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Predictors of Institutional Delivery in Nepal: Analyzing Nepal Demographic and Health Survey 2016

Ashya Parajuli[1*], Janak K.C.[1], Esther Budha Magar[2], Ranjana Chaudhary[3], Mala Gupta[4], Deepak Marahatta[5]

[1]Karnali College of Health Sciences, Nepal
[2]Public Health Research Society Nepal
[3]National Open College, Nepal
[4]Kantipur Academy of Health Sciences, Nepal
[5]Tribhuvan University Central Department of Rural Development, Nepal

**Corresponding author: parajuliashya58@gmail.com*

Abstract: Nepal has made remarkable progress in reducing the MMR and achieving the MMR-related goal of MDG-5A by 2015. Still, a substantial number of women deliver at home. Still, a significant number of women deliver at home. WHO estimated that 15% of women will suffer severe complications during delivery and pregnancy, leading to most maternal deaths. In Nepal, 1 out of 2 neonatal deaths and 2 out of 5 maternal deaths occur at home. Due to this, institutional delivery is considered the key and proven intervention to reduce maternal and neonatal mortality. The study aims to assess the trends in institutional delivery and its associated factors in Nepal. This study used the Nepal Demographic and Health Survey 2016 dataset to analyze a subset of 5060 women aged 15–49 who had given birth within the five years before the survey. The survey employed a three-stage cluster sampling method for the urban region and a two-stage cluster sampling method for the rural region, including the most recent birth in the study. The obtained data were weighted and analyzed using Chi-square, and the variables found to be significant in Chi-square were introduced with bivariate and multivariate logistic regression to identify the predictors. This study found that caste/ethnicity, place of residence, ecological zone, province, wealth quintile, mother's education, occupation, birth order, ANC visit, and birth preparedness were independently associated with institutional delivery. To achieve the SDG target of 90% by 2030, we must address these factors and increase the institutional delivery rate.

Keywords: *Determinants, Factor, Home delivery, Institutional delivery, Predictors*

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1. Introduction

Institutional delivery takes place in any health facility with the help of a Skilled Birth Attendant (SBA) (Yoseph et al., 2020). It is estimated that 15% of pregnant women will develop severe complications during pregnancy and delivery, and 5 to 10% will need a cesarean section (CS) to prevent death or long-term morbidity (Tunçalp et al., 2015). To reduce maternal mortality, WHO envisions a world where each woman and newborn receive quality care throughout pregnancy, childbirth, and the postnatal period (Tunçalp et al., 2015). Various complications arise during the delivery, such as post-partum hemorrhage, eclampsia, abortion complications, obstructed labor, and puerperal sepsis. The majority of deaths in Nepal occur as a result of hemorrhage before reaching the health facility. For addressing these complications, Institutional delivery is considered the key and proven intervention to reduce maternal mortality by providing safe delivery and reducing the complications arising during delivery (Adhikari, 2015; Karkee et al., 2013; Singh et al., 2015; Yarinbab & Balcha, 2018) Nepal has implemented a user fee exemption, an incentive scheme, and 24-hour obstetric services to

enhance institutional deliveries (Karkee, 2012). Deliveries in healthcare facilities with skilled health workers result in fewer newborn problems and deaths and fewer maternal deaths (Abdella et al., 2018; Koblinsky et al., 2006).

Despite the decrease in MMR from 539 to 239 from 2011 to 2016, the MMR is still high and above the global and South East Asian average (Ministry of Health, 2017; Ministry of Health and Population, 2012; World Health Organization, 2017). Almost 2 out of 5 maternal deaths and 1 out of 2 neonatal deaths occur at home (Ministry of Health and Population, 2012; Pradhan et al., 2010). The lack of skilled birth attendance during childbirth increases the risk of maternal and newborn death (Davies-Tuck et al., 2018; Gupta et al., 2018; Ronsmans & Graham, 2006; Seward et al., 2012). Nepal is committed to achieving 90% of all deliveries by SBAs and institutions to meet the Sustainable Development Goal by 2030 (Department of Health Services, 2019).

Home delivery is still a significant issue in Nepal. The goal of reducing mortality by three-quarters from 1990 to 2015 has been achieved partially, but the MMR is still high for achieving the SDG in 2030. Despite the enormous effort from the government, there still needs to be a gap in institutional delivery service utilization among women from various socio-economic backgrounds (Ministry of Health and Population, 2012). Also, only a few studies portray the provinces and institutional delivery. Understanding the factors contributing to institutional delivery would allow for the development of focused interventions rather than a blanket approach.

