Table 3. **Household out-of-pocket spending on health care in the previous 30 days, by economic quintile,[a] Nepal, 2011–2012**

Expenditure	Households that reported expenditure on health					
	All ($n=1517$)	Quintile 1 ($n=270$)	Quintile 2 ($n=275$)	Quintile 3 ($n=301$)	Quintile 4 ($n=324$)	Quintile 5 ($n=347$)
Costs per household, Nepalese rupees (SE)[b]						
Outpatient	1 999 (202)	1 564 (266)	2 123 (664)	1 559 (149)	2 037 (242)	2 722 (514)
Inpatient	39 657 (6 310)	25 200 (12 437)	51 147 (20 377)	26 059 (8 153)	34 578 (7 170)	50 044 (8 104)
Ayurvedic	861 (138)	301 (55)	907 (251)	828 (131)	759 (460)	1 268 (340)
Other traditional medicine or healers	335 (100)	263 (117)	239 (80)	346 (130)	512 (336)	319 (117)
Transportation and other costs	471 (74)	31 (8)	143 (53)	98 (28)	90 (36)	69 (26)
Proportion of total household expenditure represented by out-of-pocket spending on health care, % (SE)	10.1 (1.26)	10.7 (1.55)	14.8 (3.80)	8.3 (1.81)	10.3 (3.24)	6.9 (1.48)

SE: standard error; US$: United States dollars.

[a] Quintile 1 represents the poorest households and quintile 5 represents the wealthiest households.

[b] The average conversion rate during the study was 1 Nepalese rupee to US$ 0.012.

indicated that households in the richest economic quintile spent a considerably smaller share of their total expenditure on health (6.9%) than the other households (range: 8.3% in quintile 3 to 14.8% in quintile 2; Table 3).

Catastrophic health spending

Incidence and intensity

According to the respondents, 13.8% of the study households had experienced catastrophic expenditure on health in the 30 days before interview (Table 4). Such expenditure was most frequently associated with episodes of hypertension, followed – in descending order of frequency – by cold/cough/fever, diabetes and asthma (Table 4). Catastrophic expenditure associated with certain illnesses – such as migraine/headache (concentration index: −0.879; $P<0.001$) – appeared to be concentrated among the relatively poor households. When we investigated the level by which out-of-pocket treatment costs for each of the commonly reported illnesses exceeded the threshold for catastrophic expenditure, we found that the treatment costs for cold/cough/fever (concentration index: −0.392; $P<0.001$) and migraine/headache (concentration index: −0.901; $P<0.001$) appeared to exceed those that the poorer households could bear (Table 5).

Determinants

The risk of catastrophic spending on health – in the 30 days before interview –

Table 4. **Distribution of catastrophic health expenditure in previous 30 days, divided by major illness, Nepal, 2011–2012**

Illness	Catastrophic expenditure		Catastrophic overshoot[a]		Mean positive overshoot (%)[b]
	% of study households ($n=1997$)[c]	Concentration index (95% CI)	%[c]	Concentration index (95% CI)	
Any	13.8	−0.126 (−0.184 to −0.069)	4.6	−0.045 (−0.195 to 0.105)	33.2
Hypertension	1.3	−0.206 (−0.417 to 0.004)	0.1	−0.224 (−0.462 to 0.116)	10.7
Cold/cough/fever	1.2	−0.262 (−0.459 to −0.066)	0.1	−0.392 (−0.539 to −0.245)	6.8
Diabetes	1.1	−0.099 (−0.304 to 0.107)	0.1	−0.250 (−0.617 to 0.118)	10.2
Asthma	1.0	−0.185 (−0.389 to 0.018)	0.1	0.008 (−0.536 to 0.552)	12.3
Gastritis/peptic ulcer	0.9	−0.111 (−0.447 to 0.225)	0.2	0.364 (−0.111 to 0.839)	17.9
Injury	0.8	−0.033 (−0.328 to 0.261)	0.4	0.011 (−0.479 to 0.501)	49.3
Arthritis	0.7	−0.233 (−0.467 to 0.014)	0.3	−0.395 (−0.830 to 0.041)	41.2
Heart disease	0.5	−0.247 (−0.497 to 0.002)	0.0	−0.194 (−0.511 to 0.122)	8.3
Migraine/headache	0.2	−0.879 (−0.957 to −0.801)	0.0	−0.901 (−0.981 to −0.821)	4.8
Hyperuricaemia	0.2	0.426 (0.379 to 0.473)	0.0	0.426 (0.379 to 0.473)	5.0

CI: confidence interval.

