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Prevalence and determinants of home delivery among pregnant women in Somaliland: Insights from SLDHS 2020 data

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KEYWORDS
Home delivery;
Maternal healthcare;
Somaliland;
Determinants;
Sociodemographic factors;
Regional variation

Abstract
Objective: This cross-sectional study aimed to identify the determinants of home deliveries among women in Somaliland, with the objective of informing targeted interventions to improve maternal and child health outcomes.
Design: A cross-sectional study design was employed, utilizing data from a nationally representative sample of 3250 women in Somaliland. A multivariate logistic regression analysis was conducted to examine the factors influencing the likelihood of home delivery.
Site: The study was conducted in Somaliland, a region where home delivery remains prevalent.
Participants: The study included 3250 women of reproductive age in Somaliland who had given birth.
Interventions: No specific interventions were administered as part of this study. The focus was on understanding the factors associated with home deliveries.
Main measurements: Sociodemographic, economic, and regional factors were examined as potential determinants of home deliveries. Education levels of women and their husbands, maternal age at first marriage and first birth, and household wealth were among the main measurements analyzed.
Results: The analysis revealed that higher education levels were associated with a decreased likelihood of home delivery. Women with secondary (OR: 0.42, 95% CI: 0.32–0.55) or higher (OR: 0.21, 95% CI: 0.12–0.37) education were less likely to deliver at home than those with no education. Similarly, women whose husbands had a secondary (OR: 0.55, 95% CI: 0.41–0.73) or higher (OR: 0.43, 95% CI: 0.28–0.66) education were less likely to deliver at home. Increased maternal age at first marriage (OR: 1.04, 95% CI: 1.02–1.06) and first birth (OR: 1.03, 95% CI: 1.01–1.05) were significant predictors of home delivery. Lower household wealth was also associated with a higher likelihood of home delivery. Significant regional variations were observed, with certain regions showing higher rates of home deliveries compared to others.

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Conclusions: The findings highlight the importance of targeted interventions to address sociodemographic and regional disparities in the utilization of institutional delivery services in Somaliland. Strategies should focus on improving access to and quality of maternal healthcare services, empowering women's decision-making, and engaging men to address gender norms within households.

PALABRAS CLAVE
Parto domiciliario;
Atención sanitaria materna;
Somalilandia;
Determinantes;
Factores sociodemográficos;
Variación regional

Factores determinantes del parto a domicilio entre las mujeres embarazadas de Somalilandia: datos de SLDHS 2020

Resumen
Objetivo: Este estudio transversal se propuso identificar los factores determinantes de los partos en el hogar entre las mujeres de Somalilandia, con el objetivo de informar de las intervenciones dirigidas a mejorar los resultados de salud materna e infantil.
Diseño: Se empleó un diseño de estudio transversal, utilizando datos de una muestra nacional representativa de 3.250 mujeres en Somalilandia. Se realizó un análisis de regresión logística multivariante para examinar los factores que influyen en la probabilidad de dar a luz en casa.
Emplazamiento: El estudio se llevó a cabo en Somalilandia, una región donde el parto en casa sigue siendo frecuente.
Participantes: El estudio incluyó a 3.250 mujeres en edad reproductiva de Somalilandia que habían dado a luz.
Intervenciones: No se administraron intervenciones específicas como parte de este estudio. La atención se centró en comprender los factores asociados a los partos domiciliarios.
Mediciones principales: Se examinaron factores sociodemográficos, económicos y regionales como posibles determinantes de los partos en el hogar. Los niveles de educación de las mujeres y sus maridos, la edad materna en el momento del primer matrimonio y el primer parto y la riqueza del hogar fueron algunas de las principales medidas analizadas.
Resultados: El análisis reveló que un mayor nivel educativo se asociaba con una menor probabilidad de parto en casa. Las mujeres con estudios secundarios (OR: 0,42; IC 95%: 0,32-0,55) o superiores (OR: 0,21; IC 95%: 0,12-0,37) tenían menos probabilidades de dar a luz en casa que las que no tenían estudios. Del mismo modo, las mujeres cuyos maridos tenían estudios secundarios (OR: 0,55; IC 95%: 0,41-0,73) o superiores (OR: 0,43; IC 95%: 0,28-0,66) tenían menos probabilidades de dar a luz en casa. Una mayor edad materna en el primer matrimonio (OR: 1,04; IC 95%: 1,02-1,06) y en el primer parto (OR: 1,03; IC 95%: 1,01-1,05) fueron predictores significativos de parto en casa. Una menor riqueza familiar también se asoció con una mayor probabilidad de parto en casa. Se observaron variaciones regionales significativas y algunas regiones mostraron tasas más elevadas de partos en casa que otras.
Conclusiones: Los hallazgos destacan la importancia de las intervenciones específicas para abordar las disparidades sociodemográficas y regionales en la utilización de los servicios de parto institucional en Somalilandia. Las estrategias deben centrarse en mejorar el acceso y la calidad de los servicios de atención sanitaria materna, potenciar la toma de decisiones de las mujeres e implicar a los hombres para abordar las normas de género en los hogares.

