

Influence of Social Behaviour Change and Communication Interventions on Safe Motherhood Practices among Adolescent Mothers in Ndola District, Zambia

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Abstract

Introduction: Adolescent pregnancy remains a significant public health concern in low- and middle-income countries, where utilization of maternal health services among adolescents is often suboptimal. Social and Behaviour Change Communication (SBCC) interventions have been implemented to promote safe motherhood practices; however, evidence on their quality and effectiveness among adolescent mothers remains limited. This study assessed the quality of SBCC interventions and their association with safe motherhood practices among adolescent mothers in Ndola District, Zambia. **Materials and Methods:** A facility-based cross-sectional study was conducted among 394 adolescent mothers aged 15 - 19 years attending antenatal and postnatal services in selected urban health facilities in Ndola District between October and December 2024. Data were collected using an interviewer-administered structured questionnaire and analyzed using SPSS version 28. Descriptive statistics, chi-square tests, and binary logistic regression were used to examine associations between SBCC quality and safe motherhood practices. Statistical significance was set at $p < 0.05$. **Results:** Overall, 61.2% of respondents were classified as practicing safe motherhood. The majority of respondents (87.6%) perceived Social and Behaviour Change Communication (SBCC) interventions as adequate. Safe motherhood practices were significantly associated with marital status, education level, occupation, living arrangements, number of living children, and travel time to the nearest health facility in the bivariate analysis ($p < 0.05$). In the multivariable logistic regression analysis, living arrange-

ments, number of pregnancies, number of children alive, and SBCC exposure remained significant predictors of safe motherhood practices. Adolescents who reported adequate SBCC exposure had significantly higher odds of practicing safe motherhood compared with those reporting inadequate SBCC exposure. **Conclusion:** The study demonstrates that adequate exposure to Social and Behaviour Change Communication (SBCC) interventions is strongly associated with improved safe motherhood practices among adolescent mothers. Strengthening adolescent-responsive SBCC strategies and addressing contextual factors influencing maternal health behaviours may contribute to improved maternal health outcomes among adolescent mothers in Zambia.

Keywords

Adolescent Pregnancy, Safe Motherhood, Social and Behaviour Change Communication, Maternal Health, Adolescents

1. Introduction

Adolescent pregnancy remains a major global public health concern, particularly in low- and middle-income countries where maternal and neonatal health outcomes remain poor. Globally, an estimated 21 million adolescent girls aged 15 - 19 years become pregnant each year, with the majority of these pregnancies occurring in resource-limited settings where access to quality maternal healthcare is often inadequate [1]. Adolescent mothers face increased risks of pregnancy-related complications such as eclampsia, infections, preterm birth, and low birth weight compared to adult women [2]. Early pregnancy is also closely associated with gender inequalities, limited access to sexual and reproductive health services, and reduced educational opportunities, which further compromise adolescents' ability to effectively utilize maternal health services [1].

Safe motherhood interventions are designed to ensure that women receive adequate care during pregnancy, childbirth, and the postnatal period in order to reduce maternal and neonatal morbidity and mortality. Key components of safe motherhood include antenatal care (ANC), skilled birth attendance, postnatal care, and maternal health education. Evidence indicates that effective utilization of maternal healthcare services significantly reduces maternal and perinatal mortality and contributes to the attainment of Sustainable Development Goal (SDG) 3 targets [3]. However, utilization of maternal healthcare services among adolescents remains low, particularly in sub-Saharan Africa, where socio-cultural, economic, and health system barriers continue to limit access to essential maternal health services [4] [5].

Social Behaviour Change and Communication (SBCC) interventions have been recognized as effective strategies for improving maternal health outcomes through the promotion of positive health-seeking behaviours. SBCC approaches encompass health education, community engagement, peer education, interpersonal

communication, and media-based campaigns aimed at influencing maternal health knowledge, attitudes, and practices. Evidence suggests that well-designed SBCC interventions can empower adolescent mothers, enhance decision-making autonomy, and increase utilization of maternal health services when they are culturally appropriate and participatory [6] [7]. Furthermore, behaviour change communication strategies integrated into maternal health services have been shown to improve adherence to recommended antenatal care visits [8]. Despite these documented benefits, limited evidence exists on the quality and contextual effectiveness of SBCC interventions specifically targeting adolescent mothers.