By looking more closely at the NDHS 2016 data, this secondary study aims to find accurate information about the changes in institutional delivery and the factors that affect it in Nepal. As the survey is nationally representative, the results and findings from this study can help policymakers and stakeholders take adequate measures to increase institutional delivery in Nepal.

2. Materials and methods

2.1. Data source, study area, and sampling procedure

A cross-sectional study was conducted to examine the factors associated with institutional delivery in Nepal, utilizing the NDHS 2016 data. The study covered the entire country, and NDHS used an updated version of the 2011 National Population and Housing Census frame as the sampling frame. Using two-stage and three-stage sampling, they selected 11,473 households from 383 rural and urban clusters. NDHS interviewed 11,040 families out of 11,473 and 12,862 eligible women out of 13,089, resulting in a response rate of 99%. Five thousand sixty women who had given birth before the survey were eligible for this study. For more details on the methodology, please refer to the original NDHS 2016 report (Ministry of Health, 2017).

2.2. Variables selection

The study focused on women aged 15–49 who had a live birth five years before the survey. The dependent variable, i.e., institutional delivery, was dichotomized and referred to deliveries in a health facility (government, private, non-government sector, or outside Nepal), including the most recent birth:

0 = No

1= Yes

The independent variable was categorized into different groups based on the Mother's age (15-19, 20-24, 25-29, 30-49), Caste/Ethnicity (Dalit, Muslim, Janajati, Newar, Terai/Madhesi, other, Brahmin/Chhetri), Ecological zone (Mountain, Hill, Terai), and Province: Koshi Province, Madhesh Province, Bagmati Province, Gandaki Province, Lumbini Province, Karnali Province, Sudur Paschim province; Wealth quintile: Poorest, Poorer, Middle, Richer, Richest; Education: No education: No formal schooling, Primary: up to standard 5, Secondary or higher: Standard 6 to SLC level or more than SLC level; Occupation: Not working, Agriculture and Paid jobs; Household head sex: Male, Female; Has a say in health care decision: Yes, No; Exposure to media: High media exposure: Mothers exposed to at least one of these media at least once a week are considered high exposure, Low media exposure: Those exposed to none are considered low media exposure (Kafle et al., 2019).

Women can have either no visits, 1 to 3 visits, or four or more visits for antenatal care. Pregnancy can either be intended or unintended, and there are four activities to prepare for birth: saving money, preparing for a blood donor, contacting a health worker, and arranging transportation. Women can either have made no preparations, made at least one preparation, or made two or more preparations among these four activities.

2.3. Data analysis and ethical consideration

The collected data was recorded as required and underwent chi-square analysis due to its qualitative nature and proportion. The variables demonstrated statistical significance in the chi-square test and were subsequently subjected to logistic regression. Initially, the variables underwent bivariate logistic regression. Then, the variable was subjected to multivariate logistic regression to adjust the effect of other independent variables statistically, considering significant p-

values of less than <0.05. The data analysis was performed using SPSS V.25 software and tested the goodness of fit for the regression model using Hosmer and Lemeshow's chi-square test. We concluded that the model fits the data well with a finding of insignificance with a value of 0.105 (p>0.05). The Cox, Snell, and Nagelkerke R2 values indicated that the model explained 31.1% and 42.1% variations in the data, respectively. We considered the sample weight during analysis.

The Nepal Health Research Council and human research ethics committee in ICF Macro International ethically approved the secondary data of NDHS 2016 used in the study. The DHS program granted permission to download the data from https://dhsprogram.com/data/available-datasets.cfm. The data was available in the public domain, so the analysis did not require IRB approval.

3. Results and discussion

The chi-square test results are presented in Table 1 and Table 2, showing that Institutional delivery service utilization is significantly associated with Age, Caste/Ethnicity, Place of residence, Ecological zone, Province, Wealth-quintile, mother education, Mother education, Mother occupation, Husband education, Husband occupation, decision in own health care, media exposure, Birth order, ANC visit, pregnancy intentness, and birth preparedness. Household head sex was not found significant in chi-square analysis (p-value 0.177). Finally we introduced variables found significant in the chi-square test into a Logistic regression analysis to determine predictors of institutional delivery.

3.1. Predictors of Institutional Delivery

Table 3 presents logistic regression analysis of socio-economic, demographic, and obstetric variables that showed significant association with institutional delivery. The multivariate regression confirms that the caste, place of residence, ecological zone, province, wealth quintile, mother's education, mother's occupation, birth order, ANC visit, and Birth preparedness were the significant predictors of institutional delivery after adjusting for other variables. The variables Age, Husband education, Husband occupation, Has a say in health care decision, Exposure to Media, and pregnancy intentness were not found to be significant predictors of Institutional delivery.

