

MASTER OF PUBLIC HEALTH

A cooperative Program of

JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH
&
INDIAN INSTITUTE OF HEALTH MANAGEMENT RESEARCH

Capstone Project

By

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IIHMR/JHSPH MPH

2014-2016

MASTER OF PUBLIC HEALTH

A cooperative Program of

**JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH
&
INDIAN INSTITUTE OF HEALTH MANAGEMENT RESEARCH**

Capstone Project

On

**Trends of under five mortality in Nepal in relation to coverage of
important health interventions: a secondary data analysis from 1996 to
2011 Nepal demographic health survey reports**

By

Dr. Sudhamsu Koirala

Under the guidance of

Prof. (Dr.) Dr. Suresh Joshi

Master of Public Health

2014-16

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TO WHOM IT MAY CONCERN

This is to certify that **Dr. Sudhamsu Koirala**, a student of Master of Public Health Program offered by with Johns Hopkins Bloomberg School of Public Health, Baltimore in cooperation with the Institute of Health Management Research, Jaipur, has successfully completed her capstone project titled **"Trends of under five mortality in Nepal in relation to coverage of important health interventions: a secondary data analysis from 1996 to 2011 Nepal demographic health survey reports"**.

The student's approach to the study has been sincere, scientific and analytical. This Capstone is in fulfillment of the course requirements.

We wish her the best in all her future endeavors.



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CERTIFICATE BY SCHOLAR

This is to certify that the Capstone Project titled "Trends of under five mortality in Nepal in relation to coverage of important health interventions: a secondary data analysis from 1996 to 2011 Nepal demographic health survey reports" under the supervision of (Prof.) Dr. Suresh Joshi for award of Master of Public Health embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.



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MPH 2014-16

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ACKNOWLEDGEMENT

I would like to express my gratitude to entire MPH faculty and friends at IIHMR. Special thanks to **Dr. Suresh Joshi** for his timely guidance from the start to the completion of the work.

ABBREVIATIONS:

ARI: Acute respiratory tract infection

CB-IMCI: Community-Based Integrated Management of Childhood Illnesses

CDD: Control of Diarrheal Diseases

EPI: Expanded Program on Immunisation

FCHV: Female community health volunteer

MDGs: Millennium Development goals

MoHP: Ministry of health and population

NDHS: Nepal Demographic health surveys

NFHS: Nepal Family health surveys

ORT: Oral rehydration therapy

U5MR: Under five mortality rate

UNICEF: United Nation Children's Fund

VDCs: Village development committee

WHO: World Health Organisation

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ABSTRACT

Background: Nepal has achieved millennium development goal 4 (MDG4). The purpose of this study is to show trend in coverage of selected child survival interventions over a period of one and half decade and show association between urban and rural coverage of these interventions and urban and rural U5MR.

Methods: Coverage data for complete vaccination, Oral rehydration therapy use in diarrhea and care seeking for fever in health facility /from provider were obtained from (Nepal Demographic health surveys) NDHS reports 1996, 2001, 2006 and 2011 and compared with Under five mortality rate (U5MR) data .The comparison of coverage and U5MR was done in terms of level of mother's education, developmental region and ecological region

Results: Coverage was seen to increase for each intervention with higher level of education obtained and with increasing years of the surveys. The central developmental region lacked behind others in terms of ORT coverage and care seeking during fever. Change in vaccination coverage and ORT use were mostly seen during surveys held at 996 and 2001 while change in coverage for care seeking during fever was more seen in periods between 2001-2011. Urban and rural under five mortality rates were associated with urban and rural vaccination coverage but not associated with care seeking for fever Rural ORT use was associated with Rural Under five mortality rate but urban ORT use was not associated with urban under five mortality rates.

Conclusion: Coverage in complete vaccination is the single most important child survival intervention responsible for decreasing under five mortality rates in Nepal. ORT use in diarrhea and care seeking during fever show increase in coverage with succeeding surveys but approximately 50% of child with fever or diarrhea still do not receive ORT or treatment in health facility for the same.

INTRODUCTION

Nepal Demographic health surveys (NDHS) is a survey conducted every five years in Nepal since 1996, when it started as Nepal family health survey (NFHS). It is a part of comprehensive survey conducted as part of the global Demographic and Health Surveys (DHS) program with primary purpose of the NDHS is to generate recent and reliable information on fertility, family planning, infant and child mortality, maternal and child health, and nutrition.

Data from NDHS reveal nationwide improvement in child health as measured by decline in under five mortality rate (U5MR) from 154/1000 live births at 1990 to 48/1000 live births at 2011.⁽¹⁾ The figure represents the achievement of Millennium development goal 4 (MDG4) target for 2015 which was 54/1000 live births.

Causes of Under five mortality vary from causes of Perinatal, Neonatal and Infant mortality.

In an article, published in Lancet in 1991, initial years of MDGs period, among all causes of under five deaths (2101), deaths due to pneumonia were 367(17.5%), both pneumonia and diarrhea were 114(5.4%), diarrhea alone caused 360 deaths(17.1%) and measles 48(2.3%) Thus in cumulative terms 42.3% of under five deaths were due either to pneumonia, diarrhea, incomplete or lack of vaccination.⁽²⁾

In United nations children's fund (Unicef) Nepal profile , 2010, the pneumonia accounts for 10%, diarrhea accounts for 14% and measles accounts for 0% of under five deaths.⁽³⁾

This improvement in child health can be attributed to several child survival interventions run by "The Child Health Division of the Ministry of Health and Population (MOHP)". Two of these interventions responsible for decline of diarrhea deaths, pneumonia deaths and deaths due to vaccine preventable diseases are Expanded Program on Immunization (EPI), the Community-Based Integrated Management of Childhood Illnesses (CB-IMCI) program.⁽⁴⁾

EPI as implemented in Nepal follows the guidelines set by the World Health Organization (WHO) for vaccinating children.

Control of Diarrheal Diseases (CDD) Program began in 1982; and the Control of Acute Respiratory Infections (ARI) Program was initiated in 1987. The CDD and ARI programs were merged into the CB-IMCI program in 1998. Over the past decade, the country has had success in reducing under-five mortality, largely due to the implementation of the CB-IMCI program started in 1998.⁽⁵⁾

Although a national level indicator shows progress in terms of fewer than five deaths, this study is an attempt to see coverage of selected implementation indicators related to diarrhea treatment, fever treatment and vaccination across selected socio-ecological variables. The selected implementation indicators are Oral rehydration therapy (ORT) for diarrhea treatment, treatment of fever at health facility or from health provider and complete vaccination.

Few previous studies have examined non wealth-based distribution of coverage of child survival interventions in Nepal. This study describes percentage changes in coverage of selected indicators of child survival program in Nepal across a range of sub national developmental and ecological regions, over a time period of 15 years and gives a cursory idea on distribution of these services. This is followed by correlation of trends in U5MR over the same period with coverage by residence (urban, rural) as an attempt to show association of U5MR with varying coverage.

Level of maternal education has often been suggested to be the single most important factor explaining differentials in child health outcomes.(4) This article also attempts see the distribution of selected implementation indicators with level of maternal education between 1996 and 2011.

Political map of Nepal: Nepal, a small landlocked country located on the lap of Himalayan mountain range between India and China has a diverse topography and a multi-ethnic population. It has been divided into five developmental regions from East to west as Eastern, Central, Western, mid western and Far Western regions since 1982. There is further division based on geographical variation into three ecological zones, namely the Mountains, the Hills and the Terai or the plains. Urban centers are referred to as municipalities most of which located in Central and Western developmental regions while rural centers are known as Village development committees which are mostly located in Midwestern and Far western regions.

OBJECTIVES

1. To compare coverage and assess changes of key child survival interventions by socio-ecological variables.
2. Demonstrate association between U5MR and coverage of child survival interventions by residence.

