Attachment 1.

Library (2)

ETHICAL REVIEW COMMITTEE, ICDDR,B

Date 22.10.1987
25/10/87

Principal Investigator A.K.M. A. Chowdhury Trainee Investigator (if any)

Application No. 87-023 Supporting Agency (if Non-ICDDR,B) 219

Title of Study Adolescent Pregnancy out-come in a chronically Malnourished Population.

Project status:
( ) New Study
( ) Continuation with change
( ) 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 information damaging to subject or others — Yes (No)
3. Does the study involve:
   (a) Use of records, (hospital, 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 withdraw from study — (Yes) No
   (g) Confidential handling of data — (Yes) No
   (h) Compensation &/or treatment 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 (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 questions 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 confidentiality
   ___ Questionnaire or interview schedule *

* If the final instrument is not completed prior to review, the following information should be included in the abstract summary:

N.A
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 questionnaire will be presented to the Cttee. for review.

(PTO)

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

Achowdhury OCT 28 1987

Principal Investigator

Trainee

87-023

25.10.87

SECTION - I : RESEARCH PROTOCOL

1. Title: Adolescent Pregnancy out-come in a chronically Malnourished Population.

2. Principal Investigator(s): Dr. A.K.M. Alauddin Chowdhury

   Co-Investigator(s), if any: Dr. M. Badrud Duza
   Dr. W. H. Mosley

3. Starting Date: As soon as the protocol is approved

4. Completion Date: August 1988

5. (a) Total Direct Cost: (b) and probable source of funding:
   (a) US $17360 (b) Ford Foundation

6. Scientific Programme Head:

   This protocol has been approved by the Population Science and Extension Division Working Group.

Signature:

Associate Director:

Date: 22/10/87

7. Abstract Summary:

Mean age of menarche of Bangaldeshi girls is 15.8 years. Such delay in menarche was observed to be strongly associated with nutritional status of the girls. Many girls conceived for the first time when they were in their growth after their menarche. This situation may result into some adverse biological compromises because of simultaneous growth needs of mother and fetus.

This study will assess the effect of menarche to 1st conception interval on (i) attained height of mothers (2) outcome of 1st and subsequent pregnancies.

The data come from a group of 1500 girls who are now 21-31 years of age whose information on age at menarche (in part), growth during menarche (in part), date of marriages, date of pregnancy termination, pregnancy outcome and infant death by age is already available. More information about age at menarche (in part), attained height, attained weight and SES are to be collected. All this information will be put together for each individual for the analysis.

8. Reviews: (Leave Blank)

(i) Ethical Review Committee: _____
(Approved/Not Approved)

(ii) Research Review Committee: _____
(Approved/Not Approved)

(iii) Director's signature & remark, if any. _____

_____

_____

ADOLESCENT PREGNANCY OUTCOME IN A CHRONICALLY MALNOURISHED POPULATION

A collaborative project between

Department of Population Dynamics
The Johns Hopkins University
615 North Wolfe Street
Baltimore, MD-21205

and

ICDDR,B,
G.P.O. Box 128
Dhaka, Bangladesh.

Consultant : Ann P. Riley Ph. D.

INTRODUCTION

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, or if underlying socioeconomic factors are responsible for the observed higher risks. Although most of the information available on this topic comes from studies of developed country populations, the most important implications are for developing countries where chronic malnutrition retards growth, and delays age at menarche. These conditions frequently coincide with early marriage and childbearing, such that first conception may occur before the period of adolescent growth is complete.

CONCEPTUAL FRAMEWORK

Menarche occurs after the peak in height acceleration, about 1.3 years after peak height velocity on average (Marshall and Tanner, 1986). However, girls continue to grow at a slower rate for an average of five years after first menses (Roche and Davila, 1982). There is evidence that undernourished girls experience more growth after menarche relative to well nourished girls with the same age at menarche (Dreizen, 1967).

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 (Frisanco, 1978; Malcolm, 1979; Naeye, 1981; Duenhoelter, 1975; Carey et al., 1983; Frisanco et al., 1983; Kulin, et al., 1982; Zlatnic and Burmeister, 1979). Competition for nutrients may cause intra-uterine growth retardation, or interfere with continued growth of the mother.

Higher risks observed in adolescent mothers, compared to more mature mothers, include low birth weight, cephalopelvic disproportion and pregnancy induced hypertension. In developing countries this relationship may be even more important, as in some populations marriage and childbearing closely follow menarche. This may be at least partially compensated for by an extended period of adolescent subfecundity, but the evidence for this is conflicting (Foster et al., 1984).

Erkan, et al. (1971) demonstrates that gynecological age is more important than chronological age in terms of obstetric risks for young women. Results indicate that women with low gynecological age experience a two times greater risk of low birth weight, regardless of chronological age. However, this and other studies fail to consider the possibility that the meaning of gynecological age varies with age at menarche.

Immaturity of the pelvis and birth canal is of concern in pregnancy complications. Several studies show an increased proportion of contracted pelvises among adolescents less than 15 years of age, compared to 15-19 years olds and women in their twenties (Ellison, 1982, Kaltreider, 1963, Battaglia, 1963, Duenhoelter, 1975). Moreover, anthropological research shows that pelvic size is significantly smaller at menarche than after full maturity (Moerman, 1981 and 1982).

Few longitudinal studies on growth patterns in relationship to age at menarche and pregnancy outcome are available and more extensive information regarding the effects of adolescent pregnancy in chronically undernourished populations is needed. The premature cessation of skeletal growth due to rising levels of estrogen during pregnancy may have adverse effect on the health of women and their infants. Since maternal height is positively associated with birth weight, any compromise in maternal stature would have a negative impact.

