Mountains Away: Service utilization and distance from health facilities in Nepal

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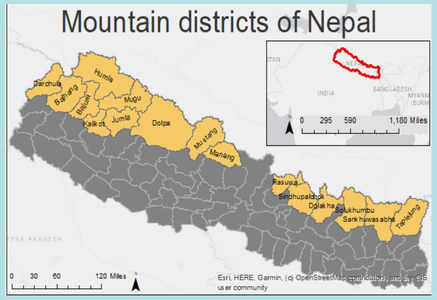
Background

Distance from a health facility is an established barrier to achieving positive health outcomes. High rates of maternal and child mortality are linked to a lack of access to and utilization of health services in middle- and low-income countries in South Asia and Sub-Saharan Africa.[1,2] Utilization of maternal and child health services in the mountain region of Nepal is lower than that of the other two regions of the country.[3,4] Existing literature on the impact of distance from a health facility on maternal and child health outcomes in Nepal use survey data about perceived distance to a health facility rather than spatial analyses of actual distance.[5]

This project aims to address this methodological gap using a cost path analysis to assess distance from villages in the mountain districts of Nepal to their nearest health facility. It will then compare utilization of maternal health resources of the different districts to the findings from the cost path analysis. These methods aim to understand two key research questions:

1) Which districts in the mountain region of Nepal have the greatest proportion of villages with long walking distances to a health facility?
2) How do the districts with higher proportions of villages with long walking distances to health facilities compare to the utilization of maternal health resources?

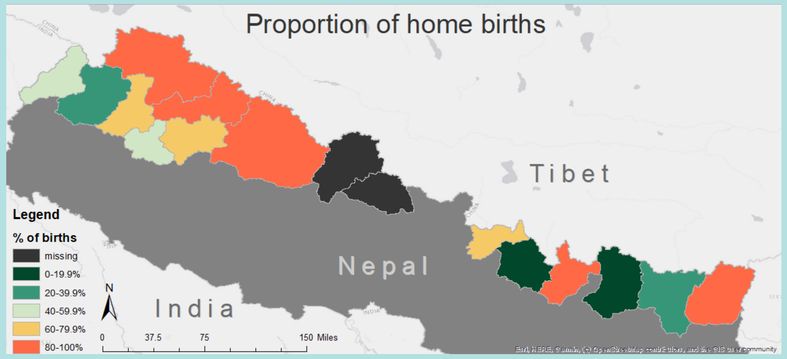


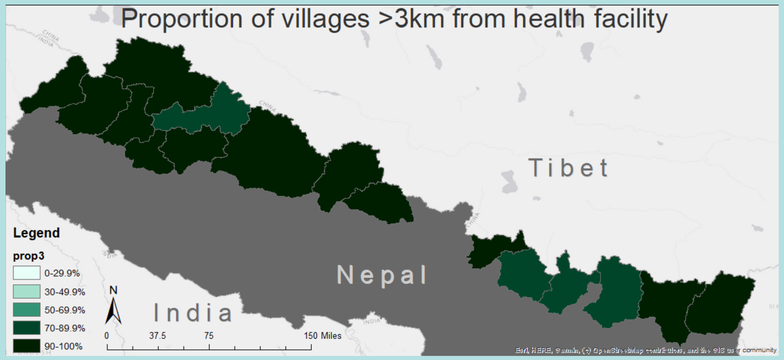
Methods

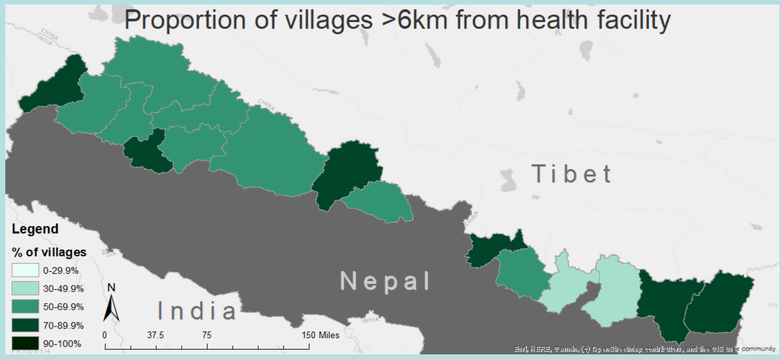
Data for this project included point data of health facilities and villages and an elevation raster from the Humanitarian Data Exchange website. A spreadsheet of health outcomes was obtained from the USAID website.