METHODOLOGY:

Sources of data

Nationwide information on rates of under-five mortality and on the coverage of interventions was abstracted from the demographic and health surveys (NDHSs) 1996, 2001, 2006 and 2011.

NDHS stratifies data on socio-ecological variables. Some of these variables were selected for study.

Selected indicators of child survival interventions: Complete vaccination, Fever treatment at health facility/from provider and Oral rehydration therapy for treatment of diarrhea.

Socio ecological variables: Level of mother's education (Higher education, secondary education, primary education, no education), Ecological regions (Mountains Hills and Terai), Developmental regions (Eastern, Central, Western, Mid Western, Far Western), Residence (Urban, Rural).

Definition of indicators:

Complete vaccination of children at age 12-23 months: Percentage of children aged 12-23 months, who had received all recommended vaccinations (vaccination against tuberculosis—BCG, three doses each of DPT and polio vaccines, and measles vaccine) at any time before the survey.

Oral rehydration therapy (ORT) for children with Diarrhea: Percentage of children, aged less than three years, with diarrhea in the two weeks preceding the survey, who received oral rehydration solution or a recommended home solution.

Care-seeking for children with fever: Percentage of children, aged less than three years, With fever during the two weeks preceding the survey for who care was sought from an appropriate health facility or service provider.

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Analysis: Data was uploaded in Excel 2007. The percentage changes in under five mortality rates were calculated by dividing the difference in under-five mortality rates between the two surveys by the baseline mortality and then dividing by the number of years between the two surveys.

The percentage changes in coverage for each of the three interventions was calculated by taking a mean of coverage of selected intervention in terms of socio ecological variable and then dividing the difference of the means between the two surveys by the mean of coverage of the 1996 survey and then dividing the number of years between the two surveys.

SPSS ver. 16.0 was used to correlate coverage by residence with under five mortality rates to show association of under five mortality rates with coverage.

LITERATURE REVIEW

The first decade of the new millennium has seen a renewed interest in child survival and achievement of the Millennium Development Goal 4 (MDG 4) of reducing the under-five mortality rate by two-thirds between 1990 and 2015.

In an article published in 2006 titled “Countdown to 2015: tracking intervention coverage for child Survival,” Nepal was one of seven among sixty countries with high child mortality rate en route to achieve MDGS 4. The article based its results on coverage of child survival interventions till the end of 2005. The same study showed estimated annual rate of decline in mortality to be 4.6 %.⁽⁶⁾

With regards to achieving MDGs 4, Child health division of MoHP Nepal has initiated several child health interventions in Nepal among which are Expanded program on immunization (EPI) and Community Based Integrated Management of Childhood Illnesses (CB-IMCI) program.

CB-IMCI program aims to train many CHVs in treatment of pneumonia and diarrhea with Overall goal to meet the Millennium Development Goal for child mortality. In Nepal it has succeeded in training many CHVs in districts where it has been implemented as evident from results of study by Ghimire M et al.⁽⁷⁾

One of the objectives of the Expanded Program of Immunization (EPI) is to achieve and sustain vaccination coverage to >90%. According to a report of National Immunisation program of Nepal, immunization coverage is as follows. DPT3 coverage > 90% in 75 districts. Coverage of all antigens: 90% in 10 or more districts (total 75districts) · At least 85% coverage in all VDCs and municipalities in the all districts.⁽⁸⁾

Estimates based on exponential-decline regression curves fitted to the 15-year data immediately preceding each survey, aggregated by 5-year period showed under-five mortality rates for the period 1986–1990 to be 158 per 1000 live births and 67 per 1000 live births for 2001–2005, respectively. The projected rates, assuming that the policy and program efforts are sustained, for the period 2011–2015 is 38 per 1000 live births.⁽⁹⁾

Results of multivariate analysis revealed that increases in the coverage of early initiation of breastfeeding, ORT for diarrhea, and care-seeking for ARI were significantly associated with reductions in under-five mortality⁽¹⁰⁾

In an article, published in Lancet in 1991, initial years of MDGs period, among all causes of under five deaths (2101), deaths due to pneumonia were 367(17.5%), both pneumonia and diarrhea were 114(5.4%), diarrhea alone caused 360 deaths(17.1%) and measles 48(2.3%). Thus in cumulative terms 42.3% of under five deaths were due either to pneumonia, diarrhea, incomplete or lack of vaccination.⁽²⁾

In United Nations children's fund (UNICEF) Nepal profile, 2010, the pneumonia accounts for 10%, diarrhea accounts for 14% and measles accounts for 0% of fewer than five deaths.⁽³⁾

In an article by Sreeramreddy et al, inequalities existed in U5MR when it was stratified by mother's education and different ecological and developmental regions. For Mother's education (for mother's with no education as compared to higher education) hazard ratio for U5MR increased from 2.55 (95% CIs 1.95, 3.33) to 3.75 (95% CIs 3.17, 4.44) data analyzed for NDHS 1996 to NDHs 2011. Changes in regional inequities were marginal and irregular.⁽¹¹⁾

Urban –rural differences in coverage of child health interventions are common phenomena in

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developing world. A study in India across six major geographical regions on coverage of vaccination showed urban-rural inequality increased in the west region during 1992–2006.⁽¹²⁾

The variation in less than five mortality rate by urban and rural residence in Nepal is described by Sreeramreddy et al. Children born in rural areas had higher risk of death before five years of age than children born in urban areas (HR ranged from 1.05 - 1.27).⁽¹¹⁾

Under five mortality is also dependent upon care seeking behavior of the mother. In a study by Sreeramreddy et al total family income, number of symptoms, mothers' education and perceived severity of illness was the predictors of care seeking behavior.⁽¹³⁾

RESULTS

Complete vaccination coverage:

When each of the NDHS is considered separately, the percentage under five that received vaccination shows increase with higher level of mother's education. The gap in the coverage between child of mother with no education and those with mother of higher education was 54.1% in NDHS 1996 which declined to 14.3% in NDHS 2011 as shown in Figure 1. Percentage of children 12-23 months who received complete vaccination by mother's education. Figure 1. Percentage of children 12-23 months who received complete vaccination by mother's education. Generally, at each level of education the percentage that were completely vaccinated showed increase in successive demographic surveys from 1996 to 2011 but there is a slight decline in coverage of complete vaccination amongst children of mother with higher and secondary level education when 2006 NDHS is compared with 2011 NDHS.

In terms of developmental regions, there is increasing trend in coverage of for all five regions when NDHS 1996 is compared with NDHS 2011. The marked improvement is noted in coverage of complete vaccination in Western and Far Western regions when NDHS 1996 is compared with NDHS 2011 Figure 2.

In terms of Ecological regions, the increase in coverage is most marked in Terai and Mountains

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Figure 3.

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Figure 1. Percentage of children 12-23 months who received complete vaccination by mother's education.