While it has been suggested that smaller body size is an adaptive response to harsh environmental conditions, there is no evidence of any benefits for reproductive health. If growth of the long bones is supressed by pregnancy (resulting in shorter adult stature), then other bones, the pelvis in particular, may be affected as well. It is important to note that both of these consequences are irreversible. Therefore, the increased risks for maternal and infant morbidity and mortality will persist throughout the reproductive period.

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 provided a substantial body of information. Age at menarche in the Matlab Thana region of Bangladesh is 15.8 years (Foster, 1984) compared to 12.7 years in U.S. girls (Frisch, 1981). Age at menarche is strongly associated with age at marriage (Chowdhury et al, 1977) and first conception occurs at an average age of 18.6 years. Additionally, girls with late age at menarche were found to 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 this population show that the growth spurt in Bangladeshi girls is delayed and spread out compared to British standards (Riley, 1987). Increases in height and weight over a one year period were observed in girls over 20 years of age (Figure 2). The combined evidence from these studies suggests that young women may become pregnant before their adolescent growth spurt is complete.

Table-1 shows the comparison of onset of reproductive events of Bangladeshi and U.S. women.

Age at menarche among Bangladeshi girls, occurs three years later than US girls and age at first marriage on the contrary among Bangladeshi women is 5 years earlier than US women. The first conception is 7 years earlier in Bangladeshi women than US women. This fact reflects the extremely unfavourable conditions of reproductive health of adolescents in rural Bangladesh.

Figure 1 shows percentile distributions of height and weight for Matlab girls compared to the median from the U.S. NCHS standards. In summary, poor nutritional status, delayed growth, late age at menarche and early pregnancy create extremely unfavorable conditions for the reproductive health of adolescents in rural Bangladesh.

OBJECTIVES

The proposed research will attempt to determine whether still growing adolescents conceive before their growth, or some other mechanism protects against pregnancy in still growing girls. Additionally, the effects of short menarche to conception intervals on pregnancy outcome and adult stature will be examined, for all girls and by age at menarche.

The study will address the following questions:

1) Do women in Bangladesh become pregnant before growth in height and weight is complete, and does this depend on the age at which menarche occurs?

2) Are short menarche to conception intervals associated with shorter adult height and lower adult weight, controlling for age at first menses?

3) Are short menarche to conception intervals associated with poor birth outcomes?

SPECIFIC AIMS

The following relationships will be assessed to study the research questions posed above:

1) The association of shorter menarche to conception intervals with higher rates of perinatal, neonatal and infant mortality for all women and by age at menarche.

2) The relationship of menarche to conception intervals and adult height and body weight, considering the age at menarche.

3) The association of length of menarche conception interval with the total change in height and weight between 1976 and 1987, controlling for time since menarche. The influence of one year growth rate in 1976-77 to postmenarcheal increases in height and weight and menarche to conception intervals will also be examined.

On the basis of the findings, the study will determine :

4) the best waiting time of first marriage after menarche in relation to mother's growth and child survival.

METHODS OF PROCEDURE

This study will include women from the original menarche study in the Matlab area of Bangladesh who were in ages 10-20 in 1976 and age 21-31 in 1987. Information on age at menarche, duration of menarche to first conception interval, outcome of pregnancy (for all pregnancies) height and weight taken in 1976 and 1987, and one year growth rates based on longitudinal data from 1976-77 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.

DATA

The sampling frame for the study was determined by the 1974 census in 13 villages included in the Matlab registration since 1966. All girls aged 10 to 20 years in 1976 residing in these villages were included in the study sample. A total of 1,618 girls were identified from 1974 census.

Exact ages of girls born after 1965 were calculated from their birth registration forms. Ages of women born before 1966 were adjusted from the 1966 census data. Ages collected for this census were determined from the parent's reporting of their daughter's age and successive interval between siblings.

Of the total sample, 1550 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. At the initial interview, information on age at menarche was collected, as well as anthropometric data (height, weight and arm circumference). In the prospective follow up, data on last menstrual period or data of first menses (menarche) were collected, along with anthropometric data and were saved in computer diskettes.

Data on births occuring to these women and the outcome of those pregnancies (livebirth or stillbirth) and subsequent infant deaths through 1986 will be put together in data set.

Data on age at menarche will be based on three types of information. Retrospective information was collected in March 1976 for : (1) 458 girls who had reached menarche by that date; (2) menarche occured in 167 girls during the first 18 months of follow-up; (3) the remaining 935 girls would have reached menarche by 1986, since the youngest girls in the study would now be 20 years of age. It is assumed that most will have reached their adult heights as well, although the youngest age groups may continue to undergo small increases in height based on the data collected in 1976-77.

Age at menarche will be reassessed during the survey in 1987. Since over one half the adolescents under study in 1976-77 had not yet attained menarche at the end of the follow up, it will be necessary to determine age at menarche on these girls. Methods of obtaining this information will be the same as in 1976, where subjects were asked the number of months they began menarche before they were married, or before the interview for unmarried girls. 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 postmenarche in the 1976, ard for those who reached menarche prospectively in 1976-77. 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 subsample of the data.

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 3200 births occuring among the women in this study. This estimate allows for 25% loss to follow up. With an infant mortality rate of 100 deaths per 1000 live births, there should be 250 infant deaths to study. The

stillbirth rate for this area is 40 per 1000 live births and the reported fetal loss rate is 10%. Based on reports from the demographic system, it can be estimated that the rate for the young women in this study will be similar to the average, and thus the estimate that there will be about 100 stillbirths and 250 early fetal losses (Chowdhury et al, 1982). Among these women both fetal and infant death rate will be higher than the usual 20-29 age group because the later one is calculated on the basis of one year period.

