

## **Maternal schooling and child health: preliminary analysis of the intervening mechanisms in rural Nepal\***



**Arun R. Joshi**

*The World Bank, 1818 H Street NW, Washington DC 20433, USA*

### **Abstract**

**This article provides evidence from a community-level study in rural Nepal of the mechanisms by which schooling affects maternal behaviour and infant and child health. Two hypotheses concerning the mechanisms are identified and tested. It was found that schooling equips women with specific skills and dispositions or identity which significantly predict two principal domains of health-care behaviour: use of medical services; and changes in household health behaviour. It was also found that women with schooling had healthier children using height-for-age as an indicator of health.**

### **Introduction**

Research in developing countries, at both the national and household levels, has shown that, even after controlling for socioeconomic status and access to health services, maternal schooling is significantly associated with the health status of children, as defined by a reduction in either mortality or risks to child survival (Caldwell 1979; Cochrane, O'Hara and Leslie 1980; Cleland and van Ginneken 1988; Bicego and Boerma 1991; Hobcraft 1993).

Researchers agree that the direct impact of schooling may account for as much as half of the observed effect<sup>1</sup> (Cochrane et al. 1980; Mensch, Lentzner and Preston 1985). However, the processes through which the effect is mediated are not well understood (Caldwell 1979; Ware 1984; Cleland and van Ginneken 1988; LeVine et al. 1991). This is primarily due to the 'dearth of studies that have been designed explicitly to examine the links between education and survivorship' (Cleland and van Ginneken 1988:1365). These processes require clarification; and our Nepal study is an effort in this direction.

---

\* The field research described in this article was supported by a grant to Integrated Development Systems (IDS), Kathmandu by the Ford Foundation, New Delhi; analysis and writing up were supported by grants to Harvard University from the Ford Foundation, the Spencer Foundation, the MacArthur Foundation the United Nations Population Fund, The Wenner-Gren Foundation, and the Rockefeller Foundation. The study was part of a larger maternal schooling project directed by Robert LeVine and coordinated by Sarah LeVine at the Harvard Graduate School of Education. The study was carried out with the help of many individuals. In the field special mention should be made of Sudhindra Sharma, Prem J. Thapa, Krishna D. Bhatta, Poonam Laxmi, Urmilla Uprety, Sri Hari Poudyal, Bhimsen Silwal, and Fr. James J. Donnelley. I am grateful to Emily Dexter, for statistical support, Peter Berman, Walter Mertens, John Comings, and Lowry Hemphill, in the US, for comments on earlier drafts of this paper.

<sup>1</sup> The other half being attributed to socioeconomic advantage.

## Background

In order to generate new questions relating to the effect of schooling on health it is necessary first to look at findings from earlier studies, and identify issues not previously addressed. Studies suggest that women acquire behavioural dispositions in school that then lead to two proximate changes in health-care behaviour: use of medical services; and changes in household health behaviour. Both these changes have been shown ultimately to affect child health measured either by mortality or biomedical risk factors of mortality.

Although medical and demographic studies acknowledge the importance of explicating the direct link between schooling and behavioural change, they focus almost exclusively on isolating the impact of schooling on health outcomes. Owing to the character of their large datasets, these survey-based studies have limited 'potential for revealing underlying behavioral and causal relationships' (Birdsall 1992:161). Moreover, exploration of the schooling-behaviour change link requires an outlook based on multiple disciplines including education, psychology, and anthropology. As a result of both the nature of the data and the multidisciplinary approach required, it is not surprising that the schooling-behaviour link has been poorly articulated. Only recently has this link begun to be investigated outside the medical-demographic domain (Lindenbaum, Chakraborty and Elias 1989; Lindenbaum 1990; LeVine et al. 1991; LeVine et al. in press) and it is this new work that is most relevant to the issues this paper attempts to address.

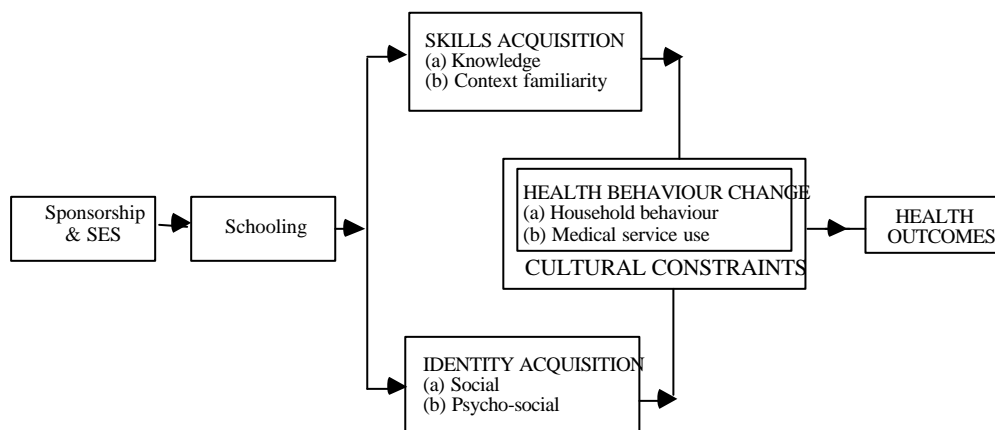
This paper briefly reviews the available evidence on the links between schooling and child health and identifies gaps in the literature; tests hypotheses concerning those gaps by presenting empirical results from a community-level study carried out in rural Nepal; and offers a model for future research that is consistent with prior and new findings (cited herein).

## Theoretical context

Most scholars agree that evidence is inadequate and inconclusive for sound conclusions to be drawn about the nature of the link between schooling and child health (Cleland and van Ginneken 1988; Hobcraft 1993). However, literature on the topic proposes two broad explanations: the skills acquisition hypothesis, and the identity acquisition hypothesis.

**Figure 1**

**Maternal schooling and child health: possible pathways**



Two possible mechanisms for behavioural change may be identified under the skills acquisition hypothesis: knowledge acquisition, and context familiarity. Knowledge acquisition posits that literacy and language abilities help women acquire knowledge and a 'broader outlook' (Mechanic 1992) concerning health. It has, for example, been demonstrated that adults were more likely to attribute natural causes to diseases if they had some schooling than if they had none (Fosu 1981). More recently, it has also been shown that mothers with some schooling have a wider knowledge of the outside world than mothers who have none (LeVine et al. 1991). Preston (1985) argues that major declines in child mortality rates started to occur in America, when health messages began to be clearly understood. It has therefore been hypothesized that individuals with more schooling are more educated about health care and are inclined to learn more (Feldman 1966). When exposed to new information, they can also assimilate more than those with less schooling (Mechanic 1992).<sup>2</sup>

Context familiarity postulates that school-acquired literacy and language skills teach children patterns of speech, work and interaction useful for participating in modern health-care environments and other bureaucracies, thereby facilitating use of the modern health-care system (LeVine et al. 1991). Khan et al. (1987) have shown that in Northern India, women without schooling feel incompetent in modern interactive settings. Furthermore Nag (1981) claims that women with schooling have a greater understanding of where the health services are located and how to gain access to them.<sup>3</sup>

Skills, however, are not the only postulated mediators between schooling and better health-service use or other forms of health-related behaviours. School-acquired identity is a serious contender.

The identity acquisition hypothesis, or 'behaviour before cognition' hypothesis, assumes that schooling leads to a behavioural change through imitation of people in the 'modern sector'. In the health literature, there are two separate theories concerning the mechanisms involved. The first, the sociological hypothesis, suggests that schooling leads women to imitate the behaviour of the urban, Westernized middle class (Lindenbaum et al. 1989; Lindenbaum 1990). Schooling makes women

aware that the health centre, the medical practitioner, immunization of children against disease and taking early action about infant diarrhoea all belong to the same system as their school, the officials, the government and themselves (Caldwell, Reddy and Caldwell 1989:212).

According to this model, schools may be seen as transmitters of 'culture.' As Caldwell says:

the quality of schooling seems relatively unimportant, compared with the fact of schooling having taken place and its duration. It is not so much what you learn or understand, but how you see yourself and how others see you...

They are cleaner because educated people are cleaner; not because the health and hygiene lessons taught them that soap destroyed the bacteria that were the agents of infection (Caldwell 1989:106).

---

<sup>2</sup> This dynamic interaction of knowledge and school-acquired skills differs from the 'content acquisition hypothesis', which theorizes that women must learn about hygiene and health behaviour in schools when they are young. Since schools in developing countries are of poor quality and rarely teach health or hygiene in the first few years, most scholars are sceptical about the reasonableness of this hypothesis (Cleland 1989; Christikas, Ware and Kleinman, in press).

<sup>3</sup> Many other studies confirm these positive associations between maternal education and the use of medical services (Sullivan 1975; Brown, Djogdom et al. 1982; Tekce and Shorter 1984; MbackŽ and van de Walle 1987; LeVine et al. 1991; Elo 1992).

Better health is thought then to be achieved primarily through health-producing behaviours, such as washing hands regularly or taking advantage of available health services, which are 'learned' swiftly through identification with modern lifestyles.

The second, the psycho-social hypothesis, acknowledges the positive impact of identity acquisition on health but emphasizes the developmental dimensions of the process (LeVine et al. 1991). Women with schooling do not arbitrarily imitate the behaviour of the upper classes; rather they internalize the teacher-pupil relationship<sup>4</sup> and later express this relational structure in other settings. Thus in the household they act like a teacher toward her pupils. Lindenbaum suggests that an educated woman takes upon herself 'the role of family tutor, helping students learn to read and write, a task with social as well as economic implications' (Lindenbaum et al. 1989:119). Conversely, in 'modern' bureaucratic settings, women with schooling take up the role of student, learning and responding to, for example, radio advertisements and physicians' instructions.

This perspective on identity acquisition complements the skills acquisition hypothesis as it makes women with schooling into lifelong teachers and learners. Furthermore, the hypothesis does not discard the social dimension of identity acquisition. Since women with schooling 'become' teachers, they act, dress, and converse like teachers; since teachers are supposed to look clean and dress neatly, women with schooling are similarly more preoccupied with cleanliness. These dimensions of imitation are, however, the 'external' husk rather than the kernel, the kernel being the psychologically internalized teacher-student role.

