Essential newborn care practices in Zambia

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Abstract

Neonatal mortality remains high in Zambia and is declining slower than infant and under five mortality. Improved adoption of essential newborn care (ENC) could help mitigate this situation. To determine the adoption of ENC practices in Zambia, cross-sectional data was used to assess ENC practices including baby kept warm, umbilical cord care and breastfeeding. Chi-square was used to assess whether maternal and social demographic factors were related to ENC. Households surveyed were 12,507, which included 5,741 women with children under two years. Findings show that 95.4% of babies were dried immediately after birth, 96.5% wrapped in a cloth/blanket, 76.7% put on mother's torso and 68.5% head covered (51.6% for all four). Eighty-five-point six percent of baby's cords were cut with a sharp and clean instrument, 46% cord kept dry and 42.1% cord kept clean (31.2% for all three). Ninety-six-point nine percent of babies were breastfed, 89.3% were initiated within one hour and 93% exclusively breastfed for the first 3 days post-delivery (82% for all three). Babies kept warm were associated with skilled birth attendance (SBA) and province, umbilical cord care with SBA, ≥4 antenatal care (ANC) visits, marital status and province, and breastfeeding with ≥4 ANC visits, marital status and province. Early and exclusive breastfeeding is widely practiced. However, appropriate thermal and cord care practices are low. There is need for a scale-up of appropriate newborn care practices in Zambia and SBA could play an important role in this regard.

Introduction

Globally neonatal deaths have declined by more than half from 5 million in 1990 to 2.4 million in 2019, with the majority occurring in developing countries.[1] In Zambia, neonatal mortality has followed a similar decline as observed globally, dropping from 43/1000 live births in 1992 to 27/1000 live births in 2018.[2] However, over the same period, the drop in neonatal mortality lagged behind the declines in under five mortality (from 191 to 61/1000 live births) and infant mortality (107 to 42/1000 live births).[2] The sluggish decline in neonatal mortality necessitates the need for intensified focused interventions so as to fast track improvements in newborn health.

The major causes of neonatal deaths include prematurity, infections, asphyxia and intrapartum causes.[3] The majority of newborn deaths occur in the first week of life, and thus essential newborn interventions implemented in this period could have a significant positive impact. If appropriate interventions are adopted, preterm, intrapartum and neonatal deaths due to infections could be reduced by more than half in a cost-effective manner.[4] Studies show that essential newborn care (ENC) practices are effective in reducing neonatal mortality rates.[5,6] ENC interventions do not only enhance newborn survival but also enable them to thrive.[7]

The Zambia Ministry of Community Development, Mother and Child Health developed guidelines in 2014, which guide ENC provision. These guidelines prioritise basic ENC interventions such as prevention of infection, keeping the baby warm, appropriate umbilical cord care and early and exclusive breastfeeding, which can play a pivotal role in improving newborn health outcomes.

It is not clear the extent to which essential newborn practices have been adopted in Zambia as they are not captured in routine monitoring tools nor in the Demographic and Health Surveys (DHS) that are done every five years. This paper provides data on ENC practices, namely umbilical cord care, keeping the baby warm and early and exclusive breastfeeding in rural Zambia and socio and demographic factors associated with the practices. The findings could be used to influence planning and shape priority interventions to improve ENC in Zambia.

Materials and methods

Ethical considerations

Ethical clearance for the multi-sectoral end of program evaluation was obtained from the Zambia ERES Converge Ethics Committee (reference number 2021-April-008).

Informed consent was obtained from respondents, and confidentiality was main-

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Key words: Essential newborn care; umbilical cord care; breastfeeding; newborn warmth.

Acknowledgements: The authors would like to thank the respondents who participated in the evaluation study whose data was used for this paper.

Contributions: SM led the overall design, data analysis and developed the draft and final version of the manuscript; MI, TC, CC contributed to development of the study and reviewed and provided input to the final manuscript. All authors agreed to the final version of the manuscript submitted.

Conflict of interest: The authors declare no conflict of interest.