Belonging to a caste Brahmin/Chhetri increases the odds of Institutional delivery by 1.449 times (AOR=1.449, 95% CI=1.086-1.933) compared with Dalit. Being a rural resident was found to be negatively associated with Institutional delivery (AOR=0.595, 95% CI=0.505-0.700). Women from the Terai region are more likely to deliver at an institution than those from the Mountain. Compared with the women from Karnali Province, Madhesh Province women were 36.4% less likely to deliver at a health facility (AOR=0.636, CI=0.413-0.981). Similarly, the women of Sudurpaschim province had 2.209 times more likelihood of institutional delivery service utilization (AOR=2.209, CI=1.459-3.345) than those of Karnali province. Unsurprisingly, Women of the richest wealth quintile had 7.854 higher odds of institutional delivery (AOR=7.854, 95%CI= 5.128-12.029) than those of the poorest. The odds of institutional delivery were significantly higher among women with secondary or higher education (AOR=1.571, 95% CI=1.245-1.962). Women from agriculture occupation had the lowest odds of Institutional delivery compared with those who were not working (AOR =0.773, 95% CI=0.638-0.396).

The study found a significant negative association of birth order with institutional delivery. The frequency of ANC visits was positively associated with institutional delivery. Similarly, the likelihood of institutional delivery was 2.562 folds among women who prepared for two or more two activities than the women who did not frame any out of the four activities (AOR=2.562, 95% CI=1.894-3.466).

Table 1: Distribution of Institutional delivery based on socio-economic and demographic factors and its association

Variables	**Institutional Delivery**		**P-value**
	Yes	**No**	
Age			
15-19	66.2%	33.8%	<0.001
20-24	62.3%	37.7%	
25-29	57.0%	43.0%	
30-49	48.4%	51.6%	
Caste/Ethnicity			
Dalit	45.3%	54.7%	<0.001
Muslim	51.7%	48.3%	

Janajati	57.9%	42.1%	
Newar	74.7%	25.3%	
Terai/Madhesi other	48.1%	51.9%	
Brahmin/Chhetri	68.7%	31.3%	
Place of Residence			
Urban	68.6%	31.4%	<0.001
Rural	44.2%	55.8%	
Ecological zone			
Mountain	41.8%	58.2%	<0.001
Hill	61.0%	39.0%	
Terai	56.9%	43.1%	
Province			
Koshi Province	62.3%	37.7%	<0.001
Madhesh Province	44.6%	55.4%	
Bagmati Province	70.7%	29.3%	
Gandaki Province	68.3%	31.7%	
Lumbini Province	59.4%	40.6%	
Karnali Province	35.6%	64.4%	
Sudurpaschim Province	66.4%	33.6%	
Wealth-quintile			
Poorest	33.9%	66.1%	<0.001
Poorer	46.6%	53.4%	
Middle	57.6%	42.4%	
Richer	69.5%	30.5%	
Richest	89.6%	10.4%	
Mothers Education			
No education	36.4%	63.6%	<0.001
Primary	49.3%	50.7%	
Secondary or higher	76.7%	23.3%	
Mothers occupation			
Not working	61.9%	38.1%	<0.001
Agriculture	48.2%	51.8%	
Paid Jobs	73.6%	26.4%	
Husband Education			
No education	35.4%	64.6%	<0.001
Primary	44.9%	55.1%	
Secondary and higher	67.2%	32.8%	
Husband occupation			
Not working	59.9%	40.1%	<0.001
Agriculture	44.3%	55.7%	

Paid Jobs	60.3%	39.7%	
Has a say in health care decision			
Yes	60.9%	39.1%	<0.001
No	53.8%	46.2%	
Exposure to media			
Low	43.2%	56.8%	<0.001
High	69.7%	30.3%	

Table 2: Distribution of Institutional delivery based on obstetric factors and its association

Variable	**Institutional delivery**		**P-value**
	Yes	**No**	
Birth order			
First	75.8%	24.2%	<0.001
Second or higher	45.4%	54.6%	
ANC visit			
None	19.0%	81.0%	<0.001
1-3	37.9%	62.1%	
4+	72.3%)	27.7%	
Pregnancy intentness			
Intended	58.7%	41.3%	<0.001
Un-intended	39.5%	60.5%	
Birth Preparedness			
No	45.6%	54.4%	<0.001
One	63.8%	36.2%	
Two or more	85.7%	14.3%	