Adolescent mothers continue to face multiple barriers that hinder effective utilization of maternal health services. Studies conducted in sub-Saharan Africa have identified stigma, financial constraints, transportation challenges, limited decision-making autonomy, and fear of discrimination by healthcare providers as key factors reducing adolescents' access to antenatal, delivery, and postnatal care services [5] [9]. In addition, inadequate awareness and misconceptions regarding maternal health services contribute to poor service utilization among adolescent mothers [4]. These challenges underscore the need for targeted communication interventions that address adolescent-specific vulnerabilities and broader social determinants of maternal health.

In Zambia, adolescent health remains a national public health priority. The Zambia National Adolescent Health Strategic Plan (2022-2026) identifies teenage pregnancy, gender-based violence, and limited access to sexual and reproductive health services as key challenges affecting adolescent health outcomes [10]. Although progress has been made in reducing maternal mortality nationally, adolescent pregnancy continues to pose a significant public health and developmental challenge [11]. Ndola District continues to record cases of adolescent pregnancy alongside suboptimal utilization of maternal health services among adolescent mothers. While SBCC interventions are being implemented within the district, limited quantitative evidence exists regarding their quality and effectiveness in improving safe motherhood practices among adolescents. Therefore, this study aims to assess the quality of Social Behaviour Change and Communication interventions in improving safe motherhood among adolescent mothers in Ndola District, Zambia.

2. Materials and Methods

2.1. Study Design, Population, Site, and Period

This quantitative study assessed the quality of Social Behaviour Change and Communication (SBCC) interventions in improving safe motherhood practices among adolescent mothers. A facility-based cross-sectional study was conducted from October 2024 to December 2024 in Ndola District, Copperbelt Province, Zambia.

Ndola District is an urban area with several public health facilities providing maternal and child health services, including antenatal care, delivery services, postnatal care, and safe motherhood interventions. The study was conducted in

24 urban health centers selected from a total of 54 eligible public health facilities in the district. These facilities were selected because they routinely provide comprehensive maternal and child health services and serve a high number of adolescent mothers.

The study population comprised adolescent mothers aged 15 - 19 years who were either pregnant or had delivered within the previous 12 months and were attending antenatal or postnatal services at the selected health facilities during the study period. All participants had been exposed to SBCC interventions delivered through routine maternal health services; therefore, the study focused on assessing variations in the quality of SBCC interventions rather than exposure status. Adolescent mothers who were severely ill, declined participation, or were not residents of Ndola District were excluded.

2.2. Sample Size Estimation and Sampling Procedure

The sample size was determined using the formula for cross-sectional studies described by Lemeshow *et al.* [12]. A 95% confidence level, a 5% margin of error, and a conservative estimated proportion of 50% were applied, resulting in a minimum required sample size of 394 adolescent mothers. The conservative proportion was used due to limited prior evidence on the quality of SBCC interventions among adolescent mothers in the study setting.

A multi-stage sampling approach was employed. In the first stage, 24 health centres were purposively selected from the 54 eligible facilities based on their provision of comprehensive maternal and child health services, high adolescent client attendance, and suitability for data collection. In the second stage, simple random sampling was used to select eligible adolescent mothers attending antenatal and postnatal clinics at each selected facility. Eligibility was confirmed using clinic records, and participants were recruited after providing informed consent.

2.3. Data Collection

Quantitative data were collected using an interviewer-administered structured questionnaire designed to capture socio-demographic characteristics, safe motherhood practices, and the quality of SBCC interventions. Face-to-face interviews were conducted with adolescent mothers attending antenatal and postnatal clinics at the selected health facilities.

The questionnaire comprised three sections. Section A collected socio-demographic and obstetric characteristics, including age, marital status, educational level, parity, and distance to the health facility. Section B assessed safe motherhood practices, including timing and adequacy of antenatal care visits, birth preparedness, and place of delivery. Section C assessed the quality of SBCC interventions, including counselling received, sources of maternal health information, perceived comprehensiveness of SBCC messages, and self-reported knowledge gained.