Introduction

Background

Childbirth at home, whether carried out independently or with the aid of a family member or a traditional birth attendant, is often referred to as home delivery.[1] While this practice is widespread, it is not without its risks, including severe maternal bleeding, lacerations, and sepsis, which can lead to the death of both mother and newborn.

The World Health Organization (WHO) has reported a significant decline in maternal and newborn mortality rates owing to deliveries conducted at health facilities.[2] It is essential to have access to skilled care during every birth and to facilities capable of managing emergency obstetric and newborn complications to reduce these mortality rates, as recommended by the WHO. Nonetheless, various chal-

lenges exist in implementing these strategies, particularly in remote areas of sub-Saharan African countries, where healthcare resources are limited in terms of both human capacity and infrastructure.

To address this issue, the United Nations introduced the Millennium Development Goals (MDGs) in 2000. Goal 4 aimed to reduce the under-five mortality rate by two-thirds between 1990 and 2015,[3] whereas Goal 5 sought to decrease maternal mortality by 75 percent by 2015 and ensure universal access to reproductive healthcare.[4]

Home delivery is a widespread issue in Africa and is influenced by various factors such as age, education, income, and media exposure. Despite the implementation of user fee exemption laws, many women continue to opt for home births because of sociocultural and religious beliefs, lack of health insurance, and limited access to media.

Previous research has identified several factors that influence home delivery of newborns. These factors include a lower level of education for both parents, a lack of antenatal care visits, non-exposure to radio or television messages, a parity of six or more births, perceived problems reaching health facilities due to distance, rural communities, pastoralist communities, and higher poverty.[6] Additionally, the absence of written birth plans for birth preparedness and readiness, incomplete antenatal care visits, and preference for home delivery[7] are factors that can influence home delivery. Demographic factors that can influence home delivery include age group, marital status, educational status, place of residence, living country, wealth index, media exposure, and the number of children born to the respondent.[5] Other factors include region and poor health quantiles,[8] being over 35 years old, never married, and not completing the recommended four or more antenatal visits.[9] Furthermore, residence, Christian religion, having three or more children before the latest delivery, and employment[10] can also influence home delivery.

The primary unfavorable outcome for patients admitted due to obstetric complications following home delivery was postpartum hemorrhage (PPH), which occurred in 48% of the patients. Of these, 61.2% were primary cases, and 38.8% were secondary cases. The next most common problem was the retention of placenta/placental tissues, affecting 26% of the women. Regrettably, three women out of the 261 admitted patients (1.1%) died within a few hours of admission due to puerperal sepsis. There was a significantly high incidence of maternal fatalities among patients who delivered at home. It is important to note that approximately 73% of all maternal deaths are caused by obstetric complications such as hemorrhage, hypertensive disorders, sepsis, and abortion. However, the top three leading causes, hemorrhage, hypertensive disorders, and sepsis, account for more than 50% of maternal deaths worldwide.[9]

In February 2023, the World Health Organization (WHO) released a report on maternal mortality rates between 2000 and 2020. The report indicates that, despite significant improvements in maternal mortality rates during the Millennium Development Goal era (2000–2015), progress has stalled in many regions between 2016 and 2020. As the first report to present data on the first five years of the Sustainable Development Goals (SDGs) era, the WHO report provides global, regional, and country-level estimates and trends, highlighting disparities and areas of concern. In 2020, the global maternal mortality rate (MMR) was estimated at 223 maternal deaths per 100,000 live births. From 2016 to 2020, the report shows stagnation or worsening of MMR in most regions of the world, with the exception of Australia and New Zealand, which reduced MMR by 34.6%, and Central and Southern Asia, which reduced MMR by 15.7%.

Sub-Saharan Africa plays a significant role in the global maternal mortality rate, accounting for approximately 70% of all maternal deaths worldwide by 2020. This region is the only region categorized as having an extremely high maternal mortality rate (545 maternal deaths per 100,000 live births). Additionally, all three countries with a maternal mortality rate exceeding 1000 maternal deaths per 100,000 live births in 2020 were located in sub-Saharan Africa, South Sudan (1223 per 100,000 live births; uncertainty interval, 746–2009), Chad (1063 per 100,000 live births; 772–1586), and Nigeria (1047 per 100,000 live births; 793–1565).

The maternal mortality rate (MMR) in Somaliland was reported to have declined from 418 deaths per 100,000 live births in 2014 to 396 deaths in the 2020, as indicated by a verbal autopsy survey conducted by the World Health Organization's Regional Office (WHO-EMRO), in collaboration with the WHO Country Office, University of Aberdeen, and Data and Research Solutions (DARS). However, the Ministry of Health did not endorse the report, leading to the public release of the first official MMR figure from the Somaliland Health and Demographic Survey (SLHDS).