Funding: None.

Availability of data and materials: All data generated or analyzed during this study are included in this published article.

Ethics approval and consent to participate: Ethical clearance for the multi-sectoral end of program evaluation was obtained from the Zambia ERES Converge Ethics Committee (reference number 2021-April-008). Informed consent was obtained from respondents, and confidentiality was maintained throughout the evaluation. Personal identifiers such as names were removed, and the data stored safely with only authorized persons allowed access to it.

Informed consent: The manuscript does not contain any individual person's data in any form.

Received for publication: 5 November 2021.
Accepted for publication: 23 April 2022.

Journal of Public Health in Africa 2022; 13:2078
doi:10.4081/jphia.2022.2078

tained throughout the evaluation. Personal identifiers such as names were removed and the data stored safely with only authorised persons allowed access to it.

Study design

The study used a cross-sectional design to evaluate a multi-sectoral end of program evaluation in Zambia.

Study setting

The study used data collected for an evaluation of 28 Area Programs (APs) implemented by World Vision Zambia between 2016 and 2021 and which are predominantly in rural areas. The programs implemented in the APs included Health and Nutrition, Livelihoods, Education and Water, Sanitation and Hygiene and covered 28 districts. The specific APs evaluated included Buyantashi in Luwingu/Lupososhi District, Bwacha in Mungwi District, Chikomeni in Lundazi/Lumezi District, Chipapa in Kafue District, Chongwe East in Rufunsa District, Chongwe South and Kapuluwe in Chongwe District, Choongo in Monze District, Hamaundu and Moyo in Pemba District, Kawaza in Katete District, Lunga in Mwinlunga District, Luswepo and Suwila in Isoka District, Magoye in Mazabuka District, Makungwa in Kasenengwa District, Manyinga in Manyinga District, Mbala in Mbala/Senga Hill District, Mbeza in Namwala District, Mporokoso in Mporokoso District, Muchila in Namwala District, Mudanyama in Mwinlunga District, Mufumbwe in Mufumbwe District, Musosolokwe in Kapiri Mposhi District, Mwamba in Kasama District, Nkeyema in Nkeyema District, Nyimba in Nyimba District, Sinazongwe in Sinazongwe District, Twachiyanda in Kalomo District, Twikatane in Mungwi District and Keembe in Chibombo District.

Data sources and target population

Data collection was done by the University of Zambia, Institute of Economic and Social Research who were contracted by World Vision Zambia. The collection of data was done between April and June, 2021, using World Visions Caregiver Survey questionnaire for program evaluations first published in 2013[8] and revised in 2020 with adaptations made to suit the Zambia context. Data was collected using mobile phones, cleaned and then uploaded into the server.

The broad target population of the evaluation consisted of parents/caregivers of children aged 3-6 years, mothers or caregivers of children under five years and women aged 18 to 49 years and pregnant women. The specific target population for this study was mothers of children aged 0-23 months.

Information on ANC, delivery and ENC was based on the mother's reports.

Sampling technique and sample size

The sample size was calculated using the World Vision sample size calculator available in the Baseline Field Guide.[9] The sample size was calculated with the statistical power to detect change set at 0.84, a design effect of 2, with the default probability of committing a Type-1 error set at 1.96. The minimum sample size required in order to detect statistically significant differences between proportions between 2 survey domains at AP level was 358 giving a total of 11,098 for all the 31 APs.

A two-stage cluster sampling was used to select sample households to be interviewed. All the APs and their respective zones were included within the sample. The first stage of sampling entailed random selection of villages from zones; however, Probability Proportion to Size (PPS) Zones was used to ensure larger villages and zones contributed more households compared to smaller ones. The zones included were selected by first listing all zones alphabetically and then using systematic random sampling to choose the ones to be included. In the second stage, households were selected using the random walk method starting from the centre of the village.

Data analysis

Cleaned data in the server was exported to SPSS version 25, which was used for the analysis.

