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Home birth and its associated factors among mothers aged 15–49 years in Somalia: a nationwide population-based cross-sectional study

Sahardid Hussein Ibrahim[1*], Zhongliang Zhou[1*], Jiao Lu[1] and Hilal Mohamed Nor[2]

Abstract

Background Understanding factors associated with home births is crucial for identifying appropriate interventions for mother and child survival and attaining the Sustainable Development Goals. No national studies have explicitly examined the distribution of home birth and its contributing factors. This study aims to assess the distribution of home birth and the contributing factors among mothers of reproductive age 15–49 years in Somalia.

Methods We analyzed the data of 8,631 mothers who gave birth within five years preceding the survey and provided responses on variables studied. The data was obtained from the 2020 Somali Health and Demographic Survey. Respondents' characteristics were summarized using descriptive analysis. Chi-square tests were applied to test the association between the distribution of home birth and each predictor. Multivariate logistic regression was used to assess factors contributing to home birth. We employed the STROBE checklist for manuscript reporting.

Results The prevalence of home birth among reproductive mothers in this study was, 75.5% (95% CI: 0.74–0.76). Living in the Northeast (AOR = 1.48, 95% CI: 1.17–1.86), no level of education (AOR = 2.38, 95% CI: 1.84–3.06), no media exposure (AOR = 3.67, 95% CI: 3.25–4.13), poor household wealth status (AOR = 3.80, 95% CI: 3.07–4.71), maternal autonomy (AOR = 1.36, 95% CI: 1.21–1.53), need companionship to treatment facility (AOR = 1.20, 95% CI: 1.07–1.36), and no antenatal visits (AOR = 3.91, 95% CI: 1.66–9.26) were associated with increased likelihood of home births among mothers. By contrast, urban and rural residences, low parity, and first-trimester antenatal visits were associated with a decreased likelihood of home births among mothers of reproductive age 15–49 years in this study.

Conclusion The Somali government has made efforts to improve maternal health utilization and reduce the associated deaths. However, three-quarters of Somali mothers still undergo home births. To lower home births in Somalia, government and non-governmental organizations should consider scaling institutional births by improving maternal level of education, media accessibility, and household wealth status. Priority emphasis must be given to the maternal knowledge of the benefits of antenatal visits for both herself and her baby.

Keywords Home birth, Predictors, Reproductive age, Socio-economic factors, Somalia

*Correspondence:
Sahardid Hussein Ibrahim
saxardid5@hotmail.com
Zhongliang Zhou
zzliang1981@163.com
Full list of author information is available at the end of the article

Background

Maternal health is critical to achieving Universal Health Coverage (UHC) and lowering global maternal and newborn mortality rates, both of which are essential in Sustainable Development Goals targets (SDGs) [1]. In 2020, nearly 287,000 mothers died worldwide due to childbearing preventable complications, translating to approximately 800 mothers dying daily. The highest proportion of these deaths, at 94%, was reported from low-middle-income countries (LMIC) [2]. Despite substantial global improvements over the last two decades, which have resulted in a 34% drop in maternal deaths, sub-Saharan Africa (SSA) and Southern Asia continue to be hotspots, accounting for 87% of global maternal mortality [2]. Somalia, an easternmost country in continental Africa, has made significant progress in reducing maternal death, with the rate falling from 1,097 per 100,000 live births in 2000 to 621 per 100,000 in 2020. However, the country continues to endure a higher burden; recent national surveys show a maternal mortality ratio (MMR) of 692 deaths per 100,000 live births [3], which is much higher than its neighboring countries [4]. Somalia is significantly far from meeting the global target of 70 deaths per 100,000 live births by 2030, as mentioned in the SDGs 3.1 [3, 4].

Numerous factors contribute to Somalia's higher maternal mortality rates, with obstetric complications being the leading cause. Common complications include postpartum hemorrhage, obstructed labor, pre-eclampsia/eclampsia, and sepsis [3]. These complications are exacerbated by low uptake of family planning, inadequate delivery care, and low attendance of skilled birth attendants (SBAs) during labor. While these complications are not easily predictable, they can be prevented and treated with proper precautions and the use of SBAs [5]. The World Health Organization (WHO) recommends that all births be supervised by a skilled attendant (e.g., doctor, nurse, or midwife) who can manage normal labor and delivery, recognize difficulties, and offer essential treatment and referrals [6]. Institutional births are the most critical intervention for reducing maternal mortality and promoting safe motherhood [7]. The use of skilled delivery available in healthcare institutions can prevent maternal-perinatal deaths and postnatal complications [8, 9]. The utilization of health interventions, such as institutional deliveries and skilled assistance during labor, can avoid and treat problems [10].

Health experts believe SBAs can reduce unnecessary mother and child mortality, especially in the LMICs [11]. Providing interventions, including antenatal care (ANC) and postnatal care (PNC), with skilled attendant services is vital for improving mother's health and reducing pre and postnatal maternal mortality [12]. Skilled birth care offered by healthcare professionals during labor is one of the significant metrics for achieving SDGs [13]. Institutional births have not only been associated with higher maternal and perinatal survival but also increased interventions when compared to home births [14]. On the other hand, home birth, which refers to a childbirth that occurs in a non-clinical setting, typically at a person's residence [14], has been associated with increased maternal and child mortalities [15, 16]. Neglect of colostrum, benefits of breastfeeding initiation, immunizations, nutrition supplementation of both mother and child, and poor postnatal check-ups were also among the dangers imposed by home births [17, 18]. Therefore, a significant prevention strategy for these risks exposed by home birth is the use of skilled attendants at birth [19].