The frequency of home deliveries differed across locations. In Pakistan, 74.3% of deliveries occur at home, and the weighted prevalence of home deliveries among women in East African countries is 23.68%. Among the three countries, Ethiopian women had the highest rate of home delivery (72.5%), followed by Kenyan (37.5%) and Tanzanian women (34.7%). In contrast, the lowest rates of home delivery were observed among women in Mozambique (2.8%), Rwanda (6.9%), and Malawi (7.1%). Multiple studies have linked home delivery to a substantial number of maternal and newborn deaths due to obstetric complications during labor and delivery, often with the assistance of traditional birth attendants.[11]

The Ministry of Health in Somaliland has established an ambitious target to reduce maternal mortality by 75% and enhance institutional deliveries by 60%. Despite the government's concerted efforts to improve maternal health, there has been no progress in the indicators of maternal mortality and morbidity over the past five years. Moreover, Somaliland ranks third globally in terms of maternal mortality, with a maternal mortality ratio of 396 per 100,000 live births, as reported in the 2020 Central Statistics Department report. However, there is a lack of research examining the preferences of women in Somaliland regarding their place of birth.

According to the authors' research, there is an absence of knowledge pertaining to the factors influencing home delivery in Somaliland. Consequently, this study was conducted to evaluate the determinants of home delivery among women of reproductive age in Somaliland. The findings of this study will be beneficial for health policymakers and planners in their efforts to decrease the prevalence of home delivery in Somaliland, and provide a foundation for further research in this area.

Methods

Study area

This study was conducted in Somaliland, East Africa. Somaliland is geographically positioned alongside Djibouti in the northwest, Ethiopia in the southwest, Somalia in the east, and the Gulf of Aden in the north. The country has a land area of 176,119.2 km^2 and experiences a mixed climate, including both wet and dry conditions. Somaliland encompasses six geopolitical regions: Awdal, Marodijeh, Sahil, Togdheer, Sanaag and Sool. The estimated population of the country is 4.2 million people, with the majority being Somali ethnic groups who practice Islam. Although there has been some economic growth success following the proclamation of independence, Somaliland remains a nation with slow economic progress. The lack of international recognition as an independent state has negatively affected investment and international aid opportunities in Somaliland. It is worth noting that livestock plays a significant role in the livelihoods of both rural and urban populations.

Study design and study period of Health Demographic Survey

Somaliland Health Demographic Survey (SLHDS) was a cross-sectional study and the survey conducted in 2019 and reported as 2020 Somaliland demographic health service (SLDHS).

Sample size and sampling of health and demographic survey

In the current study, data from 3795 women aged 15–49 years were obtained from the SLHDS dataset and analyzed. The study utilized a stratified sampling approach, considering six geographic regions and the residences of the participants (urban, rural, or nomadic). To select the enumeration areas (EA) for urban and rural residents, Geographic Information System (GIS) software was employed. The sampling frame was comprised of 2806 dwelling structures, including 1869 urban and 937 rural areas. The selection of the 35 EAs was based on the proportion of the size of the dwelling structures using the probability proportion to size. Subsequently, 10 primary sampling units (PSU) were chosen from the 35 EAs using probability proportion sampling. To construct a sampling frame for nomadic residents, a list of temporary nomadic settlements (TNS) was used as the sampling frame, with the estimated number of households in each TNS serving as the measure of size. A total of 1448 TNS dwelling structures were identified, and the selection of EAs followed the same process as for urban and rural residents. Finally, a systematic sampling technique was used to select the final sampling units (households).

Variables

Outcome variable

This study investigated home delivery practices among pregnant women in Somaliland, utilizing data from the Somaliland DHS 2020. Although the DHS data did not directly capture home delivery practices, the study analyzed responses regarding the place of delivery collected in the SLDHS 2020. The available options for place of delivery included her home, other homes, different governmental health facilities and different types of private health facilities. The study categorizes places of delivery into two groups: health institutions and homes. This study focuses on predicting the place of delivery in relation to individual- and community-level factors, specifically home delivery. The outcome variable is coded as 1 if a woman delivers at home and 0 if delivery occurs at a health institution.

Independent variables

Previous literature has identified several factors associated with home delivery practices.[5–10] In this paper, the covariates of home delivery practices were grouped into two categories, including individual level and community-level factors. Individual-level factors including maternal age group, maternal age at first birth, age at first marriage, maternal education level, maternal occupation, husband education level, husband occupation, ANC utilization, contraceptive use, and total children ever born. On the other hand, the study also focuses community-level factors including frequency of listening to a radio, owns mobile phone, frequency of watching television; region, place of residence, household size, getting medical help for self: distance to health facility, and household wealth status.

Conceptual framework

The conceptual framework aims to examine the relationship between home delivery and various individual and community level factors among pregnant women aged 15–49 in Somaliland. Drawing on previous research on influencing factors of home delivery, we incorporate individual and community level factors as key variables in our analysis. These factors were selected based on their relevance and availability in the 2020 SLDHS (Somaliland Demographic and Health Survey) dataset, which is the first-ever dataset of its kind in Somaliland. Fig. 1 illustrates the adapted constructs of our conceptual framework.

Data analysis

The data utilized for analysis in the present investigation were derived from the Somaliland Health and Demographic Survey (SLHDS). Trained interviewers conducted the survey using the CSPro Android platform in both urban and rural areas. Data were gathered from 30 households in each of the ten enumeration areas in each regional stratum. Additionally, data collection in nomadic areas was conducted by selecting 30 households from each enumeration area. Prior to data collection, a list of households in each TNS was verified the day before, to ensure the most current and comprehensive list of households.