The ENC characteristics of interest included 1. Baby kept warm, which had four sub-components (i) whether the baby was dried immediately after birth (ii) baby wrapped in a warm cloth or blanket (iii) baby put skin to skin on mother's torso and (iv) baby's head covered. 2. Umbilical cord care, which had three sub-components (i) umbilical cord cut with a sharp and clean instrument, (ii) umbilical cord kept dry and (iii) umbilical cord kept clean. 3. Breastfeeding, which consisted of three components (i) breastfed at all (ii) breastfed within the first hour and (iii) breastfed within the first three days.

These ENC practices were compared across social and demographic strata to see if there were any differences. Weighting was done during the analysis to adjust for the uniform sample sizes used at the AP level as opposed to proportions based on population size.

Results

The total number of households surveyed was 12,507 of which the majority were from Southern (28.7%) province where most programs were located and the least (3.5%) in Western, which has the least number of programs. In terms of marital status, most household heads were married (82.2%), 4.4% were single, 5.9% widows/widowers, 6.8% divorced or separated and 0.7% cohabiting (Table 1).

Pregnancy and Delivery

The survey questions on ENC were asked to mothers with children under two years, who were a total of 5,741. The vast majority (85%) of the mothers with children under two years had four or more ANC visits and 92.3% were delivered by a SBA (SBA was defined as a mother delivered by either a doctor, midwife, nurse or a clinical officer). There were 94.7% who delivered in a health facility with the rest (5.3%) delivering at home.

Newborn care

The newborn care results are broken down by the three essential practices assessed, namely, if the baby was kept warm, cord care and early and exclusive breastfeeding for the first three days.

Baby kept warm

Ninety-five point four percent of babies were dried immediately after birth and 96.5% wrapped in a warm cloth or blanket however, only 76.7% were put skin to skin on the mother's torso and only 68.6% of the babies had their heads covered. Only 51.6% of babies had all four components of keeping the baby warm which included dried immediately after birth, wrapped in a warm blanket or cloth, put skin to skin on mother and head covered.

Children who were born at home (44%) were less likely compared to those delivered in a health facility (52%) to receive all the four components of keeping the baby warm and the difference was statistically significant ($p=0.008$). A similar significant difference ($p=0.001$) is seen with SBA (52.2%) versus non-SBA (44.3%). Babies whose mothers had four or more ANC visits (51.6%) performed slightly worse than those with less than four or more ANC visits (54.7%), but this was not statistically significant ($p=0.106$).

The percentage of babies who received all the four components of being kept warm varies considerably by province from 34.3% in Eastern to 81% in Western and the differences were statistically significant ($p<0.001$). In relation to household head,

those households whose education status was classified as tertiary or other (54.1%) performed best while those where the respondent didn't know the educational status of household head faired worst and the differences were significant (p<0.001). Those where the household head was divorced/separated (46.2%) and widowed/widower (48.4%) fared worse than their counterparts who were single (50.6%), married (52.3%), and cohabiting (51.1%) but the differences were not statistically significant (Table 2).

Cord care

The study found that 85.6% of babies were reported to have had their umbilical cord cut with a sharp and clean instrument. However, only 46% of them had their cord kept dry and 42.1% had their cords kept clean. Only 31.2% of babies were reported to have received all the three components of cord care (cord cut with a sharp and clean instrument, kept dry and clean).

Similar to babies kept warm, those who were delivered in a health facility were more likely to receive the three components of cord care (31.6%) compared to those who were delivered at home (23.8%) and this was significant (p=0.004). In babies whose delivery was assisted by a skilled attendant, all three components of cord care were received by 31.9% compared to 23% for those who were delivered by non-SBAs and the difference was significant (p<0.001). There was also a significant difference (p<0.001) in babies receiving all the three components of cord care in mothers who had four or more ANC visits 32.6% compared to those whose mothers had less than four ANC visits (23.8%).

Eastern province with 21.3%, performed the worst while Western performed the best with 48.6% and differences among provinces were found to be significant (p<0.001). Babies whose household head education status was tertiary or other performed worst (29.2%) and those who did not know the household head education status (34%) performed best.