Despite the broader evidence on the benefits of institutional-based deliveries and the dangers exposed by home births, an overwhelming proportion (79%) of Somali mothers have chosen to deliver their babies at home without SBA [3]. Thus, to address this challenge, it is significant to understand the magnitude and the associated factors that forced Somali mothers to give birth at home. Several studies have been conducted on socio-economic and health factors associated with birthplace in other countries across Africa [7, 10, 11, 15, 18, 20–22], yet to the best we can tell. No study has explicitly examined the associated factors of home births among Somali mothers aged 15–49 years. In Somalia, a comprehensive assessment of these factors is currently lacking. Therefore, this study aims to address this gap in the literature by assessing the distribution of home birth and the contributing factors among mothers of reproductive age 15–49 years in Somalia.

The nature of medical system utilization and its complexity demands a sophisticated model to explain the concept better. Hence, in this study, we adopted Andersen's behavioral model [23] to assess factors associated with home births among reproductive women in Somalia (Fig. 1). The model first developed by Ronald Andersen in the 1960 s was mainly grounded in the family level as the analysis unit. This initial version was composed of three dimensions: predisposing, enabling, and need factors. However, the model has been continuously modified since then, with the unit of analysis changing from family to individual and the 'external environmental factors' being added to its latest version (phase IV). Our study has adapted the phase IV version of the model as a theoretical framework. Andersen's behavioral model has been widely applied in studies on health services usage [12, 24–26]. Andersen's behavioral model considers both demand and supply considerations when determining health services utilization. The model views health

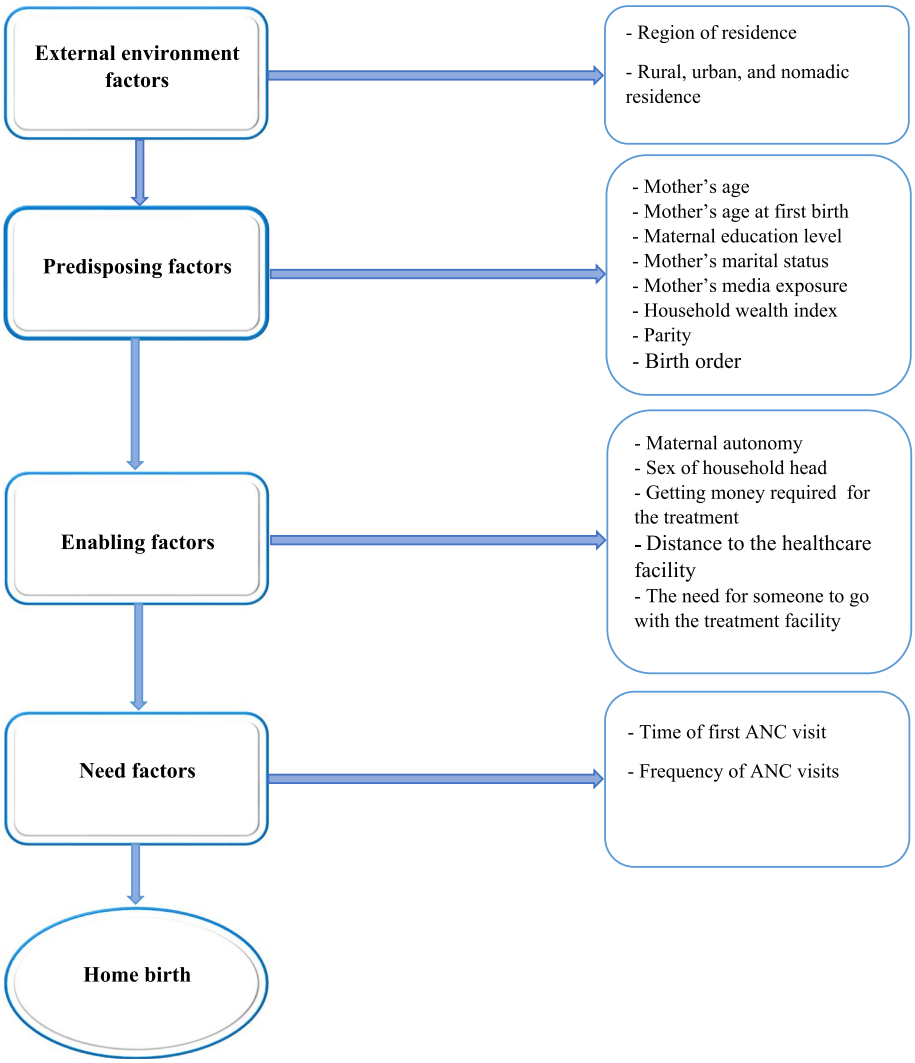

Fig. 1 Theoretical framework for examining factors associated with home birth among mothers aged 15—49 years in Somalia (based on the Andersen behavioral model [23])

services utilization as a decision-making process influenced by several factors [27].

Using Andersen's behavioral model in this study will provide a comprehensive and in-depth understanding of the factors determining Somali pregnant women's use of health care services. This provides scientific evidence for improving Somali health policies and increasing maternal health service utilization. The model identifies four major dimensions that influence an individual's access to healthcare services: the environmental, predisposing, enabling, and need factors [28, 29]. The environmental factors are the more contextual factors, e.g., region and residence place. The predisposing factors are the people's motive or decision to use services being influenced by demographics, social norms, and attitudes. The enabling factors are barriers that hinder individuals' accessibility to service utilization, e.g., availability of services, ability to pay, or long distance. The need factors are the perceived understanding of an individual's need for care, and their health condition can have a positive or negative effect on their severity and access to services. The initiation of successful maternal healthcare programs and evidence-based findings on home birth and related factors in Somalia are vital in driving improvement and realization of the SDGs targets. Furthermore, the findings will offer additional evidence for policymakers to address home birth challenges as well as lower maternal mortalities in the country.

Methods

Study aims

This study aims to assess the distribution of home births and identify the contributing factors among reproductive mothers aged 15–49 in Somalia.

