Towards universal health coverage: an example of malaria intervention in Nepal

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ABSTRACT

A comprehensive and integrated assessment of health-system functioning requires measurement of universal health coverage (UHC) for disease-specific interventions. This paper aims to contribute to measurement of UHC by utilizing locally available data related to malaria in Nepal. This paper utilizes the elements of UHC as outlined by the World Health Organization (WHO). The concept of UHC represents both improvements in health outcomes and protection of people from poverty induced by health-care costs. Measuring UHC focusing on a tropical disease highlights the progress made towards elimination of the disease and exhibits health-system bottlenecks in achieving elimination of the disease. Several bottlenecks are found in the Nepalese health system that strongly suggest the need to focus on health-system strengthening to shift the health production function of malaria intervention. The disaggregated data clearly show the inequality of service coverage among subgroups of the population. Analysis of effective coverage of malaria interventions indicates the insufficient quality of current interventions. None of households faced catastrophic impact due to payment for malaria care in Nepal. However, the costs of hospital-based care of malaria were not captured in this analysis. The paper provides the current status of UHC for malaria interventions and reveals system bottlenecks on which policy-makers and stakeholders should focus to improve Nepal's malaria control strategy. It concludes that financial coverage of the malaria intervention is at an acceptable level; however, service coverage needs to be improved.

Key words: universal health coverage, malaria, Nepal, health-systems strengthening

INTRODUCTION

There are considerable debates on how to assess whether a country has achieved universal health coverage (UHC). There is no straightforward or defined way to achieve UHC; many paths towards UHC are found in the literature and no particular path to reach UHC is endorsed. There is no doubt, however, that UHC is desirable because it makes the current health achievements sustainable. It also improves health outcomes through greater access to health services and provides financial protection against the cost associated with illness.

UHC is a means to achieving better health status and to sustaining economic and social development. It is associated with better health, equity and financial protection. Achieving UHC is a long journey and requires a huge investment to design health systems that allow universality in health care.

A movement for UHC is now in progress after being endorsed by the World Health Assembly through a resolution in 2005. UHC is being considered as the umbrella health goal in the post-2015 development agenda. In December 2012, the movement prompted the United Nations General Assembly to call on governments to “urgently and significantly scale-up efforts to accelerate the transition towards universal access to affordable and quality health-care services.” Universal indicates equality and for everyone to have the opportunity. Coverage may be the outcomes of the intervention. UHC means that all people can use health services, while being protected against financial hardship associated with paying for them.

Nepal has made remarkable achievements in health outcomes and poverty reduction over the past two decades. International development partners are providing technical and financial support to work on elements and issues related to UHC;
However, designing the path of UHC is not straightforward and national average data hide the inequality in progress at the local level. In this situation, more evidence is needed at local level to find ways to improve the coverage of existing interventions and to design a health-care financing system. Building evidence in support of UHC is more important than measuring the relative achievement of UHC. In addition, we need to know how to increase access, coverage, and utilization of quality services, and how to address obstacles that hinder success of interventions.

This paper contributes to the aforementioned literature with discussion of how to measure UHC by utilizing the locally available data related to tropical diseases. Tropical diseases, such as malaria in Nepal, are linked to progress towards the Millennium Development Goals (MDGs). In Nepal, we have made good progress in terms of national averages; however, there may be inequalities and disparities among population groups. Measuring UHC focusing on tropical diseases highlights the progress made towards elimination of diseases and exhibits health-system bottlenecks in achieving the goal of elimination of diseases. The World malaria report 2013 indicated such possible gaps; for example, worldwide, between 2000 and 2012, estimated malaria mortality rates decreased by 45% in all age groups and by 51% among children under 5 years of age; however, millions of people at risk of malaria still do not have the access to interventions such as an insecticide-treated bednets, indoor residual spraying (IRS), diagnostic testing and artemisinin-based combination therapies. The concept of UHC represents both improvements in health outcomes and protection of people from poverty induced by health-care costs. Progress against malaria provides evidence of the tangible benefits of population-wide access to life-saving interventions. Analysis of financing strategies for tropical-disease care is needed in order to know the impact of health-care cost on household economies.