Table 3: Predictors of Institutional delivery using logistic regression

Variables	**P-value**	**AOR**	**CI (95%)**
Caste/Ethnicity			
Dalit		1(Ref)	
Muslim	0.863	1.033	0.712-1.501
Janajati	0.651	0.941	0.723-1.225
Newar	0.783	0.928	0.544-1.583
Terai/Madhesi other	0.329	0.862	0.640-1.161
Brahmin/Chhetri	0.012	1.449	1.086-1.933
Place of residence			
Urban		1(Ref)	
Rural	<0.001	0.595	0.505-0.700

Ecological zone			
Mountain		1(Ref)	
Hill	0.257	1.211	0.869-1.688
Terai	0.036	1.519	1.027-2.247
Province			
Karnali Province		1(Ref)	
Koshi Province	0.612	1.107	0.748-1.638
Madhesh Province	0.040	0.636	0.413-0.981
Bagmati Province	0.092	1.413	0.945-2.113
Gandaki Province	0.103	1.444	0.928-2.246
Lumbini Province	0.605	0.899	0.602-1.344
Sudurpaschim Province	<0.001	2.209	1.459-3.345
Wealth-quintile			
Poorest		1	
Poorer	0.014	1.365	1.064-1.750
Middle	<0.001	2.937	2.212-3.900
Richer	<0.001	3.102	2.278-4.225
Richest	<0.001	7.854	5.12-12.02
Mothers education			
No education		1(Ref)	
Primary	0.555	1.069	0.856-1.335
Secondary or higher	<0.001	1.571	1.245-1.982
Mothers occupation			
Not working		1(Ref)	
Agriculture	0.009	0.773	0.638-0.936
Paid Jobs	0.539	0.917	0.696-1.208
Birth order			
First	<0.001	2.798	2.263-3.460
Second or higher		1(Ref)	
ANC visit			
None		1(Ref)	
1-3	0.001	1.955	1.309-2.920
4+	<0.001	4.451	3.014-6.575
Birth Preparedness			
No		1(Ref)	
One	0.006	1.270	1.069-1.509
Two or more	<0.001	2.562	1.894-3.466

4. Discussion

As per this study, the Brahmin and Chhetri were more likely to utilize institutional delivery services than the Dalit group. The upper caste better utilized institutional delivery than the socially disadvantageous classes like Dalit (Jat et al., 2011). The study among Young women also found the highest odds of Institutional delivery among Brahmin/Chhetri (Shahabuddin et al., 2017). Furthermore, the study conducted in Chitwan also showed that the upper caste (Brahmin/Chhetri) had higher odds of Institutional delivery than the lower caste Dalit (Pathak et al., 2018).

Mothers residing in rural areas had low odds of institutional delivery. The researchers further analyzed the NDHS 2011 survey and discovered a similar finding among young women (Shahabuddin et al., 2017). The possible reasons can be poor health service quality in the rural health facility, poor geographical structure, and lack of transportation in the rural area (Karkee et al., 2013; Shah et al., 2015). The study from western Nepal showed that distant health facilities can lead to unaccounted costs (Acharya et al., 2016), denying low-income people the ability to utilize health services. At the same time, the staff and transportation facilities in the urban region are adequate (Shakya et al., 2004; Shrestha et al., 2012), which helps increase the service utilization rate in urban areas. To enhance health service access, GoN has launched outreach clinics in the most suitable areas that give maternal and child health services. Reducing child mortality is one of the objectives of the development goals for under-five mortality and infant mortality (Shrestha, 2023). In addition, the health camp team is conducting outreach in remote areas (Pandey et al., 2011).

This study also found that the women of the Terai region are more likely to deliver in a health facility compared with the women of the mountain region, which is contra indicatory with the previous finding of further analysis of NDHS 2011, which showed no association between ecological zone and institutional delivery in multivariate logistic regression (Karkee et al., 2014).

This study showed that there was less likelihood of institutional delivery in Madhesh Province compared with Karnali Province, which concurred with the finding of the recent Annual report 2075/76, which showed a lower percentage of institutional delivery in Madhesh Province (41%) compared with Karnali province (62%) and the national average (56%) (Pokharel, 2015). Madhesh Province also has the lowest HDI (0.51) (National Planning Commission, 2020). Madhesh Province encompasses eight Terai districts in southern Nepal, where the marginalized ethnic community, Madhesi, lives in considerable numbers. In comparison to other ethnic groups, the Terai Dalit and Janajati have less access to family planning services, ANC, and the use of SBAs during births (Bennett et al., 2008; Pandey et al., 2013). As the women in Madhesh Province are socially, culturally, and economically isolated from mainstream development, they may have had difficulty receiving health care despite the availability of health care (Pokharel, 2015).