Study setting and design

This is a secondary analysis of cross-sectional questionnaire-based data extracted from the 2020 Somali Health and Demographic Survey (SHDS). The 2020 SHDS was conducted in 2018/2019 and published in 2020. This was a national population-based survey that was administered at the household level [3]. Somalia, an easternmost country located in the Horn of Africa, has an estimated surface area of 637.657 km2 and a terrain made up of plateaus, plains, and hills. It boasts the longest coastline in continental Africa, stretching 3.333 km between the Gulf of Aden to the north and the Indian Ocean to the east and south. It shares borders with Djibouti to the northwest, Ethiopia to the west, and Kenya to the southwest. Somalia has a tropical hot climate with few seasonal fluctuations with daily temperatures ranging from 30^0 to 40^0C. The country has low annual rainfall and four seasons: Spring and Autumn are rainy, while Summer and Winter are dry seasons.

Sample and sampling technique of the study

The Somali National Bureau of Statistics (SNBS), in cooperation with the central Ministry of Health and regional administration and getting technical and financial assistance from the international developmental partners in Somalia, owns the primary implementation of the survey. The data are freely and publicly available for research purposes on (http://microdata.nbs.gov.so/index.php) with permission from SNBS. The primary purpose of the 2020 SHDS was to give reliable and updated data estimates on all aspects of health and demographic factors [3]. The SHDS applied a multi-stage stratified cluster sampling technique to choose the participants. Three-stage cluster sampling was done in rural and urban areas, and two-stage cluster sampling in nomadic residents. Except for the Banadir region, which was fully considered urban, all other administrative regions were divided into nomadic, rural, and urban areas, resulting in a total of 55 sampling sections. However, for security reasons, Lower Shabelle, Middle Juba, and the Bay region's rural and nomadic areas were entirely omitted from the data collection. Thus, 47 strata formed the final sampling frame. Primary sampling units (PSUs) were created with probability proportional to the size of residential constructions, and they were proportionately allocated to ensure comparability across all regions. Finally, 30 households were chosen from each PSU for data collection. A complete explanation of the sample, sampling methodology, and setting has been published in the final study report [3].

Study population and determine sample size

A nationally representative sample of 16,360 households was chosen for the survey; 15,870 were inhabited, and 15,826 were fully surveyed successfully, resulting in a 99.7% response rate. The 2020 SHDS target population was women aged between 15 and 49 years who were in the reproductive period and children under five [3]. A total of 16,486 women were interviewed, of whom 11,876 were married, and 4,610 were never married. However, our analysis was limited to a total of 8,631 mothers aged between 15 and 49 years with complete information on their recent successful childbirth within five years before the survey. The data analyzed in our study were taken from the children's record file of 2020 SHDS [3]. The survey uses three types of questionnaires. All household individuals and guests were listed using a household questionnaire. Their demographic information was collected, and for children below 18 years old, whether their parents were still living was confirmed. The household questionnaire also included information on sources of drinking water, sanitation, and disability. The household questionnaire was also used to label the ever-married and "never-married women" who were qualified to be questioned in each household. The data of married, divorced, or widowed women aged 12 to 49 years was collected using the ever-married women's questionnaire. Birth history, child- and pregnancy-related mortality, birth spacing, antenatal–postnatal and delivery care, breastfeeding, vaccinations, HIV/AIDS status, marriage, and fertility-related information were also included in this questionnaire. Lastly, all women between the ages of 15 and 49 years were questioned using the never-married women's questionnaire to collect information regarding their socioeconomic characteristics and violence against women [3].

Variable measurement and definitions of key concepts

Outcome variable

The outcome variable of our study was home birth. Home birth, which referred to a childbirth that occurs in a non-clinical setting, typically at a person's residence [14], was generated from "*Where did you give birth to (NAME)*?" (Place of birth) in the "ever-married women's questionnaire." Specific to our study, the variable place of birth was dichotomized as (1) if the birth took place in the mother's home or another home and (0) if it happened in a health institution (e.g., hospital/clinic health facility/other) (see supplementary Table 1).

Explanatory variables

Based on previous relevant studies [7, 30–33] and the availability of relevant information in the 2020 SHDS [3], our study's explanatory variables were based on Andersen's behavioral model [23]. We included seventeen explanatory variables divided into four main dimensions. Detailed information on the studied variables, their categorization, and operational definitions was attached as a supplementary file (see supplementary Table 1).

Statistical analysis

We analyzed and summarized participants' characteristics using descriptive analysis (percentage and frequency including graphs and tables). To examine the primary and significant association between the percentage distribution of home birth (outcome variable) and the explanatory variables, we used cross-tubulation with Chi-square test values. To evaluate the unadjusted association between the outcome variable and the explanatory variables, we used simple bivariate logistic regression and reported in a 95% confidence interval with their p-values <0.05. Finally, by using multivariate binary logistic regression, we further examined the association between the variables and predicted the outcome variable on the explanatory variables while keeping other variables constant. Due to the outcome variable being binary (1 = home birth and 0 = institutional birth), we considered binary logistic regression as the appropriate statistical method.

Due to the hierarchical structure of the data, we constructed four models in a hierarchy when conducting multivariate binary logistic regression [34] using the "backward elimination method" to retain variables that were statistically significant at $p < 0.05$ in each model. First, we assessed all variables in Model I (external environmental factors), which were the more distal variables and maintained variables that satisfy the requirement of a $p < 0.05$. Then, we added the variables that had a $p < 0.05$ retained in Model I to build Model II (predisposing factors). Similarly, we retained variables that satisfy the significance level of $p < 0.05$ to build the next model.

