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Attachment 1.

Date July 26, 1989

August 14, 1989

ETHICAL REVIEW COMMITTEE, ICDDR,B.

Principal Investigator Dr Ann Riley   Trainee Investigator (if any) _____

Application No. 89-004 _____ Supporting Agency (if Non-ICDDR,B) _____

Title of Study The interval between age   Project status:
at menarche and age at first delivery: its ( ) New Study
effects on maternal nutrition, pregnancy   ( ) Continuation with change
outcome, and infant mortality.   ( ) No change (do not fill out rest of form)

Circle the appropriate answer to each of the following (If Not Applicable write NA).

1. Source of Population:
   (a) Ill subjects   Yes (No)
   (b) Non-ill subjects   (Yes) No
   (c) Minors or persons
       under guardianship   Yes (No)

2. Does the study involve:
   (a) Physical risks to the
       subjects   Yes (No)
   (b) Social Risks   Yes (No)
   (c) Psychological risks
       to subjects   Yes (No)
   (d) Discomfort to subjects   Yes (No)
   (e) Invasion of privacy   (Yes) No
   (f) Disclosure of informa-
       tion damaging to sub-
       ject or others   Yes (No)

3. Does the study involve:
   (a) Use of records, (hosp-
       ital, medical, death,
       birth or other)   Yes (No)
   (b) Use of fetal tissue or
       abortus   Yes (No)
   (c) Use of organs or body
       fluids   Yes (No)

4. Are subjects clearly informed about:
   (a) Nature and purposes of
       study   (Yes) No
   (b) Procedures to be
       followed including
       alternatives used   Yes No
   (c) Physical risks   Yes (No)
   (d) Sensitive questions   (Yes) No
   (e) Benefits to be derived   Yes (No)
   (f) Right to refuse to
       participate or to with-
       draw from study   (Yes) No
   (g) Confidential handling
       of data   (Yes) No
   (h) Compensation &/or treat-
       ment where there are risks
       or privacy is involved in
       any particular procedure Yes (No)

5. Will signed consent form be required:
   (a) From subjects   Yes (No)
   (b) From parent or guardian   n/a
       (if subjects are minors) Yes No

6. Will precautions be taken to protect
   anonymity of subjects   (Yes) No

7. Check documents being submitted herewith to
   Committee:
   ✓ Umbrella proposal - Initially submit an
     overview (all other requirements will
     be submitted with individual studies).
   ✓ Protocol (Required)
   ✓ Abstract Summary (Required)
   ✓ Statement given or read to subjects on
     nature of study, risks, types of quest-
     ions to be asked, and right to refuse
     to participate or withdraw (Required)
   ✓ Informed consent form for subjects
   ___ Informed consent form for parent or
     guardian
   ___ Procedure for maintaining confidential-
     ity
   ✓ Questionnaire or interview schedule *
   * If the final instrument is not completed
     prior to review, the following information
     should be included in the abstract summary
   1. A description of the areas to be
      covered in the questionnaire or
      interview which could be considered
      either sensitive or which would
      constitute an invasion of privacy.
   2. Examples of the type of specific
      questions to be asked in the sensitive
      areas.
   3. An indication as to when the question-
      naire will be presented to the Cttee.
      for review.

(PTO)

We agree to obtain approval of the Ethical Review Committee for any changes
involving the rights and welfare of subjects before making such change.

_____   _____
Principal Investigator   Trainee

Section I: RESEARCH PROTOCOL

1. The interval between age at menarche and age at first delivery: its effects on maternal nutrition, pregnancy outcome, and infant mortality.

2. Principal Investigator:
   Ann P. Riley, Ph.D.
   The University of Michigan Population Studies Centre
   1225 South University Avenue Ann Arbor, Michigan 48104.

   Co--investigators:
   Abdur Razzaque, M.A.
   Michael Strong, Ph.D. , and Lutfun Nahar, M.A.
   The International Centre for Diarrhoeal Disease
   Research, Bangladesh

3. Starting date: June 1 1989

4. Completion date: August 31 1990

5. Total Cost: $ US 56,200.00
   Protocol will be submitted for funding to the Ford
   Foundation, Bangladesh and the Rockefeller Foundation.

6. Scientific Division: Population Science and Extension
   Division.

   This protocol has been approved by the Population Science
   and Extension Division (PSED).

   Acting Head: _Uuuus._ _ _ _

   Date: _ _ _12. 7. 1989_ _

7. Abstract Summary:

The proposed research examines the relationship between age at menarche and the timing of marriage and first pregnancy. In addition, we will study the effects of both age at menarche and age at first pregnancy on maternal nutritional· status, pregnancy outcome, and infant mortality. The implications of early childbearing on maternal and child health are widely debated in the literature, and many issues remain unresolved. The Matlab area of Bangladesh provides an unusual opportunity to examine this issue in a population where age at menarche is known for a sample of adolescents, and marriage and reproductive events have been followed over an extended period of time. Results from this research will help to determine whether age at menarche per se is related to adult height and weight, and, more importantly, whether early pregnancy interferes with the completion of adolescent growth.