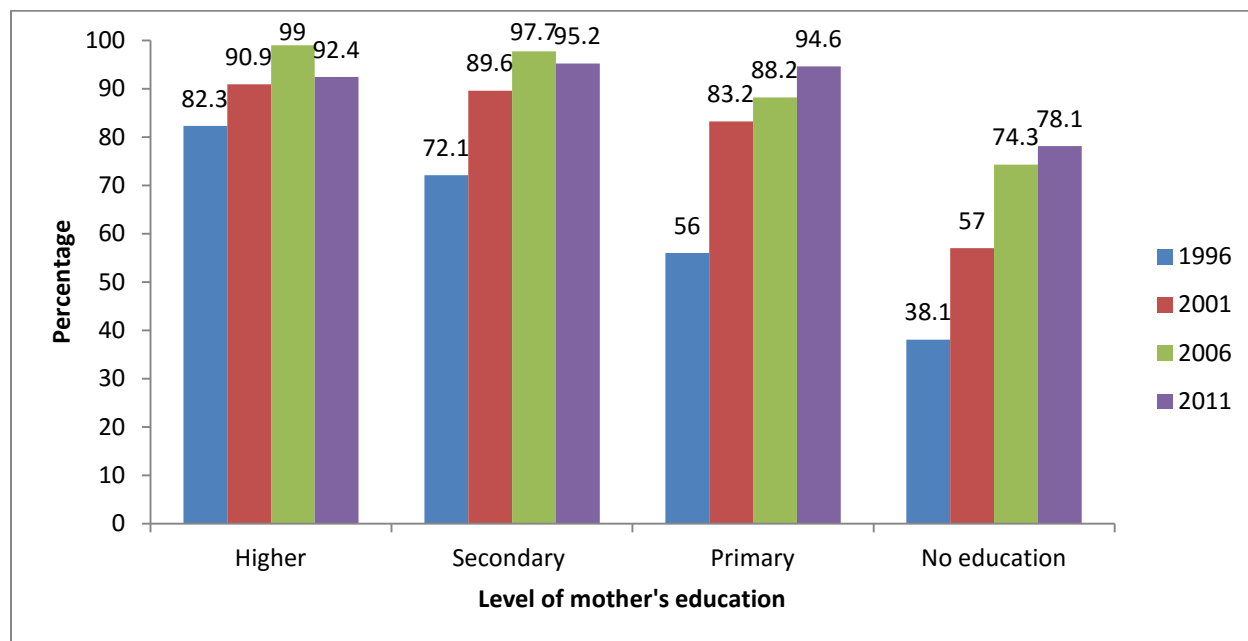
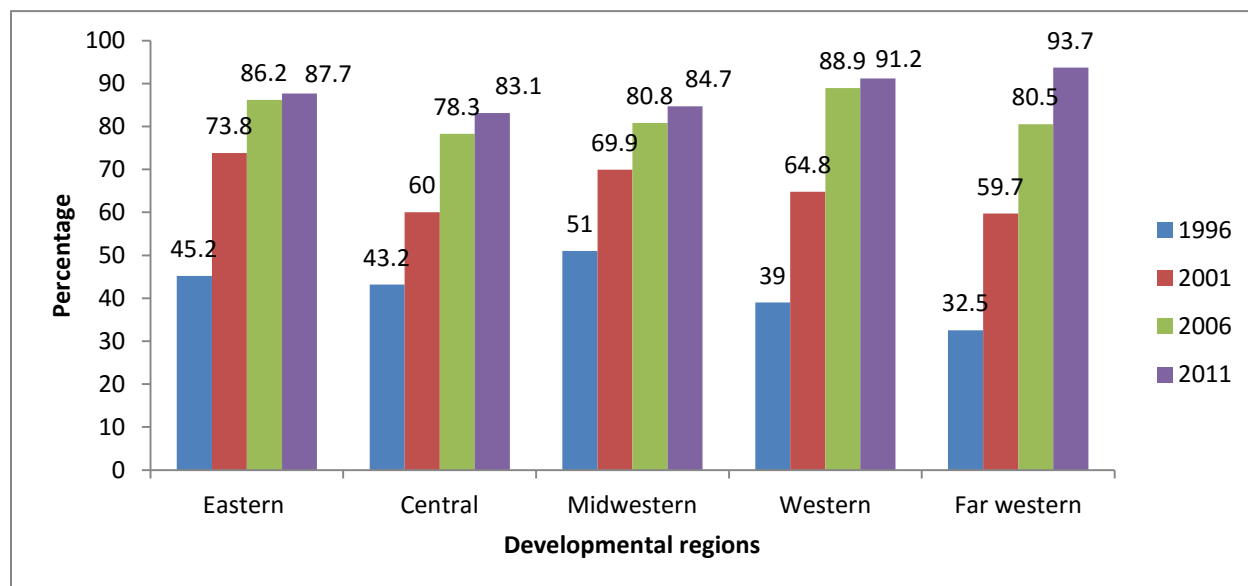


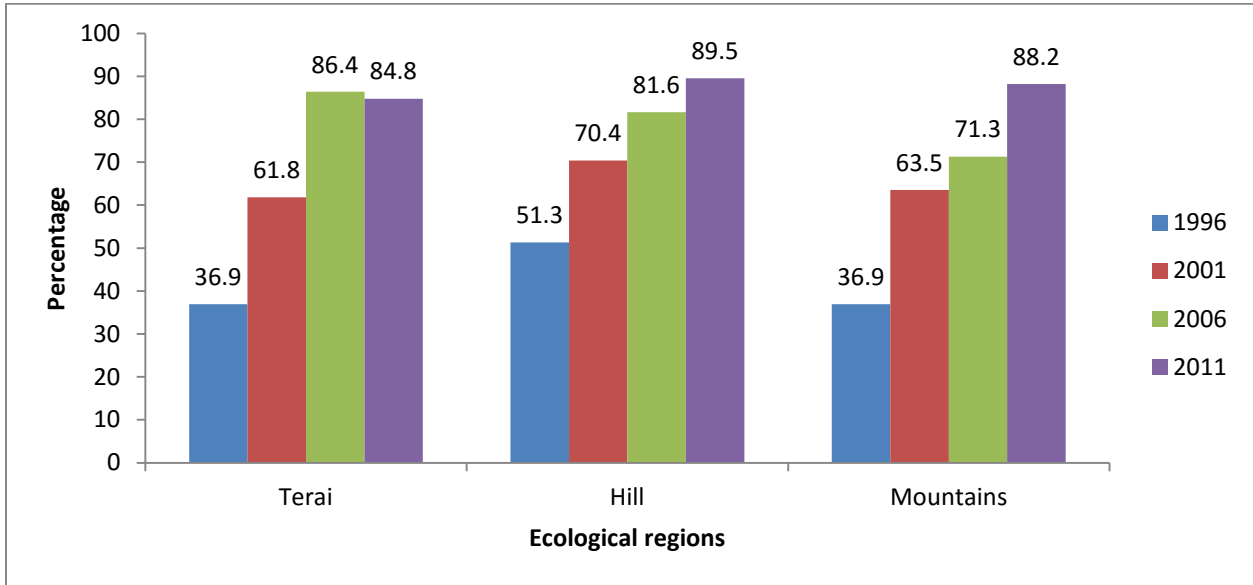
Figure 2. Percentage of children 12-23 months who received complete vaccination by developmental region



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Figure 3. Percentage of children who received complete vaccination by ecological region



Coverage of Fever treatment at health facility/ from provider:

When each of the NDHS is considered separately, the percentage that received treatment for fever at health facility /from provider shows increase with succeeding surveys except for a decline in coverage from secondary to higher education in NDHS 2011 Figure 4. Percentage of children who had fever in two weeks preceding the survey and who sought treatment in health facility/from provider by mother's education

In terms of developmental regions, there is decrease in percentage coverage for care seeking for fever for central region in all of the four surveys Figure 5.

When ecological regions are considered coverage varies across different surveys and different ecological regions with Terai showing higher coverage in 2001 and 2011 while hills showing higher coverage 1996 and 2006 Figure 6.