Model III was then composed using significant variables kept in Model II as well as enabling factors. Similar procedures were taken to build Model IV (need factors). We presented the findings as Adjusted Odd Ratios (AOR) with their corresponding 95% confidence interval and significant levels of $p < 0.05$ of each model (I–IV). Before analysis, we cleaned the data, with all missing values excluded from the analysis. We applied the variance inflation factor (VIF) to test the existence of any multicollinearity of all statistically significant predictors. The maximum VIF was 2.8, and the minimum was 1, signifying that the VIFs of all predictors were below 3, thereby indicating no severe multicollinearity of the data. All data cleaning analysis and management were performed using the Statistical Package for Social Science (SPSS) version 21. Finally, we followed the checklist of "Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)" [35], which provides appropriate guidance for preparing and reporting cross-sectional studies to prepare our final manuscript.

Ethics approval and consent to participate

Our study analyzes publicly available secondary data with no identifiable human subjects. The verbal informed consent of all participants was assured before their enrollment in the interview. All study methods were performed in accordance with the relevant guidelines and following regulations of the Helsinki Declaration. We obtained permission from the SNBS to use the 2020 SHDS dataset for research purposes. No further ethical approval was required.

Results

Descriptive statistics of the participants and the Chi-square test

A total of 8,631 mothers aged 15–49 years were included in this study. Nearly half of 3721 (43.1%) were urban residents. Regionally, 3249 (37.6%) were from the Northwest region, while the smallest proportion, 1443 (16.7%), were from the Northeast region. A higher proportion, 7634 (88.4%) of mothers, gave birth to their first child at the age between 15 and 24, and 7788 (90.2%) were married, while 7209 (83.5%) had no level of education. Approximately 7233 (83.8%) have no access to different media channels. An average of 3744 (43.4%) and 5096 (59.0%) mothers were from poor households' wealth quintile and had a parity of more than three, respectively. Of the sum of mothers, 5744 (66.6%), 5380 (62.3%), and 4158 (48.2%) have reported difficulties in getting money for treatment, distance to health facilities, and the need for companionship. More than half, 5609 (65.0%) of mothers have not attended any form of ANC during their pregnancy (see Table 1).

Table 1 also presents the prevalence of home birth amongst mothers in Somalia. Mothers at older ages have a more significant proportion of 79.0% of home births than younger ages ($p<0.001$). Married mothers 76.2%, mothers with no level of education 80.6%, and mothers not exposed to media 80.1% had higher proportions of home births than their counterparts ($p<0.001$). Similarly, mothers from poor households 92.0%, those with parity greater than three 79.0%, mothers having difficulties with money for treatment 78.4%, and mothers with problems with health facility distance 79.7% have shown higher proportions of home births ($p<0.001$). Lastly, mothers

Table 1 Sample characteristics and prevalence of home births among study participants

Categories and variables	Number	Percentage	Place of birth n (%)		χ^2	*p-value*
			Institution	Home		
External environmental factors						
Region						
North-West	3249	37.6	1157 (35.6)	2092 (64.4)	407.54	< 0.001
North-East	1443	16.7	176 (12.2)	1267 (87.8)		
Central	2233	25.9	511 (22.9)	1722 (77.1)		
South	1706	19.8	270 (15.8)	1436 (84.2)		
Place of residence						
Urban	3721	43.1	1428 (38.4)	2293 (61.6)	882.70	< 0.001
Rural	2338	27.1	540 (23.1)	1798 (76.9)		
Nomadic	2572	29.8	146 (5.7)	2426 (94.3)		
Predisposing Factors						
Age (yrs.)						
15–24	2331	27.0	634 (27.2)	1697 (72.8)	23.73	< 0.001
25–34	4081	47.3	1013 (24.8)	3068 (75.2)		
35–49	2219	25.7	467 (21.0)	1752 (79.0)		
Maternal age at first birth						
15–24	7634	88.4	1837 (24.1)	5797 (75.9)	6.60	0.010
25–49	997	11.6	277 (27.8)	720 (72.2)		
Marital status						
Married	7788	90.2	1852 (23.8)	5936 (76.2)	30.96	< 0.001
Divorced	588	6.8	200 (34.0)	388 (66.0)		
Widowed	255	3.0	62 (24.3)	193 (75.7)		
Educational level						
No education	7209	83.5	1398 (19.4)	5811 (80.6)	713.41	< 0.001
Primary	1014	11.8	438 (43.2)	576 (56.8)		
Secondary/higher	408	4.7	278 (68.1)	130 (31.9)		
Media exposure						
No	7233	83.8	1437 (19.9)	5796 (80.1)	516.68	< 0.001
Yes	1398	16.2	677 (48.4)	721 (51.6)		
Wealth index						
Poor	3744	43.4	301 (8.0)	3443 (92.0)	1297.03	< 0.001
Middle	3399	39.4	1010 (29.7)	2389 (70.3)		
Rich	1488	17.2	803 (54.0)	685 (46.0)		
Parity						
≤ 2	2251	26.1	733 (32.6)	1518 (67.4)	112.33	< 0.001
3	1284	14.9	309 (24.1)	975 (75.9)		
≥ 3^+	5096	59.0	1072 (21.0)	4024 (79.0)		
Birth order						
1	2377	27.5	669 (28.1)	1708 (71.9)	24.96	< 0.001
2—3	5333	61.8	1246 (23.4)	4087 (76.6)		
≥ 3^+	921	10.7	199 (21.6)	722 (78.4)		
Enabling Factors						
Maternal autonomy						
Respondent	1663	19.3	491 (29.5)	1172 (70.5)	79.95	< 0.001
Husband	4217	48.9	856 (20.3)	3361 (79.7)		
Others	2751	31.9	767 (27.9)	1984 (72.1)		

Table 1 (continued)

