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COVER PHOTOGRAPH

An elderly person in India, riding on a bullock cart en route to the city *(Photo by Wanphen L. Sreshthaputra, Mumbai)*. The rapid pace of population ageing in Asia and the Pacific is attracting increasing concern among government officials, population experts, health practitioners and others. The fourth article in this issue of the *Asia-Pacific Population Journal* looks closely at the issue and its repercussions in India, focusing particularly on gender disparities and mobility-related disability.

The first article contained in this issue examines fertility preferences and subsequent fertility in Malaysia over a 12-year period, while the two other papers tackle the critical issue of knowledge about HIV/AIDS in rural and urban China and among young people in urban Nepal, respectively.

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The authors examine responses to two fertility preference questions — regarding whether more children are wanted and desired total family size (compared with actual family size) — that were asked of women and their husbands as part of the First Malaysian Family Life Survey fielded in 1976-1977 and see how well these preferences (and the consistency between them) predict the women's subsequent fertility, as reported in the Second Malaysian Family Life Survey, fielded 12 years later. Women and their husbands who said in 1977 that they wanted more children were much more likely to have a birth than those who said they did not want more. If there was disagreement between spouses, the husband's preferences appear to play a stronger role in predicting the likelihood of a subsequent birth. The authors investigate how events during the 12-year period between the surveys, e.g., the death of a child, affect the relationship between fertility preferences and subsequent fertility outcomes.

This paper identifies the vulnerable groups who have lower levels of specific knowledge about HIV/AIDS transmission and prevention in China based on the data from the Baseline Survey for IEC in HIV/AIDS Prevention, conducted by the State Family Planning Commission in 2000. The survey collected information from 7,054 men and women aged 15 to 49. Findings indicate that the large urban-rural differential in knowledge of HIV/AIDS diminished after taking account of the effects of other sociodemographic factors. Higher levels of education and media exposure are associated with increased level of correct knowledge. Given the wide disparities in knowledge about HIV/AIDS transmission and prevention within China, especially by education and media exposure, it is important to have strategic approaches to

tailor health education programmes specifically to target those with a low level of education and less access to media in rural areas.

Knowledge and Beliefs about HIV/AIDS among Young People in Urban Nepal **39**

A survey conducted in 2000 among the population aged 14 to 22 in urban Nepal shows that married young people are generally less knowledgeable about HIV/AIDS and other sexually transmitted infections (STIs), their modes of transmission and preventive measures than are their unmarried counterparts. Furthermore, among both single and married persons, females are considerably less informed than males. Overall, married females are the most disadvantaged with respect to knowledge about HIV/AIDS and other STIs. For the unmarried, friends are the primary source of information–seeking and –sharing, while spouses are the primary source for those who are married. Education and the regular reading of print materials have the most consistent associations with correct and relevant information. Findings point to the need to reduce the large gaps that exist between the sexes and marital status, develop more effective communication skills between friends and between spouses and reach out through alternative approaches to the uneducated and those without access to print media.

Gender, Health, Marriage and Mobility Difficulty among Older Adults in India **53**

India and other countries in South Asia have some of the fastest ageing populations in the world. With higher female survival at older ages, these countries are also experiencing an unprecedented feminization of the elderly population. In spite of these trends, research on gender differences in the health of older adults is limited in these countries.

While studies of the elderly in India are rare, there is considerable evidence from developed and some developing countries that women are more likely than men to experience and report poor health and functional disabilities. Studies in the economically advanced countries have also shown

an association between gender, marital status, health and disability. However, there is very little information about gender differentials in mobility difficulty among elderly persons in India.

Using data from the National Sample Survey (forty-second Round, Schedule 27) of the elderly in India, this study examines the gender disparities in the health of older adults with a focus on mobility-related disability. Logistic regression analysis is used to examine the relationships among gender, marital status, socio-economic status, health and mobility difficulty among older persons in India.

How Well Do Desired Fertility Measures for Wives and Husbands Predict Subsequent Fertility? Evidence from Malaysia

If there is disagreement between spouses, the husband's preferences appear to play a stronger role in predicting the likelihood of a subsequent birth.

By Julie DaVanzo, Christine E. Peterson and Nathan R. Jones*

Data on fertility preferences are often used to help predict future fertility and the demand for contraception. The quality of fertility preference data is of prime importance when examining how well stated fertility preferences predict

* Julie DaVanzo, Senior Economist, RAND, Labor and Population Program, Santa Monica, California, United States of America, e-mail: Julie_DaVanzo@rand.org; Christine E. Peterson, Senior Economic Analyst, RAND, e-mail:Christine_Peterson@rand.org; and Nathan R. Jones, Research Associate, Institute for Social Science Research, University of California – Los Angeles, United States, e-mail: nrj@ucla.edu. Mr. Jones participated in this research while he was a postdoctoral fellow in the Labor and Population Program, RAND.

subsequent births and completed family size, and how well they predict fertility-related behaviour such as contraceptive use. Data on fertility preferences have also been used to construct measures of the unmet need for contraception and of unwanted fertility. The usefulness of these measures, which have been the basis for many studies and some programmatic efforts, depend on the underlying component (stated fertility preferences) being valid and reliable.

This paper examines responses to two fertility preference questions — regarding whether more children are wanted and desired total family size (compared with actual family size) — that were asked as part of the First Malaysian Family Life Survey (MFLS-1) fielded in 1976-1977, and then explores how well those preferences predict subsequent fertility, as reported in the Second Malaysian Family Life Survey (MFLS-2) fielded 12 years later, in 1988-1989. Because the MFLS-1 directly asked husbands as well as wives about their fertility preferences, the consistency between the woman's and her husband's responses could be examined, as well as the relationship of those responses (and the consistency between them) to fertility outcomes that occurred by 1988. The focus is primarily on whether 1977 preferences predict 1977-1988 fertility better when the two types of measures and the spouses' responses are consistent with each other and, if the responses are inconsistent, which of them better predicts subsequent fertility.

A number of studies, based on survey data from the United States of America and Asia, have examined whether a woman's subsequent fertility over a period of time is related to her stated fertility preferences, regarding whether she wants more children and whether her desired family size exceeds the number of children she has, at the beginning of the time period (Becker, 1996; Freedman, Hermalin and Chang, 1975; Coombs and Chang, 1981; Westoff and Ryder, 1977; Hermalin and others, 1979; Foreit and Suh, 1980; Nair and Chow, 1980; Clifford, Lake and Brannon, 1987; Thomson, McDonald and Bumpass, 1990; De Silva, 1991; Tan and Tey, 1994). These studies, which consider a time span of three to seven years, generally find that the wife's subsequent fertility is related to her fertility preferences. Some of these studies also had information on the husband's fertility preferences (Coombs and Chang, 1981; Clifford, Lake and Brannon, 1987; Thomson, McDonald and Bumpass, 1990; De Silva, 1991; Tan and Tey, 1994) and find that they also play a role in predicting subsequent fertility.

Few studies have been able to examine the predictive power of both types of measures (wanting more children and desired family size), for both spouses, over a period of time long enough that, by its end, most women have completed (or believe they have completed) childbearing or at least are likely to be making substantial progress towards that goal. The 12-year period between the First and Second Malaysian Family Life Surveys provides an opportunity to evaluate how well preferences at the beginning of a period, for women alone and in combination with those of their spouses, relate to fertility observed over a longer period of time. In addition, the detailed life histories collected in MFLS-2 allow analysis of how events during the period between the surveys, such as change in marital status, death of a child, and migration to a new area, affect the relationship between fertility preferences and subsequent fertility outcomes.

Data and methods

Data: The Malaysian Family Life Surveys (MFLS-1 and MFLS-2)

The First Malaysian Family Life Survey (MFLS-1) was conducted in three rounds in 1976-1977 in households in Peninsular Malaysia that each contained an ever-married woman age 50 or younger.[1] As part of the second round of MFLS-1, fielded between January and April 1977, women and their husbands were asked about their fertility preferences as part of the Female and Male Attitudes and Expectations questionnaires (MF7 and MF8). The MFLS-1 data used in this paper are drawn from the second round of MFLS-1, in which 1,216 households responded.

The Second Malaysian Family Life Survey (MFLS-2) was fielded in 1988.[2] As part of MFLS-2, MFLS-1 respondents were sought and 866 of the 1,216 MFLS-1 Round 2 female respondents were reinterviewed. These reinterviewed (or "Panel") women represent 72 per cent of MFLS-1 Round 2 respondents thought to be still alive and living in Peninsular Malaysia in 1988.[3] Complete pregnancy histories, beginning with their first pregnancy until the time of the MFLS-2 interview, were collected on the Panel women. In this paper, the live births occurring during the period between MFLS-1 and MFLS-2 (1977-1988) are related to the fertility preferences reported in Round 2 of MFLS-1 in 1977.

Fertility preference measures

The authors consider the two alternative measures of fertility preferences: more children are wanted and desired family size exceeds actual family size.

First measure: Wants more children

To determine whether the respondent wanted to have any additional children, all MFLS-1 female and male respondents (regardless of current marital status) were asked:

> *Would <u>you personally</u> like to have any more children than the number you have now?*

The question was worded and emphasis given to try to capture the respondent's own preferences as opposed to what she/he thought others might want her/him to say. Although there is no reason to believe that responses to the question "Would you like to have any more children" are biased because people systematically under- or over-report, Bongaarts (1990) notes that some error may arise if respondents think the question relates to immediate plans versus ultimate goals (i.e., the woman thinks the question asks if she wants another child in the next year or two or three, as opposed to by the end of her childbearing years).

Second measure: Desired family size exceeds actual family size

To determine desired total family size, the MFLS-1 asked both male and male respondents:

Suppose you started your married life all over again and you could decide what children to have. How many children would you want? PROMPT: How many boys? How many girls?

Desired family size is the sum of the number of boys and girls reported in response to these questions.[4] In the analyses, the total was compared with the respondent's current family size, which is defined as the number of the respondent's own children alive at the time of Round 2 (the first quarter of 1977). Respondents whose desired family size exceeds their current family size are said to "desire more children than they have"; those whose desired family size is the same or less than the current family size are said to "not desire more children than they have".

The quality of this measure as an indicator of fertility preferences depends partly on whether responses about desired family size are exact or whether they instead represent a central tendency in some acceptable range of alternative responses (Freedman and Takeshita, 1969). For example, a woman may feel that three to five children is an acceptable family size, and she may be relatively indifferent as to which number she ultimately has within that range. Which number she reports may be a function of how she feels that day as opposed to it being the most desirable number.

Samples and methods used in the analyses

The sample for the analyses consists of 650 MFLS-1 female respondents who were reinterviewed in 1988 for MFLS-2 and who at the Round 2 MFLS-1 interview in 1977 were currently married and reported that they were able to have children, did not report that they were pregnant[5] and answered the fertility preferences questions. When husbands are considered, the authors further restrict the sample to the 83 per cent of the women whose husbands answered the fertility preference questions in MFLS-1.

Of the 650 women considered by 1988 (i.e., when MFLS-2 was fielded) 269 had completed their childbearing years either through menopause (232) or sterilization (37) and another 289 reported in 1988 they wanted no more children. Thus a large majority of the women (86 per cent) in the sample considered here viewed themselves as finished with childbearing by 1988. This leaves only 92 women who could still bear children and who said they wanted more as of 1988; of those women, only 15 are potentially censored since they wanted more children in 1977 but had not had any additional children by 1988.

Bivariate analyses were first conducted to assess how the two measures "want more children" and "desire more children than have" relate to subsequent fertility at the aggregate level. Next, individual-level data were used to investigate how well our two measures of fertility preferences in 1977, and the consistency between them and between husbands and wives, predict subsequent childbearing over the 12-year period between MFLS-1 and MFLS-2. We also look at survival curves to see how these various measures of preferences are related to the timing of the next birth (if any). Multivariate analyses were then conducted to investigate the

factors that affect whether a woman meets her stated preference for having or not having more children.

Bivariate analyses

Currently married women and their husbands were first considered separately. This is followed by analyses of the joint responses of husbands and wives regarding preferences for more children.

MFLS-1 currently married women

Aggregate-level comparisons

Table 1 shows the percentage of MFLS-1 women with positive responses to each of the fertility preference measures and the percentage who had a subsequent live birth between 1977 and 1988 (i.e., between Round 2 of MFLS-1 and MFLS-2). In the aggregate, the percentage of women who had at least one live birth between 1977 and 1988 (44.5 per cent) is significantly greater than the percentage who in 1977 said that they wanted more children (38.9 per cent). Other studies from Asian countries (Hermalin and others, 1979; De Silva, 1991) using shorter time spans also found the percentage who subsequently have a live birth to be greater than the percentage of women who report wanting more children, while in the United States the reverse was found (Westoff and Ryder, 1977). Note that a lower percentage having a subsequent birth compared with the percentage saying that they want another child, as was found in the United States, is the expected case if women have not had sufficient time to meet their goal of having another child.[6] The present results suggest that, as Bongaarts (1990) noted, women may not have their whole reproductive histories in mind when answering whether they want more children.

Using the "desires more than have" measure, one observes that the percentage of women whose desired family size exceeds the number of children they now have (44.5 per cent) is the same as the percentage having a subsequent birth. However, as seen below, when one looks at which women were having births based on their responses to the "wants more children" and "desires more than have" questions, the former appears to be a better predictor of subsequent fertility.

Table 1. Percentages of Malaysian women who reported in 1977 that they wanted more children, that they desired more children than they had, and percentage who had a live birth between 1977 and 1988 (N=650)

Women who wanted more children	38.9
Women who desired more than have	44.5
Women who had a subsequent live birth	44.5

Note: Sample comprises reinterviewed MFLS-1 women who were currently married in 1977.

Individual-level comparisons

Table 2 shows the percentage of women who had a live birth between 1977 and 1988 for each of these fertility preference measures (and their combination).[7] One notes that, contrary to the aggregate results above, the stated fertility preference of "wants more children" is the better predictor of a subsequent live birth than is the "desires more children than has" measure.[8]

Table 2. Percentage of Malaysian women with a live birth between 1977 and 1988, by each of the woman's fertility preference measures

	"Desires more than has"		
"Wants more children"	**Yes**	**No**	**Total**
Yes	69.0 (213)	57.5 (40)	67.2 (253)
No	36.8 (76)	28.3 (321)	30.0 (397)
Total	60.5 (289)	31.6 (361)	44.5 (650)

Note: Sample sizes for each cell are in parentheses. Sample comprises reinterviewed MFLS-1 women who were currently married in 1977.

Looking first at the marginals, 67.2 per cent of the women who said in 1977 that they wanted at least one more child had a live birth between 1977 and 1988 compared with 60.5 per cent of the women whose stated desired family size exceeded their actual family size in 1977. The "did not want more" group and the "did not desire more than they had" group each had nearly the same incidence of subsequent births — 30 per cent and 31.6 per cent, respectively (difference not statistically significant).[9]

Consistency between preference measures and subsequent fertility

Looking at the body of table 2, one sees that the group of women who reported both wanting more children and desiring more children than they had had a slightly higher percentage of subsequent births than the overall group who reported wanting more children — 69 per cent vs. 67.2 per cent; this difference is not statistically significant. Likewise, the women with the strongest preferences for no more children (i.e., those who reported neither wanting any more children nor desiring more children than they currently had) had a slightly lower incidence of subsequent births (28.3 per cent) than either all those who "did not want more children" (30.0 per cent) or all those whose desired family size did not exceed the number of children they already had (31.6 per cent).