Mention must be made here of cultural constraints on maternal behaviour. The benefits of maternal schooling may be more rapidly felt under cultural conditions that allow women a certain degree of autonomy with health-care decisions, both inside and outside the household (Caldwell 1986; LeVine et al. in press). On the other hand, it has also been suggested that schooling shifts authority patterns in the household, providing women with the 'assertiveness' to seek treatment for their children (Caldwell 1989). These cultural factors, therefore, may be looked upon as 'contextual' inhibitors or facilitators of the impact of schooling that are channelled through the mechanisms hypothesized above.<sup>5</sup>

### Research questions

The above hypotheses have generally been seen as opposing one another. The Nepal study is an investigation of these hypotheses together.

The study addresses the following specific questions:

- (a) Skills acquisition hypothesis: are adult women with schooling more likely than women without schooling to possess and use or express the skills that are believed to be transmitted in schools and that have been hypothesized to influence adult behaviour?
- (b) Identity acquisition hypothesis: are women with schooling more likely to possess and use or express the dispositions or identity that are believed to be transmitted in schools and that are associated with 'modern' behaviour patterns that have an impact on child health?

The study then asks whether mothers with schooling are more likely to have healthier children.<sup>6</sup> Finally, the study makes a preliminary attempt to disentangle the independent influences of skills and dispositions or identity on specific maternal health behaviours and child health outcomes.

---

<sup>4</sup> LeVine suggests that this happens more easily for young children because their minds are more malleable (LeVine et al. 1991).

<sup>5</sup> Household authority is an important determinant of health behaviour among Brahmins in Nepal (Joshi, in preparation).

<sup>6</sup> The primary outcome variables in the study are wasting (weight for height) and stunting (height for age).

### The national context

Nepal, virtually isolated from the outside world until the late 1950s, has been undergoing many changes. Infrastructural, industrial, health-care, family-planning, and education-development programs have expanded, with demographic and socio-cultural consequences.

**Table 1**  
**Nepal: key socioeconomic and demographic indicators**

Indicators	1951–55	1971–75	1980–85
Economic growth: infrastructural development			
GDP (Rs. mil.) <sup>a</sup>	–	16,571	20,926
Number of roads <sup>b</sup>	624	–	4,940
Urbanization			
Urban population <sup>c</sup> (%)	2.9	–	6.3
Education expansion			
Students enrolled in primary schools <sup>a</sup> ('000s)	8.5	–	1,626.0
Adult literacy rate <sup>c</sup> (%)	5.3	–	23.5
Health expansion			
Ratio population/hospital beds <sup>a</sup> ('000s)	13.9	–	4.6
Infant mortality rate <sup>d</sup>	179	156	113 (1987)

Sources: <sup>a</sup>Nepal (1988). <sup>b</sup>Nepal (1985a). <sup>c</sup>Nepal (1985b). <sup>d</sup>Thapa and Retherford (1982).

Table 1 shows that major economic and social indicators show advance in the last 40 years. Access to schooling has expanded. The infant mortality rate has fallen.

Yet the country fares poorly by contemporary international standards. Nepal has a low Gross Domestic Product (GDP) and financial capacity (Nepal 1988; World Bank 1989), a low adult literacy rate and a high infant-mortality rate (Thapa and Retherford 1982; UNICEF 1990). Part of the reason for the poor performance may be low levels of investment by the Government in the health and education sectors (Banister and Thapa 1981): indeed, Nepal has the third lowest expenditure per primary-school pupil (US\$13.30).

In addition, there are within-country regional and urban-rural differentials in educational and health services and demographic and health outcomes. Government intervention and aid have not been uniform throughout the country. The western and mountainous areas have traditionally received proportionately less government assistance, while the central, eastern hill, and Terai<sup>7</sup> areas have received proportionately more; infrastructural development, including construction of roads suitable for motor vehicles, has been greater in these areas as well. The urban centres have been indisputably the best served in the last 40 years. This is reflected in the regional and urban-rural differentials for rates of infant mortality. The 1981 census shows that the infant mortality rate is highest in the mountain region (185) and lowest in the Terai region (123) (Thapa and Retherford 1982). Similarly, analysis of the

<sup>7</sup> The Terai is a flat lowland belt along the southern border of Nepal.

Demographic Survey Sample data shows that in 1977–78 the urban infant-mortality rate was 67 but the rural was 105 (Nepal 1981b).

**Table 2**  
**Nepal: selected reproductive and mortality variables by level of maternal schooling (years)**

	Women's schooling levels				
	None	1–5	6–8	9–10	11+
Reproductive variables					
CEB (mothers 15–49) <sup>a</sup>	2.5	1.2	1.0	0.7	0.5
Current contraceptive use <sup>b</sup> (%)	5.7	16.1	16.6	25.7	35.6
Mortality variables: <sup>c</sup> probability of dying in					
Infancy (< 1 year)	143 (168)	...	...	91 (77) <sup>d</sup>	...
Childhood (1–4 years)	35 (144)	...	...	29 (70) <sup>d</sup>	...

Notes

<sup>a</sup> Census (1971) cited in Tuladhar et al. (1977).

<sup>b</sup> Nepal (1981a)

<sup>c</sup> Nepal Fertility Survey data (1976) cited in Gubhaju (1991). Figures are for urban areas only. Figures in parentheses are number of live births for  ${}_0q_1$  and number of children that survived to age one year for  ${}_4q_1$ .

<sup>d</sup> Figures are for women with some education.

Table 2 shows that even as early as the 1970s, when data for most of the above studies were collected, the schooling of women was a predictor of key demographic variables in Nepal. Average parity was lowest among those women with the most schooling, although as Tuladhar, Gubhaju and Stoeckel (1977) warn, since it was not possible to control for relevant variables, such as age and duration of marriage, the finding should be treated with extreme caution. Expressive of a lifestyle more attuned to modern ways, current contraceptive use is also highest among those with higher schooling.

Gubhaju's (1991) analysis of the demographic and socioeconomic differentials in infant and child mortality in the Nepal Fertility Survey (part of the World Fertility Survey) is the most pertinent to the present investigation. Among the many variables explored, urban-rural and physiographic zone differentials were significant. Education of mother and father were significant predictors of infant and child mortality in urban contexts (see Table 2 for the influence of maternal education). In the rural areas, father's education had a significant influence on both infant and child mortality while mother's education was a predictor only of child mortality. While claiming that the results are generally consistent with findings from other parts of the world, Gubhaju (1991) believes that a more thorough understanding of the impact of schooling would require a larger sample size, allowing the variable to be categorized into finer divisions rather than merely dichotomized.

Several other studies exploring broader demographic processes have found maternal schooling to be a significant predictor of various other reproductive and health behaviours and outcomes, including use of family planning (Karki 1985; Schuler and Goldstein 1985) and modern medical services (Subedi 1989).

These and other findings presented in this paper that show associations between maternal schooling and demographic indicators make Nepal an appropriate place for studying the intervening variables. In addition, since relationships of maternal schooling to behavioural change are expected to

be stronger over time when demographic and educational transitions are more advanced, as in Latin America, it is also a suitable place for prospective studies, which are best suited for explicating complex processes such as these.

### **The study setting and subjects**

The rural community of Godavari has a population of around 6,000 and an area of about ten square miles, and is situated about nine miles south-east of the Kathmandu Valley in east-central Nepal. It is located in the southern area of the Mahabharat hills. At approximately 5,000 feet above sea level, its climate is pleasant with temperatures ranging between 0° Celsius in the winter and 36° Celsius in the summer, and it rains heavily during the monsoon, which occurs between June and August.

The area is hilly with streams running down the surrounding forested slopes. The valley between the hills is very fertile and is used for rice, wheat, and corn cultivation at different times of the year. The cultivation of three primary crops annually is made possible by the fertile soil and the area's well-developed irrigation works.

Godavari is connected to Kathmandu by a regular bus service on a paved highway. Major modern features of the area include a botanical garden (frequented by city dwellers and foreign tourists), an apiary, a beer factory, a marble quarry, a bank, several primary schools and a high school, a health post, and some general stores. Most homes have electricity and transistor radios.

Both qualitative and quantitative data were collected. The study was conducted in three parts. The first took the form of a village-wide survey of 1,144 households in order to obtain an overall socioeconomic picture of the community and select samples of mothers according to the ages of their children. The sample population was thus divided into two groups: one of 156 mothers of children between five months and 36 months; and the second, a sub-group of the first, of 74 families with children younger than 15 months.<sup>8</sup> Interviews were administered to the large sample (n=156) about various aspects of their lives, particularly health. Finally, the small sample (n=74) was subjected to literacy and language tests; time-allocation data were collected over one full year, mother-infant interaction was observed, and anthropometric measurements of children were taken.<sup>9</sup> In addition, ethnographic information about Godavari villagers was collected in order to contextualize the findings of the quantitative analysis.

Most people in the area are Brahmins and Chettris (653 out of 1,144 households or 57 per cent). These families generally cultivate their own plots of land. The lower-caste families, including those of other ethnic groups (e.g. Tamangs), are generally poorer, have less education, and work as labourers in the local quarry and the beer factory. Our data from the village support Borgstrom's (1980) claim about the socioeconomic superiority of the Brahmins and Chettris of the area.

### **Figure 2**

#### **Caste differentials in education, landholding, monthly income and presence of toilet**

---

<sup>8</sup> Selected in order to conduct age-sensitive mother-child observations.

<sup>9</sup> These instruments are briefly outlined in the text: for detailed descriptions, see Joshi (in preparation).