8. Review:

    a. Ethical Review Committee: _____

    b. Research Review Committee: _____

    c. Director: _____

SECTION II. RESEARCH PLAN

A. Introduction

1. Objectives

The objectives of this study are to:

a) Determine the effect of age at menarche on maternal height and weight,

b) Evaluate the relaticnship between age at menarche and age at first pregnancy,

c) Study the effect of age at first pregnancy on maternal nutritional status, and

d) Examine the effects of early childbearing on pregnancy outcome and on child survival.

2. Background

The relationship between age at menarche and the timing and outcome of subsequent reproductive events is not well understood, particularly in under-nourished women. In the research proposed below, a strategy for examining this relationship in rural Bangladeshi women is put forth. We propose to examine questions pertaining to the effect of age at menarche on reproduction in a population where malnutrition is widespread and age at menarche is considerably later than in well-nourished girls. Although contraceptive prevalence is on the rise in this population, little or no deliberate control of fertility takes place before the birth of the first child; thus the timing of first births is mediated by factors that control natural fertility.

We propose to examine the following questions. Does age at menarche per se affect adult height and weight or the magnitude of post-menarcheal growth in height and weight? Is there a relationship between age at menarche and the interval between menarche to first pregnancy when age at marriage is controlled; and does the length of the interval between menarche and first pregnancy interfere with completion of post-menarcheal growth, causing shorter adult height or lower body weight? In addition, we will look at the effect of age at menarche and the effect of the interval between menarche and first pregnancy on pregnancy outcome and child survival during the first year of life.

An important issue for both developed and developing countries is whether the association of adolescent pregnancy and poor pregnancy outcome is attributable to biological factors, such as compromised growth of the mother and fetus. Although

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most of the information available on this topic comes from studies of developed country populations, there are also important implications for developing countries, where poor nutrition retards growth, and delays age at menarche. In Bangladesh these condition coincide with early marriage and childbearing.

3. Rationale

The relationship of young maternal age to pregnancy outcome is controversial and many issues remain unresolved. Does young maternal age pose some biological risk or is the observed association between young maternal age and poor pregnancy outcome due to socio-economic factors? A number of studies suggest that adolescents who become pregnant soon after menarche are at high risk for poor pregnancy outcomes because of the competing growth needs of the mother and the fetus (Frisancho 1978, Malcolm 1979, Naeye 1981, Duenhoelter et al. 1975, Carey et al. 1983, Frisancho et al. 1983, Kulin et al. 1982, Zlatnick and Burmeister 1979). Higher risks observed in adolescent mothers, compared to more mature mothers, include low birth weight, cephalopelvic disproportion and pregnancy-induced hypertension. Immaturity of the pelvis and birth canal is a also a concern for pregnancy complications. Several studies show an increased proportion of contracted pelvises among adolescents less than 15 years of age, compared to 15-19 years old and women in their twenties (Ellison 1982, Kaltreider 1963, Battaglia 1963, Duenhoelter et al. 1975). Moreover, anthropometric research shows that pelvic size is significantly smaller at menarche than at maturity (Moerman 1981, Lavelle 1982). However, a growing body of research suggests that the high risks for poor pregnancy outcome and infant mortality associated with young maternal age are due to socio-economic rather than biological factors (Geronimus 1988, Mackison 1983).

Despite the large body of research on this topic, some important issues have been largely overlooked. With respect to poorly nourished populations, little is known about growth in adolescent females. Few longitudinal studies on growth patterns in relationship to age at menarche and pregnancy outcome are available in under-nourished populations. Bangladesh presents the possibility to further study these relationships in chronically malnourished women. A longitudinal study of growth and reproductive events in 1976-77 has already made a substantial contribution to our understanding of these relationships. The average age at menarche in Matlab, Bangladesh is 15.8 years (Foster 1984) compared to 12.7 years in U.S. girls (MacMahon 1973), and age at menarche is associated with age at marriage (Chowdhury et al. 1977). In addition, girls with late age at menarche have shorter marriage to conception intervals than earlier maturing girls (Foster et al., 1986).

Results from a recent analysis of adolescent growth and age at menarche in the population of Matlab show that the growth spurt in Bangladeshi girls is delayed and spread out compared to

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Western populations (Riley et al. 1988) and that growth in height and weight continues in some women past 20 years of age (Figure 1). Several questions, however, remain unanswered. What are the social and biological mechanisms which tend to prevent adolescent girls who are still growing from becoming pregnant? Does pregnancy arrest growth, and is the amount of remaining growth important?

B. SPECIFIC AIMS

The proposed research will study the relationship between age at menarche and adult height and weight and whether this relationship is mediated by the length of the interval between menarche and first pregnancy. Additionally, we will examine the effects age at menarche on the timing of first conception and on pregnancy-outcome and infant mortality.

The study will address the following research questions:

1) Does age at menarche have a direct relation on adult weight and stature when we control for other factors, such as age at marriage and age at first pregnancy?

2) Is age at menarche related to the magnitude of growth that follows menarche?

3) Do short menarche to conception intervals interfere with post-menarcheal growth and lead to shorter adult height and lower adult weight when we control for the age at first menses?

4) Is age at menarche related to the interval between menarche and first conception when we control for age at marriage?