When a disagreement occurs, which happens for 18 per cent of the women,[10] the "wants more" measure appears to take precedence in predicting the incidence of a subsequent live birth. One can observe from table 2 that women who said they did not want any additional children but reported a desired family size greater than their current one were much less likely ($p = 0.02$) to have a subsequent birth (36.8 per cent) than women whose 1977 family size met or exceeded their desired family size but who said they wanted more children (57.5 per cent). Overall, then, women who were inconsistent in their responses to the two measures were less likely to have a subsequent birth than those who were consistent in both wanting more children and desiring more children than they had. However, women with inconsistent responses were still more likely to have a subsequent birth than women who were consistent in not wanting more children and desiring no more children than they currently had. In addition, one does not find any statistically significant differences in the probability of a birth during the 1977-1988 period between those desiring more children than they have and those not desiring more than they have for a given response to "wants more children." However, the probability of a subsequent birth differs significantly between the two "wants more children" responses, both among those who desired more than they had and among those who did not desire more than they had.

The longitudinal data from Taiwan Province of China used by Hermalin and others (1979) also considered both types of fertility preference measures. They, too, found somewhat better predictive power when using the "wants more children" measure compared with the "desires more than have" measure. The pattern seen in the data from Taiwan Province of China is even stronger than that seen in the Malaysian data; Hermalin and others found no additional effect of the "desires more than have" measure on the percentage with a subsequent birth for women who reported wanting no more children.

Agreement between husbands and wives

Because of the relatively stronger relationship for both women and men of subsequent fertility outcomes with "wants more children" than with "desires more than has," the authors use the former measure in the rest of the analyses. Table 3 shows the percentage of couples with a subsequent live birth between 1977 and 1988 for the four combinations of wives' and husbands' 1977 responses to whether they wanted more children. From the marginals, one can see that the overall percentages are very similar for wives and husbands: 68 per cent of the women who said in 1977 that they wanted more children had at least one more child by 1988 compared with 69.6 per cent for the women with husbands who wanted more children; this difference is not statistically different.

The predictive power is highest when the husband and wife agreed on whether they want more children. A higher incidence of a subsequent birth is seen for couples where the spouses agreed on wanting more children (71.2 per cent) than when only one of the spouses wanted more children (64.9 per cent when only the husband wanted more and 57.1 per cent when only the wife wanted more) or when only one spouse's preferences were considered (69.6 per cent for husbands

and 68.0 per cent for wives).[11] Table 3 also shows that when both spouses reported that they did not want any additional children, the incidence of a subsequent live birth is much lower (23.1 per cent) than if only one spouse's answer is considered (30.5 per cent for wives and 28.4 per cent for husbands).

Table 3. Percentage of Malaysian women with a live birth between 1977 and 1988, by wife's and husband's responses to whether they wanted more children

	Husband wants more children		
"Wants more children"	**Yes**	**No**	**Total**
Yes	71.2 (170)	57.1 (49)	68.0 (219)
No	64.9 (57)	23.1 (268)	30.5 (325)
Total	69.6 (227)	28.4 (317)	45.6 (544)

Note: Sample sizes for each cell are in parentheses. Sample comprises MFLS-1 women currently married in 1977 who were reinterviewed in 1988 and whose husbands answered the MFLS-1 questions about whether they wanted more children.

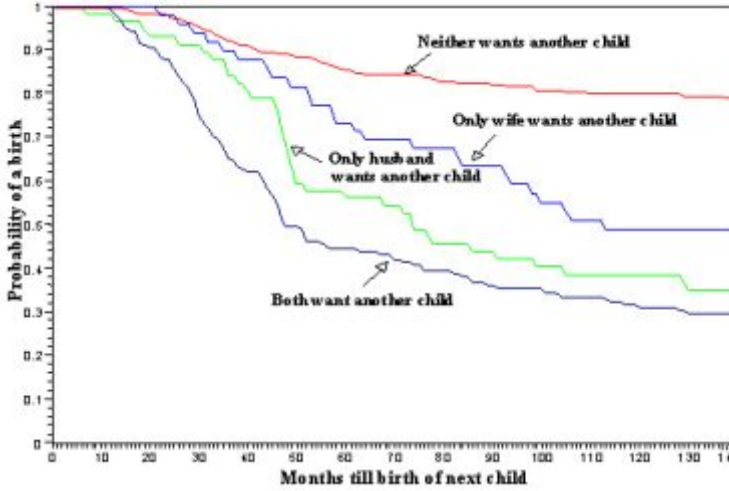
When the spouses' preferences are considered together, it appears that the husband's preferences exert a slightly greater influence. Most notably, among women who said they did not want more children but whose husbands did want more children, 64.9 per cent had a subsequent birth − very nearly the same percentage as among all women who said that they wanted more children. In addition, the percentage with a subsequent birth for couples where both wanted more children (71.2 per cent) is not statistically different from those where only the husband wanted more children (64.9 per cent). Also noteworthy is that if either spouse wanted more children, the couple was likely to have another child; the percentage with another birth is over 50 per cent in all combinations where at least one spouse wanted another child. When either spouse wanted more children, that preference seems to have dominated the other spouse's preference for no more children.[12]

Relationship between preferences and the timing of the next birth

Another way of looking at how well preferences relate to subsequent births is to see whether the timing of the next birth is affected. Figure 1 presents the survival curves showing the duration of time from the last live birth before the MFLS-1 interview to the next live birth or the time of the MFLS-2 interview, i.e., both open and closed intervals are included. The curves do indeed vary by fertility preferences. Couples wherein both spouses wanted another child had a subsequent child sooner than couples that disagreed on preferences and they did so much

sooner than when neither spouse wanted another child. Half the couples where both spouses wanted another child had a child within the first 48 months (median time) after their last birth before the 1977 interview, while 76 per cent of the couples where neither spouse wanted another child had not had a subsequent birth by the end of 1988. For spousal disagreements, it is to be noted that the husband's preferences appear to carry more weight in the timing of that next birth. When the husband was the only one who wanted more children, the median time to the next birth is shorter (73.5 months) than when only the wife wanted another child (112.5 months).[13] A formal multivariate analysis of the timing of births would be needed to see if that relationship persists when other factors are controlled; however, this is beyond the scope of the current study.

Figure 1. Months to next live birth from last live birth before the MFLS-1 Round 2 interview, by whether husband and/or wife wanted more children



Note: Sample comprises MFLS-1 women currently married in 1977 who were reinterviewed in 1988 whose husbands completed the MFLS-1 fertility preference questions. Survival curves were produced by SAS® PROC LIFETEST. For the group where neither spouse wanted another child, 76 per cent of the intervals were open (i.e., censored).

Multivariate analyses

In this section, the authors examine what affects fertility outcomes, given a stated preference for more children or for no more children. The dependent variable is an indicator for whether the woman had a live birth between 1977 and 1988, and estimation is by logistic regression. The analysis utilizes the entire sample of 650 women who were currently married, able to have children and not pregnant in 1977, and were reinterviewed in 1988. The analysis splits the data into two separate subsamples based on the woman's response regarding whether she

wanted more children. This allows the effects of all of the explanatory variables to differ between women who wanted more children and those who did not.[14]

Independent variables for multivariate analysis

The multivariate analysis controls for various characteristics that may have affected a woman's ability to bear children owing to natural forces or to behaviour. The probability of having a child generally decreases with a woman's age beyond the late teens, owing to growing infecundity and less frequent sexual activity; likewise women married to older men tend to have lower fertility. The number of living children, controlling for the woman's age, may reflect some measure of the woman's fecundity (in that she has a higher probability of conceiving and thus a greater potential for more births in her reproductive period) in addition to preferences for more children or to poor use of contraception. Women with higher education may be better able to control family size because they tend to be more effective users of contraception (Mamlouk, 1982; Rodriguez, 1979). Similarly, the higher the education of the husband, the more receptive he may be to effective contraceptive use. The husband's educational attainment, as a proxy for income, may also reflect the ability to afford more effective contraceptive methods. To control for these factors, the regressions control for woman's age and years of schooling in 1977, her spouse's age and education in 1977 and the number of living children in that year.[15]

In Malaysia, fertility rates vary by ethnicity. During the period of study, 1977 to 1988, Malays had higher fertility rates than Chinese and Indians, and Malay fertility rates did not fall while those for Chinese and Indians did.[16] Because of the small sample of Indians and because both Chinese and Indians have lower fertility than Malays, a single indicator for "Chinese or Indian" was used.

The gender composition of current children affects the likelihood of wanting additional children, and it may affect the strength of intentions (Cleland and others, 1983). If a woman says she wants more children, but has already achieved her desired number of sons and daughters, she may not be as active in trying to have more children. The authors include in the specification an indicator for whether by 1977 the woman had at least the number of sons and the number of daughters she desired.[17]

The authors also consider how life events over the subsequent 12-year period − marital status changes, child deaths, residence changes, early menopause − affect the predictive power of fertility preference measures by changing, perhaps in unexpected ways, the environment in which the fertility intentions were originally formed. Dichotomous indicators were included for whether the woman became divorced or widowed between 1977 and 1988, whether a child living at the time of the 1977 interview had died by the time of the MFLS-2 interview, whether the woman resided in an urban area in both 1977 and 1988, whether the woman resided in a rural area in 1977 but in an urban area by 1988, and whether the woman experienced menopause at or before age 45.[18]

Table 4. Means of regression variables for women who wanted children in 1977 and for those who wanted no more children

Variable description	Wanted more children	Did not want more children	Means significantly different
Had a live birth 1977-1988	0.67	0.30	***
Status in 1977 (Round 2 of MFLS-1)			
Woman's age	29.9	37.5	***
Husband's age	35.5	43.5	***
Woman's years of schooling	4.3	2.6	***
Husband's years of schooling	5.7	4.8	***
Chinese or Indian (D)	0.26	0.52	***
Number of living children	2.54	5.60	***
Has desired number of both sons and daughters	0.07	0.63	***
Husband not present (D)	0.02	0.06	***
Changes between 1977 and 1988			
No longer married to 1977 spouse (D)	0.10	0.13	*
Child alive in 1977 later died (D)	0.04	0.08	**
Age at menopause <=45 (D)	0.06	0.08	-
In urban area in 1977 and 1988 (D)	0.23	0.28	-
Moved to an urban area by 1988 (D)	0.10	0.12	-
Fertility preference measures: 1977			
Husband wanted more children (D)	0.78	0.18	***
Husband provided no preference data (D)	0.12	0.13	-
Sample size	253	397	

Note: (D) : Dichotomous variable. Significance levels for two-tailed test of difference in means: *** p<0.01; ** p<0.05; * p<0.10; - difference not significant at 10 per cent level.

The husband's desires for more children may also affect the woman's ability to follow through with her fertility preferences. An indicator for whether the husband reported wanting more children is thus included, as well as an indicator for cases where the husband did not complete the fertility preference questions.

Table 4 presents the means for the regression variables separately for women who in 1977 reported they wanted more children and for those who did not want more children. The last column in the table indicates whether these differences in the means between the two samples are statistically significant. The differences between the two samples illustrate the selected nature of each sample. Relative to women who said in MFLS-1 that they wanted more children, women who said in MFLS-1 that they did not want additional children were, on average, older, less educated (largely owing to their being older and hence having grown up when educational opportunities were very limited for Malaysian women), and were more likely to be Chinese or Indian. Further, they had older and less educated husbands who were much less likely to want more children and they were less

likely to be still married to their 1977 husband. Compared with those who said that they wanted more children, women who said in 1977 that they did not want more children had more than twice as many children by 1977, were far more likely to have achieved their desired numbers of sons and daughters by 1977, and also were more likely to have experienced a child death between 1977 and 1988 (probably because they had more children). All of the differences just mentioned are statistically significant at the 0.10 level or better. There are no significant differences between the two samples in early menopause and urban residence.

Results of the multivariate analysis

Table 5 presents the results of the logistic regressions run separately on the "wanted more" and "didn't want more" subsamples of women. The final column of the table shows the results of t-tests for whether the coefficient for a given variable differs significantly between the two subsamples.[19] The overall explanatory power is greater and more variables are significant in explaining who had a live birth between 1977 and 1988 for the sample of women who said in 1977 that they did not want any more children. Among women who wanted more children, it appears that very few of the factors considered here affect their likelihood of having another child. For both samples, the likelihood of having a live birth between 1977 and 1988 is largely affected by those characteristics that naturally limit childbearing, such as the increasing age of the woman and her husband, or the existence of a non-present spouse. As expected, older women and women with older husbands were less likely to have another birth, and these effects are statistically significant for both subsamples. The age effects do not differ significantly between the two samples.

Among women not wanting more children, more educated women have a lower likelihood of a subsequent birth and thus have less unwanted fertility; this effect is statistically significant and is significantly different from that in the "wanted more" subsample. This strong negative effect may reflect greater and more effective contraceptive use by educated women. It may also reflect the higher value of the time of educated women, which in turn raises the opportunity cost of an additional child (and the "costs" of an unintended child). A significant negative effect for woman's education among women wanting no more children was also found by Westoff and Ryder (1977) for the United States and by Hermalin and others (1979) for Taiwan Province of China. A significant effect of husbands' education for the group that did not want more children was not found in this study.

Among women who stated a preference for more children, it is to be noted that women's education has no significant effect on the likelihood of a subsequent birth, but a significant negative effect of husband's education level has been estimated for this subsample. It could be that educated men are more likely to change their minds about wanting more children in response to the increasing costs associated with having children as a result of economic development (e.g., they increase the level of schooling that they would like their children to receive) and that they are better able to achieve those new preferences through contraceptive

use. It is puzzling, however, that this is not seen for women as well, even when the husband's education is omitted from the specification.

Table 5. Logistic regressions explaining whether a live birth occurred between 1977 and 1988, separately for women who wanted and who did not want another child in 1977

Variable	Wanted more children	Did not want more children	Coefficient significantly different
Status in 1977 (Round 2 of MFLS-1)			
Woman's age	-0.219 ***	-0.259 ***	-
Husband's age	-0.078 **	-0.105 ***	-
Woman's years of schooling	0.087	-0.159 **	**
Husband's years of schooling	-0.132 **	-0.057	-
Number of living children	0.396 ***	0.230 ***	-
Has desired number of both sons and daughters	-1.165 *	-0.442	-
Chinese or Indian	-0.148	-1.360 ***	*
Husband not present	-4.445 ***	-3.913 ***	**
Changes between 1977 and 1988			
No longer married to 1977 spouse	-1.058 *	0.967	-
Child alive in 1977 later died	-0.955	1.458 ***	**
Age at menopause <=45	-1.139	0.382	-
Stayed in an urban area	-0.244	-0.641 *	-
Moved into an urban area	-0.287	-1.095 **	-
Husband's preference in 1977			
Husband wanted more children	-0.050	1.17 ***	**
Intercept	10.20 ***	12.98 ***	-
2 Log likelihood	131.5 ***	211.3 ***	
Sample size	253	397	

Note: Significance levels for two-tailed test: *** p<0.01; ** p<0.05; * p<0.10; - not significantly different at 10 per cent level.

