth, breastfeeding and delay of next pregnancies. Assistance of a trained person during delivery is needed to control the health situation of both the women and the child. In Bangladesh, 67 per cent of all pregnant women have never made an antenatal care visit during pregnancy, about 92 per cent delivers at home and 87 per cent delivers without a skilled birth attendant (ICDDR,B 2002). Births are attended by untrained relatives and neighbours who generally lack knowledge about hygiene and safe-delivery practices (Ross 1996). Bathia and Cleland (1995) found that women who delivered their last child in a private clinic reported less gynaecological problems compared to women who delivered the last child at home or in a government hospital.

Figure 2.4 presents the measures applied in this study used to assess the reproductive health status. The figure is based on aspects of the reproductive morbidity model (subsection 2.2.2) and on aspects of the model of mothers reproductive and child's survival career (subsection 2.2.3).The women's reproductive career and the women's health career are in the rest of this study combined into the women's reproductive health career.

Figure 2.4 Conceptualisation of reproductive health



2.3 The influence of culture

In this section we describe the influence of culture on the perception of health. Culture is a factor at the macro level which may influence the *perceived* health status. People in different cultures have different ideas about health. Nothing has a fixed meaning when subjects are studied within their context. As the context changes, the meaning of the studied subject will also change (Hardon et al. 2001). Culture affects our perceptions and experiences of health and illness in many ways, these perceptions and experiences change as culture changes (Loustaunau and Sobo 1997). The concept of folk illness is an example of the cultural meaning given to an illness or disease. A folk illness is a syndrome from which members of a particular group claim to suffer and for which their culture provides aetiology, a diagnosis, preventive measures and regimes of healing (Rubell 1977).

The ways in which we perceive and interpret health and illness, and seek and deliver care, are inextricably bound up with cultural norms, beliefs and values as well as with social structures and environmental conditions (Loustaunau and Sobo 1997). The 'Explanatory Model' (EM) of illness by Kleinman (1980) is useful within this process of patterning, interpreting and threatening illnesses. Kleinman's model places an emphasis on cognitive processes such as the belief systems on health and illness. The model has taken a central place in research on particular illnesses or health problems to present a coherent picture of the features that affect people's health behaviour and to understand individual's explanations for those illnesses or health problems (Loustaunau and Sobo 1997). An explanatory model for a particular health problem should consist of signs and symptoms by which the problem is recognised, presumed causes of the health problem, recommended therapies, the patho-psychology of the health problem and a prognosis (Ibid. 1997).

The cognitive and symbolic approach is one of the theoretical perspectives in the general framework of the anthropological approach. It has proven to be very useful in medical anthropology. This approach deals with questions such as: what is illness (or health) and how do people explain and label illness (or health) (Hardon et al. 2001) and can be used to indicate the characteristics of health and illness in rural Bangladesh. What is illness to one person or one culture may be no problem to another and visa versa. A health problem that is identified in the United States as a mental illness can be interpreted in another culture as "a favour from God in allowing an individual to understand and see what others cannot" (Adair et al. 1988, p206-207). Women have their own vision on identifying health problems. Their health behaviour is, according to earlier research, guided by what they perceive as good or ill health whether it is consistent with the biomedical model or not (Zurayk et al. 1993). It is important

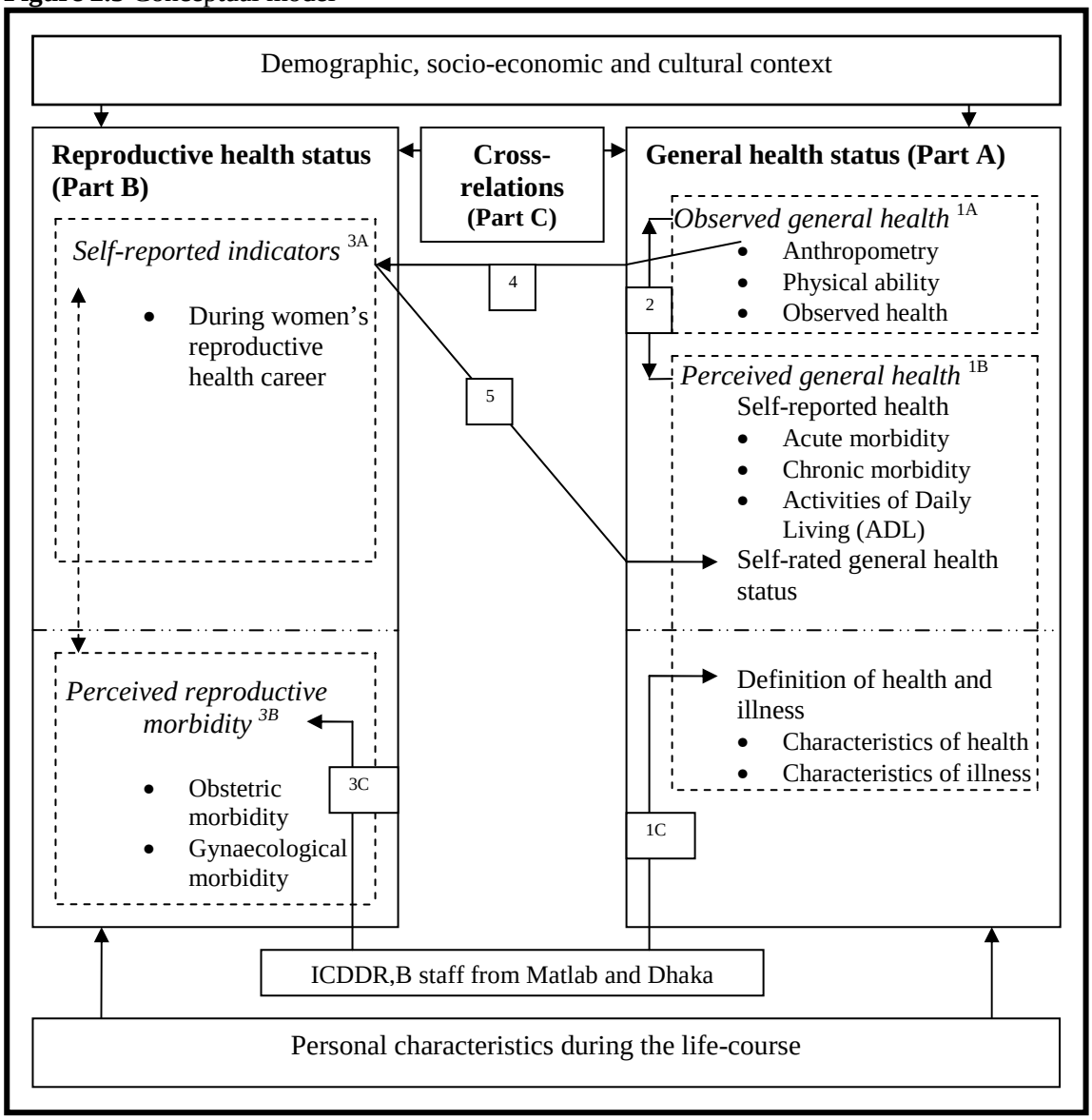
to have a clear understanding of the context in which health problems arise, how women define their health problems, how they manage their own and their family's health and how they choose their health care options (Pachauri 1994). Visual signs of health also differ between countries and cultures. In the United States women strive for thinness while in Jamaica a plump female body is much more appealing (Sobo 1994). People in Fiji also strive for fat bodies because they signify it with wealth of social connections and financial resources and thus 'health'. This perspective on body structure seems to be a general picture in several poor developing countries (Becker 1994). A study on women's health in Bangladesh by Jorgenson (1983) illustrates that during pregnancy most of the women under study did not consider themselves ill, in the sense that they sought medical help or treatment or that they stayed in bed. Usually the women sought treatment when they felt that ill that they could no longer work. Another study in Bangladesh found out that there is a distinction between the illnesses which did not affect the performances of the women so that there was no need for treatment and the illnesses which disturbed their performance and treatment was needed (Islam 1985).

In the Bangladeshi culture illness is related to behaviour which is not in line with the normative behaviour as prescribed by the society. Recovery of illness is considered to be dependant on the wishes of God (Yunus et al. 1994). Health, based on the lay theories of illness causation, is in many non-western countries conceived as a balanced relationship between man and man, man and nature, and man and the supra-natural world (Helman 1984). The meaning of health underlies the biomedical model (Young 1998). The cause of illness is an important factor in analysing the health situation (Glick 1967). Health problems can be attributed to phenomena such as pathogens, accidents or physical degeneration. On the other hand they can also be attributed to supernatural relationships that do not meet idealized cultural standards and then they may be treated accordingly (Clarck et al. 1991). Concepts such as cold and hot, purity and pollution are in a lot of cultures also important phenomenon about health and illness (Blanchet 1984, Helman 1984). Blanchet explains several theories of disease in Bangladesh. According to these theories disease and illness is related to the anger of a goddess, to imbalance of hot and cold in the body, impoverishment of the blood and to a wrong diet (1984). In Bangladesh it is generally accepted to search for reasons behind events when illness occurs (Aziz and Maloney 1985). A study in Matlab, Bangladesh about miscarriage and stillbirth identified that women in general believed that miscarriage might result from evil eye or evil spirit because they belief that spirits are fond of pregnant women (Ibid. 1985).

2.4 Conceptual model

In this section the conceptual model adopted in this study is presented. The model is derived from the theoretical framework as described in the previous sections 2.1 to 2.3. The theoretical framework consists of two main concepts which are the basis for our model: general health (Part A) and reproductive health (Part B). In Part C, the cross-relations between these two concepts is made. Figure 2.5 (see next page) presents the conceptual model; the numbers are related to the concerning research questions as formulated in chapter 1.

Figure 2.5 Conceptual model



The main concepts, general health and reproductive health, are studied in relation to personal characteristics during the reproductive life course and within the demographic, socio-economic and cultural context of rural Bangladesh. As described in chapter 1, this study is divided into 3 parts. In the conceptual model we refer to these parts by A (general health), B (reproductive health) and C (the cross-relations between general health and reproductive health).

The *general* health status (Part A of the model) focuses on observed general health, perceived general health and the relation between observed and perceived health (section 2.1).

- Research question 1^A refers to *observed* general health status of the women as indicated by: anthropometry, physical ability and as according to the interviewer (subsection 2.1.1).
- Research question 1^B refers to the general health status as *perceived* by the women themselves. It is indicated by self-reported health, the self-rated general health status and by their definition of health and illness (subsection 2.1.2).
- Research question 1^C addresses on the perceptions of women and ICDDR,B staff in Matlab and Dhaka on health and illness (subsection 2.1.3).
- Research question 2 refers to the possible relation between the *observed general* health status and the *perceived general* health status (subsection 2.1.3).

Reproductive health (Part B), central to research question 3, focuses on self-reported reproductive health status and the perceived reproductive health problems (section 2.2).

- Research question 3^A focuses on the reproductive health status of the women as indicated by the *self-reported reproductive health indicators* (subsection 2.2.3).
- Research question 3^B is adressed to the *perceived reproductive morbidity* of the women studied on the basis of the reproductive morbidity model by Zurayk et al. (1993) (subsection 2.2.2 and 2.2.3).
- Research question 3^C focuses on the reproductive problems of the women as perceived by the ICDDR,B staff in Matlab and Dhaka.

In Part C of the model the link is made between the *general health status* and indicators of the *self-reported reproductive health status* and follows from the research questions 4 and 5.

- Research question 4 focuses on the relation between anthropometry and the indicators of the self-reported reproductive health status (subsections 2.1.1 and 2.2.3).
- Research question 5 focuses on the relation between self-reported indicators of reproductive health status and the self-rated general health status.

3. Methodology and Data

This chapter describes the research design, the data and the methods of our study and is organised as follows: first we formulate our hypotheses (section 3.1) after which we operationalise the main variables (section 3.2), then we describe the study area (section 3.3) and at the end we describe the data and methods of data collection (section 3.4).

3.1 Hypotheses

On the basis of the research questions as presented in chapter 1, this section presents the hypotheses for our study. The hypotheses are presented by research question and we follow the organisation of the research questions as presented earlier. First we present the hypotheses about the *general* health status (Part A), then we present the hypotheses about the *reproductive* health status (Part B) and finally we present the hypotheses about the *relation* between the general health status and the reproductive health status (Part C).

Part A: general health status
Research question 1: What is the general health status of the women of reproductive age…

a. as indicated by observed measures?
b. as perceived by the women themselves?
c. according to ICDDR,B staff in Matlab and Dhaka?

Research question 2: What is the extent of correspondence between the women's observed general health status and their perceived general health status?

Main literature about these questions is presented in sections 2.1 and 2.3:

- More than 50 per cent of the women in Bangladesh are underweighted (Gillespie and Flores 2000). We know from Huffman et al. (1985) and Ford and Huffman (1988) that particularly women in rural Bangladesh are considered to be chronically malnourished and their mean weight is lower than that of a reference population. Of the rural (poor) women, 57 per cent is less than 147 centimetres in height as a result of stunting, almost all mothers weight less than 50 kilogram (Ross et al. 1996), and 47 per cent have a BMI below 18, indicating underweight (WHO, 2003) (subsection 2.1.1).
- In the cultural context of Bangladesh there is a tendency to report that someone is fairly healthy in case of a good health because people are afraid to attract the attention of evil spirits with saying that they feel healthy (Rahman and Barsky 2003) (subsection 2.3). For women in Bangladesh there is a difference between illnesses that affect the performances and illnesses that did not affect performances (Islam, 1985). Disease and illness is related to the anger of a goddess, to imbalance of hot and cold in the body, impoverishment of the body and to a wrong diet (Blanchet 1984) (subsection 2.3).
- Health perception is dependent on the personal, socio-economic, demographic and cultural context in which someone lives. Zimmer et al. (2000) for example state that education may have an influence on the self-assessment of health. Given the fact that the ICDDR,B staff is generally better educated than the women in Matlab and that the context in which they life is different we formulate hypotheses 2 and 5 (subsection 2.1.2).
- Comparative studies by, among others, Krueger (1957) and Belcher (1976) state that *objective* health measures and *subjective* health measures may measure fundamentally different aspects of health and illness. However there are no insights about the direction of the differences (subsection 2.1.3).

Hypothesis 1: The general health status of the women, irrespective of measurement is not adequate.
Hypothesis 2: Women of reproductive age in Matlab define different health definitions as compared to ICDDR,B staff.
Hypothesis 3: The observed general health status and the perceived general health status of the women do not correspond with each other.

Part B: reproductive health status

Research question 3: What is the reproductive health status of the women…

a. according to the self-reported reproductive health indicators?
b. according to the women's perceived reproductive health problems?
c. according to ICDDR,B staff in Matlab and Dhaka?

Main literature about this question (section 2.2):

- Becoming pregnant before the age of 18 or after the age of 35 increases the health risks for mother and child (UNICEF et al. 1993) and the prevalence of reproductive morbidity is higher among the early and late childbearing age-groups (Dixon-Mueller and Wasserheit 1991) (subsection 2.2.3). Levels of adolescent childbearing for Bangladesh are among the highest in the world: 117 births per 1000 girls aged 15 to 19 in 2002 (UNFPA 2003).
- Having more than four children increases the health risks of pregnancy and childbirth (UNICEF et al. 1993) and reproductive morbidity increases with the number of pregnancies and births and with shorter intervals (Dixon-Mueller and Wasserheit 1991). A birth interval of less than 24 months is a risk for both mother and child (UNICEF et al. 1993) (subsection 2.2.3).
- Pregnancy check-ups can prevent mother and child from health problems (such as anaemia, tetanus and malaria) and the care provider can advise the mother about the childbirth, breastfeeding and delay of next pregnancies. Assistance of a trained person during delivery is needed to control the health situation of both the women and the child (UNICEF et al. 1993). In Bangladesh, 67 per cent of all pregnant women never made an antenatal care visit during their pregnancy, about 92 per cent delivers at home and 87 per cent delivers without a skilled birth attendant (ICDDR,B 2002) (subsection 2.2.3).
- Women in rural Bangladesh perceived *sada srab* (white discharge), *mashikey gulmal* (menstrual problem) and *sutika* (post partum diarrhoea and burning in the hand and feet) as the most important *reproductive* and *sexual health* problems in their community (Bhuiya et al. 1997) (subsection 2.2.3).
- The most common *gynaecological* problems reported by women were a feeling of weakness and tiredness (suggestive anaemia), menstrual disorders, white or coloured vaginal discharge (suggestive of lower reproductive tract infections) and lower abdominal pains and discharge with fever (suggestive of acute Pelvic Inflammatory Disease, PID) (Bathia and Cleland 1995)

Hypothesis 4: According to a selection of UNICEF et al. (1993) indicators of the reproductive health status, the reproductive health condition of the women can be indicated as low.
Hypothesis 5: Women of reproductive age in Matlab define reproductive health problems differently as compared to ICDDR,B staff.

Part C: the cross-relations between the general health status and the reproductive health status.

Research question 4: How does the anthropometry of the women relates to their self-reported reproductive health status?

Research question 5: Which self-reported indicators of the reproductive health status relate to the perceived general health status?