5) Are short menarche to conception intervals associated with a higher probability of fetal loss, or higher infant mortality?

C. METHODS OF PROCEDURE

1. Data

Data for this research will be compiled from several sources; some existing records will be utilized, and some new data will be collected (See Appendix 1). The sample will be composed of women from an earlier study of menarche and amenorrhea in the Matlab area in 1976-77. The sampling frame for the 1976-77 study of menarche and amenorrhea was determined by the 1974 census. Thirteen villages in the Matlab area were purposefully selected at that time to provide a larger proportion

of Hindus than is found in the Matlab population at large. All non-pregnant females, 10 to 20 years old at their last birthday in 1976, and residing in these villages were eligible for the study sample. A total of 1,618 non-pregnant girls were identified from the 1974 census.

In 1989 these same women will be 22-32 years old; presumably virtually all will be married and a large proportion will have begun childbearing. Information on age at menarche, length of the interval between menarche and first conception, outcome of pregnancy (for all pregnancies), height and weight taken in 1976 and again in 1989 will be used to assess the effect of the menarche-conception interval on pregnancy outcomes and adolescent growth. Prospectively collected data on pregnancy outcome is available in the vital registration system for births and deaths in Matlab. (It must be kept in mind, of course, that since these data on pregnancy outcomes and duration of pregnancy are all self-reported by the women in the study area there will be possible problems in using this data set. The most important of these problems will be the probable under-reporting of very early spontaneous abortions and the precise determination of the duration of pregnancy. This latter problem may be have to be addressed by looking at the directly observable date of pregnancy termination rather than an estimated date of conception.)

From the 1976-77 data, approximately 1,550 girls were interviewed at least once in addition to information collected by the registration system. A series of 18 monthly interviews was conducted between March 1976 and August 1977 by local female field assistants. The first 12 months of these data are cleaned and have already been analyzed in several research projects. (See Chowdhury et al. 1977, Foster et al. 1986, Riley et al. 1988). The last six months of data were coded, but have not yet been entered in the computer. We hope to utilize the last six months of these data in the proposed analyses.

At the initial interview, information on age at menarche was collected, as well as anthropometric data (height, weight, and arm circumference). In the follow-up interviews, data on last menstrual period or date of first menses (menarche) were collected, along with anthropometric data.

Data on the outcome of pregnancies (live birth, stillbirth, or fetal loss) occurring to these women and subsequent deaths of women and children through 1986 are being put together in a data set in Dhaka. Data on age at menarche will be based on three types of information. Retrospective information was collected in March 1976 for 458 girls who had reached menarche by that date. Menarche occurred in 106 girls during the first 12 months of follow-up and in 61 girls during the final 6 months. The remaining 935 girls would have reached menarche by 1986, since the youngest girls in the study would now be 22 years of age. It is assumed that virtually all girls will have reached their adult heights. Using the data collected in 1976-77, we will investigate the possibility that some growth continues in the early twenties.

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Records from the 1974 census will be linked to the 1982 census and to marriage records at the ICDDR,B in Dhaka. It will be possible to trace all women who have migrated to other villages·within the DSS area since 1974. In addition we will attempt to locate women who migrated outside of the DSS area but to neighboring villages. We examined records from two villages, and estimate that as many as 30 per cent of women in the original study have moved outside the DSS area. However, at least half·of these women are in nearby villages, and relatives were able to identify current information on Bari of residence and on the husbands' family. Relatives appear to remain in reasonably close contact with girls who have moved to nearby areas, and frequent visits by the women to their home villages were reported. Based on our informal interviews in one village and detailed examination of migration records from two villages we estimate that we will be able to re-interview about one quarter of all the women who have left the DSS area. Fortunately, it appears that most of the respondents were still in the DSS area for marriage and for first birth, so that our analysis will not be greatly effected by out migration.

Age at menarche will be re-assessed during the survey. Since over one half the adolescents under study in 1976-77 had not yet attained menarche at the end of the follow up, we will attempt to determine age at menarche for these girls, although we recognize the severe limitations of using retrospective age at menarche. Methods of obtaining this information will be the same as in 1976, where women were asked the number of months they had been menstruating prior to the interview or to marriage. Important cultural and historical events in the area will be used to improve the accuracy of reporting. This method was successful in 1976, when reported ages at menarche were compared with prospective data for girls who reached menarche during the study. In 1987, we can check reported age at menarche with reported age in 1976 and with the prospective data. Additionally, reported ages at menarche in 1976 and 1987 will be compared for women who were post-menarcheal in the 1976, and for those who reached menarche during the 1976-77 study. This will provide valuable information on recall bias in reported age at menarche at different point in time and between actual and reported age at menarche·for a sub-sample of the data.

We plan to address some methodological issues pertaining to the measurement of age at menarche using recalled ages at menarche recorded at two points in time, and prospectively collected age at menarche. However, we recognize that recalled age at menarche may prove too unreliable and we are prepared to rely on those cases for which age at menarche was collected in 1976.