Categories and variables	Number	Percentage	Place of birth n (%)		χ^2	*p-value*
			Institution	Home		
Sex of the household head						
Male	5876	68.1	1455 (24.8)	4421 (75.2)	0.718	0.397
Female	2755	31.9	659 (23.9)	2096 (76.1)		
Getting money required for the treatment						
Problematic	5744	66.6	1241 (21.6)	4503 (78.4)	77.44	< 0.001
Not problematic	2887	33.4	873 (30.2)	2014 (69.8)		
Distance to the healthcare facility						
Problematic	5380	62.3	1093 (20.3)	4287 (79.7)	134.76	< 0.001
Not problematic	3251	37.7	1021 (31.4)	2230 (68.6)		
The need for someone to go with the treatment facility						
Problematic	4158	48.2	819 (19.7)	3339 (80.3)	99.79	< 0.001
Not problematic	4473	51.8	1295 (29.0)	3178 (71.0)		
Need Factors						
Time of first ANC visit						
No ANC visits	5612	65.0	678 (12.1)	4934 (87.9)	1406.36	< 0.001
First trimester	1008	11.7	560 (55.6)	448 (44.4)		
Second trimester	1025	11.9	487 (47.5)	538 (52.5)		
Third trimester	986	11.4	389 (39.5)	597 (60.5)		
Frequency of ANC visits						
None	5609	65.0	677 (12.1)	4932 (87.9)	1538.48	< 0.001
1	527	6.1	161 (30.6)	366 (69.4)		
2—3	1774	20.6	809 (45.6)	965 (54.4)		
4^+	721	8.4	467 (64.8)	254 (35.2)		
The overall distribution of place of birth						
Institutional birth	2114	24.5				
Home birth	6517	75.5				

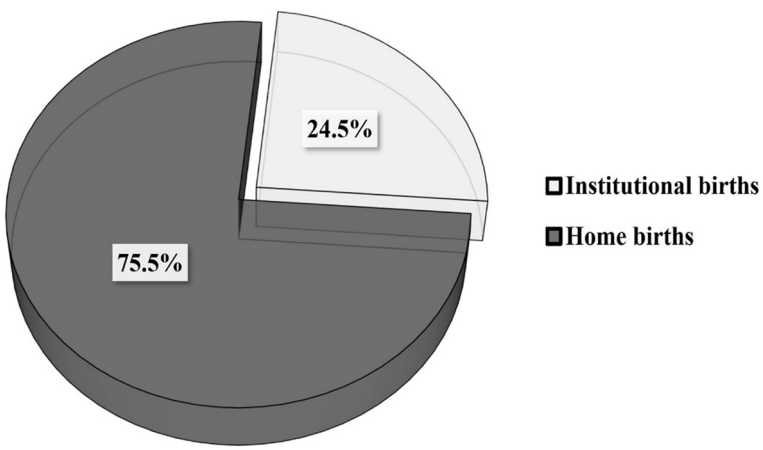

Fig. 2 The percentage distribution of mothers aged 15—49 years by place of their recent successful childbirth in this study (n = 8,631)

with no antenatal visits had an increased proportion of 87.9% of home births than those with four or more antenatal visits (p<0.001) (see Table 1).

Percentage distribution of home birth in Somalia

The proportion of Somali mothers aged 15–49 years who give birth at home in this study was 75.5% (95% CI: 0.74–0.76). Nomadic residents had the highest percentage of home births (94.3%) compared with rural (76.9%) and urban (61.6%, p < 0.001) (see Fig. 2).

Percentage distribution of home birth by regions in Somalia

The region having the highest percentage of home births was the Northeast region (87.8%), followed by the South (84.2%), while the lowest home birth was observed in the Northwest region of the country (64.4%) (see Fig. 3).

Determinants associated with home birth among mothers in Somalia

The results from our bivariate analysis demonstrated that all explanatory variables except for "sex of household head" exhibited statistical significance in their unadjusted association with home birth among reproductive mothers aged 15–49 years in Somalia. Mothers from poorest household wealth quintile (UAOR = 13.41, 95% CI: 11.48–15.67), no antenatal visits (UAOR = 13.39, 95% CI: 11.27–15.92), and no level of education (UAOR = 8.89, 95% CI: 7.16–11.03) were the three main factors associated with increased unadjusted odds of home births increasing home births by 13.41-fold, 13.39-fold and nearly 9-fold respectively among reproductive mothers in this study. Additionally, notable factors include no media access (UAOR = 3.79, 95% CI: 3.36–4.27), distance to the healthcare facility (UAOR = 1.80, 95% CI: 1.63–1.98), and the need for companionship to the health facility (UAOR = 1.66, 95% CI: 1.50–1.84), as well as residence in the Northeast (UAOR = 1.35, 95% CI: 1.10–1.66), (see Table 2).

Following multivariate level, two external environmental factors, four predisposing factors, two enabling factors, and two need factors were significantly associated with home births (see Table 3, Model IV). The odds of home birth were 1.48 (AOR =1.48, 95% CI: 1.17–1.86) times more likely among mothers living in the Northeast than mothers in the South. The odds of home birth were 50% (AOR =0.50, 95% CI: 0.39–0.64) less likely among mothers in urban and 40% (AOR =0.60, 95% CI: 0.48–0.76) less likely among mothers in rural compared to mothers living in nomadic residents. The odds of home birth were more than twice (AOR =2.38, 95% CI: 1.84–3.06) likely among mothers with no level of education than in mothers with secondary or higher level of education. Similarly, the odds of home birth were more than three and a half (AOR =3.67, 95% CI: 3.25–4.13) times likely among mothers with no media access than in mothers with media access. Additionally, the odds of home birth were nearly four (AOR =3.80, 95% CI: 3.07–4.71) times likely among mothers from households in the poorest wealth quintile than mothers from the rich wealth quintile. Lastly, relative to maternal ANC visits,