In both subsamples, women with a greater number of living children in 1977 were more likely to have a subsequent birth, suggesting that a large number of children (when the woman's age is controlled) may be an indicator of greater fecundity or a tendency to use little or no contraception. The coefficients estimated for number of children do not differ significantly between the two subsamples. Among women who wanted no more children, De Silva (1991) and Foreit and Suh (1980) also found positive effects of family size on the likelihood of a subsequent birth in data from Sri Lanka and the Republic of Korea, respectively. Other studies not using multivariate techniques have tended to find

that the percentage of women having a subsequent birth fell with parity, but the authors believe those results were largely picking up the effect of the woman's age ¾ women who have had more children tend to be older ¾ – which is controlled in this study.

Women who said in 1977 that they wanted more children but had already achieved their desired numbers of both sons and daughters by then were less likely to have another child than those who had not yet achieved their desired gender composition. The gender-composition variable has no significant effect for the sample that did not want more children.

Among women who in 1977 expressed a preference for no more children, Chinese and Indian women were much less likely to have a subsequent birth; the ethnic difference is much larger in the "wants no more" subsample and is significantly different from that in the "wants more" subsample, which shows no significant ethnic difference. This is consistent with the continued higher level of fertility among Malay women as mentioned previously. It may reflect the greater response of Malay women to the New Population Policy (NPP) instituted in the period 1982-1984. As part of a programme to increase the size of the Malaysian population towards the goal of 70 million by the year 2100, NPP provides economic incentives to increase family size. Although the incentives apply regardless of ethnic origin, Malays have shown the greatest response to them (Govindasamy and DaVanzo, 1992). It appears from the present results that the policy may have led some Malays who said in 1977 that they did not want more children to change their minds.

Of women who wanted more children, those who were no longer married to the MFLS-1 husband were less likely ($p<0.10$) to have another child. This variable does not have a significant effect for women who did not want more children.[20] If the woman's 1977 spouse was not present in the household in 1977, the likelihood of an additional birth by 1988 is strongly reduced, although the effect is slightly smaller in absolute value in the "did not want more" subsample than in the "wants more" subsample (and the difference is statistically significant).[21]

The death of a child greatly increases the likelihood of another birth among women who said in 1977 that they did not want more children. The coefficient for this variable is significantly different from that in the "wanted more children" sample, where this variable does not have a significant effect. Whether this is truly child replacement cannot be determined here since the current specification does not restrict the timing of the child's death to the period before the next birth. Early menopause has no significant influence on the likelihood of a subsequent live birth for either sample.

Staying in or moving to an urban area by 1988 reduced the likelihood of a birth between 1977 and 1988 for both subsamples, but only significantly so for those who did not want more children. The coefficients do not differ significantly between the two subsamples. The lower likelihood of a subsequent birth for those in urban areas in 1988 may reflect the potentially higher cost of children in urban areas, which may reduce the number of children desired, and also the better access to contraceptive services in urban compared with rural areas.

Women who said in 1977 that they did not want more children were significantly more likely to have a birth by 1988 if in 1977 their husbands said they wanted more children. This is consistent with what was observed previously, in table 3, where women who did not want more children but whose husbands did want more were much more likely to have a subsequent live birth. Alternatively stated, couples where neither the husband nor the wife said they wanted another child were very unlikely to have another child. Among women who said they wanted more children, their husbands' preferences did not have a significant effect on the likelihood of a subsequent birth. The first row of table 3 suggested that husbands' preferences affect the fertility outcomes of women who wanted more children; indeed, when only the husband's "wants more" preference measure is included in the regression, the effect is positive and significant (at the $p<0.05$ level of significance). However, once the other covariates are added, husbands' preferences no longer play a significant role.

Summary and conclusions

In comparing the two fertility preference measures − wants more children and desired family size exceeds current family size − one finds that, at the individual level, for both women and men, the "wants more" fertility preference measure is more strongly related to the incidence of a subsequent birth than the "desires more than has" measure, though, at the aggregate level, the latter is closer to the percentage of women who had a birth. For both measures, predictive power at the individual level is stronger for husbands than for wives. In addition, as found by Hermalin and others (1979), this study finds that individuals with consistent preferences (i.e., the person's "wants more" and "desires more than has" responses agree) are more likely to realize those preferences than those with inconsistent responses to those two preference measures. These results accord with Westoff and Ryder's (1977) finding that women who were more "certain" about their fertility intentions were more likely to fulfil those intentions.

The weaker performance of the "desires more than have" preference measure relative to the "wants more children" measure may reflect the fact that: (a) hypothetical questions may be more prone to respondent confusion and (b) reported desired family size may be drawn from a range of equally-valued family sizes. Education and culture may affect how well an individual processes a hypothetical question such as "if you could start over again, what would you do?" Indeed, women with more education had less disagreement between the two measures of fertility preferences (Peterson and Reichman, 1997). In the case of desired family size, if the woman has a range of family sizes over which she is indifferent that overlaps her current number of living children, then the resulting "desires more than have" indicator created by comparing current to desired family size may over- or understate the respondent's fertility preference depending on the degree of overlap.

The use of joint responses of wives and husbands to the "wants more" measure provides more information than when only the woman's preferences are considered, and somewhat more information than when only the husband's preferences are considered. Wives and husbands who are consistent with each other on the "wants more" measure (either both "yes" or both "no") are more likely to achieve their preferences, more so than when each individual spouse's preferences are considered in isolation. When couples disagree, it appears that the husbands' preferences better predict subsequent fertility than the women's preferences. It is important to note, however, that with regard to having more or not having more children, the majority of couples agree on their fertility goals: 80.5 per cent for the "wants more" measure and 82.1 per cent for the "desire more than has" measure (Peterson and Reichman, 1997).

Using multivariate analysis, it was found that the observed relationship between preferences and outcomes is not completely due to those wanting more children having characteristics that tend to lead to more births or to those not wanting more children having characteristics that lead to fewer births. The relationship between preferences and subsequent fertility remains when other variables are controlled.

Among women who say that they do not want to have another child, the characteristics that lead to a higher likelihood of "failure" (i.e., having another child despite the stated preference for not doing so) are similar to those that distinguish women with an unmet need for contraceptive services. Westoff and Pebley (1981), using aggregate-level World Fertility Survey (WFS) data, found the prevalence of unmet need was highest among women in their thirties, those who already have several children, those living in rural areas, and those who were illiterate or poorly educated. The Westoff-Pebley study included the 1974 Malaysia WFS data, and the above relationships were quite evident in those data even in their bivariate analysis. The present results suggest that along with these measures information on the husband's preferences may help to improve estimates of the extent of unmet need and help to identify couples who may need additional counselling on contraceptive methods.

Although some have questioned their value, fertility preference data provide useful information that helps to predict whether a couple has more children, especially if collected for both husbands and wives.[22] At the individual level, information on whether the respondents want more children appears to be more useful than information on desired family size. Such data can help programmes to identify the couples most in need of contraceptive services to achieve, but not exceed, their family size desires.

Endnotes

1. For a description of the MFLS-1 survey and its contents, see Butz and others (1978).

2. For a description of the MFLS-2 survey and response rates, see Haaga and others (1993), DaVanzo and others (1993), and Haaga and others (1994). The MFLS-2 also interviewed a sample of the adult children of the MFLS-1 respondents, a new sample of women of reproductive age and a sample of older Malaysians. The analyses in this paper only consider the reinterviewed MFLS-1, or Panel, respondents.

3. Attrition between the MFLS-1 and MFLS-2 surveys was not random. (See Haaga and others, 1994, for a more detailed discussion of sample attrition between MFLS-1 and MLFS-2.) However, it appears that attrition is not correlated with fertility preferences. The authors found the percentage wanting more children and the percentage who had a desired family size that was greater than their number of children in 1977 for women not reinterviewed in MFLS-2 to be identical to those for the women who were reinterviewed, and the degree of agreement between the two fertility preference measures was very similar for the two samples.

4. Respondents gave the number of boys and the number of girls; the interviewer then added them to get the total number. A few respondents did not have a gender preference and gave only the total number desired. Only a few of respondents could not give a number at all. Thus the MFLS-1 data do not face the problem of substantial non-response that has been experienced in other developing country surveys that asked women to give their desired number of children.

5. Women who were pregnant at the 1977 Round 2 interview were dropped because it was not clear from the wording of the intentions questions whether such women were to include or exclude the child with whom they were pregnant.

6. Studies using shorter time spans found less discrepancy between the proportions who want more children and those having a birth during the time span. See DaVanzo and others (2003) for details.

7. Among women who had a subsequent birth, more than half had more than one subsequent birth. See DaVanzo and others (2003) for details.

8. A similar pattern emerges when looking at the husband's fertility preferences in relation to the incidence of subsequent births: the "wants more children" measure predicts better than the "desires more than have" measure. See DaVanzo and others (2003).

9. Other studies using shorter time-spans have found similar patterns. See DaVanzo and others (2003) for details.

10. For an analysis of the internal consistency between the "wants more children than have" and the "desires more children than have" preference measures and between husbands' and wives' preferences, see Peterson and Reichman (1997).

11. Tan and Tey (1994), using data from the 1984 Malaysian Population and Family Survey (MPFS) matched with 1985-1987 birth records, also found that subsequent fertility, in their case over a three-year period, was better explained by considering both the woman's and husband's intentions regarding a child in the next three years than by the woman's intention alone, although it was not as strong an effect as observed from the present data for a longer period. The 1984 MPFS, however, did not ask husbands directly about their fertility preferences, as had been done in MFLS-1; women were asked to report their husbands' preferences, which may explain the smaller additional explanatory

power of the husbands' preferences if the women tended to project their own preferences when reporting their husbands' preferences.

12. Coombs and Chang (1981) found similar effects of spousal agreement on the number of births among couples from Taiwan Province of China during their four-year study period, 1970-1974. See DaVanzo and others (2003) for additional information.

13. The patterns exhibited in figure 1 are similar to those seen by Thomson, McDonald and Bumpass (1990), who looked at the effect of spousal agreement regarding fertility preferences on the timing of the third birth in the United States.

14. When one pools the two subsamples but does not allow the effects of explanatory variables to differ, one finds that fertility preferences at the beginning of the period continue to exhibit a significant effect on the likelihood of a subsequent birth even when key factors such as ethnicity, age and education of the husband and wife, number of children, and presence of spouse at the beginning of the interval are controlled. These results can be seen in Peterson and Reichman (1997).

15. To handle information on missing spouses and missing data, the authors created two indicator variables: one for the 29 husbands not residing in the household in 1977 and one for the 84 husbands who did not complete the fertility preference questions. For the non-resident spouses, spouse characteristics and fertility preferences were set to zero; for the resident husbands who did not answer the fertility preference questions, their preference measures were set to zero.

16. TFR for Malays was 4.6 in 1975 and 4.7 in 1986; for Chinese women, TFR fell from 3.6 in 1975 to 2.4 in 1986; and among Indian women it fell from 3.9 to 3.0 between 1975 and 1986 (Department of Statistics Malaysia, 1986).

17. Other specifications were tried but none of them had significant explanatory power. For an analysis of the effects of gender composition of children on fertility using these data, see Pong (1994).

18. For a discussion on the underlying theoretical rationale for the effects of these variables on fertility, see DaVanzo and others (2003).

19. To test for differences in coefficients between the two subsamples, the authors ran the regression specification on the pooled sample of women (those who wanted more children and those who did not) and included interactions of all explanatory variables with the indicator for "wants more children." The t-statistic on a given interaction tells whether the coefficient of that variable differs significantly between the two subsamples.

20. The change variables in this analysis only signify that a change occurred by 1988 and are not specifically related to the timing of births. The lack of significance for many of the change variables may reflect the fact that most next births occurred shortly after 1977 (see figure 1), giving little time for these types of changes to occur and affect fertility decisions.

21. In all but two of the cases where the husband was not present in 1977, the woman was still married to that husband in 1988. The large coefficient is due to the small number of cases where husbands were absent in 1977.

22. A recent study for Bangladesh has shown that fertility preference data also help to explain abortion behaviour (Rahman, DaVanzo and Razzaque, 2001).

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Who Has Correct Information and Knowledge about HIV/AIDS in China?

Given the wide disparities in knowledge about HIV/AIDS within China and the large population with disadvantaged sociodemographic characteristics, it is important to have strategic approaches that tailor health education programmes specifically to target those with low education and those in farming occupations in rural areas.

By Jiajian Chen, Chen Shengli and Minja Kim Choe*

Acquired immunodeficiency syndrome (AIDS) is the late clinical stage of infection with the human immunodeficiency virus (HIV). The first AIDS case in China was reported in 1985. By 1998, new HIV infections had spread to all

* Jiajian Chen, Senior Fellow, East-West Center, Population and Health Studies, Honolulu, United States of America, e-mail: chenj@eastwestcenter.org; Chen Shengli, Director, IEC Department, National Population and Family Planning Commission of China, Beijing, China, e-mail: chen-sl@263.net; and Minja Kim Choe, Senior Fellow, East-West Center, Population and Health Studies, Honolulu, United States, e-mail: mchoe@hawaii.edu.

provinces, autonomous regions and municipalities. It has been estimated that HIV/AIDS prevalence among adults rose from less than 0.002 per cent (10,000 cases) in the period 1990-1995 to about 0.2 per cent (1 million cases) in the period 2000-2001 (UNAIDS China, 2002; WHO, 2001). While the rate is still low in comparison with some other affected countries, there is no indication that the spread of HIV/AIDS in China will be controlled or will slow down in the near future (Zeng, 2001; UNAIDS and WHO, 2002).

In response to the rising HIV/AIDS epidemic, by 1998, the Government of China issued the China Mid- and Long-Term Plan for HIV/AIDS Prevention and Control (1998-2010). The plan calls for HIV/AIDS prevention and control programmes to be integrated into the social and economic development plans at different levels of Government. The plan emphasizes that "by the year 2002, over 70 per cent of the urban population, 40 per cent of the rural population and 80 per cent of the high risk population should have basic knowledge about HIV/AIDS and STD prevention and control" (State Council, China, 1998).

The most recent Five-year Action Plan of China sets new goals and targets of reaching 75 per cent of the urban population and 45 per cent of the rural population to have basic knowledge of HIV/AIDS by the year 2005 (China, 2002). The new plan reports that while local governments in all regions have vigorously promoted health education and behavioural intervention campaigns with some progress, the HIV/AIDS prevention work in China has yet to meet the big challenges. For example, the very rapid spread of HIV among intravenous drug users has still not been brought under control. The transmission of HIV through the collection or transfusion of blood still exists owing to illegal blood plasma collection (China, 2002).

Worldwide experience has suggested that public knowledge of HIV/AIDS is the most fundamental weapon against the HIV/AIDS pandemic as long as a vaccine or cure has not been developed (UNAIDS China, 2002). The level of knowledge of the population is thus an important measure for understanding the magnitude of the challenges Governments and non-governmental organizations have to deal with (United Nations, 2002).