Prior to the main study, the questionnaire was pilot tested among approximately 10% of the calculated sample size at a health facility not included in the

final study sample. The pilot test assessed clarity, consistency, and contextual appropriateness of the tool. Necessary revisions were made before data collection.

2.4. Measurement of Study Variables

The primary outcome variable was safe motherhood practice. This was assessed using a set of composite indicators reflecting key components of the maternal continuum of care, including antenatal care, delivery preparedness, postnatal care, family planning counselling, and access to maternal health services. Specific indicators included perceptions of the comprehensiveness of safe motherhood information received, improvement in knowledge through SBCC sessions, appropriateness of antenatal care (ANC) initiation timing, satisfaction with guidance received during the first ANC visit, adequacy of ANC visits attended, satisfaction with ANC services, clarity of birth preparedness information, confidence in delivery plans due to SBCC guidance, satisfaction with the place of delivery, perceived safety of the delivery environment, recognition of pregnancy complications through SBCC messages, satisfaction with care received for complications, satisfaction with postnatal care services, motivation to attend postnatal check-ups, clarity of family planning counselling, confidence in choosing a family planning method, accessibility of maternal health services, satisfaction with family planning services, and the ability of SBCC sessions to overcome barriers to accessing services.

These items were measured using a five-point Likert scale, with response options ranging from Strongly Disagree (1), Disagree (2), Not Applicable (3), Agree (4), and Strongly Agree (5). The “Not Applicable” option was included to accommodate respondents who had not yet experienced certain stages of the maternal care continuum, such as delivery or postnatal services.

For analysis, responses were aggregated to generate an overall safe motherhood score for each participant. The total score was converted into a percentage score by dividing the observed score by the maximum possible score for applicable items and multiplying by 100. Participants who attained 70% or above were categorized as practicing safe motherhood, while those who scored below 70% were classified as practicing unsafe motherhood.

The main independent variable was the quality of Social and Behavior Change Communication (SBCC) interventions. This was measured using a series of Likert-scale items assessing the clarity, relevance, cultural appropriateness, and effectiveness of SBCC messages delivered during antenatal and postnatal care. Indicators included clarity and understandability of SBCC messages, relevance of the information to respondents’ needs, opportunities for participation during sessions, ability to ask questions or provide feedback, adequacy of time allocated for SBCC sessions, regularity of sessions during ANC and PNC visits, use of a language understood by the respondent, respect for cultural beliefs, and the perceived influence of SBCC sessions on health behaviors, nutrition practices during pregnancy, recognition of danger signs, birth preparedness, postnatal care attendance,

exclusive breastfeeding, and decision-making regarding family planning.

Like the safe motherhood variable, responses were aggregated to produce a composite SBCC quality score, which was then converted into a percentage. Respondents who scored 70% or higher were classified as having received adequate SBCC, while those scoring below 70% were categorized as having received inadequate SBCC. Other independent variables included age, parity, educational level, marital status, distance to the health facility, timing of antenatal care initiation, adequacy of antenatal visits, birth preparedness status, and place of delivery.

2.5. Data Analysis

Data was entered into Microsoft Excel for coding and cleaning before being exported to the Statistical Package for Social Sciences (SPSS) version 28 for analysis. Descriptive statistics were used to summarize socio-demographic characteristics, safe motherhood practices, and the quality of SBCC interventions.

Chi-square tests and Fisher's exact tests were used to examine associations between the quality of SBCC interventions and safe motherhood practices. Binary logistic regression analysis was conducted to assess the relationship between SBCC quality and safe motherhood outcomes while controlling for potential confounders. Statistical significance was set at $p < 0.05$ with a 95% confidence level.

2.6. Ethical Approval

Ethical approval was obtained from the University of Zambia Biomedical Research Ethics Committee (UNZABREC) under approval number 5166-2024. Permission to conduct the study was obtained from the National Health Research Authority and relevant health facility authorities. Participation was voluntary, and written informed consent was obtained from all participants. For participants under 18 years of age, assent and parental or guardian consent were obtained. Confidentiality and anonymity were maintained.