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Figure 4. Percentage of children who had fever in two weeks preceding the survey and who sought treatment in health facility/from provider by mother's education

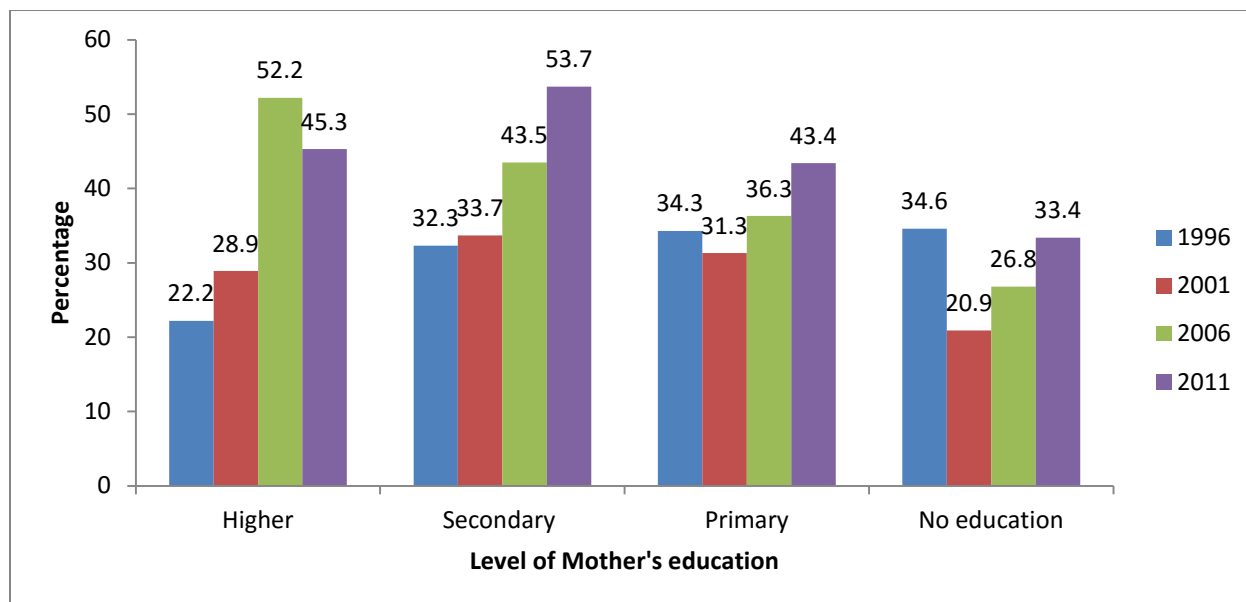
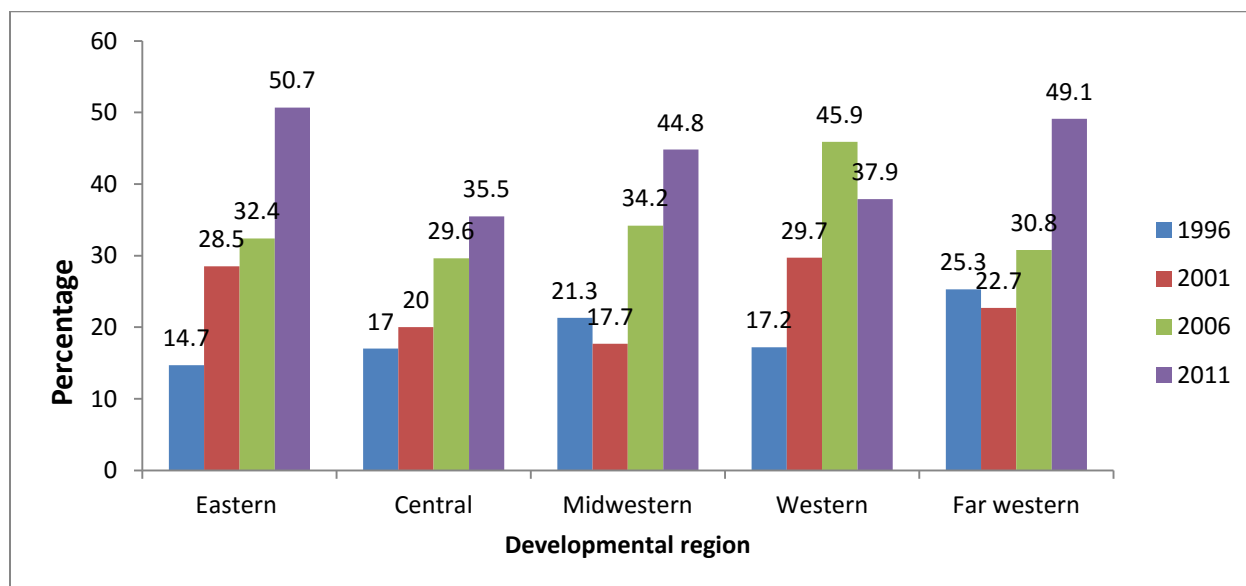


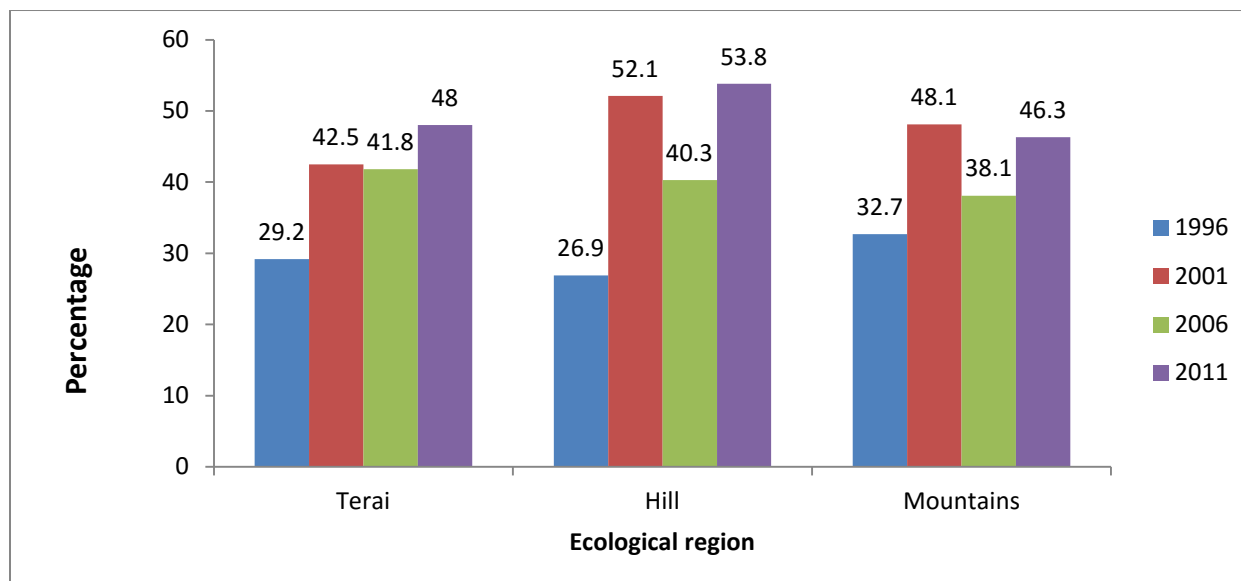
Figure 5. Percentage of children who had fever in two weeks preceding the survey and who sought treatment in a health facility/provider by developmental region.



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Figure 6. Percentage of children who had fever two weeks preceding the survey and who sought treatment in health facility /from provider by ecological region



Coverage of ORT treatment for children with diarrhea in two weeks preceding the survey:

When each of the NDHS is considered separately, the percentage that received ORT shows increase with higher level of education. When trend of ORT use is seen over the period of various surveys there is decrease in coverage when child of mother with primary level education and secondary level education were compared for the years 2001 and 2006 Figure 7.

In terms of developmental regions, there is marked decline in coverage of ORT across all five developmental regions when NDHS 2001 is compared with NDHS 2006. However, this trend is reversed when NDHS 2006 is compared with NDHS 2011 Figure 8.

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Similar is the case when ecological regions are considered, where decreasing trend in ORT coverage is seen across all regions when NDHS 2001 is compared with 2006 with reversal of trend when NDHS 2006 is compared with NDHS 2011 Figure 9.