Previous reports show that 80 per cent of the Chinese population had heard of HIV/AIDS by the end of 2000, while a wide gap in the general awareness of HIV/AIDS existed between rural (74 per cent) and urban (95 per cent) populations (State Family Planning Commission, 2001; Chen and others, 2002). However, it is suggested that general awareness of HIV/AIDS does not reveal any specific knowledge and does not lead to behavioural change to reduce risk. Much HIV/AIDS prevention requires identification of specific forms of safe behaviour for behavioural change (UNAIDS China, 2002; Ingham, 1995).

To assess the prospects for adopting effective preventive behaviour change, it is crucial to ascertain current levels of specific knowledge about HIV/AIDS in China. A more recent report shows that, consistent with current literature on levels of knowledge about HIV/AIDS among various subpopulations, there were considerable sociodemographic variations in levels of knowledge about

HIV/AIDS transmission and prevention among the population in China (Holtzman and others, 2003; Wu and others, 1999). Nevertheless, sociodemographic variations in specific knowledge about HIV/AIDS transmission and prevention need to be further identified.

Epidemiological studies have shown that the only routes of HIV transmission are through sexual intercourse, transfusion of blood, intravenous injections using HIV-contaminated needles or syringes, and transmission from an infected mother to her foetus or infant (United Nations, 2002; WHO, 1990). To meet the targets and goals of HIV/AIDS prevention and control, there is a strong need to assess the current levels of specific knowledge about HIV/AIDS transmission and prevention by urban-rural residence and other key sociodemographic factors. This baseline information is also important for identifying target areas where future health education will need to be intensified for HIV/AIDS prevention and control.

Based on previous research, the present study is aimed at assessing the sociodemographic factors related to specific knowledge about HIV/AIDS transmission and prevention. The factors that have been identified as determinants of HIV/AIDS knowledge in other studies include urban-rural residence, sex, age, marital status, educational achievement, occupation, exposure to media and perceived presence of neighbourhood risks (Holtzman and others, 2003; Brown, 2002; UNAIDS China, 2002; United Nations, 2002; Wang and others, 2000; Wu and others, 1999; Balk and others, 1999; Ingham, 1995).

Data and method

The authors use data from the cross-sectional Baseline Survey for HIV/AIDS Prevention conducted by China's State Family Planning Commission in December 2000. The survey interviewed 7,053 individuals aged 15-49 in two urban areas and five rural counties selected from seven provinces in China. Respondents were drawn from a multistage random sample of the population in urban and rural areas with varying levels of economic development and seriousness of the HIV/AIDS problem (State Family Planning Commission, 2002). The survey was funded by the United Nations Children's Fund (UNICEF), the Ford Foundation and the Joint United Nations Programme on HIV/AIDS (UNAIDS). It was expected to provide baseline information on AIDS knowledge, attitudes and practice in order to develop further action plans (State Family Planning Commission, 2002; Chen and others, 2002).

In the survey questionnaire, the section on knowledge of HIV/AIDS prevention starts with a general question: Have you ever heard of [HIV/]AIDS? It is to be noted that HIV infection and AIDS were not distinguished in the Chinese questionnaire. Respondents who answered "yes" to the question were further asked about their knowledge of the routes of transmission and ways of prevention. Respondents who had not heard of AIDS, and thus were not asked about their knowledge of transmission and prevention, were classified as not having correct knowledge of HIV/AIDS.

The dependent variables in this study are (a) whether the respondents gave a correct answer concerning HIV/AIDS routes of transmission and (b) whether the respondents gave a correct answer concerning ways of prevention. Respondents who identified "blood transfusion", "sharing needles among drug users", "foetus or baby of HIV-positive mother", or "sexual intercourse" to the question "How is HIV/AIDS transmitted?" were classified as having correct knowledge on HIV/AIDS transmission. Respondents who identified "use condoms correctly", "avoid unsafe blood transfusion" and "use disposable or sterilized needles" to the question "How can AIDS be prevented?" were classified as having correct knowledge of HIV/AIDS prevention. In constructing the dependent variables, responses of "don't know" or "no answer" were treated as having incorrect knowledge. Persons who did not respond were excluded from the analysis.

Near the end of the survey, all respondents (regardless of their answer to the screening question on HIV/AIDS knowledge) were asked whether they agreed or disagreed with some statements about condoms, the last one being: Correct use of condoms can prevent AIDS. Respondents who answered "agree" with the statement were classified as having correct knowledge of HIV/AIDS prevention and those who answered "disagree" or "don't know" were grouped as not having correct knowledge.

Multivariate logistic regression was used to estimate the net effects of a number of determinants on the correct knowledge of HIV/AIDS. The dependent variables (or outcome variables) included knowledge about HIV/AIDS routes of transmission through blood transfusion, sharing needles, mother-to-foetus and sexual intercourse; and ways of prevention through avoidance of unsafe blood transfusion, use of disposable or sterilized needles and use of condoms. While knowledge about the use of condoms as a way of HIV/AIDS prevention was asked more than once in the survey, only the multivariate result for the response to the latter question is reported owing to limited space. All the dependent variables had a value 1 for having correct knowledge and 0 for not having correct knowledge.

The independent variables include place of residence (rural, urban), sex, age (15-24, 25-34, 35-44 and 45-49), marital status (currently married, currently not married), education (primary school or none, middle school, high school, senior high school, technical college or university), occupation (farmers, other farm workers, non-farm blue-collar workers, white-collar workers including students, and unemployed or others), media exposure (sometimes/never, often) and perceived presence of HIV/AIDS-related risk in the neighbourhood (yes, no).

Media exposure was based on information about how often the respondents watched television, listened to the radio, read the newspaper and read magazines. Each answer of "never" was scored as value 0, "occasionally" was scored as 1 and "often" as 2. Scores of all answers were added and then grouped into 3 categories based on one standard deviation of the average total score: 0-1 for low level of media exposure, 2-5 for medium exposure and 6-8 for high exposure.

Perceived presence of HIV/AIDS-related risk in the neighbourhood was defined as a dichotomous variable based on the following questions: To your knowledge, are there prostitutes in your neighbourhood? Are there people paying for sex in your neighbourhood? Are there people using illegal drugs in your neighbourhood? Are there people selling blood in your neighbourhood? Any response of "very common" or "somewhat" was defined as perceived presence of neighbourhood risks; a response of "none" was defined as non-presence of neighbourhood risks. Respondents who did not answer were excluded from the analysis.

Limitation

The data used in this study are from a mixture of communities from five counties and two urban districts over seven provinces in China. The sample was expected to provide results that were representative of the total population of China (State Family Planning Commission, 2002). However, owing to sampling variations with limited geographic coverage of a very large and heterogeneous population, caution should be exercised in generalizing the results.

Results

Sample characteristics

Of the total of 7,053 adults aged 15-49 interviewed in 2002, about 52 per cent are males and about 48 per cent are females (table 1). The majority of respondents are rural residents (72 per cent), aged 25-44 (73 per cent), currently married (84.2 per cent), farmers (54 per cent), have some middle school or senior high school education (62 per cent) and have been exposed to mass media at a medium level (65 per cent). With regard to neighbourhood risk problems such as prostitution, paying for sex, drug use, or illegal blood selling, 34 per cent of the respondents perceived the presence of such risks.

Basic knowledge of HIV/AIDS transmission

Table 2 shows the urban-rural differences in the proportion of persons who had correct knowledge about HIV/AIDS transmission. Among selected routes of transmission, the most frequently mentioned route was sexual intercourse: 71 per cent in the urban and 42 per cent in the rural population. However, knowledge of HIV/AIDS transmission through blood transfusion, sharing needles among drug users and mother-to-foetus was low among the rural population (table 2). Except for knowledge about sexual intercourse as a route of transmission, increasing the knowledge about the HIV/AIDS transmission to 40 per cent of the rural population by the end of 2002 appears to be a big challenge.

Table 1. Sample characteristics and distribution of persons aged 15 to 49, China, 2000

Selected characteristics	Sample size	Percentage
Total	7,053	100.0
Residence		
Urban	2,000	28.4
Rural	5,053	71.6
Sex		
Men	3,702	52.5
Women	3,351	47.5
Age		
15-24	944	13.4
25-34	2,496	35.4
35-44	2,659	37.7
45-49	954	13.5
Marital status		
Currently married	5,941	84.2
Currently not married	1,112	15.8
Education		
Primary or less	1,971	27.9
Middle school	3,155	44.7
Senior high school	1,238	17.6
College or higher	688	9.8
Missing	1	0.0
Occupation		
Farmer	3,789	53.7
Other farm worker	1,119	15.9
Urban worker	591	8.4
White collar/students	781	11.1
Unemployed and others	773	11.0
Media exposure		
Low	1,225	17.4
Medium	4,578	64.9
High	1,249	17.7
Missing	1	0.0
Presence of neighbourhood risks		
None	4,619	65.5
Existing	2,405	34.1
Missing	29	0.4

Source: China's HIV/AIDS knowledge survey, 2000.

Table 2. Percentage of people aged 15 to 49 with correct knowledge about routes of HIV/AIDS transmission by place of residence, China, 2000

Routes of transmission	Urban	Rural	Total
Blood transfusion	56.6	25.9*	34.6
Sharing needles	35.1	9.6*	16.8
Mother-to-foetus	25.2	7.0*	13.0
Sexual intercourse	71.2	41.9*	50.2

Source: China's HIV/AIDS knowledge survey, 2000.

* Urban-rural difference is statistically significant at $p<0.05$

Table 3 shows the multiple logistic regression model of factors related to correct knowledge about routes of HIV/AIDS transmission. It is important to note that the large urban-rural differential in knowledge of HIV/AIDS diminished after taking the effects of other sociodemographic factors into account. For example, before taking into account other factors, the estimated odds of having correct knowledge about HIV/AIDS transmission through blood transfusion, needle sharing, and mother-to-foetus transmission for the urban population were three to five times those for the rural population (data not shown). However, after adjusting for all other selected sociodemographic factors in the multiple logistic regression model, the corresponding odds ratios were reduced to 2.4 or smaller. Furthermore, the urban/rural differences in knowledge about sexual intercourse were not significant at all after taking into account the effects of other factors (table 3).

Among all the sociodemographic factors that are significantly associated with knowledge of HIV/AIDS, the effects of the respondents' schooling, media exposure and perceived risk in neighbourhood appear to be the strongest. For example, the adjusted odds of having correct knowledge about AIDS transmission for those with the highest level of schooling were three to five times as high as those with the lowest level of education. In addition, the adjusted odds of having accurate knowledge about AIDS routes for respondents with high media exposure were about two to five times those for respondents with low media exposure (table 3).

Table 3 also shows that the adjusted odds of knowing about sexual intercourse as a route of AIDS transmission were significantly higher for married persons than for unmarried persons. Youth 15-24 years of age tended to have lower adjusted odds of knowing about sexual intercourse as a route of AIDS transmission than others. As unmarried persons and youth are more vulnerable to uncommitted sexual relationships than married and older persons, the significant differences in knowledge about sexual intercourse as a route of HIV/AIDS transmission by marital status and age are noteworthy.

Table 3. Odds ratios, estimated by multiple logistic regression, of having correct knowledge about HIV/AIDS routes of transmission, by selected characteristics, persons aged 15 to 49, China, 2000

Characteristics	Blood transfusion	Sharing needles	Mother-to-foetus	Sexual intercourse
Residence				
Urban	1.38*	2.32*	1.85*	1.00
Rural [a]	1.00	1.00	1.00	1.00
Sex				
Men	1.19*	1.51*	1.06	1.13*
Women [a]	1.00	1.00	1.00	1.00
Age				
15-24 [a]	1.00	1.00	1.00	1.00
25-34	1.03	1.00	1.07	1.43*
35-44	0.71*	0.56*	0.58*	1.25*
45-49	0.68*	0.53*	0.42*	1.19
Marital status				
Currently married	1.11	0.96	1.21	1.48*
Currently not married [a]	1.00	1.00	1.00	1.00
Education				
Primary or less [a]	1.00	1.00	1.00	1.00
Middle school	1.80*	1.29*	1.64*	2.06*
Senior high school	2.91*	1.87*	2.36*	2.61*
College or higher	5.38*	3.18*	5.07*	5.08*
Occupation				
Farmer [a]	1.00	1.00	1.00	1.00
Other farm worker	1.16	1.61*	1.11	1.50*
Urban worker	1.95*	2.14*	1.91*	1.98*
White collar/students	1.90*	1.69*	1.89*	2.07*
Unemployed and others	1.20	1.54*	1.69*	2.05*
Media exposure				
Low [a]	1.00	1.00	1.00	1.00
Medium	1.56*	1.72*	1.65*	2.50*
High	2.55*	2.16*	2.36*	5.16*
Presence of neighbourhood risks				
No [a]	1.00	1.00	1.00	1.00
Yes	1.80*	2.12*	2.31*	1.95*

Source: China's HIV/AIDS knowledge survey, 2000.
[a] Reference group.
* Significantly different from the reference group at $p<0.05$.

Knowledge of HIV/AIDS prevention

While specific knowledge about HIV/AIDS transmission had not reached the vast majority of the people, even fewer knew about how to prevent it. For example, the unadjusted proportions of the rural population who mentioned avoidance of unsafe blood transfusion, use of disposable/sterilized needles and correct use of condoms as means of preventing HIV/AIDS were only 9 per cent, 6 per cent, and 9 per cent, respectively (table 4). Increasing the level of knowledge of HIV/AIDS prevention to 40 per cent of the rural population by the year of 2002 appears to be an enormous challenge.

Table 4. Percentage of people aged 15 to 49 with correct knowledge about ways of HIV/AIDS prevention, by place of residence, China, 2000

Ways of prevention	Urban	Rural	Total
Avoid unsafe blood transfusion	33.9	8.9*	16.0
Use disposable/sterilized needles	26.7	5.9*	11.8
Use condoms correctly (1)	27.7	8.8*	14.1
Use condoms correctly (2)	61.1	39.7*	45.8

Source: China's AIDS knowledge survey, 2000.

* Urban-rural difference is statistically significant at $p<0.05$.

(1) Response to question asked earlier during the interview.

(2) Response to question asked at the end of the interview.

By contrast, when respondents were asked near the end of the survey whether they agreed or disagreed with the statement that correct use of condoms can prevent AIDS the proportion giving the correct response went up to 40 per cent for the rural population and 61 per cent for the urban population (table 4). The increased level of knowledge is an interesting phenomenon. Such an increase in demonstrating correct knowledge could be partially related to the survey question format effect or survey learning effect (Fowler, 1988; De Bruin and Fischhoff, 2000). Nevertheless, it is evident that people could acquire correct knowledge about HIV/AIDS easily through increased publicity.

Multivariate logistic regression results show that education has a major effect on having correct knowledge about AIDS prevention independent of other variables. For example, the odds of knowing about the correct use of condoms, avoiding unsafe blood transfusion and using disposable or sterilized needles for persons with the highest level of education were three-six times as high as those with the lowest level of education (table 5). In addition, the positive relationship between media exposure and the knowledge about AIDS prevention persists even after controlling for all other selected factors.