Main literature can be found in subsection 2.2.3:

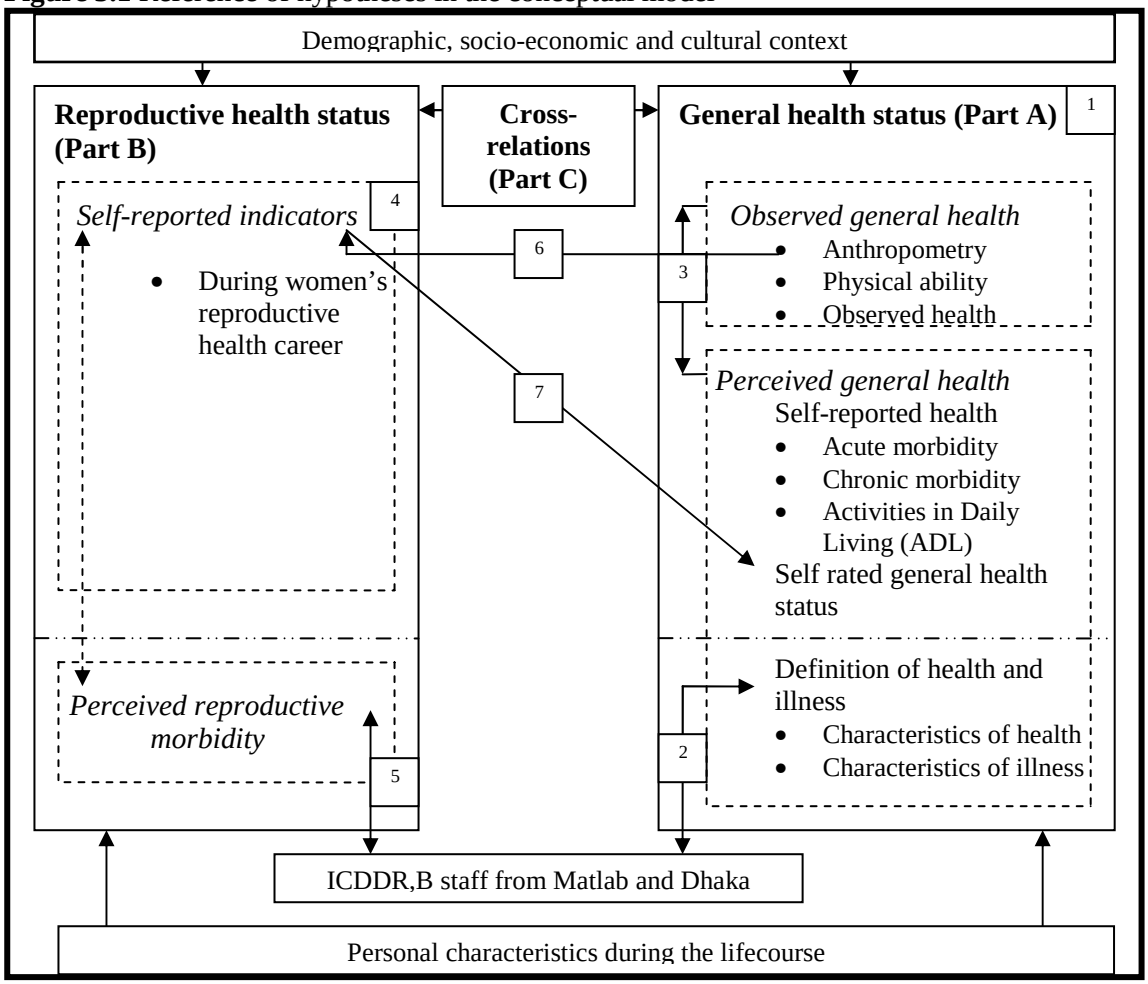
- The age at menarche is, among others, related to body weight (Chowdhury et al. 1977) and the nutritional status of a girl, better nourished girls reach menarche earlier than undernourished girls (WHO 2003) (subsection 2.2.3).
- Low weight and short height are risk factors during pregnancy and especially childbirth. Women with a weight below 45 kg and a height less than 145 cm are considered to be at obstetric risk (WHO 2003) (subsection 2.1.1).

However, no literature could be found about the relation between indicators of the self-reported *reproductive* health status (discussed in subsection 2.2.3) and the *perceived general* health status (discussed in subsection 2.1.2).

Hypothesis 6: Women with a sub-normal anthropometry report a lower reproductive health status compared to women with a normal anthropometry.
Hypothesis 7: There is a strong relation between the self-reported reproductive health status and the self-rated general health status.

The hypotheses formulated above are visualised in figure 3.1 (see next page). This figure presents the conceptual model with the numbers of the corresponding hypotheses. The numbers one to three refer to the general health hypotheses, four and five to the reproductive health hypotheses, six to the relation between anthropometry and the self-reported reproductive health status and seven to the relation between the self-reported reproductive health status and the self-rated general health status.

Figure 3.1 Reference of hypotheses in the conceptual model



3.2 Operationalisation of main variables

In this section we describe how we define and measure the main concepts from the conceptual model (figure 2.5, section 2.3). The operationalisation follows the same structure as chapter 2, first we operationalise the main general health variables (subsection 3.2.1) after which we operationalise the main reproductive health variables (subsection 3.2.2).

3.2.1 General health status

The main general health variables from the conceptual model as presented in chapter 2 (figure 2.4, section 2.3) are: observed general health (subsection 2.1.1) and perceived general health (subsection 2.1.2).

Observed general health

The observed health status can be measured in many ways. In this study it is assessed by anthropometry, measured physical ability to perform Activities of Daily Living (ADL) and by observation of the interviewer. The anthropometry of the women is measured by weight, height and Body Mass Index (BMI). Weight and height are measured in the survey. The height is generally measured in standing position but a few exceptions are measured in laying down position (Rahman et al. 1999). Weight is measured only once, in kilograms (Ibid. 1999). We do not make a distinction between the two measurement methods. The Body Mass Index (BMI) indicates weight relative to height (calculated by the weight in kilogram divided by the height^2 in meters (WHO 1991)). BMI indicates Chronic Energy Deficiency (CED). With the physical test the ability of the women to perform ADL such as: walking, standing up from a chair, standing et cetera is tested by asking the women to walking and standing up from a

chair. The third observed measure, observed health by the interviewer, is the general health status of the women at time of the survey indicated by the interviewer. There were no specific guidelines provided to the interviewer for the indication of the general health status.

Perceived general health
Perceived general health comprises of: indicators of the self-reported general health status, the self-rated general health status and the health and illness definition of the women. In this study, *self-reported general health* is assessed by the reported acute morbidity, chronic morbidity and by ADL. For acute morbidity we examined if a woman reported that she suffered from the listed problems during the month before the survey. We look at the following listed acute morbidities individually: headaches, eye infection, toothache, symptoms of cough, fever or cold, vomiting, fever with chills, watery diarrhoea, loose stool, skin problems and accidental causes and at the acute health problems in general. For chronic morbidity, we examined also if the woman has reported that she suffered from the listed problems. But now the women were asked if she suffered from the problem during the year before the survey took place. The listed chronic diseases were: anaemia, arthritis or rheumatism, broken bones, asthma, respiratory diseases, diabetes, pain in passing urine (burning sensation), paralysis, tuberculosis, gastric problems and edema. The last self-rated general health indicator is ADL. The ADL comprises the reported ability of women to: walk for a mile, to carry a heavy load, to draw a pail from a tube-well, to stand up from a sitting position on the floor, to use a ladder, to sit on the floor with bent knees, to stand up from a sitting position on a chair and to bow. This measure has a link (but does not measure exactly the same) with the observed physical ability test. The *self-rated general health status* is indicated by the women themselves and comprises her general health status as rated by the woman herself. Interpretation of this measure could be enhanced when we know more about how the women in Matlab define health and illness. The *definition of health and illness* is indicated by the characteristics of health and illness according to the women. In order to see differences, commonalities and complementarities we also look at the characteristics of health and illness as defined by ICDDR,B staff in Matlab and Dhaka.

3.2.2 Reproductive health status

The reproductive health status can be measured in many ways. In this study it is indirectly measured by self-reported indicators (subsection 2.2.3) and more directly measured by perceived reproductive health problems (subsections 2.2.2 and 2.2.3).

The *self-reported reproductive health indicators* used in this study are:
- Age at first menstruation
- Contraceptive use
- Pregnancy (pregnancy losses, physical problems during pregnancy and pregnancy check-ups)
- Delivery (physical problems at delivery, care provider delivery, place of confinement)
- Age at first birth
- Time between menarche and childbearing
- Birth interval
- Parity

These indicators are primarily based on the model of mother's reproductive and child's survival career and elaborated by other secondary literature (as presented in chapter 2, subsection 2.2.3). Through the influence of these self-reported reproductive health indicators on the perceived general health status we get to know something more about the perceived reproductive health status.

In this study, *perceived reproductive health* contains the reproductive health problems reported by the women. The women were asked to list the most prominent reproductive health problems in their area. Additionally ICDDR,B staff in Matlab and Dhaka were also asked about reproductive health problems prevalent among the women in Matlab.

3.3 Research area: Matlab

This section describes our study area: Matlab. The Matlab *thana* (sub region) is a subdivision of Chandpur district. Matlab is the central town in this *thana*. The town Matlab is situated about 50 kilometres southeast of Dhaka, the capital of Bangladesh (see figure 3.2, next page).

Bangladesh is with a population density of about 1589 people per km^2 one of the most populated areas in the world (Population Reference Bureau, 2004). Population density becomes higher during monsoon season when the water level rises about 4 meters compared to the dry winter season. About 70 per cent of the surface of the country is covert by water. The Matlab *thana* is located in the river delta of the Padma and the Meghna (Fauveau 1994). The total population in the Matlab *thana* in 2003 was 224,154 (ICDDR,B 2005). The primary occupations in Matlab are to be found in agriculture and fishing, for which the methods are traditional. Common crops are rice, miller, jute, pulses, oil seeds, potatoes, wheat, onions, chillies, turmeric and other spices. The socio-economic status is generally low (Fauveau 1994). Women's social status in the Bangladesh is influenced by the institution *purdah. Purdah* is "a socio-cultural norm, perpetuated by religion, which defines women's roles by enforcing a high standard of female modesty, dictating propriety in deed and thought, restricting mobility and limiting autonomy" (Ross 1996, p.33). Islam is the greatest religion in Bangladesh, 88 per cent of the total population is Muslim (Amin et al. 1997)

ICDDR,B has collected data in Matlab since 1966. Each individual in the Matlab *thana* has an permanent registration number, the Registration Identification Number. This number enables researchers to link information over time. This number makes the data collection in Matlab relatively unique because the complete life histories of every individual born in the area have been recorded. Currently 224,154 people and 142 villages are under observation in the Health and Demographic Surveillance System (HDSS) (ICDDR,B 2005). In this system the Community Health Research Workers (CHRW) collect monthly data on vital events (birth, death, marriage and migration), occupation and education of the individuals. The head of the household identifies which persons belong to the household. The CHRW registers each event and reports every month (normally at the Block-meeting) to the Health Assistant (HA). The Health Assistant reports data to the Matlab Field Research Station. Data entry takes place in Matlab, subsequently data is transferred to the HDSS department of ICDDR,B (Ross 1996).

In Matlab a treatment area (or government area) is distinguished from the comparison area (or ICDDR,B area). In both areas are health services provided by the government, in the treatment area additionally special services for Maternal and Child Health and Family Planning (MCH-FP) are provided by ICDDR,B. The services are provided to women aged between 14 and 49 and to under-five children (Ross, 1996). The treatment area comprises currently 67 villages (ICDDR,B 2005). In these villages information about reproductive events, reproductive status (lactating, menstruating and pregnant), maternal status and under-five morbidity is collected in the Record Keeping System (RKS). This system covers about 16,000 women. The RKS data are like the HDSS data updated every month by the CHRW and subsequently transmitted to the Matlab Field Research Station for data entry and to the HDSS department in Dhaka (Fauveau 1994).

Figure 3.2 Map showing the location of Matlab in Bangladesh

Source: ICDDR,B GIS Unit, edited by Haq and De Jong

3.4 Data

This section describes the data set used for analysis and the methods of analyses and is divided into two parts. The first part is based on quantitative data derived from the Matlab Health and Socio-economic Survey (MHSS) (subsection 3.4.1). The second part is based on qualitative data collected by free-listing among women in Matlab and ICDDR,B staff in Matlab and Dhaka (subsection 3.4.2). For each part we describe the data (collection), the data quality and the methods used for analysis.

3.4.1 Quantitative data: survey

The dataset we used as basis for the quantitative part of our study is the Matlab Health and Socio-economic Survey (MHSS), a prospective survey from 1996. The dataset is free available on the internet[2]. The survey is conducted to examine health status, health care utilization, social network characteristics, and the impact of community service and infrastructure with respect to adults and elderly persons residing in the Matlab *thana* of rural Bangladesh. The dataset consists of four separate samples of which we use the following two samples:

1. Main household data (MHD): Primary random sample of 4364 households, clustered in 2883 *baris* (residential compounds); this is approximately a 33 per cent random sample of the total numbers of *baris* in the Matlab Surveillance area. The actual number of *baris* in which the interviews took place was 2781.
2. Determinants of Natural Fertility Survey (DNFS): follow up groups of 2441 women in 1790 households, the women were interviewed about their health and pregnancy status in mid 1970s. 2273 DNFS women were still alive form the 1970s sample. From these women, 1806 DNFS women were involved in the MHSS survey (80 per cent sample) (Rahman et al. 1999).

One of the main reasons to choose Matlab for this survey was the existence of the Demographic Surveillance System (DSS) which allows accurate determination of ages and the possibility to make a link with data of studies carried out previously (Van Ginneken et al. 1998). "The Matlab surveillance system data (the MHSS is part of it) have been used extensively in the demographic literature and are considered to be one of the few high quality (i.e. complete, accurate and up to date) data sources in the developing world. Particularly the age reporting is considered to be highly accurate, which is a feature not found in other South Asian data sources" (Menken and Phillips 1990, cited by Rahman and Barsky 2003, p. 857). The data quality has, according to us also some drawbacks. For example, the respondents were asked about diseases such as their (self-reported) anaemic status. There is a chance that people suffer from anaemia (or another disease) but don't know what it is. Then the chance that people report that they suffer from it is small. Further, because people go with health problems more often to a traditional healer than to a trained physician, the medical terms in the survey might be not understood by the respondents. Also the reporting of some of the reproductive indicators (as presented in figure 3.2, subsection 3.2.2) such as the date of pregnancy outcome might be difficult for the respondents (especially for stillbirths and miscarriages) because it may be a long time ago. The results obtained from the measures with a long time between the event and the survey may differ from results obtained from measurement. The results may give an under or over reporting of events, amongst others due to the time gab between the event and the survey and the 'medical' language used in the survey.

The dataset was prepared for analysis based on the criteria for our study population and the data available. Our study population comprises women of reproductive age (15 to 49 years). The age of 15 is the minimum age because the survey does not provide information about reproductive health indicators for women below the age of 15. For the maximum reproductive age we choose 49 because this age is used in many studies by ICDDR,B on reproductive

[2] The survey was funded by P01 Grant P01AG11952 from the national Institute of Aging and it is a collaborative effort of RAND, the Harvard School of Public Health, the University of Pennsylvania, the University of Colorado at Boulder, Brown University, Mitra and Associates and the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). More information about the MHSS dataset is available on: www.rand.org/labor/FLS/MHSS

health (see for example ICDDR,B 2005). The reproductive age is divided into the following three categories: the youngest age-group comprises of women who are aged from 15 to 24, the second age-group with women aged 25 to 34 and the third age-group with women from 35 to 49 years. A data file with all women aged 15 to 49 years based on book one (household characteristics), book three (general health), book four (ever married women, reproductive health) and book six (physical measurement and anthropometry) of the questionnaire was created as main data file (Rahman et al. 1999). The dataset was not easy to handle because the format of several files was not usable for most of the analyses. Recoding and transforming of the file was needed (especially self-reported morbidities and reproductive indicators). After this transformation, several separate files based on selected topics for this study were created for analyses purposes. The analyses of the dataset are done by means of frequency tables and explorative analysis, cross-tabulation and binary logistic regression. Frequency tables and explorative analysis were done to explore the data and to identify missing and extreme cases. Correlation analyses were done to indicate the relation between measures and with binary logistic regression the direction of the correlation between measures was studied.

3.4.2 Qualitative data: free-listing

The qualitative part of this study comprises the exploration of health definitions and reproductive health problems as perceived by the women in Matlab by the use of free-listing. Free- listing is an established technique in qualitative research with applications to reproductive health. It is a technique to reveal underlying health beliefs by asking respondents to list as many items as possible on a particular subject (Hudelson 1994). The free-listing interviews were done in two steps: first a pilot and second the actual data collection.

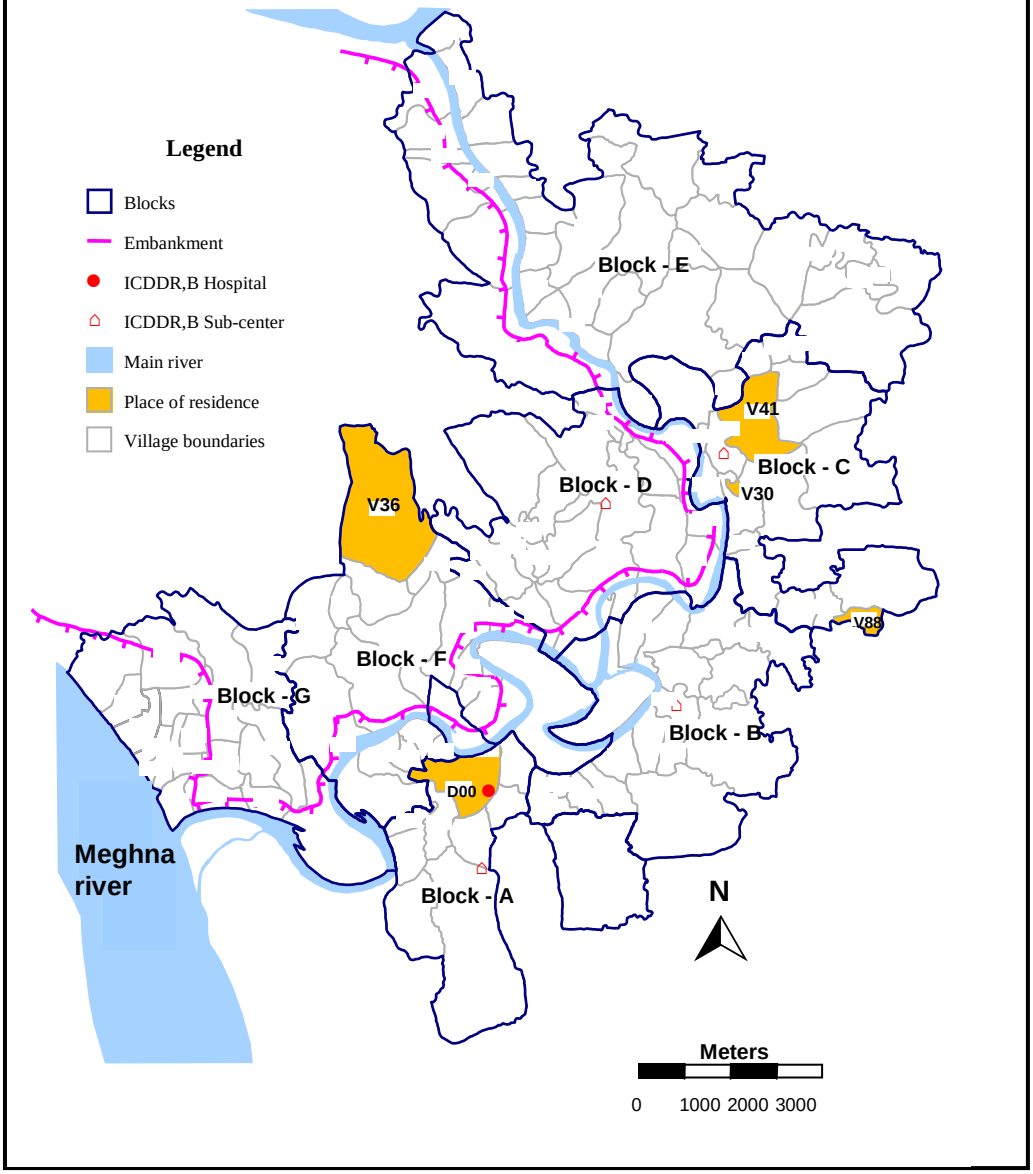
For the pilot we selected two Bangladeshi women (25 and 48 years of age) working at the Dutch Club to test our questions about their health definition and their perceived reproductive health problems. These women had some knowledge of English that is why the interviews were done in English. The women were first asked to list all *characteristics of being healthy* that came in mind, and second to do the same for the *characteristics of being ill.* We have asked about health and illness because we wanted to see if there was a difference for them between the characteristics of health and the characteristic of illness or that being ill was just the opposite of being healthy. In the pilot we learned that *health* and *illness* had different characteristics and were not just the opposite from each other. Next, we asked the women to list the most prominent reproductive health problems for women in Bangladesh. The women were able to make a list of problems and to rank the most prominent three problems. The final list of free-listing questions which we have used for the actual data collection is presented in Appendix A.

