# Modelling the effectiveness of financing policies to address underutilization of children's health services in Nepal

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**Objective** To estimate the price responsiveness of utilization of formal children's health-care services in Nepal and to use this information to model the impact on utilization of subsidies or increases in user fees.

**Methods** A total of 8112 individual observations (of children aged ⩽ 15 years) from 2847 households in 274 communities were obtained from the 1996 Nepal Living Standards Survey. A logit model was applied to determine the net impact of price on a parent or caregiver's decision to seek care for a given instance of illness. The model's coefficients were used to calculate the price responsiveness of utilization decisions.

**Findings** Parents or caregivers reported that 9.7% of children (788/8112) had been ill or injured in the previous month. Parents reported that they had sought care in 566 (71.8%) of these cases; care was most frequently sought from public providers. The price elasticity of demand for children's health-care services in the formal sector was estimated at −0.16. As prices rise, the demand curve exhibits continuous and declining price elasticity. Overall, a 100% subsidy of user fees would increase current utilization rates by 56%, while a 100% increase in fees would lead to a drop in utilization of only 12%. The differential in utilization across income groups was substantial after changes in fees were implemented.

**Conclusion** While the effect of price on the utilization of children's health-care services in Nepal is statistically significant, the size of the impact is modest. Policies to subsidize fees could increase utilization substantially, while fee increases would lead to modest declines in utilization and generate increased revenue.

**Keywords** Child health services/economics/utilization; Fees and charges; Financing, Organized; Health policy; Health services needs and demand/economics; Nepal (*source: MeSH, NLM*).

**Mots clés** Service santé infantile/économie/utilisation; Tarifs et honoraires; Organisation financement; Politique sanitaire; Besoins et demande services santé/économie; Népal (*source: MeSH, INSERM*).

**Palabras clave** Servicios de salud infantil/economía/utilización; Honorarios y precios; Organización del financiamiento; Política de salud; Necesidades y demanda de servicios de salud/economía; Nepal (*fuente: DeCS, BIREME*).

**الكلمات المفتاحية:** خدمات صحة الأطفال، اقتصاديات خدمات صحة الأطفال، الانتفاع بخدمات صحة الأطفال، الأجور والرسوم، التمويل المنظم، السياسة الصحية، احتياجات ومتطلبات الخدمات الصحية، اقتصاديات احتياجات ومتطلبات الخدمات الصحية، نيبال (المصدر: رؤوس الموضوعات الطبية، المكتب الإقليمي لشرق المتوسط).

Bulletin of the World Health Organization 2005;83:338-344.

*Voir page 343 le résumé en français. En la página 343 figura un resumen en español.* يمكن الاطلاع على الملخص بالعربية في صفحة 343.

## Introduction

Like many other low-income countries, Nepal's health system is characterized by underutilization of the health-care infrastructure (*1–3*). Several studies have examined why utilization of formal health-care services is low in Nepal. A few recent studies are of critical importance. These reveal that when people are ill they tend to use self-care or visit traditional healers (*2*, *3*); that increases in income increase the likelihood of choosing more expensive providers (private clinics and public hospitals) and decrease the probability that someone will choose public clinics and self-care (*4*); and if women complete even primary education then health-care utilization is substantially increased (*5*). Some authors argue that apart from household characteristics, supply-side interventions, such as improving the quality of primary health-care facilities, would have larger effects on the use of maternal and child health-care services (*6*, *7*).

Several studies have assessed the effect of user fees on the utilization of health-care services (for example in Peru (*8*), Burkina Faso (*9*) and in the Philippines (*10*)). These studies are reviewed by Gertler & Hammer (*11*). These studies have consistently shown that user fees have significant effects on utilization, in particular among low-income groups. In the countries studied, health care at government facilities was free until user fees were introduced. In Nepal, user fees have long prevailed in different forms (e.g., charges for registration, investigations or drugs). We wondered whether price was the major determinant of the low level of utilization in Nepal. Few attempts have been made to explore the extent to which the price of health care affects the demand for it in Nepal. A study that used data from

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Ref. No. **04-012435**

(*Submitted: 10 February 2004 – Final revised version received: 13 June 2004 – Accepted: 15 June 2004*)

1984 found that cost was the most significant determinant of the choice of provider and that the impact of cost on choice is greater for poorer people, women and children (*12*). Another study that analysed health expenditure showed that income (as an indicator of ability to pay for care) has both a direct effect on health expenditure and an indirect effect through the likelihood of becoming ill and the type of provider chosen (*4*). While both of these studies shed light on the effect of price, they reveal little about whether demand would be responsive to an increase or decrease in the price of health care.

This paper attempts to answer two questions. The first is: to what extent can financial subsidies increase the utilization of formal health-care services in Nepal? The second question is: does an increase in user fees lead to an increase in total revenue? We focus on the utilization of health-care services for children because illness such as diarrhoea and acute respiratory tract infections are the leading causes of mortality among children in Nepal. These causes can largely be avoided by the timely and appropriate use of formal health-care services.