Figure 7. Percentage of ORT coverage in child who had diarrhea 2 weeks preceding the survey

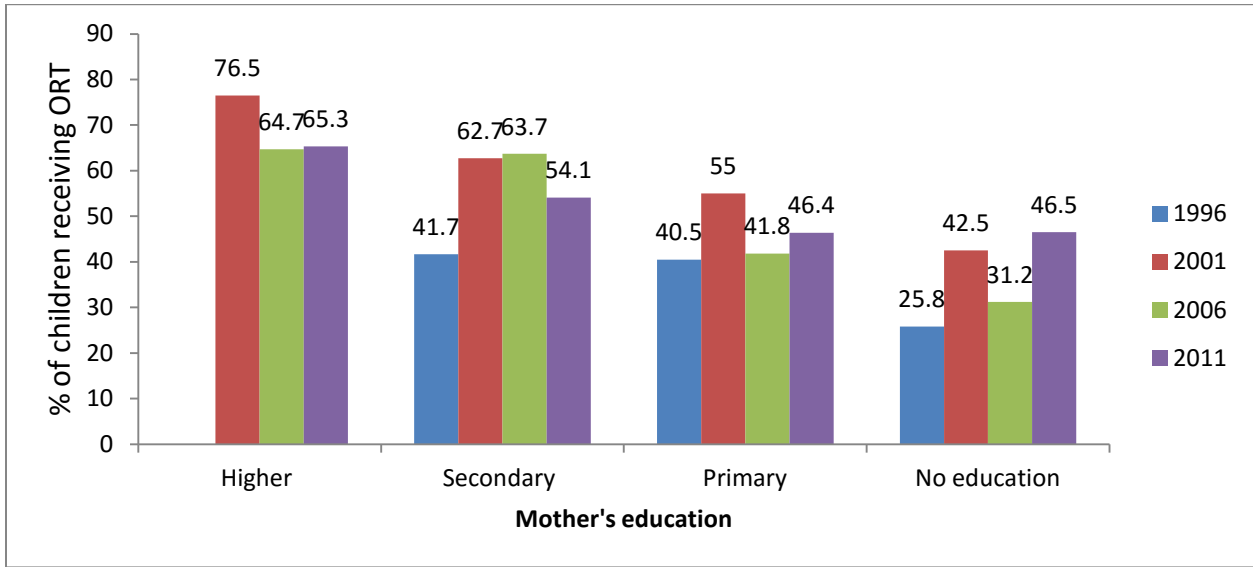
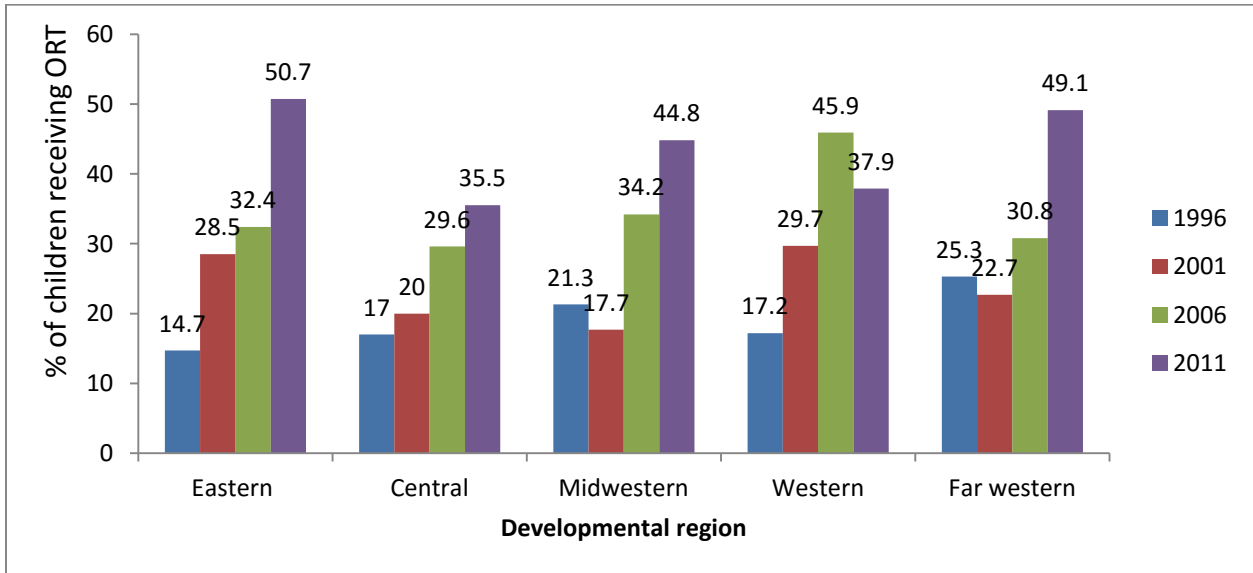


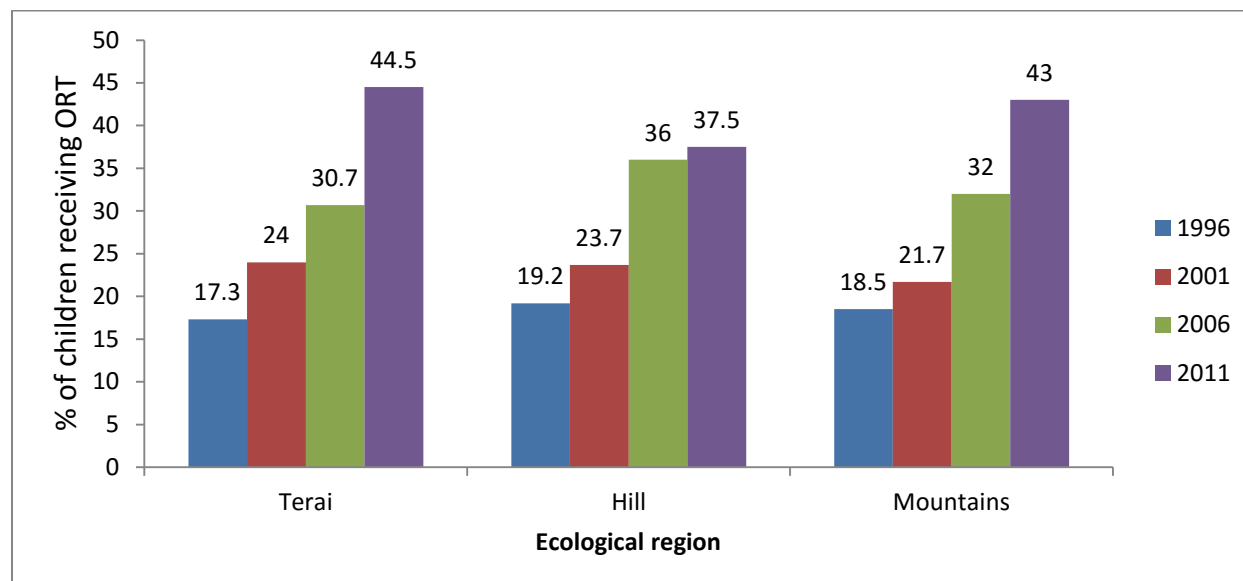
Figure 8. Percentage of children who received ORT for diarrhea two weeks preceding the survey by developmental region



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Figure 9. Percentage of children who received ORT for diarrhea two weeks preceding the survey by ecological region



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Correlation of coverage by residence with U5MR

- **For complete vaccination coverage**

- The line diagram, Figure 10, shows as urban and rural U5MR decreases both changes in urban and rural vaccination coverage increases. Strong negative associations are observed between urban and rural coverage of vaccination and urban and rural U5MR and both are statistically significant with ($p=0.03$) and ($p=0.016$) respectively at 95% confidence intervals. **Error! Reference source not found.**