3. Results

3.1. Sociodemographic Characteristics of Participants

A total of 394 adolescent mothers aged 15 - 19 years participated in the study. The largest proportion of respondents was 19 years old (46.4%), followed by those aged 18 years (27.7%) and 17 years (17.0%). Smaller proportions were aged 16 years (7.6%) and 15 years (1.3%).

Regarding marital status, most respondents were married (69.5%), while 30.5% were single. In terms of educational attainment, half of the respondents (50.3%) had completed primary education, while 37.6% had secondary education. A smaller proportion (12.2%) had never attended school.

With respect to occupation, 42.1% of respondents were dependents, 30.7% were engaged in small-scale business, and 27.2% were housewives. Concerning living arrangements, slightly more than half of the respondents (50.5%) lived with their parents or guardians, while 31.2% lived with a partner or husband. Smaller pro-

portions lived alone (9.4%) or with other relatives (8.9%).

Regarding reproductive history, most respondents (69.8%) had experienced one pregnancy, while 26.9% had experienced two pregnancies, and 3.3% reported three or more pregnancies. Nearly half of the respondents (47.0%) reported having one living child, whereas 39.8% had no living children, and 13.2% had two or more children.

In terms of access to health services, most respondents (62.2%) reported taking 30 - 59 minutes to reach the nearest health facility, while 27.4% reported travel times of less than 30 minutes, and 10.4% required between one and two hours to reach a health facility (**Table 1**).

Table 1. Sociodemographic characteristics (n = 394).

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	15	5	1.3
	16	30	7.6
	17	67	17
	18	109	27.7
	19	183	46.4
Marital status	Single	120	30.5
	Married	274	69.5
Education	Never been to school	48	12.2
	Primary	198	50.3
	Secondary	148	37.6
Occupation	Dependent	166	42.1
	Business	121	30.7
	Housewife	107	27.2
Living arrangement	Parents/guardians	199	50.5
	Partner/husband	123	31.2
	Alone	37	9.4
	Other relatives	35	8.9
Number of pregnancies	One	275	69.8
	Two	106	26.9
	Three or more	13	3.3
Living children	None	157	39.8
	One	185	47
	Two or more	52	13.2
Time to go to health facility	<30 minutes	108	27.4
	30 - 59 minutes	245	62.2
	1 - 2 hours	41	10.4
Total		394	100.0

3.2. Safe Motherhood Practices among Adolescent Mothers

Safe motherhood practices were assessed across antenatal care, delivery, postnatal care, family planning, and access to maternal health services using Likert-scale items. Overall, high levels of agreement were reported across most indicators, including satisfaction with antenatal care services, birth preparedness information, delivery planning, and access to maternal health services.

After aggregation of scores, 61.2% (n = 241) of respondents were classified as practicing safe motherhood, while 38.8% (n = 153) were classified as practicing unsafe motherhood (Table 2).

Table 2. Safe motherhood practices (n = 394).

Safe motherhood status	Frequency (n)	Percentage (%)
Safe	241	61.2
Unsafe	153	38.8
Total	394	100

3.3. Perceived Quality of SBCC Interventions

The results in Table 3 show the perceived quality of Social and Behaviour Change Communication (SBCC) interventions among adolescent mothers. Out of the total 394 respondents, the majority 345 (87.6%) perceived the SBCC interventions as adequate, while a smaller proportion 49 (12.4%) perceived them as inadequate.

Table 3. Perceived Quality of SBCC Interventions (n = 394).

SBCC Status	Frequency (n)	Percentage (%)
Adequate	345	87.6
Inadequate	49	12.4
Total	394	100

3.4. Factors Associated with Safe Motherhood Practices

The association between sociodemographic characteristics and safe motherhood practices was assessed using the Chi-square test. Fisher's exact test was applied where expected cell counts were less than five as shown in Table 4. The analysis showed that marital status, level of education, occupation, living arrangements, number of living children, and time taken to reach the health facility were significantly associated with safe motherhood practices ($p < 0.05$).