# Methods

## Context

Nepal has a population of 23 million people, 80% of whom live in rural areas. Annual per capita income is US$ 230.00. Mortality among infants and children less than five years old have declined steadily in the past decade, but they are still among the highest in the world. Curative and preventive health care are organized primarily by the Ministry of Health through hospitals located at central, regional and district levels, and at primary health centres, health posts and sub-health posts located in the community. Private hospitals and clinics exist mostly in urban areas; there is a large cluster in the capital, Kathmandu. Missionary and not-for-profit hospitals also operate in a few areas. Nepal spends about 5% of its gross domestic product on health, of which only one quarter comes from the public sector; the remainder is paid for by individual households. About 66% of the total amount of public funds spent on health comes from the government; the remainder is covered by donors. Health insurance is almost non-existent, except for a few small-scale community-based financing schemes (*1*, *13*–*15*).

## Data

The Nepal Living Standards Survey, phase I, was administered by Nepal's Central Bureau of Statistics together with The World Bank in 1996. Data from this survey were used in this paper. Altogether 3388 nationally representative households (18 855 individuals) in 275 communities were included in the sample. A two-stage stratified sampling procedure was used. The primary sampling units were wards. Wards are the smallest administrative units used in the 1991 census; each ward includes 50–200 household s (*16*). Wards were selected from four strata representing different geographical areas of Nepal (mountains, urban hills, rural hills and the plains in the southern part of the country known as the Terai) with a probability proportional to the sample size. A fixed number of households from each ward was selected so that all had an equal probability of being chosen.

Phase I of the survey included questions on health-related behaviour, economic status and demographic information. Questions relating to health were used in our analysis. These asked whether any household member had had an illness or injury in the past month and whether the individuals in the household had used any health-care services for the illness or injury. If respondents had seen a health-care provider, they were asked which type of provider they had consulted and how much they had spent. We analysed data on 8112 individuals living in 2847 households. This subsample included all children aged ⩽ 15 years. Adults provided information about children living in their household. Our analysis was restricted to instances of acute illness and first consultation for that illness.

## Analyses

We assumed that parents or other caregivers make decisions about whether to seek care for their children (*17*) based on the maximization of household utility (denoted as $\mathbf{u}$) which is a linear function of health-care price (denoted as $\mathbf{p}$) and other covariates (denoted as $\mathbf{X}$). These other covariates include, for example, household income and characteristics of the child, the parents and the community. Theoretically,

$$\mathbf{u} = \pi\mathbf{p} + \gamma\mathbf{X} + \theta \qquad \text{(A)}$$

where, $\pi$ and $\gamma$ are parameters to be estimated and $\theta$ is the specification error.

If $\mathbf{u_1}$ and $\mathbf{u_0}$ are the utilities associated with seeking formal care and not seeking formal care, respectively, then households choose to seek care if

$$\mathbf{u_1} > \mathbf{u_0} \qquad \text{(B)}$$

Empirically, a logit model (*18*) can be used to describe expression B:

$$\begin{aligned} \text{Prob}_{\text{formal}} &= \text{Probability [formal care is chosen]} \\ &= \text{Probability } [\mathbf{u_1} > \mathbf{u_0}] \\ &= \text{Probability } [\pi\mathbf{p} + \gamma\mathbf{X} + \theta > 0] \\ &= \frac{\exp(\pi p + \gamma X)}{1 + \exp(\pi p + \gamma X)} \end{aligned}$$

If price is assumed to enter the utility function in a log-linear form, the point–price elasticity (denoted as $\mathbf{E_P}$) will be equal to: $\pi$ ($\mathbf{1\text{-}Prob_{formal}}$), where $\pi$ is the estimated coefficient of the natural log of price (*19*). The value of $\mathbf{E_P}$ indicates how the demand for formal care changes in response to increases in price, e.g. $\mathbf{E_P} = -0.20$ means that a 10% increase in price leads to a 2% drop in demand.

There are several ways of modelling demand (*4*, *19*). Because we wanted to model the choice to use formal health-care services (as opposed to its non-use), using a simple logit, as described above, will suffice (*9*). The goodness-of-fit of the model was assessed by the Hosmer–Lemeshow test (*20*, *21*). Because formal care was observed only if the child was reported to have been ill in the month prior to the survey, sample selection bias may be expected. We used a method described by Van de Ven & Van Pragg (*22*) that allowed us to rule out the possibility of such a bias. Details of this method are described by Pokhrel elsewhere (*17*).