Using the 1980 age-specific fertility rates for Matlab (Becker and Hiltabiddle, 1981), we estimate that during the period 1976 to 1986 there were approximately 3,200 births occurring among the women in this study. This estimate allows for a 10 per cent·loss to follow up. With an infant mortality rate of

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100 deaths per 1,000 live births, there should be 320 infant deaths to study. The stillbirth rate for this area is 40 per 1,000 and the reported fetal loss rate is 10 per cent, based on reports from the Matlab Demographic Surveillance System. Therefore, the young women in this study will have experienced approximately 125 stillbirths and 320 early fetal losses (Chowdhury et al., 1982).

Heights of women will be measured with locally made portable stadiometers. Portable balance beam scales will be used to collect their weights, and arm circumferences be measured with standard arm circumference bands. Weight and arm circumference will provide some indication of current nutritional status. We will consider in our analysis that these measures may reflect massive flooding that occurred in the summer of 1988. A team of women field workers at the ICDDR,B will collect this data, under the supervision of the principal investigators.

Matlab also provides a rich array of socio-economic and cultural data. Detailed information on household structure and wealth are available through census and demographic surveillance system. Thus the relative importance of cultural and socio-economic versus biological variables can be assessed. We plan to update and expand information pertaining to socio-economic status. (An English language version of the draft questionnaire is presented in Appendix 2.) In particular, we will gather information about women's work activities, in and outside of the home, both before marriage and at the present time, and their contribution to subsistence agriculture. We will consider the possibility that socio-economic status may have changed since the original data was collected, and collect more recent information on selected variables. Most of these data may be available in later demographic surveillance data.

2. Analysis

Descriptive Analysis

The first portion of the analysis will be descriptive in nature, and will be used to guide formulation of multivariate models. One of the first tasks is to evaluate the bias in retrospectively collected age at menarche data. We will compare prospective data collected in 1976-77 with retrospective data collected in the same period on post menarcheal girls and collected in the present survey for girls who were pre-menarcheal when the last period of observation came to a close. We will also check retrospective with prospective data on women for whom the actual date of menarche is known, and between retrospective data collected in 1976 and some 12 years later. Menarche is closely linked with age at marriage in this culture. We hope to discover whether this linkage improves reporting accuracy or if responses are heavily influenced by cultural norms.

The relationship between age at conception and pregnancy outcome will be described by cross-tabulations, controlling for

age at menarche and age at marriage categories. We will compare
these tables by religion and by other socio-cultural variables.
Likewise, menarche to first conception intervals will be
examined by age of menarche, age at marriage and socio-cultural
variables using two or three dimensional tables and graphs.

Adult height and weight will be examined by menarche to
first conception interval and other covariates through two or
three dimensional tables. We will also look at the change in
height between 1976-77 and current adult height in appropriate
age and age at menarche groupings, for those subjects with
measurements taken at two points in time.

Multivariate Analysis

Using the information available through the previous
interviews, matched vital registration data, and the proposed
field study, models to assess the following outcomes will be
constructed: 1) pregnancy outcome will be considered in terms of
fetal loss, stillbirths, early neonatal, late neonatal, and post
.neonatal mortality; 2) length of the interval between menarche
and first conception, controlling for age at marriage, 3) adult
height and weight, and 4) the change in height and weight between
1976 and the data to be collected in 1989.

Using multiple logistic regression, we will estimate the
relationship between the length of the interval from menarche to
first conception and the probability of a poor pregnancy outcome
(fetal loss, stillbirth, and infant death), while controlling for
the following intervening variables: age at menarche of the
mother, and her age at the specified pregnancy, birth order,
current height and weight, and socio-economic status. Since
adult heights and weights will not be available on all subjects,
separate analyses will be conducted on women for whom weight and
height are available at both time periods and on all women
excluding previous height and weight as an independent variable.

Separate models will be constructed to look at different
pregnancy outcomes, along with the covariates of interest, such
as menarche to conception interval, age at menarche, parity,
anthropometric measurements, changes in these measurements over
time, and socio-economic factors. We will consider relationships
among covariates in constructing appropriate models. First
births (or first pregnancies) are the focus of this portion of
the analysis, and will be examined separately. Subsequent models
will include all births, and will take into account that births
are not independent events, since more than one birth can have
the same mother and all of her characteristics.

The effect of the length of the interval between menarche
and first conception on attained height will be assessed by
comparing the current heights of the women in the study with
their ages at menarche and with the length of the menarche to
first conception intervals. We will also be able to examine
growth following conception by the age at menarche and age at
conception for women who had at least one pregnancy by the end of

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the 1976-77 study. The change in height and current height will be compared with age at menarche, age at conception or pregnancy outcome, and length of the interval between menarche and first conception. For a specified age at menarche, we expect that girls with long menarche-conception intervals will be taller than those with short menarche-conception intervals. We also expect that there will be minimal changes in height following conception for both groups of women.

For the larger sample of women, we will assess the relationship between the length of the menarche to conception interval and adult height and weight. Since height and weight are continuous and approximately normally distributed, we will most likely use ordinary least squares (OLS) regression for this portion of the analysis.

