REVIEW O e Acce

Estimating the child health equity potential of improved sanitation in Nepal

A a Ac a a*, L L , Q fe L, I d K F be

Ab ac

Background: Acce ed a a a a e c d ea ac d a ea a ad a . l e e a a c ea e a a e ea e e ac c -ec c . T a e e e ed ffe e a ac c d a a dd a ea c de ce f e a d a a c ea e ac ea e Ne a.

Methods: We de ed ee ca e c ea e ce a a e a a e e a d a eac f e 5 ea e f ed a a Ne a e L e Sa ed T (L ST): e a f a e, ea ca - a d a b - .

Results: T e e a e a e e a a c ea e ca a e a a f 226 e (10.7% f e ec ed d a ea dea), e a ea ca - a ca a e 451 c d e (20.5%) a d e a b - a ca a e 542 e (24.6%).

Conclusions: P - c e f e a d a a c ea e a e e ab ed ce a e e ea e a e c ca a a e ed ced c d d a ea a .

I d c i

The past few years have witnessed an increased attention to health equity analyses describing the distributional impact of interventions [1-4]. These studies have aimed to analyze the extent to which interventions reach and benefit disadvantaged groups, such as the poor, certain ethnicities, or otherwise vulnerable populations [2]. Poor children are consistently found to be

translate into health inequities across socio-economic groups. However, very few studies have looked at how scaling up such interventions differentially impacts different socio-economic groups. A study of the impact of improved water and sanitation in Stockholm from 1878 to 1925 showed a decline in overall mortality and of diarrhea mortality and a leveling out of socioeconomic differences in child mortality due to diarrheal diseases [15]. Another paper used comparative risk assessment modeling to estimate the reduction in child mortality as a result of improving child nutrition and providing clean

projection by cause of death and by specific child health intervention based upon changes in health intervention coverage. These projections then can be used to enhance knowledge of child survival options among policymakers and to build support for effective activities. LiST requires information about child health and nutritional status, deaths by cause, and coverage of child health interventions, in addition to assumptions concerning the efficacy of those i

Table 1 I da a ac eal h i ile i Ne al

Data	*QUINTILE*					
Mortality Rates	poorest	poorer	middle	richer	richest	national
Ne a a	43.0	38.0	47.0	31.0	26.0	33.00
I fa	71.0	62.0	70.0	51.0	40.0	48.00
U de 5	98.0	83.0	91.0	63.0	47.0	61.00
Ca e f Dea (1-59)						
D a ea	11.9	14.63	19.51	13.04	13.64	14.22
I e	4.76	7.32	9.76	13.04	9.09	7.58
Mea e	0	0	2.44	0	0	0.47
O e	45.24	51.22	29.27	39.13	36.36	41.71
P e a	38.1	26.83	39.02	34.78	40.91	36.02
D a ea I cde ce (<5 ea)						
<1	0.00	0.00	0.00	0.00	2.61	0.51
1-5	3.02	2.37	3.41	3.72	4.27	3.30
6-11	3.56	2.34	3.14	3.16	2.15	2.95
12-23	2.00	1.55	1.59	1.53	1.75	1.71
24-59	16.48	15.35	10.54	9.29	12.65	13.31
S (<-2 Z c e)						
< 1	42.10	38.89	31.86	7.89	0.00	11.60
1-5	15.06	14.03	12.22	9.93	5.28	11.60
6-11	33.66	27.80	29.43	11.65	6.13	52.20
12-23	59.44	57.52	49.97	36.09	21.65	47.50
24-59	71.90	63.44	60.41	50.36	39.20	62.40
< 5 ea	61.60	54.90	50.40	39.80	30.90	
Wa (<-3 Z c e)						
< 1	0.00	16.15	0.00	0.00	5.08	3.90
1-5	6.00	1.71	1.58	6.07	5.99	3.90
6-11	6.44	5.00	7.06	5.61	1.23	9.40
12-23	3.81	6.56	3.55	4.30	1.46	4.10
24-59	2.25	1.76	2.02	1.25	0.50	1.00
< 5 ea	3.20	3.10	2.60	2.50	1.20	
Wa e , Sa a a d H e e						
I ed a a fac (%)	2.61	7.95	19.67	33.68	46.23	22.70
I ed a e 30 (%)	85.2	87.7	84.3	87.7	79.5	79.8
P ed a e e/ a d/ (%)	0.91	4.34	7.45	12.88	36.58	*14.687.7*