## Variables

### *Dependent variable*

The dependent variable takes the value of 1 if the child received care from formal health-care services; otherwise it is 0. Formal

Table 1. **Coefficients of hedonic price regression**

| Independent variable[a] | Price of informal care[b] | | Price of formal care[b] | |
|---|---|---|---|---|
| Constant | −14.372 | (0.23) | 358.245 | (4.35)[c] |
| Age | −0.743 | (0.51) | 4.095 | (0.97) |
| Male | −18.471 | (0.93) | 3.688 | (0.12) |
| Respiratory problem (*diarrhoea*) | −35.115 | (1.20) | 144.410 | (1.61) |
| Fever (*diarrhoea*) | −21.889 | (0.76) | −12.863 | (0.39) |
| Skin disease (*diarrhoea*) | 240.562 | (1.64) | 28.204 | (0.30) |
| Injury (*diarrhoea*) | 3.422 | (0.11) | 269.455 | (2.22)[d] |
| Other (*diarrhoea*) | −0.896 | (0.02) | 16.054 | (0.36) |
| Rural | 9.949 | (0.26) | −79.328 | (1.52) |
| Central region (*Eastern region*) | 13.173 | (0.31) | −10.821 | (0.22) |
| Western region (*Eastern region*) | −18.559 | (0.52) | −13.598 | (0.28) |
| Mid-western region (*Eastern region*) | −21.831 | (0.63) | −104.192 | (2.26)[d] |
| Far western region (*Eastern region*) | −14.897 | (0.46) | 20.391 | (0.34) |
| Takes more than 1 hour to reach closest public clinic | −15.398 | (0.93) | 21.795 | (0.63) |
| Population of the community | −0.000 | (1.11) | 0.001 | (0.93) |
| Term for choosing informal care selection | 106.287 | (2.81)[c] | | |
| Term for choosing formal care | | | −180.572 | (1.75) |
| No. of observations | 328 | | 458 | |
| Relative predictive power [$R^2$] | 0.13 | | 0.09 | |

Note: It is not surprising to see many insignificant *t* ratios. This is because explanatory variables are in different units and have different variances (*10*).
[a] Reference categories are shown in italics.
[b] Figures in parentheses are Student's *t* statistics.
[c] *P* value < 1%.
[d] *P* value < 5%.

care includes care received from public providers (hospitals, clinics and outreach services provided by the government) or private providers (including nongovernmental organizations).

### *Independent variables*

Price was measured as the total out-of-pocket costs (consultation and investigation fees paid to providers, drug costs and travel costs). The time–price (opportunity costs of obtaining care in terms of both travel time and waiting time) was not included since the survey did not collect this information. Another limitation of the survey was that it collected information on the financial costs of only the chosen alternative. Following the hedonic approach as applied in studies carried out in Peru (*23*) and the Philippines (*10*), we used information on financial costs to impute prices for formal and informal health care for all individuals. In the hedonic price equation, price was assumed to be a function of age, sex, type and seriousness of illness, and market-structure variables, such as location, population and availability of health-care services. The regression coefficients (Table 1) were then used to predict the health-care price for all individuals. Details of the estimation methods are described elsewhere (*17*).

Other covariates included in the model are: income, age and sex of the child, the mother's socioeconomic status (her level of education and employment status as well as whether she heads the household), household composition (number of adults), location variables (mountain, hills, or Terai), residence in a rural or urban area, type of illness reported, and the time it takes to reach the nearest public clinic. Time to reach the nearest public clinic could be interpreted as either a measure of "health service availability" or "time costs". We considered this variable to be the proxy for availability because not all households sought care at the nearest public clinic (some went to other types of providers, e.g. private clinics or traditional healers), and information on the travel time of those who went elsewhere was not available.

Total annual expenditure per capita was used as a proxy for income. Household consumption is a better measure of income than reported income because it is less sensitive to short-term fluctuations and because it includes the value of goods produced in the home, which in developing countries is an important source of income (*24*). Using consumption as a proxy for income is consistent with the methods of several other studies (*4*, *8*, *25*).

The use of several other variables was also considered, such as father's level of education and employment status, characteristics of the head of household and whether there was a bus stop nearby. However, these were not used in the final model because they had an insignificant effect in this sample. Because information on the severity of illness was not available, it was not included in the model.

## Results

About 10% (788/8112) of children aged ⩽ 15 years were reported to have had an acute illness or injury one month prior to the survey (Table 2). The most commonly reported illnesses were fever and diarrhoea, which together accounted for more than 60% of all illnesses (485/788). Of the children who had been ill, about 39% (310/788) had been taken to see public providers and 19% (150/788) had been taken to private providers. This translates roughly to a 60% chance of using formal health care in the event of a child being ill or injured. The average cost of obtaining care from formal providers was 232 Nepalese rupees (US$ 4.14 in 1995–96); care from informal providers cost 159 Nepalese rupees (US$ 2.84).