Data quality assurance

Before initiating data collection through surveys, comprehensive training was administered to the data collectors,

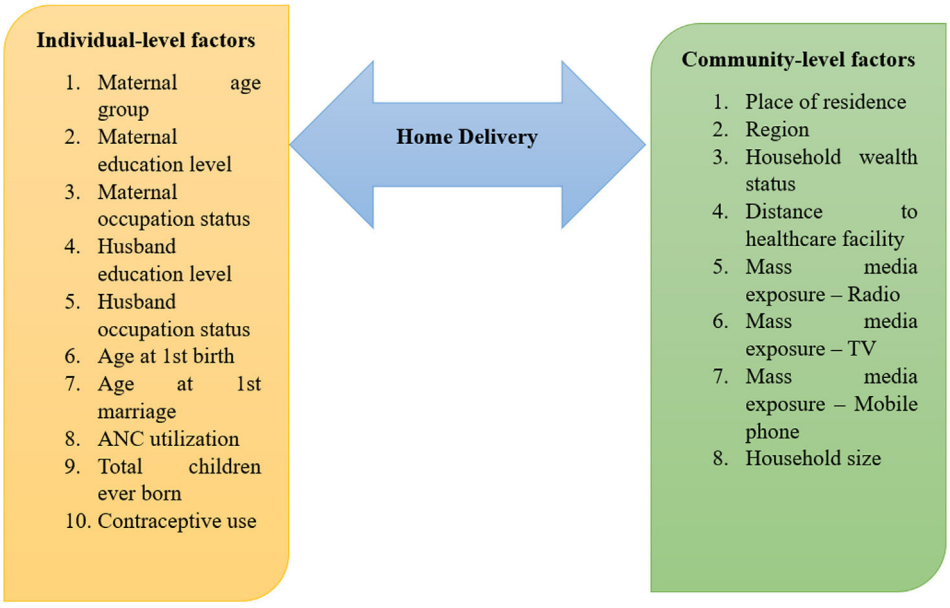

Figure 1 The conceptual framework for the study.

followed by a preliminary assessment. To facilitate geolocation and georeferencing, a system employing GPS tracking for field operations was implemented and the data collection process was closely monitored to ensure accuracy.

Data processing and analysis

Data were extracted from the SLHDS and cleaned. Participants who lacked outcome variables in the datasets were excluded from analysis. Subsequently, the data were exported and analyzed using STATA version 17 software. Descriptive statistics, including the mean, frequency, and percentage, were computed. Bivariable and multivariable binary logistic regression analyses were used to assess the factors associated with home delivery.

Results

Table 1 presents the univariate and bivariate analyses of home delivery among women in Somaliland, utilizing data from the 2020 Somaliland Demographic and Health Survey (SLDHS). This analysis examined the relationship between various sociodemographic and health-related factors and the likelihood of delivering at home, as opposed to a health institution.

The findings demonstrate that age plays a crucial role in determining the choice of delivery location. The proportion of women who delivered at home diminished as their age increased from 84.13% in the 45–49 age group to 60.39% in the 15–19 age group. This suggests that women in the younger age group are more inclined to give birth in health institutions than their older counterparts are.

Educational attainment serves as a strong predictor of place of delivery. Women with no education were more likely to deliver at home, accounting for 74.93% of such cases, as opposed to those with primary, secondary, or higher education levels, who were less likely to deliver at home. This suggests that higher levels of education are correlated with a greater probability of delivery in a health facility.

Additionally, the analysis demonstrated that the employment status of the respondent, her husband's educational background, and employment status all played a significant role in determining the choice of delivery location. Specifically, women whose husbands had never received formal education or who were not employed in the 12 months preceding the survey were more likely to give birth at home.

Access to media and communication channels has become crucial. Women who possessed a mobile phone, regularly listened to the radio, or watched television were more inclined to deliver in a healthcare facility than those who lacked access to these resources.

Geographic region also played a significant role in determining the place of delivery. The highest proportion of home deliveries was observed in the Woqooyi Galbeed region (76.93%), whereas the Awdal region had the lowest (67.93%). However, the type of residence (rural, urban, or nomadic) did not exhibit a statistically significant association with the outcome variable.

Finally, the analysis examined the effect of various reproductive and health-seeking behavioral factors. Women from wealthier households, those who married and had their first birth at an older age, and those who had fewer children ever born were more likely to deliver in a health facility. Moreover, women who reported having access to medical help for themselves and those who used modern contraceptive methods were also more inclined to deliver at a healthcare institution.

Prevalence of home delivery

The prevalence of home delivery among pregnant women in Somaliland based on the first ever SLDHS 2020 dataset was 69.19% (95%CI: 67.71–70.65) (Fig. 2).

Table 1 Univariate and bivariate analysis of home delivery among women in Somaliland using SLDHS 2020 data.