Ideally birthweight would used as an indicator of infant health since we suspect that any compromise in maternal stature or pelvic size would cause a reduction in birthweight. Unfortunately, this is unavailable, thus fetal loss and neonatal death will be the focus of the analysis of birth outcome. We acknowledge, however, that other factors besides maternal nutritional status and time postmenarche influence child survival. Some information on the size and health of the infant at birth are to be collected retrospectively. Of particular interest are questions concerning the size of the infant. Women were asked to report whether the size of their infant was small, medium or large. Although the validity of this data is unclear, we intend to do preliminary work on assessing its association with relavent variables such as perinatal mortality.

Intervention program (MCH-FP) introduced into this area since 1978. This may bring some bias in the study. These women might have been spread over MCH-FP area, comparison area as well as out of DSS area. It is necessary to record status of these women in terms of intervention program areas such that the effect of this program on pregnancy outcome can be controlled. Principal investigator already studied the MCH-FP impact on infant mortality in Matlab, observed that the MCH impact on perinatal mortality was negligible.

Heights will be measured to provide adult stature, although the possibility of continued growth in the younger age groups will be considered. Weight and arm circumference will also be collected in order to provide some indication of the current nutritional status. A team of women field workers at the ICDDR,B will collect this data, under the supervision of the principal investigator.

Because of the limited amount of information available on socio-economic status in the earlier study, the survey will include additional questions on this to indicate more clearly the economic level of the women under study. In particular, we will gather information about women's work activities, in and outside of the home, before marriage and at the present time. This information will be helpful in explaining differences seen in nutritional status and in infant mortality. We will consider the

possibility that socioeconomic status may have changed since the original data was collected, and collect more recent information on selected variables.

ANALYSIS OF DATA

1. Evaluation of bias in age at menarche data to be collected retrospectively by : (a) comparing with prospective data, (b) consistency checking with probable co-variates.

2. Age at conception by outcome will be described by simple cross tabulation along with other co-variates.

3. Menarche to 1st conception intervals will be examined by age of menarche and SES through two or three dimensioned tables.

4. Attained height will be examined by menarche to first conception interval along with probable co-variates through two or three dimensioned tables.

If exploratory analysis of the data reflects the hypotheses as described in the proposal, then multivariate analysis will be conducted such that inclusion of more covariates with simultaneous expositions is possible.

Using the information available through the previous interviews, matched vital registration data, and the proposed field study, the probability of poor pregnancy outcome will be assessed. Poor pregnancy outcome will be considered in terms of perinatal loss (stillbirths and early neonatal deaths) and late neonatal mortality. Menarche to first conception interval will be calculated by subtracting 9 months from the date of a live birth, 8 months from a still birth, and the given duration of the pregnancy for fetal losses as recorded on the registration forms. We realize that the accuracy of these durations is inexact. The largest bias relates to unreported fetal losses. Such losses would cause the duration of the menarche to first conception interval to be overestimated, especially since early losses are likely to be missed. This bias would result in any detrimental effect of short menarche to conception intervals being less apparent because women with fetal losses would be estimated as having longer rather than the true shorter durations.

Using multiple logistic regression, we will estimate the relationship of the length of the interval from menarche to first conception with the probability of a poor pregnancy outcome

(fetal loss, stillbirth, and infant death), while controlling following intervening variables: age of menarche, age of the mother at the specified birth, birth order, attained height, current weight, and socio-economic status.

We will construct separate models to look at three different outcome (fetal loss, and perinatal and infant mortality). The general model for the logistic equation can be stated as:

$$E(Y) = B(0) + B(1)X(1)..... + B(n)X(n)$$

where, E(Y) represents the logit of the probability of poor outcome and X(1...n) represent the covariates of interst. These variables will include: Menarche to conception interval, age at menarche, parity, anthropometric measurements, changes in these measurements over time, and socioeconomic factors. We will consider the interrelationships of these variable in constructing appropriate models.

The effect of the duration of menarche to first conception interval on attained height will be assessed by comparing the attained heights of the women in the study by their ages at menarche and the duration of the menarche to first conception intervals. For the small sample of the women for whom we have information on height at conception (about 150), we will examine growth following conception by the age at menarche and age at conception. The mean change in height and level of attained heights will be compared by age at menarche, age at conception and duration of menarche to first conception interval. For a specified age at menarche, we expect that girls with long durations of menarche-conception intervals will have taller attained heights, than those with short menarche-conception intervals. We will also expect that there will be minimal changes in height following conception for both groups of women.

For the larger sample of a l women (for whom we will have age at menarche, age at conception and attained height), we will assessed the relationship of the duration of the menarche to first conception interval with a tained height through multiple regression controlling for the f llowing intervening variables: age at menarche, age at conception, current weight, socioeconomic status.

ICDDR,B COLLABORATION

The proposed survey, and data coding, entry and cleaning will

be done in collaboration with ICDDR,B in Dhaka. Detail field rocedure will be developed in consultation with ICDDR,B. After the survey data will be coded and transferred to diskette at ICDDR,B. Final analysis of the data will be conducted at ICDDR,B, The Johns Hopkins School of Public Health and The University of Michigan Population Studies Center (Please see page 22).

SIGNIFICANCE AND POLICY IMPLICATIONS

A large proportion of births occur among adolescents in Bangladesh and in most countries of the developing world, where chronic malnutrition is prevalent. The effects of early births on the nutritional status of mothers and survival of their infants are yet to be clarified. In particular, any reduction in height, weight or pelvic size of 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 life.