The second step involved the actual data collection. First we have done the interviews with ICDDR,B researchers and second in we have done interviews with 15 women and with ICDDR,B staff in Matlab. At ICDDR,B in Dhaka six researchers with a background in nutrition, epidemiology, demography, anthropology and medicine were approached for an interview. Two of the researchers have also given a lot of additional information about the culture and beliefs in Matlab and the women in Matlab. First the researchers were asked to list the characteristics of health and illness for themselves *and* for the women in Matlab. Second, they were asked to list the most prominent reproductive health problems among women in Matlab.

Selection of the women and Matlab staff

The interviews for the women and ICDDR,B staff in Matlab were prepared in Dhaka. Two villages were selected for interviews with women of reproductive age, one in the treatment area (close to the Matlab Field Research Station) and one village in the comparison area (no ICDDR,B facilities available). This was done because there might be differences in the health situation in the two areas. For the free-listing interviews we wanted to interview women had also been involved in the MHSS. We have made a link between our MHSS dataset and the Health and Demographic Surveillance System (HDSS) to see which women were still in the surveillance system and in which village they currently live in. The two selected villages, Charmukundi (in the treatment area, D00) and Ludhua (in the comparison area, V36) had at least 20 possibly available women for our interview, had a Community Health Research Worker (CHRW) who was willing to go with us to the women in the villages and were logistic good accessible by foot, rickshaw, car or speedboat. In Charmukundi six women were selected by the CHRW and in Ludhua four. All women were between 23 and 57 years old (between 15 and 49 years in 1996), were (ever) married, (have) had at least 1 child and were Muslim. Because we had somewhat more time available than expected, two more women were selected at the sub-centre of Block C and three women from Paton (V41) a village relatively close to the sub-centre of Block C. These last five women had not been involved in the MHSS but were involved in the Health and Demographic Surveillance System (HDSS). The CHRW, a familiar person for the women, was asked to introduce us to the women. After this introduction the women were very cooperative. The Matlab area is divided into seven Blocks. The Blocks A to D belong to the treatment area and the Blocks E to G belong to the comparison area. Each Block in the treatment area has its own sub-centre. Figure 3.3 (next page) presents a map with the places of residence of the interviewed women as well as the Blocks A to G.

Figure 3.3 Place of residence of the interviewed women



Source: ICDDR,B GIS unit, edited by Haq and De Jong

Among the ICDDR,B staff in Matlab are the Community Health Research Workers (CHRW), the Field Research Supervisors (FRS), Field Research Officers (FRO) and the Senior Supervisor. We have visited three Block-meetings in Matlab (a monthly meeting of the CHRWs and their supervisors), at each of these meetings were CHRWs and FRSs asked to involve in the free-listing interviews (with the criteria that the CHRW had at least one year experience in her work). A total of 10 CHRWs and three FRSs have been interviewed. The Senior Supervisor and a FRO were interviewed at the Matlab Field Research Station.

The quality of the collected data is influence by the interview setting. The interview with the ICDDR,B researchers in Dhaka have taken place in English on the preferred time according to the researcher and with only the respondent and the interviewer involved. The interviews

with the senior supervisor, the FRO and one of the FRS were done in English in a one on one situation between interviewer and respondent. For the interviews with the CHRWs and two of the FRS a translator was used, these interviews were done in Bengali. The interviewer had asked the questions to the respondent in English after which the (male) translator asked the same thing in Bengali. The respondent answered in Bengali after which the translator formulated in key words the listed answers. The interviews with the women took place in more or less the same way as the interviews with the Matlab staff. However, the approximate number of people present at the interview setting was four. For the first ten interviews the CHRW of the village was asked to bring us to the house of the women and to introduce us to the women. During the interviews at least the respondent, the CHRW, the translator and the interviewer were present. During some of the interviews the senior supervisor or a FRO were present and it was unfortunately not possible to send them away. The answers of especially the women may be influenced by the presence of the male translator (and the male senior supervisor/FRO) because speaking about reproductive health problems in presence of a male person is quite uncommon in Bangladesh. The large number of people present in the interview setting (and sometimes the large number of neighbours and family in and/or around the house) was most of the time almost unavoidable but not preferable for the interview. Because there were no tape recorders available we had to rely on the direct translation during the interview by the translator. The quality of the data would have been better when the interview with the women took place in a 'private' setting, with a female translator and by the use of a tape-recorder to check the answers afterwards. The data collected in especially the treatment area in Matlab may suffer from selectivity because through intensive intervention by ICDDR,B people have more access health care and are exposed to Western cultures (through researchers) through which the population is considered to be no longer representative for rural Bangladesh (Ross 1996, Bosch 2005). However, from the women in this study, four live in the comparison area in which selectivity is not yet the case.

Some of the researchers were very surprised that they were interviewed as a respondent. During the first few minutes they were quite hesitating in answering the questions. Two of them seemed somewhat scared to give the 'wrong' answer. The interviews with the researchers were in general a useful preparation for the interviews in Matlab. Two respondents knew that much of the topic that a combination of free-listing questions and additional questions was used. After the prepared free-listing questions some additional questions were asked to them to get to know more about the women and the culture in Matlab (and especially the current situation). Especially this part of the interview gave more insight in the current beliefs and cultural practices related to health in Matlab. Literature about culture, belief and habits in Matlab is quite outdated (1980s). More research about the contemporary culture, beliefs and habits may be both, a useful addition to the current (outdated) knowledge as well as a useful background for other studies in Matlab and the rest of Bangladesh. Three researchers were not able (or willing) to list reproductive health problems for the women in Matlab because they experienced that they were not able to do that. Interviewing the ICDDR,B researchers as well as the Matlab staff was done to gain more insight in the differences, in the definition on health and illness and in the reporting on reproductive problems, between the people researching the women and the women in Matlab themselves. The researchers view both health and illness and reproductive problems from a biomedical perspective. When they develop questionnaires or surveys or develop other types of research, they will probably do that with their biomedical model in mind, while the perspectives on health of the women are more influenced by their socio-cultural environment. The Matlab staff functions in between these two groups and is primary addressed with the actual collection of the data.

The ICDDR,B staff in Matlab was very willing to be involved as a respondent and to cooperate in the fieldwork. The senior supervisor has helped us to arrange a three day schedule to do and see as much as possible. Three Block-meetings were attained where we got the possibility to interview CHRWs and the FRSs. Most of the CHRWs were proud that

they were asked to tell about the health definition among women in Matlab and about the reproductive health problems, some of them seemed a bit tired and were answering very short. In general they are the best information source when you want to know something about the women in Matlab without asking the women themselves because they are standing most close to the women. During the interviews with the women we experienced that the listing of reproductive health problems was a difficult task for most of them. We decided to split the reproductive period into: reproductive health problems during adolescence, reproductive health problems during pregnancy, problems during delivery and reproductive health problems after childbirth. When we asked about these periods, most of the women were able to list some problems. The process of interviewing women with a translator in between was a new experience. I discovered that it was for me not the most optimal method of interviewing because I was not able to reflect directly on the answers of the respondents. In general the women were very willing to answer our questions. During the interview and afterwards some of the women were trying to get to know as much as possible about that 'strange' white women.

3.5 Outline of the analyses

In next three chapters describe the results of the analyses of the data. In chapter 4 we describe the analysis of the *general* health status (Part A, see chapter 1). The *observed* general health status and the *perceived* general health status are discussed and the relation between those two health statuses is studied. In this chapter we try to answer the research questions one and two (chapter 1). Chapter 5 is based on Part B and describes the analysis of the *reproductive* health status of the women. The self-reported reproductive health indicators and the perceived reproductive health problems are discussed on the basis of research question three. Chapter 6 describes the analyses of the relation between the reproductive health status and the general health status. Cross-relations are made between anthropometry (observed general health) and the self-reported reproductive health status and between the self-reported reproductive health status and the perceived general health status. Chapter 7 presents the conclusions and some recommendations for further research.

4. Measures of general health status

This chapter focuses on the general health status of the women as indicated by observed general health measures and by perceived general health measures. Perceived health is further elaborated by an exploration of the definition of health and illness for women in rural Bangladesh and for ICDDR,B staff in Matlab and Dhaka. First the general health status as indicated by observed measures is discussed (section 4.1, research question 1a) after which we discuss the general health status as perceived by the women (section 4.2, research question 1b). Then we look at the health and illness characteristics of ICDDR,B staff (section 4.3, research question 1c) and after which the relation between the observed general health status and the perceived general health status is tested (section 4.4, research question 2). At the end of the chapter the conclusions are presented (section 4.5)

4.1 Observed general health status: survey data

The observed general health status is in this study indicated by three measures: anthropometry, physical test and interviewer observation. First we will discuss the anthropometric measures (subsection 4.1.1), than the physical test (subsection 4.1.2) and finally the health status as observed by the interviewer (subsection 4.1.3).

4.1.1 Observed general health status according to anthropometry

In this subsection we describe the observed health status of the women by age-group. First we discuss the height and weight of the women after which the Body Mass Index is discussed.

Weight and height are the core anthropometric measures. Within the MHSS dataset anthropometry is measured for a sub-sample of 4103 women. Given the poor nutritional status of the population in Bangladesh in general (chapter 2, subsection 2.1.1) we expect that a large part of the women will be malnourished (section 3.1, hypothesis 1). Weight and height are particularly important measures in the case of pregnancy. Height seems particular important because of its association with the pelvic size (WHO 1991). The WHO (2003) has defined cut-off values for women and girls, below these values women may be at obstetric risk. The cut-off values are for weight 45 kg and for height 145 cm. Table 4.1 presents the mean weight (in kg) and height (in cm) by age-group and the percentages of women that score below the cut-off points by age-groups.

Table 4.1 Women's weight and height by age-group, Matlab 1996

	Age			
Nutritional status indicators	15-24 years	25-34 years	35-49 years	Total
Mean weight (in kg)	41.8	43.3	43.1	42.8
Mean height (in cm)	149.4	150.2	149.7	149.8
Weight < 45kg (%)	68.4	62.2	63.9	64.6
Height < 145 cm (%)	20.2	14.9	18.6	17.7
Weight below 45 kg *or* height below 145 cm (%)	69.7	64.1	66.4	66.5
Weight below 45 kg *and* height below 145 cm (%)	30.3	35.9	33.6	33.5
N	1123	1414	1566	4103

The women weigh on average 42.8 kg and are on average 149.8 cm tall. We can read from the table that there is specifically a difference between the age-groups in the mean weight. Our data further reveals that 64.6 per cent of all women weight below the cut-off point of 45 kg and 17.7 per cent is less than 145 cm tall. Given that all of these women are (ever) married, all of the women with a weight and/or height below the cut-off point are (currently) at obstetric risk when they get pregnant. We can read from the table that the highest percentages

of weight below 45 kg and height below 145 cm are among the women aged 15-24 years old. We need to take into account that these women may not be fully grown because of their young age, but they are at obstetric risk in case they become pregnant.

The Body Mass Index (BMI) considers weight relative to height and is calculated by the weight (in kg) divided by the square height (in meters). A low BMI (BMI < 18.5) reflects chronic energy deficiency (CED) or underweight. A BMI between 18.5 and 25.0 reflects a normal weight (for height), a BMI between 25.1 and 30.0 indicates overweight and a BMI above 30.0 reflects obesity (chapter 2, section 2.1.1). In this study we combine the last two categories because the total percentage of women with overweight or obesity is only 2.7 per cent (not shown). Like with weight and height we expect that a large proportion of women will have a low BMI (section 3.1, hypothesis 1). Figure 4.1 presents the percentages severe underweighted, underweighted, normal weighted and over weighted (obese) women by age-group. For a closer look at the underweighted women we have split up the underweighted in two groups, BMI between 18.5 and 16.0 and BMI below 16. A score below 16 indicates severe underweight (WHO 2003). BMI is not always a good indicator for women below the age of 20 because they might be not fully grown. That is why we have divided the first age-group in two groups, 15 to 19 years and 20 to 24 years.

Figure 4.1 BMI of the women by age group, Matlab 1996

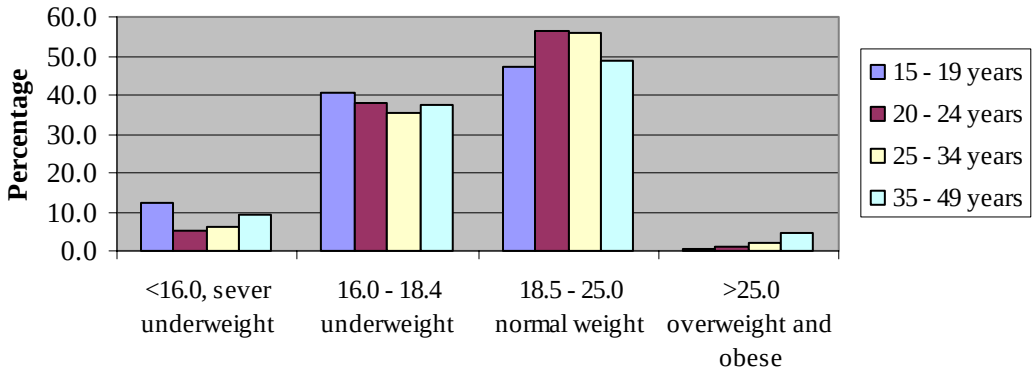


Figure 4.1 shows a wide prevalence of women with underweight among all age-groups, 8.2 per cent of all women are severe underweighted and 37.3 per cent of the women are underweighted (totals not shown). The youngest age-group (15 to 19 years) is relatively most (severe) underweighted. This is in line with our expectation because for adolescents BMI is not always a good measure when girls are still growing.

In line with our expectation (as formulated in hypothesis 1) we can say that the observed health status of women, according to anthropometric indicators is poor. A large proportion of the women are malnourished. These women are potentially at obstetric risk in times of pregnancy and childbirth (chapter 2, subsection 2.1.1).

4.1.2 Observed general health status according to physical tests

This subsection describes the observed health status of the women as measured with physical tests (chapter 1, research question 1^{A}). The physical test comprises eight separate small tests. These tests are: the ability to stand (three types), the ability to perform repeated chair stands, the ability to perform two measured walks, the ability to bend and the ability to tap foot (left and right). All tests were (preferably) performed on tennis shoes or shoes with very low heals

or barefoot[3]. We expect that the general performance of the women in the test is not adequate (section 3.1, hypothesis 1).

For each test we have calculated whether the respondent was able to perform the test in a right way or not. While analysing the tests we use two categories: able to perform without difficulties and unable to perform without difficulties. Table 4.2 reveals the percentage distribution of women who were able to perform the each test in a right way. The results of all tests were added up and respondents were divided into two categories: women who were able to perform all tests without difficulties and women who were not able to perform all tests without difficulties. These test results are also presented in table 4.2. We need to take into account that the tests may be influenced by (not chronic) health problems at the time of the test. When the tests were done a week or a month later, results may be different. Pregnancy is also an influencing factor. For only a part of the sample women we have information about current pregnancies. That is why we have decided to include the pregnant women because for a large part of the women we do not know if they were pregnant at the time of the test. To see the influence of pregnancy on test results we have analysed the test results of the women of whom we know that they were pregnant at the time of the test (duration of pregnancy is not known).

Table 4.2 Physical tests results for all women and pregnant women by age-group, Matlab 1996 (%)

	Age			
Test results	15-24 years	25-34 years	35-49 years	Total
All women (entire test)				
Able to perform all (%)	97.0	95.5	96.4	96.3
Unable to perform all (difficulties) (%)	3.0	4.5	3.6	3.7
All women				
Semi-tandem stand	98.8	97.9	98.8	98.5
Full tandem stand	99.0	97.9	98.7	98.5
Side by side stand	99.0	97.9	98.7	98.5
Repeated chair stands	98.7	97.3	97.7	97.8
Two measured walks (8 feet)	99.2	98.1	99.2	98.8
Bending	98.0	96.7	98.1	97.6
Right foot tapping	97.5	96.2	97.2	96.9
Left foot tapping	97.8	96.4	97.1	97.1
N	1063	1339	1495	3897
Pregnant women (entire test)				
Able to perform all (%)	82.3	71.7	73.1	75.4
Unable to perform all (difficulties) (%)	17.7	28.3	26.9	24.6
Pregnant women				
Semi-tandem stand	91.9	86.0	84.6	87.8
Full tandem stand	91.9	86.0	84.6	87.8
Side by side stand	91.9	86.0	88.5	88.3
Repeated chair stands	88.7	77.0	76.9	80.9
Two measured walks (8 feet)	93.5	84.0	92.3	88.3
Bending	82.3	72.7	73.1	75.9
Right foot tapping	90.3	83.0	80.8	85.1
Left foot tapping	91.9	84.0	80.8	86.2
N	51	71	19	141

[3] More information about the test can be found at www.rand.org/labor/FLS/MHSS

Almost all women were able to perform all the tests without difficulties. The foot tapping tests (left and right) gave the most problems (respectively 2.9 and 3.1 per cent unable to perform it); the standing tests and the measured walks were the easiest to carry out for most of the women (respectively 98.5 and 98.8 per cent able to perform it). From all the women who did the physicals test only 3.7 per cent was not able to perform the entire test or had difficulty in performing one or more of the tests. Women aged 25 to 34 years were relatively most likely to be unable to perform the entire test (4.5 per cent), only three per cent of the women aged 15 to 24 were not able to perform the complete test. From the pregnant women 24.6 per cent was not able to perform all tests without difficulties. The side by side stand and measured walks gave the least problems (both 11.7 per cent unable to perform) and bending and repeated chair stands were most difficult to perform (respectively 24.1 and 19.1 per cent unable). Regression analysis on the relation between pregnancy and the physical ability tests shows that pregnancy is significantly related (negative) with influence on the test outcome. Pregnant women were more likely to be unable to perform the entire test than non-pregnant women ($p<0.000$).