Variable	Levels	Frequency (%)	Place of delivery		Chi square	df	*p*-Value
			Home (%)	Health institution (%)			
Age in 5-year groups	15–19	154 (4.06)	93 (60.39)	61 (39.61)	27.0880	6	0.000
	20–24	756 (19.92)	521 (68.92)	235 (31.08)			
	25–29	1146 (30.20)	779 (67.98)	367 (32.02)			
	30–34	813 (21.42)	540 (66.42)	273 (33.58)			
	35–39	641 (16.89)	469 (73.17)	172 (26.83)			
	40–44	222 (5.85)	171 (77.03)	51 (22.97)			
	45–49	63 (1.66)	53 (84.13)	10 (15.87)			
Respondent's highest education level	No education	3151 (83.03)	2361 (74.93)	790 (25.07)	326.6099	3	0.000
	Primary	456 (12.02)	219 (48.03)	237 (51.97)			
	Secondary	131 (3.45)	39 (29.77)	92 (70.23)			
	Higher	57 (1.50)	7 (12.28)	50 (87.72)			
Respondent worked in last 12 months	Yes	43 (1.13)	29 (67.44)	14 (32.56)	0.0628	1	0.802
	No	3752 (98.87)	2597 (69.22)	1155 (30.78)			
Husband ever attended school	No	856 (22.56)	367 (42.87)	489 (57.13)	359.2972	1	0.000
	Yes	2939 (77.44)	2259 (76.86)	680 (23.14)			
Husband worked in last 12 months	No	1884 (49.64)	1518 (80.57)	366 (19.43)	227.1941	1	0.000
	Yes	1911 (50.36)	1108 (57.98)	803 (42.02)			
Owns a mobile phone	Yes	2963 (78.08)	1945 (65.64)	1018 (34.36)	80.0605	1	0.000
	No	832 (21.92)	681 (81.85)	151 (18.15)			
Frequency of Listening a radio	At least once a week	337 (8).88	204 (60.53)	133 (39.47)	28.5532	2	0.000
	Less than once a week	90 (2.37)	46 (51.11)	44 (48.89)			
	Not at all	3368 (88.75)	2376 (70.55)	992 (29.45)			
Frequency of watching television	At least once a week	545 (14.36)	221 (40.55)	324 (59.45)	314.9521	2	0.000
	Less than once a week	116 (3.06)	45 (38.79)	71 (61.21)			
	Not at all	3134 (82.58)	2360 (75.30)	774 (24.70)			
Region	Awdal	502 (13.23)	341 (67.93)	161 (32.07)	51.2749	4	0.000
	Woqooyi Galbeed	776 (20.45)	597 (76.93)	179 (23.07)			
	Togdheer	784 (20.66)	491 (62.63)	293 (37.37)			
	Sool	828 (21.82)	537 (64.86)	291 (35.14)			
	Sanaag	905 (23.85)	660 (72.93)	245 (27.07)			
Type of place of residence	Rural	1202 (31.67)	820 (68.22)	382 (31.78)	1.0475	2	0.592
	Urban	1127 (29.70)	779 (69.12)	348 (30.88)			
	Nomadic	1466 (38.63)	1027 (70.05)	439 (29.95)			
Wealth index	Lowest	1067 (28.12)	988 (92.60)	79 (7.40)	785.3082	4	0.000
	Second	516 (13.60)	436 (84.50)	80 (15.50)			
	Middle	542 (14.28)	418 (77.12)	124 (22.88)			
	Fourth	746 (19.66)	417 (55.90)	329 (44.10)			
	Highest	924 (24.35)	367 (39.72)	557 (60.28)			
Age at first marriage	Less than 20	2624 (69.14)	1892 (72.10)	732 (27.90)	33.7231	1	0.000
	20 and more	1171 (30.86)	734 (62.68)	437 (37.32)			
Age at first birth	Less than 20	2034 (53.60)	1480 (72.76)	554 (27.24)	26.1610	1	0.000
	20 and more	1761 (46.40)	1146 (65.08)	615 (34.92)			
Total children ever born	Less than 5	1838 (48.43)	1157 (62.95)	681 (37.05)	65.2660	1	0.000

Table 1 (*Continued*)

Variable	Levels	Frequency (%)	Place of delivery		Chi square	df	*p*-Value
			Home (%)	Health institution (%)			
	5 and more	1957 (51.57)	1469 (75.06)	488 (24.94)			
Getting medical help for self: distance to health facility	Yes	2520 (66.40)	1843 (73.13)	677 (26.87)	54.5887	1	0.000
	No	1275 (33.60)	783 (61.41)	492 (38.59)			
Contraceptive use and intention	Using modern method	119 (3.14)	47 (39.50)	72 (60.50)	93.7100	3	0.000
	Using traditional method	4 (0.11)	3 (75.00)	1 (25.00)			
	Non-user, intends to use later	385 (10.14)	214 (55.58)	171 (44.42)			
	Does not intend to use	3287 (86.61)	2362 (71.86)	925 (28.14)			
Wanted pregnancy when became pregnant	Then	2853 (75.18)	1955 (68.52)	898 (31.48)	4.2765	2	0.118
	Later	785 (20.69)	552 (70.32)	233 (29.68)			
	No more	157 (4.14)	119 (75.80)	38 (24.20)			