In countries, such as Bangladesh, where marriage closely follows menarche, the concern for the negative effects of early conception on the health of both the mother and her offspring can be addressed through health and economic policy. In current attempts to reduce infant mortality emphasis is placed on the reduction of low birth weight. Raising the age at marriage and thereby increasing the interval between menarche and first birth could make a significant contribution to these efforts. Current programs to improve child survival need to consider prevention of early conception among adolescents.

The proposed research will contribute to the existing evidence for the need to encourage the use of family planning by young women. Possibly of greater importance, this may lead to the promotion of alternate opportunities for young women. Education and employment are both associated with later marriage in Babgladesh (Ahmed, 1986). Findings that early pregnany adversely effect women's health and birth outcome would justify a greater emphasis for educational programmes to prevent adolescent pregnancy, and to improve women's economic opportunuties before marriage.

PROGRAM IMPLICATION :

(1) Health worker may educate the women-who are married shortly after menarche-to postpone their first conception till their growth is over.

(2) If such a conception occurs this may be identified as high risk pregnancy.

(3) An adolescent nutrition program may be developed such that age at menarche can be reduced to a safe level relating present age at 1st conception.

REFERENCES CITED

Battaglia, Fredrick et al. "Obstetric and Pediatric Complications of Juvenille Pregnancy". Pediatrics, Nov., 1963.

Becker, S. and Hiltabiddle, H. Comparisons of measures of childbearing: "Patterns by age and parity in Matlab, Bangladesh". Working Paper 15. 1981.

Carey, W.B., McGann-Sanford, T. and E.C. Davidson Jr. "Adolescent age and obstetric risk". In: Mc Anarney, E.Ed. Premature pregnancy and Parenthood. Gryne and Stratton, N.Y., New York. 1983.

Chowdhury, A.K.M.A.; Huffman, S.L. and G.T. Curlin. "Malnutrition, Menarche and Age at Marriage in Bangladesh." Social Biology, 1977, 24:316-325.

Chowdhury M.K., A. Razzaque, G. Mostafa, A.M. Sardar, S.D'Souza. Demographic Surveillance System-Matlab. Vol. 10. Vital Events and Migration Table. Scientific Report 58, 1982.

Duenhoelter, J.H., Jimenez, J.M. and G. Baumann. "Pregnancy performance in patients under fifteen years of age". Obstetrics and Gynecology 46(1): July, 1975.

Dreizen, S. "A comparison of sketeltal growth in undernourished and well nourished girls before and after menarche". Journal of Pediatrics 70:256-263. 1967.

Ellison P.T. "Skeletal Growth, Fatness and Menarcheal Age : A Comparison of Two Hypotheses." Human Biology, 54(2) 269-281 May, 1982.

Erkan, K.A. et al. "Juvenile Pregnancy: Role of Physiologic Maturity". Maryland State Medical Journal, 20 50-52 March, 1971.

Foster, A., A. Chowdhury, J. Trussell, J. Menken. "Female reproductive development and the hazard model. "Submitted for publication, 1984.

Frisancho, A.R. "Nutritional influences on human growth and maturation." Yearbook on Physical Anthropology 21:174-191, 1978.

Frisancho, A.R. Matos, J., and P. Flegal. "Maternal Nutritional status and pregnancy outcome". American Journal of Clinical Nutrition 38:739-746. 1983.

Frisch, R.E. et al. "Delayed Menarche and Amenorrhea in College Atheletes in Relation to Onset of Training". JAMA, 1081 246(14).

Kaltreider, D.F. Effect of Height and Weight on Pregnancy in the Newborn. Charles C Thomas publisher. Springfield, Illinois, 1963.

Kulin, H.E. et al. "The effects of Chronic malnutrition on pubertal growth and developmetn". American Journal of Clinical Nutrition, 36:527-536. September, 1982.

Malcolm, L. "Protein-energy malnutrition and growth". In : Falkner and Tanner (eds.) Human Growth Volume 3: 361-372, 1979.

Moerman, M.L. A longitudinal study of growth in relation to body size and sexual dimorphism in the human pelvis. Ph.D. dissertation. University of Michigan, Ann Arbor, 1981.

Moerman, M.L. "Growth of the Birth Canal in Adolescent Girls." Obsterics and Gynaecology, 143: 528-532, 1982.

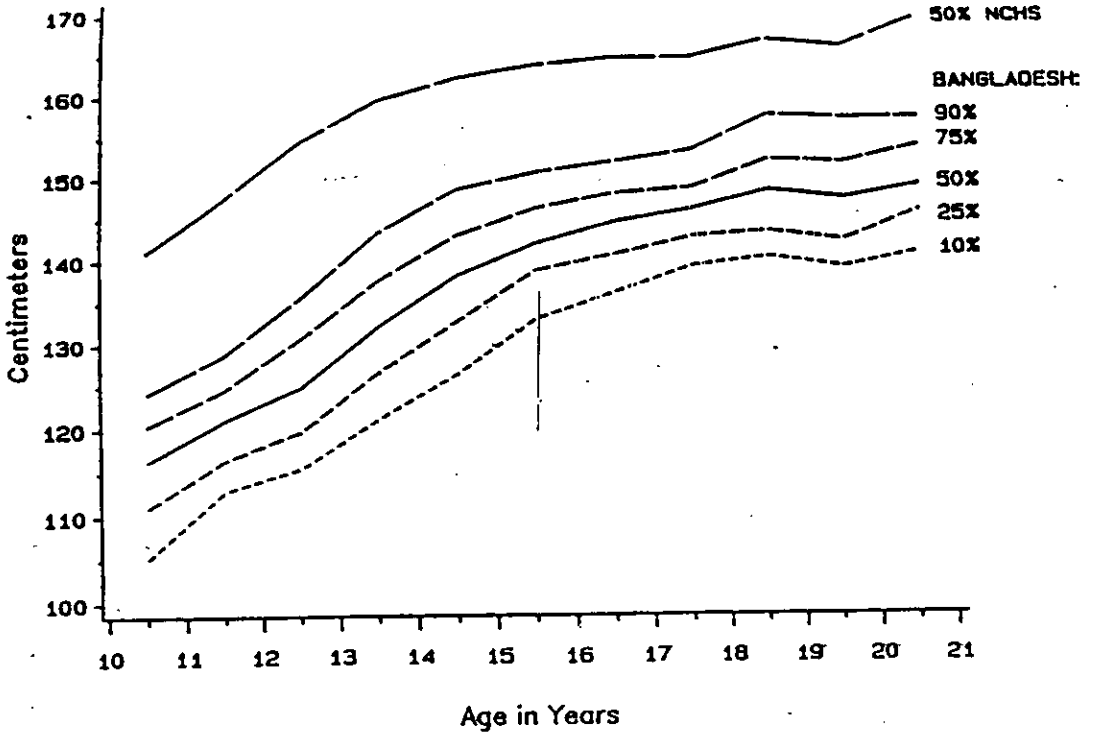
Naeye, R.L. Teen-aged and pre-teen aged pregnancies: consequences of fetal-maternal competition for nutrients". Pediatrics 67(1):146-150, 1981.