Finally, a proportional hazards model (Cox 1972) analysis will be conducted to examine factors that effect the probability of conception. This analysis will be similar to that conducted by Foster et al. 1986, but will have important differences. First, we will have a larger sample size on which to conduct the analysis: the additional six months of prospective data will increase the number of subjects with known age at menarche. There will also be more first conceptions since we will have access to a longer time span of demographic surveillance in Matlab. Second, we will examine all reported pregnancy outcomes, whereas the analysis by Foster et al. looks only at conceptions that resulted in a live birth. Since fetal loss may be an important factor in adolescent fertility, this additional step may further our understanding of this important area.

D. SIGNIFICANCE

The relationship between age at menarche, continued growth and the timing and outcome of first births remains unclear, particularly in under-nourished women. A large proportion of births occur among adolescents in Bangladesh and in most countries of the developing world, where poor nutrition is prevalent. The effects of early births on the nutritional status of mothers and survival of their infants are yet to be clarified. Of particular concern is the possibility that any failure to achieve potential height, weight, or pelvic size by young women could have long term effects for the outcome of pregnancy in first and subsequent births, and for the health of these women throughout their reproductive lives.

At present, the overwhelming majority of nutrition interventions in developing countries focus on pregnant and lactating women and on infants and young children. Adolescents and nulliparous young women are largely overlooked by such initiatives. Our findings may call attention to the importance of including young women in nutritional programs, before the onset of childbearing.

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In addition, this research may contribute to the existing evidence for the need to encourage social programs designed to improve the economic value of women in the household, thus encouraging later age at marriage. Education and employment are both associated with later marriage in Bangladesh (Ahmed, 1986). Age at marriage has been rising in Matlab, although the increase may be attributable to adverse socio-economic conditions. Policies to maintain later marriage may serve to lower maternal and infant morbidity and mortality. Findings that early pregnancy adversely effects women's health and pregnancy outcome would justify a greater emphasis for educational programmes to prevent adolescent pregnancy, and to improve women's economic opportunities before marriage. Program implications from this research will include an improved ability of health workers to identify high risk pregnancies (e.g., those who married shortly after menarche).

F. COLLABORATIVE ARRANGEMENTS

Data collection, coding, and entry will be conducted over a three month period. The principal investigator will stay in Bangladesh for approximately three months to assist with the field work and with data management. Survey data will be coded and entered on computer at the ICDDR,B in Dhaka. A portion of the analysis may also be preformed jointly in Dhaka by the principal investigator and co-investigator, Mr. Abdur Razzaque, as time permits. Remaining analyses of the data will be conducted at the University of Michigan Population Studies Centre by the principal investigator, and in Dhaka by the co-investigators.
    As part of the collaborative agreement the co-investigator will present a training workshop on the use of the computer software package Statistical Analysis System (SAS). Arrangements for the workshop will be coordinated with Dr. Jane Menken, who will also be presenting a workshop at that time.
    In addition, arrangements will be made for Mr. Razzaque to spend approximately three months in the U.S. working with the principal investigator on analysis and taking courses at the University of Michigan. Several short programs in public health and in social sciences are available at the university and scholarship arrangements are feasible, especially given the strong ties between the University of Michigan and the ICDDR,B. The field work and data analysis in Dhaka and completing the project and receiving additional training at the University of Michigan will also be helpful when he returns to the Australian National University to complete the requirements for his Ph.D. in demography. All of these will also be valuable to Mr. Razzaque's career by improving his analytical skills and capability as a researcher at the ICDDR,B. Finally, the upgrading of Mr. Razzaque's skills, the completion of the 1976-77 data set, the collection of new data, and the linking together of the various data sets will be useful to the ICDDR,B.

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G. OWNERSHIP OF DATA

The investigators will allow the data which they collect to enter the public domain two years after the completion of the field work. At their discretion they may allow other researchers access to these data before that time. When the data enter the public domain they will be administered by the ICDDR,B; that organization shall release the data set under the scientific guidelines established by the Director or his representatives.

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ABSTRACT SUMMARY FOR ETHICAL REVIEW COMMITTEE

1. Requirement for study subjects is participation in previous study on menarche and growth in 1976-77.

2. Potential risks are invasion of privacy and embarrasement over questions concerning menstruation.

3. Privacy will be protected by employing female interviewers and conducting interview as privately as possible with no males present.

4. Names of subjects will be kept separately with ID. numbers from the rest of the data.

5. A verbal consent form (see attached) will be read to each participant.

6. The interviews will take place in the bari and will take 15-20 minutes.

7. Benefits will include improved information on the effects of early childbearing on maternal nutritional status, and the relationship of age at menarche and fertility. These findings will help guide policy for the prevention and management of teenage pregnancy.