Married respondents reported a higher proportion of safe motherhood practices (76.7%) compared with single respondents (54.4%). Education level was also associated with safe motherhood status, with respondents who had never attended school demonstrating the highest proportion of safe practices (79.2%), followed by those with secondary education (63.5%), while respondents with primary education reported lower safe practices (55.1%).

Occupation showed a significant association with safe motherhood practices. Housewives had the highest proportion of safe practices (74.8%), compared with businesswomen (56.2%) and dependents (56.0%).

Living arrangements also demonstrated a strong association with safe motherhood practices. Respondents living with partners or husbands reported higher safe practices (79.7%), followed by those living alone (81.1%), while respondents living with parents or guardians reported lower safe practices (48.7%).

The number of living children was significantly associated with safe motherhood practices. Respondents with one or two living children reported higher safe practices (76.8% and 76.9%), compared with those who had no living children (37.6%).

Distance to the health facility was another significant factor. Respondents who reported taking 30 - 59 minutes to reach the health facility showed higher safe motherhood practices (67.3%), compared with those living within 30 minutes (47.2%).

However, age and number of pregnancies were not significantly associated with safe motherhood practices.

The analysis also examined the relationship between SBCC adequacy and safe motherhood practices. A statistically significant association was observed between the two variables. Respondents who reported adequate SBCC exposure demonstrated substantially higher safe motherhood practices (67.0%), compared with those who reported inadequate SBCC exposure (20.4%). Conversely, most respondents who reported inadequate SBCC exposure (79.6%) were classified as practicing unsafe motherhood behaviors.

These findings indicate that adequate SBCC interventions play an important role in promoting safe motherhood practices among adolescent mothers.

Table 4. Factors associated with safe motherhood (Chi-Square) (n = 394).

		Safe motherhood				P-Value
		Not Safe		Safe		
		n	%	n	%	
1. Age	15	2	40.0%	3	60.0%	0.798
	16	11	36.7%	19	63.3%	
	17	25	37.3%	42	62.7%	
	18	38	34.9%	71	65.1%	
	19	77	42.1%	106	57.9%	
3. What is your marital status?	1	28	23.3%	92	76.7%	<0.001*
	2	125	45.6%	149	54.4%	
4. How far have you gone with your education?	Never been to school	10	20.8%	38	79.2%	0.007*
	Primary	89	44.9%	109	55.1%	
	Secondary	54	36.5%	94	63.5%	

Continued

5. What is your occupation?	Housewife	27	25.2%	80	74.8%	0.003*
	Business lady	53	43.8%	68	56.2%	
	Dependent	73	44.0%	93	56.0%	
6. Who do you live with most of the time?	Parents/guardians	102	51.3%	97	48.7%	<0.001*
	Partner/husband	25	20.3%	98	79.7%	
	Alone	7	18.9%	30	81.1%	
	Other relatives	19	54.3%	16	45.7%	
7. Times you have been pregnant?	1	116	42.2%	159	57.8%	0.099
	2	32	30.2%	74	69.8%	
	3	5	38.5%	8	61.5%	
8. How many of your children are currently alive	0	98	62.4%	59	37.6%	<0.001*
	1	43	23.2%	142	76.8%	
	2	12	23.1%	40	76.9%	
9. How long does it take to reach the health facility?	<30 minutes	57	52.8%	51	47.2%	0.002*
	30 - 59 minutes	80	32.7%	165	67.3%	
	1 - 2 hours	16	39.0%	25	61.0%	
SBCC	Inadequate	39	79.6%	10	20.4%	<0.001*
	Adequate	114	33.0%	231	67.0%	

*Statistically significant at $p < 0.05$.

3.5. Logistic Regression Analysis of Factors Associated with Safe Motherhood Practices

A binary logistic regression analysis was conducted to identify factors associated with safe motherhood practices among respondents. First, bivariate binary logistic regression analysis was performed to examine the association between each independent variable and safe motherhood practices. The results were presented as Crude Odds Ratios (COR) with 95% Confidence Intervals (CI).