Both price and income were significant predictors of the use of formal care (see Appendix 1 and Appendix 2 for coefficients in the logit models, available on the web version only at http://www.who.int/bulletin). Price elasticity ranged from −0.11 to −0.23 in different socioeconomic groups, averaging −0.16 (Table 3). The differences in elasticity across income groups are substantial (twice as much in the richest group compared to the poorest group).

Fig. 1 shows the demand curve. At an average price of 202 Nepalese rupees (US$ 3.61), about 59% of parents seek any type of care for their children. The demand curve exhibits continuous and declining price elasticity as price rises.

Using the model's coefficients, a simulation was carried out in order to determine the impact of different financial policies on the use of formal children's health-care services. The results are shown in Table 4.

Overall, a subsidy of 100% would increase the current utilization rate by 56%, while a 100% increase in fees would lead to a drop of only 12%. In other words, if the conditional demand for formal care at present is 600 instances per 1000 sick children, a full subsidy would increase this figure to 940 instances per 1000 sick children. On the other hand, if the

Table 2. **Key characteristics of 8112 children aged ⩽ 15 years in 2847 households who were reported to have been ill or injured in the past month in Nepal**

| Characteristic | No. (%)[a] (*n* = 8112) |
|---|---|
| Children who had been ill or injured | 788 (9.7) |
| Most frequently reported illness | |
| Fever | 336 (42.6) |
| Diarrhoea | 149 (18.9) |
| Caregiver sought health care for child | 566 (71.8) |
| Caregiver sought formal care | 460 (58.3) |
| Public care | 310 (39.3) |
| Private care | 150 (19.0) |
| Caregiver did not seek care or sought informal care | 328 (41.6) |
| No care | 232 (29.4) |
| Traditional healer | 40 (5.1) |
| Pharmacy | 56 (7.1) |
| Average health-care costs[b,c] | |
| Formal provider (*n* = 458)[d] | 232 (303) |
| Informal provider (*n* = 96) | 159 (253) |
| Mean income per capita in 1995/96 Nepalese rupees[c] | 7452 (8611) |
| Sex ratio (Female: Male) (*n* = 8112) | 49:51 |

[a] Figures in the parenthesis indicate percentage or standard deviation.
[b] Fees for first consultation and travel expenses in 1995/96 Nepalese rupees (US$ 1.00 = 56 Nepalese rupees).
[c] Values are mean (standard deviation).
[d] Two observations with extreme values were dropped from this analysis.

Table 3. **Price elasticity of demand for formal health-care services for children in Nepal[a]**

| Group | Price elasticity[b] |
|---|---|
| Overall price elasticity of demand | −0.16 |
| By age group | |
| Infants | −0.17 |
| 1–5 years | −0.16 |
| 6–15 years | −0.16 |
| By income | |
| Quartile 1 (poorest) | −0.23 |
| Quartile 2 | −0.18 |
| Quartile 3 | −0.15 |
| Quartile 4 (richest) | −0.11 |
| By sex | |
| Girls | −0.18 |
| Boys | −0.15 |
| Overall income elasticity of demand | 0.38 |

[a] Estimated at an average price of 202 Nepalese rupees (US$ 3.61).
[b] These results are conditional upon a parent reporting their child's illness.

present price of care were doubled then this number would drop to 528 instances per 1000 sick children, but revenue would be increased through user fees. In general, the impact of subsidizing health care would be substantial for the poorest children, while the impact of increasing fees would be minimal for the richest ones.

## Discussion

The results of this study need to be interpreted with great care for several reasons. Due to the absence of the information on the quality of care in the formal sector, our estimates do not take into account how quality affects demand; this has been found to be both positive and significant in many developing countries (*26*–*29*). Furthermore, the price variable includes only the financial costs associated with receiving care and thus excludes the opportunity cost of time (time–price) which may have even larger effects (*30*, *31*). In a country like Nepal, where the majority of the population lives in rural areas and is poor, time costs may be more important than user fees. In Burkina Faso, where national per capita income is similar to that of Nepal, the time costs of obtaining care account for as much as 73% of the total household expenditure on health care (*32*).

Had the price and quality of alternative service providers been available, it would have been possible to model a more robust analysis in a nested logit framework, and this would have helped to assess what would happen when prices are increased by one provider and patients opt for another method of care, such as self-medication, in response to changes in price (*8*, *11*, *33*, *34*). This would also have made it possible to look at the interrelationship between price, income and choice of care with a functional form that is non-linear in terms of net consumption as proposed by Gertler & van der Gaag (*8*).

The estimated price elasticities are conditional upon the reporting of illness and therefore reflect responsiveness in the short term only (*35*). Further, the recall period was 1 month and this may not have captured possible intertemporal fluctuations of disease patterns within a year.

Our results show that price is a significant determinant of the utilization of health-care services for children in Nepal. However, the overall effect of price on utilization is inelastic. Our elasticity estimates are a little less than those found in other settings (*11*). The possible causes of this dissonance could be the exclusion of time costs and use of different types of modelling. Moreover, our estimates may have been influenced by the low income levels in Nepal and the fact that health insurance does not exist there (*8*).