Babies whose household heads were divorced/separated (24.4%) or who were widowed/widower (27.6%) performed worse than those whose household head was single (34.6%), married (31.6%) or cohabiting (46.7%) and the difference among the groups was significant (p=0.002), (Table 3).

Breastfeeding

The study found that 96.7% of babies were breastfed, 89.3% breastfed within one hour of birth and 93% exclusively breastfed for the first three days with 82% having all the three components of breastfeeding.

Mothers who had four or more ANC visits (84.4%) were more likely to have all the three components of breastfeeding compared to those who had less than four ANC visits (70.7%) and this was significant (p<0.001). There was no significant difference (p=0.574) in breastfeeding in mothers who were delivered in a health facility (82.1%) compared to those who delivered at home (80.8%). Similarly, mothers who delivered with a SBA (82.3%) performed only slightly better than those who were delivered by a non-SBA (79%) but this was not significant (p=0.097). In terms of provinces Lusaka (88.9%) performed best while Central (75.8%) performed worst in having the three components of breastfeeding and the differences among provinces was again significant (p<0.001). Households where the head was cohabiting (65.8%) performed worse than those where the household head was single (79.5%), married (81.8%), divorced/separated (84.7%) and widower/widows (87.8%) and this was significant (p=0.004). Babies from households where the heads had tertiary or other education status (75.8%) performed worse than those whose household heads had no education (85.1%), didn't know the education status of the household head (78%), primary education (83.5%), and secondary (79.9%) (Table 4).

Discussion

Baby kept warm

The study found that nearly all babies are dried immediately after birth and wrapped in warm cloth or blanket but only just over three quarters were put skin to skin on mother's torso and just over two thirds their heads were covered. It is of concern that only a half of babies receive the four components of keeping the baby warm, which is one of the essential components of newborn care. This means that half of all babies are not adequately kept warm after birth which predisposes them to hypothermia which can lead to death.

The practice of all the four components of keeping the baby warm was associated

Table 1. Descriptive statistics.

Variable	Frequency	Percentage	Total (n)
Province			12,507
Northern	2934	23.5	
Eastern	1858	14.9	
Lusaka	1423	11.4	
Southern	3586	28.7	
Central	659	5.3	
North Western	877	7.0	
Muchinga	737	5.9	
Western	433	3.5	
Marital status of household head			12,507
Single	546	4.4	
Married	10276	82.2	
Cohabiting	92	0.7	
Divorced/separated	856	6.8	
Widow/widower	737	5.9	
Educational status of household head			12,507
None	1088	8.7	
Primary	6272	50.1	
Secondary	4932	39.4	
Tertiary & other	127	1.0	
Don't know	84	0.7	
ANC Visits			5579
≥4 visits	4743	85.0	
<4 visits	836	15.0	
Delivery place			5741
Home	303	5.3	
Health facility	5438	94.7	
Skilled birth attendance			5741
Yes	5296	92.3	
No	445	7.7	
Knowledge of at least three newborn danger signs			5741
Yes	3161	55.1	
No	2580	44.9	

with delivery in a health facility and SBA. These two are closely related as the vast majority of babies who are delivered in a health facility are by a skilled worker. However, attendance of four or more ANC visits did not have a significant relationship with having all four components of keeping the baby warm. This is likely because the practices of keeping the baby warm are done mostly by the birth attendant and so if she/he is not skilled may not follow the recommended post-delivery thermal care practices.

Cord care

Good umbilical cord care is essential for preventing infections which are one of the leading causes of neonatal deaths.[3] The study found that most babies have their cords cut by a clean and sharp instrument however, less than half keep the cords dry or clean. In addition, less than a third of babies received all the three components of umbilical cord care assessed. This poses a risk of infection through the umbilical cord, which is an important entry site for infections in newborns.[10]

The umbilical cords may not be kept clean and dry because culturally, some mothers apply substances to the cord. A study in Southern Zambia found that the common substances applied include cooking oil, baby lotion, breast milk, root powders, burnt gourds and ash.[11]

The findings show that mothers who receive four or more ANC visits compared to those with less than four ANC visits, deliver in a health facility compared to those who deliver at home or have a skilled delivery compared to non-skilled delivery are more likely to have all three components of all the elements of umbilical cord

Table 2. Baby kept warm.