Riley, A.P. Age at Menarche and Adolescent Growth Among Adolescent Females in Rural Bangladesh: Implications for Childbearing. Dissertation. The Johns Hopkins University, 1987.

Roche, A.F. and G.H. Davilla. "Late Adolescent Growth in Stature". Pediatrics, 1972 50(6).

Zeger, S.L., Liang, K.Y. and Self, S. The analysis of binary longitudinal data. Biometrika, Vol. 72, No. 1, 1985.

Zlatnik, F. and L.F., Burmeister. "Low gynaecological age: an obstetrics risk factor". American Journal of Obstetrics and Gynecology, 128(2): 1979.



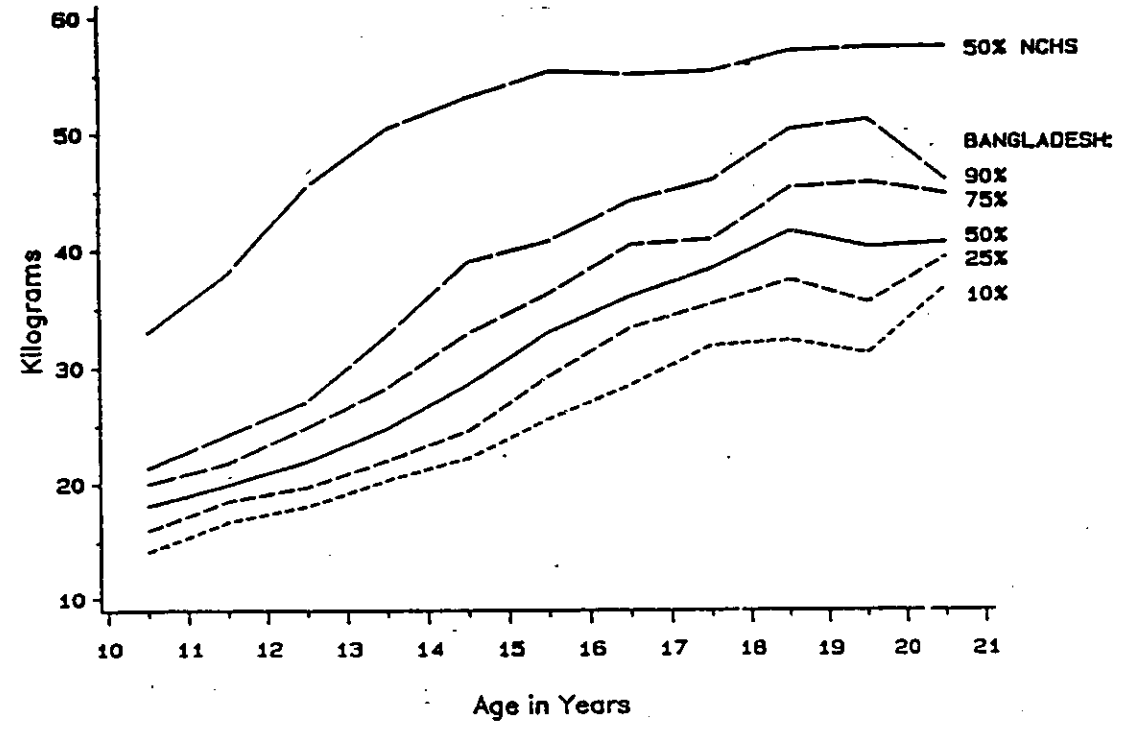


Figure 1. Percentile Distributions of Height and Weight for Age: Bangladeshi Girls compared to NCHS Median