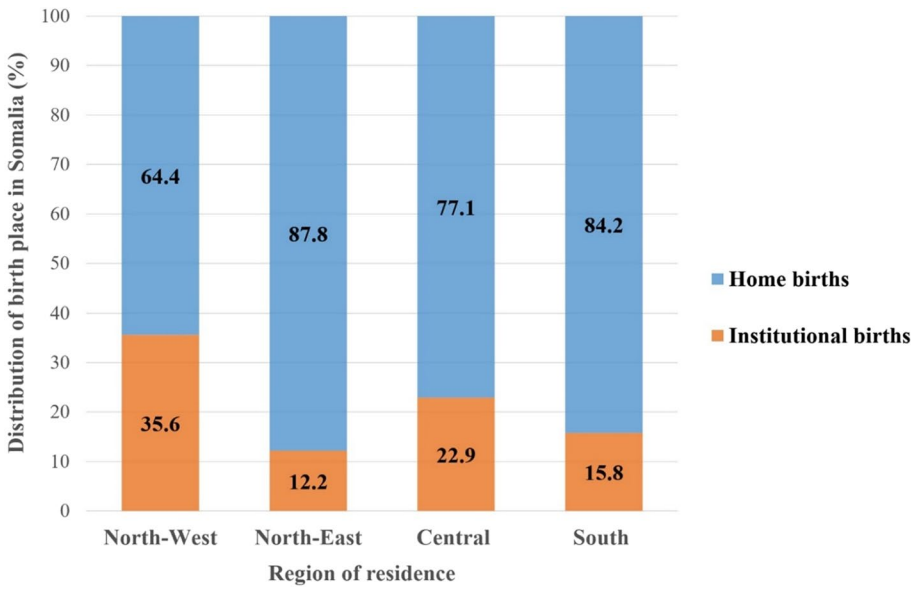

Fig. 3 The percentage distribution of birthplace by residential regions in Somalia

Table 2 Bivariate analysis of factors influencing home birth among study participants

Categories and variables	UAOR	95% CI	*p-value*
External environmental factors			
Region			
North-West	0.34	0.29–0.39	< 0.001
North-East	1.35	1.10–1.66	0.004
Central	0.63	0.54–0.75	< 0.001
South	Reference	–	–
Place of residence			
Urban	0.09	0.08–0.12	< 0.001
Rural	0.20	0.17–0.24	< 0.001
Nomadic	Reference	–	–
Predisposing Factors			
Age (yrs.)			
15–24	0.71	0.62–0.82	< 0.001
25–34	0.81	0.71–0.91	< 0.001
35–49	Reference	–	–
Maternal age at first birth			
15–24	1.21	1.05–1.41	0.010
25–49	Reference	–	–
Marital status			
Married	1.03	0.77–1.38	0.844
Divorced	0.62	0.45–0.87	0.005
Widowed	Reference	–	–
Educational level			
No education	8.89	7.16–11.03	< 0.001
Primary	2.81	2.21–3.58	< 0.001
Secondary/higher	Reference	–	–
Media exposure			
No	3.79	3.36–4.27	< 0.001
Yes	Reference	–	–
Wealth index			
Poor	13.41	11.48–15.67	< 0.001
Middle	2.77	2.45–3.14	< 0.001
Rich	Reference	–	–
Parity			
≤ 2	0.55	0.49–0.62	< 0.001
3	0.84	0.73–0.97	0.019
≥ 3^+	Reference	–	–
Birth order			
1	0.70	0.59–0.84	< 0.001
2—3	0.90	0.76–1.07	0.242
≥ 3^+	Reference	–	–
Enabling Factors			
Maternal autonomy			
Respondent	0.92	0.81–1.06	0.241
Husband	1.52	1.36–1.70	< 0.001
Others	Reference	–	–
Sex of the household head			
Male	0.96	0.86–1.06	0.397
Female	Reference	–	–
Getting money required for the treatment			
Problematic	1.57	1.42–1.74	< 0.001
Not problematic	Reference	–	–
Distance to the healthcare facility			
Problematic	1.80	1.63–1.98	< 0.001
Not problematic	Reference	–	–
The need for someone to go with the treatment facility			
Problematic	1.66	1.50–1.84	< 0.001
Not problematic	Reference	–	–
Need Factors			
Time of first ANC visit			
No ANC visits	4.74	4.08–5.51	< 0.001
First trimester	0.52	0.44–0.62	< 0.001
Second trimester	0.72	0.60–0.86	< 0.001
Third trimester	Reference	–	–
Frequency of ANC visits			
None	13.39	11.27–15.92	< 0.001
1	4.18	3.29–5.32	< 0.001
2—3	2.19	1.83–2.62	< 0.001
4^+	Reference	–	–

UAOR Unadjusted odds ratio, *CI* Confidence intervals

the odds of home birth were about four (AOR = 3.91, 95% CI: 1.66–9.26) times likely among mothers with no antenatal visits than in mothers with four or more than ANC visits (see Table 3, Model IV).

Discussion

This study found a higher prevalence (75.5%) of home birth among mothers aged 15–49 years in Somalia (Fig. 2). This prevalence is lower compared to the national average of 79.1% [3]. Similar findings were reported in Eritrea (75.4%) [15] but higher than the neighboring countries of Ethiopia (33%) [36], Kenya (37.5%) [37], and Tanzania (35.2%) [38]. However, our finding was lower than in Chad (78%) [39]. Despite Somalia's fragile healthcare system, other factors, including socioeconomics, health inequalities, and security conditions, could contribute to the differences among countries. Nonetheless, the findings underline the importance of further prioritizing reproductive health needs and improving institutional-based deliveries among mothers in Somalia. We studied several predictors comprehensively using Andersen's behavioral model. Mothers with no ANC attendance, poor household wealth quintile, no media access, and no level of education were more likely to have increased odds of home births in our study [3, 7]. Our findings align with previously documented associations between studied predictors and increased home births [7,