Table 5. Odds ratios, estimated by multiple logistic regression, of having correct knowledge about HIV/AIDS prevention, by selected characteristics, persons aged 15 to 49, China, 2000

Characteristics	Avoid unsafe blood transfusion	Use disposable or sterilized needles	Use condoms correctly
Residence			
Urban	2.21*	2.53*	0.97
Rural [a]	1.00	1.00	1.00
Sex			
Men	1.26*	1.23*	1.14*
Women [a]	1.00	1.00	1.00
Age			
15-24 [a]	1.00	1.00	1.00
25-34	1.06	0.90	1.48*
35-44	0.68*	0.51*	1.27*
45-49	0.53*	0.46*	1.28*
Marital status			
Currently married	1.10	1.10	2.24*
Currently not married [a]	1.00	1.00	1.00
Education			
Primary or less [a]	1.00	1.00	1.00
Middle school	1.67*	1.88*	1.82*
Senior high school	2.64*	2.36*	1.75*
College or higher	5.85*	5.28*	3.48*
Occupation			
Farmer [a]	1.00	1.00	1.00
Other farm worker	1.04	0.87	1.42*
Urban worker	1.63*	1.81*	2.17*
White collar/students	1.36*	1.36	1.94*
Unemployed and others	1.06	1.19	1.60*
Media exposure			
Low [a]	1.00	1.00	1.00
Medium	2.35*	1.81*	1.63*
High	3.64*	2.23*	3.95*
Presence of neighbourhood risks			
No [a]	1.00	1.00	1.00
Yes	2.05*	2.37*	1.09

Source: China's HIV/AIDS knowledge survey, 2000.

[a] Reference group.

* Significantly different from the reference group at $p < 0.05$.

It is noteworthy that when other factors were taken into account, the odds ratios of knowing about condom use as a preventive method were significantly higher among married persons than among unmarried persons (table 5). Further, after controlling for the effects of marital status and other factors, young adults (aged 15 to 24) were the least likely to agree that condom use could prevent AIDS. The statically significant effects of marital status and age on the knowledge of condom use as a way of HIV/AIDS prevention suggest that unmarried and young adults had less information about condoms than married or older persons. This is not surprising because in China information on contraceptives is disseminated mainly to married couples.

Discussion

In summary, the results of the survey show wide differences in specific knowledge about HIV/AIDS between rural and urban areas. The rural population was less knowledgeable about HIV/AIDS transmission through blood transfusion, sharing needles and mother-to-foetus routes, and ways of prevention by correct use of condoms and disposable or sterilized needles, as well as by avoiding blood transfusion. To reduce the risk of HIV/AIDS spreading in the future to the general population, there is a strong need to provide full and specific knowledge to the general public, especially the rural population.

The results show that the wide urban-rural gaps in knowledge about HIV/AIDS diminished when sociodemographic factors, especially education, occupation, media exposure and the presence of neighbourhood risks, were taken into account. Given the wide disparities in knowledge about HIV/AIDS within China and the large population with disadvantaged sociodemographic characteristics, it is important to have strategic approaches that tailor health education programmes specifically to target those with low education and those in farming occupations in rural areas. Some in these population groups are more vulnerable to risk behaviours, such as having unsafe blood transfusions, intravenous drug use and unprotected high-risk sexual behaviour.

Media exposure has a statistically significant positive influence on correct knowledge of AIDS transmission and prevention, net of educational and occupational effects. This indicates that diffusion of knowledge on AIDS prevention could be successful with effective and efficient mass media coverage, given the existing infrastructure for long-term structural improvement in socio-economic status of the population. Sound health education programmes through television, radio, newspapers and magazines should be made more accessible to the people with little education in rural areas. In addition, the family planning network could also be utilized to facilitate the access to health education programmes through existing reproductive health programmes.

Last but not least, the lesser knowledge about HIV/AIDS transmission through sexual intercourse and about prevention by condom use among unmarried

Chinese youth is especially worrisome. HIV/AIDS has spread rapidly among high-risk populations in China. In the light of the fact that unmarried and young adults are potentially most vulnerable to HIV/AIDS infection through unprotected sex (UNAIDS, 1999; 2002a; Population Council and UNFPA, 2002; Balk and others, 1999), there is also a need to expand efforts to inform the public, especially unmarried and young adults, about safe sex with the use of condoms in order to prevent the spread of HIV/AIDS.

The goal of promoting basic knowledge about HIV/AIDS to 40 per cent of the rural population and 70 per cent of the urban population has probably been accomplished by now. However, the observed wide sociodemographic disparities in knowledge about HIV/AIDS within the population indicate that the level of HIV/AIDS knowledge might be much lower among some vulnerable populations: women, youth, unmarried persons and those with low levels of education and media exposure. Preventing potential HIV/AIDS outbreaks calls for a broader and faster dissemination of AIDS-prevention knowledge to the total population (UNAIDS China, 2002). The lack of knowledge needs to be overcome by extensive publicity, especially by targeting those who are in a disadvantaged situation concerning access to sources of information.

Increasing HIV/AIDS knowledge during the early stage of the epidemic is seen as one of the most cost-effective measures for HIV/AIDS prevention (UNAIDS China, 2002). Currently, the prevalence of HIV/AIDS is low in China, but a rapid increase is projected: a total of 10 million Chinese might acquire HIV by the end of this decade if effective prevention programmes do not take place (UNAIDS and WHO, 2002). However, spreading knowledge to the majority of the population in a short time is by no means an easy task without strong support from all levels of the Government in China. The spread of knowledge also needs innovative and carefully-designed education programmes to address a new set of sensitive topics in public. In addition, it needs sufficient funding resources and manpower to advocate and implement the campaigns. To monitor and evaluate any further progress towards desired targets and goals for reducing and stopping the spread of the AIDS epidemic, repeated high-quality sample surveys on changes in knowledge and risk behaviours at regular time intervals may become an indispensable tool (Cleland, Ferry and Carael, 1995).

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Knowledge and Beliefs about HIV/AIDS among Young People in Urban Nepal

Among young people in urban Nepal, females and married individuals are disadvantaged in terms of knowledge of HIV/AIDS and other sexually transmitted infections and preventive measures relative to their married and unmarried counterparts.

By Shailes Neupane, Douglas Nichols and Shyam Thapa*

Until recently, little information has been available on sexually transmitted infections (STIs) in the Nepalese population. Prior to the recognition of HIV/AIDS as a national health problem in the mid-1990s, health authorities in Nepal paid little attention to STIs. Few hospitals or clinics collected statistical information on cases or treatment[1].

A 1993 survey by the World Health Organization found STIs to be more prevalent in urban than in rural areas and that those seeking treatment — primarily in the private sector — were mostly males and aged between 15 and 25. Since then,

* Shailes Neupane, Executive Director, Valley Research Group, Lalitpur, Nepal; Douglas Nichols, Consultant, Family Health International, Research Triangle Park, North Carolina, United States of America; Shyam Thapa, Senior Scientist, Family Health International, Arlington, Virginia, United States of America.

various investigations have suggested incidence rates ranging from 6 to more than 100 per thousand adults. Serologic testing of blood donors and pregnant women has shown syphilis seroprevalence to be between 1 and 2 per cent nationally. Other STIs reported include gonorrhea, chancroid and genital herpes.

AIDS was first detected in Nepal in 1988. As of October 2001, 2,097 HIV-positive cases (1,508 males and 589 females) had been reported to the National Centre for AIDS and STD Control (NCASC) at Kathmandu. Most of the infected individuals (56 per cent of all cases) were in the age group 20–29 and were likely to have been infected as a result of heterosexual relations. Sentinel surveillance has been sporadically in place since 1991. HIV prevalence was found to be 1 per cent among prostitutes in the period 1991–1992, and 0.2 per cent among women seen at antenatal clinics in 1996. NCASC estimated a total of 15,000 HIV-infected individuals in Nepal as of 1999 and projected that the annual death toll from AIDS would reach 1,000 the following year.

The first baseline knowledge, attitudes and practice (KAP) survey on STI/AIDS in Nepal was conducted in 1993 in Nuwakot district. Interviewing "clusters" of respondents, the KAP survey found their knowledge of HIV/AIDS to be relatively low (24 per cent), but higher than for STIs in general (15 per cent). Not surprisingly, those with higher educational attainment were the most likely to be aware of STIs and HIV/AIDS while illiterate respondents had the least knowledge. Overall, only 13 per cent knew about any of the signs or symptoms of STIs and less than 10 per cent knew about any measures to prevent or reduce the likelihood of their transmission.

More recent investigations in Pokhara and Nepalganj, using anonymous self-administered questionnaires, have found a higher level of HIV/AIDS knowledge — as high as 90 per cent among higher-educated males — but persistent gender and educational differentials. An ethnographic study in 1996, conducted in several areas, suggested a high awareness of syphilis, gonorrhea and HIV/AIDS, and the fact that most respondents thought that HIV was spread by sex with multiple partners. There was consensus that better health education and reduced pre- and extramarital sexual activity were the most effective preventive measures. Few respondents mentioned condom use as an effective means of preventing the spread of HIV.

The HIV/AIDS situation in Nepal is worrying and worsening. Nepal has progressed from being a low-prevalence, low-risk population to one with a "concentrated" epidemic in the early 2000s (UNICEF, undated). For several years, HIV/AIDS has been concentrated in certain high-risk populations such as injecting drug users, commercial sex workers and truck drivers. In those populations, the pace of the epidemic's growth has recently accelerated. For example, in the capital city of Kathmandu, HIV infection among injecting drug users remained negligible during the early 1990s, but by 1997, nearly half of the users were infected (UNAIDS, 2002). Furthermore, in recent years, the epidemic has been found to be spreading among traditionally lower-risk populations, such as pregnant women.

The number of persons currently infected with HIV/AIDS is estimated at 58,000 (UNAIDS, 2002). The trafficking of girls (most of whom end up in brothels in Indian cities) and the seasonal out-migration of males to India (the rate in some districts is known to be as high as two thirds of the male population for four or five months annually) are generally thought to be two of the major factors contributing to the rise in infection rates. Owing to the potential for rapid spread of the epidemic to the general population, it is necessary to intensify urgently the efforts to promote preventive measures and behavioural change throughout Nepal's population, particularly among young adults.

This study focuses on the young population for several reasons. First, both the incidence and the prevalence of STIs are higher among young people than the general population. Second, there is a paucity of comprehensive age-cohort data and marital-specific cohort data for Nepalese under the age of 25. Third, for economic as well as social and health reasons, the public and private sectors in Nepal increasingly recognize the need to protect the health of the country's next generation of adults (Thapa and others, 2001).

Data and methods

The data for the analysis are from the Nepal Adolescent and Young Adult (NAYA) Survey, conducted in 2000 in both urban and rural areas. The NAYA Survey oversampled the urban population to allow reliable estimates based on the urban adolescent and young adult population (Bastola, 2000). The analysis presented here focuses on the urban sample. The survey's sampling universe included the five largest urban areas — Kathmandu, Lalitpur, Pokhara, Biratnagar and Birgunj — which together accounted for approximately 50 per cent of the country's urban population as of the 1991 census. Respondents aged 14 to 22 years were selected by means of a stratified, two-stage sampling design with probability proportional to the estimated number of dwellings in the enumeration area.

Fifty-nine persons (11 supervisors and 48 interviewers) were assigned to work in the field for the urban component of the survey. Of them, 31 were men and 28 were women. Most of the survey staff were students having an average of 14 years of schooling. More than two thirds had spent their childhood in rural areas; 44 per cent were married.

A total of 18,311 houses were visited in all of the urban sample blocks. The houses contained 24,972 households (defined as household members who shared the same kitchen) or about 1.4 households per house visited. Among the households surveyed, 10,298 had eligible members — that is, males and females aged 14 to 22 who had spent the previous night in the house. From this number, a total of 3,053 eligible respondents in 2,000 households were selected for the interviews. Further details on sampling are given in Thapa, Dhital and Neupane (2002).

Ninety-six per cent of the selected households were successfully interviewed. A total of 2,824 respondents (92.5 per cent) were successfully interviewed in the five urban areas. All the results in this analysis are weighted

(Bastola, 2000). The weighted samples included in 988 single females, 451 married females, 1,272 single males and 113 married males. Given the small sample size for married males, the results for this subgroup should be interpreted with caution.

The overall non-response rate (including incomplete interviews) was 7.5 per cent (Thapa, Dhital and Neupane, 2002). Of the 229 non-response cases, 42 per cent were not interviewed because they were not at home (despite up to three attempts by interviewers to contact them), 29 per cent refused to participate in the interview, 13 per cent had their interviews terminated primarily because of interference by elders or other family members and 17 per cent could not be interviewed for various other reasons.

This paper is based on analysis of the data collected in the NAYA Survey's STIs and HIV/AIDS survey module (Family Health International and Valley Research Group, 2000), which examined respondents' knowledge, attitudes and practices related to sexually transmitted diseases. Given the sensitive nature of some of the questions in that module, it is likely that responses to some of the questions were not entirely candid (Thapa, Dhital and Neupane, 2002). Because of the very small number of persons reporting personal experience with an STI, the present report does not address incidence or prevalence. Instead, it focuses on awareness of STIs, knowledge of signs and symptoms, modes of transmission, preventive measures treatment, and sources of information. The main focus of the analysis is HIV/AIDS, although some data on two other types of STIs — syphilis and gonorrhea — are also included.

Results are disaggregated for four subgroups — single males and females and married males and females. This analysis, therefore, focuses on differentials by gender and marital status, factors that are increasingly known as important dimensions in health and development in general. An analysis based on the same survey data set also found that whether a young person is married or unmarried, male or female results in large differences in access and exposure to mass media in urban Nepal (Thapa and Mishra, 2003).

Results

Respondents were asked if they had ever heard of three specific types of sexually transmitted infections (STIs) or diseases — HIV/AIDS, syphilis and gonorrhea. The results are shown in table 1. Two main themes emerge from these data. First, HIV/AIDS is the most commonly known and gonorrhea is the least known.

Second, awareness varies considerably according to the marital status of females, though much less so among males. Of the four population groups, married females have the lowest level of awareness. For example, whereas over 95 per cent of males (single or married) and single females have heard of HIV/AIDS, only about two thirds of married females have done so. Married females have consistently lower awareness of other types of STIs as well. While awareness of all three types of STIs is generally very low among all four groups, it is the lowest (6 per cent) among married females.