Background characteristic	Baby dried immediately after birth	Baby wrapped in warm cloth/blanket	Baby put on mum Torso	Head was covered	Baby dried immediately, wrapped in warm cloth/blanket, put on mums Torso & Head covered	Number	Chi square
Total	95.4	96.5	76.8	68.6	51.6	5,741	
Educational status of household head							<0.001*
None	92.2	92.8	68.7	62.8	42.2	460	
Primary	95.9	96.8	76.4	68.3	51.8	2,887	
Secondary	95.3	96.6	78.6	70.4	53.4	2,277	
Tertiary & others	93.9	100	86.2	66.2	54.1	65	
Don't know	94.1	98.0	78.0	62.0	44.0	50	
Marital status of household head							0.140
Single	95.4	97.7	74.5	67.3	50.6	263	
Married	95.3	96.4	77.1	69.5	52.3	4,762	
Cohabiting	97.8	93.3	67.4	77.8	51.1	45	
Divorced/separated	96.7	98.5	75.6	59.6	46.2	390	
Widow/widower	95.0	93.9	75.0	65.9	48.4	279	
ANC Visits							0.106
≥4 visits	95.4	96.4	77.4	68.2	51.6	4,743	
<4 visits	96.8	97.6	74.1	74.1	54.7	836	
Delivery place							0.008*
Health Facility	95.8	96.5	71.0	62.4	52.0	5,438	
Home	89.1	95.4	77.1	69.0	44.2	303	
Skilled Birth Attendance							0.001*
Yes	96.0	96.8	77.2	69.3	52.2	5,296	
No	88.1	92.6	71.2	60.7	44.3	445	
Assisted in delivery							
Doctor	96.3	95.5	81.7	71.2	59.3	881	
Nurse/midwife	96.2	97.2	77.3	68.9	52.0	4,647	
Auxillary Midwife	96.7	97.6	80.6	65.9	54.3	210	
Clinical Officer	95.3	96.1	65.4	77.0	44.4	257	
Traditional Birth Attendant	93.1	95.7	80.2	70.7	55.7	115	
Community Health Worker	94.8	96.1	81.6	80.8	67.7	229	
Relative/Friend	97.7	99.1	86.9	82.4	75.1	221	
No one	64.7	88.2	64.7	38.2	26.5	34	
Don't know	69.7	76.5	51.5	52.9	36.4	33	
Province							<0.001*
Northern	93.7	95.4	72.6	73.0	49.5	1,294	
Eastern	96.4	96.7	72.4	50.7	34.3	872	
Lusaka	94.9	97.7	77.4	63.9	50.9	690	
Southern	96.5	95.6	84.7	73.8	61.2	1,442	
entral	96.7	98.2	67.8	48.1	41.8	335	
North Western	92.7	96.4	60.2	75.0	37.9	412	
Muchinga	95.7	97.7	79.3	79.3	61.7	347	
Western	96.8	98.3	94.3	87.0	81.0	347	

* Statistically significant (p<0.05).

care assessed. These results support the need for mothers to attend four or more ANC visits and to deliver in health facility by SBA. During ANC and also post-delivery in health facilities, mothers are taught how to care for the cord which helps foster appropriate cord care practices when they go home.

Breastfeeding

Breastfeeding, in particular colostrum, is important because it provides antibodies that protect children against infections and also enhances child survival when initiated early.[12–14] This study found that breastfeeding is almost universally practiced (97%), with the vast majority of babies breastfed exclusively for the first three days (93%) and most starting within the first hour after birth (89%). However, only just over four-fifths of babies received all the three components of breastfeeding. ANC (four or more visits) was found to be an important factor contributing to having all the three components of breastfeeding. However, delivery in a health facility or skilled birth attendance did not have a significant effect.