8. DSS vital events records of births, marriage and deaths will be employed in the analysis.

DETAILED BUDGET

University of Michigan Budget

Personnel	$ US
Ann P. Riley 50% time (Principal Investigator)	14500.00
Fringe (25%)	3625.00
Sub-Total	18125.00
International Travel	
Two trips US-Dhaka for Principal Investigator	4000.00
One trip Dhaka-US for A. Razzaque Co-investigator	2000.00
Per diem in U.S. (A. Razzaque) 3 months ($65 x 90 days)	5850.00
Per diem in Bangladesh (A. Riley) First trip: 3 months Second trip 1 month $30 X 120 days	3600.00
Sub-total	15450.00
Computer expenses (Michigan)	2500.00
Equipment	
Portable PC for use in Dhaka (Battery pack, math co-processor)	3000.00
Photocopying	300.00
(Postage, Telex, Telephone)	500.00
Total UM Budget	39875.00

Budget for ICDDR;B

Personnel	Pay Level	Person months	Salary/ month	Total
Abdur Razzaque (Co-investigator)	GS-6	6.00	595.00	3570.00
Michael Strong (Co-investigator)	P5	0.60	6007.00	3604.20
Senior Health Officer	GS-4	2.00	263.00	526.00
Interviewers (5)	GS-3	10.00	219.00	2190.00
Coding Assistant	GS-3	1.50	219.00	328.50
Data entry technician	GS-3	2.00	219.00	438.00
Porters (5)		10.00	11.00	410.00
Secretarial Assistant	GS-4	3.00	304.00	912.00
Sub-Total				11978.70

Domestic Travel

Dhaka-Matlab once per week for A. Riley and A. Razzaque for 8 weeks	250.00
Per diem for A. Razzaque 3 days per week, 8 weeks $6.00 per day	144.00
Country boats for interviewers	550.00
Country boats for A. Razzaque and A. Riley	55.00
Sub-total	999.00

Budget for ICDDR,B - cont.

Equipment

5 Salter scales (Adult)	800.00
5 Stadiometers	300.00
Subtotal	1100.00
Stationary For questionnaire	100.00
Photo copying	150.00
Computer expenses (ICDDR,B)	2000.00
Total ICDDR,B	16327.70
Total UM	39875.00
Grand Total ICDDR,B and UM	56202.70
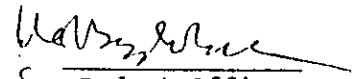
SUMMARY BUDGET
(in US dollar)

		Total Requirements	
Expense Category		University of Michigan	ICDDR,B
1.	Local salary	–	8,375.00
2.	International salary	18,125.00	3,604.00
3.	Local travel	–	394.00
4.	International travel	15,450.00	–
5.	Supplies & materials	–	100.00
6.	Other services	800.00	605.00
7.	Interdepartmental/computer charges	2,500.00	2,150.00
8.	Capital expenses	3,000.00	1,100.00
	Total US$	39,875.00	16,328.00