We can conclude that the general measured physical performance of the women is good. The general health status of the women as indicated by measured physical ability is good. This is in contrast with hypothesis 1. Pregnancy correlates significant (negative) with the test outcome ($p<0.000$). However to draw conclusions about this, information on the stage of the pregnancy is needed.

4.1.3 Observed general health status according to the interviewer's observation

This subsection describes the observed health status according to the interviewer's observation (chapter 1, research question 1^A). After the respondent had reported about how she perceives her general health status (see subsection 4.2.2), the interviewer was also asked to evaluate the general health status of the women. The observed general health condition was coded in three categories: healthy, fairly healthy and unhealthy/sick. In this subsection we use these three categories. In subsection 4.4.1 we will recode these categories into (fairly) healthy and unhealthy/sick for binary regression analysis. Coding follows the literature about the cultural tendency in Bangladesh to underreport the health status (section 2.1.2). The evaluation of general health status according to the interviewer is presented in table 4.3.

Table 4.3 Health status of the women as observed by the interviewer by age-group, Matlab 1996 (%)

	Age			
Observed health status	15-24 years	25-34 years	35-49 years	Total
Healthy (%)	85.7	73.5	63.0	72.9
Fairly healthy (%)	11.9	23.0	31.2	23.0
Unhealthy (%)	2.2	3.6	5.8	4.1
N	1253	1548	1748	4549

Only 4.1 per cent of all women were observed as unhealthy/sick. The youngest age-group is observed healthiest and the oldest age-group to be least healthy. Table 4.4 reveals that the interviewers observed health status of the women might be influenced by the age of the women. Somewhat older women are more frequent reported as fairly healthy.

Based on these results we can conclude that the observed general health status of the women is good. However, we have to take into account that a relatively large part of the women is observed as fairly healthy. We acknowledge that a health evaluation as this is rather subjective. However, we will further examine this indicator in subsection 4.4.1 where we compare this observation with the self-rated general health status evaluated by the women themselves.

4.2 Perceived general health status: survey and free-listing data

This section discusses the general health status as perceived by the women themselves (research question $1^{B)}$. The analysis is based on two types of data: quantitative data and qualitative data. The quantitative part is based on the MHSS survey and uses the self-reported general health indicators (subsection 4.2.1) and the self-rated general health status of the women (subsection 4.2.2). The data of the qualitative part is derived from free-listing and examines the health and illness definitions of the women (subsection 4.2.3).

4.2.1 Self-reported general health status based on survey data

This subsection discusses the self-reported general health status of the women. Self-reported general health is measured by the reported: acute morbidity, chronic morbidity and ability to carry out Activities of Daily Living (ADL).

The self-reported *acute* morbidity in this study is measured as the percentage of women who suffered from any form of acute morbidity during the month before the survey took place. The acute diseases involved are: headache, eye infection, toothache, cough/fever/cold symptoms, vomiting/stomach-ache, fever with chills (malaria, typhoid), watery diarrhoea, loose stool associated with mucus or blood, skin problems and accidental causes. These acute diseases were listed by the interviewer and the women were asked if they suffered from the disease during the last three months. Table 4.4 presents the percentages of women suffering from acute morbidity. Self-reported *chronic* morbidity is indicated by whether the women suffered from any chronic disease during the year before the survey took place or not. The women were asked if they had suffered from the diseases listed by the interviewer in the year before the survey took place or not. The chronic diseases in this study are: anaemia, arthritis or rheumatism, broken or fractured bones, asthma, respiratory diseases, diabetes, urine pain, paralysis, tuberculosis, gastric problems and edema. In table 4.4 the percentages of women suffering from (the different types of) chronic morbidity are presented. In section 4.1.2 the measured physical ability test was discussed, this test has measured the ability of the women to perform daily activities. Here we look at the self-reported ability to carry out Activities of Daily Living (ADL) (chapter 2, subsection 2.1.1). The ADL consists of the following activities:

- Walk for a mile
- Carry a heavy load (like 10 seer rice) for 20 yards
- Draw a pail of water from the tube-well
- Stand-up from sitting position on the floor (without help)
- Use a ladder to climb a storage place at least 5 feet in height
- Sit on the floor with bent knees
- Stand up from sitting position on a chair/stool without help
- Bow

The women were asked if they were able to perform these activities if they had to, but they were not asked to perform it. The results of the ADL are also presented in table 4.4 (see next page).

Table 4.4 Self-reported morbidity of the women by age-group, Matlab 1996 (%)

Self-reported morbidity	Age			Total	Pregnant women
	15-24 years	25-34 years	35-49 years		
Nr of acute diseases					
0	50.8	42.1	40.8	44.0	46.9
1	30.8	38.2	34.6	34.8	29.1
2	13.6	14.4	17.6	15.4	20.2
3 or more	4.8	5.3	7.0	5.8	3.8
Acute diseases					
Headache	23.7	29.2	31.4	28.5	32.9
Eye infection	1.4	1.2	0.4	0.9	0.0
Toothache	3.7	5.9	10.5	7.1	4.7
Cough/fever/cold	26.4	25.6	26.3	26.1	25.8
Stomach/vomiting	7.3	6.7	6.9	6.9	6.1
Fever with chills	0.3	0.6	0.6	0.6	0.5
Watery diarrhoea	4.1	4.1	4.5	4.3	3.3
Loose stool	1.5	2.8	2.7	2.4	2.3
Skin problem	1.0	1.6	1.9	1.5	0.0
Accidental causes	1.4	0.8	0.6	0.9	1.4
Other acute diseases	3.1	5.5	6.8	5.3	5.2
N	1215	1523	1686	4424	213
Nr of chronic diseases					
0	61.4	29.1	15.6	32.8	30.0
1	24.3	29.5	25.2	26.4	31.5
2	8.6	22.5	27.4	20.6	21.1
3 or more	5.7	18.8	31.8	20.2	17.4
Chronic diseases					
Anaemia	10.0	25.9	30.3	23.2	25.8
Arthritis or rheumatism	12.0	32.3	57.9	36.5	33.8
Broken bones	0.4	0.4	1.1	0.7	0.5
Asthma	1.4	2.0	3.0	2.2	1.4
Respiratory diseases	1.8	2.3	4.8	3.1	3.3
Diabetes	1.4	6.0	10.5	6.5	6.6
Urine pain	6.9	15.0	21.1	15.1	14.6
Paralysis	0.2	0.5	1.3	0.7	0.9
Tuberculosis	0.0	0.1	0.2	0.1	0.0
Gastric problems	20.4	45.8	51.1	40.8	40.8
Edema	1.0	1.7	3.6	2.2	2.8
Other chronic diseases	6.1	8.0	10.9	8.6	4.2
N	1254	1548	1747	4549	213
Activities of Daily Living (ADL)					
Able to perform all	96.1	87.9	68.6	82.8	84.0
Unable or with difficulties	3.9	12.1	31.4	17.2	16.0
Activities					
Walk for a mile	97.6	89.8	72.7	85.4	86.9
Carry heavy load	97.4	91.5	75.8	87.1	87.8
Draw pail of water	99.0	95.7	86.6	93.1	92.5
Stand up from floor	99.4	98.4	95.6	97.6	96.7
Use ladder	98.9	96.6	89.8	94.6	91.5
Sit on floor with bent knees	99.5	98.3	94.4	97.2	95.3
Stand up from chair	99.5	98.9	96.7	98.2	96.7
Bow	99.4	97.7	93.6	96.6	93.3
N	1255	1549	1749	4553	213

In this study we particularly want to know how many women report that they suffer from any type of *acute* morbidity. Table 4.4 reveals that more than 55 per cent of all women reported that they have suffered from one or more acute diseases in the month before the survey took place. Most of them suffered from only one acute disease. The reported acute morbidity is related to age, women in the older age-groups suffer significantly more from reported acute diseases than women in the youngest age-group (correlation, $p<0.001$, not shown). Further analysis of the acute diseases shows that most women suffered from headaches (28.5 per cent) and symptoms of cough, fever and cold (26.1 per cent). The youngest age-group (15 to 24 years) suffered relatively most often from symptoms of cough, fever and cold (26.4 per cent) whereas the two older age-groups suffered most from headaches (29.2 per cent for 25 to 34 year olds and 31.5 per cent for 35 to 49 year olds). Pregnant women experienced especially headaches as well.

Table 4.4 reveals that only 38.6 per cent of the women in the youngest age-group report that they suffer from one or more chronic disease compared to 84.3 per cent in the oldest age-group. The number of problems increases as well with the age-group. Correlation analysis shows that there is a significant correlation (negative) between age and chronic morbidity ($p<0.001$). For the women in general, gastric problems were the most prevalent during the year before the survey took place. Almost 41 per cent of the women reported that she suffered from gastric problems (40.8 per cent). Arthritis or rheumatism (36.5 per cent), anaemia (23.2 per cent) and urine pain (15.1 per cent) were also frequently reported by the women. Arthritis or rheumatism seems to be an important problem especially among the oldest age-group, 57.9 per cent of all women between the age of 35 and 49 reports that she has suffered from this during the year before the survey. The chronic diseases anaemia and urine pain may be related to the reproductive problems such as excessive bleeding and the nutritional status of the women. Bathia and Cleland (1995) found in a study among women in India that women experienced a feeling of weakness and tiredness. These feelings may suggest anaemia. About 34 per cent of the women with excessive bleeding in our study reported that they were also suffering from anaemia (no significant correlation). Anaemia and low BMI ($BMI < 18.5$) correlate significantly (negative, $p<0.001$), women with a low BMI reported more frequently anaemia than women with a normal BMI ($BMI > 18.5$). Urine pain can be the cause of a bladder infection but this may also be related to a Unitary Tract Infection (UTI).

Table 4.4 reveals further that almost 83 per cent of all women perceived them selves to be able to perform all listed activities. Women between the age of 15 and 24 are almost all reported to be able to perform all the activities (96.1 per cent). The reported inability to carry out the listed activities increases with age. From the listed activities, walking for a mile and carrying a heavy load for 20 yards were most frequently reported by the women as the activities that they were unable to perform or had difficulties with, 14.6 per cent reported to be unable for the first activity and 12.9 per cent reported to be unable for the last activity.

Based on the results presented in table 4.4 and described above we can conclude that the general health status of the women as assessed by self-rated general health indicators is not adequate. A relatively large part of the women suffers from acute and/or chronic morbidity and/or perceives problems in carry out Activities of Daily Living (ADL). Based on the literature we expected further that the *self-reported* acute and chronic morbidity might be related to the knowledge level of the respondent. When a respondent does not know the name of the listed disease the chance that she is reporting it is very small (section 2.2.2, see for example Bathia and Cleland 1995). Correlation tests have been done to analyse the relation between education and the self-reported health indicators. The test results show that for self-reported acute morbidity ($p=0.018$) and chronic morbidity ($p=0.004$) there is a significant correlation with education. Binary regression analysis between education and the self-reported chronic and acute morbidity shows that women with more than six years of education report significantly less chronic and acute diseases than women with less than six years education. This is contrary to our expectation and to the finding of Bathia and Cleland

(1995), that women with more education report more diseases because they know more about the diseases.

4.2.2 Self-rated general health status based on survey data

The self-rated general health status is an indicator of the current health status as experienced by the women themselves (chapter 1, research question 1^B). The self-rated general health status is coded in healthy, fairly healthy and unhealthy/sick. For subsection 4.4.3 and chapter 6 this variable will be binary coded into (fairly) healthy and unhealthy/sick. Table 4.5 presents the self-rated general health status for the women in general and for the pregnant women by age-group.

Table 4.5 Self-rated general health status of all women and pregnant women by age-group, Matlab 1996 (%)

	Age			
Self-rated general health status	15-24 years	25-34 years	35-49 years	Total
All women				
Healthy (%)	85.6	66.5	54.0	66.7
Fairly healthy (%)	9.4	19.7	24.4	18.7
Unhealthy/sick (%)	5.0	13.9	21.6	14.4
N	1253	1547	1749	4549
Pregnant women				
Healthy (%)	78.9	62.4	42.9	65.7
Fairly healthy (%)	18.4	22.9	32.1	22.5
Unhealthy/sick (%)	2.6	14.7	25.0	11.7
N	76	109	28	213

Of all the women enrolled in the survey 66.7 per cent rated her current general health status as healthy. The tendency of the women to evaluate and rate their current general health status as fairly healthy seems to increase with age. There is a significant correlation (negative) between the self-rated general health status and age ($p<0.001$). The percentage women rating themselves unhealthy is increasing with age, from only five per cent of the women in the first age-group (15 to 24) to almost 22 per cent of the women in the third age-group (35 to 49 years). Table 4.5 reveals that 65.7 per cent of all pregnant women rated themselves as healthy. The pregnant women rated themselves somewhat less healthy than the non-pregnant women, but this relation is not significant (correlation, $p=0.129$). A remarkable fact is that particularly the pregnant women in the youngest age-group (15 to 24 years) rated themselves relatively less times unhealthy than the women in this age-group in general. We can not say much about the difference between the age-groups because for the pregnant women the percentages are based on small numbers.

4.2.3 Perceived general health status according to free-listing data

The aim of this subsection is to get insight in what women consider as healthy and ill because the ways in which we perceive and interpret health and illness, and seek and deliver care, are inextricably bound up with our cultural norms, beliefs and values (Loustaunau and Sobo 1997). This is done to gain more knowledge of the self-reported and self-rated general health status of the women (subsections 4.2.1 and 4.2.2, research question 1^B). The analyses in this subsection are based on data derived from free-listing interviews with 15 women. During the interview the answers of the women were directly translated and reported by the translator mostly only in keywords. This is why, in most cases, we can not present whole sentences. There were 15 women involved in this study, one woman could not respond because of back-problems and was excluded from analysis. Although the answer 'don't know' can also have value, we decided not to use the answers of this woman for the analysis. The questions asked to the women were: "*What are the characteristics of being healthy?*" and "*What are the*

characteristics of being ill?" We asked the women to list as much characteristics as possible that came in mind (see chapter 3, subsection 3.4.2). First we analyse the characteristics of health and second the characteristics of illness. In Bangladesh people make a distinction between illnesses which did not affect the performances meaning that there was no need for treatment and the illnesses which disturbed the performance and thus treatment was needed (Islam 1985). Visual signs of health differ between countries and cultures (Sobo 1994). We expect that women related good health to physical appearance and performance (subsection 2.3). In the analysis we try to make a link with the concepts from the WHO definition of health: *a state of physical, mental and social well-being* (WHO 1958).

The characteristics of being healthy of the women can be grouped into three major categories and one rest category. The three major categories are: absence of disease, physical appearance and food.

The absence of diseases, as listed in many ways, is for 12 out of the 15 women a characteristic of being healthy. A woman, 29-year-old told resolute: '*people are healthy when they are free from disease'*. Other women were somewhat more precise in their answer, a woman, 32-years-old spoke about health as: '*the absence from major diseases'*, another women, 50-years-old told us: '*when a person has only a few diseases'*. For three women the absence of disease was the only characteristic of being healthy. The second category, physical appearance, was listed in some way by most of the women. The most common answers were physical wellbeing or healthy appearance. Health was also linked to the body. '*When the physical body structure is good'* said a 29-year-old woman and another woman (38 years) said: '*having a well build body.'* Related to the body structure is the concept *'fatty'*. With fatty they mean most of the time a well nourished body. As health characteristic several women said: healthy is fatty, and they add quickly, but not too fatty and also not too thin. Thinness is seen by them as unhealthy. Another aspect of physical health named by a 57-year-old woman is: '*that you can move easily, whenever and wherever you like'*, and another woman (32 years) said: '*that you can move properly'*. The absence of disease and the physical appearance categories are both part of the physical component of the WHO definition. These characteristics of health are in line with our expectation that women link health with physical appearance and performance. The third characteristic of health is food. Some food related characteristics are purely focused on food, like one of the things a 57-year-old woman said: '*able to take food properly'* or '*enough vitamin intakes'* as listed by another woman (56-year-old). Other food related characteristics are more economically in nature such as: access to good food, enough food and able to take food at least three times a day (frequency). Other characteristics named by the women related to economic reasons are '*no need to do hard work, because of economic situation'* (50-year-old women) or '*richness, than people do not have to work very hard' (*women, 29-years-old). One woman (47-year-old) listed some interesting things that were not named by other women like: '*healthy is when people have for a long time no physical problems, when there is no need to consult a physician and when people do not have an eye problem'*. Another thing she listed was: '*up to 40 people are healthy!'* This perception is in line with the results from the self-rated general health status from the survey (subsection 4.2.2). There we found that older women perceive themselves more times fairly healthy and unhealthy than women in younger age-groups.

The characteristics of illness can be grouped in almost the same way as the characteristics of being healthy. The groups are: presence of disease, physical appearance, food, reproduction related characteristics and a group with other characteristics. The physical appearance seems to be even more important for illness than for health. Remarkable fact is that the women listed more characteristics of illness than of health. For health some women only gave one characteristic (free from disease) while for illness all women gave at least two characteristics.