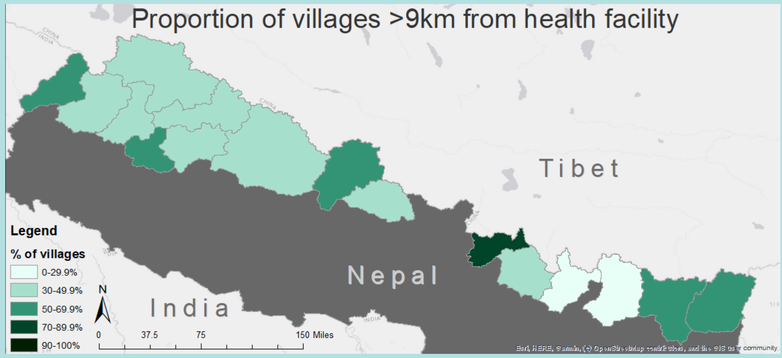
To address the first research question of this project, a Tobler cost path analysis was used to identify the shortest walking routes between villages and their nearest health facility according to slope. Many people in the mountain region do not have cars therefore identifying walking routes most closely aligns with how patients might realistically arrive at a health facility. A spreadsheet of the calculated cost paths facilitated calculation of the proportion of paths >3km, >6km, and >9km for each mountain district.

To address the second research question, data about where women gave birth was used. The proportion of home births was calculated in a spreadsheet that was joined to a district polygon layer. Districts with a greater proportion of home births are considered worse on the scale because that statistic shows a decreased utilization of potentially life saving health services available at health facilities. The health map with symbolized districts could then be compared to each of the distance to a health facility maps to see whether distance appears correlated with maternal health resource utilization.









Geographic Coordinate System: GCS WGS 1984
Projected Coordinate System: Nepal Nagarkot TM

Results

Several districts including Humla, Mugu, and Dolpa in western Nepal as well as Dolakha and Taplejung in eastern Nepal have high proportions of home births (80-100%). Conversely, Sindhupalchok and Solukhumbu have the lowest rates of home births (0-20%).

In all of the mountain districts at least 70% of villages have greater than a 3 km walk to the nearest health facility. Most of the mountain districts have about 50% of villages that are greater than a 6 km walk to the nearest health facility. Dolakha and Solukhumbu have the smallest proportion of villages greater than a 6 km walk to the nearest health facility (30-50%). The greatest variation in proportion occurs at the 9 km distance cut off. Dolakha and Solukhumbu have the smallest proportion of villages greater than a 9 km walk from the nearest health facility (0-30%). Conversely, Rasuwa appears to be the worst off as it is the only district with 70-90% of villages greater than 9 km from the nearest health facility.

Conclusion

The results indicate that while walking distance from a health facility may contribute to maternal health resource utilization, there are likely many other access barriers at play. Solukhumbu has the best rates of facility deliveries as well as the lowest proportion of villages >3km, >6km, and >9m from a health facility. Along the same trend, Rasuwa has high rates of home deliveries and high proportions of villages >3km, >6km, and >9m from a health facility. However, Dolakha has the highest proportion of home births yet similar to Solukhumbu it has the lowest proportion of villages >3km, >6km, and >9m from a health facility.

Some limitations of this project include the fact that the cost path analysis to assess distance between villages and the nearest health facility only created paths according to walking the most efficient route through the mountains according to slope. It would be interesting for future research to compare the walking paths that the analysis created with actual known foot paths between villages and health facilities. The cost path analysis could also be expanded to include factors such as land use type and other modes of transportation such as driving along roads. This research confirms findings from prior research that suggests distance from a health facility is one of many barriers to accessing health care in underdeveloped rural regions. Future steps should be taken to dive further into the various factors that affect routes between villages and health facilities and the decision-making process behind visiting a health facility or not.

References

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