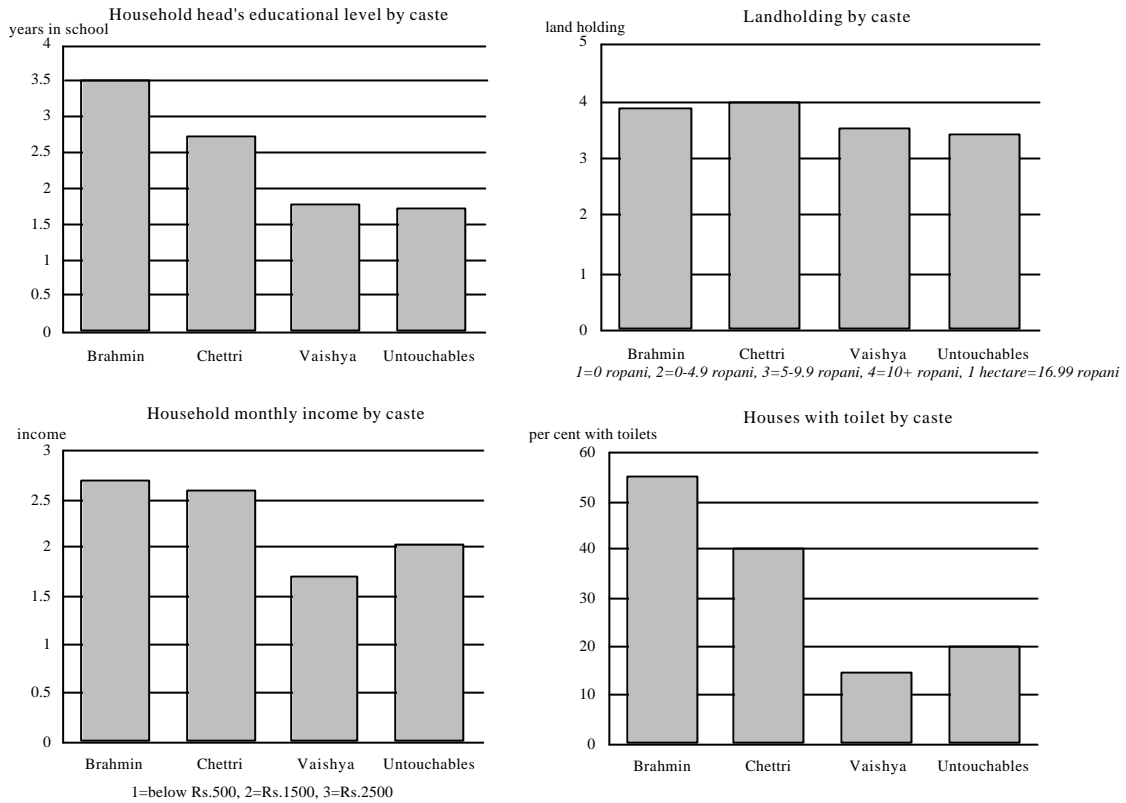


Figure 2 clearly shows, for example, that the Brahmins and Chettris perform significantly better than other groups in a number of important socioeconomic dimensions. In order to include an adequate number of women with schooling in our sample, mother-child dyads were selected exclusively from these two groups.

As Nepali-speaking patrilineal Hindus, Brahmins and Chettris live in joint families, organized by an age-sex hierarchy in which young women occupy the lowest rung. Relatively homogeneous, the Brahmins and Chettris of Godavari have a lifestyle characteristic of Nepali-speaking hill communities as described by Borgstrom (1980) and Bennett (1981, 1983). Indeed, they share some basic socio-cultural features with the larger rural populations of North India, particularly with regard to women's roles and the care of children. Thus, the results of this study are expected to provide findings of more than local significance.

Some of the basic socioeconomic and demographic characteristics of the subjects in the two sub-samples are presented in Table 3.

**Table 3**  
**Godavari: socioeconomic and demographic characteristics**

Variables	Large sample (n=156)			Small sample (n=74)		
	mean	s.d.	range	mean	s.d.	range



Maternal age	25.1	4.6	16–38	24.6	3.9	16–35
Years of schooling	1.9	3.2	0–14	1.4	2.9	0–12
Husband's schooling	8.1	3.4	0–14	8.0	2.8	0–14
Age at marriage	17.0	3.3	7–30	16.9	3.0	10–30
Children ever born	2.6	1.6	1–9	2.4	1.5	1–9

The mean age of the mothers was about 25 years, with a range between 16 and 38 years. This is then the 'younger' cohort of daughters-in-law who are still bearing children. The mean age at marriage was about 17 years, or about two years higher than the age estimated by the WFS data for the Brahmin-Chettri group in 1976 (Tuladhar 1985). The rise may be attributed to, among other cultural factors, the influence of modern values and the spread of schooling in the last decade and a half. The average number of children ever born was 2.6 for the larger sample and 2.4 for the smaller, with a range between one and nine children. This figure is close to the 1971 national mean of 2.2 children for women aged 25–29 years (Tuladhar et al. 1977).

In terms of education, the mean number of years of schooling was 1.9 years for the larger sample and 1.4 years for the smaller sample; two mothers held college degrees. Since mass schooling started in Nepal only in the mid-1960s, these mothers were among the first rural women to receive formal education. The low average is caused by the subjects having no schooling at all. In the smaller sample, only 23 women out of 74 subjects had been to school. Similar to the Indian rural scene in the 1950s (Mandelbaum 1970), parents were sceptical about the effect of schooling on their daughters, and especially on their marriage prospects; daughters had to work in the house, supporting their mothers and learning the management of the household for the future.<sup>10</sup>

Husbands, on the other hand, had an average of eight years of schooling. Such attainment of higher education levels may be attributed largely to the early history of schooling in Godavari.<sup>11</sup>

Fewer than five per cent of the sample mothers were employed outside their homes. There is a strong cultural pattern among the Brahmins and Chettris in Godavari which constrains women from working outside their homes unless it is absolutely necessary (Bennett 1981). There is a great need for domestic labour and the rate of outside employment reflects this demand.

Most husbands, on the other hand, were employed outside their homes. About 62 per cent were employed as 'office-workers',<sup>12</sup> 23 per cent as labourers in the local beer factory and marble quarry and the rest (15%) were 'non-employed' (worked only in their own fields). The proportion of men who were employed has increased in Godavari from only 60 per cent in the 1970s (Borgstrom 1980) to 85 per cent in the late 1980s. It is worth noting that even those who are employed frequently take time off to work their fields.

<sup>10</sup> The low mean number of years of maternal schooling and the distribution of the variable may represent to some a problematic issue for statistical analyses because the variance may be seen as arising from only those who have been to school (i.e. in the smaller sample, variation in the variable is only found in the 23 cases of schooled mothers). However, the argument may just as well be that the results we get with this variable is a 'suppressed' one and is expected to be strengthened as more women attend schools.

<sup>11</sup> Several members of the local elites (primarily Brahmin and Chettri politicians) founded the Kitini school in 1947 and persuaded the people of the village to enroll their children. It is important to note, however, that the gender gap in schooling like this one is typical of South Asia.

<sup>12</sup> Mainly in the city, as peons and messengers.

### **The findings: the link between schooling and behavioural change**

Before presenting the results of the analyses, mother's schooling must be delineated as a variable and the control variables must be identified.

#### **Maternal schooling**

Mother's schooling was measured in terms of the number of years a woman had attended school. Although few subjects had any schooling (about 35 per cent of both the large and small samples), the variable was kept 'continuous' for most analyses. The distribution of the variable has been presented in Table 3.

It is generally necessary to distinguish between the highest grade level achieved and the number of years of schooling. Nevertheless, only one mother in the sample had repeated a grade. Apparently, in a social environment that does not encourage the education of women, those who failed were rarely given a second chance.

In order not to confound the cognitive, attitudinal, and behavioural impacts of schooling with the influence of literacy,<sup>13</sup> it was necessary to identify and re-classify those women who had learned to read and write without formal schooling. Six women who claimed initially that they were literate failed a decoding test<sup>14</sup>, thereby placing them in the illiterate category.

#### **Control variables**

Before exploring the links between maternal schooling and child health, it is necessary to establish the 'direct' (that is, not a proxy for other socioeconomic variables) relationship between maternal schooling and specific health behaviours. In order to establish such an impact, analyses must control for variables judged *a priori* to be relevant. Maternal age, socioeconomic variables and parents' education are especially pertinent to our study. Maternal age needs to be considered because, given the slow spread, and acceptance by parents, of mass schooling for Nepalese girls, younger women are more likely to have attended school than older women. Socioeconomic variables, comprising socioeconomic status, husband's education (level of schooling), and husband's occupational and employment status are important controls because they are generally correlated with maternal schooling, more educated women having been shown to be married to more educated and richer husbands; and because they have been shown to be powerful predictors of child survival (Mosley and Chen 1984).

Socioeconomic status was quantified by aggregating the following: *khet* or 'lowland'; number of cows, buffaloes, goats, and sheep, oxen, and dogs (an indicator of wealth because it shows first, that the owners are able to feed them, and secondly, that they are being kept as protectors of property); radio and television; and presence of toilet. These attributes and possessions were claimed by informants, and suggested by our own understanding of the area's economy to have a bearing on the socioeconomic status of villagers. Husband's occupational and employment status was categorized as working in 'official' positions in the city (these are the most educated, are most 'exposed' to modern ways, and usually have the highest income); not working outside their homes or fields through lack of education or because they own more property (these have less exposure and lower income); and working as a 'labourer' in the local beer factory and marble quarry for minimal wages (these are least educated, least 'exposed' and have the lowest income).

---

<sup>13</sup> In a literate society like Nepal, there have always been people who know how to read and write, knowledge that has been transferred by family members within the household. If there were enough women who could read without having attended school, we could directly disentangle schooling from literacy effects. In our sample, this was not possible.

<sup>14</sup> The ability automatically to recognize letters and words.

Parents' educational status is the sponsorship or background variable. Behrman and Wolfe (1987) for example have suggested that background characteristics such as parents' education must be included in analyses such as these because education may simply be a proxy for experience and health-related skills acquired during childhood from more 'exposed' and educated parents. In Godavari, where none of the parents of sample mothers had been to formal schools, simple 'literacy' (that is, literacy without schooling) is used as a background variable. Parents' education was calculated by summing the scores of each parent (0 unable to read and write; 1 able to read and write). The range for the variable was therefore between 0 (both parents illiterate) and 2 (both parents literate).

**Table 4**  
**Godavari: correlations between maternal schooling and socioeconomic variables**

Variables	Pearson correlation coefficient	N
Maternal age	-0.20 <sup>a</sup>	156
Husband's schooling	0.47 <sup>c</sup>	156
Husband's occupation status	-0.08	70
Household's socioeconomic status	-0.005	74
Parents' literacy	-0.04	156

Note: <sup>a</sup>p<0.05 <sup>b</sup>p<0.01 <sup>c</sup>p<0.001

Table 4 shows that maternal schooling is correlated with age and husband's education but not with husband's occupational status (education of husbands is not yet associated with higher occupation-income levels), socioeconomic status of household (girls with schooling do not necessarily marry into wealthier households) or parental education.