Table 3 Multivariate analysis of factors influencing home birth among study participants

Categories and variables	Model I		Model II		Model III		Model IV	
	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
External environmental factors								
Region								
North-West	0.38***	0.33–0.45	0.45***	0.39–0.54	0.45***	0.39–0.54	0.56***	0.47–0.66
North-East	1.19	0.97–1.47	1.34**	1.07–1.67	1.37***	1.10–1.71	1.48***	1.17–1.86
Central	0.511***	0.43–0.61	0.61***	0.51–0.73	0.64***	0.54–0.77	0.65***	0.54–0.79
South	Reference	–	Reference	–	Reference	–	Reference	–
Place of residence								
Urban	0.10***	0.09–0.13	0.32***	0.25–0.40	0.33***	0.26–0.41	0.50***	0.39–0.64
Rural	0.21***	0.17–0.25	0.40***	0.32–0.50	0.41***	0.33–0.51	0.60***	0.48–0.76
Nomadic	Reference	–	Reference	–	Reference	–	Reference	–
Predisposing Factors								
Educational level								
No education			3.04***	2.40–3.87	2.93***	2.30–3.72	2.38***	1.84–3.06
Primary			1.61***	1.24–2.10	1.63***	1.26–2.12	1.55***	1.18–2.04
Secondary/higher			Reference	–	Reference	–	Reference	–
Media exposure								
No			1.29***	1.11–1.49	1.26***	1.08–1.46	3.67***	3.25–4.13
Yes			Reference	–	Reference	–	Reference	–
Wealth index								
Poor			4.15***	3.38–5.08	4.05***	3.29–4.97	3.80***	3.07–4.71
Middle			1.80***	1.56–2.07	1.78***	1.54–2.06	1.67***	1.44–1.95
Rich			Reference	–	Reference	–	Reference	–
Parity								
≤ 2			0.56***	0.47–0.67	0.60***	0.53–0.68	0.59***	0.52–0.68
3			0.82*	0.68–0.98	0.84*	0.72–0.99	0.85	0.71–1.01
≥ 3^+			Reference	–	Reference	–	Reference	–
Enabling Factors								
Maternal autonomy								
Respondent					0.97	0.83–1.13	0.87*	0.76–0.99
Husband					1.18**	1.04–1.34	1.36***	1.21–1.53
Others					Reference	–	Reference	–
The need for someone to go with the treatment facility								
Problematic					1.30***	1.12–1.50	1.20***	1.07–1.36
Not problematic					Reference	–	Reference	–
Need Factors								
Time of first ANC visit								
No ANC visits							1.34	0.57–3.13
First trimester							0.71***	0.58–0.87
Second trimester							0.86	0.70–1.05
Third trimester							Reference	–
Frequency of ANC visits								
None							3.91***	1.66–9.26
1							2.59***	1.97–3.40
2—3							1.75***	1.43–2.13
4^+							Reference	–

AOR Adjusted odds ratio, *CI* Confidence intervals

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

16, 24, 37, 40, 41]. Our study adapted Andersen's model of healthcare usage; therefore, we categorized the discussion section accordingly.

External environmental factors

The odds of home birth were more likely higher among mothers in the Northeast region than in the South region in this study. This was not surprising due to the region's mountainous geography and poor infrastructure, which could challenge the accessibility of healthcare services among laboring mothers. A Nepalese study associated higher odds of home birth to mothers in mountainous areas than in other regions [42]. Additionally, transportation barriers and sub-standard services in existing health institutions resulted in delayed maternal health-seeking behavior in the region, likely promoting home births [43]. The socioeconomic difficulties and poor obstetric and newborn care also contributed to the increased home births in this region [44]. Our findings were comparable to that of other countries [24, 26, 38, 45]. Compared to nomadic mothers, mothers in urban and rural areas were less likely to give birth at home. Similar findings have been reported in Ethiopia [46]. Despite limited healthcare institutions and low socioeconomic status, the abundant practice of TBAs, a longer distance to health facilities, and the mobile lifestyle could explain the increased home births among nomadic residents. The establishment of local maternal and child healthcare posts can significantly reduce the increased number of home births among different communities [7].

Predisposing factors

The odds of home birth were more than twice as likely among mothers with no level of education than in mothers with secondary or higher education. Our findings are in line with similar studies from SSA [7, 38, 47]. Educated mothers understand the benefits of skilled birth and utilize the available services, potentially explaining the increased home births among non-educated mothers in our study [21]. Education promotes mothers' health awareness and information accessibility [48]. The odds of home birth were nearly four times more likely among mothers from poorer household wealth quintiles than in mothers from richer households. Our findings were comparable to that in SSA and beyond [38, 49, 50]. Perhaps institutional-based deliveries require transportation, food, and other expenses, particularly for mothers living in rural and nomadic areas, thereby incurring financial responsibility. This constitutes financial stress for poorer mothers seeking skilled birth [24, 51]. Another explanation is that educated or self-employed mothers possess earnings that facilitate institutional-based deliveries [25].

In line with previous findings [7, 9, 52], The odds of home birth were more than three and a half times more likely among mothers with no media access than their counterparts. Low socioeconomic status among mothers studied and the fact that most media programs may favor institutional births could explain the association [52]. Mass media health promotions increase ANC attendance and institutional births [53]. However, poor socioeconomics and rural residency may hamper mothers' media exposure and access to media-facilitated health programs [52]. Mothers with lower parities were less likely to give birth at home than mothers with higher parties in our study. The findings were in accord with Bado et al. [7]. Previous risk experience with home births may lead a mother to seek institutional birth. Higher parity was associated with home birth preference in previous studies [21, 36, 54].

