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PFHS 380.665 FAMILY PLANNING POLICIES AND PROGRAMS

Intermediate Fertility Variables
A Framework for Fertility Analysis and Program Planning

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A.   Definitions:

1.   natural fertility

2.   proximate determinants

B.   Intermediate Fertility Variables:

1.   Kingsley Davis and Judith Blake framework (1956)

2.   Variables used in reproductive models

      a.   proportion of females married

      b.   contraception

      c.   induced abortion

      d.   postpartum infecundability

      e.   frequency of intercourse

      f.   spontaneous intrauterine mortality

      g.   permanent sterility

C.   Relative Importance of the Intermediate Variables

D.   The Bongaarts Model

E.   Applications of the proximate determinants model

1. decomposition of determinants of fertility for policy/program analysis (Beijing case study)

2. setting goals and allocating resources for programs (SPECTRUM computer model)

References

Required Reading:

Stover, J. Revising the proximate determinants framework of fertility. What have we learned in the past 20 years? *Studies in Family Planning* **29,3: 255–267, 1998.**

Recommended Readings:

Bongaarts J. The fertility-inhibiting effects of the intermediate fertility variables. *Studies in Family Planning* 13(6/7):179-189, 1982.

Bongaarts J. A simple method for estimating the contraceptive prevalence required to reach a fertility target. *Studies in Family Planning* 15(4):184-190, 1984.

Bongaarts J, Frank O, Lesthaeghe R. The proximate determinants of fertility in Sub-Saharan Africa. *Population and Development Review* 10(3):511-537, 1984.

Davis K, Blake J. Social structure and fertility, an analytic framework. *Economic Development and Cultural Change* 4:211-23, 1956.

Wang S-X, Chen Y-D, Chen CHC, Rochat R, Chow LP, Rider R. Proximate determinants of fertility and policy implications in Beijing. *Studies in Family Planning* 18(4):222-228, 1987

Figure 1- Intermediate Variables Affecting Fertility*

I. Factors affecting exposure to intercourse

A.   *Those governing the formation and dissolution of unions in the reproductive period*

      1.   Age of entry into sexual unions

      2.   Permanent celibacy; proportion of women never entering sexual unions

      3.   Amount of reproductive period spent after or between unions

          a.   When unions are broken by divorce, separation or desertion
          b.   When unions are broken by death of husband

B.   *Those governing the exposure to intercourse within unions*

      4.   Voluntary abstinence

      5.   Involuntary abstinence (from impotence, illness, and unavoidable but temporary separations

      6.   Coital frequency (excluding periods of abstinence)

II. Factors affecting exposure to conception

      7.   Fecundity or infecundity, as affected by involuntary causes

      8.   Use or non-use of contraception

          a.   By mechanical and chemical means
          b.   By other means

      9.   Fecundity or infecundity, as affected by voluntary causes (sterilization, subincision, medical treatment, etc.)

III. Factors affecting gestation and successful parturition

      10.   Foetal mortality from involuntary causes

      11.   Foetal mortality from voluntary causes

* Source: Kingsley Davis and Judith Blake. Social Structure and Fertility: An Analytic Framework, Economic Development and Cultural Change 4:211-35, 1956.

The BongaartsModel

$$TFR = TF \times C_m \times C_c \times C_a \times C_i$$

where: TFR = Total Fertility Rate

TF = Total natural Fertility rate

C_m = index of non-marriage

C_c = index of contraception

C_a = index of induced abortion

C_i = index of lactational infecundability

The value of each index ranges between 0 and 1; the lower the index value, the greater the inhibiting effect of the variable. Each of these indices can be estimated from survey data to assess the relative contribution of each of these proximate determinants to the level of fertility.

Index of Non-Marriage

This index (C_m) expresses the effect of non-marriage in terms of reduction in fertility per woman. By definition the index of non-marriage is the ratio between the total fertility rate (TFR) and the total marital fertility rate (TM). That is:

$$C_m = TFR/TM$$

The proportion of women of reproductive age who are married can be used as an approximation of C_m. That is:

$$C_m \sim MWRA/WRA$$

Index of Contraception

The index of contraception varies inversely with prevalence and use effectiveness of contraception practiced by couples. The index of contraception is calculated according to the following formula:

$$C_c = 1 - (1.08 \times u \times e)$$

Where: u = the overall proportion of married women currently practicing contraception

e = the weighted average of contraceptive use effectiveness using the proportions of current contraceptive users of each method as weights

1.08 is a sterility correction factor

Index of Induced Abortion

Computation of the index of induced abortion requires first the estimation of the age-specific induced abortion rates from which one can calculate the total abortion rate (TA). The total abortion rate is then used to estimate the total number of births averted per woman (A) as follows:

$$A = b \times TA$$

$$= .4(1 + u) \times TA$$

where: b = births averted per induced abortion

0.4 is an estimate of births averted per induced abortion in the absence of contraception

u = the prevalence of contraception

After the total number of births averted per woman (A) is estimated, the index of induced abortion is calculated as:

$$C_a = TFR/(TFR + A)$$

Index of Lactational Infecundability

The effect of lactational infecundability on fertility operates entirely through modification of the birth interval. The equation to estimate the index of infecundability is as follows:

$$C_i = 20.0/(18.5 + i)$$

where: $(18.5 + i)$ is the average birth interval with lactation

i = average duration of postpartum infecundability

This equation implies that 20 months is the birth interval in the absence of lactational infecundability, allowing 7.5 months as waiting time to conception, 2 months to account for spontaneous fetal wastage, 9 months for term gestation, and 1.5 months for infecundability without lactation.

Estimation of Total Fertility

The total fertility rate is estimated from the indices according to the Bongaarts model:

$$TFR = 15.3 \times C_m \times C_c \times C_a \times C_i$$

15.3 is an average estimate of TF that Bongaarts has derived based on data from multiple studies. It is generally used for this analysis unless there is specific data from the population under study to derive a better estimate, which is not usually the case.