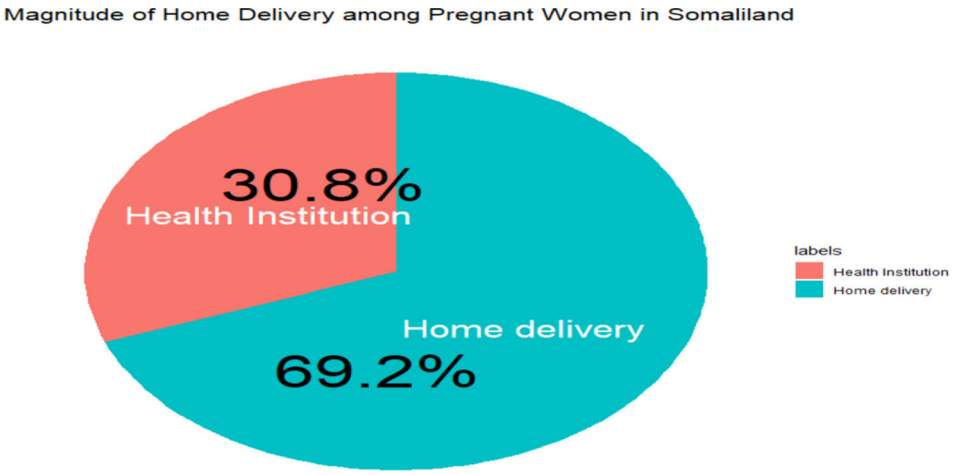

Figure 2 Prevalence of home delivery among pregnant women in Somaliland.

Table 2 presents the outcomes of a multivariate logistic regression analysis that aimed to identify the determinants of home delivery among women in Somaliland using data from the 2020 Somali Demographic and Health Survey (SDHS). An analysis was conducted to determine the factors associated with the likelihood of a woman delivering at home.

The findings of this analysis indicate that several sociodemographic and reproductive health factors are significantly linked to home deliveries. With regard to the respondent's level of education, those with primary, secondary, or higher education were found to have significantly higher odds of home delivery than those with no education. This suggests that higher levels of education are associated with increased utilization of institutional delivery services.

Additionally, the analysis showed that women whose husbands had received formal education were less likely to deliver at home than those whose husbands had received no education. This implies that the husband's level of education plays a role in the decision-making process regarding place of delivery.

Intriguingly, participants' employment status during the past 12 months failed to show a significant relationship with the outcome in question. However, the wealth index proved to be a potent predictor, with women in the upper wealth quintiles demonstrating markedly higher odds of giving birth at home than those in the lowest quintile.

Regarding regional differences, women from the Woqooyi Galbeed and Sanaag regions exhibited lower odds of home delivery than those from the Awdal region did. Moreover, women from nomadic households experienced significantly lower odds of home delivery than those from rural households.

The study also assessed the effect of maternal age at first marriage and first birth as well as the overall number of children born. The results indicate that women who wed

Table 2 Multivariable logistic regression analysis of determinants of home delivery among women in Somaliland using SDHS 2020 data.

Variable	Levels	Odds ratio (OR)	Standard error	Confidence interval (CI)	*p*-Value
Age in 5-year groups	15–19	Reference			
	20–24	.7300049	.1625587	.4718227–1.129465	0.158
	25–29	.7783753	.1789861	.4959714–1.221579	0.276
	30–34	.9789578	.2435893	.6011235–1.594279	0.932
	35–39	1.029636	.2772929	.6073583–1.745509	0.914
	40–44	.7957961	.2565722	.4230253–1.497053	0.479
	45–49	.5182387	.2396317	.2093811–1.282692	0.155
Respondent's highest education level	No education	Reference			
	Primary	1.292929	.1603996	1.013854–1.648822	0.038
	Secondary	2.450624	.5459477	1.583605–3.792334	0.000
	Higher	6.455142	2.881002	2.691566–15.48127	0.000
Respondent worked in last 12 months	Yes	Reference			
	No	.9054356	.3707311	.4058193–2.020145	0.808
Husband ever attended school	No	Reference			
	Yes	.569323	.0595312	.4638237–.6988189	0.000
Husband worked in last 12 months	No	Reference			
	Yes	1.078596	.1040897	.892717–1.303179	0.433
Owns a mobile phone	Yes	Reference			
	No	.8563109	.1072022	.669991–1.094445	0.215
Frequency of listening a radio	At least once a week	Reference			
	Less than once a week	.880949	.2516137	.5033075–1.541942	0.657
	Not at all	.9006494	.1304207	.6781028–1.196234	0.470
Frequency of watching television	At least once a week	Reference			
	Less than once a week	1.325404	.3234616	.821513–2.138365	0.248
	Not at all	.8672268	.1119549	.6733589–1.116912	0.270
Region	Awdal	Reference			
	Woqooyi Galbeed	.5719246	.0947246	.4133893–.7912584	0.001
	Togdheer	.8943329	.1412735	.6562041–1.218876	0.480
	Sool	.8293738	.1298017	.6102846–1.127115	0.232
	Sanaag	.4614765	.0721228	.3397174–.6268757	0.000
Type of place of residence	Rural	Reference			
	Urban	.9194237	.1071573	.7316604–1.155372	0.471
	Nomadic	.3225705	.0368335	.2578862–.4034793	0.000
Wealth index	Lowest	Reference			
	Second	3.06344	.5492018	2.15580–4.353209	0.000
	Middle	5.843909	1.035328	4.129538–8.269998	0.000
	Fourth	14.83256	2.5148	10.63894–20.67921	0.000
	Highest	19.37796	3.448295	13.67216–27.46495	0.000
Age at first marriage	Less than 20	Reference			
	20 and more	1.460012	.1736932	1.156356–1.843408	0.001
Age at first birth	Less than 20	Reference			
	20 and more	.8908193	.1050577	.7069752–1.122471	0.327
Total children ever born	Less than 5	Reference			
	5 and more	.5795953	.0684768	.4597893–.7306189	0.000
Getting medical help for self: distance to health facility	Yes	Reference			
	No	.8430681	.0788733	.7018244–1.012737	0.068
Wanted pregnancy when became pregnant	Then	Reference			
	Later	.8310063	.08894	.6737564–1.024957	0.084
	No more	.6985544	.1605941	.4451571–1.096193	0.119
Constant		.6731617	.3979629	.2113013–2.144553	0.503