All these variables will be used as controls in later analyses involving maternal schooling. Even though no significant association is evident between maternal schooling and household socioeconomic status, husband's employment, or parental education, they will continue to be treated as controls in order to arrive at a more accurate estimate of the impact of schooling.

The associations between maternal schooling and behaviours reflecting use of medical services and household child-care patterns are examined in the next set of tables. While these associations are in themselves interesting, they form the basis for the more fundamental question of why women with schooling behave as they do.

#### **Use of medical services<sup>15</sup>**

Use of modern health-care services is associated with reduced rates of mortality in the developing world (Cleland 1989). It has been shown, for example, that with increased schooling parents are more likely to bring sick children to health services, to follow suggested treatments properly and sufficiently long, and to report back to the health service when illness persists (Caldwell 1986).

Table 5 displays the results of logistic regressions of maternal schooling on prenatal care and hospital delivery during the last pregnancy for the larger sample. These analyses demonstrate the use of modern health-care services by the mothers of Godavari.

<sup>15</sup> All further analyses involving mother's schooling will control for mother's age, husband's schooling, husband's occupational status, household's socioeconomic status, and parental literacy.

Fifty-two per cent of women received prenatal care during their last pregnancy. Godavari has one government-operated rotating health clinic that comes to two locations within the village on a weekly basis. One health assistant and two nurse practitioners recommend dietary measures and family planning, perform examinations and prescribe medications. Regression analysis shows that schooling was a significant predictor of prenatal care; thus, although antenatal care is freely available in the village, women with some schooling use it more than women with no schooling.

Only 30 per cent of all deliveries occur in a hospital. Nevertheless, this is a much higher rate than in the more remote areas of the country where most deliveries occur at home (JICA 1987). The nearest hospital from Godavari is the Patan hospital, about five miles distant on the main road to Kathmandu. Most of the hospital deliveries take place there or in the maternity hospital in Kathmandu. Going into town for a hospital delivery is clearly more difficult<sup>16</sup> than making a prenatal visit to the clinic in the village. Yet the result shows that schooling continues to have an impact even under such complicated circumstances.<sup>17</sup>

Schooling is also positively correlated with current contraceptive use ( $r=0.14$ ,  $p<0.08$ ; although not significant at the 0.05 level) and negatively correlated with the duration of breastfeeding ( $r=-0.49$ ,  $p<0.001$ ). All of these associations are consistent with modern 'medicalized' patterns of behaviour (Caldwell 1986; LeVine et al. 1991) that are characteristic of women with schooling in different parts of the world, and involve a transformation of behaviour from more traditional to modern patterns of prevention and treatment.

---

<sup>16</sup> In terms of the mothers and others in the household having to organize the extended trip.

<sup>17</sup> Parental literacy is also a significant predictor of hospital delivery, showing that early experience (in an 'educated' household) also may influence the manner in which these health decisions are made later in life. Understandably, once controlled for other variables, household socioeconomic status is also a significant predictor. A detailed exploration of these variables and their association with maternal schooling is being explored elsewhere (Joshi, in preparation).

**Table 5**  
**Fitted logistic regression models predicting the probability that during her last pregnancy a woman had prenatal care (N=156), and that she delivered in hospital (N=151)**

Intercept	Schooling	Age	Husband's school.	Husband's employ.	Socio-econ. status	Parents' literacy	Chi square	Differ. in df from model without predict.	Reduct. in Chi sq. from model without predict.
<b>Prenatal care</b>									
Intercept only							211.9		
0.03 (0.19)	0.21 <sup>c</sup> (0.06)						197.3 <sup>c</sup>	1	0.07
-0.33 (1.01)	0.21 <sup>c</sup> (0.06)	0.001 (0.04)					197.3 <sup>c</sup>	2	0.07
-0.82 (0.45)	0.17 <sup>c</sup> (0.22)		0.07 (0.06)				193.2 <sup>c</sup>	2	0.09
-0.66 (0.60)	0.21 <sup>c</sup> (0.06)			0.20 (0.29)			195.8 <sup>c</sup>	2	0.08
-0.80 (0.37)	0.21 <sup>c</sup> (0.06)				0.10 (0.06)		194.6 <sup>c</sup>	2	0.08
-0.74 (0.36)	0.19 <sup>c</sup> (0.06)					0.38 (0.29)	168.9 <sup>c</sup>	2	0.20
-2.24 (1.45)	0.17 <sup>b</sup> (0.07)	0.02 (0.04)	0.06 (0.06)	0.13 (0.31)	0.08 (0.07)	0.37 (0.30)	165.32 <sup>c</sup>	6	0.22
<b>Hospital delivery</b>									
Intercept only							185.7		
-1.32 (0.22)	0.24 <sup>c</sup> (0.06)						166.9 <sup>c</sup>	1	0.10
-1.62 (1.15)	0.24 <sup>c</sup> (0.06)	0.01 (0.04)					166.8 <sup>c</sup>	2	0.10
-1.45 (0.51)	0.22 <sup>a</sup> (0.06)		0.02 (0.06)				165.9 <sup>c</sup>	2	0.11
-2.06 (0.69)	0.23 <sup>c</sup> (0.06)			0.39 (0.33)			165.0 <sup>c</sup>	2	0.11
-1.91 (0.37)	0.29 <sup>c</sup> (0.07)				0.12 (0.06)		164.1 <sup>c</sup>	2	0.12
-2.74 (0.53)	0.35 <sup>c</sup> (0.09)					1.2 <sup>c</sup> (0.38)	128.90 <sup>c</sup>	2	0.30
-5.70 (1.86)	0.17 <sup>b</sup> (0.07)	0.47 (0.05)	-0.06 (0.07)	0.52 (0.38)	0.19 <sup>a</sup> (0.08)	1.43 <sup>c</sup> (0.41)	119.90 <sup>c</sup>	6	0.35

Note: <sup>a</sup>p<0.001 <sup>b</sup>p<0.01 <sup>c</sup>p<0.05

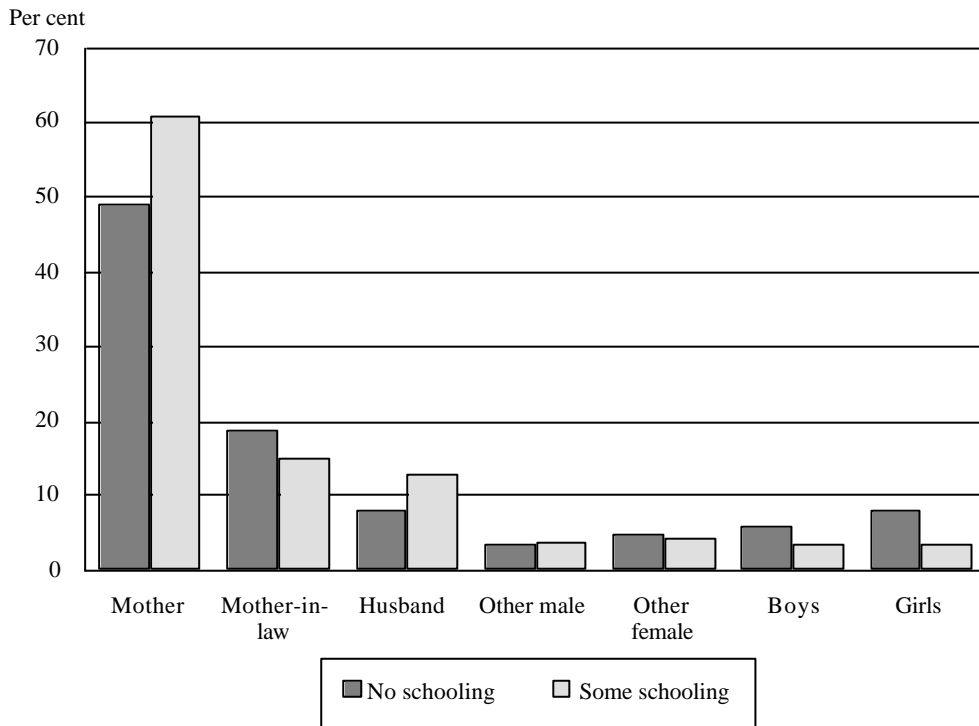
**Household child care**

Household behaviour patterns have also been shown to affect children's health. It has been found, for example, that 'education inculcates a greater sense of personal responsibility for, and control over the

welfare of children' (Cleland and van Ginneken 1988:1363). Figure 3 presents results concerning mothers' and household members' allocation of time on child care. These are based on one-year observational data obtained by applying Gross's (1984) spot observation method to a subgroup (N=74)].<sup>18</sup>

For spot observations, 'caretaker' was defined as anyone who was 'responsible for or responsibly occupied' with the sample child at the moment of observation. Some of the frequently noted activities of caretakers included holding, carrying, playing, feeding, putting to sleep, washing, changing, talking, oiling, or simply 'looking after' while the child played or slept.

**Figure 3**  
**Time allocated to child care (April 1989 – March 1990)**



In households where mothers had no schooling about 49 per cent of child-care time is spent by the mother;<sup>19</sup> slightly more than half the remaining time is distributed among others in the household, including a large portion being handled by the mother-in-law (20%) and younger girls in the house (10%). In households where mothers had some schooling, however, over 60 per cent of child care is handled by the mother, and less than 40 per cent managed by others. It is interesting to note that

<sup>18</sup> In order not to confound the results by the presence of other women with schooling, households with the subjects without schooling contained no other women with schooling. The educational level of mothers was treated dichotomously in this analysis in order to be able to present the findings more meaningfully.

<sup>19</sup> The number of household members, a critical determinant of time allocation, was virtually the same when the mother had no schooling (6.31) and when she had some schooling (6.35).

husbands in the latter households do more child care (12%) than husbands in the former ones (9%). The difference between the time spent on child care by women with and without schooling is statistically significant (ANOVA:  $p=0.0001$ ,  $R^2=0.18$ ).