Several studies have suggested that there is a lack of consideration of the health-system context in interventions for tropical-disease control since factors of health systems can constrain the success of programmes such as tuberculosis control and malaria control. A comprehensive and more integrated assessment of health-system functioning requires measurement of UHC for disease-specific interventions. It is important for the country to know the relative status of UHC. For example, the Nepal health sector implementation plan 2010–2015 has set an objective to improve the health system to achieve universal coverage of essential health services.

The Sixty-fourth World Health Assembly Resolution WHA64.17 on malaria adopted in May 2011 focuses on developing strategic and operational plans for achieving and maintaining universal coverage of malaria interventions. As a Member State, Nepal has a strategic vision of a “malaria-free Nepal by 2026”; however, situation analysis and programme evaluation were primarily based on epidemiological data. Analysis of the situation of malaria intervention from a health-system approach is a major missing element despite the importance of better understanding the sustainability of programmes and the current status of UHC for malaria interventions in Nepal.

Specifically, this paper aims to answer two questions from a UHC perspective. (1) What are the important elements of UHC at the local level? (2) How can we measure UHC, particularly related to tropical diseases using the example of malaria? The analysis aims at assessing the effective coverage of malaria interventions and the catastrophic and impoverishing impact from the use of these interventions in Nepal by utilizing the data from health information systems and national representative household surveys.

**METHODS AND MATERIALS**

**Conceptual framework**

This paper focuses on the elements of UHC as outlined by the *World Health Report 2010*: providing all people with access to needed health services of sufficient quality to be effective and ensuring that the use of these services does not expose the user to financial hardship. The Report provided a three-dimensional conceptual framework for UHC – breadth, depth, and height of coverage – to demonstrate population coverage, service coverage and financial coverage. In this context, breadth is defined as the proportion of the population covered across various population subgroups, which highlights equity in coverage across consumption quintile groups, gender, age, and place of residence among others. The service coverage dimension captures the character of services covered and need of range of services. The financial coverage dimension ensures that people do not suffer financial hardship linked to paying for these services at the time they need them. Although the conceptual framework is clear, operationalizing measurable indicators for tracking a country’s level of coverage is not straightforward; for example, what are the indicators for service coverage or financial coverage?

Several studies have suggested approaches to measure coverage: for example, the Piot–Fransen model for sexually transmitted infections; the Tanahashi model for health services; and the model for environment and access to health care. After rigorous review of various concepts based on the available literature in order to measure service coverage, we concluded that the concept developed by Tanahashi may be a better fit for measuring the elements of UHC.

There are numbers of reasons behind reaching this conclusion, for example: (a) the model focused on effectiveness of coverage as an output indicator; (b) the model allows us to assess potential capacity of a health system and the utilization of that capacity; (c) it allows assessment of the capacity of the health system to deliver the full effect of interventions and quality of services; (d) some organizations such as UNICEF and the World Bank have used this concept to show health-system bottlenecks in marginal budgeting bottleneck analysis or investment cases; (e) it can be applied to national or decentralized health systems; (f) it is easy to apply to scaled-up health care.

Coverage can be defined as the proportion of the population who receive an intervention among those who need it. Coverage is influenced by supply (provision of services) and demand...
by people in need of services. The Tanahashi health-service-delivery framework has been applied to evaluate the effect of the availability, accessibility, acceptability, and quality of health services on utilization and coverage of malaria services among vulnerable populations. The dimensions of access and coverage of services that are derived from the Tanahashi model are shown in Figure 1.