The presence of disease is for the women a frequently listed characteristic of illness. Illness is characterised by suffering from (some sort of) disease for three women (47-, 38- and 52-years

-old) and by having (many) diseases for four other women (29-, 57-, 32- and 48-years-old). Characteristics which are in some way related to the physical appearance were most frequently listed by the women. For physical appearance we distinguish general physical appearance, movement and thinness. Illness was related to the physical appearance in a general way like: '*physically looking sick'* (women, 29), '*appearance unhealthy'* (women, 36) and '*look like unhealthy'* (women, 23) but also in a more specific way such as a 31-year-old women said '*when the eyes are not flourishing'* and '*when the face of someone does not look healthy'* (women, 29). Women also listed also some characteristics related to the physical ability to move. A 57-year-old woman told *'when you can not move normally, when you walk like an old man'*. Others said: when you can't stand, can't walk or can't get up from the bed. The women who listed fatty as characteristic of health list for illness '*thin person'* and '*when the appearance is too thin'* (31- and 36-year-old women). The third group is food; having a problem with taking food and less appetite are two of the listed characteristics. The other characteristics are more food related causes why people get ill. One woman (50 years) said '*when taking too little food'*, another woman (47) said '*not eating food regularly'*. One woman (56) added to her listed characteristics of illness *'when you are sick, after intake of good food you will become healthy again.'* Illness is for some of the women related to reproductive events and the life course. '*Becoming older is become less healthy'* said a 47-year-old woman. Reproductive events are also influencing the health status. *'Those who are pregnant are in ill health'* said a 32-year-old woman who just delivered her second child. '*After delivery is a woman sick'* said a 56-year-old woman, for others are becoming mother and having more children also characteristics for illness. Other characteristics of illness are: weakness, *mathagura* (further explained in section 5.2) and need more sleep. Can't speak, can't talk well, being poor and having difficulties to survive are also characteristics of illness for the women.

We expected that the women would relate good health to physical appearance and performance. This expectation was confirmed, however physical appearance is more related to illness and the performance is more related to health. However, health and illness were not only related to physical appearance and performance; the women have listed many other characteristics. When we compare the characteristics of the women with the health definition of the WHO we see that the women focus especially on the physical aspects of health and less on the mental and social aspects of health. In the next section we will look at the characteristics of health and illness by ICDDR,B staff, and compare these characteristics with the characteristics of the women as described above.

4.3 Definition of general health according to ICDDR,B staff in Matlab and Dhaka

Medical experts try to make a diagnosis by narrowing the health problem to medically explained phenomena. Individuals on the other hand may relate the problem to their own perceptions and experiences, such as the ability to carry out Activities of Daily Living (ADL), misfortune and discomfort (Loustaunau and Sobo 1997). The aim of this section is to link ideas of ICDDR,B staff in Matlab and Dhaka, about the health characteristics of the women and themselves, with the actual health characteristics of the women (research question 1^{C}, chapter 1). We expect that the health definition of the women and the staff are not comparable to each other (hypothesis 2, section 3.1). The data for this analysis is derived from free-listing interviews with 10 (female) Community Health Research Workers (CHRWs), three (female) Field Research Supervisors (FRSs), one (male) Field Research Officer (FRO) and six ICDDR,B researchers (two physicians, one demographer, one anthropologist, one nutritionist and one epidemiologist). First we look at the perceptions of the staff about how they think that health and illness is characterised by the women of reproductive age in Matlab (subsection 4.3.1) after which we look how health and illness is characterized by the staff themselves (subsection 4.3.2).

4.3.1 Characteristics of health and illness of women in Matlab

The aim of this subsection is to link the ideas that ICDDR,B staff from Matlab and Dhaka have about the health characteristics of the women with the actual health characteristics of the women (as presented in subsection 4.2.3). We try to declare certain characteristics listed by the women and have a look at the differences and commonalities.

One of the characteristics of being healthy listed by the women is '*fatty*'. The characteristics fatty and thinness are closely related to each other. These concepts were also named by some of the researches. Their view on the beliefs of the women may clarify the concept. A male Bangladeshi senior physician said:
'They belief that being fatty is healthy, that is their perception. Although a women who is thin can also be healthy. Even when a woman is thin but able to do all things, the perception is that she is not fully healthy. This perception is even stronger for adolescents and children, when a child is thin, they think that it could not be healthy. They search the cause for this by the mother, by breastfeeding or by evil eye and evil spirit.'

A female physician focused more on low weight, she told:
'In Bangladesh it is deeply believed that low weight is not healthy, but this believe is not measurable. People belief that when you have a low weight that you are not fully healthy, although a woman with a low weight might be fully healthy'.

And a male nutritionist said:
'They think fatty is healthy, define it like that. But they don't make a direct like with nutrition. It is just good health is fatty and when thin, than the health is not good'. He relates thinness also to pregnancy: '*Thinness influences pregnancies. Thin women have fewer pregnancies and women with more pregnancies are more malnourished. They loose weight with every pregnancy.'*

Only one of the interviewed women related health to age (*'up till forty people are healthy')*. One of the researchers expected that women in Matlab would relate health and illness to age. He told: *'When people grow older they think that it is normal not to perform well. They have lower expectations about their health, because of age, than professionals expect. Mentally they feel well with their physical problems because they see it as a normal thing which comes with age.'* Most of the women did not make a direct relation between health and illness characteristics, and age.

The Community Health Research Workers (CHRWs) thought that the women would characterize health with a physical, mental, social and economical component. No disease, no tension, a good family life (having a husband and children) and money are characteristics named by them. It is conspicuous that the women listed especially physical and economical characteristics and not directly the social and mental characteristics such as the CHRWs thought that they would do. The Field Research Supervisors (FRSs) thought that the absence of disease would be an important characteristic of health for the women. Having no disease is healthy, thought an FRS, and fever and cold are no diseases for the women. According to the women, health is characterized by more than only the absence of disease. The CHRWs expected that the women would characterize more dimensions of health (mental, social) while in fact the women did not. The FRSs expected that the women would only look at the absence of disease while in fact the characteristics of health and illness of the women comprised more (appearance, food, reproduction related).

4.3.2 Characteristics of health and illness in general in Bangladesh

In this subsection we discuss the characteristics of health and illness as listed by the ICDDR,B researchers and the Matlab staff for themselves. The health and illness characteristics of these persons give additional information about how health is in general defined in Bangladesh. We expected a difference in the definition of health between the women and the ICDDR,B staff (hypothesis 2) because of the influence of, for example, education (chapter 2, subsection 2.1.2). We try to define the differences between the people close to the women and the people only researching the women. First we will look at the Community Health Research Workers (CHRWs), these women are most closely related to the women in Matlab after which we will discuss the Field Research Supervisors (FRS) and the Field Research Officer (FRO) and third the ICDDR,B researchers.

The health and illness characteristics listed by the CHRWs are closely related to the WHO definition. Most of the CHRWs list a physical, mental and social aspect as characteristic of being healthy and some point at the importance of a balanced relation between those three aspects. Characteristics of being ill are more physical and economically in nature for them. Interesting are the mental components of health frequently listed by the CHRWs but only once listed by one of the women. A 35-year-old CHRW listed as characteristic of being healthy: *'when women have no mental tension about taking care of the family'*. And characteristics of being ill for her were: *'mentally disturbed by family members, like husband and family in law'* and *'low age at fist marriage is mentally not healthy, than women have their first child at a younger age and the interval between births is shorter'*. One CHRW (28 years) listed the importance of good sanitation and cleanness. She told that it is difficult for her to convince the women of cleaning and good sanitation. She said: '*they think cleaning is needed, but they don't clean, and they think that their sanitation is good but it isn't.'*

Most of the characteristics of health and illness for the FRSs and FRO are closely related to the characteristics of the CHRWs. The difference is that the FRSs and the FRO do not mention the social and economical aspects of health. Health is to them no disease, no physical illnesses and no frequent morbidity and illness is characterised by lying in the bed, being inactive and behaving like being sick. Weight and height were also listed by the FRSs and the FRO. The FRO said: *'someone is healthy when weight according to height is considerable'*. *'When weight and height are normal according to the age standard'* listed a 30-year-old FRS and another FRS mentioned that thin is unhealthy.

Some of the ICDDR,B researchers found it difficult to list characteristics of health and illness for themselves. It seemed new for them to be the respondent in stead of the interviewer. Two of them said: *'Health is like the WHO definition, not only the physical component but also the mental and psychological thing'*. Health is for them further related to: being energetic, not tired, and able to go to work and to do the work planned for the day. The ability to perform daily life requirements like walking, praying and household tasks is also important for some of them. Being ill is far more related to the physical component of health, discomfort related to physical health when physical things are not normal like with fever and when they are unable to perform small things. A feeling of stress and feeling unhappy is also linked with being ill.

We can conclude that, in line with our expectation (hypothesis 2) that the women have a different definition of health and illness as compared to the ICDDR,B staff in general. The women focus mostly on the physical aspects of health and illness while the ICDDR,B staff members define health more in line with the WHO definition on health (physical, mental and social aspects).

4.4 Relation between observed and perceived measures of the general health status

The aim of this section is to analyse the relation between the *observed* general health status (section 4.1) and the *perceived* general health status (section 4.2). This analysis is based on research question 3 (as presented in chapter 1): 'What is the extent of correspondence between the observed general health status and the perceived general health status?' We start the analysis with the relation between the observed general health measures and the self-reported general health measures (based on subsection 4.2.2) (subsection 4.4.1). Then we analyse the relation between the observed general health status and the self-rated general health status (subsection 4.4.2), after which we look at the relation between the self-reported health status and the self-rated general health status (subsection 4.4.3). We expect that the observed general health status and the perceived general health status do not correspond to each other (hypothesis 3, section 3.1).

4.4.1 Observed general health status versus self-reported general health status

In this subsection we compare one of the observed general health measures with one of the self-reported general health indicators. We compare the measured physical ability test with the self-reported ADL, because these two measures assess, although in a different way, the ability to carry out activities of daily living. Table 4.6 presents the cross-tabulation between the physical ability test and the self-reported ADL ($p<0.001$).

Table 4.6 Cross-tabulation between physical ability test and self-reported ADL for all women aged 15 to 49, Matlab 1996 (%)

	Self-reported ADL (%)	
Measured physical ability (%)	Able	Unable
Able	96.6	93.3
Unable	3.4	6.7
N	2824 (100%)	704 (100%)

The self-reported inability to carry out Activities of Daily living seems to be a bit overestimated. From the women perceiving themselves as unable to perform the listed daily activities, 6.7 per cent was unable to perform the physical ability test. The self-reported ADL and the measured physical ability correlate highly significant (negative, $p<0.001$). This means that the general health status assessed by measured physical ability and the health status assessed by self-reported ADL are comparable. Although the measures of physical ability consist of different activities of daily living, the health status obtained from the tests is comparable. This analysis would have been better when both tests consisted of the same activities.

4.4.2 Observed general health status versus self-rated general health status

The observed general health status is indicated by three measures: anthropometry (here only BMI), the physical ability test and observation by the interviewer. For this section, all measures are binary coded, BMI by normal weight (and overweight) and underweight, physical ability by able to perform all and unable to perform all, and the interviewer's observation by (fairly) healthy and unhealthy. The relation between the observed measures and the self-rated general health status is measured by correlation tests and the direction of the relation is analysed with binary logistic regression. The results of the cross-tabulation are presented in table 4.7 (next page).

Table 4.7 Cross-tabulation between observed general health status and self-rated general health status for all women aged 15 to 49, Matlab 1996 (%)

Observed health indicators	Perceived health indicators		Total
	(fairly) healthy	Unhealthy / sick	
BMI (%)			n=4056
BMI < 18.5	81.6	18.4	
BMI 18.5	89.0	11.0	
Physical ability (%)			n= 4000
Able to perform all	86.0	11.6	
Unable to perform all	74.6	25.4	
Observed health status (%)			n=4055
(fairly) healthy	88.4	11.6	
Unhealthy	18.0	82.0	

Table 4.7 reveals that women with underweight (a BMI below 18.5) perceive themselves less healthy than women with a normal or above normal weight (BMI of 18.5 or higher) ($p<0.001$). For the physical ability there is also a significant correlation (negative) with the self-rated general health status ($p<0.001$). From the women who were measured unable to perform all the tests, 25.4 per cent perceived herself as unhealthy compared to 11.6 per cent of the women who were able to perform the tests. The health status observed by the interviewer and the self-rated general health status correlate significantly (negative, $p<0.001$). From the women who rated themselves as healthy, 18.0 per cent was observed as unhealthy and from the women self-rated as unhealthy was 11.6 per cent observed as healthy. Binary logistic regression analysis was done to indicate the direction of the correlation between the observed general health measures and the self-rated general health status. The self-rated general health status is coded as 0 for healthy and 1 for unhealthy. The results of this analysis are presented in table 4.8.

Table 4.8 Binary logistic regression of observed general health status and self-rated general health status for all women aged 15 to 49, Matlab 1996

Observed health indicators	Reference category	Coefficient	Odds ratio	Standard Error	Sign.
BMI					
Underweight	Normal weight	0.527	1.693	0.103	0.000
Physical test					
Unable to perform all	Able to perform all	0.719	2.052	0.222	0.001
Observed health					
Unhealthy	(fairly) healthy	3.475	32.294	0.238	0.000

This analysis shows that: women with normal weight rate themselves healthier than women with underweight; women who are able to perform all physical tests rate themselves healthier than women who were unable to perform all physical tests and the women who were observed healthy rate themselves healthier than the women who were observed unhealthy.

Based on these analyses we can say that observed general health measures related to the self-rated general health status (reject hypothesis 3). Women with a low BMI rated themselves more times unhealthy than women with normal BMI. This seems to be in line with the health characteristics as defined by the women in subsection 4.2.3 where they told that they perceive thin as unhealthy. Women who were able to perform all physical tests rate themselves more times healthy than women who were not able to perform all physical tests. This is also in line with our expectation based on chapter 2 (section 2.3) that health and illness is related to performance for people in Bangladesh and with the characteristics of health and illness as formulated by the women specifically about movement (see subsection 4.2.3).

4.4.3 Self-reported general health status versus self-rated general health status

The self-reported general health status is indicated by the reported *acute* morbidity, the reported *chronic* morbidity and the reported ability to perform Activities in Daily Living (ADL). We analyse the relation between the self-reported general health status and the self-rated general health status by cross-tabulation (not shown) and indicate the direction of the relation by binary logistic regression (table 4.9).

According to the cross-tabulation there is a significant correlation (negative) between the three self-reported general health indicators and the self-rated general health status ($p<0.001$ for all three). Binary logistic regression analyses have been done to examine the direction of the relation between the self-reported general health indicators and the self-rated general health status. The self-rated general health status is coded with 0 for healthy and 1 for unhealthy.

Table 4.9 Binary logistic regression of self-rated general health status and self-reported general health indicators for all women aged 15 to 49, Matlab 1996

Observed health indicators	Reference category	Coefficient	Odds ratio	Standard Error	Sign
Perceived ADL					
Unable	Able	0.397	1.488	0.024	0.000
Chronic morbidity					
Yes	No	1.478	4.382	0.150	0.000
Acute morbidity					
Yes	No	0.895	2.448	0.101	0.000

Table 4.9 reveals that the women who perceive themselves able to perform all listed daily activities rate themselves healthier than the women who were perceived not able to perform all daily activities. Women without perceived chronic diseases rate themselves healthier as women with chronic diseases; this is the same for women without acute diseases. From this table we can conclude that the self-rated general health status correlates highly significantly with the ability to carry out Activities of Daily Living (ADL), by chronic diseases and by acute diseases.

4.5 Conclusions

The central theme in this chapter is the general health status of women of reproductive age in Matlab as indicated by observed and perceived measures. The analysis of this chapter is guided by hypothesis 1 to 3 (see section 3.1).

In hypothesis 1 we state that the general health status of the women, irrespective of the type of measure, is not adequate. This appeared to be true, especially for the general health status as indicated by anthropometry, acute morbidity, chronic morbidity, self-reported ADL. In addition, the self-rated general health status has also proven not to be adequate. For example, almost 65 per cent of the women have a weight below 45 kg and 45.5 per cent of the women are undernourished (BMI<18.5). About 56 per cent of the women reported that they suffered from one or more acute diseases during the last month and about 72 per cent reported that they have suffered from one or more chronic diseases during the past year. Especially the women in the older age-group (35 to 49 years) perceived themselves as unable to carry out Activities of Daily Living (ADL) (31.4 per cent). Only 66.7 per cent of all women rated their general health status as healthy.

We expected that the women in Matlab defined health different as compared to ICDDR,B staff (hypothesis 2). This expectation appeared to be true. The main characteristics of health and illness for the women are related to the absence of disease, physical appearance and food. The characteristics of health and illness as defined by the ICDDR,B staff are more similar to the WHO definition of health (physical, mental and social aspects) as compared to the description of the characteristics of health and illness as provided by the women in Matlab. The women listed especially physical aspects of health and illness while the ICDDR,B staff listed also more frequent mental and social aspects of health.

Previous studies suggested that there is a difference between the health status obtained by perceived health measures and the health status obtained by objective health measures (section 2.1.3). The third hypothesis, analysed in this chapter, focused on the *relation* between observed and perceived measures of the general health status. A highly significant correlation (negative) has been found between the measured physical ability test and the self-reported ADL. Although these measures of physical ability consist of different Activities of Daily Living, the health status obtained from these measures is comparable. Correspondence has also been found between the *observed* general health measures and the *self-rated* general health status (negative correlation). The self-rated general health status is strongly related (negative) with BMI, observed physical ability and by the interviewer's observation. For example, women who were able to perform all physical tests perceive themselves healthier than the women who were not able to perform all physical tests. *Self-reported* general health measures (acute morbidity, chronic morbidity and ADL) are also strongly (negative) related to the *self-rated* general health status. Based on these results we can reject hypothesis 3 because the general health status of the women obtained by observed measures and the general health status obtained by perceived measures correspond with each other. The perceived measures used in this study may be as good as the observed health measures used, to assess the general health status of women of reproductive age in Matlab.

5. Measures of the reproductive health status

This chapter focuses on measures of the reproductive health status. First the reproductive health status as indicated by self-reported reproductive health indicators is discussed (section 5.1, research question 3^A), then the reproductive health status as indicated by perceived reproductive morbidity of the women (section 5.2, research question 3^B) and as perceived by ICDDR,B staff (section 5.3, research question 3^C). The final section of this chapter presents the conclusions (section 5.4).

5.1 Self-reported reproductive health indicators

The self-reported reproductive health indicators are primarily based on the model of mother's health and child's survival career (Hutter 1998a) and are further elaborated by other secondary literature (see chapter 2, subsection 2.2.3). This section shortly reviews the indicators and presents some values for each indicator for women in Matlab (chapter 1, research question 3^A). The indicators are:

- age at menarche,
- contraceptive use
- pregnancy (pregnancy losses, pregnancy loss rate, physical problems during pregnancy, receiving pregnancy check-up),
- delivery (physical problems during delivery, care provider at delivery and the place of confinement),
- age at first birth,
- time between menarche and the first birth,
- birth interval,
- children,
- currently pregnant

Table 5.1 (see next page) presents some values for each indicator. With the interpretation of the values in table 5.1 we have to take into account that the answers are not measured or observed, it are all self-reported measures.