This study found that the Sudurpaschim province had the highest likelihood of Institutional delivery service utilization. However, the recent annual report found that the institutional delivery service utilization rate was lower in Sudurpaschim province compared with Karnali province. If we look at the trend of the last three years from the survey, in 2073/74, the Institutional delivery was higher in Sudurpaschim province (55%) compared with the Karnali province (49%). However, the Karnali province progressed faster than the Sudurpaschim province, and due to this, in FY 2075/76, the Karnali province had higher institutional delivery service utilization compared with the Sudurpaschim province (Department of Health Services, 2019).

This study showed that wealthier and better-educated women were more likely to utilize Institutional delivery services. Another study demonstrated similar findings (Agha & Carton, 2011; Karkee et al., 2014). Educated women are more aware of the delivery issues, have better self-efficacy, and adhere to better health behavior (Amano et al., 2012; Karkee et al., 2013; Zahodne et al., 2015).

This study identified a strong association with wealth status, possibly because women with poor wealth status may be deprived of healthcare services, as indicated by similar findings (Deo et al., 2015; Develay et al., 1996; Reniers & Tesfai, 2009). A qualitative study conducted in Nepal showed that the financial problem was the primary cause that prevented women from delivering at health institutions (Morrison et al., 2014). Poverty is one of the main reasons for low healthcare utilization in Nepal and other developing countries (Acharya et al., 2017; Sprague et al., 2016). The study found an interesting association between the women's occupation and Institutional delivery. The women whose occupation was agriculture were less likely to deliver their children at health institutions than non-working women, similar to the previous study (Acharya et al., 2017). Thus, as a part of occupational health, it is important to promote and maintain the highest level of physical, mental, and social well-being for all workers (Giri, Adhikari, Khanal, Chipalu, Aryal, & Pandey, 2023).

This study found that women with first-order birth were more likely to utilize Institutional delivery services. Even the study on remote mountainous districts of Nepal showed that the women were more likely to deliver at a health facility on their first-order birth than their subsequent birth (Joshi et al., 2016).

This analysis showed that the women who completed four or more ANC visits and prepared for their birth on two or more activities had a greater likelihood of institutional delivery, similar to the previous study (Karkee et al., 2014). Other studies also showed a positive association of ANC with institutional delivery (Mbugua & MacQuarrie, 2018;

Shahabuddin et al., 2017). The prospective cohort study conducted in the Kaski district also showed that Birth preparedness increased the institutional delivery rate (Karkee et al., 2013). Distance to the health facility might be the factor that affects the utilization of both ANC and Institutional delivery (Deo et al., 2015; Karkee et al., 2013; Shahabuddin et al., 2017; Sharma et al., 2014). Timely ANC visits help women remain in contact with healthcare providers. This visit can help them sensitize the importance of institutional delivery and motivate them to deliver at the health facility. However, counseling during ANC visits could have been more effective in various settings, hampering its effectiveness in increasing institutional delivery (Duysburgh et al., 2013). Similarly, birth preparedness in money, health personnel, blood donors, and transportation may motivate them to deliver at the health facility.

Compared with other similar countries, Congo has 91% SBA deliveries, but the MMR is 442 per 100,000 live births; Djibouti has more than 87 percent SBA deliveries, but the MMR is the same as Nepal (World Health Organization, 2018). Increasing the percentage of institutional delivery alone may not be enough to reduce maternal mortality. It may be due to the low quality of the services, which needs to be addressed through the study.

5. Conclusion

This study found the various factors that are associated with institutional delivery. Socio-economic and demographic factors such as Caste/Ethnicity, place of residence, ecological zone, province, wealth quintile, mother's education, and mother's occupation played a significant role in Institutional delivery. Likewise, obstetric factors like birth order, ANC visit, and birth preparedness significantly influenced Institutional delivery. To achieve the SDG target of 90% institutional delivery and an MMR of 70 per 100,000 live births in 2030, Nepal must address these factors, which might be challenging.

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References

Abdella, Y. E., Hajjeh, R., & Sibinga, C. T. (2018). Reducing maternal mortality: The case for availability and safety of blood supply. *Eastern Mediterranean Health Journal*, 24(7), 696–697. https://doi.org/10.26719/2018.24.7.696

Acharya, J., Kaehler, N., Marahatta, S. B., Mishra, S. R., Subedi, S., & Adhikari, B. (2016). Hidden costs of hospital-based delivery from two tertiary hospitals in western Nepal. *PLoS ONE*, 11(6), 1–11. https://doi.org/10.1371/journal.pone.0157746

Acharya, P., Adhikari, T. B., Neupane, D., Thapa, K., & Bhandari, P. M. (2017). Correlates of institutional deliveries among teenage and non-teenage mothers in Nepal. *PLoS ONE*, 12(10), 1–13. https://doi.org/10.1371/journal.pone.0185667

