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Differentials in Childhood Immunization Coverage Among the Three South Asian Countries (Bangladesh, Pakistan and Nepal): Evidence from Demographic and Health Survey

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INTRODUCTION

Globally 6 million under five children died in 2015 and more than 30 percent of the deaths came from South Asian region which could have been prevented through proper vaccination. Worldwide 11 children are dying in every single minute and if we fail to pull up the trend immediately, around 4·4 million children (≤ 5 years) will die in 2030. In this study we aimed to explore the potential differences and associations with childhood immunization coverage based on selective socio-cultural and socio-economic factors among three South Asian countries, namely, Bangladesh, Pakistan and Nepal.

METHODS

The analysis uses data pooled from last round of DHS for Bangladesh (2014), Pakistan (2012-2013) and Nepal (2016) to attain an adequate sample size. Immunization status was defined according to either the vaccination card for each living child or when unavailable, as reported by the mother. The study considered children between 12–23 months of age for the analysis because, according to WHO guidelines, children across this age range are not rebuffed vaccination in a field situation. Thus, mothers with children aged 12–23 months, were extracted from the children's data set. A secondary data analysis utilizing datasets (2004 to 2014) from the nationally representative Bangladesh Demographic and Health Surveys that followed stratified, multi-stage cluster sampling design conducted both in urban and rural contexts.

Taking vaccines

Going for vaccination

VARIABLES AND STATISTICAL ANALYSIS

This study exploited numerous exposure variables, namely, the age of children (12–23), gender (male, female) birth order (1, 2–3, 4–5, 6+), place of residence (urban, rural), mother's education (no education, primary complete, secondary and higher) and wealth index (poorest, poorer, middle, richer and richest). The full immunization coverage status was the outcome variable in this study. Full vaccination was defined as having received all eight EPI-recommended vaccine doses (one dose of BCG, three doses of pentavalent vaccine (DPT-HepB-Hib), three doses of OPV, and one dose of measles/rubella, in accordance with the WHO definition of full vaccination coverage.

Statistical analysis

Whole analyses were carried out utilizing the SPSS software (24.0 version) and Epi Info (7.0 version).

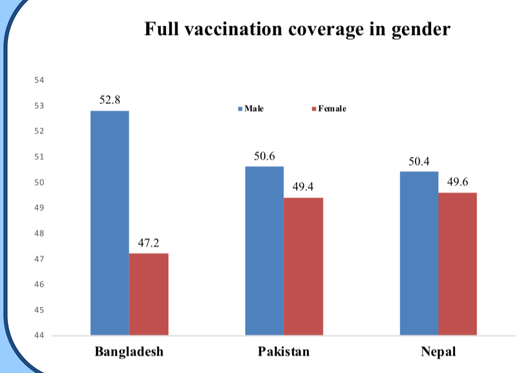
Ethical issues

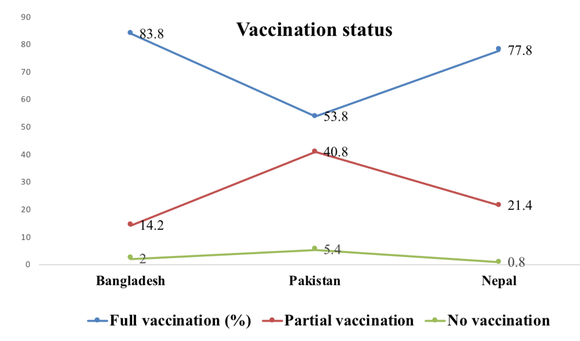
Our study is based on secondary data (DHS). The data is available in the public domain and was taken from the Measure DHS website (http://dhsprogram.com/). Therefore, ethical clearance is not required for this study.