[a] The mean value by which household out-of-pocket expenditure on the illness – as a percentage of total household expenditure – exceeded the 10% threshold used to define catastrophic household expenditure.

[b] The mean level by which out-of-pocket expenditure on the illness, by a household reporting catastrophic health expenditure, exceeded the 10% threshold used to define catastrophic household expenditure.

[c] Adjusted for sampling weight.

Table 5. **Illness and the risk of catastrophic health expenditure in the previous 30 days, by economic quintile,[a] Nepal, 2011–2012**

Illness[b]	Rate ratio (95% CI)				
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Diabetes	2.37 (1.16 to 4.83)	2.13 (1.03 to 4.41)	2.85 (1.67 to 4.84)	1.14 (0.61 to 2.13)	1.04 (0.45 to 2.39)
Heart disease	2.24 (1.29 to 3.88)	0.76 (0.26 to 2.27)	1.19 (0.50 to 2.85)	2.17 (0.74 to 6.43)	2.36 (0.83 to 6.71)
Asthma	2.09 (1.28 to 3.42)	1.62 (0.73 to 3.59)	1.94 (1.12 to 3.36)	4.26 (1.89 to 9.61)	1.39 (0.40 to 4.82)
Arthritis	1.72 (0.82 to 3.63)	2.21 (1.24 to 3.94)	1.29 (0.67 to 2.48)	2.32 (1.14 to 4.70)	1.91 (0.75 to 4.88)
Hypertension	1.66 (0.87 to 3.15)	3.26 (1.21 to 8.81)	1.47 (0.81 to 2.67)	1.52 (0.92 to 2.51)	1.62 (0.69 to 3.81)
Migraine/headache	1.64 (0.74 to 3.68)	4.35 (1.71 to 11.04)	1.96 (0.58 to 6.60)	2.29 (0.93 to 5.62)	NA[c]
Gastritis	1.55 (0.76 to 3.17)	1.29 (0.63 to 2.66)	1.32 (0.73 to 2.38)	1.45 (0.77 to 2.74)	2.09 (0.86 to 5.06)
Cold/cough/fever	1.25 (0.57 to 2.73)	2.20 (1.10 to 4.40)	0.85 (0.47 to 1.52)	0.91 (0.43 to 1.94)	0.87 (0.40 to 1.87)
Injury	1.19 (0.35 to 4.03)	3.57 (1.41 to 9.05)	2.58 (1.14 to 5.81)	2.59 (1.32 to 5.09)	3.47 (1.42 to 8.49)
Hyperuricaemia	0.91 (0.38 to 2.16)	1.24 (0.40 to 3.84)	0.11 (0.01 to 0.97)	3.15 (1.65 to 6.00)	1.74 (0.37 to 8.26)

CI: confidence interval; NA: not applicable.
[a] Quintile 1 represents the poorest households and quintile 5 represents the wealthiest households.
[b] For each illness, we compared households that had experienced at least one episode with households that had experienced no episodes.
[c] No episodes of migraine/headache were reported in households in quintile 5.

varied by the type of illness that affected the household and the economic quintile to which the household belonged (Table 5). For example, in households belonging to the poorest quintile, one or more episodes of diabetes (rate ratio, RR: 2.37; 95% CI: 1.16–4.83), asthma (RR: 2.09; 95% CI: 1.28–3.42) or heart disease (RR: 2.24; 95% CI: 1.29–3.88) were associated with a significantly increased risk of catastrophic expenditure. The occurrence of at least one episode of diabetes increased the risk of catastrophic spending by households in quintiles 2 (RR: 2.13; 95% CI: 1.03–4.41) and 3 (RR: 2.85; 95% CI: 1.67–4.84) but did not significantly increase the risk of such spending by the wealthier households. Injury was associated with an elevated risk of catastrophic spending from the second to the fifth quintile (Table 5).

Discussion

This study provides evidence relating illnesses to catastrophic out-of-pocket expenditure on health care. More than one in every seven of the households that we investigated in urban areas of Kathmandu Valley reported catastrophic expenditure on health in the previous 30 days. In an earlier nationwide study, using the same definition, the corresponding proportion was only 5.9%.[4] However, our study focused on urban areas of Nepal, where health facilities are used more frequently than in rural areas.