Table 1. Percentages of youth (aged 14–22) having heard of different types of sexually transmitted infections, by sex and marital status: urban Nepal, 2000

Type of STI	Males		Females		Total
	Single	Married	Single	Married	
HIV/AIDS	98.0	96.5	96.0	68.4	92.6
Syphilis	52.1	48.7	44.0	33.7	46.2
Gonorrhea	22.2	15.9	25.0	10.2	21.0
Any one	*98.0*	*97.3*	*96.0*	*68.7*	*92.6*
All three	*19.2*	*11.5*	*20.4*	*6.4*	*17.3*
(N)	(1,272)	(113)	(988)	(451)	(2,824)

Table 2. Among youth (aged 14–22) aware of HIV/AIDS, percentages having knowledge of the principal modes of HIV/AIDS transmission: urban Nepal, 2000

Knowledge about transmission	Males		Females		Total
	Single	Married	Single	Married	
Having sexual intercourse with an infected person	87.3	80.8	90.1	85.3	87.8
Using non-sterile needles	60.5	41.1	72.4	45.9	62.3
Having sexual intercourse with a commercial sex worker	62.7	64.1	51.3	60.2	58.4
Receiving a blood transfusion	52.8	32.2	64.4	44.3	55.1
Having sexual intercourse with many partners	45.8	35.6	39.1	48.7	43.3
Any one of the above	*96.2*	*88.1*	*97.6*	*95.1*	*96.2*
All five of the above	*15.5*	*10.1*	*14.3*	*9.4*	*14.1*
Other[a]	41.1	33.9	31.0	21.0	34.8
Don't know	3.2	8.3	2.2	4.9	3.3
(N)	(1,247)	(109)	(948)	(308)	(2,613)

[a] Includes sharing a shaver/razor, infected pregnant mother to unborn child, infected mother to breastfed child, sexual intercourse without using a condom, sexual intercourse with same-sex partner, oral/anal sex, sharing clothing, kissing, using public toilets, sharing meals, insect bites, sharing drinking vessels, using drugs and abortion.

All those who had heard of HIV/AIDS were further asked how it could be transmitted. The results are presented in table 2. The most commonly cited mode of transmission was having sexual intercourse with an infected person. Between 81 and 90 per cent of the respondents in the four groups gave this response, with the percentages among married respondents being lower than those for unmarried respondents both male and female. The other two modes of transmission mentioned were use of non-sterile needles and having sexual contact with a sex worker. Married males and females had lower awareness than their counterparts with respect to use of needles. However, the level of awareness was about the same (except for single females) across the groups with regard to having sex with a sex worker as a mode of transmission. The percentage who were aware that having multiple sex partners is a significant risk factor was generally low (ranging from 36 per cent among married males to 49 per cent among married females). Overall, although the great majority of the young people indicated an awareness of at least one mode of transmission, only about one is six was aware of all five modes. Awareness was lower among married males and females than among their unmarried counterparts.

Nine out of 10 respondents knew that a person who appeared to be healthy could spread the virus that causes AIDS (table 3). Males and females had similar levels of knowledge in this regard, but single individuals were better informed than married persons. The remaining 10 per cent were nearly equally divided between having misinformation and not knowing whether it was possible to identify an infected person from his or her appearance.

Table 3. Among youth (aged 14–22) aware of HIV/AIDS, percentage distribution of opinions regarding the possibility that a person who looks healthy can transmit HIV: urban Nepal, 2000

Is it possible for a person who looks healthy to transmit HIV?	Males		Females		Total
	Single	Married	Single	Married	
Yes	89.5	81.7	92.6	84.7	89.7
No	5.3	8.3	3.1	4.2	4.5
Don't know	5.2	10.1	4.3	11.0	5.8
Total	100.0	100.0	100.0	100.0	100.0
(N)	(1,248)	(109)	(949)	(308)	(2,614)

Respondents were asked what measures could be taken to reduce or avoid the possibility of exposure to HIV/AIDS or any other type of STI. At least 70 per cent of the respondents, irrespective of their sex or marital status, stated that avoiding sex with a sex worker is a precautionary measure (table 4). Using a condom during sexual intercourse and having only one steady partner were almost as frequently cited. However, married males and females were considerably less likely to cite condom use than unmarried young males and females. Although the

percentage of respondents with knowledge about at least one of these measures was quite high, the percentage knowing all three measures was much lower.

Table 4. Among youth (aged 14–22) aware of STIs, percentages reporting knowledge of various precautionary measures against STIs: urban Nepal, 2000

Precautionary measure	Males		Females		Total
	Single	Married	Single	Married	
Avoid sex with commercial sex workers	71.0	72.6	71.8	69.8	71.2
Wear a condom during sexual intercourse	74.5	52.6	61.2	48.5	65.7
Have only one steady sex partner	68.7	52.7	62.8	63.0	65.2
Any one of the above	*90.7*	*81.8*	*91.6*	*89.4*	*90.5*
All three of the above	*46.1*	*34.2*	*27.5*	*24.6*	*36.3*
Other [a]	21.0	12.6	18.7	15.5	19.2
Don't know	7.8	14.8	5.7	9.7	7.5
(N)	(1,247)	(111)	(949)	(310)	(2,615)

[a] Includes abstention from sexual intercourse, having sex with only a clean and healthy partner, using antibiotics prior to sexual intercourse, avoiding sharing underwear, not having sex with a same-sex partner, not sharing needles/syringes, using sterilized syringes, avoiding infected-blood transfusions, not using public toilets, being informed about the disease and avoiding drug use.

A final question about respondents' knowledge of STIs (including HIV/AIDS) concerned how STIs could be treated. The vast majority (80 per cent or more) said they would see a doctor. The other main treatment measures mentioned were taking antibiotics or consulting a health worker. Responses to this question did not vary much by the respondents' sex or marital status and are not presented.

Respondents who had indicated their familiarity with HIV/AIDS were asked where they had learned about the disease. The results are shown in table 5. Television was the leading means of receiving information about HIV/AIDS — and probably other STIs as well — among urban young people. Over 90 per cent of single males and females had heard about HIV/AIDS from television, as had nearly 80 per cent of their married counterparts. Radio was the second most common source of information; single males were more likely to cite this source than the remaining three population subgroups. Print media (newspapers and magazines) were cited more by single males and than by married males and females. Friends were also an important source, but more so for males than for females.

Table 5. Among youth (aged 14–22) aware of HIV/AIDS, percentages reporting various sources of information about HIV/AIDS: urban Nepal, 2000

Source of information	Males		Females		Total
	Single	Married	Single	Married	
Television	92.6	77.6	94.1	78.8	90.9
Radio	79.5	68.1	71.2	69.9	74.8
Newspaper/magazine	56.2	38.9	45.8	24.3	47.9
Friend	51.7	54.2	23.6	28.4	38.9
School/teacher	45.0	11.0	42.6	8.8	38.4
Brochure/poster/leaflet	27.9	34.5	11.3	5.3	19.5
Neighbour	3.7	1.3	4.9	17.2	5.6
Spouse	na	3.7	na	30.7	3.8
(N)	(1,247)	(109)	(948)	(308)	(2,613)

na = not applicable.

Note: Sources, including an unspecified source, mentioned by less than 10 per cent of the respondents in all four subgroups are not shown.

Respondents with knowledge of HIV/AIDS were asked where they could receive testing for the disease. The overwhelming majority knew they could obtain AIDS testing at a government hospital. Other sources mentioned were public and private clinics.

All respondents, including those not familiar with STIs, were asked with whom they usually discussed their own health problems. Their responses, presented in table 6, show wide differences by sex and marital status. Single females discussed such problems with their mothers (55 per cent) or female friends (23 per cent), almost to the exclusion of all other persons. Married females, however, were most likely to talk about such matters with their spouse (79 per cent).

Half of the single males discussed their health problems with a male friend (50 per cent). Married males were likely to discuss their problems with their own spouse (51 per cent), followed by a male friend (28 per cent). Thus a same-sex friend was identified as an important part of the health information network for single and married males and for single females, but not for married females, who tend to rely largely on their husbands.

Table 6. Percentage distribution of responses to question about the person with whom respondents usually discussed their own health problems: urban Nepal, 2000

Person identified	Males		Females		Total
	Single	Married	Single	Married	
Mother	16.4	3.6	54.8	9.8	28.3
Male friend	49.8	27.7	1.0	0.0	23.9
Spouse	na	50.9	na	78.5	14.6
Female friend	2.4	0.9	23.3	3.3	9.8
Other family member	7.4	0.0	13.3	4.4	8.7
Father	12.3	8.0	1.2	0.0	6.3
Other [a]	11.7	8.9	6.4	4.0	8.4
Total	100.0	100.0	100.0	100.0	100.0
(N)	(1,273)	(113)	(988)	(450)	(2,824)

na = not applicable.

[a] Includes health practitioner, teachers, neighbour and the response "don't know".

That urban young people in Nepal are aware of HIV/AIDS is noted in table 7, which indicates that fully 70 per cent of the respondents stated that they had discussed HIV/AIDS with someone. Males and single respondents were more likely to have had discussions about HIV/AIDS than were females or married respondents. Males — both married and single — were most likely to have discussed this topic with a male friend; a comparatively low 24 per cent of married males said that they had discussed HIV/AIDS with their spouse. In contrast, three fourths of married females, had discussed HIV/AIDS with their husband. Females were more likely than males to have discussed this issue with a family member, and males were more likely than females to have had such discussions with a doctor or health worker.

It is to be noted that some of the observed differentials in the subgroups' awareness and precautionary measures could be associated with differences in their socio-economic characteristics, such as geographic locale, ethnicity, household living standard, age, education and work status (see Thapa and Mishra, 2003). To examine the net influence of these factors on awareness of STIs and precautionary measures, multivariate logistic regression analysis was performed separately for three outcome variables — heard of HIV/AIDS, gonorrhea and syphilis; heard of all five principal modes of transmission of HIV/AIDS; and heard of all three principle precautionary measures against STIs. (Definitions of these measures were discussed previously.) These dependent variables were used as dichotomous. Of the six independent variables examined, the two consistently and

significantly related factors were educational background and exposure to mass media. The net effects of these two factors (controlling for the effects of other factors) are given in table 8.

Table 7. Among youth (aged 14–22) aware of HIV/AIDS, percentages who ever discussed HIV/AIDS with others, and with whom they discussed this topic: urban Nepal, 2000

Description	Males		Females		Total
	Single	Married	Single	Married	
Ever discussed HIV/AIDS?					
Yes	76.4	69.7	65.0	58.8	69.9
No	23.6	30.3	35.0	41.2	30.1
(N)	(1,246)	(109)	(948)	(308)	(2,611)
Among those who ever discussed HIV/AIDS, person with whom they discussed topic					
Male friend	93.6	91.1	7.4	6.8	55.8
Female friend	9.2	9.3	82.4	55.1	38.4
Teacher	27.8	5.4	39.4	5.5	28.6
Other family member	10.0	6.6	30.6	28.2	18.8
Sibling	4.8	0	29.4	12.0	13.6
Doctor or health worker	11.8	13.1	5.8	4.6	9.2
Spouse	na	24.4	na	74.0	8.4
(N)	**(952)**	**(76)**	**(616)**	**(181)**	**(1,825)**

na = not applicable.

Note: Type of person with whom HIV/AIDS was discussed with, including an unspecified source, mentioned by less than 10 per cent of respondents in all four subgroups is not shown.

The results indicate that completing high school is strongly and significantly associated with the respondents having heard of the three types of STIs, having heard of all five principal modes of transmission of HIV/AIDS, and having heard of all three principle precautionary measures against STIs. Furthermore, reading a newspaper or magazine at least once a week also has a net influence on all three outcome measures. Exposure to television and radio has a positive influence on the odds of having heard of principal precautionary measures against STIs, although it does not have a significant effect on the other two outcome measures. The two factors — education and mass media exposure — independently influence the outcome measures.

Table 8. Relative odds ratios, based on logistic regression, of the influence of educational attainment and exposure to mass media net of selected background variables[a] on knowledge of STIs,the principal modes of transmission of HIV/AIDS, and the principal precautionary measures against STIs: urban Nepal, 2000

Variable	Heard of HIV/AIDS, gonorrhea, and syphilis	Heard of all five principal modes of transmission of HIV/AIDS[b]	Heard of all three principal precautionary measures against STIs[c]
Education			
None	1.005	ni	0.457*
Primary	1.0 (r)	1.0 (r)	1.0 (r)
Secondary	5.372***	1.417	1.093
High school or higher	10.138***	1.916**	2.360***
Exposure to mass media[d]			
Television	1.183	1.126	1.413**
Radio	1.167	1.031	1.336**
Newspaper/magazine	1.282*	1.695***	1.558***
(N)	**(2,824)**	**(2,613)**	**(2,615)**

* p<0.05, ** p<0.01, *** p<0.001.

ni = not included in the model because of insufficient number of cases.

(r) = reference category.

[a] The other control variables included in the modelling were sex and marital status, location, ethnicity, household living standard, age and current working status. Details on ethnicity and household living standard variables are described elsewhere (Thapa and Mishra, 2003).

[b] Having sexual intercourse with an infected person; using non-sterile needles, having sexual intercourse with a commercial sex worker, receiving,a blood transfusion and having sexual intercourse with many partners.

[c] Avoiding sex with commercial sex workers, using a condom during sexual intercourse and having only one steady sex partner.

[d] Listening to radio every day, or watching television at least once a week, or reading a newspaper/magazine at least once a week. reference group for each subgroup consists of those with no or irregular exposure.

Conclusion and implications

The analysis of data based on the young population of urban Nepal shows that awareness of HIV/AIDS is very high. This must be considered a success as dissemination of information about HIV/AIDS is a relatively new phenomenon in Nepal, advocated widely only in the previous decade. Awareness of other two types of sexually transmitted infections or diseases — syphilis and gonorrhea — is relatively lower than that for HIV/AIDS. This is most likely due to the fact that information about these conditions has not received attention to the extent that HIV/AIDS has in the media. Other reasons may be that some respondents still feel shy or uncomfortable to talk freely about them or that local terms that refer to these may vary (Thapa, Dhital and Neupane, 2002). The data also reveal that a large proportion of the respondents are aware of at least one of the modes of transmission of the infections. Awareness of all modes of transmission is, however, low.

The data show unequivocally that married young people are generally less knowledgeable about STIs, their modes of transmission and preventive measures than unmarried young people and within each marital status category, females are generally less informed than males. In some respects, the finding that unmarried young people are more knowledgeable than their married counterparts should be considered an encouraging sign because, to the extent that premarital sexual behaviour occurs among young people, they might be expected to adopt safer sex behaviour. By contrast, the fact that married young people are less knowledgeable is disturbing and presents its own set of challenges. Should the pattern of transmission of new HIV/AIDS infections shift from being predominantely from sex workers-to-husbands to husbands-to-wives, a shifting risk pattern that has been emerging in such other countries as Cambodia (NCHADS, 2003), young married persons might potentially be at higher risk in the absence of knowledge and information regarding safer sex practices.

The reasons for lower levels of awareness among married females may be related to several factors, both contextual and personal. It is likely that their familial socialization and time allocation is different from that of their unmarried counterparts. They may not get as much time as unmarried individuals to socialize with peers, watch television or read print materials. Even when they socialize, their peers are likely to resemble them in terms of exposure and knowledge. Their educational background is also likely to be different. In other words, married young people might represent a different group of people than their unmarried counterparts. It should also be noted that because of early marriage patterns, the proportion of married young women in Nepal is large (see Choe, Thapa and Mishra, 2004; Ministry of Health, 2002).

The data also reveal that friends are generally the primary source for information-seeking and -sharing regarding STIs. This is true especially for unmarried males and females. For married males and females, the spouse is the primary source, although friends are also important.

The above findings have three main policy and programmatic implications. First, efforts must be made to narrow the information gaps that exist between the sexes and people's marital status. Married females remain largely neglected. Efforts must, therefore, be made to reach married females (and their husbands as well). Current approaches to information and knowledge dissemination do not seem to be sufficiently gender- or marital status-sensitive. As mentioned previously, married males and females are likely to have different patterns of time use and socialization than unmarried young people. This calls for a better understanding of these constraints and situations and the interventions that are designed appropriately for the situation.