Coverage is measured as the ratio of services in relation to the target population. The top three coverage indicators are related to the demand perspective and the remaining three coverage indicators are the supply perspective. Availability of critical health-system inputs, such as drugs, long-lasting insecticide-treated nets (LLIN) stocks, human resources for functioning of the health system, and accessibility of malaria interventions to clients are the important elements while assessing the service coverage. Initial utilization describes preconditions for clients such as availability of at least any type of bednets or the first contact with services to continue the utilization of services. Continuous utilization indicates adequate coverage such as percentage of households having at least one LLIN. Effective coverage is a critical indicator that measures health-system performance and quality of care. It is an impact indicator based on given interventions such as percentage of children younger than 5 years sleeping under a LLIN the previous night. The Government of Nepal, with the support of external development partners has executed malaria control interventions: IRS, LLIN, rapid malaria diagnosis and artemisinin-based combination treatment. Malaria is a focal disease in Nepal. The recent microstratification based on village development committees (VDCs) suggested that only 52% of the population is at risk. Choices of tracer intervention and service delivery modes are primarily determined by the availability of indicators.

To assess financial coverage requires total expenditures from different sources on malaria interventions. Health-system goals are not only improving health due to malaria interventions but also protecting people from the financial consequences of malaria. There may be financial consequences of out-of-pocket-payments (OOP) for malaria care on households. The paper uses financial coverage indicators of catastrophic payments and impoverishment that reflect the concept of hardship to utilize malaria interventions. Malaria diagnosis and treatment are provided free of cost at public health facilities; however the Nepal Living Standard Survey (NLSS) 2010–2011 suggested that people had paid some amount of money for malaria care. The private sector uses a variety of rapid diagnostic tests including antibody-based tests and treatment with artemisinin monotherapy as well as other forms of malaria combination treatment.

**Indicators of UHC and sources of data**

The indicators in Table 1 were used to measure UHC for malaria interventions. Tracer interventions that represent the service coverage are selected only if data are available for each of its six coverage indicators: availability of commodities and human resources; geographical accessibility; initial utilization; continued utilization; and effective coverage level. A tracer intervention is representative of other similar indicators within the service delivery mode. This analysis used indicators of financial coverage as suggested by the literature to measure the capacity of current financial coverage to provide protection from financial risk due to malaria illness.

**RESULTS**

**Population coverage**

Consultations of malaria care are conditional on need or illness. This analysis disaggregated the types of illness by gender, development region, rural/urban residence, age group and consumption quintile. Malaria care may be different from other health care; however, malaria and other health services are provided under the same roof by health providers. Therefore, analysis of population coverage in relation to other types of illness may be interesting because it gives some idea about the burden of malaria relative to other illnesses.

Data from the NLSS 2010–2011 indicating the percentage distribution of acute illness by type show that the burden of malaria illness is around 1%. Data from the NLSS 2010–2011 also indicate the percentage of health consultations for acute illnesses by status and practitioner type across various population subgroups. They show that almost 30% of people with acute illness did not consult any health-care providers, indicating that in aggregate, the services do not cover almost 30% of the population for some reason. Table 2 shows the calculated inequalities within population subgroups. The highest inequality was found between different age groups. This is followed by inequality in coverage in development regions; however, no difference is found between rural–urban categories.
Self-reported adequacy of health services can be used as an indicator for population coverage in UHC. In the NLSS 2010–2011, respondents were asked about adequacy of health-care services (which included malaria care). The results, shown in Table 3, highlight that 90% of the richest quintile experienced “just adequate” health services; however, only 68% of the poorest quintile people perceived services to be “just adequate”. There is an almost 10 percentage point difference between rural and urban in adequacy of health services. These results suggest that minimum population coverage in terms of just and more than adequate services was 67%.

**Service coverage**

The service coverage dimension of UHC for malaria interventions includes availability of services, utilization of services and quality of services that are captured by the facility-based as well as household survey data. Malaria interventions can be broadly categorized into two groups – curative and preventive – although the roles of promotion and rehabilitation services are significant in providing health outcomes. An assessment of service coverage is based on diagnosis and treatment and prevention of malaria.

**Diagnosis and treatment**

A microscopy facility is available in available at the district hospital, primary health care centre (PHCC) and some of the health posts (HPs) in endemic districts, while rapid diagnostic tests are available in HPs and sub-health post (SHPs) where a microscopy facility is not available. Antimalarial drugs are provided free of charge from all the public sector health facilities. Antimalarial drugs are provided free of charge through the female community health volunteer (FCHV) network in high-risk areas according to national treatment guidelines. In malaria endemic areas, where there is no microscopy facility, rapid diagnostic tests are made available for the diagnosis. For diagnosis and treatment interventions, the aim is to ensure prompt and effective treatment of malaria. Figure 2 shows coverage of diagnosis and treatment of malaria.