After adjusting for confounders, we found that major noncommunicable diseases – such as diabetes, asthma and heart disease – were often associated with catastrophic spending in the poorest households. We also found that injury significantly increased the risk of catastrophic expenditure, irrespective of the household's economic status. A strong relationship between catastrophic expenditure and diabetes was also reported in a review of data from 35 low- and middle-income countries.[14] In a study in Viet Nam, the households of 27.5% of inpatients receiving treatment for injury had been faced with catastrophic expenditure.[29]

In Nepal there is scope for reducing the economic burden caused by noncommunicable diseases such as diabetes and heart disease. The control and management of the associated risk factors need to be improved, to prevent the onset of the diseases and any further complications. The Islamic Republic of Iran has successfully employed programmes of primary health care, targeted training of health workers and clear guidelines to improve diabetes screening and diagnosis at an early stage.[30] The regulation of tobacco and alcohol can also reduce the risks of several noncommunicable diseases. The government of Nepal banned tobacco and alcohol advertisements in 1996 and has taxed tobacco and alcohol products for many years. The raising of tobacco prices has been found to be an effective way of reducing tobacco consumption, especially among manual labourers and other low-income groups.[31] Such interventions can reduce the incidence of some noncommunicable diseases.[32]

It was not surprising to see injuries among the major causes of catastrophic household expenditure in Kathmandu Valley. Although drink-driving is banned in Nepal and the traffic police conduct regular breath tests among drivers in cities, road traffic accidents remain a major cause of injuries requiring treatment in Nepal – as in south-eastern Asia.[33] In the absence of any general health insurance scheme, serious injury is likely to be associated with unexpected and large household expenditures. The government of Nepal should consider intensifying programmes for the prevention of traffic accidents and injuries in urban municipalities, through road and workplace safety measures such as speed limits and traffic signals.[34]

As a policy priority – for the prevention of health-care-related financial catastrophe in the urban households of Nepal – some form of broad-based risk pooling needs to be encouraged.[6,35,36] The introduction of such a financial protection mechanism may be challenging in Nepal, and with limited fiscal space, a rapid increase in Nepal's national health expenditure seems unlikely, at least in the short-term.[37] However, a phased introduction of health insurance or other forms of financial protection may be feasible.[7,38]

This study has several limitations. First, it was conducted between November 2011 and January 2012 – i.e. in mid-winter. The timing of the survey may well have influenced the recorded prevalence of communicable diseases such as colds, which tend to be more common in winter than in summer. However, in a national survey that took place in 2010–2011 – the Nepal Living

Standard Survey – cold/cough/fever was found to be the most prevalent illness throughout the year.[39] Other studies have also reported a fairly consistent prevalence of diabetes and hypertension in urban Nepal.[40,41]

The second limitation is that our results are based on self-reported health spending. We assumed that poor households might use coping strategies to minimize their expenditure on health care – e.g. avoiding consultations with physicians, skipping dosages or selecting cheaper medicines. In the treatment of chronic illnesses, non-adherence to prescribed medications is common.[42,43] Although respondents were asked whether, to minimize costs, they had ever skipped a dosage, delayed seeking new supplies of medicines or reduced doses, we were not able to quantify how much the respondents may have saved from such cost aversion. Therefore, although, for each of the commonly reported illnesses, we estimated the treatment costs paid by an affected household, these estimates may have been smaller than the full costs of a standard regimen of treatment.

Despite its limitations, this population-based study demonstrates associations between injury and several major diseases and the incidence of catastrophic household expenditure on health care. By identifying the economic burden posed by each type of common illness, it should be possible to prioritize health interventions that are most likely to protect households from impoverishment – even in resource-limited settings.

In Nepal, there is an urgent need to initiate programmes for the control and management of the diseases associated with catastrophic household spending and the prevention of road traffic and other injuries. A phased introduction of health insurance, initially designed to cover or subsidize the costs of care for diabetes and heart disease, should be considered in Nepal. The national government needs to take extra measures to protect the poorest in its population from financial catastrophe. ■

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ملخص

معدل حدوث الإنفاق الأسري الكارثي على الصحة في نيبال والاعتلالات المرتبطة به: دراسة استقصائية متعددة القطاعات

الغرض تحديد معدل حدوث الإنفاق الأسري الكارثي على الصحة في نيبال – والاعتلالات الشائعة المرتبطة بهذا الإنفاق – في نيبال.

الطريقة قمنا بإجراء دراسة استقصائية سكانية متعددة القطاعات في خمس بلديات في كاتماندو فالي في الفترة من تشرين الثاني/ نوفمبر 2011 إلى كانون الثاني/ يناير 2012. وقد اعتبر الإنفاق من المال الخاص على الصحة خلال الثلاثين يوماً السابقة الذي تجاوز 10٪ من مجموع الإنفاق الأسري على مدار الفترة ذاتها كارثياً، لكل أسرة خضعت للدراسة الاستقصائية. وقمنا بتقدير معدل حدوث الإنفاق الصحي الكارثي وكثافته. وقمنا بتحديد الاعتلالات المرتبطة على نحو أكثر شيوعاً بهذا الإنفاق باستخدام نموذج ارتداد بواسون، وتقييم توزيع الإنفاق عن طريق الشرائح الخمسية الاقتصادية للأسر باستخدام مؤشر التركيز.