RESULTS

This study was limited to data collected about the children who were 12-23 months of age at the time of the survey, resulting in a total sample of 4626 children among the three South Asian countries. Our study results revealed that factors such as child's residence, mother's education, birth order had a significant effect on immunization coverage among Bangladesh, Pakistan and Nepal. Urban-rural differences on immunization coverage were quite visible in Bangladesh vs. Pakistan (unadjusted OR = 1.27 (1.10–1.47) P < 0.001), Bangladesh vs. Nepal (unadjusted OR = 3.31 (2.79–3.92) P < 0.001) and Pakistan vs. Nepal (unadjusted OR = 2.59 (2.21–3.04) P < 0.001). Marked association were observed on child's maternal education (none to primary and some secondary levels) with immunization coverage between Bangladesh vs. Pakistan (none to primary: unadjusted OR = 0.65 (0.54–0.79) P < 0.001 and none to secondary: unadjusted OR = 7.47 (5.93–9.41) P < 0.001), Pakistan vs. Nepal (unadjusted OR = 1.74 (1.42–2.14) P < 0.001) and some secondary: unadjusted OR = 0.37 (0.28–0.49) P < 0.001) and Bangladesh vs. Nepal (only none to secondary: unadjusted OR = 2.81 (2.21–3.57) P < 0.001). Children's from households in the poorer wealth quintile (Bangladesh vs. Pakistan: unadjusted OR = 0.72 (0.58–0.89) P = 0.003 and Bangladesh vs. Nepal: unadjusted OR = 0.65 (0.49–0.85) P = 0.002, were less likely to be immunized than those from the households in the richest quintiles.

FIGURES





TABLE

Variables	Bangladesh n (%)	Pakistan n (%)	Nepal n (%)
Gender			
Male	862 (52.8)	1050 (50.6)	463 (50.4)
Female	771 (47.2)	1024 (49.4)	456 (49.6)
Residence			
Urban	423 (25.9)	640 (30.9)	493 (53.6)
Rural	1210 (74.1)	1434 (69.1)	426 (46.4)
Mother's Education			
None to primary	443 (27.1)	1118 (53.9)	312 (33.9)
Finished primary	225 (13.8)	361 (17.4)	191 (20.8)
Some secondary	701 (42.9)	156 (7.5)	202 (22.0)
Secondary or higher	264 (16.2)	439 (21.2)	214 (23.3)
Birth Order			
1	660 (40.4)	566 (27.3)	365 (39.7)
2 to 3	767 (47.0)	736 (35.5)	417 (45.4)
4 to 5	151 (9.2)	417 (20.1)	100 (10.9)
6+	55 (3.4)	355 (17.1)	37 (4.0)
Wealth quintile			
Poorest	376 (23.0)	456 (22.0)	207 (22.5)
Poorer	292 (17.9)	444 (21.4)	200 (21.8)
Middle	323 (19.8)	400 (19.3)	185 (20.1)
Richer	336 (20.6)	437 (21.1)	190 (20.7)
Richest	306 (18.7)	337 (16.2)	137 (14.9)

DISCUSSION

Like other developing countries Bangladesh, Pakistan and Nepal, vaccination coverage plays a pivotal role to reduce the child mortality rate and it is already established that substantial reductions in child mortality are associated with increases in immunization coverage. This study examined the differentials in EPI coverage children aged 12–23 months from most recent Bangladesh, Pakistan and Nepal DHS data. In developing countries, proper vaccination coverage still remains a challenge and this is an unfinished agenda which we need to complete immediately to secure our future generation. Hence, there is a need to understand the factors associated with immunization coverage. Results of the study found huge significant disparities on immunization coverage among socio-economic and socio-demographic status.

Although the DHS adopted appropriate survey methodology to attain a representative sample, the final sample does not guarantee complete representativeness at national and regional levels. Despite this, the study made an effort to access the predictors for full immunization coverage in the leading child mortality region due to vaccine preventable diseases using the best data sources of population-based information in low and middle-income countries.

CONCLUSION

This study focused on three South Asian countries and found that childhood immunization coverage in Bangladesh was highest among the three South Asian countries. However, an appropriate policy guideline focusing on improving the vaccine intake where it is needed and more focused programs targeting behavioral changes should be implemented and evaluated. Finally, this kind of research will help the policy makers, program implementers and service providers to understand the recent scenario and associated factors which are probably working as barriers to enhance child vaccination coverage and control of vaccine preventable diseases.

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