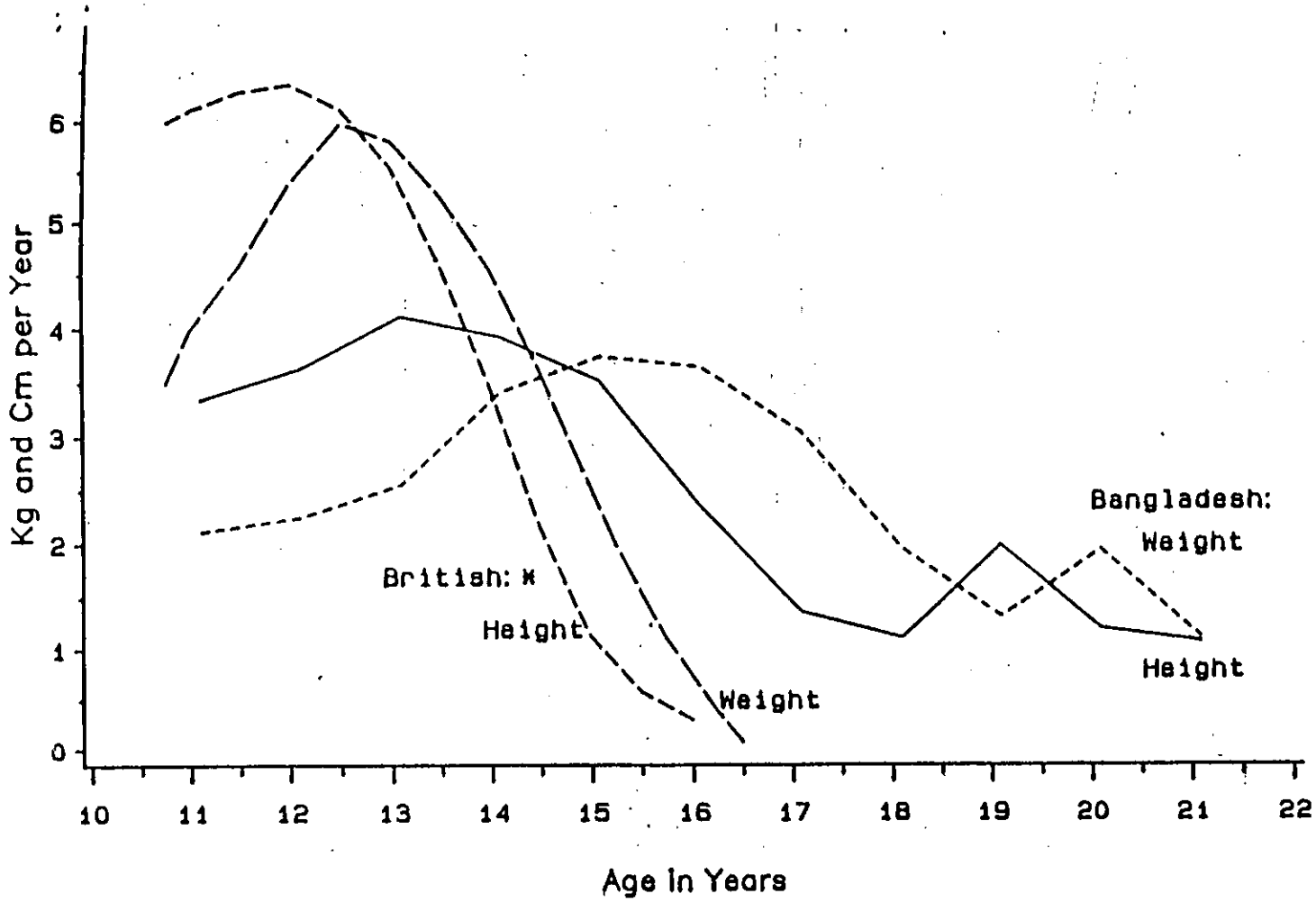


Figure 2. Median Height and Weight Velocity per Year by Age

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

TABLE 1

COMPARISON OF MEAN AGE (IN DECIMAL) AT MENARCHE, MARRIAGE AND FIRST CONCEPTION BETWEEN BANGLADESHI AND U.S. WOMEN

	MATLAB BANGLADESH *	U.S.
Age at menarche	15.8	13.0
Age at marriage	17.3	23.1
Age at first conception	18.8	25.6

* Calculated from ICDDR,B data from Matlab.

TABLE 2

SOURCES, PERIOD AND TYPES OF INFORMATION TO BE MERGED ON THE SAME SAMPLE

SOURCE	PERIOD	TYPE (Key variable)
Initial Survey (1550)	1976	1. Age at menarche (458) 2. SES 3. Height, weight and arm circumference
Prospective follow up (1550)	1976-1977	1. Weight and Height gain 2. Onset of menarche (167) 3. Date of menses
Demographic surveillance (1550)	1976-1986	1. Marriage date 2. Conception date 3. Pregnancy outcome and date 4. Infant deaths date
Proposed Survey (1550)*	1987	1. Age at menarche for those who did not attain menarche in 1976-77 (935) 2. Attained height, weight (current) 3. Size and prematurity 4. SES 5. Area

* Some subjects will be lost because of death and migration out.

BUDGET FOR ICCDR,B

	US$
1. Personnel :	
Dr. B. Duza (ICDDR,B contribution)	-
Mr. Nizamuddin Khan	1016
2 Health Assistant (GS. III) for 4 months (8 person month)	1752
1 Field Research Officer (GS. VI from Matlab) 0.5 time for 4 months (2 person month)	1016
2 Coding Assistant (GS. III) for 4 months (8 person month)	1752
1 Secretarial Assistant (GS. IV) for 2 months (2 person months)	526
2 Porter on daily basis for 75 days at rate of Tk. 40.00	200
	6262
2. Travel : Dhaka - Matlab	
2 Health Assistant per diem (@ Tk. 115 X 120 X 2) for months (240 days)	920
2 Coding Assistant per diem (@ Tk. 115 X 120 X 2) for 4 months (240 days)	920
Principal Investigator's daily cost at Matlab for 20 days @ Tk. 225.00/day	150
	1990
3. Stationary and office supply	500
Freight and other charges	100
4. Computer data entry 1500 records, with 160 columns in System 34 then transferred to P.C. file with editing	1000

5. Transport Dhaka - Matlab : 8 trips (@ Tk. 200 per hour)	300
Water transport Matlab (25 hours/month for 4 months @ Tk. 600	2000
6. Xerox and Mimeograph	800
	4100
7. 2 Standimetre (Local)	100
2 Weighing Machine adult (local)	200
	300
TOTAL DIRECT COST	13,252
INDIRECT COST	4,108
	17,360