We did not find comparable studies in Zambia that evaluated the components of ENC, but our findings are similar to Multiple Indicator Survey studies done in Zimbabwe and Lesotho[15,16] which capture some of the indicators. These studies show that the practice of drying the baby immediately after birth is high but that of skin-to-skin contact is less so and appropriate cord care practice is generally low. One study in Zambia found that although there was good knowledge of ENC in general, young mothers had low knowledge of umbilical cord care.[17]

In Ghana, essential thermal care practices were found to be associated with ANC and education status, cord care and good neonatal feeding with ANC[18] while in Ethiopia ENC was correlated with ANC and urban residence but not with marital and educational status, religion and ethnicity.[19] In Bangladesh, ANC, SBA, birth order and mothers age were found to influence ENC practices considerably[6] while in Uganda, place of delivery and socioeconomic status did not have a correlation with ENC.[20]

The definitions of ENC varies consider-

Table 3. Cord care.

Background characteristic	Cord cut with sharp and clean instrument	Cord kept dry	Cord kept clean	Cord cut with sharp & clean instrument, kept dry & clean	Number	Chi square
Total	85.6	46.0	42.1	31.2	5,741	0.953
Educational status of household head						
None	87.4	46.7	42.2	32.4	460	
Primary	86.3	45.8	43.0	31.0	2,888	
Secondary	84.3	46.2	41.0	31.2	2,277	
Tertiary & others	78.5	38.5	39.1	26.7	65	
Don't know	96.1	47.1	38.0	34.0	50	
Household head marital status						0.002*
Single	88.5	48.7	45.6	34.6	263	
Married	85.8	46.3	42.0	31.6	4,763	
Cohabiting	80.4	52.2	60.9	46.7	45	
Divorced/separated	83.6	43.3	36.6	24.4	390	
Widow/widower	84.6	40.5	44.1	27.6	279	
ANC Visits						<0.001*
≥4 visits	87.9	47.9	43.5	32.6	4,743	
<4 visits	75.3	37.8	35.1	23.8	835	
Delivery place						0.004*
Health Facility	85.8	46.5	42.5	31.6	5,438	
Home	82.2	37.6	35.0	23.8	303	
Skilled Birth Attendance						<0.001*
Yes	86.3	47.0	42.9	31.9	5,296	
No	78.4	33.6	31.9	23.0	444	
Assisted in delivery						
Doctor	88.3	46.8	46.4	37.5	881	
Nurse/midwife	85.7	47.6	42.4	31.6	4,648	
Auxillary midwife	92.9	43.3	35.5	32.2	211	
Clinical Officer	91.9	46.7	50.4	34.1	258	
Traditional Birth Attendant	85.2	50.0	43.5	34.5	116	
Community Health Worker	67.2	40.2	38.9	31.4	229	
Relative/Friend	61.1	35.3	33.0	27.6	221	
No one	67.6	12.1	18.2	12.1	33	
Don't know	75.8	29.4	29.4	18.2	33	
Province						<0.001*
Northern	87.2	39.3	41.2	30.2	1,294	
Eastern	88.0	38.3	35.8	21.3	872	
Lusaka	92.5	42.5	37.5	30.0	690	
Southern	74.7	56.5	46.5	32.9	1,442	
Central	93.7	31.6	37.9	28.9	336	
North Western	83.9	40.3	40.3	29.9	412	
Muchinga	89.1	55.7	46.3	41.1	348	
Western	96.8	64.0	53.9	48.6	348	

* Statistically significant (p<0.05).

ably across studies which makes it difficult to cross compare. We thus recommend for the standardization of indicators of ENC to make it easier for comparison across countries.