Di c i

In developing countries such as Nepal, sanitation coverage – an important contributor to child health – has been very much overlooked. Politically, attention to provide access to water, especially piped water, has received much more attention, and strategies to expand access to water have often focused on urban areas. This neglect of sanitation becomes even more stark when one looks at it through the lens of health equity – with lower socio-economic sections (as measured by wealth quintiles) of

the population being disproportionately impacted. Knowing how health impacts from expanding sanitation coverage vary across wealth quintiles is critical input to government decision making.

This is the first application of the LiST model to the impacts of sanitation coverage on child health disaggregated across wealth quintiles, and can, and should, be replicated for other developing countries to inform policy dialog and contribute to government investment strategies. If sanitation coverage in Nepal were to reach the MDG target of 53 percent, it would result in averting approximately 529 deaths. This is about 24% of the approximately 2200 diarrheal deaths annually in children under five due to lack of adequate water and sanitation in Nepal [20,24]. However, this aggregate figure does not contribute to helping the government of Nepal in strategizing on which sub-populations to target by increased sanitation coverage. Through an analysis of alternative scenarios of sanitation expansion across the various quintiles, this analysis helps the Nepalese government with better targeting strategies. With currently available technology, the LiST model estimates that there could be as many as 542 fewer diarrheal deaths in Nepal by the end of 2015 if sanitation coverage was appropriately targeted to poorest households where environmental health conditions are the worst. This represents a 130 percent increase relative to the scenario of equal increase across wealth quintiles in the number of child lives saved from averted diarrheal mortality attributed to increased sanitation coverage – pointing to the potential for improving health equity by saving more lives amongst the poorest households in countries like Nepal.

Sanitation is particularly important for child health, not only in terms of the lives saved, but also because of the longer term impacts (such as IQ levels, school performance and future worker productivity) mediated through malnutrition [26,27]. Repeated diarrheal episodes contribute to malnutrition (stunting) in children under five – some of which is irreversible [28,29]. In this LiST application, results showed a considerable decline in diarrheal incidence especially under the pro-poor scenario when sanitation expansion was targeted to the lowest quintile – demonstrating the potential for lower rates of malnutrition and subsequent longer term health impacts.

remaining constant in the period 2011-2015. Corresponding increases in other interventions such as access to improved water sources and piped water, handwashing practices, and increased ORS use would result in an even greater reduction in health inequities between the poorest and the richest subgroups in Nepal. Lastly, there is uncertainty associated with inputs and outputs of the LiST model, which has not been accounted for in this analysis.

Real progress can be made if the prevention and treatment of diarrhea becomes an international priority among governments in developing countries like Nepal. Increasing sanitation coverage in countries in South Asia, where sanitation lags far behind other environmental services, is critical, and requires inputs and leadership from, and coordination among, health, environment and infrastructure ministries. Coordinating especially the targeting of sanitation interventions to vulnerable population subgroups (such as the poorest quintile) is especially important to maxmize health benefits in terms of reduced child morbidity and mortality due to diarrhea.

The costing of the alternative scenarios was beyond the scope of this paper; but clearly resource considerations often constrain the rolling out of sanitation interventions in low income countries like Nepal. In a budget-constrained world, it becomes even more important to appropriately target these interventions to communities where the largest reductions in diarrheal mortality can take place, and to counter the tendency for co-coverage of many health and environmental interventions in richer households.

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