As in most other parts of Hindu Nepal and India, children in Godavari are born into a complex extended family. Although the child's natural mother is the primary caretaker, others in the house take a greater share of the responsibility for child care as the child grows older (Seymour 1976). Strong emotional bonds with the child are created and maintained by the elders in order to thwart the dissolution of the family structure that is often believed to be initiated by young mothers (Madan 1965; Bennett 1983). One possible explanation of the time-allocation data is that mothers with schooling may be reorganizing child-care patterns to 'reclaim' their child from collective ownership by the household.<sup>20</sup>

Without a corresponding change in the quality of time spent on child care, the change in the amount of time spent on child care may have little impact on child health. Cleanliness of the child was used as a variable to assess the quality of care, a medical doctor having assessed the cleanliness of the 74 children brought by their mothers to the clinic.<sup>21</sup>

Results demonstrate that mothers with some schooling had children who were both cleaner and better dressed than those of mothers without schooling ( $r=0.47$ ,  $p=0.0001$ ). This suggests that schooling may be associated with greater (personal) maternal responsibility (Caldwell 1989) and a more intense pattern of child care involving more energy, attention or time (LeVine et al. 1991).

These results suggest a direct association between maternal schooling and use of health services and household health behaviour patterns, even after controlling for the relevant variables. As stated earlier, these results are confirmed by other studies. What is still not understood, however, are the actual mechanisms through which such behavioural changes occur. This is the focus of the present investigation.

### **The mechanisms<sup>22</sup>**

#### ***Skills acquisition***

One of the hypotheses concerning changes in health behaviour is that schooling gives women skills and subsequently knowledge that make it easier to use health-care messages and health-care services more efficiently (Cleland and van Ginneken 1988; LeVine et al. 1991).

In order to investigate this skills acquisition hypothesis, some tests were administered to subjects in a quiet room, away from their homes. Three skills were examined.

Ability to read and comprehend written passages: One absolutely distinguishing feature of schooling is the 'children's encounters with text or their preparations for those encounters' (Olsen 1977:76). Literacy (reading and writing skills), is therefore, not only a primary goal of schooling, but essential for the achievement of all other educational goals, primarily knowledge acquisition (Gagne 1977).

---

<sup>20</sup> However, this is not to imply that women with schooling simply acquire and use more power within the household. While they certainly claim more informal power, they must continue to abide by the norms governing interaction patterns inside and outside the household (Bennett 1983).

<sup>21</sup> The doctor, who was specifically hired for the purpose of the study, was unaware of the educational level of the mothers and assigned scores to children based on cleanliness of the clothes, body, face, and hair. The doctor also rated the mothers at the same time. The mothers were asked to come with their child to have him or her checked by the doctor. Nothing concerning cleanliness assessment was mentioned to them.

<sup>22</sup> Unless otherwise indicated, all following analyses are based on the subgroup of 74 cases.

Dr. Patricia Velasco, a reading specialist trained at Harvard, developed the literacy test that was administered to women who had been to school. The resulting measure was based on Chall's (1983) model of reading development which treats reading development as a series of six stages. Each woman with some schooling was asked to read a simple passage from a first-grade textbook to test her ability to decode words, the ability to decode or associate letters with words being the first stage in the development of literacy. A failure to decode was defined as illiteracy. Those who passed the decoding test were asked to read a series of progressively more difficult passages from higher grades. After reading each passage, they were asked to describe what they understood and their response was coded into 'idea units.' Comprehension of at least half of the idea units contained in the text allowed passage to the next grade level. This process was repeated until the subject reached a level at which she understood less than half of the idea units contained in the passage. The highest grade level passed (with half the idea units understood) was judged to be the assessed reading level.

Ability to listen and comprehend: The ability to understand audio information needs to be studied because it is associated with both reading skills and the ability to assimilate information presented verbally by doctors and social workers (P. Velasco, personal communication). In addition, such information is also often broadcast by radio.

In our study, three radio advertisements concerning health-related topics, for example oral-rehydration therapy, were played to each mother, and she was then asked what she understood the advertisements to mean. The cumulative total number of idea units presented for all three advertisements made up the variable.

Ability to use decontextualized language: To acquire knowledge and to participate competently in classrooms in childhood and in organized bureaucracy in adulthood requires highly specialized uses of language. It has been claimed that schooling provides the instrument for the development of these skills (Olsen 1977). For example, it has been shown that schools use the 'language of formalized written prose' and are 'committed to the logical uses of language' (Olsen 1977:76). It has also been argued that schooling 'consists largely of training in decontextualized language use' (Snow 1983:183). Decontextualized language use (as opposed to contextualized language use) is characterized by an increasing freedom from physical-interactional and historical context with an ability to listen to, comprehend, and discuss the remote and the abstract (Snow 1983). The skill warrants attention here as it might provide a link between maternal schooling and the use of health-care services (LeVine et al. 1991). Perhaps fluency in decontextualized language would create a capacity to converse effectively in a range of settings, including clinics and other bureaucratic contexts.

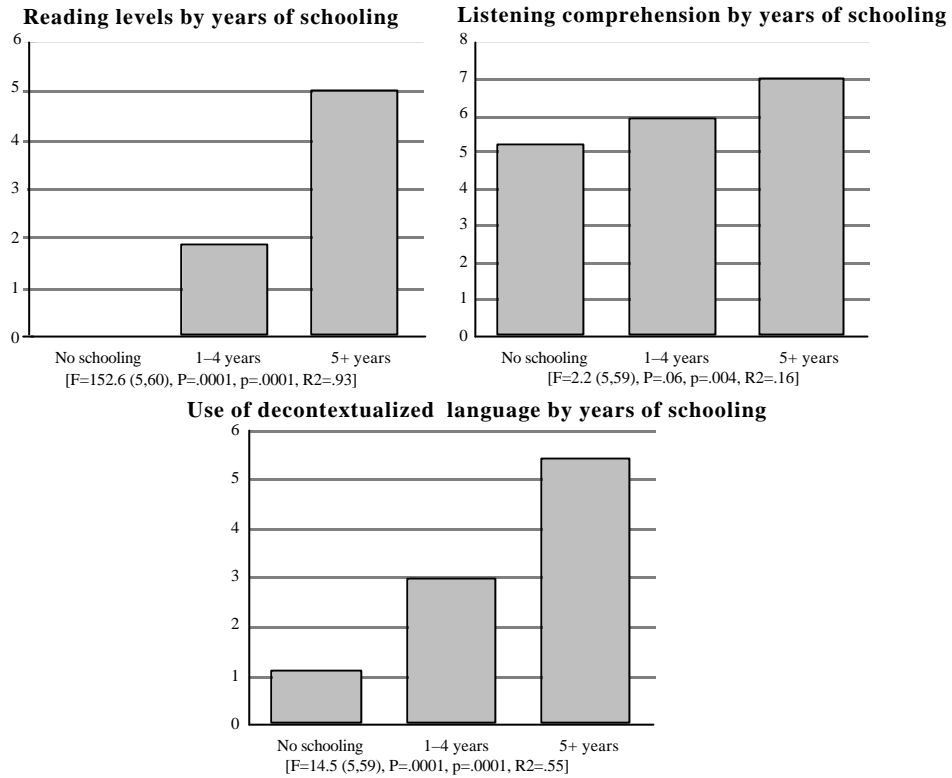
In this study, the use of decontextualized language was measured through the ability to define nouns (Snow 1990). Ten common nouns (such as thief, dog, car) were presented to subjects, and they were asked to define each in turn to someone 'who doesn't know what the word means'. Definitions were coded in terms of whether they presented a contextualized (informal) definition—for example, many defined *dal* (a type of lentil soup) as *dal* and nothing more, assuming that the test administrator shared relevant background knowledge and therefore did not need to be told what it was—or a decontextualized (formal) definition—for example, one mother explained that *dal* was a type of proteinous 'soup' (a superordinate category) that is eaten with rice, assuming ignorance on the part of the administrator. The formal definitions were summed to create the variable for analysis.<sup>23</sup>

---

<sup>23</sup> Even though the coding procedures for the skill variables listed above were fairly straightforward, the following measures were taken for reliability: (a) one Nepali coder (a Harvard undergraduate) was trained to do the coding: numerous example data sets were coded until the coder understood the nuances; and (b) since all data was taperecorded, the coder replayed and closely scrutinized problematic data before coding them.



**Figure 4**



The results summarized in Figure 4 show that schooling is a significant predictor of reading comprehension, listening comprehension, and the use of decontextualized language. There is little reading material in Godavari except for scraps of newspapers that men bring from their work in the city, and children’s textbooks; and women rarely have the time to read. These results show that even under these circumstances, women do not lose their reading-comprehension skills, although most read at a grade level that is one lower than the grade they had passed.

The findings also indicate that women with some schooling are better able to absorb information presented aurally. This is an important finding for those communicating health messages to rural populations. The fact that women who have been to school listen to and comprehend more of the messages than other women supports the ‘knowledge-gap’ hypothesis in the field of communication that posits that prior knowledge of the topic and higher-educational levels facilitate the assimilation of new knowledge of related topics (Donohue, Tichenor and Olien 1975). Similarly, schooling seems to facilitate the use of decontextualized language, confirming prior studies (Tapia-Uribe 1989).

As mentioned in the theoretical section, there are two possible links between these skills and the health behaviour of mothers. The first is knowledge acquisition. Reading and listening comprehension skills could help construct a knowledge base that could guide behaviour. The ability of educated women to absorb more information concerning the ‘outside’ world (that is, outside the village) was measured. This was done by asking them the name of the King of Nepal. During the time of the study,

the King's name was mentioned frequently on the radio and was a common topic of discussion. A categorical analysis showed that the odds of knowing the King's name was 4.8 times greater for those with schooling than those without schooling ( $\chi^2=18.74$ ,  $df=2$ ,  $P<0.001$ ). Again, this facility with information among women with some schooling has been demonstrated by earlier studies (Bhuiya, Streatfield and Meyer 1990; LeVine et al. 1991).

The second link is context familiarity. The use of decontextualized language skills may confer a 'context-familiarity'. In other words, this competency probably allows women to feel more comfortable, efficient, and confident in modern bureaucratic settings (including hospitals, clinics, and pharmacies) where both written and aural messages are routinely given in decontextualized types of conversations (LeVine et al. 1991).

In order to test this 'context-familiarity' hypothesis, mothers were assessed on their ability to discuss their child's health with a doctor. Two variables were used. The first was an objective measure of the 'fluency' or 'efficiency' of the mother's report to the doctor about the health of her child. The fluency was assessed by dividing the number of idea units presented in the first minute and a half of conversation with the doctor by the number of prompts the doctor had to use in the same time. The assumption was that an efficient mother would be able to present more idea units per prompt while an inefficient mother would require more prompts from the doctor.