Availability and accessibility of malaria interventions are the preconditions for willingness to use and utilization of these interventions. Effective coverage of a malaria intervention indicates the quality of the intervention; for example, treatment of severe malaria with antimalarials as per national guidelines is 66% although 92% of people show willingness to use diagnosis and treatment services. The indicators shown in the figures...
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### Table 2. Health consultations for acute illnesses across population subgroups

<table>
<thead>
<tr>
<th>Population sub-groups</th>
<th>Percentage of service consultation</th>
<th>Inequality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consulted any types of health providers</td>
<td>Not consulted</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>70.5</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>68.5</td>
</tr>
<tr>
<td>Development regions</td>
<td>Eastern</td>
<td>67.6</td>
</tr>
<tr>
<td></td>
<td>Central</td>
<td>66.3</td>
</tr>
<tr>
<td></td>
<td>Western</td>
<td>75.3</td>
</tr>
<tr>
<td></td>
<td>Mid-western</td>
<td>71.0</td>
</tr>
<tr>
<td></td>
<td>Far western</td>
<td>72.7</td>
</tr>
<tr>
<td>Rural/Urban</td>
<td>Urban</td>
<td>69.6</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>69.4</td>
</tr>
<tr>
<td>Consumption quintile</td>
<td>Poorest</td>
<td>71.1</td>
</tr>
<tr>
<td></td>
<td>Second</td>
<td>69.4</td>
</tr>
<tr>
<td></td>
<td>Third</td>
<td>68.3</td>
</tr>
<tr>
<td></td>
<td>Fourth</td>
<td>69.6</td>
</tr>
<tr>
<td></td>
<td>Richest</td>
<td>69.2</td>
</tr>
<tr>
<td>Age groups</td>
<td>0-5 years</td>
<td>79.7</td>
</tr>
<tr>
<td></td>
<td>6-14 years</td>
<td>69.7</td>
</tr>
<tr>
<td></td>
<td>15-44 years</td>
<td>68.0</td>
</tr>
<tr>
<td></td>
<td>46-59 years</td>
<td>63.7</td>
</tr>
<tr>
<td></td>
<td>60+ years</td>
<td>61.1</td>
</tr>
<tr>
<td>Nepal Total</td>
<td>69.4</td>
<td>30.6</td>
</tr>
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</table>

### Table 3: Self-reported adequacy of health services

<table>
<thead>
<tr>
<th>Population sub-groups</th>
<th>Less than adequate</th>
<th>Just adequate</th>
<th>More than adequate</th>
<th>Not applicable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development regions</td>
<td>Eastern</td>
<td>16.4</td>
<td>82.2</td>
<td>0.6</td>
<td>0.8</td>
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<tr>
<td></td>
<td>Central</td>
<td>12.9</td>
<td>83.8</td>
<td>2.4</td>
<td>0.8</td>
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<tr>
<td></td>
<td>Western</td>
<td>17.5</td>
<td>80.0</td>
<td>2.1</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Mid-western</td>
<td>30.7</td>
<td>68.9</td>
<td>0.4</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Far west</td>
<td>32.0</td>
<td>66.2</td>
<td>1.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Urban/Rural</td>
<td>Urban</td>
<td>10.2</td>
<td>87.7</td>
<td>1.0</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>20.7</td>
<td>77.2</td>
<td>1.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Consumption quintile</td>
<td>Poorest</td>
<td>30.2</td>
<td>68.2</td>
<td>0.9</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>Second</td>
<td>24.1</td>
<td>73.8</td>
<td>1.6</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Third</td>
<td>22.4</td>
<td>75.5</td>
<td>1.4</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>Fourth</td>
<td>15.2</td>
<td>82.3</td>
<td>2.1</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Richest</td>
<td>7.4</td>
<td>90.3</td>
<td>1.6</td>
<td>0.7</td>
</tr>
</tbody>
</table>
provide at least two views: (a) the situation of availability or utilization of interventions; and (b) determinants of system bottlenecks of the intervention. For example, out of laboratory confirmed cases of malaria only 92% of clients received treatment indicating the gap in service coverage; at the same time, it indicates that 92% clients are willing to use services but not why the percentage of treatment with antimalarials (both severe and complication) as per national guidelines is lower by at least 20%. Figure 2 shows the problems in the supply side. The Annual Report of the Department of Health Services 2010–2011 also indicated problems or constraints in the supply side such as irregular and inadequate supplies of antimalarial drugs, lack of orientation on the malaria programme for all health workers, irrational use of rapid diagnostic tests and malaria microscopy against national protocols, and lack of coordination between the microscopic networks and collection centres.18 Without improving supply-side indicators such as availability of essential commodities and drugs and human resources, and accessibility of malaria care, increasing the effective coverage (or impact indicator) such as percentage of severe malaria treatment may not be possible. Figure 2 indicates the situation of coverage of diagnosis and treatment of malaria. Different processes should be followed in the different services delivery mode, such as facility-based or community-based, while providing diagnosis and treatment services. Figure 2, however, does not provide a comprehensive picture with regard to diagnosis and treatment of malaria, such as the huge gap between clinically suspected malaria and laboratory confirmed cases;20 but such a problem is indicated by the 82% available human resource with correct skill mix at the facility. Data availability and choice of appropriate tracer intervention are critical issues while analysing the depth of service coverage.