Table 5.1 Selected self-reported reproductive health indicators by age-group, Matlab 1996

Indicator	Age			Total
	15-24 years	25-34 years	35-49 years	
Age at menarche (in years)				
Mean	14.6	14.4	14.1	14.3
Median	14	14	14	14
Younger than 14 years of age (%)	20.6	26.0	31.6	27.7
14 years of age (%)	32.4	34.4	35.3	34.4
Older than 14 years of age (%)	47.5	39.8	33.2	37.8
N	547	1510	1742	3799
Contraceptive use				
Ever used contraceptives (%)	62.3	82.6	77.1	77.1
N	549	1510	1746	3805
Health problems in using contraceptives (current users) (%)	35.7	40.6	36.4	38.1
N	213	818	950	1981
Pregnancy				
Total experienced pregnancy loss	10.4	19.6	31.8	23.9
Of which miscarriage	8.9	14.1	19.0	15.6
Of which stillbirth	1.5	5.5	12.8	8.3
N (women)	550	1513	1746	3809
Pregnancy loss rate	104.4	62.1	57.0	60.4
Miscarriage rate	89.7	44.8	34.0	39.5
Stillbirth rate	14.7	17.4	23.0	20.9
N (births)	546	4788	9751	15077
Experiencing physical problems during pregnancy (%)	36.0	39.4	41.1	39.0
Ever received pregnancy check up (%)	70.7	41.3	8.1	28.7
N (women)	376	1451	1645	3472
Delivery				
Ever experienced physical problems at delivery (%)	15.5	10.3	23.6	14.2
N (women)	376	1451	1645	3472
Care provider at delivery				
Trained care provider (all births)	8.9	5.4	3.3	4.2
Trained care provider (births after 1991)	9.3	8.1	11.2	9.0
Place of confinement				
Safe place (all births)	3.8	1.9	1.3	1.6
Safe place (births after 1991)	3.8	3.6	6.9	4.3
N (all births)	607	5102	10483	16192
N (all births after 1991)	525	1558	517	2600
Age at first birth (in years)				
Mean	18.6	19.3	18.0	18.6
Median	19	19	18	18
Women without children (%)	33.1	2.6	1.2	6.3
N	550	1513	1746	3809
Time between menarche and first childbearing (in years)				
Mean	4.1	5.0	4.1	4.5
Median	4	5	3	4
N	376	1451	1645	3472
Birth interval (first interval) (in years)				
Mean	1.9	2.6	2.7	2.6
N	164	1357	1704	3225
Parity				
Mean number of children	1.0	3.2	5.6	4.0
N	550	1513	1746	3809
Currently pregnant (%)	13.8	7.2	1.6	5.6
N	550	1513	1746	3809

Age at menarche

The median age of reaching menarche in our study was 14. Women in the youngest age-group reached menarche on average a bit later than women in the oldest age-group (14.6 compared with 14.1). Only 27.7 per cent of all women reached menarche before the age of 14, 34.4 per cent at the age of 14 and the rest (almost 40 per cent) reached menarche later. "From an international perspective 14 years may be considered as a 'late' timing of menarche" (Bosch 2005, p 166). The timing of menarche is, as discussed in chapter 2 (subsection 2.2.3), among others related to the nutritional status of the girl. Better nourished girls reach menarche earlier than undernourished girls (WHO 2003). We will analyse the relation between the age at menarche and the current nutritional status in chapter 6 (section 6.1).

Contraceptive use

Contraceptive use is presented in table 5.1 by 'ever used contraceptives' and by 'health problems while using contraceptives'. No difference is made between traditional methods and modern methods. Table 5.1 reveals that 77.1 per cent of all women have reported that they have ever used contraceptives (any type). The youngest age-group has the lowest percentage of ever users, 62.3 per cent of the women in this age-group have ever used any type of contraceptive. All women in this part of the survey are (ever) married which means that most of the women are at risk of getting pregnant. The women of the youngest age-group will probably first get children before they start using contraceptives. Hutter (1994) states that in the Indian context, after marriage women have to prove their fertility and if the woman does not get pregnant after two years of marriage people (especially family-in-law) start worrying if she can have children. Between marriage and the birth of the first child hardly any contraceptives are used (Sukumari Amma et al. 1989, Basu 1993, Singh et al. 1993). This is probably also the case for women in Bangladesh. The contraceptive methods used by the women and her husband are presented in table 5.2.

Table 5.2 Contraceptive methods used by couple by age-group, Matlab 1996 (%)

	Age			
Method used (%)	15-24 years	25-34 years	35-49 years	Total
Contraceptive pill	27.5	29.6	32.6	30.0
1-monthly injection	0.2	0.0	0.1	0.1
2-monthly injection	1.8	2.4	1.5	1.9
3-montly injection	37.0	33.4	34.4	34.9
Condom	3.0	2.4	3.3	2.9
IUD	1.5	1.0	1.5	1.4
Nortplant	0.0	0.2	0.3	0.1
Female sterilization	17.3	18.0	17.9	17.7
Male sterilization	0.5	0.5	0.3	0.4
Calendar method	8.1	8.9	5.9	7.5
Coitus interruptus	1.1	1.1	1.0	1.1
Abstinence	0.8	1.0	0.1	0.6
Traditional herbs	1.1	1.3	0.9	1.1
Others	0.2	0.3	0.1	0.2
N (total %)	665 (100%)	629 (100%)	780 (100%)	2074 (100%)

The most frequently used methods are three monthly injection, oral pill and female sterilization. The percentage sterilized women is almost the same for all age-groups. When we compare this with the prevailing methods for Bangladesh in 2004 (BDHS 2004) we see that contraceptive pill is the most widely used method (45.1 per cent) followed by traditional methods (18.6 per cent) (ICDDR,B 2005), while traditional methods were only used by about 10 per cent of the women in Matlab. Contraceptive methods may have side effects, 38.1 per cent of the women who are currently using any type of contraceptive experience health problems while using the method (see table 5.1). Table 5.3 presents the reported health problems of women while using contraceptives.

Table 5.3 Health problems while using contraceptives of the women by age-group, Matlab 1996 (%)

Health problems while using methods (%)	Age			Total
	15-24 years	25-34 years	35-49 years	
Weight gain	0.8	1.3	2.7	1.9
Weight loss	4.1	6.4	6.3	6.1
Too much bleeding	8.2	5.6	6.7	6.4
High blood pressure	0.8	0.4	1.0	0.7
Headache	9.0	6.9	7.4	7.3
Nausea	6.6	2.7	2.4	2.9
No menstruation	14.8	15.8	14.9	15.3
Weak/tired	21.3	27.5	25.1	25.8
Dizziness	25.4	26.4	23.1	24.7
Other	9.0	7.1	10.4	8.8
N (total %)	122 (100%)	550 (100%)	585 (100%)	1257 (100%)

Table 5.3 reveals that the most frequently reported health problems that the women relate to the use of contraceptives are: weakness (25.8 per cent), dizziness (24.7 per cent), no menstruation (15.3 per cent) and headaches (7.3 per cent). For women in the first age-group is dizziness the most prominent health problems related to contraceptive use (according to the women). For the women in the other age-groups is weakness the most prominent health problem related to contraceptive use.

Pregnancy

Table 5.1 reveals that the pregnancy loss rate for all women is 55.0 per 1000 pregnancies, the miscarriage rate is 36.0 per 1000 pregnancies and the stillbirth rate is 19.1 per 1000 pregnancies. The miscarriage rate is highest in the youngest age-group (89.7 per 1000 live births) and the stillbirth rate is highest in the oldest age-group (23 per 1000 live births). The stillbirth and miscarriage rates are based on the total number of pregnancies experienced by the women in a certain age-group divided by the number of stillbirths and miscarriages these women experienced. The current miscarriage and stillbirth rates in Matlab are respectively 94.6 and 25.1 per 1000 pregnancies (ICDDR,B 2005). When we compare these rates with the rates found in our study, we can say that the rates in our study are probably influenced by underreporting of pregnancy losses (probably due to the time between the pregnancy losses and the reporting). Very young women are at higher risk of miscarriages (Roman and Stevenson 1983, cited by Becker 1993) this is also found in our data. Almost 24 per cent of the women experiences one or more pregnancy losses. From the women in the oldest age-group (35 to 49 years), 19.0 per cent have experienced at least one miscarriage and almost 13 per cent have experienced at least on stillbirth. Women in the older age-groups have experienced more pregnancy losses. This is logical when we take into account that their reproductive career is already longer. Weinstein et al. (1993) found in reviewing nine studies that the probability of foetal loss declines after the age of 24 and starts to increase from the late twenties onwards. Table 5.1 reveals also that about 39 per cent of the women experienced physical problems such as excessive bleeding, convulsion, headaches, fever, edema, anaemia and 'weakness' during pregnancy. Older women experienced somewhat more problems during pregnancy than the younger women. This might be related to the fact among the younger age-group more women have received at least on pregnancy check-up. From the youngest age-group 70.7 per cent of the women have ever received one or more pregnancy check-ups, for the second age-group is this percentage 41.3 and for the third age-group only 8.1 per cent.

Delivery

Problems at delivery such as excessive bleeding, convulsion, and reverse position (leg first) were experienced by 14.2 per cent of all women. The second age-group reported less frequent

problems compared to the other groups, 10.3 per cent of the women in this age-group reported problems at delivery compared with 15.5 per cent in the youngest age-group and 23.6 per cent in the oldest age-group. The percentages in table 5.1 are based on the births after 1991. Table 5.4 presents the problems women perceived during delivery.

Table 5.4 Problems during delivery of the women by age-group, Matlab 1996 (%)

	Age			
Problem (%)	15-24 years	25-34 years	35-49 years	Total
Excessive bleeding	39.4	33.3	9.0	25.8
Convulsion	9.9	9.0	3.3	7.1
Reverse position	16.9	16.0	9.0	13.7
Other problem	33.8	41.7	78.7	53.4
N (total %)	71 (100%)	144 (100%)	122 (100%)	337 (100%)

The table reveals that women aged 15 to 34 experiences especially excessive bleeding while women aged 35 to 49 experienced particularly other problems. As presented in chapter 2 (subsection 2.2.3) assistance of a trained person during delivery is needed to control the health situation of both the women and the child (UNICEF et al. 1993). For the care provider during delivery, stillbirth or miscarriage we make the distinction between trained providers and traditional providers (according to ICDDR,B staff). Trained providers are the MBBS (Bachelor in Medicine and Bachelor in Surgery), compounder (experienced medical assistant, assistant of the physician), nurses and trained midwifes. Untrained providers are health workers, Family Welfare Assistants, traditional midwifes, village doctors, pharmacists, *kabiraj,* relatives and the women herself. Table 5.1 shows that only 4.2 per cent of all births are assisted by a trained provider. For the births after 1991 the percentage is more than doubled to 9.0 per cent. Striking feature is that for the births after 1991 women of the oldest age-group are the most frequent users of trained providers (11.2 per cent). ICDDR,B (2002) reported that in 2002 in Matlab 87.0 per cent of the women delivered without a skilled birth attendant. In this study we distinguish safe places of confinement from 'unsafe' places of confinement. Selection of safe places is based on the possible hygienic situation of the place and the professionalism of the assistance during the delivery, stillbirth or miscarriage. Safe places are than hospitals, health centres, sub-centres, the office of a physician and the house of a trained midwife. Unsafe places are the house of the traditional midwife, house of the village doctor, own houses and fathers' houses. This classification is based on considerations by ICDDR,B staff. Only 1.6 per cent of all births have take place at a safe delivery place. For births after 1991 the percentage is a bit higher (4.3 per cent). It is remarkable that for the births after 1991 the women in the older age-groups (35-49 years) deliver more often at a safe place than the younger age-groups, while for all births it is the other way around (see table 5.1). According to ICDDR,B (2002) were in 2002 92 per cent of the deliveries in Matlab home deliveries. Bathia and Cleland (1995) found that women who delivered their last child in a private institution were significantly less likely to report gynaecological symptoms than women who delivered the last child at home or in a government hospital.

Age at first birth

As discussed in chapter 2 (subsection 2.2.3) getting children before the age of 18 or after the age of 35 brings higher risks during pregnancy and delivery for mother and child. We look only at the first childbirth. From table 5.1 we can read that almost all women get children in the Matlab society, only 6.3 per cent of all women in the survey were childless and among the women in the oldest age-group the percentage women without children was even lower (1.2 per cent). The mean age at the first birth was 18.6, the highest mean is found among women aged 25 to 34 years (19.3). With the interpretation of the table we need to take into account that the mean ages are somewhat influenced by extreme cares and that they can still rise, especially in the first and second age-group because in these groups a considerable proportion of the women does not already had her first child. The minimum age of giving birth was 11 (not shown); although this is a very young age for childbearing, and it is possible that both

values are underestimated, we have controlled this value for age at menarche. Because the mean values shown are already low, there might be a considerable proportion of women that had their first child before the age of 18 (38.5 per cent of all women, not shown). These women were at obstetric risk during pregnancy and childbirth.

Time between menarche and first childbearing
The mean time between menarche and childbearing is 4.5 years. The mean time is longest for the second age-group (5.0 years). The median time for all women is four years. Comparison between age-groups over time is not yet possible because in the youngest age-group 33.1 per cent of the women have not yet children. Childbearing is considered to happen only within marriage in the Bangladeshi context and most women will try to get children as soon as possible after marriage (see for example Hutter 1994). This indicator may also be seen as an indicator of choice. We consider that when the time between menarche and the first child is short (less than four years) it might be not always the free choice of the women to have a child. When we take into account that having children before the age of 18 entails health risks, and the median age of menarche is 14, the time between menarche and childbearing should preferably be at least four years. The mean for this indicator is somewhat influenced by extreme cases. The time between these two events is measured in years, measuring in months would have given a more precise results.

Birth interval
After childbirth a women needs at least two years to recover completely from the childbirth and the pregnancy (UNICEF et al. 1993). The two years is also needed to enlarge the survival change of mother and child (subsection 2.2.3). In this study we look at the time between the first and the second birth in years. Table 5.1 reveals that the mean interval duration is 2.6 years, in the youngest age-group is the mean interval duration shorter than two years (proportion women with a second child is smaller). The mean interval time for all women is good given the UNICEF standard. The mean interval time for the youngest age-group is to short; however this mean might rise when more women in this age-group get their first child. About 13.0 per cent of the women had a birth interval shorter than 2 years (not shown). The time between the first birth and the next conception is the result of the combination of the in fecund period (due to amenorrhoea and abstinence) and the waiting time to conception (Hutter 1998a). The birth interval is normally measured in months in stead of years. Measuring the birth interval in months would have given a more precise interval time.

Parity
From table 5.1 we can read that the mean number of children for the women in this survey is almost four and a half, the mean number of children for women aged 35 to 49 years is 5.6. With the interpretation of these numbers in the table we need to take into account that these women were still in the reproductive age at the time of the survey and childbearing episodes are open ended for most of the women. As described in chapter 2 (subsection 2.2.3) getting more than four children involve higher risks for mother and child. Table 5.5 presents the percentages of women by number of children.

Table 5.5 Number of children of the women by age-group, Matlab 1996 (%)

	Age			
Number of births	15-24 years	25-34 years	35-49 years	Total
0 births	33.1	2.6	1.1	6.3
1 to 4 births	66.7	79.7	29.7	54.9
5 or more births	0.2	17.7	69.1	38.8
N (total %)	547 (100%)	1510 (100%)	1742 (100%)	3799 (100%)

Table 5.5 reveals that from the women in the third age-group (35 to 49 years) 69.1 per cent of these women had already more than four children and 38.8 per cent of all women had already more than 4 children. These women are at higher risk of reproductive health problems. The maximum number of children was 15 (not shown); this is according to Bongaarts and Potter (1983) and Bongaarts (1993) the approximate biological maximum number of children a woman can get.

Currently pregnant women
Reported pregnancy is also one of our reproductive health indicators, because pregnancy may influence the perceived health status of the women. From the women in the survey, 5.6 per cent told that she was pregnant at the time of the survey. The first age-group consist of the highest percentage of pregnant women, 13.8 per cent.

5.2 Perceived reproductive health problems and causes according to women in Matlab

This section discusses the reproductive health problems as perceived by the women themselves (chapter 1, research question 3^B), and their reproductive health problems according to the CHRWs, FRSs, FRO, Senior Supervisor and some of the ICDDR,B researchers (chapter 1, research question 3^C). First we discuss the problems perceived by the women themselves and second we look at the problems as perceived and ranked by the Matlab staff and the ICDDR,B researchers. We have asked the women to list the most prominent reproductive health problems for women of reproductive age in their area (subsection 3.4.2). The perceived problems are divided into three periods: problems during adolescence, during pregnancy and delivery and problems after delivery. Within these periods, a distinction is made between gynaecological problems, obstetric problems and other reproductive health problems. Gynaecological problems are women diseases in general and obstetric problems are related to pregnancy and childbirth (see reproductive morbidity model chapter 2, subsection 2.2.2). Other problems are the problems listed by the women but who are not directly classifiable as gynaecological or obstetric problems.

Reproductive health problems are firstly experienced during adolescence. Bosch (2005) found that adolescent post-menarcheal girls in Matlab (14 to 16 years old) experienced during periods pain and discomfort (especially in the lower belly), excessive bleeding and irregular bleeding. More general feelings which were directly related to periods by the girls were the feeling of weakness, headaches, moodiness and seclusion. The perceived problems during adolescence found in our study are all gynaecological in nature.

A problem especially experienced during adolescence, but also during the rest of the reproductive period, is according to several women *Kalisud. Kalisud* is self defined by the women and has not exact corresponding medical term. *Kalisud* is experiencing pain before and during periods and is especially a problem among adolescent girls. During menstrual periods women experience (especially during adolescence) weakness, one woman told (38-years-old): '*experiencing weakness due to the loss of blood'*. Excessive bleeding, irregular menstruation and pain in the lower belly were also listed as specific problems for this period. These listed problems are in line with the findings by Bosch (2005).

Some of the women related problems to the stage in life of becoming a teenager. A 47-year-old woman said: '*becoming a teenager is becoming in ill health by loosing weight'*. Another woman (38 years) told that '*the brightness of the appearance is lost during the teenage period'*. Bosch (2005) found a contradictory result in an in-depth interview with a 34-year-old woman. This woman told: *'by that time I could say that they had grown up and become smart: they had a good health, were looking good physically and had appealing faces (cited from Bosch 2005, p.206)'*. Two women told also that they experienced burning of hand and feet during this period. Burning was explained by them as a caustic feeling in hand and feet due to

bloated hands. Burning was experienced during adolescence but also after delivery. White discharge is also a problems named by different women as particularly during adolescence even as headaches.