Second, given that spouses and same-sex friends are an important source of information on health issues, it is important to pay more attention to developing quality and effective communication and trust skills among friends and between spouses. Young people and their peers should have access to quality information. Current school- or higher education-based curricula do not include interpersonal communication skills as a prerequisite in the learning process. Perhaps there is a need to look closely into this or at least to offer training programmes on a continuous basis through curricula in both in-school or out-of-school settings. Doing so could produce long-lasting benefits that would extend beyond HIV/AIDS concerns.

Third, completion of secondary education and regular reading of print media were found to be important vehicles for knowledge dissemination and acquisition. In the long run, as the proportion of young persons attending secondary school increases, along with access to the print media, knowledge dissemination or acquisition would seem to be a lesser problem. In the foreseeable future, however, finding ways to reach those with less than schooling at the secondary level or those having no access to print materials remains a challenge. Both gender- and marital status-sensitive approaches need to be developed and tested to reach them, probably through a combination of alternative approaches — television, local clubs, workshops, non-formal education curricula, and other modes. The rural setting may present even more difficult challenges, although this is outside the scope of the present analysis. Reaching out to the most disadvantaged and neglected segments of the population is not an easy task, but it should form an integral part of a comprehensive strategy aimed at a healthier future for young people in Nepal.

Endnote

1. The information in this section is based largely on Shrestha, Burathoki and Mugrditchian (1998) unless otherwise noted.

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Gender, Health, Marriage and Mobility Difficulty among Older Adults in India

The population of older persons in India is rising significantly. As men and women live longer, there will be an increase in older persons with mobility difficulties. It is therefore necessary to assess the covariates of mobility difficulty in this population in order to effectively model interventions that will delay the onset of these functional limitations.

By Manisha Sengupta and Emily M. Agree*

Recent evidence from India suggests a growing prevalence of morbidity and poor health status along with significant increases in longevity in the elderly population (Alam, 2000). Yet, barring a few exceptions, most studies about the health and functional ability of older persons in India are based on impressionistic findings and rarely provide empirical evidence addressing the factors that are associated with morbidity and functional limitations.

* Manisha Sengupta, Postdoctoral Fellow in Demography of Ageing, Johns Hopkins University Bloomberg School of Public Health, Baltimore, Maryland, United States of America, e-mail: msengupt@jhsph.edu and Emily M. Agree, Associate Professor, John Hopkins University Bloomberg School of Public Health, United States, e-mail: eagree@jhsph.edu.

Using a large nationally representative sample, this paper documents the prevalence of mobility difficulty among older persons in India and examines the factors associated with such difficulty. In this research, the authors seek to enhance the understanding of mobility limitations among older persons in Western industrialized countries by addressing how different socio-economic, health and demographic variables are associated with mobility limitations in persons aged 60 years and over in India. With a rise in the size of the population of older persons and an increase in life expectancies at older ages, India is likely to experience a concomitant increase in the number of functionally limited elders. It is therefore necessary to examine the covariates of functional limitations, particularly mobility difficulty among older persons in India. This paper attempts to initiate such a dialogue.

Studies differ in their use of measures that gauge disability and functional limitations among elders, and consequently in their estimates of these difficulties. For instance, some studies have used chronic diseases to measure health and disability among the elderly, while others have focused on difficulty in performing activities of daily living (ADL) and instrumental activities of daily living, and yet others have measured difficulty in performing those activities that require at least some level of mobility. However, these studies clearly demonstrate that difficulty in physical functioning is more frequent with increasing age, among women and unmarried/divorced individuals (Fried, 2000; Leveille and others, 2000; Lillard and Waite, 1995). Furthermore, mobility difficulty is a common problem and lower body limitation is a persistent predictor of limits in capacity for daily life.

In India, there are variations in the gender differences in mortality and physical impairments between the northern and southern parts of the country (Bhatt, 1998; Sengupta and Agree, 2001). In previous research, those differences are largely attributed to differences in the status of women between the northern and the southern parts of the country. Considering the generally low status of women (Basu, 1992) in the northern and north-western states, it is likely that socio-economic marginalization through the life course makes older women in these states more vulnerable to ill-health than women in the southern states. For instance, using data from the National Family Health Survey from the states of Uttar Pradesh and Haryana in northern India and Kerala and Tamil Nadu in southern India, Sengupta and Agree (2001) found that northern women were more likely than northern men to report physical impairments of the eyes and limbs, while in southern India, there were no significant differences between men and women. In another study, Rajan, Mishra and Sarma (1999), using data from the southern states of Tamil Nadu, Kerala and Karnataka, found that women were less likely than men to report vision, hearing and walking difficulties.

There is evidence that in India as well as in other countries in South Asia, marriage and the presence of sons is associated with better survival as well as health outcomes (Rahman, 2000; Sengupta and Agree, 2001). However, the comparatively greater benefits of marriage experienced by women compared with

men may vary between countries and regions within countries, based on kinship and marriage systems. Such regional variations are evident in a recent study in India (Bhat, 1998): the southern states show a pattern of higher mortality disadvantage among widowers whereas the northern states show greater disadvantage for widows. Mari Bhat attributes this regional difference to the variation in the incidence of joint families (see Kolenda, 1987 for an explanation of family systems in India).

In a patriarchal society where gender roles are strictly followed, as in India, and where women do most of the housework and caregiving, coresidence with one's spouse may be more beneficial for men since women do most of the housekeeping and caregiving. Yet, Indian women may benefit more than their husbands from the presence of the spouse and sons in the household, mainly owing to their general dependence on men and the sociocultural security of having a spouse (for more discussion, see Lamb, 1999).

One of the consistent findings from previous studies is the positive association between socio-economic status and health, particularly physical functioning (Ross and Wu, 1996; Zimmer and Amornsirisimboon, 2001). Similarly, the association between chronic diseases such as arthritis, stroke, heart disease, hypertension, diabetes, pulmonary disease and cognitive impairment, and decreased functional capacity at older ages is well-established (Fried and others, 1994; Fried, 2000).

Although most of these studies on elderly persons' health and functional ability are limited to western societies, some consistent observations regarding correlates of disability and functional limitations have emerged. Using research findings from previous studies conducted almost exclusively in western industrialized countries and taking into consideration the sociocultural underpinnings of the Indian subcontinent, the following hypotheses are examined:

H1: Compared with older men, older women in India are more likely to report mobility difficulty.

H2: Marriage has a significant and positive association with mobility status. This association is stronger for older women.

H3: Each measure of health (chronic disease) is associated with mobility difficulty. The association between chronic disease and mobility difficulty varies by sex.

H4: Education is inversely associated with mobility difficulty.

H5: Compared with older persons who do not have sons, those who have sons are less likely to report mobility difficulty.

Data and methods

The data used for this study come from the forty-second Round of the National Sample Survey of India conducted in 1986-1987 by the National Sample Survey Organization (NSSO), Ministry of Planning and Programme Implementation, Government of India. The importance of this nationally-representative sample lies in its being the first survey conducted by NSSO to assess the nature and dimensions of socio-economic and health problems of persons aged 60 years and over. The data include a wide variety of information, including demographic and health status data as well as information on mobility restrictions. In addition to questions about socio-economic and demographic factors, this survey includes questions on disability and chronic diseases.

The dependent variable for this analysis is a three-category variable indicating whether the respondent was (a) physically immobile, (b) had some mobility difficulty, or (c) had no mobility difficulty. The questions that determine the extent of mobility restrictions are different from those used in surveys in the United States of America and are not aligned with the ADL or Nagi questions commonly used in Western surveys. Respondents were first asked if they were physically immobile. Responses were coded as either "yes" or "no". Each respondent who reported being mobile was subsequently asked whether he/she had any mobility restrictions. Respondents who stated that they had some mobility restrictions were asked to select a reason for their mobility difficulty. Response categories included "health", "financial", "loss of contact" and "others". Only those respondents who stated that their mobility restriction was related to health reasons were considered as having "mobility difficulty" for the purpose of this analysis. Respondents who stated that the reason for their mobility difficulty was not health-related were considered as having no mobility difficulty. As respondents were expected to provide one and the most important reason that led to that mobility difficulty, mobility difficulty among those individuals who may suffer some health-related mobility restrictions might have been underestimated for cases in which it was not the most important reason for their restricted mobility.

Another limitation of the data stems from the use of self-perceived measures of mobility difficulty. In addition to reflecting real difficulty, these self-perceived measures could be affected by the perceptions of difficulty. There is evidence from other studies that perceptions about illness and disability are positively associated with education and it is likely that in the present context, large differences in educational status between men and women may lead to differences in illness perceptions (Sengupta and Agree, 2001). Given the generally low levels of education in this population and particularly among women, the use of self-perceived measures of mobility difficulty are likely to cause an underestimation of mobility difficulty in the sample in general, and among women in particular.

Table 1. Characteristics of men and women aged 60 years and over, India National Sample Survey, 1986-1987

	Men (N = 34,864)		Women (N = 23,342)		Total (N=58,206)	
	N	Percentage	N	Percentage	N	Percentage
Mobility difficulty* **						
Immobile	1,683	4.8	1,673	7.2	3,356	5.8
Some difficulty	1,692	4.9	1,271	5.4	2,963	5.1
No difficulty	31,489	90.3	20,398	87.4	51,887	89.1
Age* (Mean)**		66.5		67.2		66.7
Marital status* **						
Currently married	32,516	93.3	7,902	33.9	40,418	69.4
Widowed/divorced/separated	2,348	6.7	15,440	66.1	17,788	30.6
Sons alive						
None	5,224	15.0	2,902	12.4	8,126	14.0
1-2	16,928	48.6	12,581	53.9	29,509	50.7
3 or more	12,712	36.5	7,859	33.7	20,571	35.3
Daughters alive* **						
None	6,721	19.3	4,881	20.9	11,602	19.9
1-2	17,784	51.0	12,092	51.8	29,876	51.3
3 or more	10,359	29.7	6,369	27.3	16,728	28.7
Health conditions						
Cough***	8,027	23.0	4,717	20.2	12,744	21.9
Problem with joints and limbs***	9,779	28.0	7,671	32.9	17,450	30.0
Urinary problems***	1,164	3.3	521	2.2	1,685	2.9
Hypertension*						
Yes	2,499	7.2	1,868	8.0	4,367	7.5
None	26,496	76.0	17,517	75.0	44,013	75.6
Don't know	5,869	16.8	3,957	17.0	9,826	16.9
Heart disease						
Yes	1,179	3.4	735	3.1	1,914	3.3
None	28,031	80.4	18,788	80.5	46,819	80.4
Don't know	5,654	16.2	3,819	16.4	9,473	16.3
Diabetes* **						
Yes	825	2.4	381	1.6	1,206	2.1
None	28,222	80.9	19,035	81.5	47,257	81.2
Don't know	5,817	16.7	3,926	16.8	9,743	16.7
Urban residence* **	15,046	43.2	8,296	35.5	23,342	40.1
Education* **						
Illiterate	22,472	64.5	19,010	81.4	41,482	71.3
Primary school	4,067	11.7	1,588	6.8	5,655	9.7
Middle school	6,176	17.7	2,145	9.2	8,321	14.3
High school	1,637	4.7	474	2.0	2,111	3.6
Graduate or higher	512	1.5	125	0.5	637	1.1

* $p<0.10$ *** $p< 0.01$

Table 1 presents selected characteristics of the respondents separately for men and women. While 5.8 per cent of older men and women reported being immobile, only 5.1 per cent reported having some mobility difficulty. This relatively low percentage of individuals who reported having mobility difficulty owing to health reasons likely indicates an underestimation of individuals who may have some health-related mobility difficulty, which may not have been the primary cause of their mobility restriction and was therefore not recorded in the survey. While 7.2 and 5.4 per cent of older women are immobile and have some mobility difficulty, respectively, fewer men are immobile (4.8 per cent) and have mobility difficulty (4.9 per cent). These gender differences in mobility difficulty are statistically significant.

Based on theoretical considerations and the review of previous research largely in developed countries, the authors selected a set of independent variables indicating health, demographic and socio-economic characteristics of the respondents. Age, sex and marital status were entered into the model to indicate the demographic characteristics of the respondents. The mean age of the sample was about 67 years. Out of the 58,206 respondents, about 60 per cent were men and 40 per cent women. Women were significantly less likely than men to be currently married. Over 65 per cent of older women in the sample were widows compared with only 6 per cent of older men. This higher rate of female widowhood can be largely explained by the age differences between marriage partners where women marry men who are significantly older than themselves (Gulati, 1993), and to a lesser extent to increasingly higher female life expectancies at older ages.

Among the independent variables, a series of diseases was used to indicate the general health of the respondents. These health variables include chronic cough, urinary disease, pain in joints and limbs, diabetes, blood pressure and heart disease. Respondents were asked if they suffered from each of these health problems and the responses were coded as “yes”, “no” and “don’t know”. Based on the responses in each of these categories of the disease variables, the variables indicating chronic cough, urinary disease, and pain in joints and limbs were recoded into dichotomies indicating the presence or absence of the condition. The heart disease, blood pressure and diabetes variables remained as three-category variables.

The disease questions asked in the survey were precisely worded to ascertain whether respondents had specific illnesses. However, the list of health problems included those that could be diagnosed without formal medical diagnosis (chronic cough, pain in joints and limbs and urinary problems) and those that needed formal diagnosis (hypertension, diabetes and heart disease). Considering that other studies in South Asia have found gender differences and a female disadvantage in the use of health facilities and doctor visits, women respondents in this survey were likely to underreport illnesses such as heart disease, diabetes and hypertension that require medical diagnosis.

The most common health problem reported by the particular group was pain in the joints and limbs (about 30 per cent of the sample). Considering that this

health condition is the closest to what may be termed as "arthritis" in surveys in the United States and other developed countries, it is not surprising that women were significantly more likely than men to report this condition. Nearly 22 per cent of the respondents reported suffering from chronic cough and more men than women suffered from this condition. This gender difference in chronic cough likely arises from the higher consumption of tobacco and subsequently from the higher incidence of lung disease, including tuberculosis, among men. Relatively fewer people reported having the other health conditions included in the survey. Interestingly, over 16 per cent of the respondents reported not knowing whether they suffered from diabetes, abnormal blood pressure and heart disease.

Socio-economic status was measured with respondents' level of education. Education was coded as a five-category variable indicating that the respondent was illiterate, had completed primary school, middle school or high school or had a graduate or higher degree. Over 70 per cent of the sample was illiterate and there were significant gender differences in educational attainment.

To assess the level of family support, the authors controlled for the respondents' surviving sons and daughters. Two separate variables were coded to indicate whether the respondent had no sons/daughters, one or two sons/daughters, or three or more sons/daughters. About 80 per cent of the respondents had at least one surviving daughter and over 86 per cent had at least one surviving son. As the availability of health services varies by area of residence, a dichotomous variable indicating rural or urban residence was included. Over 40 per cent of the respondents lived in urban areas.