The second was a more subjective measure, whereby the doctor judged the mother's 'confidence in speech' (without prior knowledge of her educational level) as she spoke about her child's health. At the end of each conversation, the doctor rated the mother for confidence, overall 'urgency', and total communicative adequacy. All of these were added to develop an aggregate measure ranging in value from three to 15.

Table 6 shows that mothers with higher decontextualized language scores were indeed more 'efficient' in conversing with the doctor. This may be the 'efficiency' that allows women who have been to school to be 'self-sufficient' and 'brave and smart' (Lindenbaum et al. 1989). The result also supports the demonstration that schooling provides 'habits...essential for participation in a modern economy' (Mechanic 1992:52). These results indicate that the schooling effect observed in these studies may be mediated by school-acquired skills.

In addition, these skills also contribute to a compatible and more subtle doctor-patient relationship. Studies have shown that literate patients receive better treatment at government hospitals and health centres (Maclean 1974). One of the best examples of the 'provider's' inability to cater to the uneducated and those of lower socioeconomic status is a Nepalese experiment that found that the type of 'care' provided by family-planning clinic staff depended on the client's socioeconomic status (Schuler and Goldstein 1985). It was found that the clinic staff had a low estimation of the intelligence of uneducated clients; these clients were correspondingly submissive, and had a difficult time describing the clinic experience to the researchers.<sup>24</sup>

**Table 6**  
**Correlations between noun definitions and 'context familiarity' indicators (N=74)**

Variable	Pearson correlation coefficient
Fluency of conversation with doctor	0.46 <sup>c</sup>

<sup>24</sup> The experiment was conducted with simulated clients.

Doctor's assessment of confidence

0.42<sup>c</sup>


---

 Note: <sup>a</sup>p<0.001 <sup>b</sup>p<0.01 <sup>c</sup>p<0.05

In our study, the fact that the doctor found more confidence in mothers who had been to school points to the type of rapport established. The 'harsh' experience Antonovsky (1980) described for the lower class as they tried to make use of Western health-care services may reflect the experience of women without schooling when they attempt to use health services in developing societies, an experience that is overwhelming and bewildering, alien and frightening. Women who have not gone to school are unfamiliar with the subtle verbal and non-verbal 'scripts' guiding behaviour in medical settings, and are probably similarly bewildered and therefore unable to make adequate use of health services.

Schooling thus seems to impart skills of basic literacy, listening comprehension, and decontextualized language use that are carried into adulthood and continue to influence, probably 'without conscious intent' (Cleland and van Ginneken 1988:1364) not only the amount of information but the type of services people feel comfortable and confident in using.

### ***Identity acquisition***

Schools have been shown to afford experiences structured by sanctions, rules, constraints, and methods of emotional expression that implicitly teach students the principles of independence (working independently and taking responsibility for their own actions), achievement (accepting the premise that to succeed it is necessary to perform one's tasks as well as one can), universalism (cooperating with others for specific tasks) and specificity (knowledge of and ability to interact with others and the particular roles they play) (Dreeben 1968). The learning of such subtle 'norms,' primarily in interaction with teachers, seems to furnish them with an identity different from that of people in the village who have not been to school. It has also been shown that such socialization patterns not only affect the social meanings of schooling and the status aspirations of pupils, but also modify consumption patterns and tastes (Bourdieu 1984).

Given the above, two prevailing models are explored.

The first is the sociologically oriented hypothesis according to which education 'induces a cluster of prestigious behaviours and attitudes' (Lindenbaum 1990:425).<sup>25</sup> The attainment of better health, by this model, is primarily an effect of cleanliness and other such 'modern' behaviour patterns. Lindenbaum claims that:

Educated women follow hygienic behaviours associated with the social standing of prestigious people. They keep their children, children's clothing and food free from dirt and contamination, and observe *bhadra lok* codes of personal behaviour; they refrain, for instance, from spitting inside houses, wipe mucus from their children's faces, and bathe in 'private' waters (Lindenbaum et al. 1989:125).

In order to test this hypothesis, the following questions were asked: are women with schooling neater and cleaner in their dress and overall appearance?<sup>26</sup> Do they 'carry' themselves differently from

---

<sup>25</sup> Identity acquisition through this perspective is essentially an adult phenomenon that reflects and supports the cultural capital school of sociology (Bourdieu 1984).

<sup>26</sup> The doctor without knowledge of the educational level of the mothers, rated their general facial appearance and overall cleanliness.

women without schooling?<sup>27</sup> These questions were specifically asked to investigate the changing aspects of their social identity in the village context. The detailed ethnographic data analysis of these changes is presented elsewhere (Joshi, in preparation).

Table 7 shows that women with schooling were rated by the doctor as being cleaner than women without schooling.<sup>28</sup> In the village, women with schooling were considered to wear their clothes *milaera*, that is, in a way that reflected some degree of 'modern sophistication'. Some informants mentioned that women with schooling do not necessarily wear new clothing; after all, they cannot afford it any more than the other high-caste villagers. The difference, they thought, lay more in the fact that they wore cleaner clothing, and the result above reflects the informants' judgement.

It also transpired that women with schooling carried themselves differently from women without schooling. The measure used was the way they sat on a chair: sitting *uper khutti* shows that they 'identified with' and felt more 'comfortable' on the chair than the women without schooling. In addition, most informants mentioned that women with schooling had a certain *lachkai* (sway) in their walk that lacked shyness. Our informants could easily tell whether women had been to school just by watching them walk. Overall, results suggest that women with schooling internalize a more 'modern' style of presenting themselves.

**Table 7**  
**Correlations between schooling and the 'identity' variables (N=74)**

Variable	Pearson correlation coefficient
Maternal appearance	0.66 <sup>c</sup>
Maternal style of sitting	0.65 <sup>c</sup>

Note: <sup>a</sup>p<0.001 <sup>b</sup>p<0.01 <sup>c</sup>p<0.05

The second developmentally informed hypothesis posits that women with schooling learn to identify with the role of the teacher, a task that is facilitated by their youth and suggestibility when they attended school. LeVine suggests that the greater verbal responsiveness to their children of Mexican mothers who have been to school is an expression of their 'teaching role' (LeVine et al. 1991; Richman, Miller and LeVine 1992). Conversely, women with schooling may also take on a student role if they are confronted by an opportunity in the outside world to learn something new: examples are learning from health-care workers and the media. Thus from this perspective, better health results from the 'teacher-like' energy, attention and intensive care provided by parents with schooling who are continually absorbing modern messages.

<sup>27</sup> When mothers were called in for an extensive interview in the course of the study, the manner in which they sat on the chair was noted. They were divided into those who sat *uper khutti* and those who sat with both legs on the floor. *Uper khutti* is a cross-legged sitting style that is characteristic of Westerners and modern city-dwellers. Chairs are not very common in Godavari but most homes in Godavari do have a few chairs and everyone has had an opportunity to sit on one.

<sup>28</sup> No correlation, however, was seen between maternal schooling and the degree of cleanliness of home courtyard, kitchen, and cowshed, probably because many people without schooling lived in these extended households, and were less 'cleanliness driven' than women with schooling.

The hypothesis was tested by observing whether mothers with schooling respond more verbally, like teachers, to their children than mothers without schooling. The variable was generated by observing 74 mother-child pairs during two one-hour episodes, and coding for the proportion of maternal verbal responses to child-initiated acts.<sup>29</sup>

Regression analysis shows no significant association ( $r=-0.03$ ,  $p=0.88$ ) between schooling and verbal response. The lack of strong association, that runs counter to LeVine et al.'s (1991) Mexican finding, may stem from community disapproval of young women talking a lot; such disapproval is characteristic of the Hindu Brahmin-Chettri society; but not of the Mexican community studied by Le Vine.

Alternatively, the weak association could also be caused by the small number of women with any schooling, the narrow range of school attainment, and the community's being at an early stage of the demographic transition. If the latter explanation were true, it would be expected that the verbal-responsiveness association would strengthen over time.

### **The findings: education and child health**

The results to this point provide evidence of schooling-related changes in behaviour. The question remains of how these changes affect the health of children.

Among the most widely used measures for assessing child health and risks to survival are anthropometric measurements (Martorell and Ho 1984). Their popularity may be attributed to a growing body of evidence that suggests that these measures are 'as dependent on maternal health factors and infections as they are on the nutrient deficiency' (Mosley and Chen 1984:42).

The outcome variables studied are weight for height (body wasting) and height for age (stunting). The first compares the weight of the child to the weight of a reference child<sup>30</sup> of the same height. In assessing the adequacy of mass relative to length it bypasses the shortcomings of measuring height or weight for age. The method, however, does not identify those children who are stunted but otherwise well nourished.

Height for age, on the other hand, in which a child's height is compared to that of a reference child of the same age, does not reflect the current nutritional status of the child (as wasting does) but indicates past or chronic malnutrition (Martorell and Ho 1984). Low birth weight and long-term malnutrition are reflected by this variable.

The scores for both variables were calculated for sample children using the National Center for Health Statistics (NCHS) tables.

Given the fact that mothers with schooling were found to be more active seekers of health services, such as prenatal care and hospital delivery, and more competent providers of child care in that they spent more time on child care and were cleaner, a differential in the health status of children across levels of maternal schooling may be anticipated.

**Table 8**  
**Maternal schooling and anthropometric scores**

	No schooling	0-4 years	5+ years
--	--------------	-----------	----------

<sup>29</sup> Reliability of the observations was ensured by having one female Nepali university graduate, who was carefully trained through numerous pilot observations to observe all episodes. Coding was done by the same Nepali student who coded the skill variables with similar reliability checks.

<sup>30</sup> Based on the NCHS standard, which is based on the mean weight and height of US children.