Women experience during pregnancy and delivery many different problems, these problems are grouped as *obstetric* problems. Although some of the problems during pregnancy are better classified as *gynaecological* diseases, here we have chosen to classify them here as *obstetric* diseases because the women perceive them as pregnancy related.

Loss of appetite, vomiting and less sleep at night are problems named by many women during pregnancy. Another problem perceived by the women is *Mathagura*. *Mathagura* is perceived by many women during the whole reproductive period, but especially during pregnancy. The medical term for *mathagura* is vertigo. However vertigo is not the whole definition of *mathagura* for the women, *mathagura* entails much more than what is considered as vertigo. It is also a feeling of weakness developed during pregnancy and dizziness. A Field Research Supervisor (FRS) explained mathagura as: *'That you can not recognize someone for a moment, no clear vision due to stress and shortage of good food.'* The description of *mathagura* by the women, the Community Health Research Workers and the FRS suggests that it is not only comparable with vertigo. *Mathagura* may also be related with *pregnancy Alzheimer* (see for example De Groot et al. 2003 and De Groot 2003). Other problems perceived by the women during pregnancy are: infections, dysentery, edema, swelling, bleeding, jaundice, tetanus and white discharge. A 52-year-old woman talks about '*the evil spirit during pregnancy'*. This is in line with what we wrote earlier about the cultural belief (chapter 2), that pregnant women more vulnerable are for evil spirits.

The women listed especially uterus problems during delivery such as: not opening uterus, prolapsed uterus and uterus coming out. A placenta problem defined by a 50-year-old woman is '*placenta keeps inside'*. Obstructed labour is also a problem during delivery with features as malpresentation and hand coming first. Other problems experienced during delivery are excessive bleeding, fluid discharge, pain and false pain (with the latter the women revered to false labour pain or false contractions).

After delivery, reproductive health problems experienced were also experienced. Most of them are related to *gynaecological* problems, a few are *obstetric* problems and some are more general problems. Perceived obstetric problems after childbirth are edema, demonstrated as swelling and burning of hand and feet and eclampsia. *Sutika* is a commonly perceived gynaecological problem according to the women. It was also one of the main reproductive problems in another rural area in Bangladesh according to Bhuiya et al. (1997). *Sutika* is experienced during the whole reproductive period but especially after childbirth. The main mentioned symptoms are *mathagura* (vertigo), weakness and diarrhoea. Other symptoms of *sutika* named by the women are pain in the limbs, anorexia and strange feeling. One of the ICDDR,B researchers explained *sutika* is as follows:

'There is no medical name for sutika, conditions which seem to be under the term sutika are anaemia and diarrhoea, but sutika encompasses more. The perception is that weight loss like anorexia, follows from childbirth, this weight loss is for the women one of the manifestations of sutika. They also distinguish wet and dry sutika.'

Other gynaecological problems experienced after childbirth are infections, severe bleeding, white discharge, severe pains, *mathagura* and gonorrhoea. Other more general problems of the women are tetanus, tuberculosis, headaches and mental tension. Bathia and Cleland (1995) found in an Indian study about self-reported gynaecological problems that the most commonly reported problems were: a feeling of weakness and tiredness, menstrual disorders, white or coloured vaginal discharge and lower abdominal pain. All of these problems were also listed by the women in our study. Bathia and Cleland related the feeling of weakness to

anaemia, which would suggest that the prevalence of anaemia is high among women in Matlab even as lower reproductive tract infections (symptoms are white or coloured discharge). The general sense of weakness, fatigue and exhaustion among women was also found by Obermeyer (1997). Obermeyer relates this feeling to poverty as well as to anaemia, poor nutritional status, untreated reproductive tract infections and a poor sexual life.

The perception on reproductive health problems is closely related to the perceived cause of these diseases. In Bangladesh it is generally accepted to search for reasons behind events when illness occurs (Aziz and Maloney 1985). The causes of reproductive health problems as perceived by the women are grouped together in five groups: social reasons, medical reasons, economic reasons (food, workload), hygienic reasons and supernatural reasons. Social reasons are mostly family related like early marriage, early pregnancy and more children. These reasons can also be found in the self-reported reproductive health indicators (time at first childbirth, section 5.1). The impact of these reasons is measured in the relation between the perceived general health status and the self-reported reproductive health indicators (see chapter 6). Tension is another social reason, the feeling of too much to care for like food, education, children and work. Perceived medical causes are no tetanus injection, taking family planning and not following advice during pregnancy and after delivery. Economic reasons mentioned by the women are: because we are poor, we can not afford treatment costs, transport costs and good food and shortage of food and heavy work load. Hygienic reasons are related to unhygienic food, unsafe water (not boiled) and the overall unhygienic situation. Yunus et al. (1994) state that people in Bangladesh relate illness to behaviour which is disregarded the prescriptions of the society and that recovery of the illness is considered to be dependent on the wishes of God (see also chapter 2, section 2.3). This perception was only found by the women in the comparison area, these women told that they perceived God as the cause of their illnesses.

5.3 Perceived reproductive health problems of women according to ICDDR,B staff

In this section we look at the reproductive health problems listed by the Matlab staff and by ICDDR,B researchers to identify differences and commonalities in the perceived reproductive health problems. The problems are here also grouped in gynaecological problems, obstetric problems and other problems. First we will look at the reported health problems of the Community Health Research Workers (closed to the women) and at the Matlab supervisor (FRSs, FRO, Senior Supervisor) (subsection 5.3.1) and second we look at the ICDDR,B researchers (subsection 5.3.2).

5.3.1 Perceived reproductive health problems according to Matlab staff

The Community Health Research Workers (CHRWs), the Field Research Supervisors (FRSs), the Field Research Officer (FRO) and the Senior Supervisor were asked to list the most prominent reproductive health problems among women in their area and to rank the three most prominent problems. Between these four groups not much difference was found. Problems are divided into gynaecological problems, obstetric problems and other problems.

The most prominent gynaecological problem, listed by almost every Matlab staff member is white discharge. Related to white discharge are several types of vaginal infections such as: reproductive tract infections, syphilis, gonorrhoea and infections due to husband. One of the health workers explained '*women experience infections due to husband* as *the husband work in Dhaka or outside Bangladesh, he comes home with infections and the women will get infected in this way.'* Second ranked problem are *mathagura* and *weakness. Mathagura* is also one of the frequently listed problems by them women themselves. Problems related to menstruation are also very prominent according to the CHRWs. Remarkable is that *kalisud* (subsection 5.2.1) was not mentioned by the Matlab staff although frequently mentioned by the women. Menstrual problems listed are lower abdominal pains before and during

menstruation, irregular menstruation, spotting, excessive bleeding and haemorrhage. The ICDDR,B staff members perceived that these menstrual problems are partly caused and intensified by hormonal contraceptives. Irregular menstruation, excessive bleeding and lower abdominal pain were also found by Bosch (2005) among adolescent girls in Matlab.

Obstetric problems were less prevalent according to the Matlab staff in their areas. Listed problems were: infections due to unsafe abortions, miscarriages, vomiting during pregnancy and uterus problems. The women listed much more obstetric problems compared to Matlab staff, only the vomiting during pregnancy and uterus problems are listed by both groups.

Problems related to family planning methods are also common among the women according to the Matlab staff. Perceived reported problems through family planning are headaches, spotting, excessive menstrual bleeding (especially for sterilized women), no menstruation due to oral pill and injectable method and heavy bleeding for IUD users. However this link made between menstrual problems and family planning methods was not made by the women. Other listed problems by the Matlab staff were: infections, burning of hand and feet, breast problems (hard breasts), urine infections, skin diseases, anaemia, tetanus and malnutrition.

5.3.2 Perceived reproductive health problems according to researchers in Dhaka

From the six ICDDR,B researchers, only the epidemiologist, one of the physicians and the demographer were able to report reproductive health problems of women in Matlab. The other three ICDDR,B researchers told that they had no idea about reproductive health problems in Matlab and were not willing to try to list some problems. The problems are again divided in gynaecological problems, obstetric problems and other problems. An interesting aspect by the listing of problems was that the epidemiologist listed only obstetric problems, the physician only gynaecological problems and the demographer listed problems in all three groups.

Listed gynaecological reproductive health problems are *sutika* (subsection 5.2.3), vaginal infections, irregular menstruation, high bleeding and severe menstruation pain. White discharge is also very common, one of the researchers said: '*when you go to the medicine shop at the street, most medicines sold are related to white discharge and people speak about these problems there.'* Sutika, white discharge and severe menstruation pain (*kalisud*, subsection 5.2.1) were also perceived by the women as reproductive health problems. Listed obstetric problems are eclampsia, malpresentation, uterine infections, prolapsed uterus and abortion related infections. The women perceived only malpresentation and prolapsed uterus (section 5.2). The reported problems other than gynaecological or obstetric are according to the ICDDR,B researchers related to the use of family planning methods. Side effects of contraceptives according to one of the ICDDR,B researchers are: *aching of the body, burning of hand and legs, dizziness* and *mathagura. Mathagura* is according to the ICDDR,B researchers a combination of vertigo, headache and severe pains cause by oral pills and other hormonal contraceptives.

5.3.3 Perceived causes of reproductive health problems according to ICDDR,B staff

The perceived causes of reproductive health problems were by the women grouped together in the following five groups (section 5.2): social reasons, medical reasons, economic reasons (food, workload), hygienic reasons and supernatural reasons. We expect that people with more education (and more knowledge about health) perceive other causes of reproductive health problems than people with very less or no education.

The ICDDR,B staff related the problems especially to the hygienic situation and not to social and supernatural reasons. An important hygienic reason according to most respondents is unhygienic pad use. Pads are poorly cleaned and washed with unhygienic water. Home delivery is another cause of many problems; this is related to the practices of birth attendants. Traditional birth attendants and relatives do not use safe delivery kids, cutting their nails, washing their hands and cleaning the room. Medical reasons are the use of medicines form traditional healers for induced abortions, family planning methods, sterilization and the lack of treatment from medical trained persons. Perceived economic reasons for Matlab staff and ICDDR,B researchers are the hard physical workload (also during pregnancy) and the lack of good food like fish, milk and eggs.

5.4 Conclusions

Central theme in this chapter is the reproductive status of women of reproductive age in Matlab as indicated by self-reported reproductive health measures and by the perceived reproductive morbidity of the women. The analysis of this chapter was guided by hypothesis 4 and 5 (see section 3.1).

Hypothesis 4 stated that, according to several UNICEF indicators of reproductive health, the general reproductive health status of the women can be indicated as low. This expectation is true for some of the selected self-reported health indicators but not for all of them. The mean age at first menstruation (14.3) may, from an international perspective, be considered as late (Bosch 2005). About 38.5 per cent of the women gave birth before the age of 18. These women are according to UNICEF et al. (1993) at obstetric risk during pregnancy and childbirth. The time between the first menstruation and the first birth is short; the mean time for all women is 4.5 years. Having more than 4 children brings higher health risks during pregnancy and childbirth for mother and child (UNICEF et al. (1993). In our study 38.8 per cent of the women had more than four children and were at higher health risk. In the oldest age-group this percentage is even higher i.e. 69.1 per cent. Only 28.7 per cent of the women have ever received a pregnancy check-up, 4.2 per cent of all births were attended by a trained provider and 1.6 per cent of all births were delivered at a safe place. About 77.1 per cent of the women have ever used contraceptives. The miscarriage and stillbirth rates, as reported in the survey, are lower than the current rates in Matlab. This may be the due to deterioration in the general health situation in Matlab but another cause may be a possible underreporting of miscarriages and stillbirths in the survey (time gap). The time between the first and the second child is on average more than two years, which is more than the standard laid down by UNICEF et al. (1993). We can conclude that for some of the women the reproductive health status as assessed by self-reported indicators is low, but this is not the case for the women in general. However, the selected indicators may be not the best indicators for measuring the reproductive health status of the women. Most of the indicators assess a health *risk* and do not measure if the woman is actually suffering from any problem. With the interpretation of the results we need to take into account that the women who are at higher health risk may have no reproductive health problems at all.

We expected that the women in Matlab would describe different reproductive health problems as compared to ICDDR,B staff members (hypothesis 5). This expectation appeared not to be entirely true. The main reproductive health problems for the women during adolescence are menstrual problems (*kalisud),* buring of hand and feed and white discharge. Obstetric reproductive health problems are *mathagura* which is perceived during pregnancy and uterus problems (such as uterus not opening, uterus coming out and prolapsed uterus) perceived during delivery. After childbirth, *sutika*, *mathagura*, weakness and diarrhoea were experienced by the women. Gynaecological problems according to Matlab staff are white discharge and infections. According to ICDDDR,B researchers, *sutika*, vaginal infections, menstrual problems and white discharge. Obstetric problems of the women are according to

Matlab staff: infections, miscarriages, vomiting and ‘uterus problems’. The ICDDR,B researchers listed as obstetric problems also uterus problems, eclampsia and malpresentation. The Matlab staff could have referred to eclampsia and malpresentation by listing ‘uterus problems’. Other reproductive health problems of the women such as excessive bleeding, no menstruation and *mathagura*, are according to Matlab staff and the ICDDR,B researchers related to family planning methods. The women did not relate these problems to the use of family planning methods. Most of the reproductive health problems are listed by both the women and the ICDDR,B staff. However, some of the reproductive health problems are by the women named by local terms and by the ICDDR,B staff sometimes by more medical terms. An example of this is anaemia, which is listed by ICDDR,B staff, but not by the women. The women may refer to anaemia by *mathagura* or weakness.

6. Cross-relations between general and reproductive health status

This chapter tries to incorporate the *reproductive* health status in the *general* health status. First we look at the relation between the *observed general health status* and the *self-reported reproductive health indicators* (section 6.1, research question 4) after which we look at the influence of the *reproductive health indicators* on the *self-rated general health status* (section 6.2, research question 5). The conclusions are presented at the end of the chapter (section 6.3).

6.1 Relation between observed general health status and self-reported reproductive health status

The aim of this section is to examine which anthropometric measures influence the self-reported *reproductive* health indicators (research question 4). Chapter 2 has discussed the relation between *body weight and/or height and the Body Mass Index* on the one hand and *the age at menarche (subsection 2.2.3) and obstetric problems during pregnancy and childbirth (2.2.1)* on the other hand. Better nourished girls reach menarche earlier than undernourished girls (WHO 2003) (subsection 2.2.3) and low weight and/or short height are risk factors during pregnancy and childbirth. In this section we will first examine if a current low body weight and/or low BMI can be related to the above median age at menarche or not and then, if poor anthropometry is related to a lower self-reported reproductive health status or not.

Nutritional status and body weight during adolescence are related to the age at menarche. Better nourished girls reach menarche earlier than undernourished girls. Here we try to indicate if women with an above median age at menarche are currently more undernourished and/or have more frequent a weight below 45 kg. No correlations between current BMI or body weight and the age at menarche have been found. Women with a current weight below 45 kg and/or a low BMI (BMI<18.5) did not have a higher age at menarche than women with a weight of 45 kg or more and/or a BMI of 18.5 or higher. The age at menarche seems to be only related to the nutritional status during childhood and adolescence (see for example Bosch 2005). However, the age at menarche has no significant relation with the current anthropometric status of the women.

Women with a weight below 45 kg and/or a height below 145 cm are considered to be at an obstetric risk (WHO 2003). We try to indicate the relation between *poor anthropometry* (BMI below 18.5, weight below 45 kg or less than 145 cm tall) and *self-reported reproductive health*. First we look at the Body Mass Index (BMI) than we look at weight and finally at height. There is no significant correlation between BMI and most of the self-reported reproductive health indicators (as described in section 5.1). However, there is a correlation (negative) between BMI and the number of children ($p<0.001$). Women with more than four children are more times malnourished than women with less than five children, this was also suggested by Dr. Roy (personal conversation, February 2005). Body weight correlates (negative) with anaemia ($p<0.001$) and health problems while using contraceptives ($p=0.015$). Women with a body weight below 45 kg suffer more from anaemia and from health problems while using contraceptives than women with a body weight of 45 kg or more. Height correlates (negative) with excessive bleeding ($p=0.058$), miscarriages ($p=0.063$) and stillbirths ($p=0.001$). Women who are less than 145 cm tall experience more frequent excessive bleeding, miscarriages and stillbirths than women who are 145 cm tall or taller. This is in line with the literature that women less than 145 cm tall are at obstetric risk during pregnancy (WHO 1991). We can conclude that undernourished women (BMI<18.5), women with a body weight below 45 kg and/or women with a height below 145 cm experience somewhat more reproductive health problems than better nourished women.

6.2 Reproductive health indicators and self-rated general health status

In this section we try to indicate the perceived reproductive health status by incorporating the *self-reported reproductive health indicators* in the *self-rated general health status* (research question 5). The self-rated health status is described and analysed in chapter 4 (subsection 4.2.2). The self-reported reproductive health indicators are described and analysed in chapter 5 (subsection 5.1). In this section we measure the impact of self-reported health indicators on the self-rated general health status by regression analysis and try to answer research question 5: 'which self-reported indicators of reproductive health influence the perceived health status?' The first step was to examine the indicators which significant correlate with the self-rated general health status by cross-tabulation. The second step was the determination of the coefficient (direction of the difference), relative risk, standard error and the significance level between categories of the significant variables by binary logistic regression analysis.

The indicators are coded based on secondary literature described in chapter 2 (subsection 2.2.2 and 2.2.3) and on the general analysis of the indicators in chapter 5 (section 5.1). The self-rated general health status, categorized as zero for healthy and one for unhealthy is the dependant variable and the self-reported reproductive health indicators are the independent variables. Table 6.1 presents the independent variables that are significantly related to the self-rated general health status.