Preventive intervention

A recent microstratification report on malaria risk in Nepal demonstrated that 54 VDCs came under the high-risk category, 201 VDCs came under the moderate-risk category, 999 came under the low-risk category and 2718 (68.36%) came under the no-risk category. A total population of 985 636 (3.62% of the population) live in high-risk VDCs; 2660 692 (9.79%) live in moderate-risk VDCs; and 9378 735 (34.52%) live in low-risk VDCs. A total population of 14 139 920 (52.05%) live in no-risk VDCs.22

The Ministry of Health and Population (MOHP) with the support of external development partners has implemented a malaria control programme including IRS and LLIN. LLINs are distributed according to the existing LLIN distribution guidelines, one LLIN per two persons in a house.18 LLINs are distributed through a campaign with the strategy of one third target VDCs per year in each district so as to cover the entire high-risk VDCs by the end of the third year. Two rounds of routine IRS are carried out annually in each high-risk VDC unless LLIN population coverage in that VDC exceeds 80%. The first round is undertaken during May–June and the second round in August–September.

Different sources report different coverage of LLINs. Reported data used different denominators such as targeted population or total population. Survey-based data are more reliable than reported data; however, survey-based data are not frequently available. Some of the VDCs achieved more than 90% coverage; however, a field survey report suggested 80% coverage with at least one LLIN in the targeted intervention areas.20 In other words, more than 80% people are agreeable to use an LLIN; however, as shown in Figure 3, only 76% people utilized the LLIN.17 Effective coverage, i.e. the proportion of children younger than 5 years who slept under an LLIN the previous night is only 61%. The effective coverage indicator indicates that the behaviour change communication strategy is not very effective.

LLIN coverage in targeted areas is found satisfactory; however, in the endemic districts, the coverage is very low. The recent national household survey shows that effective coverage in the endemic districts is only 10%.19 The demand-side barriers in use of LLINs in endemic districts are shown in Figure 4. On the other hand, the results from the demand side suggest that there are some problems with LLINs reaching the household level or problems in LLIN distribution. From the point of view of UHC, coverage indicators do not show satisfactory results.