- **For Fever treatment at health facility or from care provider**

The line diagram,

- Figure 11, shows as urban and rural U5MR decreases coverage of care seeking from a health care provider or from health facility for both urban and rural population increases. Strong negative association between treatment of fever at health facility /from provider and U5MR is seen in rural areas with ($p= 0.016$) but there is no association between treatment of fever at health facility/from provider and U5MR in urban areas ($p=0.134$) at 95% confidence intervals **Error! Reference source not found..**

- **For ORT coverage**

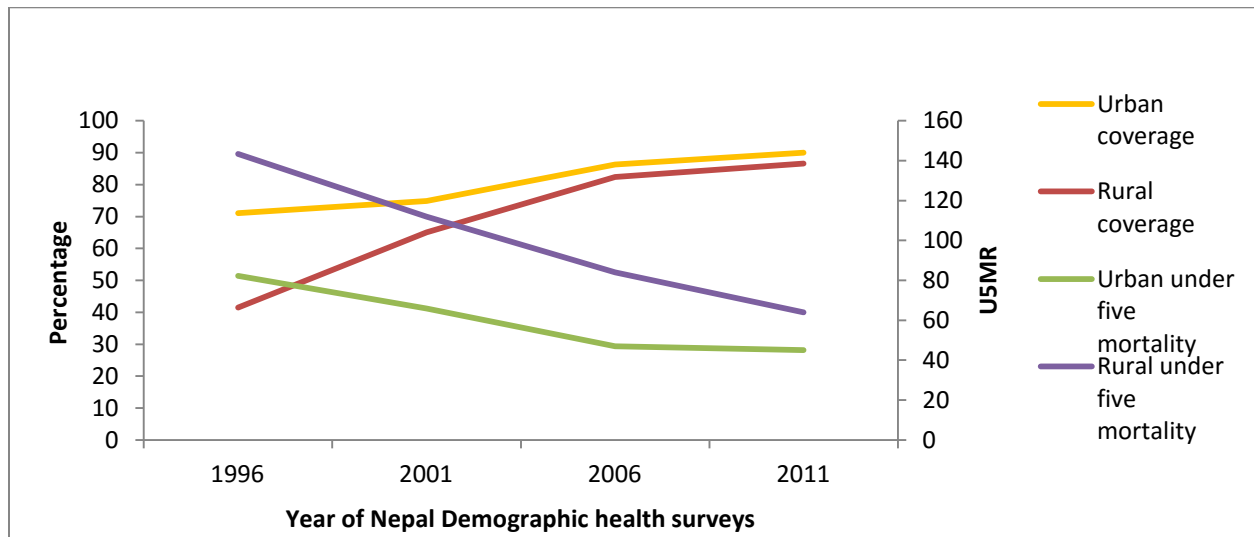
The line diagram,

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- Figure 12, shows as urban and rural U5MR decreases coverage of both urban and rural ORT increases. However, association between both urban and rural ORT coverage with urban and rural U5MR are not statistically significant with (p value=0.08) and (p=0.177) respectively at 95% confidence intervals **Error! Reference source not found..**

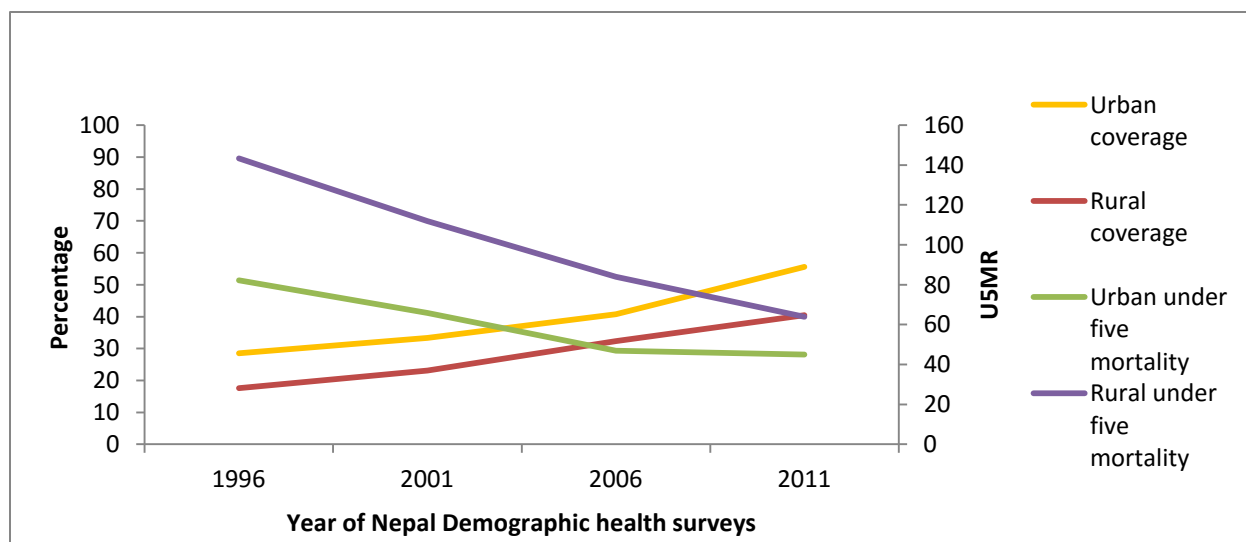
Figure 10. Trend in under five mortality compared with children 12-23 months who received complete vaccination



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Figure 11. Trend in under five mortality with under five children who had fever in two weeks preceding the survey and who sought treatment in health facility /from provider by residence



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Figure 12. Trend in under five mortality with ORT two weeks preceding the survey

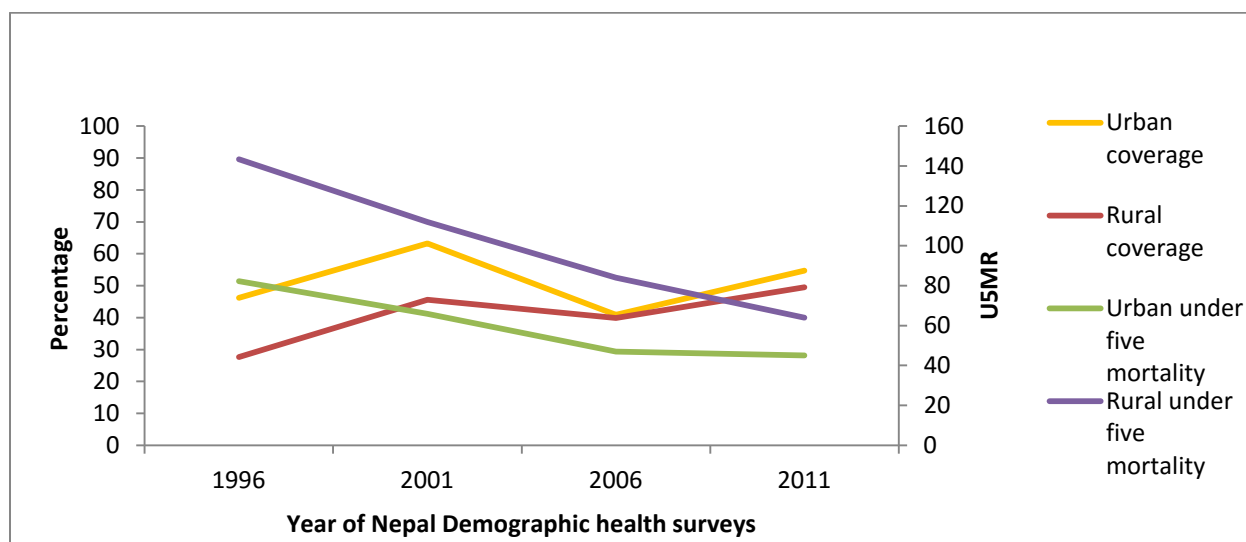


Table 1. Correlation of urban and rural under five mortality rate with urban and rural child survival interventions