Enabling factors

We found that mothers relying on their husbands for their healthcare decisions and those who indicated difficulty in going alone to a treatment facility were more likely to have home birth than their counterparts. Our findings were consistent with previous studies in the region and elsewhere [9, 21, 24, 55]. Patriarchal norms prevalent in Somalia, wherein men decide healthcare access and delivery options for their wives, could be a plausible explanation [9]. The mothers' financial reliance on husbands to use health facilities may also promote home births associated with maternal autonomy. Empowering mothers educationally and financially could contribute to their health program participation and utilization [21, 56]. The observed association between a mother's difficulty in going alone to a treatment facility and the increased likelihood of home births could be explained by the traditional customs, security conditions, as well as the mother's attitudes towards medical staff. A study in SSA underlined lower access to healthcare institutions among mothers with similar conditions [57].

Need factors

Mothers who performed ANC visits in their first trimester were less likely to have home birth than mothers in their third trimester. Our findings were comparable to the study in Ghana [54]. Time allocated during ANC visits might explain this. The first ANC visit is crucial for the mother's subsequent follow-ups. Comprehensive first ANC health check-ups may require roughly thirty minutes [58]. Giving adequate time for their first ANC visits encourages mothers' willingness for follow-ups of up to eight or more ANC visits [58, 59].

Mothers could also benefit from health consultations of themselves and their babies during ANC visits. Relative to the frequency of ANC visits, the odds of home birth were four times more likely among mothers with no ANC visits than in mothers with four or more ANC visits. A lack of ANC attendance is the single most considerable predictor of home births in our study. The findings were in accord with previous studies [7, 24, 31, 36, 60, 61].

The study mother's lower ANC attendance might be due to socioeconomic factors such as lack of education, media accessibility, and poorer household wealth [3]. Evidence associated educated mothers with higher ANC attendance [32, 62]. Studies in neighboring countries and elsewhere have reported similar findings [38, 49, 50]. To reduce home births among reproductive mothers in Somalia, maternal-oriented ANCs and the associated factors should be prioritized.

The strengths and limitations

The research is the first of its type in the country using a recently published standardized survey. National representatives and large sample size are major strengths of this study. Other strengths include the higher response rates, the application of a well-regarded theoretical framework of Anderson's behavioral model, and the broader range of variables studied. Hence, the results were generalizable to the entire population of mothers in Somalia with a reproductive age of 15–49 years. However, there are some limitations to the study. The cross-sectional design of the survey could not establish the causal relationships properly; only the association must be considered when interpreting the findings of this study. Furthermore, recall bias is likely due to the self-reported data; however, limiting our samples to the most recent live births within five years before the 2020 SHDS reduces the likelihood of recall bias. Errors in the data extraction, curation, and coding techniques in charts and tables [10, 18] might be probable to happen. Nevertheless, coding and data extraction remained substantially unchanged. Lastly, the study relied only on quantitative methods to assess factors associated with home births among women of reproductive age in Somalia. Therefore, a qualitative study might provide a more narrative overview of the findings, allowing for a deeper exploration of the research subject.

Conclusions

Our study aimed to assess the prevalence of home birth and identify the contributing factors among reproductive mothers in Somalia. The prevalence of home birth among reproductive mothers aged 15 to 49 years in this study was 75.5%. Mothers living in the Northeast, mothers with no level of education, mothers who were not exposed to media, and those who lived in the poorest household wealth quintile had comparatively increased odds of home births in this study. A lack of ANC attendance became the most significant predictor associated with home births in our study. Initiatives aimed at improving maternal care and institutional-based births should prioritize reducing regional disparities and promoting maternal education, household wealth, and accessibility to media services. Specific healthcare interventions targeting maternal understanding of the benefits of ANC attendance and the importance of skilled attendance at birth should also be established to decrease the burden of home birth among reproductive mothers in Somalia. Further research is recommended to examine other factors, such as service quality, antenatal care, and other motive factors for institutional births, which may impact home birth outcomes.

The policy implications of the finding

Somalia has made significant advancements towards reducing maternal mortality rates over the past 20 years. However, the country continues to endure a higher burden of maternal mortalities compared to its neighbors, and only a quarter of women have had skilled attendants at birth. Therefore, if Somalia achieves SDG 3.1 to reduce maternal mortalities to 70 per 100,000 live births by 2030, it needs to accelerate faster by putting greater efforts into scaling institutional births. At the policy level, efforts are required to promote institutional births among reproductive women, bridge the regional and geographical disparities in service accessibility, and implement free maternal healthcare services nationwide to encourage more ANC visits and increase overall service utilization. Socioeconomic empowerment and women-oriented healthcare awareness programs, particularly the benefits of antenatal care visits, are principally needed.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12905-025-03781-5.

Supplementary Material 1.
Supplementary Material 2.
Supplementary Material 3.
Supplementary Material 4.
Supplementary Material 5.
Supplementary Material 6.

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Authors' contributions
SI conceived the subject, overall design, and interpretation of the data. ZZ, JL supervised and contributed to the study editing and methodology. HN was responsible for data accession and analysis. SI wrote the first draft of the manuscript, which was amended and approved for submission by all the authors.

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Data availability
The data used in this study are publicly available for research purposes at http://microdata.nbs.gov.so/index.php. Approval is required from the SNBS.

Declarations

Ethics approval and consent to participate
Our study analyzes publicly available secondary data with no identifiable human subjects. The verbal informed consent of all participants was assured before their enrollment in the interview. All study methods were performed in accordance with the relevant guidelines and following regulations of the Helsinki Declaration. We obtained permission from the SNBS to use the 2020 SHDS dataset for research purposes. No further ethical approval was required.

Competing interests
The authors declare no competing interests.

Author details
[1]Institute for Health Management and Policy, School of Public Policy and Administration, Xi'an Jiaotong University, Xi'an, Shaanxi 710049, China. [2]Department of Nursing, Faculty of Medicine and Health Sciences Center, Simad University, Mogadishu, Somalia.

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