Appendix I

Procedure for data collection :

A list with parents' family address of the sample are already in the menarche data file. As most of them are being married by this time, their husband's address are to be collected from marriage registration forms. It is expected that around 50 percent will be within DSS area and another 25 percent will be within the walking distance of DSS area. All these will be accessable by foot and water transport. On this basis about 1000 women can possibly be reinterviewed. Before going to the field the two coding assistant will record the recent addresses of these women in the questionare at the begining of the field work and sort them geographically such that field work can be improved. Because of the scatteredness of the sample for marriages it is expected that one worker will be able to cover at least 10 women a day. For two workers it will be needing two and half month to cover the whole sample. The simple questionare is included in Appendix II.

Training of the worker :

If the new worker are recruited, they should be trained for anthropometric measurements and relevant question for two days.

Data Processing :

After the field survey, data will be coded and then entered and varified in computer system 34. The data will be transferred into ASCII data double density double sided floppy disk.A copy of data in floppy disk will be taken to JHU by the principal investigator and share that data with Dr. Ann Riley from Michigan University. Original data will be left in ICDDR,B for the analysis as well as data archival purpose with all the documents code sheets and programs (Appendix II and Appendix III).

Appendix II

MENARCHE - 1987

Survey Date: |__|__|__|__|__|__| (1-6)
Y Y M M D D

Reg.No. |__|__|__|__|__|__|__|__|__|__| (7-16)

Name of Women_____

Date of birth of the women |__|__|__|__|__|__| (17-22)

Parent's Address: VILL |___|___| BARI |___|___| HOUSE HOLD |___|___| (23-32)

Husband's name: _____

Address: _____

Village: |__|__|__| Bari |__|__|__| Household |__|__|__|__| (33-42)

Education (woman) (years of schooling) |__|__| (43-44)

Education (Husband) (years of schooling) |__|__| (45-46)

Occupation (Husband)_____ |__|__| (47-48)
D.S.S. code

The status upto the end of previous study [1] in the study (49)

[2] not in the study

Date of marriage |__|__|__|__|__|__| (50-55)
Y Y M M D D

How many months after menarche you have been married |__|__| (56-57)

If not yet married (ask) age at menarche (years) |__|__| (58-59)

[To calculate Date of menarche by computer] |__|__|__|__|__|__| (58-65)
Y Y M M D D

For married women only:

Number of pregnancies |__|__| (66-67)

Number of live births |__|__| (68-69)

Number of living children |__|__| (70-71)

Preg No (1)	Result of Preg (2)	Date of termi-nation (3)	if LB, child surviving (4)	if No in col 4 Date of Death — (5)	was the baby small at birth (6)	was the baby premat-ure at birth (7)
1	1 Miscar 2 SB 3 LB (72)	--------- YY MM DD (73-78)	1. Yes 2. No 3. NA (79)	--------- YY MM DD (80-85)	1. Yes 2. No 3. ____ (86)	1. yes 2. No 3. ____ (87)
2	1 Miscar 2 SB 3 LB (88)	--------- YY MM DD (89-94)	1. Yes 2. No 3. NA (95)	--------- YY MM DD (96-101)	1. Yes 2. No 3. ____ (102)	1. yes 2. No 3. ____ (103)
3	1 Miscar 2 SB 3 LB (104)	--------- YY MM DD (105-110)	1. Yes 2. No 3. NA (111)	--------- YY MM DD (112-117)	1. Yes 2. No 3. ____ (118)	1. yes 2. No 3. ____ (119)
4	1 Miscar 2 SB 3 LB (120)	--------- YY MM DD (121-126)	1. Yes 2. No 3. NA (127)	--------- YY MM DD (128-133)	1. Yes 2. No 3. ____ (134)	1. yes 2. No 3. ____ (135)

Area of current Residence Status: 1.A 2.B 3.C 4.D 5.comp 6.Out of DSS (136)

Height (cm) |__|__|__| (137-139) Weight (kg) |__|__|__| (140-142)

Arm circumference (mm) |__|__|__| (143-145)

Recorded by: _____

Appendix III
already archived by DMB

Code-B ... - Menarche 1976 - June 1980*

Tape No._____ Unblocked BPI - 800

Record Length 324. No. of Records - 1618

Variable No.	Variable Name	Column	No. of Columns	Codes
1.	Study number	1-3	3	203
2.	Census number	4-12	(9)	
	Village	4-6	3	
	Family	7-10	4	
	Indiv. No.	11-12	2	
3	Subjects Age (in 1976)	13-14	2	10-20
4	Birth rank	15-16	2	99 = UK
5	Mother's age	17-18	2	99 = UK
6	No. living children (living siblings)	19-20	2	99 = UK
7	No. siblings born (alive now dead)	21	1	9 = UK
8	Mother's parity	22-23	2	99 = UK
9	Religion	24	1	1 = Muslim 2 = Hindu
10	Father's education	25-26	2	00 = None 01-12 13 =
11	Mother's education	27-28	2	
12	Father's occupation	29-30	2	Same as DNF-1 (See ~~attached sheet~~)
13	Composit code (Socioeconomic status)	31-32	2	Same as '74 census ~~00-34~~
14	No. of Cows	33	1	"
15	House size	34-36	3	"