Variables that were statistically significant in the bivariate analysis were then included in a multivariable binary logistic regression model to control for potential confounding effects. The results of this model were presented as Adjusted Odds Ratios (AOR) with 95% Confidence Intervals (CI) as indicated in **Table 5**.

Multivariable Analysis Results

After adjusting for other variables in the model, living arrangement, number of pregnancies, number of children alive, and SBCC exposure remained statistically significant predictors of safe motherhood practices. Respondents living with a partner or husband were more likely to practice safe motherhood compared with the reference group (AOR = 4.29, 95% CI: 1.02 - 18.03, $p = 0.047$). Similarly, respondents living alone also had higher odds of practicing safe motherhood (AOR = 3.18, 95% CI: 1.02 - 9.95, $p = 0.046$).

The number of pregnancies was also significantly associated with safe moth-

erhood practices. Respondents who had two pregnancies had lower odds of practicing safe motherhood compared with those with one pregnancy (AOR = 0.17, 95% CI: 0.07 - 0.41, $p < 0.001$). Likewise, respondents with three pregnancies had lower odds of safe motherhood practices (AOR = 0.05, 95% CI: 0.01 - 0.24, $p < 0.001$).

The number of children alive showed a strong positive association with safe motherhood practices. Respondents who had one living child had significantly higher odds of practicing safe motherhood compared with those with no living children (AOR = 12.51, 95% CI: 5.85 - 26.74, $p < 0.001$). Similarly, respondents with two living children had higher odds of practicing safe motherhood (AOR = 35.29, 95% CI: 9.59 - 129.83, $p < 0.001$).

Exposure to Social and Behavior Change Communication (SBCC) was the strongest predictor of safe motherhood practices. Respondents who reported adequate SBCC exposure were significantly more likely to practice safe motherhood compared with those with inadequate exposure (AOR = 19.15, 95% CI: 7.25 - 50.59, $p < 0.001$).

However, marital status, education level, occupation, and travel time to the health facility were not statistically significant predictors after adjustment for other variables in the model ($p > 0.05$).

Table 5. Binary logistic regression (n = 394).

Variable	Category	COR			AOR		
		OR	p-value	95% CI	OR	p-value	95% CI
Marital Status	Single (Ref)	1	-	-	1	-	-
	Married	0.36	<0.001	0.22 - 0.59	0.52	0.292	0.16 - 1.74
Education	No education (Ref)	1	-	-	1	-	-
	Primary	0.32	0.003	0.15 - 0.68	0.59	0.273	0.24 - 1.50
	Secondary	0.46	0.048	0.21 - 0.99	0.67	0.415	0.26 - 1.75
Occupation	Reference	1	-	-	1	-	-
	Business lady	0.43	0.004	0.25 - 0.76	1.57	0.48	0.45 - 5.49
	Other	0.43	0.002	0.25 - 0.73	3.12	0.09	0.84 - 11.64
Living Arrangement	Reference	1	-	-	1	-	-
	Partner/Husband	4.12	<0.001	2.45 - 6.93	4.29	0.047	1.02 - 18.03
	Alone	4.51	0.001	1.89 - 10.74	3.18	0.046	1.02 - 9.95
	Other relatives	0.89	0.741	0.43 - 1.82	1.99	0.122	0.83 - 4.75
Number of Pregnancies	1 (Ref)	1	-	-	1	-	-
	2	1.69	0.032	1.05 - 2.72	0.17	<0.001	0.07 - 0.41
	3	1.17	0.791	0.37 - 3.66	0.05	<0.001	0.01 - 0.24
Number of Children Alive	0 (Ref)	1	-	-	1	-	-
	1	5.49	<0.001	3.43 - 8.77	12.51	<0.001	5.85 - 26.74
	2	5.54	<0.001	2.69 - 11.39	35.29	<0.001	9.59 - 129.83

Continued

Travel Time to Facility	<30 minutes (Ref)	1	–	–	1	–	–
	30 - 59 minutes	2.31	<0.001	1.45 - 3.66	1.37	0.292	0.76 - 2.46
	1 - 2 hours	1.75	0.136	0.84 - 3.63	1.03	0.949	0.41 - 2.58
SBCC Exposure	Inadequate (Ref)	1	–	–	1	–	–
	Adequate	7.9	<0.001	3.81 - 16.40	19.15	<0.001	7.25 - 50.59

Note: COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio; CI = Confidence Interval. Reference categories are indicated.