LLIN and IRS are complementary interventions; however, the aim is to increase the coverage of LLINs and to reduce IRS. As mentioned previously, two rounds of IRS campaigns are conducted in a year in villages at risk. The efficacy of IRS is about 12 weeks; therefore, to make IRS more effective, the second round IRS is crucial. The literature suggest that IRS coverage is very poor and effective coverage is found to be zero because the second round of spraying was not conducted for some reasons in 2009.20 This does not mean that the second round IRS campaign is in the guideline but not in the practice; it means that sometimes two rounds of the IRS campaign do not happen on time or do not cover all households of that the first round is also covered in the second round. The major problems, as indicated by the results shown in Figure 5, are in the supply side such as lack of equipment or commodities. Willingness to use IRS is also less than willingness to use LLINs.
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On occasion, demand-driven activities exert sufficient pressure to improve supply-side efficiency. This analysis used the composite coverage index (CCI) as suggested Boerma et al. This composite index aggregates malaria intervention coverage indicators. With providing equal weight to all tracer interventions, CCI is presented in Figure 6.

**Financial coverage**

**Disease account**

National health accounts provide evidence to monitor trends in health spending for all sectors – public and private – different health-care activities, providers, diseases, population groups and regions in a country. They help in developing national strategies for effective health financing and in raising additional funds for health. Information can be used to make financial projections of a country’s health-system requirements and compare their own experiences with the past or with those of other countries. Nepal does not yet produce national disease accounts, although the approach has been popular in other countries, such as in Australia, for some years. In Nepal, malaria preventive, diagnostic and curative services are free of charge in all health facilities; however, national representative survey data suggest that people have paid some amount of money to different types of providers such as public or private providers.

The data on public expenditure and number of malaria cases and OOP for malaria from the survey data and estimation methods as suggested by the 2011 OECD report were used to estimate the total expenditure on malaria. The data suggest that OOP including for the private sector was 5% of total expenditure on malaria. The remaining 95% is jointly covered by the Government of Nepal and external development partners. Nepal does not have an insurance system and public facilities provide the services at free of cost or a heavily subsidized price. Survey data suggest that average OOP (drug and consultation
Distribution of OOP

Household consumption that includes food and nonfood consumption is used as a living standard measure as suggested by O’Donnell and colleagues.27 From the NLSS 2010–2011 data on consumption and cost of malaria care it is seen that the poorest and eighth groups shared almost an equal percentage in the distribution of total cost for malaria care while the sixth or richest groups shared the highest percentage. This finding suggests that the richest group paid relatively less of their affordable capacity for malaria care; however, the third to sixth groups paid more.

The concentration index (CI), which summarizes the information on the relationship between total cost of malaria care paid by the household and the rank of their living standards, is found to be −0.1043. The negative sign indicates malaria-care payment is higher among the poor. Nevertheless; the CI is not significant at the 5% level. As malaria is concentrated in the certain areas of the country, this means missing values for a national representative survey. It is challenging to get significant results with limited data sets.

OOP payments can be categorized as catastrophic when they exceed a given threshold, say 10% of household consumption. OOP payments are also impoverishing when they are sufficient to dip a low-income household into poverty. This paper adopted the methods suggested by Adhikari and colleagues to measure catastrophic payments and the impoverishment impact of OOP for malaria care.28 The widely accepted method for measuring the incidence and intensity of the catastrophic payments is to use a threshold range from 5% to 40% of household total consumption and nonfood consumption.29 The impoverishment impact of a health-care payment is measured in terms of its poverty incidence and intensity. The difference between the pre-payment and post-payment income poverty, gives an estimate of the poverty impact of health care payment on incidence and intensity. The NLSS 2010–2011 reported an average per person consumption NRs 34,829 for all Nepalese citizens. The average consumption for the first poorest decile group was NRs 11,093; while for the richest decile it was NRs 102,772. We measured systematically catastrophic and impoverishment impact using national representative data, but with limited data on malaria care. None of households faced a catastrophic impact due to payment for malaria care in the given range of thresholds in the literature. Similarly, no one was pushed due to malaria care payment to below the poverty line. As mentioned previously, the reported cost in the survey did not capture the hospital cost of malaria care. Due to limitation of measurement of catastrophic payment, it fails to capture those individuals who do not seek malaria care.

DISCUSSION AND CONCLUSION

A three-dimensional framework for UHC as suggested by WHO (2010) was used to analyse the status of UHC for malaria interventions in Nepal. There not yet global consensus on service coverage measurement, especially on issues such as an essential versus comprehensive service package for UHC and criteria for selecting particular indicators.12 An essential or narrow service package within the limited fiscal space can ensure UHC; however, adopting a comprehensive service package creates more challenges to achieving UHC. This paper focuses on malaria interventions where services packages are relatively clear and the interventions are globally acceptable.