While the potential drop in utilization rates after an increase in fees is small, the gain in the utilization rate after implementation of a subsidy is much more substantial. If the priority of the national health service is to improve utilization of outpatient care for children, our results show that subsidies could work. Assuming that the use of medical care leads to the avoidance of unnecessary child mortality, a full subsidy for outpatient care for children, as has been implemented in many developed countries, may lead to a substantial improvement in health outcomes by bringing about a 56% increase in the utilization rate.

The benefit of subsidies will affect the poorest children most because their utilization rate will increase the most. However, in financial terms rich households will probably benefit more because the services they currently use and pay for will cost less than what they are willing to pay (*11*). We are aware that recommending a subsidy requires consideration of sources of financing. This is a promising area for future research.

The estimates of price elasticity indicate that there is a potential increase in revenue if fees are increased for outpatient care for children. Formal health-care providers can raise the price of care without losing their customers. For example, doubling the present average price would cause utilization to drop to only 12% but would ensure that revenues increased. Although

Table 4. **Predicted change in probability of seeking formal health care for children aged ⩽ 15 years in Nepal after a change in financing policy by income, sex and age of child. Values are percentages unless otherwise indicated**

| Group | Probability of use at current average price[a] | Change in probability of use after implementation of subsidy | | | | Change in probability of use after implementation of fee increase | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 25% subsidy | 50% subsidy | 75% subsidy | 100% subsidy | 25% increase | 50% increase | 75% increase | 100% increase |
| All ($n$ = 788) | 59 | 3.4 | 10.2 | 20.3 | 55.9 | −5.1 | −8.5 | −10.2 | −11.9 |
| By income | | | | | | | | | |
| Quartile 1 (poorest) ($n$ = 193) | 43 | 0.0 | 7.0 | 20.9 | 95.3 | −14.0 | −18.6 | −20.9 | −25.6 |
| Quartile 2 ($n$ = 186) | 55 | 1.8 | 9.1 | 20.0 | 65.5 | −9.1 | −10.9 | −14.5 | −16.4 |
| Quartile 3 ($n$ = 208) | 62 | 3.2 | 9.7 | 19.4 | 50.0 | −3.2 | −6.5 | −9.7 | −11.3 |
| Quartile 4 (richest) ($n$ = 201) | 74 | 5.4 | 10.8 | 14.9 | 31.1 | 0.0 | −1.4 | −2.7 | −4.1 |
| By sex of child | | | | | | | | | |
| Male ($n$ = 432) | 62 | 3.2 | 9.7 | 17.7 | 50.0 | −4.8 | −8.1 | −9.7 | −11.3 |
| Female ($n$ = 356) | 56 | 3.6 | 10.7 | 21.4 | 62.5 | −5.4 | −8.9 | −12.5 | −14.3 |
| By age of child | | | | | | | | | |
| < 1 year ($n$ = 88) | 58 | 3.4 | 10.3 | 20.7 | 58.6 | −5.2 | −8.6 | −10.3 | −13.8 |
| 1–5 years ($n$ = 401) | 60 | 3.3 | 10.0 | 20.0 | 55.0 | −5.0 | −8.3 | −10.0 | −13.3 |
| 6–15 years ($n$ = 299) | 59 | 1.7 | 8.5 | 18.6 | 55.9 | −1.8 | −3.6 | −7.1 | −8.9 |

[a] Average price estimated at 202 Nepalese rupees (US$ 3.61).

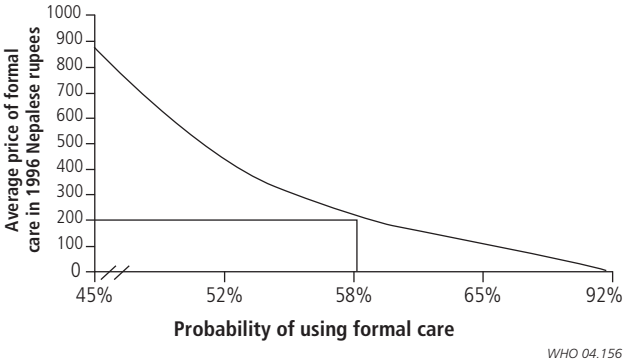
this seems to be an attractive policy from a cost-recovery viewpoint, it has been argued elsewhere that even a small drop in health-care utilization caused by increases in user fees may bring about a large societal cost if the illnesses for which care is not sought have spill-over effects (or externalities), e.g. as in the case of tuberculosis (*9*). Further, estimates also reveal that a small increase in fees will lead to an appreciable drop in the use of health-care services by low-income children. Similar results have been reported in Burkina Faso, where the predicted changes in the probability of using health care after introduction of a user fee were less for those in the quartile with the highest income but were 10 times greater for those in the lowest quartile (*9*).