4. Discussion

4.1. Socio-Demographic Characteristics of Respondents

This study provides important insights into the socio-demographic characteristics of adolescent mothers and how these factors relate to safe motherhood practices and engagement with Social and Behaviour Change Communication (SBCC) interventions. The respondents were aged 15 - 19 years, with the majority being 19 years old, reflecting patterns widely documented in sub-Saharan Africa, where adolescent pregnancy remains common. Early motherhood in these contexts is often shaped by social norms, cultural expectations, and socioeconomic challenges that influence adolescents' access to reproductive health services and maternal health outcomes [13] [14].

Marital status was significantly associated with safe motherhood practices in the bivariate analysis. Married adolescents demonstrated a higher proportion of safe motherhood practices compared with single adolescents. Similar findings have been reported in studies conducted in Ghana and Iran, where marital status influenced adolescents' access to reproductive health services and maternal care utilization [13] [15]. Married adolescents may benefit from greater social and partner support during pregnancy, which can facilitate access to antenatal care and other maternal health services. However, marital status did not remain statistically significant after adjusting for other variables in the multivariable logistic regression model, suggesting that its influence may be mediated by other socioeconomic or household factors.

Education was also associated with safe motherhood practices in the bivariate analysis. Adolescents with higher levels of education demonstrated relatively better safe motherhood practices compared with those with lower educational attainment. Education is widely recognized as a key determinant of maternal health behaviours because it improves health literacy, enhances understanding of health information, and promotes utilization of maternal health services [16] [17]. Adolescent who had higher education level were more likely to attend at least four ANC visits compared to those with no education, this was especially true in the urban areas. In addition, women with partners with higher education level were also more likely to have optimal ANC attendance [18]. However, in the multivariable analysis, education did not remain a statistically significant predictor after adjusting for other factors, indicating that structural and contextual influences may play a more dominant role in determining safe motherhood behaviours

among adolescent mothers.

Occupational status also reflected the socioeconomic vulnerability of adolescent mothers in this study. A large proportion of respondents were dependents, with relatively fewer engaged in income-generating activities. This finding is consistent with studies conducted in Zambia and other parts of sub-Saharan Africa where adolescent motherhood frequently disrupts education and limits economic opportunities [19]. Although occupation was significantly associated with safe motherhood practices in the bivariate analysis, this association did not remain significant after adjustment in the multivariable model.

Distance to the health facility was another factor associated with safe motherhood practices at the bivariate level. Respondents who reported moderate travel time to health facilities demonstrated higher levels of safe motherhood practices compared with those living closer to health facilities. Similar patterns have been reported in other studies examining maternal health service utilization in resource-limited settings [20] [21]. However, this association did not remain statistically significant in the adjusted model, suggesting that other factors such as household support and exposure to health information may have a stronger influence on maternal health behaviours.

Overall, these findings suggest that socio-demographic characteristics may influence adolescent mothers' engagement with maternal health services. However, when considered within a multivariable framework, their effects appear to be mediated by other contextual factors.

4.2. Perceived Quality of SBCC Interventions

One of the most important findings of this study was the strong association between the perceived adequacy of Social and Behaviour Change Communication (SBCC) interventions and safe motherhood practices among adolescent mothers. The majority of respondents perceived SBCC interventions as adequate, and adolescents who reported adequate SBCC exposure were significantly more likely to practice safe motherhood compared with those who reported inadequate SBCC exposure.

The multivariable logistic regression analysis further confirmed that SBCC exposure was the strongest predictor of safe motherhood practices in this study. Adolescents who reported adequate SBCC exposure had substantially higher odds of practicing safe motherhood compared with those who reported inadequate exposure. This finding highlights the critical role of communication-based interventions in influencing maternal health behaviours among adolescent mothers.