النتائج بشكل عام، أبلغت 284 من أصل 1997 أسرة خضعت للدراسة في كاتماندو، أي 13.8 ٪ بعد التصحيح عن طريق أخذ عينات الوزن عن إنفاق صحي كارثي خلال الثلاثين يوماً السابقة للدراسة الاستقصائية. وتبين ارتباط هذا الإنفاق، بعد تصحيحه لأغراض تحديد العوامل المؤثرة، بالإصابات لا سيما تلك الناجمة عن حوادث المرور. وكان الإنفاق الكارثي بواسطة الأسر في أفقر شريحة خمسية مرتبطة بنوبة واحدة على الأقل من السكري أو الربو أو مرض القلب.

الاستنتاج ارتبط الإنفاق الأسري الكارثي على الصحة في إحدى المناطق الحضرية في نيبال في معظمه بالإصابات والأمراض غير السارية مثل السكري والربو. وينبغي تعزيز التدخلات في جميع أرجاء نيبال من أجل مكافحة الأمراض غير السارية وتدبيرها العلاجي وتوقي حوادث المرور. وينبغي أن يؤدي الاستخدام التدريجي للتأمين الصحي أيضاً إلى تقليل معدل حدوث الإنفاق الأسري الكارثي.

摘要

尼泊尔家庭灾难性卫生支出发生率和相关疾病：横断面调查

目的 确定尼泊尔灾难性卫生家庭支出发生率以及通常与这些支出相关的疾病。

方法 在 2011 年 11 月和 2012 年 1 月之间，我们在加德满都谷地五个自治市展开基于人口的横断面口调查。对于每个受调查的家庭，在调查前 30 天预算外卫生支出超过同一时期家庭总开支 10% 的支出被视为灾难性支出。我们估计灾难性卫生支出发生率和强度。我们使用泊松回归模型识别与此类支出最常相关的疾病，并通过集中指数按照家庭经济五分位数评估支出的分配。

结果 总体来看，加德满都 1997 户受研究的家庭有 284 户（即抽样权重调整后 13.8% 的家庭）报告在调查前 30 天有灾难性卫生支出。调整混杂因素后，发现这部分支出与损伤有关，特别是道路交通事故引起的伤害。10% 最贫穷的家庭中，其灾难性支出与糖尿病、哮喘或心脏病当中至少一种疾病的发病期有关。

结论 在尼泊尔市区，家庭灾难性卫生支出主要与损伤和非传染性疾病相关，如糖尿病和哮喘。在尼泊尔全国，应该提升控制和管理非传染性疾病和预防道路交通事故的干预措施。分阶段引入医疗保险也将降低灾难性家庭支出的发生率。

Résumé

Dépenses catastrophiques de santé des ménages au Népal: une enquête transversale

Objectif Déterminer l'incidence de dépenses catastrophiques de santé des ménages – et les maladies généralement associées à ces dépenses – au Népal.

Méthodes Nous avons mené une enquête transversale sur la population dans cinq municipalités de la Vallée de Katmandu entre novembre 2011 et janvier 2012. Pour chaque ménage étudié, les dépenses de santé qui sont restées à la charge du ménage dans les 30 jours précédents et qui ont dépassé 10% des dépenses totales du ménage au cours de la même période, ont été considérées comme étant catastrophiques. Nous avons estimé l'incidence et l'intensité des dépenses catastrophiques de santé. Nous avons identifié les maladies les plus généralement associées avec de telles dépenses en utilisant un modèle de régression de Poisson et évalué la distribution des dépenses par quintile économique des ménages en utilisant l'indice de concentration.

Résultats Dans l'ensemble, 284 des 1 997 ménages étudiés à Katmandu, c.-à- d. 13,8% après correction par pondération de l'échantillonnage, ont signalé des dépenses catastrophiques de santé dans les 30 jours qui ont précédé l'enquête. Après ajustement pour les variables confusionnelles, nous avons pu montrer que ces dépenses étaient associées à des blessures, en particulier celles causées par les accidents de la route. Les dépenses catastrophiques des ménages faisant partie du quintile le plus pauvre étaient associées à au moins un épisode de diabète, d'asthme ou de maladie cardiaque.