Several strategies appear relevant here but need further scrutiny. First, poor people may benefit from price discrimination under a prepayment scheme. Price discrimination may be easier to implement because "it can be centralized and it only needs to be done periodically outside the pressure of having to treat an illness" (*11*). Second, the revenue from a fee increase can be reinvested to improve the quality of care, and poorer people may benefit from this more than others (*36*). Improving the quality of care should begin with improving the availability of essential drugs (*37*). Third, the impact of a fee increase on poorer patients could be minimized by using mechanisms such as self-selection; this allows health managers to "cross-subsidize their market choice by over-charging the non-poor in other segments of the market" (*38*). Lastly, because there may be a greater potential role for user fees within hospitals than in primary health-care facilities (*39*), fees may need to rise by different amounts in different facilities.

## Conclusion

The effect of price on decisions about whether to utilize health-care services for children in Nepal is statistically significant, but the size of the impact is modest. Subsidy policies could improve utilization substantially, while increases in fees would bring about modest declines in utilization and generate increased revenue. Financing policies that reduce the price of care at the point of delivery (through insurance or otherwise) may help address utilization problems. ■

Fig. 1. **Demand for formal health-care services for children in Nepal** (US$ 1.00 = 56 Nepalese rupees)




## Acknowledgements

This study was carried out under the auspices of Tropical Medicine Heidelberg. We thank the Central Bureau of Statistics (Nepal) and The World Bank for providing us with the NLSS–I dataset. Thanks are also due to two anonymous reviewers whose input improved this paper substantially. Finally, we thank the members of the Health Economics Group at the Department of Tropical Hygiene and Public Health (Heidelberg) for their constructive comments and Ms Linda "Jay" Jackson for correcting English errors.

**Competing interests:** none declared.

## Résumé

### Modélisation de l'efficacité des politiques de financement dans l'amélioration de la sous-utilisation des services de santé pédiatriques au Népal

**Objectif** Les auteurs cherchent à estimer la réactivité au prix de l'utilisation des services de santé pédiatriques officiels népalais et à utiliser cette information pour modéliser l'impact de subventions ou d'une augmentation des frais à la charge des utilisateurs.

**Méthodes** Les auteurs ont obtenu au total 8112 observations individuelles (concernant des enfants de moins de 15 ans) provenant de 2847 foyers de 274 communautés grâce à l'Enquête sur le niveau de vie au Népal 1996. Ils ont appliqué un modèle logit pour déterminer l'impact net du prix sur la décision d'un parent ou un parent substitut de solliciter ou non des soins pour un cas de maladie donné. Ils ont utilisé les coefficients du modèle pour calculer la réactivité au prix des décisions d'utilisation.

**Résultats** Les parents ou les parents substituts ont signalé que 9,7 % des enfants (788/8112) avaient été malades ou accidentés au cours du mois précédent. Ils ont indiqué qu'ils avaient sollicité des soins dans 566 (71,8 %) de ces cas, et le plus souvent auprès des dispensateurs publics. L'élasticité-prix de la demande en soins de santé pédiatriques auprès du secteur officiel a été estimée à -0,16. A mesure que les prix augmentent, la courbe de demande présente une élasticité-prix continue et en baisse. Globalement, une subvention à hauteur de 100 % des frais réglés par les utilisateurs augmenterait les taux d'utilisation actuels de 56 %, tandis qu'un accroissement de 100 % de ces frais conduirait à une baisse de l'utilisation de 12 % seulement. Le différentiel d'utilisation entre les groupes de revenus était très important une fois les modifications du montant des frais mises en place.

**Conclusion** Bien que l'effet du prix sur l'utilisation des services de soins de santé pédiatriques au Népal soit statistiquement significatif, l'ampleur de l'impact est modeste. Les politiques visant à subventionner les frais à la charge de l'utilisateur pourraient accroître notablement l'utilisation, tandis qu'une augmentation de ces frais pourrait entraîner une baisse modeste de l'utilisation et générer une hausse de revenus.

## Resumen

### Modelización de la eficacia de las políticas de financiación para mejorar el uso de los servicios de salud infantil en Nepal

**Objetivo** Estimar la respuesta a los precios de la utilización de los servicios formales de atención de salud infantil en Nepal, y usar dicha información para modelizar el impacto de las subvenciones o los aumentos de los honorarios pagados por los usuarios en esa utilización.

**Métodos** Se reunieron 8112 observaciones individuales (de niños ⩽ 15 años) realizadas en 2847 hogares de 274 comunidades durante la Encuesta del Nivel de Vida de Nepal de 1996. Se aplicó un modelo logit para determinar el impacto neto del precio en la decisión de un progenitor o un cuidador de buscar atención ante un caso concreto de enfermedad, y se usaron los coeficientes del modelo para calcular la respuesta a los precios de las decisiones de utilización.