and became mothers for the first time at age 20 or older had higher odds of home delivery, whereas those with five or more children had reduced odds of home delivery.

Discussions

The results of the analysis are consistent with those of prior research on the determinants of home delivery in Somaliland. As demonstrated in the literature, there is a well-established correlation between higher education levels for both women and their partners and an increased likelihood of using institutional delivery services.[12] Additionally, the negative association between wealth and home delivery aligns with studies indicating that wealthier households tend to have better access to and utilization of healthcare services.[13]

However, the impact of maternal age at first marriage and first birth on the likelihood of home delivery is noteworthy, as previous research has produced mixed results on this relationship.[14] This finding suggests the need for further investigation of the potential mechanisms underlying this association.

To offer a more in-depth examination, it would be beneficial to investigate regional discrepancies in home delivery rates, as the available data suggest considerable variability across different regions of Somaliland. This could aid in identifying specific geographic areas that might necessitate targeted interventions to enhance access and utilization of healthcare facilities for deliveries. Additionally, exploring the potential avenues through which the husband's educational accomplishments influence the woman's decision to deliver at home or in a healthcare facility could provide valuable insights into the intricacies of decision-making within households.

It is also crucial to consider the broader social, cultural, and economic context of Somaliland when interpreting these findings. Various factors, such as gender norms, access to transportation, and the availability and quality of healthcare services in different regions, may all contribute to shaping the observed patterns of home delivery. Given that the data are from 2020, the analysis provides a relatively current picture of the situation, which can inform the ongoing policy and programmatic initiatives in the country.

This analysis presents useful information, but there are certain limitations that should be taken into consideration. Adopting a more robust multivariate regression model would offer clearer insight into the individual influence of each factor on the likelihood of home delivery. Additionally, incorporating additional variables, such as the standards of and satisfaction with healthcare services, and any potential hindrances to accessing facility-based deliveries would considerably enrich the analysis and offer a more complete understanding of the determinants of home delivery in Somaliland.

The results of this study underscore the need for tailored interventions to reduce the disparities in institutional delivery services observed across different sociodemographic and regional groups. Such interventions could include increasing access to and enhancing the quality of maternal healthcare services, particularly in underserved areas, and implementing strategies to empower women and strengthen their decision-making authority within the householdold. Additionally, husbands' education level of education emphasizes the significance of engaging men and addressing gender norms within households to improve maternal health outcomes.

In summary, this study offers crucial insights into the factors associated with home deliveries among women in Somaliland, emphasizing the role of sociodemographic factors, access to resources, and regional disparities in shaping maternal healthcare-seeking behaviors. These findings can inform the development of targeted interventions and policies to increase the utilization of facility-based deliveries, thereby contributing to improved maternal and child health outcomes.

Conclusions

Analysis of the determinants of home delivery in Somaliland offers valuable insights into the factors shaping maternal healthcare-seeking behaviors in the country. The findings emphasize the significance of sociodemographic characteristics, access to resources, and regional disparities in influencing the utilization of institutional delivery services.

One essential observation is the strong association between higher levels of education for both women and their husbands and the increased use of facility-based deliveries. This aligns with previous research suggesting that education plays a crucial role in empowering women, improving their knowledge of healthcare options, and increasing their decision-making power within the household. Furthermore, the negative relationship between wealth and home delivery underscores the need to address socioeconomic inequalities in access to maternal health care services.

An insightful discovery was the influence of maternal age at the time of first marriage and birth on the probability of home delivery. Previous research has generated conflicting outcomes with respect to this relationship, and the current study emphasizes the need for additional investigation into the underlying mechanisms that may drive this association. Delving into the pathways by which the husband's level of education affects the woman's choice between home and health facility delivery could also provide valuable insights into decision-making processes within households.

The analysis also reveals significant regional variations in home delivery rates across Somaliland. This highlights the importance of considering the broader social, cultural, and economic contexts of different geographic areas when developing interventions to improve maternal health care outcomes. Factors such as gender norms, access to transportation, and availability and quality of healthcare services may all play a role in shaping the observed patterns of home delivery.

To enhance the comprehensiveness of the analysis, the use of a more robust multivariate regression model can provide a better understanding of the independent effects of each factor on the likelihood of home delivery. Furthermore, the inclusion of additional variables, such as the quality of and satisfaction with healthcare services, as well as potential barriers to accessing facility-based deliveries, could offer a more detailed picture of the determinants of home delivery in Somaliland.