A multinomial logistic regression was used to model the three-category mobility variable. Although the three-category dependent variable would seem to be a candidate for ordered logistic regression, the model did not meet the distribution necessary for an ordered logistic regression. The chi-square score for testing the proportional odds assumption was 113.1365 with 18 degrees of freedom, significant at 0.001, indicating that a proportional odds model was not appropriate for the data. Therefore, a multinomial logistic regression model was used, in which the order of the outcomes is not imposed on the data and effects are allowed to vary. The authors begin their analysis with a model with all control variables and proceed to show interactions in the following models.

Results

Table 2 shows the odds ratios (ORs) from multinomial logistic regression of mobility difficulty among persons 60 years and over. All the demographic variables have significant association with mobility difficulty. Age significantly enhances the odds of having some mobility difficulty as well as being immobile. Results indicate that older women are 1.19 times more likely than men to report severe mobility difficulty. However, there are no significant gender differences among persons who report some mobility difficulty.

Table 2. Odds ratios from multinomial logistic regression showing the likelihood of mobility difficulties among persons aged 60 years and over

	Severe mobility difficulty	Some mobility difficulty
Female	1.183 ***	1.041
Age	1.086 ***	1.062 ***
Marital status		
Widowed/divorced/separated		
Currently married	0.72 ***	0.882 **
Sons alive		
None		
1-2	0.902 *	0.825 ***
3 or more	0.835 ***	0.813 ***
Daughters alive		
None		
1-2	0.956	0.977
3 or more	0.923	0.978
Health conditions		
Cough	1.598 ***	1.66 ***
Problem with joints/limbs	2.28 ***	2.779 ***
Urinary problems	2.125 ***	2.111 ***
Hypertension		
No		
Yes	1.419 ***	1.494 ***
Don't know	0.871 *	1.208 **
Heart disease		
No		
Yes	1.684 ***	1.689 ***
Don't know	1.251 ***	1.029
Diabetes		
No		
Yes	1.351 ***	1.1
Don't know	1.177 **	0.877 *
Urban residence	0.963	0.869 ***
Education		
Illiterate		
Primary school	0.891 *	0.987
Middle school	0.849 ***	0.946
High school	0.823	0.696 ***
Graduate or higher	0.724	0.57 **
Log likelihood	-21,861.40	
N	**58,206**	

* p<0.10, ** p<0.05, *** p<0.01

According to the second hypothesis, marital status was expected to be significantly and negatively associated with mobility difficulty. The results from this analysis confirm the hypothesis. Being married significantly reduces the likelihood of reporting severe mobility difficulty (OR= 0.72; $p<0.01$) as well as the likelihood of reporting some mobility difficulty (OR= 0.88; $p<0.05$). However, there was no significant interaction between marital status, sex of respondent and mobility difficulty (not shown in table).

Among the disease variables, pain in the joints and limbs has the most significant association with mobility difficulty. Compared with persons who report no pain in the joints and limbs, persons who report such pain are 2.28 times more likely to report severe mobility difficulty and 2.78 times more likely to report some mobility difficulty. The results suggest that having any of these diseases is significantly associated with increased odds of having at least some mobility difficulty, therefore confirming the authors' third hypothesis. An interesting result with respect to heart disease, blood pressure and diabetes is that persons who do not know whether they have these diseases are also significantly more likely than those who do not have these diseases to report mobility difficulty. For instance, compared with persons who do not have heart disease, those who do not know whether they suffer from heart disease are 1.25 times more likely to report severe mobility difficulty. Similarly, compared with persons who do not have diabetes, persons who do not know whether they suffer from diabetes are 1.8 times more likely to report severe difficulty. Several interesting interactions between morbidity, mobility difficulty and gender were also observed. These findings are discussed in the following paragraphs.

There appears to be a positive, though not consistently significant association between educational achievement and mobility status. While education at the middle school level significantly reduces the odds of reporting severe mobility difficulty (OR=0.85; $p<0.01$), high school completion (OR=0.70; $p<0.01$) and a graduate or higher degree (OR=0.57; $p<0.05$) significantly reduces the odds of reporting some mobility difficulty.

Compared with those living in rural areas, older urbanites are significantly less likely to report some mobility difficulty (OR=0.87; $p<0.01$). With respect to the availability of family support, it appears that the number of sons is significantly associated with functional mobility. Confirming the expectations (H5), older persons who have one or two sons are significantly less likely to report some mobility difficulty compared with those who have no sons. However, the positive association between having sons and better mobility status is more pronounced when an individual has three or more sons. For instance, compared with those who have no sons, persons who have three or more sons are less likely to report some mobility difficulty (OR=0.81; $p<0.01$) as well as less likely to report having severe mobility difficulty or being immobile (OR=0.84; $p<0.01$). By contrast, having daughters is not significantly associated with mobility status.

To address possible gender interactions in the association between mobility status and chronic diseases, separate logistic regression models were used for each of the chronic disease variables. Gender interactions are not significant in the association between mobility status and chronic cough, pain in joints /limbs and urinary problems. Given that the association between chronic diseases (diabetes, heart disease and hypertension) and mobility difficulty showed interactions with the sex of the respondent, this statistical interaction term was decomposed to intercode the two independent, interactive variables and the multinomial logistic regression was recomputed (see table 3).

Table 3. Odds ratios from multinomial logistic regression showing the likelihood of mobility difficulties among persons aged 60 years and over

	Severe mobility difficulty	Some mobility difficulty
Men without diabetes	1.000	1.000
Men with diabetes	1.444 ***	1.140
Men who do not know if they have diabetes	1.229 ***	0.799
Women without diabetes	1.212 ***	1.002
Women with diabetes	1.473 **	1.003
Women who do not know if they have diabetes	1.365 ***	0.991
Men without hypertension	1.000	1.000
Men with hypertension	1.610 ***	1.616 ***
Men who do not know if they have hypertension	0.912	1.137
Women without hypertension	1.240 ***	1.030
Women with hypertension	1.540 ***	1.392 ***
Women who do not know if they have hypertension	1.028	1.346 ***
Men without heart disease	1.000	1.000
Men with heart disease	1.854 ***	1.920 ***
Men who do not know if they have heart disease	1.290 ***	0.968
Women without heart disease	1.211 ***	1.033
Women with heart disease	1.797 ***	1.414 ***
Women who do not know if they have heart disease	1.472 ***	1.150

** $p < 0.05$, *** $p < 0.01$
(controled for sociodemographic factors, not shown)

Table 3 shows the odds ratios from separate multinomial logistic regression models with gender interactions in the association between mobility status on the one hand and hypertension, diabetes and heart disease on the other. The control variables are not shown in table 3, as they do not vary significantly from the original model in table 2.

The results show that compared with men who do not report hypertension, men and women who report hypertension are 1.6 times and between 1.4 and 1.5 times, respectively, more likely to report either some mobility difficulty or severe mobility difficulty. However, women who do not have hypertension or who do not know whether they have hypertension are also more likely than men who do not have hypertension to report at least some mobility difficulty. For instance, women who do not have hypertension are 1.24 times more likely than the comparison group to report severe mobility difficulty. Similarly, women who do not know if they have hypertension are 1.35 times more likely than the comparison group to report mobility difficulty.

With respect to heart disease, the results show that both men and women who have heart disease are significantly more likely than men who do not have heart disease to report mobility difficulty. Men who have heart disease are almost two times more likely than men who do not have heart disease to report mobility difficulty. Furthermore, both men and women who do not know if they have heart disease are significantly more likely to report severe mobility difficulty. Compared with men who do not have heart disease, men and women who do not know whether they have heart disease are 1.3 and 1.5 times respectively more likely to report severe mobility difficulty. In addition, women who have no heart disease are 1.2 times more likely to report severe mobility difficulty than men without heart disease.

Discussion

The population of older persons in India is rising significantly. As men and women live longer, there will be an increase in older persons with mobility difficulties. It is therefore necessary to assess the covariates of mobility difficulty in this population in order to effectively model interventions that will delay the onset of these functional limitations. In this article, the authors explore the characteristics of individuals who report severe and moderate mobility difficulties. The measure of mobility difficulty, though not without limitations, is unique in its approach to address levels of mobility difficulty. Furthermore, in the absence of better ADL/Nagi measures of disability, the measures provide at least some proxy estimate of disability.

Results from this study confirm that women experience a disadvantage with respect to severe mobility restriction that can lead to immobility. The results also confirm previous research regarding the negative association between marriage and mobility limitation. However, the study finds no significant gender differences in the association between marital status and mobility status among older persons in India. Considering the level of son preference and the overwhelming cultural dependence on sons, especially at older ages, it is not surprising that having more sons is associated with no or fewer mobility restrictions. It is likely that with more sons in the household, older men and women

receive more support and have better access to health care, both of which are associated with higher mobility status.

The analysis suggests that the association between mobility and chronic diseases in the elderly is substantial. The cross-sectional data do not allow the identification of causal linkages, but the present findings suggest that these chronic conditions, including diabetes, arthritis, heart disease, hypertension and chronic cough, can be risk factors associated with mobility difficulty. Furthermore, both men and women who do not know if they have diabetes, heart disease or hypertension also report more mobility-related difficulties compared with those who do not have these diseases. This association is stronger in the case of older women. Although it is possible that mobility difficulty in some men and women may have occurred before the onset of these diseases and are associated with accidents or early impairments, the finding that non-diagnosis of chronic diseases is associated with mobility difficulty more likely reflects the lack of health care utilization among older persons in general and older women in particular.

Furthermore, what is very interesting among the present findings is that older women in the sample consistently reported severe mobility difficulty or being immobile even in the absence of certain chronic conditions such as diabetes and heart disease. This could mean that women are overreporting their mobility difficulties or that they suffer other health conditions (not measured in this survey) that are associated with severe mobility difficulty. It would be interesting in the future to assess a wider variety of chronic conditions and examine their association with mobility difficulty.

This study has important policy implications. First, these results, though not causal, suggest the need for a prevention strategy that will advocate steps to deter and timely treat chronic conditions that are associated with mobility difficulty. These strategies may include lifestyle changes during middle age in order to decrease subsequently the incidence or at least severity of chronic diseases that are associated with ageing on one hand and mobility restrictions on the other. Second, these strategies may underscore the need for timely diagnosis of chronic diseases and identification of risk factors, which may then be treated in order to halt, or at least decrease, their negative impact on functional decline. There are several major difficulties inherent in the immediate adoption of these recommendations, especially in a country where the population is still largely young and the focus of public health administrators is directed to the younger generations. Yet, these findings provide guidelines and outline strategies that will be necessary to deal cost-effectively with health problems among the growing number of elders, many of whom may suffer from mobility limitations.

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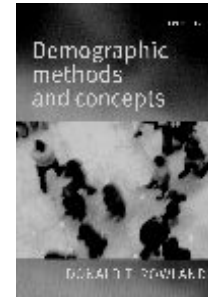
Demographic Methods and Concepts



By Donald T. Rowland

Oxford University Press
Oxford 2003, 546 pages + CD-ROM

Reviewed by L. Ruzicka

This new textbook of demography combines a discussion of methods of analysis of demographic data with explanation of demographic concepts and research issues.

It represents a new, exciting approach in at least two respects: in the use of clear, non-technical language and the assumption that the reader has no more than an elementary knowledge of mathematics. (Appendix A explains the basic mathematical concepts used in the book.) The second important innovation is the recognition of the fact that in most instances the student or researcher would be using a computer.

A CD-ROM which accompanies the volume contains Microsoft Excel spreadsheet modules that provide illustrative examples of the procedures explained in the text. The author guides the user of the computer step by step, through the application of the individual modules so that no previous knowledge of Excel is required. In addition, Appendices B and C contain a concise introduction to Excel.

The book contains 13 chapters organized in 6 sections. The first section, entitled "Population Dynamics", has three chapters dealing with measuring population change and age and sex composition. The second section is labelled "Analytical Approaches" and deals with methods of comparing populations; it includes standardization and explains the period and cohort approach to data analysis. One chapter in this section is devoted to demographic research and to the writing of research papers in general and on demographic topics in particular.

Section three, "Vital Processes" covers measures of mortality and health (including the concept of epidemiologic transition) and of fertility and the family (including the second demographic transition).

"Demographic Models" – life tables and stationary and stable populations – are the subject of section four. Here too is included an explanation of population momentum. Section five on "Spatial Patterns and Processes" contains not only approaches to the study of such spatial aspects of population as measures of population distribution and of housing, occupancy rates and housing density, but also population mapping and geographic information systems. Migration statistics and methods for estimating migration from basic demographic data also form a part of this section.

The final section "Applied Demography" is concerned with methods of projecting total population as well as constructing special-purpose projections, such as labour force, households and families.

The presentation is well structured. Each chapter starts with an outline of the topic, followed by learning objectives and boxed sections on computer applications that relate to the examples on the CD-ROM. The chapters end with advice on sources for further study, Internet resources, spreadsheet exercises which are accompanied by a detailed explanation of the relevant Microsoft-Excel procedures and other exercises.

The author has been teaching demography at the undergraduate and postgraduate levels for many years at the Australian National University. In this textbook, he offers the reader a possibility, on one hand, to understand the evolution of a population, and on the other, to focus on and study in detail the processes that are responsible for the dynamics of populations.

"Demographic Methods and Concepts" was not written with merely the needs of undergraduate students of demography in mind. The book is equally relevant to students of such disciplines as geography, sociology, economics and statistics. Moreover, professionals in areas that deal with population-related issues in planning and decision-making in health, education, social welfare, market research, or business management, for instance, will find much of the contents of this book useful as a reference work.

Asia-Pacific Population Journal Guidelines for Contributors

The quarterly *Asia-Pacific Population Journal* is a periodical produced by the Emerging Social Issues Division of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), with support from ESCAP and the United Nations Population Fund (UNFPA). Its purpose is to provide a medium for the international exchange of knowledge, experience, ideas, technical information and data on all aspects of the field of population in order to assist developing countries in the region in improving the utilization of data and information for policy and programme purposes, among others.

Original contributions are invited, especially papers by authors from or familiar with the Asian and Pacific region. Ideally those papers will discuss the policy and/or programme implications of population issues and solutions to problems and report on experiences from which others may benefit.

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All material submitted for the consideration of the Editorial Board should be in the English language. The paper, prepared in one of the major word-processing programs, should be supplied in "hard-copy" form with a diskette (3½ inch) or sent by e-mail attachment to the address indicated below. Ideally, the printed copy will be typewritten in double spacing on one side only of white A4 paper. The margins should be generous, at least 3 cm (roughly 1 inch) wide, preferably more for the left-hand margin. The paper should be within approximately 7,000 words including tables, figures, references, etc. It should include a short abstract (100-200 words) of the issues addressed and the most important findings.

A complete list of references arranged alphabetically by author should also be included at the end of the manuscript. Please refer to examples in any issue of the *Journal*. Figures and tables should be supplied on diskette, preferably in any major spreadsheet program or in Microsoft Excel.

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Editor
Population and Social Integration Section
Emerging Social Issues Division
United Nations Economic and Social Commission for Asia and the Pacific
United Nations Building
Rajadamnern Nok Avenue
Bangkok 10200
Thailand

Fax: (662) 288-1009
Tel: (662) 288-1586
E-mail: escap-population@un.org

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