**Resultados** Los progenitores o cuidadores informaron de que un 9,7% de los niños (788/8112) habían sufrido enfermedades o traumatismos en el mes anterior. Los padres notificaron que habían buscado atención sanitaria en 566 (71,8%) casos, y esa búsqueda se centró con mayor frecuencia en los proveedores públicos. La elasticidad de la demanda frente a los precios de los servicios de salud infantil en el sector estructurado se estimó en -0,16. A medida que aumentan los precios, la curva de demanda muestra una disminución constante de la elasticidad. En términos generales, una subvención del 100% de los honorarios pagados por los usuarios aumentaría las tasas de utilización en un 56%, mientras que un aumento del 100% de esos honorarios conllevaría una disminución de la utilización de sólo un 12%. El diferencial de utilización entre los distintos grupos de ingresos fue sustancial después de cambiar los honorarios.

**Conclusión** El efecto de los precios en la utilización de los servicios de atención infantil en Nepal es estadísticamente significativo, pero moderado. Las políticas tendentes a subvencionar el pago de honorarios podrían aumentar la utilización sustancialmente, mientras que los aumentos de los honorarios comportarían disminuciones moderadas de la utilización y generarían mayores ingresos.

## ملخص

### وضع نموذج لفعالية سياسات التمويل لمواجهة النقص في الانتفاع من خدمات صحة الأطفال في نيبال

**الهدف**: عملنا على تقدير مدى تأثير الاستجابة لتحديد الأسعار على الانتفاع الرسمي من خدمات الرعاية الصحية للأطفال في نيبال، واستخدام هذه المعلومات لوضع نموذج لتأثير استخدام التعويضات أو زيادة الأجور على المستخدمين.

**الطريقة**: تم تجميع الملاحظات الفردية من 8112 من الأطفال الذين تقل أعمارهم عن 15 عاماً من بين 2847 من السكان الموزعين في 274 مجتمعاً من المسح المعياري للمعيشة في نيبال عام 1996، ثم طبق نموذج لوغاريتمي لتحديد حصيلة التأثير على القرار الذي يتخذه الوالدان أو القائمون على إيتاء الرعاية الصحية لالتماس الرعاية في أصناف محدَّدة من الأمراض. وقد استخدمت قِيَم المعاملات الخاصة بالنموذج لحساب مدى الاستجابة بتحديد الأسعار في اتخاذ القرارات حول الانتفاع بخدمات الرعاية الصحية.

**الموجودات**: أبلغ الآباء والقائمون على إيتاء الرعاية الصحية عن أن 9.7% من الأطفال، وعددهم 788 من أصل 8112 طفلاً، قد عانوا من المرض أو الأذيات في الشهر المنصرم، وذكر الآباء أنهم التمسوا الرعاية في 565 من هذه الحالات، ويعادل ذلك 71.8% ، وقد كان التماس الرعاية أكثر من القطاع العام. وقد قدر أن مرونة الأسعار لمطالب الأطفال في خدمات الرعاية الصحية في القطاع الصحي تبلغ 0.16 . ومع ارتفاع السعر فإن منحي الطلب يتعرض لتناقص مستمر في مرونة الأسعار، وعلى وجه

الإجمال فإن 100% من التعويضات لأجور المستخدمين سيزيد من الانتفاع بمقدار 12% إن التفريق في الانتفاع بين المجموعات المختلفة الدخل كان واضحاً بعد تنفيذ التغييرات في الأجور.

**النتيجة:** رغم أن تأثير السعر على الانتفاع بخدمات الرعاية الصحية للأطفال في نيبال لم يكن له أهمية إحصائية، فإن مقداره وأثره جديران بالاعتبار. فالسياسات التي تعوض الأجور قد تزيد من الانتفاع زيادة ملحوظة، أما زيادة الأجور فقد تنقص الانتفاع بشكل متوسط وتسبب زيادة في العوائد.

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Appendix 1. **Descriptive statistics**