* MARRIAGE & FIRST PREGNANCY TERMINATION ARE UPDATED UPTO JUNE 1980 ONLY

Appendix III
Continued

iable	Variable Name	Column	No. of Columns	Code
16	Subjects schooling in 1976 (highest grade completed)	37-38	2	
17	Presently attends	39	1	1 = yes 2 = no
	Date of marriage			
18	Month	40-41	2	01-12
19=	year	42-43	2	70-78
20	Interval between marriage-menarche (in months)	44-45	2	
	Date of menarche			
21	month	46-47	2	01-12
22	year	48-49	2	70-78
23	Age at menarche (in years)	50-51	2	50-200
24	Arm Circumference (1970)	52-54	3	50-200
25	Height (1970)	55-58	4	100-180.0
	Date of 1st pregnancy termination			
26	month	59-60	2	Moved out by Marriage age = 8888
27	year	61-62	2	
28	Type of Pregnancy Termination	63	1	1 = L.B, 2 = S.B. 3 = Misc., 9&4 = UK 8 = Moved Out
28A	Date of Conception			
	Month	64-65	2	
	Year	66-67	2	
28B	Marriage Conception Interval	68-70	3	In Months
28C	Sign of Menarche	71	1	0=Date Mar.=Date.Men 1= " " > " " 2= " " < " " 9 = Unknown
28D	Menarche-Conception Interval	72-74	3	In Months.
28E	Blank	75-79	5	0

Appendix III
Continued

Table	Variable Name	Column	No. of Columns	Code
29	No. of total cards	79-80	2	01-10
30	Card Number	81	1	=1
31	Study number	82-84	3	203
32	Census number	85-93	9	
—	Date of 1st interview			
33	Month	94-95	2	03-04
34	Year	96-97	2	76-77
35	Absence (1st)	98	1	0 = Not absent 1 = Absent, but interviewed later. 4 = Absent, not interviewed. 6 = Moved out for marriage. 7 = Moved out Not for marriage. 8 = Died
36	Menarche (1st)	99	1	1=Menarche prior to 1st interview entirely retrospective) 2=No menarche 3=Began menarche at this month. 4=Post menarche
37	Menses (1st)	100	1	1=yes 2=No
38	Weight (1st interview)	101-103	3	20.0-65.0kg. 999 = UK
39	Height (1st)	104-107	4	97.0 - 180.0 cm 0970 = 97.0 0990 = 99.0 1000 =100.0 1100 =110.0 1800 =180.0
40	Arm circumference	108-110		10.0 - 30.0 cm 100 = 10.0 150 = 15.0 250 = 25.0

Interview	No. of Columns	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
Date of Interview Variables No. Column	(2)	41 111-112	49 128-129	57 145-146	67 175-176	75 192-193	83 209-210	91 226-227	101 256-257	109 273-274	117 290-291	125 307-308
Year of Interview Variable No. Columns	(2)	42 113-114	50 130-131	58 147-148	68 177-178	76 194-195	84 211-212	92 228-229	102 258-259	110 275-276	118 292-293	126 309-310
Absence Variable No. Columns	(1)	43 115	51 132	59 149	69 179	77 196	85 213	93 230	103 260	111 277	119 294	127 311
Menarche Variable No. Column	(1)	44 116	52 133	60 150	70 180	78 197	86 214	94 231	104 261	112 278	120 295	128 312
Menses Variable No. Column	(1)	45 117	53 134	61 151	71 181	79 198	87 215	95 232	105 262	113 279	121 296	129 313
Weight Variable No. Column	(3)	46 118-120	54 135-137	62 152-154	72 182-184	80 199-201	88 216-218	96 233-235	106 263-265	114 280-282	122 297-299	130 314-316
Height Variable No. Column	(4)	47 121-124	55 138-141	63 155-158	73 185-188	81 202-205	89 219-222	97 236-239	107 266-269	115 283-286	123 300-303	131 317-320
Arm Circumference Variable No. Column	(3)	48 125-127	56 142-144	64 159-161	74 189-191	82 206-208	90 223-225	98 240-242	108 270-272	116 287-289	124 304-306	132 321-323
Card No. and Study No.	(4)			(65) 162-174 Card No. 2				(99) 243-255 Card No.3			(133) 324-337 Card No. 4	
C ensus No.	(8)											

ser Authorisation Required - YES NO

CONSENT STATEMENT

International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), (Former CRL) are planning to collect information on Menarche of women, birth and death of children of the women, height and weight of women etc. These all informations are an extention of what you had answered 10 years before. It will take only 15 minute times to reply. Your information will be treated as confidential. You may at any time refuse to answer our questions. If you have any question about it we will try to answer them.

Do you have any question ?

Do you agree to answer my question ? YES /__/ NO /__/

মৌখিক সম্মতি পত্র

আন্তর্জাতিক উদরাময় গবেষনা কেন্দ্র (প্রাক্তন কলেরা রিসার্চ লেবরেটরী) মতলবে মহিলাদের মানসিক ও স্বাস্থ্য সম্বন্ধীয় কিছু তথ্য, উচ্চতা ও ওজন পরিমাপ সংগ্রহ করার চিন্তা করছে। এই সমস্ত তথ্য আপনাদের ২০ বৎসর আগের দেওয়া প্রশ্নেরই বর্ধিত কিছু তথ্য। এ কাজ শেষ করতে মাত্র ২৫ মিনিট সময় লাগবে। এ ব্যাপারে আপনার দেওয়া সমস্ত তথ্য গোপন রাখা হবে। আপনি ইচ্ছা করলে যে কোন সময় প্রশ্নের জবাব দেওয়া বন্ধ করতে পারেন। এ ব্যাপারে আপনার কোন প্রশ্ন থাকলে আমরা জবাব দিতে চেষ্টা করবো।

আপনার কোন প্রশ্ন আছে কি ?

আপনি কি আমার প্রশ্নের জবাব দেবেন? হ্যাঁ ☐ না ☐