Budget Officer
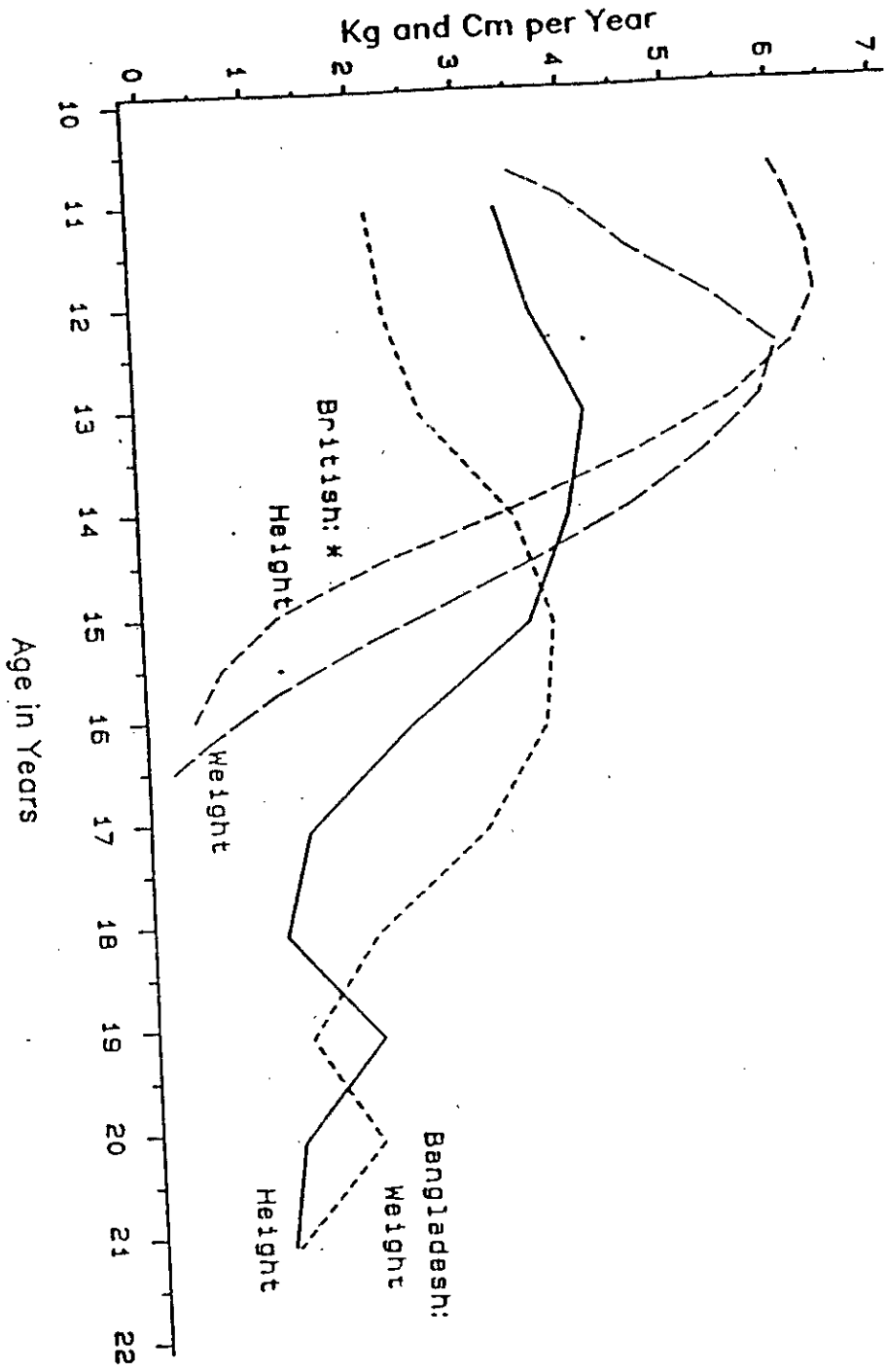
24/7/89

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Figure 1 Median Height and Weight Velocity per Year of Age

* Whole year velocity standards (Tanner et al, 1966).

Appendix 1

Sources and Collection Dates of Data

Source and Brief Description	Date(s)	Variables
Menarche and Amenorrhea Study: First interview, retrospective, cross-sectional, women aged 10-20 years	3/76	Recalled time since first menses. Socio-economic Indicators. Marital status, height, weight arm circumference
_____. Prospective follow-up, monthly interviews	4/76-2/77	Menstrated this month.* Height, weight, arm circumference, pregnancy, marriage
Demographic Surveillance	1976-1988	Date of marriage, pregnancy termination dates, birth outcome, infant deaths, migrations
Survey data to be collected	1989	Recall months between menarche and marriage, menstruated this month, currently pregnant, husband present, living children in the home, living children outside the home, socio-economic status, work outside the home now, ever, work before marriage. Height, weight, arm circumference

*Marks month of menarche for subjects who began menstruating in the one-year period.

CTION I.   This section should be completed BEFORE interviewers
           go into the field.

ME:_____   VILLAGE _____

GISTRATION ID _____   CURRENT ID   _____

RI   _____   HUSBAND'S NAME: _____

TE OF FIRST MARRIAGE   _____/_____/_____
                            DAY   MONTH   YEAR

NGALI MONTH _____   YEAR _____

_____

ction II.   Complete for women who have moved out of the DSS area.
k family or neighbors to provide the current address, village,
ri name, and any other information that will help locate her.

 THE RESPONDENT HAS MOVED RECORD DETAILS OF HER CURRENT RESIDENCE:

Section III.   INDIVIDUAL INFORMATION

First, I am going to ask you some questions about your marital status, your education and the type of work that you do for payment.

CURRENT MARITAL STATUS:

MARRIED ____   WIDOWED ____   DIVORCED ____   NEVER MARRIED ____
        (1)   (2)   (3)   (4)

IF MARRIED: FIRST MARRIAGE   YES ____   NO ____
                                    (1)   (0)

WHAT IS YOUR HIGHEST LEVEL OF EDUCATION?

NUMBER OF YEARS   _____

FOR THE LAST ONE YEAR, HAVE YOU DONE ANY WORK FOR WHICH YOU RECEIVE PAYMENT GOODS?   BY THIS I MEAN SERVICES FOR WHICH YOU WERE PAID, SELLING EGGS, VEGETABLES OR OTHER ITEMS, OR MAKING ANYTHING IN YOUR HOME THAT WAS SOLD.

          YES ____   NO ____   (SKIP TO NO.10)
              (1)   (0)

WHERE DID YOU DO THIS WORK?

BARI ____   OUT OF BARI, IN VILLAGE _____   OUTSIDE OF VILLAGE ____
     (1)   (2)   (3)

WHAT TYPE OF WORK IS THAT?

IN WHICH SEASON(S) DID YOU WORK?

WHAT TYPE OF PAYMENT DID YOU RECEIVE?

CASH ____   GOODS ____   BOTH ____   OTHER (SPECIFY) _____
     (1)   (2)   (3)   (4)

WHO HAS THE AUTHORITY TO SPEND OR USE THIS PAYMENT?

SELF ____   HUSBAND ____   IN-LAWS ____   OTHER (SPECIFY) _____
     (1)   (2)   (3)   (4)

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·w, I am going to ask you some questions about where you lived
·d the work you did just before and after you were first married.
ink back to the time before you were married.

. THINKING BACK TO THE TIME JUST BEFORE YOU WERE MARRIED, DID YOU DO ANY WORK
R WHICH YOU RECEIVED PAYMENT OR GOODS? AGAIN, THIS INCLUDES SERVICES FOR WHICH
U WERE PAID, SELLING EGGS, VEGETABLES OR OTHER ITEMS, OR MAKING ANYTHING IN
UR HOME THAT WAS SOLD.

             YES ____   NO ____   (SKIP TO NO.20)
                  (1)   (0)

. WHERE DID YOU DO THIS WORK?