Analysis of disease-specific UHC has a number of advantages. For example, firstly, considering different types of health care together to assess a service package could be highly misleading due to the aggregation of many different types of health intervention with widely different efficacy, effectiveness and duration of treatment and prevention. Secondly, a number of tropical diseases have their own peculiarities that require specific interventions for their control or elimination, making these virtually independent medical commodities and definition of effective coverage differs. Thirdly, malaria in Nepal is in pre-elimination phase, and a number of national and international experts and stakeholders are engaged to develop updated strategies; however, they are focusing on a disease perspective rather than a health-system perspective. Patterns of disease, care and treatment are changing. These changes demand new delivery systems. Narrowly defined or disease perspective strategies may not be sufficient to achieve the desired outcomes.

This analysis used the Tanahashi approach of six coverage indicators to measures service coverage. The approach allows us to update the capacity of the health system to achieve effective coverage by assessing both the potential capacity and the utilization of that capacity. The service coverage dimension captures issues related to availability of services and use of these services. Population coverage focuses on population subgroups such as gender and quintile group. Financial coverage shows the financial hardship to use these services. These three dimensions ensure priority of population groups, comprehensive benefit packages, and subsidized cost of care.

UHC can be defined for the disease-specific situation, for example UHC can mean greater than 80% coverage of LLINs for those at risk of malaria, and prompt and effective treatment of malaria with an effective antimalarial within 24 hours of onset of fever, in most cases an artemisinin-based combination therapy. Comparing the current coverage situation of malaria interventions with the given baseline coverage for UHC suggests that Nepal, through focusing some of the indicators, is far below this baseline indicator of UHC. Patterns of malaria illness and epidemiology can suggest movement towards pre-elimination; however, several bottlenecks are found from the results in the Nepalese health system, which strongly suggest a need to focus on health-system strengthening to shift the health production function of malaria interventions.

cost) for malaria care was Nepalese Rupees (NRs) 1624 for 2010–201126 (approximately US$ 22); however, hospitalization costs were not included. The drug cost of OOP for malaria was almost 90%. Average transportation cost, which indicates the geographical access to services, was NRs 88 (US$ 1.2).
Financial coverage indicators show the financial burden or shocks due to payment for malaria care on households. The literature has frequently suggested that the costs of malaria care are above 10% of household income, and total household costs of malaria per year have been reported to be as much as 18% of annual income in Kenya and 13% in Nigeria. The financial shocks or catastrophic payment discourages use of services not only for other household members but also other members of society. The results suggest that OOP for malaria in Nepal does not create financial hardship or discourage use of services. None of patients faced catastrophic payment and an impoverishment impact due to malaria care. This paper does not capture the hospital-based care of malaria. Clients have to pay more for hospital-based care although services are provided free of cost at the public hospital, for example, OOP for hospital-based treatment of kala-azar care was catastrophic for the household since it extracted 17% of annual household income and pushed more than 20% of non-poor people below the poverty line.

Both the strengths and shortcomings of the key indicators of UHC for malaria interventions are discussed. There are some limitations in the paper while measuring service coverage and financial coverage. The paper tried to use the indicators from same year, 2010–2011; however, very limited data were available to measure the service coverage indicators that did not permit measurement of depth of service coverage based on service delivery mode, such as facility-based service delivery, community-based service delivery and population-based service delivery. However, the paper is able to contribute to the existing literature on how to measure UHC for malaria interventions using available indicators in low-income countries such as Nepal, and to provide the current status of UHC for malaria interventions and to reveal system bottlenecks on which policy-makers and stakeholders should focus to improve the malaria control strategy of Nepal.

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How to cite this article: Adhikari SR. Towards universal health coverage: an example of malaria intervention in Nepal. WHO South-East Asia J Public Health 2014; 3(1): 103–112.

Source of Support: Nil. Conflict of Interest: None declared.