Weight/height	mean	91.41	91.29	93.37
	standard deviation	9.15	9.72	6.58
	N	51	13	10
[F=1.59 (6.61), p=0.17; p=0.53, R <sup>2</sup> =0.14]				
Height/age	mean	91.63	94.01	97.17
	standard deviation	5.43	6.67	7.27
	N	51	13	10
[F=3.74 (6.61), p=0.003; p=0.01, R <sup>2</sup> =0.28]				

Table 8 shows that maternal schooling is a predictor of height for age (stunting) but not weight for height (wasting). The mean height for age rises consistently by levels of schooling (with a significant p value and the variable with the controls explaining 28 per cent of the variance), but no association is evident for weight for height. This indicates that for the children of this community, and during the monsoon, long-term nutritional and health status is affected by maternal schooling, but not short-term growth patterns. These results in a small community are reminiscent of DHS findings in 17 countries that the association between maternal education and stunting is more pronounced in early life than the education-wasting relationship (Bicego and Boerma 1991; Hobcraft 1993).

The anthropometric findings also support results from studies indicating that maternal education is of limited effectiveness in protecting children where extensive sources of infection are present (Mustard 1990). Since our assessments were done during the monsoon (April and May), it may have been difficult even for mothers with schooling to protect their children from diarrhoea and other infections that strike during this season and which directly affect weight for height. Results show that for this period, diarrhoeal episodes over the previous twelve months were not correlated with schooling ( $r=0.09$ ,  $p=0.42$ ); but are almost significantly associated with wasting scores ( $r=-0.22$ ,  $p=0.06$ ). The results for other seasons of the year (for example, during winter) may have shown a different pattern of association between maternal schooling and weight for height. The height-for-age result was expected, given the various types of health-producing behaviours that mothers with schooling were seen to practise, beginning with prenatal care, although it is difficult to specify pathways without better longitudinal data.

Regression results also showed that husband's education was a significant predictor of weight for height ( $p=0.05$ ) and husband's occupation and employment was a significant predictor of height for age ( $p=0.05$ ). None of the other variables (mother's age, the household's socioeconomic status and parental literacy) influenced either outcome. It is plausible that husband's education and occupation might be important, not only because they are connected with modern exposure, knowledge, skills, and income, that affect the proximate determinants, but also because they are characteristics of a responsible adult male in a patriarchal household.<sup>31</sup>

### Skills or identity?

Thus far, the influences of school-acquired skills and identity on specific maternal behaviours, like cleanliness and ability to converse effectively with a doctor, have been investigated. It has been shown

<sup>31</sup> For a detailed discussion of the household issues relevant to this inquiry see Berman, Kendall and Bhattacharya (1989); Das Gupta (1990); Joshi (in preparation).

that the behaviour of women with schooling differed in many important ways from that of their unschooled counterparts. Changes in behaviour were assumed to have been engendered by skills (skills-acquisition hypothesis) or identity (identity-acquisition hypothesis). Yet there is always the possibility that the ascribed influences were spurious. For example, cleanliness behaviour was shown to be predicted by acquired identity, but it might simultaneously be predicted by acquired skills: for example, women with schooling may learn about cleanliness through the radio. The same may be true for other behaviours. The next step in the analysis, therefore, is to try to disassociate the influence of skills and identity.

A truly reliable test of the relative influence of skills and identity would involve creating meaningful 'composite' variables and performing more sophisticated analyses than could be reported in this paper. Such analyses must address difficult issues like multi collinearity which is expected given the nature of the exploration. Here a simpler set of partial correlations, which should reflect the expected trend, is attempted.<sup>32</sup>

In order to reduce the number of variables for the analyses, an important consideration given limitations of sample size, three 'principal components' were created: a literacy component, consisting of the ability to define nouns (decontextualized language ability) and the ability to understand radio messages (listening comprehension)<sup>33</sup>; an identity component, consisting of maternal appearance and sitting style; and a variable to control for exposure and experience, consisting of maternal age, husband's schooling and employment status, and parental literacy. Socioeconomic status was also used as a control.

Table 9 shows correlation coefficients between schooling and specific maternal behaviours with regular control and composite variables (either literacy or identity variables in addition to the regular controls). The results show that behaviour such as keeping a child clean remains significantly associated with schooling when controlled for literacy, but not when controlled for identity. This suggests that the influence of schooling on this sort of behaviour may be mediated through identity (Lindenbaum et al. 1989; Lindenbaum 1990). On the other hand, health-care utilization behaviour such as talking more effectively with a doctor loses all significance when controlled for literacy, which suggests a link through skills (LeVine et al. 1991).

It thus seems that acquired listening and language skills (literacy variable) and identity (identity variable) may independently influence specific types of behaviour. More studies are needed to increase our understanding of which types of behaviour are influenced by skills and which are influenced by identity. It may then also be possible to determine to what extent skills or identity affect child-health outcomes.

**Table 9**  
**Correlations between maternal schooling and health behaviours using literacy and identity as controls**

	Child's appearance	Ability to converse with doctor
--	--------------------	---------------------------------

<sup>32</sup> In this paper it is assumed that any remaining effect of schooling on behaviours, after controlling for skills, is the effect of identity.

<sup>33</sup> Reading was not used as a control because of its very high correlation with schooling.

With regular controls only	0.50 <sup>c</sup>	0.52 <sup>c</sup>
With literacy and regular controls	0.39 <sup>b</sup>	0.18
With identity and regular controls	-0.003	0.47 <sup>c</sup>

Note: <sup>a</sup>p<0.5 <sup>b</sup>p<0.01 <sup>c</sup>p<0.001

## Conclusion

The Godavari study has systematically investigated some important hypotheses concerning the links between maternal schooling and behaviour. Schooling provides basic literacy and language skills which are then used in 'modern' health settings. These skills also help women acquire and absorb new information through the media. It is not difficult to see how a widening base of practical knowledge concerning medical situations would give mothers more confidence as well as fluency or competence when interacting with modern health institutions. The acquisition of such skills and knowledge also acts synergistically with a new identity to help create 'psychologically modern' (Mechanic 1992) individuals. Such women identify with the whole modern system, including health centres and recommended treatments (Caldwell, Reddy and Caldwell 1989).

When villagers were asked their overall impression of the difference between educated and uneducated women, most said that they were simply *pharak* or different (identity), that they knew more (*badi aune* or had more knowledge) and that they were more *buddhiman* or intellectually and socially adept (skills). An educated mother has the potential to make use of her school-acquired skills, knowledge and identity. However, under household and familial constraints, such expressions may not always be possible.<sup>34</sup>

The results presented in this paper demonstrate that school-acquired attributes mediate the impact of formal education on certain health behaviours. While the findings are interesting, they are still incomplete. More studies, especially longitudinal ones, are needed before these findings can be woven into a meaningful theory.

Meanwhile these findings have implications for health and educational policies in developing countries. They suggest, just as have some demographers, the need for rapidly expanding access to schooling for girls as a means to reduce fertility and mortality. They also demonstrate that even where the quality of schools is poor, more subtle 'structural' skills and dispositions are quickly acquired by young girls. Nevertheless, both the level of schooling and its quality are critical for better mastery of skills in childhood and more adaptive health behaviour in adulthood.

## References

- Antonovsky, A. 1980. Implications of socio-economic differentials in mortality for the health system. In *Proceedings of the Meeting on Socio-economic Determinants and Consequences of Mortality*. New York: United Nations and Geneva: World Health Organization.
- Banister, J. and Shyam Thapa. 1981. *The Population Dynamics of Nepal*. Papers of the East-West Population Institute, No. 78. Honolulu: East-West Population Institute.
- Behrman, J. and B. Wolfe. 1987. Women's schooling and children's health: are the effects robust with adult sibling control for the women's childhood background? *Journal of Health Economics* 6:239-254.
- Bennett, L. 1981. *The Parbatiya Women of Bakundole*. The Status of Women in Nepal Series. Kathmandu: CEDA.

<sup>34</sup> As noted earlier, the interaction of the changes brought about by schooling with cultural factors such as female autonomy is being presented elsewhere (Joshi, in preparation).



- Bennett, L. 1983. *Dangerous Wives and Sacred Sisters: Social and Symbolic Roles of High-Caste Women in Nepal*. New York: Columbia University Press.
- Berman, Peter, Carl Kendall and Karabi Bhattacharya. 1989. The household production of health: putting people at the center of health improvement. Paper presented at Ford Foundation Workshop on Mother's Education and Child Survival, Ahmedabad.
- Bhuiya, Abbas, Kim Streatfield and Paul Meyer. 1990. Mothers' hygienic awareness, behaviour, and knowledge of major childhood diseases in Matlab, Bangladesh. Pp. 462–477 in *What We Know about Health Transition: The Cultural, Social and Behavioural Determinants of Health*, Vol. I, ed. John Caldwell, Sally Findley, Pat Caldwell, Gigi Santow, Wendy Cosford, Jennifer Braid and Daphne Broers-Freeman. Canberra: Australian National University.
- Bicego, G. and J. Boerma. 1991. Maternal education and child survival: a comparative analysis of DHS data. Pp. 177–204 in *Proceedings of the Demographic and Health Surveys World Conference, Washington, D.C., 1991*, Vol. I. Columbia, MD: IRD/Macro International Inc.
- Birdsall, N. 1992. Health and development: what can research contribute. Pp. 159–185 in *Advancing Health in Developing Countries: The Role of Social Research*, ed. Lincoln C. Chen, Arthur Kleinman and Norma C. Ware. New York: Auburn House.
- Borgstrom, B. Erik. 1980. *The Patron and the Panca*. New Delhi: Vikas Publishing House.
- Bourdieu, P. 1984. *Distinction: A Social Critique of the Judgement of Taste*. Cambridge MA: Harvard University Press.
- Brown, J., P. Djogdom, K. Murphy, G. Kesseng and D. Heymann. 1982. Identifying the reasons for low immunization coverage: a case study from Yaoundé (Cameroon). *Revue Epidémiologie et Santé Publique* 30.
- Caldwell, John C. 1979. Education as a factor in mortality decline: an examination of Nigerian data. *Population Studies* 33,3:395–414.
- Caldwell, John C. 1986. Routes to low mortality in poor countries. *Population and Development Review* 12,2:171–220.
- Caldwell, John C. 1989. Mass education as a determinant of mortality decline. Pp. 101–111 in *Selected Readings in the Cultural, Social, and Behavioural Determinants of Health*, ed. John C. Caldwell and Gigi Santow. Canberra: Australian National University.
- Caldwell, John C. P.H. Reddy and Pat Caldwell. 1989. The social component of mortality decline: an investigation in South India employing alternative methodologies. Pp. 200–221 in *Selected Readings in the Cultural, Social, and Behavioural Determinants of Health*, ed. John C. Caldwell and Gigi Santow. Canberra: Australian National University.
- Christikas, N., Norma Ware and Arthur Kleinman. In press. Illness behavior and the health transition in the developing world. In *Health and Social Change in International Perspective*, ed. Lincoln Chen, Arthur Kleinman and Norma Ware. Boston: Harvard University.
- Cleland, John. 1989. Maternal education, health-seeking behaviour and child survival. Paper presented at Ford Foundation Workshop on Mother's Education and Child Survival, Ahmedabad.
- Cleland, John and Jerome van Ginneken. 1988. Maternal education and child survival in developing countries: the search for pathways of influence. *Social Science and Medicine* 27,12:1357–1368.
- Cochrane, S., Donald O'Hara and Joanne Leslie. 1980. *The Effects of Education on Health*. World Bank Staff Working Paper. No. 405. Washington DC: The World Bank.
- Das Gupta, Monica. 1990. Death clustering, mother's education and the determinants of child mortality in rural Punjab, India. Pp. 441–461 in *What We Know about Health Transition: The Cultural, Social and Behavioural Determinants of Health*, Vol. I, ed. John Caldwell, Sally Findley, Pat Caldwell, Gigi Santow, Wendy Cosford, Jennifer Braid and Daphne Broers-Freeman. Canberra: Australian National University.