SBCC interventions aim to improve health outcomes by increasing knowledge, influencing attitudes, and promoting positive behavioural practices through targeted communication strategies. Among adolescent mothers, effective SBCC interventions can enhance awareness of antenatal care, birth preparedness, skilled delivery, and postnatal care services. Evidence from previous studies indicates that well-designed SBCC programs significantly improve maternal health behaviours

by empowering women with knowledge and encouraging positive health-seeking behaviours [22] [23].

In addition, the effectiveness of SBCC interventions often depends on their cultural relevance and responsiveness to the needs of the target population. Adolescents are more likely to respond positively to health messages that are delivered in familiar language and reflect their social and cultural context [24]. Designing adolescent-friendly SBCC interventions that address the specific needs and challenges faced by adolescent mothers is therefore essential for improving maternal health outcomes.

4.3. Factors Associated with Safe Motherhood Practices

This study identified several key factors associated with safe motherhood practices among adolescent mothers. In the multivariable logistic regression analysis, living arrangement, number of pregnancies, number of children alive, and SBCC exposure remained statistically significant predictors of safe motherhood practices.

Living arrangement emerged as an important determinant of safe motherhood behaviour. Adolescents living with partners or husbands had significantly higher odds of practicing safe motherhood compared with those in the reference group. This finding suggests that partner support may play an important role in facilitating access to maternal health services and encouraging positive health behaviours during pregnancy. Interestingly, adolescents living alone also demonstrated higher odds of safe motherhood practices. This may reflect greater autonomy in decision-making and increased ability to independently seek maternal health services.

The number of pregnancies was also significantly associated with safe motherhood practices in the adjusted model. Adolescents with multiple pregnancies had lower odds of practicing safe motherhood compared with those experiencing their first pregnancy. This finding may reflect the complex social and economic challenges associated with repeated adolescent pregnancies, which can limit access to health services and increase vulnerability.

The number of living children showed a strong positive association with safe motherhood practices. Adolescents who had one or more living children were significantly more likely to practice safe motherhood compared with those with no living children. This may reflect increased maternal experience and familiarity with maternal health services among adolescents who have previously given birth.

Importantly, exposure to SBCC interventions remained the most influential factor associated with safe motherhood practices. Adolescents who reported adequate SBCC exposure were substantially more likely to practice safe motherhood compared with those reporting inadequate SBCC exposure. This finding underscores the importance of strengthening SBCC programs as a strategy for improving maternal health behaviours among adolescent mothers.

5. Limitations and Strengths of the Study

This study had several limitations that should be acknowledged. First, the cross-

sectional design limits the ability to establish causal relationships between SBCC exposure and safe motherhood practices. The findings therefore reflect associations rather than causal relationships. Second, the study was conducted in a specific geographical setting, which may limit the generalizability of the findings to other populations or regions. Third, the reliance on self-reported data may have introduced recall bias or social desirability bias in reporting maternal health behaviours.

Despite these limitations, the study has several important strengths. It provides quantitative evidence on the relationship between SBCC interventions and safe motherhood practices among adolescent mothers, a population group that is often underrepresented in maternal health research. In addition, the use of multivariable logistic regression analysis allowed for the identification of independent predictors of safe motherhood practices while controlling for potential confounding variables. These findings therefore provide valuable evidence to inform the design and implementation of targeted SBCC interventions aimed at improving maternal health outcomes among adolescent mothers.

6. Conclusions

The findings of this study demonstrate that Social and Behaviour Change Communication (SBCC) interventions play a critical role in promoting safe motherhood practices among adolescent mothers. Adequate exposure to SBCC interventions was strongly associated with improved maternal health behaviours and increased likelihood of practicing safe motherhood.

The study also identified several contextual factors influencing safe motherhood practices, including living arrangements, number of pregnancies, and number of children alive. These findings highlight the importance of addressing both behavioural and social determinants when designing interventions aimed at improving maternal health outcomes among adolescents.

Overall, strengthening adolescent-responsive SBCC interventions, alongside broader social and health system support, has the potential to improve maternal health behaviours and contribute to safer motherhood outcomes among adolescent mothers.

Conflicts of Interest

The authors declare no conflict of interest.

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