Adhikari, R. (2015). Effect of women's role on household decision making on institutional delivery of the recent child in Nepal. *Journal of Management and Development Studies*, 26(July), pp. 51–61. https://doi.org/10.3126/jmds.v26i0.24941

Agha, S., & Carton, T. W. (2011). Determinants of institutional delivery in rural Jhang, Pakistan. *International Journal for Equity in Health*, 10(31), 1–12. https://doi.org/10.1186/1475-9276-10-31

Amano, A., Gebeyehu, A., & Birhanu, Z. (2012). Institutional delivery service utilization in Munisa Woreda, southeast Ethiopia: a community-based cross-sectional study. *BMC Pregnancy and Childbirth*, 12(105), 1–6. https://doi.org/10.1186/1471-2393-12-105

Bennett, L., Dahal, D. R., & Govindasamy, P. (2008). *Caste, ethnic and regional identity in Nepal: Further analysis of the 2006 Nepal demographic and health survey*. In Macro International Inc. Calverton, Maryland, USA. un.org.np/data-coll/Health.../2006_NDHS_Caste_Ethinicity_Identity.pdf%5Cn

Davies-Tuck, M. L., Wallace, E. M., Davey, M. A., Veitch, V., & Oats, J. (2018). Planned private homebirth in Victoria 2000-2015: A retrospective cohort study of Victorian perinatal data. *BMC Pregnancy and Childbirth*, 18(1), 1–8. https://doi.org/10.1186/s12884-018-1996-6

Deo, K. K., Paudel, Y. R., Khatri, R. B., Bhaskar, R. K., Paudel, R., Mehata, S., & Wagle, R. R. (2015). Barriers to utilization of antenatal care services in Eastern Nepal. *Frontiers in Public Health*, 3, 1–7. https://doi.org/10.3389/fpubh.2015.00197

Department of Health Services. (2019). *Annual report: Department of health services 2075/76 (2018/19).* In Department of Health Services, Ministry of Health and Population, Government of Nepal. https://publichealthupdate.com/department-of-health-services-dohs-annual-report-2075-76-2018-19/

Develay, A., Sauerborn, R., & Diesfeld, H. J. (1996). Utilization of health care in an African urban area: Results from a household survey in Ouagadougou, Burkina-Faso. *Social Science and Medicine*, 43(11), 1611–1619. https://doi.org/10.1016/S0277-9536(96)00061-5

Duysburgh, E., Zhang, W. H., Ye, M., Williams, A., Massawe, S., Sié, A., Williams, J., Mpembeni, R., Loukanova, S., & Temmerman, M. (2013). Quality of antenatal and childbirth care in selected rural health facilities in Burkina Faso, Ghana and Tanzania: Similar finding. *Tropical Medicine and International Health*, 18(5), 534–547. https://doi.org/10.1111/tmi.12076

Giri, S., Adhikari, A., Khanal, A., Chipalu, P., Aryal, P., & Pandey, P. (2023). Usage of Personal Protective Equipment by Patient Care Nurses to Reduce Occupational Health Risk: Challenges and Related Policy Measures in Nepal. *Journal of Multidisciplinary Research Advancements*, 1(1), 12–20. https://doi.org/10.3126/jomra.v1i1.55099

Gupta, N., Hirschhorn, L. R., Rwabukwisi, F. C., Drobac, P., Sayinzoga, F., Mugeni, C., Nkikabahizi, F., Bucyana, T., Magge, H., Kagabo, D. M., Nahimana, E., Rouleau, D., Vanderzanden, A., Murray, M., & Amoroso, C. (2018). Causes of death and predictors of childhood mortality in Rwanda: A matched case-control study using verbal social autopsy. *BMC Public Health*, 18(1), 1–9. https://doi.org/10.1186/s12889-018-6282-z

Jat, T. R., Ng, N., & Sebastian, M. S. (2011). Factors affecting the use of maternal health services in Madhya Pradesh state of India: A multilevel analysis. *International Journal for Equity in Health*, 10(59), 1–11. http://dx.doi.org/10.1186/1475-9276-10-59

Joshi, D., Baral, S. C., Giri, S., & Kumar, A. M. V. (2016). Institutional delivery among mothers in a remote mountain district of Nepal: what are the challenges? *Public Health Action*, 6(4), 267–272. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5176053/pdf/i2220-8372-6-4-267.pdf

Kafle, R. B., Paudel, R., Gartoulla, P., & MacQuarrie, K. L. D. (2019). *Youth health in Nepal: levels, trends, and determinants*. In DHS Further Analysis Report. https://dhsprogram.com/pubs/pdf/FA116/FA116.pdf

Karkee, R. (2012). How did Nepal reduce the maternal mortality? A result from analysing the determinants of maternal mortality. *Journal Nepal Medical Association*, 52(2), 88–94.