Multiple studies show that higher education status tends to be associated with better maternal and child health-seeking behavior and outcomes[21–23] but in this study, household head educational status was only correlated with the three components of keeping the baby warm but not with the three components of umbilical cord care nor the three components of breastfeeding. The reason for this difference is not apparent, but it may be because the drivers of each behavior are different and the influence of education status on each may be different. It could also be related to the fact that in this study education status was measured using household head as opposed to mother's education which is used in most other studies.

Limitations

The evaluation questionnaire length was reduced so as to shorten the time spent by enumerators at household so as to reduce the risk of spread of COVID-19. As a result, some demographic data such as age of mother, education status, religion *etc*. were not collected which limited the scope of factors explored by the study. The study population was mostly rural and thus limits the generalizability of the findings.

Conclusions

Although the country has guidelines for the implementation of ENC, the study found that the adoption of these practices is still relatively low in Zambia. Breastfeeding is well adopted. However, thermal care and umbilical cord care still lags far behind.

ANC and skilled birth attendance are important factors that can help increase coverage of ENC practices in the country.

Given the sluggish decline in newborn deaths compared to infant and under-five deaths, there is a need for the government to prioritise newborn interventions which could go a long way in reducing neonatal mortality. In addition, there is limited information on newborn care practices and thus

Table 4. Breastfeeding..

Background characteristic	Breastfed	Breastfed within 1 hour	Breastfed exclusively first 3 days	Breastfed, breastfed within 1 hour and exclusively	Number	Chi square
Total	96.9	89.3	92.9	82.0	5,298	
Educational status of household head						0.004*
None	97.4	91.2	95.2	85.1	422	
Primary	97.5	89.9	93.7	83.5	2,663	
Secondary	95.9	88.5	91.5	79.9	2,099	
Tertiary & others	100.0	83.9	90.8	75.8	62	
Don't know	96.0	87.2	94.0	78.0	50	
Marital status of household head						0.004*
Single	97.7	87.4	91.6	79.5	244	
Married	96.6	89.2	92.7	81.8	4,411	
Cohabiting	100.0	81.6	86.7	65.8	38	
Divorced/separated	98.5	91.1	94.9	84.7	360	
Widow/widower	97.5	92.0	96.4	87.8	245	
ANC Visits						<0.001*
≥4 visits	98.9	89.7	94.9	84.4	4,364	
<4 visits	86.9	87.4	83.1	70.7	785	
Delivery place						0.574
Health Facility	96.7	89.8	97.4	82.1	276	
Home	100.0	81.1	92.7	80.8	5,020	
Skilled Birth Attendance						0.097
Yes	97.1	89.6	93.1	82.3	4,897	
No	93.7	86.2	91.7	79.0	400	
Assisted in delivery						
Doctor	99.0	84.8	94.0	79.4	773	
Nurse/midwife	96.8	90.1	92.9	82.5	4,309	
Auxillary Midwife	99.5	81.8	94.3	77.9	190	
Clinical Officer	98.4	90.8	96.5	86.1	244	
Traditional Birth Attendant	96.6	84	93.0	74.7	99	
Community Health Worker	78.2	88.5	76.4	66.5	206	
Relative/friend	70.1	92.1	67.9	58.8	194	
No One	94.1	80.6	94.1	75.8	33	
Don't know	87.9	89.3	85.3	78.1	32	
Province						<0.001*
Northern	98.5	89.1	96.9	85.1	1,231	
Eastern	99.2	83.8	91.2	76.4	709	
Lusaka	99.1	91.4	98.0	88.9	592	
Southern	90.9	93.4	85.6	78.1	1,429	
Central	99.1	82.3	93.1	75.8	298	
North Western	98.3	90.9	97.3	87.1	403	
Muchinga	98.6	90.1	95.1	85.2	318	
Western	99.7	85.8	95.7	84.0	318	

* Statistically significant (p<0.05).

it is recommended that future national surveys such as the Zambia DHS should consider including the newborn care practices evaluated in this study. There is need for studies to explore the factors that contributed to the relatively low prevalence of some of the essential newborn care practices in Zambia.

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