Table 6.1 Cross-tabulation between self-reported reproductive health indicators and self-rated general health status of all women aged 15 to 49, Matlab 1996

Indicator	Significance level
Age at first childbearing	0.0000*
Time between menarche and childbearing	0.0000*
Number of children	0.0000*
Number of stillbirths	0.0002*
Number of miscarriages	0.0005*
Number of pregnancy losses	0.0002*
Ever received pregnancy check up (all births)	0.0000*
Physical problems during pregnancy	0.0044**
Health problems using in contraceptives	0.0001*
Currently pregnant	0.0660***

* Correlation is significant at a 0.001 level
** Correlation is significant at a 0.005 level
*** Correlation is significant at a 0.10 level

Based on the UNICEF et al. (1993) messages for the timing of births and safe motherhood, we expected that the age of the mother at first birth, the number of children, the birth interval, receiving pregnancy check ups and the assistance of a trained birth attendant at delivery correlate with the self-reported general health status (hypothesis 7, section 3.1). For birth interval and assistance of a trained birth attendant there was no significant correlation with the self-rated general health status. For the other indicators and some other selected self-reported reproductive health indicators (based on other literature) was the correlation with the self-rated general health status significant (see table 6.1). Next we will analyse the direction of the correlation by binary logistic regression.

The dependent variable for the regression analysis is the self-rated general health status binary coded in zero for (fairly) healthy and one for unhealthy. The independent variables are the self-reported reproductive health indicators, also binary coded. With this analysis we test hypothesis 7 (section 3.1). Table 6.2 presents the outcome of the regression analysis.

Table 6.2 Binary logistic regression for self-reported reproductive health status versus self-rated general health status for all women aged 15 to 49, Matlab 1996

Factors	Reference category	Coefficient	Odds ratio	S.E.	Sign.
Age at first childbearing					
<18	18-35 years	0.493	1.637	0.089	0.000*
Time between menarche and first child					
0-3 years	4-7 years	0.371	1.440	0.097	0.000*
8 or more years		-0.254	0.776	0.153	0.097***
Number of children					
0 children	1-4 children	-1.103	0.332	0.303	0.000*
5 or more children		0.575	1.777	0.089	0.000*
Nr of stillbirths					
1	0	0.330	1.391	0.111	0.003**
>1		0.525	1.691	0.160	0.001*
Nr of miscarriages					
1	0	0.307	1.360	0.124	0.013**
>1		0.622	1.862	0.202	0.002**
Nr of pregnancy losses					
1	0	0.330	1.391	0.111	0.003**
>1		0.525	1.691	0.160	0.001*
Pregnancy check ups					
No	Yes	0.207	1.230	0.005	0.000*
Physical problems during pregnancy					
Yes	No	0.661	1.936	0.236	0.005**
Problems using contraceptives					
Yes	No	0.473	1.605	0.125	0.000*
Currently pregnant					
Yes	No	-0.409	0.664	0.218	0.060**

* Significant at 0.001 level, ** significant at 0.05 level, *** significant at 0.10 level

Table 6.2 reveals results more or less in line with our expectation. Women with their first child before the age of 18 perceive themselves less healthy than women with their first child between the age of 18 and 35. This is in line with our expectation based on the messages for the timing of births by UNICEF et al. (1993). Testing the influence of getting the first child after the age of 35 was not reliable because the small number of women getting the first child after the age of 35. Women with an interval between menarche and the first birth between four and seven years perceive healthier than women with a birth interval less than four years. Women with a birth interval of eight or more years perceive themselves healthier even than women with a birth interval of four to seven years. A longer time between menarche and childbearing improves the self-rated general health status of women. As we found in section 6.1, there is a correlation between poor anthropometry and the number of children. We expected that women with more than four children perceived themselves as less healthy than women with four or less children because UNICEF et al. (1993) formulated that getting more than four children greater risks to the life and health of both mother and child. Interpretation of table 6.2 shows that this expectation is true. Additionally we can say that women without children perceive them selves healthier than women with one to four children. Women with no stillbirths or miscarriages perceive their selves healthier than the women with one or more stillbirths and/or miscarriages. In section 6.1 we found already that miscarriages and stillbirths correlate with the height of the women. For receiving pregnancy check-ups we have tested all births and the births after 1991. Striking feature is that only for all births there was a significant correlation with the self-rated general health status. Women who have ever received a pregnancy check-up (for one or more births) rated themselves healthier than women who have never received a pregnancy check-up. Physical problems during pregnancy

influence the self-rated general health status. Women with no problems during pregnancy rate themselves healthier than women with physical problems during pregnancy. Women reported many perceived problems during pregnancy, some of the problems correspond with the problems reported in the survey. According to the Matlab staff and the ICDDR,B researchers are women suffering from many problems related to (hormonal) contraceptives. The women in the survey perceived also problems in using contraceptives while the women from the free-listing interviews did not report reproductive health problems related to the use of contraceptives. The regression analysis shows that women without reported problems while using contraceptives perceive themselves healthier than women with health problems while using contraceptives. Finally we can say that non-pregnant women perceive themselves less healthy than pregnant women although this is not highly significant ($p<0.10$). They may see pregnancy as a signal for good (reproductive) health.

6.3 Conclusion

In this chapter we have endeavoured to make cross-relations between general health and reproductive health based on the relation between the anthropometric status of the women and the self-reported reproductive health indicators (research question 4) and on the relation between the self-reported reproductive health indicators and the self-rated general health status (research question 5). The analysis is guided by hypothesis 6 and 7.

Hypothesis 6 stated that women with poor anthropometry report a lower reproductive health status as compared to women with a normal anthropometry. This appeared to be true for a few of the reproductive health indicators. No correlation has been found between the age at menarche at the one hand and the current Body Mass Index (BMI) and weight on the other hand. A strong correlation (negative) has been found for BMI and the number of children. Weight correlates highly significantly with anaemia (negative) and problems while using contraceptives (negative). Height correlates with excessive bleeding (negative), having experienced one or more miscarriages (negative) and having experienced one or more stillbirths (negative). We can conclude that women with underweight (BMI<18.5), weight below 45 kg and/or less than 145 cm tall experience more reproductive health problems than better nourished women. Improvement of the nutritional status of the women may result on the longer term in a decrease in the number of reproductive health problems.

We expected that there was a strong relation between the self-reported indicators of reproductive health and the self-rated general health status (hypothesis 7). This expectation appeared to be true for most of the selected self-reported indicators of the reproductive health status. No significant correlation between the self-rated general health status on the one hand and birth intervals and the assistance of a trained birth attendant at delivery on the other hand has been found. Significant correlations have been found between the self-rated general health status and respectively the age at first birth, the time between menarche and the first birth, the number of miscarriages, stillbirths and pregnancy losses, receiving a pregnancy check-up (all births), experiencing health problems while using contraceptives and for current pregnancy. Women above the age of 18 at the first birth perceive healthier than women who gave birth before the age of 18. Women with more than four years between menarche and the first birth perceived themselves healthier than women with an interval of less than four years. The women who had experienced one or more pregnancy losses (miscarriages or stillbirths) perceived themselves less healthy than the women never experiencing pregnancy losses. Ever receiving a pregnancy check-up seemed to improve the self-rated general health status. Women with health problems while using contraceptives perceive themselves less healthy than women without problems using contraceptives. Pregnant women perceived themselves healthier than non-pregnant women. From this we can conclude that the (timing of) reproductive events and the use of health services influences the self-rated general health status of the women. Pregnancy may be seen as a sign for good health, especially among women aged 15 to 24 years.

7. Conclusions and discussion

In this final chapter the major findings of this study are presented and recommendations for further research are formulated. We have endeavoured to study the *general* and *reproductive* health status of women in rural Bangladesh by *perceived* and *observed* measures. The main research question in this study that we aimed to answer was formulated as follows:
What is the observed and perceived general health status of the women in rural Bangladesh, and how are these statuses related to their perceived reproductive health status?

We focused on the (reproductive) health status of women of reproductive age (15 to 49 years) and have used quantitative data (Matlab Health and Socio-economic Survey of 1996) and qualitative data (applying the free-listing method). The main research question was split up into five more specific research questions (see chapter 1), dividing the study into three parts:

- Part A: on observed and perceived general health status
- Part B: on self-reported and perceived reproductive health status, and
- Part C: on cross-relations between the general and the reproductive health status.

First the research questions and hypotheses are reviewed (section 7.1) after which some recommendations for further research are formulated (section 7.2).

7.1 Review of the research questions and hypotheses

In this section we try to review the research questions (as formulated in chapter 1) and hypotheses (as formulated in section 3.1). Part A deals with the general health status of the women (research question 1) and the relation between observed and perceived measures of the general health status of the women (research question 2). The general health status of the women was indicated by observed measures, self-reported measures and self-rated measures. From the results, as presented in chapter 4, we can conclude that the general health status of the women according to these measures is not adequate. This was in line with hypothesis 1. Especially the general health status as indicated by anthropometry, acute morbidity, chronic morbidity and the self-reported ability to carry out Activities of Daily Living (ADL) has proven not to be adequate. In addition, the self-rated general health status has also proven not to be adequate. For example, 65 per cent of the women had a weight below the cut-off point for obstetric risk of 45 kg, about 56.0 per cent suffered from one or more acute diseases during the month before the survey, and 72 per cent suffered from one or more chronic diseases in the month before the survey. The health status of the women of reproductive age in Matlab is not adequate according to observed measures as well as to perceived measures.

To get more insight in the perceived general health status of the women, we compared their definition of health with the definition provided by ICDDR,B staff. We have found that these two definitions of health do not correspond with each other. This was also in line with what we formulated in hypothesis 2. The ICCDR,B staff in general formulated health in line with the WHO definition of health (physical, mental and social aspects) while the women define health especially in terms of physical well being. When the women experience no physical problems, they would probably rate their current general health status as healthy.

The second research question, also presented in Part A, dealt with the correspondence between the observed general health status and the perceived general health status of the women. In section 4.4 we examined the extent of correspondence between measures of the observed and perceived general health status (hypothesis 3). A highly significant correlation (negative) has been found between the physical ability test and the self-reported ADL. Although these measures of physical ability consist of different activities of daily living, the health status obtained from the tests is comparable. Correspondence was also found between the general health status obtained by observed measures and the self-rated general health status. There appeared to be a strong correlation between the self-rated general health status

on the one hand and BMI (negative), measured physical ability (negative) and health status as observed by the interviewer (negative) on the other hand. Women with an adequate nutritional status, for example, perceived themselves healthier than women with a poor nutritional status. The selected indicators of the self-reported general health status (acute morbidity, chronic morbidity and ADL) correlate all three significantly with the self-rated general health status. Based on these results we can reject hypothesis 3 because for women of reproductive age in Matlab, their health status obtained by observed measures and their health status obtained by perceived measures correspond with each other. The perceived measures used in this study may be as good as the observed measures used, to asses the general health status of women of reproductive age in Matlab.

Part B and research question 3, concerns the reproductive health status of the women as assessed by self-reported indicators and reproductive health problems (as perceived by the women themselves and as perceived by ICDDR,B staff). Hypothesis 4 stated that according to several UNICEF indicators the reproductive health status of the women under study would be low. Results from chapter 5 show that this expectation appeared to be true for only some of the self-reported indicators of the reproductive health status. We found, for example, that the mean age at first menstruation was 14.3 years. From an international perspective, this may be considered as late (Bosch 2005). About 38.5 per cent of all women had their first child before the age of 18 years. According to UNICEF et al. (1993) a woman is physically not ready to begin childbearing until she is about 18 years of age. The time between the first menstruation and the first birth appeared to be short. The mean time between these two events for all women was 4.5 years. Also, having more than four children brings higher health risks (UNICEF et al. 1993). In our study 38.8 per cent of the women had more than four children and were thus at higher health risk. In the oldest age-group this percentage is even higher (69.1 per cent). Furthermore, only 28.7 per cent of the women have ever received a pregnancy check-up, only 4.2 per cent of all births were attended by a trained provider and 1.6 per cent of all births took place at a safe place. We can conclude that for some of the women the reproductive health status as assessed by self-reported indicators is low. Another part of the women is potentially at higher (health) risk due to, for example, a young age at first birth and a high number of children.

The reproductive health status of the women was also indicated by their perceived reproductive health problems, as defined by themselves and as defined by ICDDR,B staff. We expected that the women in Matlab would report differently on reproductive health problems as compared to the ICDDR,B staff members (hypothesis 5). This expectation appeared to be the case. Although many of the reproductive health problems are listed by both the women and the ICDDR,B staff, the way they report about the reproductive problems is different. Some of the reproductive health problems are named by the women in local terms and by the ICDDR,B staff in more medical terms. An example of this is anaemia, which is listed by ICDDR,B staff, but not by the women. The women may refer to anaemia by *mathagura* or weakness. Both the women and the ICDDR,B staff, listed excessive bleeding, no menstruation and *mathagura*. According to the ICDDR,B staff, these reproductive health problems are related to family planning methods while the women did not relate these problems to the use of family planning methods. When studying reproductive health problems, it is important to know the local names of health problems as well as the symptoms and perceived causes of these health problems.

Part C entailed the cross-relations between the general and the reproductive health status and dealt with research question 4 and 5. The fourth research question looked at the relation between anthropometry and self-reported indicators of the reproductive health status. The women's anthropometry correlates significantly (negative) with various indicators of the self-reported reproductive health status. Body Mass Index correlates highly significant (negative) with number of children. Weight correlates with problems while using contraceptives (negative). Excessive bleeding, miscarriages and stillbirths correlate (negative) all three

significantly with height. For example, having a small stature (height below 145 cm), correlated significantly with a higher number of miscarriages and stillbirths. We found that women with underweight (BMI<18.5), weight below 45 kg, and/or height below 145 cm experienced more reproductive health problems than better nourished women. This result is in line with hypothesis 6. On the basis of these findings, we can conclude that an improvement of the nutritional status of the women may result in a decrease in the number of reproductive health problems.

The final research question, presented in Part C, dealt with the relation between self-reported reproductive health indicators and the self-rated general health status. We expected that there would be a strong relation between the self-reported indicators of the reproductive health status and the self-rated general health status (hypothesis 7). This expectation appeared to be true for most of the selected self-reported indicators of the reproductive health status. Women aged above 18 years at the first birth perceived themselves healthier than women who gave birth before the age of 18 years. Women with more than four years between menarche and the first birth perceived themselves healthier than women with an interval of less than four years between these two events. The women who had experienced one or more pregnancy losses (miscarriages or stillbirths) perceived themselves less healthy than the women with no pregnancy losses. Ever receiving a pregnancy check-up seemed to improve the self-rated general health status. Women with health problems while using contraceptives perceived themselves less healthy than women without problems while using contraceptives. The (timing of) reproductive health events and the use of (reproductive) health services influence the self-rated general health status of the women. Stimulating a higher age at first birth, a longer time between menarche and the first pregnancy and pregnancy check-ups may improve the self-rated general health status of the women.

Pregnant women perceived themselves healthier than non-pregnant women. The youngest age-group comprises the highest percentage pregnant women (13.8 per cent was pregnant). For especially this younger age-group, pregnancy may be seen as a sign for good health. However, this result about the role of pregnancy on the self-rated general health status requires more study.

7.2 Recommendations

In this section we review the shortcomings of our study and formulate some recommendations for further research.

Theory

Theories about the relation between the *observed* and *perceived general health status* were not at hand. Findings on this relation provided by earlier research were a useful guideline for our study. However, the development of more theoretical models on the relation between the observed and perceived health measures may be a useful addition for guiding further research. The reproductive morbidity model as described by Zurayk et al. (1993) and the model of mother's health career and child's survival career by Hutter (1998a, 1998b) were useful for the construction of the plan of analysis. The reproductive health indicators were selected on the basis of the model of mother's health career and child's survival career and on several UNICEF et al. (1993) messages. However, the messages of UNICEF et al. focus more on the indication of the *risk* at health problems than on the reproductive health status itself. Indicators based on these messages may be thus not the best indicators of the reproductive health status.

Quantitative data (MHSS survey data)

One of the aims of our study was to indicate the relation between the *observed* and the *perceived general* health status for 15 to 49-year-old women in Matlab. The analysis was highly dependent on the quality of the MHSS dataset. Studying the relation between the

measured and perceived physical ability may be further improved by the use of the same activities in both measures. The perceived physical ability test comprised now more difficult tasks than the measured physical ability test. Testing the relation between the self-rated general health status on the one hand and both anthropometry and measured physical ability on the other hand turned out to be a good way to assess the validity of perceived general health measures. The general health status as observed by the interviewer is not a real objective measure and it may be better not to use this indicator or to classify is as a perceived measure for the interviewer.

The *reproductive* health status of the women was, amongst others, assessed by self-reported reproductive health indicators from the MHSS survey. Many questions in the survey are based on events experienced by the women more than five years before the survey took place. Because time is difficult to indicate for many of the women, asking about the age at first menstruation, age at miscarriages and/or stillbirths, and the care provider or place of delivery for all of their births (possible up to 16 pregnancies) could be very difficult for them. Such information may not be very reliable and may have influenced our results. Asking only about the last pregnancy or reproductive events in, for instance, the last two or five years may yield more reliable data. The examination of the right time between the reproductive events and the survey should be dependent on the type of questions asked in the survey.

Qualitative data (method of free-listing)
Collecting data by use of the free-listing method was a useful because of the explorative character of the study. Listing characteristics of health and illness appeared to be not very difficult for the women. However, listing reproductive health problems was somewhat more difficult for the women, which was probably influenced by the presence of a male translator (for women in the Bangladeshi society it is not very common to speak about reproductive health problems in the presence of men). The quality of the data could be improved by interviewing women in the presence of a female translator and by tape-recording the interview which makes transcription possible (and checking of the translation). Furthermore, by interviewing the respondent in a, as much as possible, private setting may enhance the ability for the women to talk freely about reproductive issues. The privacy setting was now not sufficient and might have influenced the results. For the interpretation of the survey data, it is important to know how the people under study define (reproductive) health. For further research it would be helpful to explore first how the people under study think about their (reproductive) health status, for example by use of qualitative methods, before developing a survey.

Summarizing we can say that for women of reproductive age in Matlab, *perceived general* health measures are as good as *observed general* health measures for the indication of the general health status. The general health status obtained by use of observed general health measures correlates significant with the general health status obtained by the use of perceived general health measures. The *general health status* and the *reproductive health status* of the women are related to each other. There is a cross-relation between the anthropometry of the women and their reproductive health status and between their reproductive health status and their self-reported general health status.

The nutritional status and the self-rated general health status of the women are related to the reproductive health status. Improving the nutritional status from childhood onwards may decrease the percentage of women with a weight below 45 kg and/or a height below 145 cm, which will reduce the number of women at obstetric risk. Our results revealed that timing of reproductive events and the use of health services influence the self-rated general health status of the women. A health campaign on nutrition and reproductive health which involves women as well as men, community leaders, teachers and imams may help to improve on the longer term the general and reproductive health status of the women in Matlab.

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