Karkee, R., Binns, C., & Lee, A. (2013). Determinants of facility delivery after implementation of safer mother programme in Nepal: A prospective cohort study. *BMC Pregnancy and Childbirth*, 13(January 2009). https://doi.org/10.1186/1471-2393-13-193

Karkee, R., Lee, A. H., & Binns, C. W. (2013). Birth preparedness and skilled attendance at birth in Nepal: Implications for achieving millennium development goal 5. *Midwifery*, 29(10), 1206–1210. https://doi.org/10.1016/j.midw.2013.05.002

Karkee, R., Lee, A. H., & Khanal, V. (2014). Need factors for utilization of institutional delivery services in Nepal: An analysis from Nepal demographic and health survey, 2011. *BMJ Open*, 4(3). https://doi.org/10.1136/bmjopen-2013-004372

Koblinsky, M., Matthews, Z., Hussein, J., Mavalankar, D., Mridha, M. K., Anwar, I., Achadi, E., Adjei, S., Padmanabhan, P., & van Lerberghe, W. (2006). Going to scale with professional skilled care. *Lancet*, 368(9544), 1377–1386. https://doi.org/10.1016/S0140-6736(06)69382-3

Mbugua, S., & MacQuarrie, K. L. D. (2018). *Maternal health indicators in high-priority counties of Kenya: levels and inequities.* In DHS Further Analysis Reports No. 110 (Issue 110). http://dhsprogram.com/pubs/pdf/FA110/FA110.pdf

Ministry of Health. (2017). *Nepal demographic and health survey 2016*. In Ministry of Health Nepal. https://doi.org/10.1080/19485565.1967.9987700

Ministry of Health and Population. (2012). *Demographic and health survey 2011*. In Ministry of Health and Population, New ERA and ICF International. https://doi.org/10.4324/9781315671307-6

Morrison, J., Thapa, R., Basnet, M., Budhathoki, B., Tumbahangphe, K., Manandhar, D., Costello, A., & Osrin, D. (2014). Exploring the first delay: A qualitative study of home deliveries in Makwanpur district Nepal. *BMC Pregnancy and Childbirth*, 14(1). https://doi.org/10.1186/1471-2393-14-89

National Planning Commission. (2020). *Nepal human development report 2020: Beyond graduation*: Productive transformation and prosperity. https://hdr.undp.org/system/files/documents/nhdr2020nepalpdf.pdf

Pandey, A., Paudel, P., & Paudel, L. (2011). Scenario of health camps in Nepal. *Journal of Nepal Health Research Council*, 9(1), 86–88.

Pandey, J. P., Dhakal, M. R., Karki, S., Poudel, P., & Pradham, M. S. (2013). *Maternal and child health in Nepal: The effects of caste, ethnicity, and regional identity*. In DHS Further Analysis Reports No. 73 (Issue March). http://dhsprogram.com/pubs/pdf/FA73/FA73.pdf

Pathak, P., Shrestha, S., Devkota, R., & Thapa, B. (2018). Factors associated with the utilization of institutional delivery service among mothers. *Journal of Nepal Health Research Council*, 15(3), 228–234. https://doi.org/10.3126/jnhrc.v15i3.18845

Pokharel, T. (2015). Poverty in Nepal: Characteristics and challenges. *Journal of Poverty, Investment & Development*, 11, 44–56.

Pradhan, A., Suvedi, B. K., Barnett, S., Puri, M., Poudel, P., Chitrakar, S. R., KC, N. P., & Hulton, L. (2010). *Nepal maternal mortality and morbidity study 2008/2009*. https://km.mohp.gov.np/sites/default/files/2018-07/NMMM_Study_2008_09.pdf

Reniers, G., & Tesfai, R. (2009). Health services utilization during terminal illness in Addis Ababa, Ethiopia. *Health Policy and Planning*, 24(4), 312–319. https://doi.org/10.1093/heapol/czp015

Ronsmans, C., & Graham, W. J. (2006). Maternal mortality: who, when, where, and why. *Lancet*, 368(9542), 1189–1200. https://doi.org/10.1016/S0140-6736(06)69380-X