Indicators		Urban U5MR	Urban vaccination coverage
Urban U5MR	Pearson Correlation	1	-0.97
	Sig. (2-tailed)		0.03
Urban vaccination coverage	Pearson Correlation	-0.97	1
	Sig. (2-tailed)	0.03	
Indicators		Rural U5MR	Rural vaccination coverage
Rural U5MR	Pearson Correlation	1	-0.984
	Sig. (2-tailed)		0.016
	Pearson Correlation	-0.984	1

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Rural vaccination coverage			
	Sig. (2-tailed)	0.016	
Indicators		Urban U5MR	Urban ORT coverage
Urban U5MR	Pearson Correlation	1	0.08
	Sig. (2-tailed)		0.920
Urban ORT coverage	Pearson Correlation	0.08	1
	Sig. (2-tailed)	0.920	
Indicators		Rural U5MR	Rural ORT coverage
Rural U5MR	Pearson Correlation	1	-0.823
	Sig. (2-tailed)		0.177
Rural ORT coverage	Pearson Correlation	-0.823	
	Sig. (2-tailed) 0.177	0.177	
Indicators		Urban U5MR	Urban Fever treatment in health facility/provider coverage
Urban U5MR	Pearson Correlation	1	-0.866
	Sig. (2-tailed)		0.134
Urban Fever treatment in health facility/from	Pearson Correlation	-0.866	1

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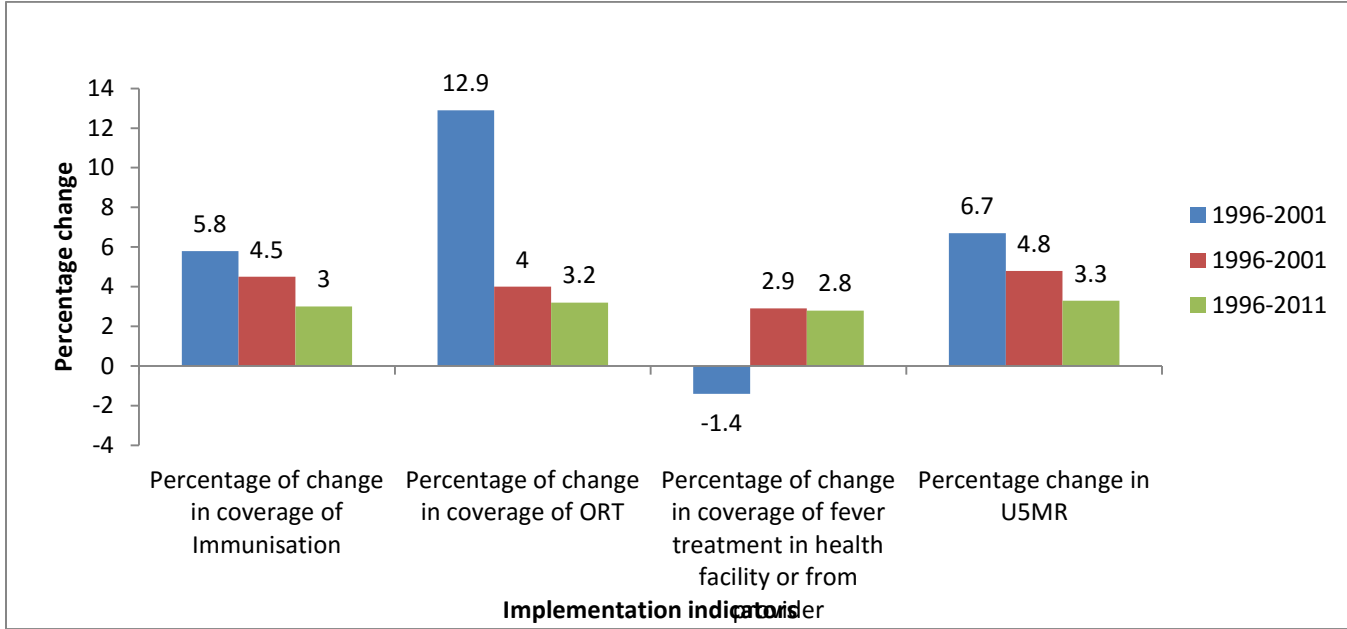
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provider coverage	Sig. (2-tailed)	0.134	
Indicators		Rural U5MR	Rural Fever treatment in health facility/provider coverage
Rural U5MR	Pearson Correlation	1	-0.984
	Sig. (2-tailed)		0.016
Rural Fever treatment in health facility/ from provider coverage	Pearson Correlation	-0.984	1
	Sig. (2-tailed)	0.016	

Change in percentage coverage and U5MR by Mother's education

Percentage change in ORT coverage showed greatest rise when coverage for 1996 NDHS was compared with coverage for 2006 NDHs (12.9%). The percentage change in coverage of care seeking for fever at health facility or from provider remained constant at around 3% approximately when different surveys were considered. A slight decline in change in coverage of care seeking for fever was seen when NDHS 1996 was compared with NDHS 2001. Change U5MR showed gradual decline from change of 6.7% to a change of 3.3% in successive surveys **Error! Reference source not found..**

Figure 13. Percentage of change in various implementation indicators compared with percentage of change U5MR by Mother's education



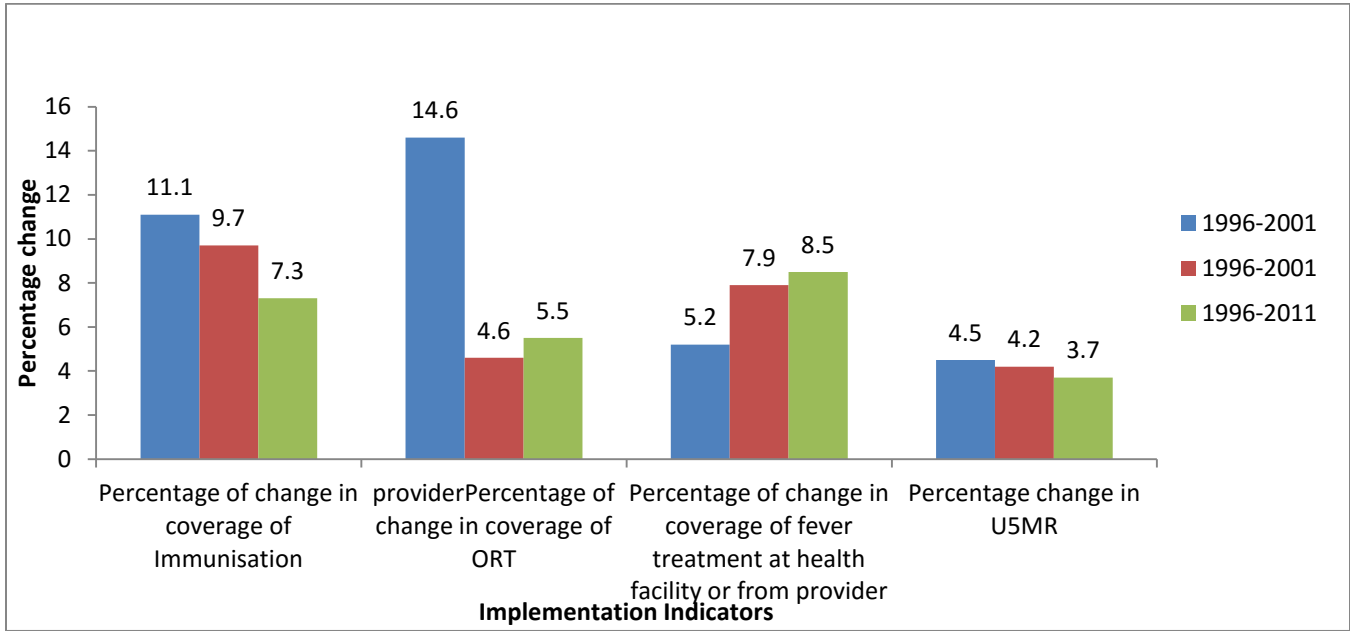
Change in percentage coverage and U5MR by Developmental region