Finally, the findings underscore the need for targeted interventions to address identified sociodemographic and regional disparities in the utilization of institutional delivery services. This may involve increasing access to and improving the quality of maternal healthcare services, particularly in underserved regions, and implementing strategies to empower women and promote their decision-making power within households. Additionally, the role of the husband's educational attainment suggests the importance of engaging men and addressing gender norms within the household to improve maternal health care outcomes.

Strength and limitations

The study on the determinants of home delivery in Somaliland has several strengths that contribute to its comprehensive and robust analysis. First, researchers have adopted a comprehensive approach by examining a wide range of sociodemographic, economic, and regional factors that may influence the likelihood of home delivery, thus providing a holistic understanding of the underlying determinants. Furthermore, the use of a multivariate regression model allowed for the examination of the independent effects of each factor on the outcome of interest, strengthening the validity of the findings. Additionally, the timeliness and relevance of the study, conducted in the context of Somaliland, a region with persistent challenges in maternal healthcare access and utilization, make the findings highly valuable for informing policy and program interventions. Moreover, the study's alignment with the existing literature on the determinants of home delivery in sub-Saharan Africa enhances the generalizability of the results.

However, this study has some limitations. The cross-sectional design of the study limits the ability to establish causal relationships between the factors and outcome, and a longitudinal or prospective study would be better suited to explore causal pathways. Additionally, the study relied on self-reported data from the participants, which may have been subject to recall bias or social desirability bias, potentially affecting the accuracy of the data. The absence of variables related to the quality of maternal healthcare services is another limitation as these factors may play a significant role in shaping women's decisions to deliver at home or in a health facility. Furthermore, the lack of qualitative insights in this study does not provide an in-depth, contextual understanding of the decision-making processes and barriers faced by women in choosing their place of delivery, which could enrich the analysis. Finally, the limited geographical coverage of the study, confined to Somaliland, and the use of outdated data collected in 2020, may limit the generalizability of the findings to other regions or the current landscape of maternal healthcare in Somaliland.

Despite these limitations, this study provides valuable insights into the determinants of home delivery in Somaliland, which can inform the development of targeted interventions to improve access and utilization of maternal healthcare in the region. Future research could address these limitations by employing longitudinal designs, incorporating measures of healthcare quality, and integrating qualitative methods to gain a more holistic understanding of the complex factors that shape maternal healthcare-seeking behaviors.

Future work

This study on the determinants of home delivery in Somaliland lays a solid foundation for future research and interventions aimed at improving maternal healthcare outcomes in the region. While the current analysis provides valuable insights, there are several avenues for future work that can further expand our understanding of the factors shaping women's decisions regarding the place of delivery.

One promising direction for future research is to employ a longitudinal study design, which would allow for the establishment of causal relationships between the identified determinants and the outcome of home delivery. By following a cohort of women over time, researchers could better elucidate the dynamic interplay between sociodemographic, economic, and regional factors, as well as how these change over the course of a woman's reproductive life. Moreover, a longitudinal approach would enable examination of the long-term impact of interventions on maternal healthcare-seeking behaviors.

Additionally, incorporating qualitative methods into future studies could offer a more nuanced and contextual understanding of the decision-making processes and barriers faced by women when choosing their place of delivery. In-depth interviews and focus group discussions can shed light on the cultural, social, and personal factors that influence women's perceptions and preferences regarding institutional deliveries. This complementary approach would provide a more holistic picture of the determinants of home delivery, ultimately informing the design of more effective and tailored interventions.

Furthermore, future research should consider the role of healthcare quality and accessibility in shaping maternal healthcare utilization. By including variables that capture availability, quality, and perceived satisfaction with maternal healthcare services, researchers can better disentangle the complex relationships between supply- and demand-side factors that influence home delivery rates. This comprehensive approach would support the development of interventions that address both barriers to accessing care and the quality of the services provided.

Finally, expanding the geographical coverage of future studies to include other regions within Somaliland or even across the wider Horn of Africa would enhance the generalizability of the findings and provide a more nuanced understanding of the contextual factors that shape maternal healthcare-seeking behaviors. This broader perspective is crucial for informing national and regional policy decisions and ensuring equitable distribution of maternal healthcare resources.

By building upon the insights gained from the current study, future research can contribute to the development of more effective evidence-based strategies to address the persistent challenges in maternal healthcare access and utilization in Somaliland. This multifaceted approach, combining quantitative and qualitative methods as well as a focus on both demand-side and supply side factors, holds

the promise of driving meaningful improvements in maternal and child health outcomes in the region.

Ethics approval and consent to participate

The research utilized secondary data obtained in accordance with the National Data Sharing and Accessibility Policy (NDSAP) implemented by the Government of Somalia. The dataset employed in the study did not contain any personally identifiable information about the survey participants, thus eliminating the need for ethical approval for this study.

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Authors' contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Declarations

We declare that this work has not been submitted as a manuscript to any other journal.

Conflict of interests

The authors affirm that there are no conflicts of interest pertaining to the publication of this article.

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