Seward, N., Osrin, D., Li, L., Costello, A., Pulkki-Brännström, A. M., Houweling, T. A. J., Morrison, J., Nair, N., Tripathy, P., Azad, K., Manandhar, D., & Prost, A. (2012). Association between clean delivery kit use, clean delivery practices, and neonatal survival: Pooled analysis of data from three sites in South Asia. *PLoS Medicine*, 9(2). https://doi.org/10.1371/journal.pmed.1001180

Shah, R., Rehfuess, E. A., Maskey, M. K., Fischer, R., Bhandari, P. B., & Delius, M. (2015). Factors affecting institutional delivery in rural Chitwan district of Nepal: A community-based cross-sectional study. *BMC Pregnancy and Childbirth*, 15(1), 1–14. https://doi.org/10.1186/s12884-015-0454-y

Shahabuddin, A. S. M., De Brouwere, V., Adhikari, R., Delamou, A., Bardaj, A., & Delvaux, T. (2017). Determinants of institutional delivery among young married women in Nepal: Evidence from the Nepal Demographic and Health Survey, 2011. *BMJ Open*, 7(4). https://doi.org/10.1136/bmjopen-2016-012446

Shakya, G., Kishore, S., Bird, C., & Barak, J. (2004). Abortion law reform in Nepal: Women's right to life and health. *Reproductive Health Matters*, 12(24), 75–84. https://doi.org/10.1016/S0968-8080(04)24007-1

Sharma, S. R., Poudyal, A. K., Devkota, B. M., & Singh, S. (2014). Factors associated with place of delivery in rural Nepal. *BMC Public Health*, 14(306). https://doi.org/10.1186/1471-2458-14-306

Shrestha, S. K., Banu, B., Khanom, K., Ali, L., Thapa, N., Stray-Pedersen, B., & Devkota, B. (2012). Changing trends on the place of delivery: Why do Nepali women give birth at home? *Reproductive Health*, 9(1), 1–8. https://doi.org/10.1186/1742-4755-9-25

Singh, K. J., Chaturvedi, H. K., & Pandey, A. (2015). Factors influencing antenatal care services utilization in empowered action group (EAG) states, India: A spatial and multilevel analysis. *Global Journal of Human-Social Science: H Interdisciplinary*, 15(8), 1.0.

Sprague, D. A., Jeffery, C., Crossland, N., House, T., Roberts, G. O., Vargas, W., Ouma, J., Lwanga, S. K., & Valadez, J. J. (2016). Assessing delivery practices of mothers over time and over space in Uganda, 2003-2012. *Emerging Themes in Epidemiology*, 13(9), 1–12. https://doi.org/10.1186/s12982-016-0049-8

Shrestha, R. (2023). Assessing Knowledge of Acute Respiratory Infections among Mothers of Under-Five Children in Kageshwori Manahara, Nepal. *Journal of Multidisciplinary Research Advancements*, 1(1), 8–11. https://doi.org/10.3126/jomra.v1i1.55098

Tunçalp, W. M., Maclennan, C., Oladapo, O. T., Gülmezoglu, A. M., Bahl, R., Daelmans, B., Mathai, M., Say, L., Kristensen, F., Temmerman, M., & Bustreo, F. (2015). Quality of care for pregnant women and newborns - The WHO vision. BJOG: *An International Journal of Obstetrics and Gynaecology*, 122(8), 1045–1049. https://doi.org/10.1111/1471-0528.13451

World Health Organization. (2017). *World health statistics 2017: Monitoring health for the SDGs, sustainable development goals*. https://iris.who.int/bitstream/handle/10665/255336/9789241565486-eng.pdf?sequence=1

World Health Organization. (2018). *World health statistics 2018: monitoring health for the SDGs, sustainable development goals.* https://iris.who.int/bitstream/handle/10665/272596/9789241565585-eng.pdf?sequence=1

Yarinbab, E., & Balcha, S. (2018). Delays in utilization of institutional delivery service and its determinants in Yem Special Woreda, Southwest Ethiopia: Health institution based cross-sectional study. *Research & Reviews: Journal of Medical and Health Sciences*, 7(2), 16–23. https://doi.org/10.22259/2638-5244.0101004

Yoseph, M., Abebe, S. M., Mekonnen, F. A., Sisay, M., & Gonete, K. A. (2020). Institutional delivery services utilization and its determinant factors among women who gave birth in the past 24 months in Southwest Ethiopia. *BMC Health Services Research*, 20(1), 1–10. https://doi.org/10.1186/s12913-020-05121-9

Zahodne, L. B., Nowinski, C. J., Gershon, R. C., & Manly, J. J. (2015). Self-efficacy buffers the relationship between educational disadvantage and executive functioning. *Journal of the International Neuropsychological Society*, 21(4), 1–8. https://doi.org/10.1017/S1355617715000193