Percentage change in complete vaccination coverage was maximum for surveys between 1996-2001(11.1%) while the percentage change in coverage of ORT was maximum for the surveys between the years 1996-2006. (14.6%).Percentage change in fever treatment at health facility or from provider has picked up in the surveys of 2006 and 2011 when compared to survey done in 1996. Percentage change in U5MR remained more or less constant through the surveys, approximately around 4% **Error! Reference source not found..**

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Figure 14. Percentage of change in various implementation indicators compared with percentage of change U5MR by developmental regions



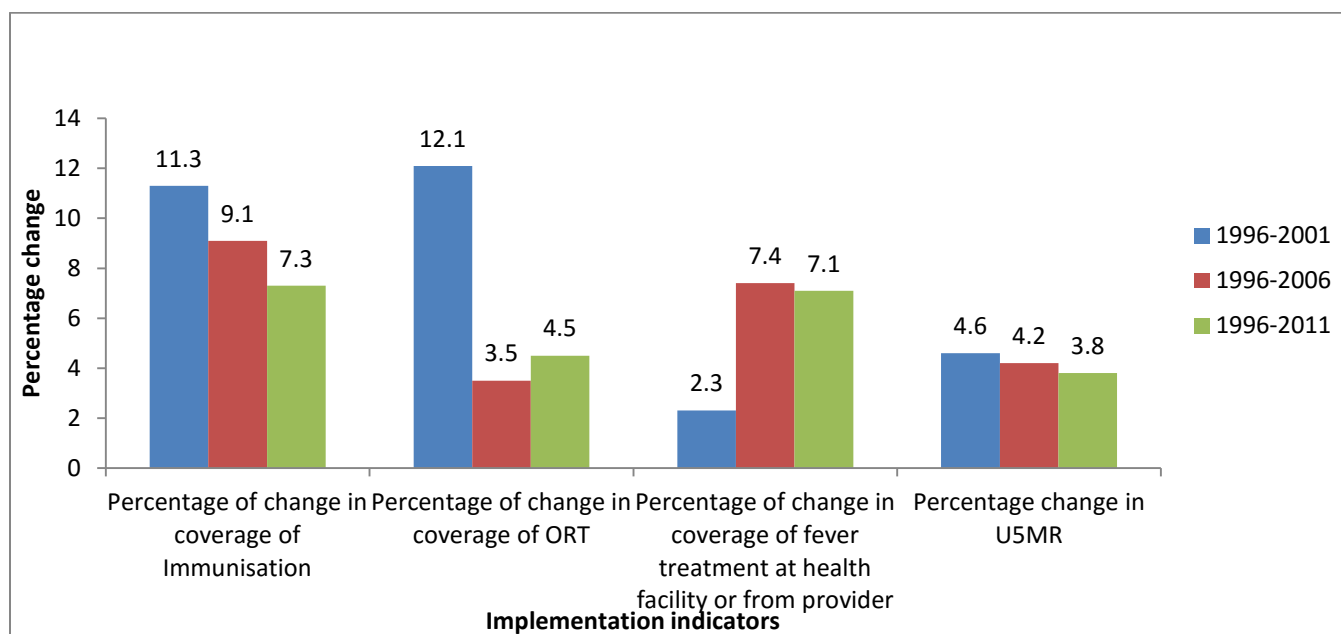
. Change in Percentage coverage and U5MR by ecological region

Percentage change in complete immunization and ORT coverage were maximum for the surveys between 1996-2001. Change in coverage of fever treatment at health facility was approximately 7% when survey of 1996 was compared with 2006-2011. Change in percentage of under five mortality rate has remained constant at approximately 4% through the surveys

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Figure 15. Percentage of change in various implementation indicators compared with percentage of change U5MR by ecological region



DISCUSSION

There is increasing percentage of coverage for complete vaccination with increasing level of maternal education.

In fact with the exception of 1996 NDHS and mother's with no education the vaccination coverage were over 80% for child of all levels of education of mother and different survey periods.

This finding was similar to study done in India where Immunization rates rose sharply with mother's education through upper primary education. After the upper primary level, the returns from additional years in secondary school or university were positive but diminished considerably.⁽⁴⁾

Change in complete vaccination coverage were maximum for initial periods as shown by change in coverage of complete vaccination by ecological and developmental regions when surveys of 2001 and 2006 are compared with 1996. Vaccination coverage started to increase early 2000s as shown by NDHS 2006 with more than 80% coverage of complete vaccination in all ecological and developmental regions except Mountains for the NDHS 2006. Decline of measles related death to 0% in Unicef Nepal profile ,2010 can be assumed to be direct evidence of this increased sustained coverage of complete vaccination over the last decade.⁽³⁾

Vaccination coverage when stratified by residence was statistically significant when compared with U5MR stratified by residence which reflects universal increase in trends of vaccinations regardless of developmental and ecological regions.

The maximum coverage for care seeking of fever from health facility or provider for any socioecological variable is 53.7%, for child of mother with secondary education in 2011. This would suggest a big gap to fill in terms of

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coverage however the coverage has only increased by (7-8%) across different ecological and developmental regions when data of NDHS 2006 and 2011 are compared with data of NDHS 1996.

Coverage of care seeking have improved for child of mother with higher and secondary education in 2006 and 2011 when compared with mother's with no education however the change in mean coverage for any level of education for these years is only approximates 3%.

The actual numbers for coverage of care seeking from the health facility are however more than noted in NDHS surveys, which exclude visit to pharmacies. In context of Nepal, pharmacies have clinics located at the back of the facility; thus visit to pharmacy would most of the time entail visit to a private clinic. ⁽¹⁴⁾ Similarly The results of the another study show only 51% of mother are aware of fever in Western Nepal which could mean less coverage of care seeking behavior. ⁽¹³⁾

As could be expected from low numbers in coverage at all levels of education and various regions both urban and rural care seeking behavior for fever is not statistically significant with urban and rural U5MR.

Percentage change in ORT coverage for diarrhea treatment by mother's education, developmental and ecological regions is maximum between surveys carried out for years 1996 and 2001. Beyond NDHs 2001 there is very little percentage change (4-5%) in ORT coverage with levels of mother's education, developmental or ecological regions.

With regards to actual coverage of ORT by developmental regions, central developmental region which includes most of urban centers in the nation seems to show less coverage of ORT when compared to Midwestern and Far western regions which comprise mainly of rural areas. This finding could explain statistical significance in rural coverage of ORT with rural U5MR but no statistical significance of urban ORT coverage with Urban U5MR.

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In a report by Quinley J et al in 2006 it is seen that Female community health volunteer (FCHVs) are the most important provider in terms of ORT (88%). FCHVs are also seen as the main provider of health intervention in rural areas. These findings would also support statistical significance seen between rural U5MR and Rural ORT coverage.⁽¹⁴⁾

CONCLUSION

U5MR over the period of various surveys shows greatest percentage change between 1996 and 2001. These were the periods when both percentage changes in those that were completely vaccinated and received ORT for diarrhea increased by more than 10% in different ecological and developmental regions. In surveys done in 2006 and 2011, the percentage change in fever treatment at health facility and provider also increased. However sustained complete vaccination can be singled out as most important child intervention for reducing U5MRs in last decade and half leading to achievement of Millennium Developmental goal 4 by Nepal.

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