RI ____   OUT OF BARI, IN VILLAGE _____   OUTSIDE OF VILLAGE ____
   (1)   (2)   (3)

. WHAT TYPE OF WORK WAS THAT?

. IN WHICH SEASON(S) DID YOU WORK?

. WHAT TYPE OF PAYMENT DO YOU RECEIVE?

CASH ____   GOODS ____   BOTH ____   OTHER (SPECIFY) _____
     (1)   (2)   (3)   (4)

WHO HAD THE AUTHORITY TO SPEND OR USE THIS PAYMENT?

.F____   PARENTS____   IN-LAWS____   OTHER (SPECIFY) _____
  (1)   (2)   (3)   (4)

)ok at the bengali month and year of marriage on page 1 and copy it in the
ice below.

J WERE MARRIED: MONTH:_____   YEAR:_____

HOW MANY MONTHS AFTER YOUR MARRIAGE DID YOU BEGIN SLEEPING WITH YOUR HUSBAND?
[IF THE ANSWER IS IMMEDIATELY AFTER WRITE '0' AND SKIP TO NO. 20]

_____ MONTHS

E YOUR EVENTS CALENDAR TO HELP THE RESPONDENT, BY ASKING: SO YOU BEGAN
EPING WITH HIM IN THE MONTH OF ------?]

WHO DID YOU LIVE WITH AT THAT TIME --AFTER YOU WERE MARRIED, BUT BEFORE
ING WITH YOUR HUSBAND?

DID YOUR HUSBAND VISIT YOU DURING THAT TIME?   YES_____   NO_____
                                                     (1)   (0)

WHY WEREN'T YOU LIVING WITH YOUR HUSBAND IMMEDIATELY AFTER MARRIAGE?

THINKING BACK AGAIN TO THE TIME WHEN YOU WERE FIRST MARRIED, DID YOU HAVE
R FIRST MENSTRUATION BEFORE OR AFTER YOUR WERE MARRIAGE?

BEFORE ____   AFTER ____   (SKIP TO NO.22)
        (1)   (2)

HOW LONG HAD YOU BEEN MENSTRUATING BEFORE YOUR MARRIAGE? [USE YOUR EVENT
ENDAR TO VERIFY THE MONTH. COUNT BACK FROM THE DATE OF MARRIAGE. USE THE
NK SPACE TO WRITE THE BENGALI MONTH AND YEAR.]

RS_____   _____ MONTHS

IP TO NO.24]

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22.   HOW LONG AFTER YOUR MARRIAGE DID YOUR FIRST MENSTRUATION COME?
[USE YOUR EVENT CALENDAR TO VERIFY THE MONTH.   COUNT FORWARD FROM THE DATE OF
MARRIAGE.   USE THE BLANK SPACE TO WRITE THE BENGALI MONTH AND YEAR.]

YEARS _____   _____ MONTHS

23. WAS THAT BEFORE OR AFTER YOU BEGAN SLEEPING REGULARLY WITH YOUR HUSBAND?

      BEFORE ____   AFTER ____   (SKIP TO NO.22)
         (1)   (2)

24. AT THIS TIME, ARE YOU

FULLY BREASTFEEDING? _____   PREGNANT? _____

25.   WHEN WAS YOUR LAST PERIOD?

NOW, WE WILL ASK A FEW QUESTIONS ABOUT YOUR PRESENT HOUSEHOLD?

SECTION IV.   HOUSEHOLD INFORMATION

26. HUSBAND'S NAME:

27. OCCUPATION OF HUSBAND:

28. EDUCATTION OF HUSBAND: _____   YEARS

29. WHO IS LIVING IN THE HOUSEHOLD WITH YOU?

30. HOW MANY PEOPLE LIV IN THIS HOUSEHOLD AT THE PRESENT TIME?

31. ITEMS OWNED

LEP ____   NUMBER COWS _____

HURRICANE ___   NUMBER GOATS _____

WATCH ____   NUMBER POULTRY _____

REMITTENCE _____   NUMBER BOATS _____ .

RADIO/CASSETTE _____

TV ____

32. DOES YOUR HUSBAND OWN ANY LAND?   YES _____   NO _____
                                            (1)   (2)

33. STRUCTURE OF LARGEST ROOM:

WALLS _____   ROOF _____

34. HOW BIG IS THIS HOUSE?

WEIGHT   ___ ___ . ___

HEIGHT   ___ ___ ___ . ___

ARM CIRCUMFERENCE ___ ___ . ___

od morning. We work for the Cholera Hospital in Matlab. If you remember,.
out 12 years age you were part of a study where someone came to your bari each
nth to measure your height and weight and to ask you some questions about
nstration. We are conducting another survey of the same women and would like
 measure your height and weight again, but only once. We would also like to
k you some questions about the type of work you do and about your marriage.
ild you have some time available for this?

CONSENT FORMS

Since the DSS has been going on since 1966 in Matlab and since 1975 in Teknaf, the entire populations of the areas are well aware of the nature of the project. Every household in the two areas has a Family Visitation card; the fact that these cards are carefully maintained indicates an implied type of consent. As approved by the RRC and ERC in the past, no consent form will be used during the continuation of this protocol.