- Donohue, G., P. Tichenor and C. Olien. 1975. Mass media and the knowledge gap: a hypothesis reconsidered. *Communication Research* 2,1:3–23.
- Dreeben, R. 1968. *On What is Learned in School*. Reading MA: Addison-Wesley Publishing Company.
- Elo, Irma T. 1992. Utilization of maternal health-care services in Peru: the role of women's education. *Health Transition Review* 2,1:49–69.
- Feldman, J. 1966. *The Dissemination of Health Education*. Chicago: Aldine.
- Fosu, G. 1981. Disease classification in rural Ghana: framework and implications for health behaviour. *Social Science and Medicine* 15,4:471–482.
- Gagne, Robert M. 1977. *The Conditions of Learning*. New York: Holt, Rinehart and Winston.
- Gross, D. 1984. Time allocation: a tool for the study of cultural behavior. *Annual Review of Anthropology* 13:519–558.
- Gubhaju, B. 1991. *Child Mortality and Survival in South-Asia—Nepalese Perspective*. Delhi: Daya Publishing House.
- Hobcraft, John. 1993. Women's education, child welfare, and child survival: a review of the evidence. *Health Transition Review* 3,2:159–175.
- JICA. 1987. *Basic Survey Report on Population and Family Planning in the Kingdom of Nepal*. Kathmandu.
- Joshi, Arun R. In preparation. Maternal schooling, maternal behavior, and child health: a Nepalese case study. Doctoral dissertation. Cambridge MA: Harvard University.
- Karki, Y.B. 1985. *Estimates of TFM (Trends in Fertility and Mortality) for Nepal and its Geographical Subdivisions and Administrative Zones*. Kathmandu: National Planning Commission.
- Khan, M., Richard Anker, S.K. Ghosh Dastidar and Shashi Bairathi. 1987. Inequalities between men and women in nutrition and family welfare services: an in-depth enquiry in an Indian village. *Population and Labour Policies Working Paper No. 158*. Geneva: International Labour Office.
- LeVine, R., Sarah E. LeVine, Amy Richman, F. Medardo Tapia Uribe and Clara Sunderland Correa. 1991. Women's schooling and child care in the demographic transition: a Mexican case study. *Population and Development Review* 17,3:459–495.
- LeVine, R., Sarah E. LeVine, Amy Richman, F. Medardo Tapia Uribe, Clara Sunderland Correa and Patrice Miller. In press. Schooling and survival: the impact of maternal education on health and reproduction in the Third world. In *Health and Social Change in International Perspective*, ed. Lincoln Chen, Arthur Kleinman and Norma Ware. Boston: Harvard University.
- Lindenbaum, Shirley. 1990. Maternal education and health care processes in Bangladesh: the health and hygiene of the middle classes. Pp. 425–440 in *What We Know about Health Transition: The Cultural, Social, and Behavioural Determinants of Health*, Vol. I, ed. John Caldwell, Sally Findley, Pat Caldwell, Gigi Santow, Wendy Cosford, Jennifer Braid and Daphne Broers-Freeman. Canberra: Australian National University.
- Lindenbaum, Shirley, Manisha Chakraborty and Mohammed Elias. 1989. The influence of maternal education on infant and child mortality in Bangladesh. Pp. 112–131 in *Selected Readings in The Cultural, Social, and Behavioural Determinants of Health*, ed. John C. Caldwell and Gigi Santow. Canberra: Australian National University.
- Maclean, U. 1974. *Magical Medicine, a Nigerian Case Study*. London: Penguin
- Madan, T. 1965. *Family and Kinship: A Study of the Pundits of Rural Kashmir*. New York: Asia Publishing House.
- Mandelbaum, D. 1970. *Society in India*. Bombay: Popular Prakasan.
- Martorell, R. and Teresa Ho. 1984. Malnutrition, morbidity and mortality. Pp. 49–68 in *Child Survival: Strategies for Research*, ed. W. Henry Mosley and Lincoln C. Chen. Supplement to *Population and Development Review* 10. New York: The Population Council.

- Mbacke, C. and E. van de Walle. 1987. Socioeconomic factors and access to health services as determinants of child mortality. Paper presented at IUSSP Seminar on Mortality and Society in Sub-Saharan Africa, Yaoundé.
- Mechanic, David. 1992. Research possibilities on facilitating the health care transition. Pp. 49-58 in *Advancing Health in Developing Countries: The Role of Social Research*, ed. Lincoln C. Chen, Arthur Kleinman and Norma C. Ware. New York: Auburn House.
- Mensch, B., H. Lentzner and S. Preston. 1985. *Socio-economic Differentials in Child Mortality in Developing Countries*. ST/ESA/SER. A/97. New York: United Nations.
- Mosley, W. Henry and Lincoln C. Chen. 1984. An analytic framework for the study of child survival in developing countries. Pp. 25-48 in *Child Survival: Strategies for Research*, ed. W. Henry Mosley and Lincoln C. Chen. Supplement to *Population and Development Review* 10. New York: The Population Council.
- Mustard, C. 1990. Maternal education and the incidence and treatment of diarrheal disease in young children: Honduras 1981-83. Unpublished dissertation, Johns Hopkins University, Baltimore.
- Nag, Moni. 1981. Impact of social development and economic development on mortality: a comparative study of Kerala and West Bengal. *Working Paper* No. 78. Center for Policy Studies. New York: The Population Council.
- Nepal, His Majesty's Government. 1981a. *Contraception Prevalence Survey Report*. Kathmandu.
- Nepal, His Majesty's Government. 1981b. *Demographic Sample Survey of Nepal*. Kathmandu: Central Bureau of Statistics.
- Nepal, His Majesty's Government. 1985a. *Seventh Plan*. Kathmandu: National Planning Commission.
- Nepal, His Majesty's Government. 1985b. *Summary Statistics*. Kathmandu: Central Bureau of Statistics.
- Nepal, His Majesty's Government. 1988. *Population and Development Report*. Kathmandu: The Population Commission.
- Olsen, D. 1977. The languages of instruction: on the literate bias of schooling. Pp. 65-90 in *Schooling and the Acquisition of Knowledge*, ed. Richard C. Anderson, Rand J. Spiro and William E. Montague. Hillsdale, NJ: Lawrence Erlbaum Assoc.
- Preston, Samuel H. 1985. Resources, knowledge and child mortality: a comparison of the U.S. in the late nineteenth century and developing countries today. Pp.373-386 in *International Population Conference, Florence 5-12 June 1985*, Vol. 4. *League*: International Union for the Scientific Study of Population.
- Richman, Amy, Patrice Miller and Robert LeVine. 1992. Cultural and educational variations in maternal responsiveness. *Developmental Psychology* 28,4:614-621.
- Schuler, S. and M. Goldstein. 1985. Reproductive decision-making in Nepal from the user's and nonuser's perspective. *Fertility Determinants Research Notes* No. 7. New York: The Population Council.
- Seymour, S. 1976. Caste/class and child-rearing in a changing Indian town. *American Ethnologist* 3, 4:783-796.
- Snow, C. 1983. Literacy and language: relationships during the preschool years. *Harvard Educational Review* 53,2:165-189.
- Snow, C. 1990. The development of definitional skill. *Journal of Child Language* 17:697-710.
- Subedi, J. 1989. Modern health services and health care behavior: a survey in Kathmandu, Nepal. *Journal of Health and Social Behavior* 30:412-420.
- Sullivan, J. 1975. The influence of demographic and socioeconomic factors on infant mortality in Taiwan, 1966-1968. *Academy of Economic Papers* 31.
- Tapia-Uribe, M. 1989. Women's schooling, fertility and child survival in a Mexican village. Unpublished dissertation, Cambridge MA: Harvard University.
- Tekce, B. and F. Shorter. 1984. Determinants of child mortality: a study of squatter settlements in Jordan. Pp. 257-280 in *Child Survival: Strategies for Research*, ed. W. Henry Mosley and Lincoln C. Chen. Supplement to *Population and Development Review* 10. New York: The Population Council.

- Thapa, S. and R. Retherford. 1982. Infant mortality estimates based on the 1976 Nepal fertility survey. *Population Studies* 36,1:61–80.
- Tuladhar, J. 1985. Factors affecting the age at marriage in Nepal. *Contributions to Nepalese Studies*, 12,2:55–62.
- Tuladhar, Jayanti M., B.B. Gubhaju and John Stoeckel. 1977. *The Population of Nepal: Structure and Change*. Berkeley: University of California Press.
- UNICEF. 1990. *The State of the World's Children*. New York: Oxford University Press.
- Ware, Helen. 1984. Effects of maternal education, women's roles, and child care on child mortality. Pp. 191-214 in *Child Survival: Strategies for Research*, ed. W. Henry Mosley and Lincoln C. Chen. Supplement to *Population and Development Review* 10. New York: The Population Council.
- World Bank. 1989. *World Development Report*. Washington DC.