Conclusion Dans une zone urbaine du Népal, les dépenses catastrophiques de santé des ménages furent principalement associées à des blessures et à des maladies non transmissibles comme le diabète ou l'asthme. À travers tout le Népal, des interventions pour le contrôle et la gestion des maladies non transmissibles et pour la prévention des accidents de la route devraient être encouragées. Une introduction progressive de l'assurance maladie devrait également réduire l'incidence des dépenses catastrophiques des ménages.

Резюме

Распространение заболеваний в результате катастрофических расходов домашних хозяйств на медицинские услуги в Непале: перекрестное исследование

Цель Определить влияние катастрофических расходов на медицинские услуги в Непале и выявить, какие заболевания в большинстве случаев связаны с этими расходами, а также частоту возникновения этих заболеваний.

Методы С ноября 2011 г. по январь 2012 г было проведено перекрестное исследование среди населения пяти муниципальных образований Долины Катманду. Расходы на медицинские услуги для всех домашних хозяйств, принимавших участие в исследовании, признавались катастрофическими, если за предыдущие 30 дней они превышали 10% от общих расходов домашнего хозяйства за этот период.. Были оценены влияние и величина катастрофических расходов на медицинские услуги. Были определены заболевания, которые чаще всего связаны с такими расходами, при помощи модели пуассоновской регрессии и оценено распределение расходов по экономическим квинтилям домашних хозяйств при помощи индекса концентрации.

Результаты Всего 284 из 1997 домашних хозяйств в Катманду, участвовавших в исследовании, что составляет 13,8% после поправки на размер выборки, сообщили о катастрофических расходах на медицинские услуги за 30 дней, предшествовавших опросу. После поправки с учетом возможных неизвестных факторов эти расходы оказались связаны с травмами, в особенности полученными в результате дорожных происшествий. В домашних хозяйствах, относящихся к самой бедной части населения, были отмечены как минимум по одному случаю диабета, астмы или сердечно-сосудистых заболеваний.

Вывод В городских районах Непала катастрофические расходы домашних хозяйств на медицинские услуги преимущественно связаны с травмами и неинфекционными заболеваниями, такими как диабет и астма. На всей территории Непала должны быть предприняты оперативные меры по контролю и профилактике неинфекционных заболеваний и предотвращению дорожно-транспортных происшествий. Поэтапное внедрение медицинского страхования должно снизить численность катастрофических расходов домашних хозяйств на медицинские услуги.

Resumen

Incidencia del gasto catastrófico por motivos de salud y enfermedades asociadas con el mismo en los hogares en Nepal: un estudio transversal

Objetivo Determinar la incidencia del gasto catastrófico por motivos de salud de los hogares y las enfermedades generalmente asociadas con dichos gastos en Nepal.

Métodos Se llevó a cabo una encuesta transversal de la población en cinco municipios del Valle de Katmandú entre noviembre de 2011 y enero de 2012. Para cada hogar encuestado, se consideró catastrófico cualquier gasto de desembolso directo por motivos de salud en los últimos 30 días que hubiera excedido el 10 % del gasto total del hogar durante el mismo periodo. Se estimó la incidencia y el grado de los gastos catastróficos por motivos de salud. Se identificaron las enfermedades asociadas con mayor frecuencia con dichos gastos mediante un modelo de regresión de Poisson y se evaluó la distribución del gasto por quintil económico de los hogares mediante el índice de concentración.

Resultados En total, se descbrió que 284 de los 1997 hogares estudiados en Katmandú, es decir, un 13,8 % tras el ajuste mediante el muestreo de peso, tuvieron que hacer frente a gastos catastróficos por motivos de salud en los 30 días anteriores a la encuesta. Después del ajuste por factores de confusión, se halló que dicho gasto estaba asociado a lesiones, sobre todo aquellas derivadas de accidentes de tráfico y, en los hogares pertenecientes al quintil más pobre, con al menos un episodio de diabetes, asma o enfermedades cardíacas.

Conclusión En un área urbana de Nepal, el gasto catastrófico de los hogares por motivos de salud estuvo en su mayoría asociado a lesiones y a enfermedades no transmisibles como la diabetes y el asma. Es necesario fomentar las intervenciones para el control y el manejo de las enfermedades no transmisibles, así como la prevención de los accidentes de tráfico en todo Nepal. La introducción gradual de un seguro médico también podría reducir la incidencia de los gastos catastróficos de los hogares.

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IV 章
研究成果の刊行に関する一覧表

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著者氏名	論文タイトル名	書籍全体の編集者名	書　籍　名	出版社名	出版地	出版年	ページ

雑誌

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