| Variable[a] | Mean | Standard deviation | Measurement |
|---|---|---|---|
| Log of price ($n$ = 786) | 5.31 | 0.84 | Natural log of price of health care |
| Log of income | 8.63 | 0.68 | Natural log of annual expenditure per capita (proxy for income) |
| Male sex | 0.51 | 0.50 | 1 = male; 0 = female |
| Infants (reference group) | 0.06 | 0.25 | 1 = age <1 year; 0 = other |
| Age 1–5 years | 0.32 | 0.47 | 1 = age 1–5 years; 0 = other |
| Age 6–15 years | 0.62 | 0.49 | 1 = age 6–15 years; 0 = other |
| Mother's formal schooling (number of years) | 1.01 | 2.77 | Number of years formal schooling |
| Mother heads the household | 0.08 | 0.27 | 1 = mother is head of household; 0 = otherwise |
| Mother in paid employment | 0.13 | 0.33 | 1 = mother in paid employment; 0 = otherwise |
| Terai region (reference group) | 0.41 | 0.49 | 1 = Terai region; 0 = other |
| Mountain region | 0.12 | 0.33 | 1 = mountain region; 0 = other |
| Hill region | 0.47 | 0.50 | 1 = hill region; 0 = other |
| Rural area | 0.83 | 0.37 | 1 = rural area; 0 = urban |
| Public clinic 1 hour away | 0.29 | 0.45 | 1 = public clinic > 1 hour away; 0 = otherwise |
| Number of adults in household is 1–2 (reference group) | 0.40 | 0.49 | 1 = 1–2 adults in household; 0 = other |
| Number of adults in household is 3–5 | 0.46 | 0.50 | 1 = 3–5 adults in household; 0 = other |
| Number of adults in household is > 5 | 0.14 | 0.35 | 1 = ⩾ 5 adults in household; 0 = other |
| Reported illness ($n$ = 788) | | | |
| Diarrhoea (reference group) | 0.19 | 0.39 | 1 = diarrhoea; 0 = other |
| Respiratory problems | 0.04 | 0.21 | 1 = respiratory problem; 0 = other |
| Fever | 0.43 | 0.49 | 1 = fever; 0 = other |
| Skin diseases | 0.03 | 0.17 | 1 = skin disease; 0 = other |
| Injury | 0.05 | 0.21 | 1 = injury; 0 = other |
| Other | 0.26 | 0.44 | 1 = other; 0 = diarrhoea, respiratory problem, fever, skin disease or injury |

[a] For variables $n$ = 8112 unless otherwise indicated.

Appendix 2. **Estimated coefficients for logit model examining whether formal care would be sought for a child suffering from a given illness**

| Variable | Model 1 | | Model 2[a] | | | |
|---|---|---|---|---|---|---|
| | Coefficient | z-Statistics | Coefficient | z-Statistics | Odds ratio | Robust standard error[b] |
| Age 1–5 years | 0.052 | (0.20) | | | | |
| Age 6–15 years | −0.078 | (0.29) | | | | |
| Male child | 0.309 | (1.99)[c] | 0.322 | (2.10)[c] | 1.38 | 0.21 |
| Mother's formal schooling (number of years) | 0.010 | (0.28) | | | | |
| Mother heads the household | −0.115 | (0.45) | | | | |
| Mother in paid employment | −0.222 | (0.95) | | | | |
| Log of price | −0.413 | (3.77)[d] | −0.399 | (3.45)[d] | 0.67 | 0.08 |
| Log of income | 0.901 | (5.58)[d] | 0.921 | (5.43)[d] | 2.51 | 0.43 |
| Number of adults in the household: 3–5 | −0.101 | (0.57) | | | | |
| Number of adults in household is > 5 | 0.193 | (0.74) | | | | |
| Mountain region | −0.793 | (2.96)[d] | −0.803 | (2.58)[d] | 0.45 | 0.14 |
| Hill region | −0.629 | (3.41)[d] | −0.648 | (3.32)[d] | 0.52 | 0.10 |
| Rural area | −0.069 | (0.26) | | | | |
| Public clinic 1 hour away | −0.369 | (2.01)[c] | −0.370 | (1.78)[e] | 0.69 | 0.14 |
| Reported illness | | | | | | |
| Respiratory problems | −0.105 | (0.25) | −0.093 | (0.19) | 0.91 | 0.45 |
| Fever | −0.461 | (2.09)[c] | −0.506 | (2.11)[c] | 0.60 | 0.14 |
| Skin diseases | 0.597 | (1.14) | 0.438 | (0.68) | 1.55 | 1.00 |
| Injury | −0.108 | (0.26) | −0.187 | (0.46) | 0.83 | 0.34 |
| Other | −0.501 | (2.06)[c] | −0.566 | (2.19)[c] | 0.57 | 0.15 |
| Constant | −4.453 | (3.22)[d] | −4.761 | (3.73)[d] | | |
| Log likelihood | −488.87119 | | −490.69885 | | | |
| $\chi^2$ (degrees of freedom) | 90.28 (19) | | 57.22 (11) | | | |
| Probability > $\chi^2$ | 0.0000 | | 0.0000 | | | |
| Goodness of fit (Hosmer–Lemeshow test) | $\chi^2 = 6.45$ (df = 8); $P = 0.59$ | | $\chi^2 = 7.5$ (df = 8); $P = 0.48$ | | | |
| Number of observations | 786 | | 786 | | | |

[a] This model excludes variables which turned out to be insignificant in Model 1, and is the basis for elasticity estimates.
[b] Standard errors are robust standard errors corrected for intrahousehold correlations among individual observations.
[c] *P*-value < 5%.
[d] *P*-value < 1%.
[e] *P*-value < 10%.