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Multilevel modelling of the determinants of early marriage among women aged 20-49 years in South Africa

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Abstract

Early marriage is a societal problem that affects many young women in developing countries. There are not many studies which have focused on the determinants of early marriage in South Africa. This study aimed to examine multilevel determinants of early marriage among women in South Africa. We used cross-sectional data from the 2016 South Africa Demographic and Health Survey. We found that age, level of education, spousal/partner educational differences, age at first sex, parity, household wealth, community poverty, place of residence, and province were statistically associated with early marriage. We also found that women with primary education, women from poor households, from Limpopo, Mpumalanga, Gauteng, and Free State had higher odds of early marriage. Our findings underline the need for public awareness campaigns, geared towards teaching rural communities about the various laws that protect children from early marriage and related practices. *(Afr J Reprod Health 2023; 27 [8]: 83-94).*

Keywords: Determinants, early marriage, child marriage, multilevel modelling, South Africa

Résumé

Le mariage précoce est un problème de société qui touche de nombreuses jeunes femmes dans les pays en développement. Il n'y a pas beaucoup d'études qui se sont concentrées sur les déterminants du mariage précoce en Afrique du Sud. Cette étude visait à examiner les déterminants à plusieurs niveaux du mariage précoce chez les femmes en Afrique du Sud. Nous avons utilisé des données transversales de l'enquête démographique et sanitaire de 2016 en Afrique du Sud. Nous avons constaté que l'âge, le niveau d'éducation, les différences d'éducation du conjoint/partenaire, l'âge au premier rapport sexuel, la parité, la richesse du ménage, la pauvreté de la communauté, le lieu de résidence et la province étaient statistiquement associés au mariage précoce. Nous avons également constaté que les femmes ayant suivi une éducation primaire, les femmes issues de ménages pauvres, du Limpopo, du Mpumalanga, du Gauteng et de l'État libre avaient une probabilité plus élevée de mariage précoce. Nos conclusions soulignent la nécessité de campagnes de sensibilisation du public, visant à informer les communautés rurales sur les différentes lois qui protègent les enfants contre le mariage précoce et les pratiques connexes. *(Afr J Reprod Health 2023; 27 [8]: 83-94).*

Mots-clés: Determinants, mariage précoce, le mariage d'enfants, modélisation multiniveaux, Afrique du Sud

Introduction

Early marriage, also known as child marriage, is a societal problem that affects many young women in developing countries. It has implications for young women's development and health; moreover, how early marriage affects women in various countries differs by context[1-3]. Early marriage has a long-lasting impact on women's life[4,5]. In situations where the young woman marries someone significantly older than them, the union has the potential to reduce her autonomy. Reduced autonomy, disruptions to their education, the possibility of domestic violence, and partner control are a few effects of early marriage that most young women experience[4,6,7]. Early marriages are associated with lower educational levels, and the majority of women who marry early are subordinate and dependent on their husbands[8]. Moreover, there is a strong correlation between early marriage and rises in unplanned pregnancies, abortions, and reproductive health[2]. The social and legal challenges that early marriage brings to societies make it crucial to investigate. Although not many people are getting married as early as they did before, especially in the southern African context,

it is important to understand various aspects related to early marriage. Nevertheless, it remains difficult to measure early marriage in many settings because the young women involved in this engagement do not freely report or share their experiences, which makes it a hidden practice in many societies[3]. Goal 5 of the Sustainable Development Goals (SDGs) strives to promote gender equality and empower all women and young girls. SDG 5 notes that gender equality is a critical human and it is also the basis for stability, peace, and sustainability in the world[9,10]. There are nine targets for this goal, however, this study is related to target 5.3, which aims to end unsafe practices like child marriage, forced marriage, and female genital mutilation[11,12].

Africa has among the highest rates of early marriage. Statistics from Girls Not Brides indicate that 15 out of the 20 countries with the highest rates of child marriage in the world are situated in Africa[13]. It has been estimated that about 39% of women in sub-Saharan Africa (SSA) get married before reaching the age of 18, and nearly 13% marry before they are 15 years old[14]. Furthermore, child marriage is associated with a higher risk of intimate partner violence in the majority of sub-Saharan African countries; thus, putting an end to child marriage will result in a significant decrease in intimate partner violence (IPV)[15,16]. Regulations must be put into place in sub-Saharan Africa to encourage and protect women from early marriage and the dangerous conditions associated with early marriage[17,18]. Scholars argue that the age gap between the legal age of first sexual consent and early marriage is problematic and opens room for many issues, such as intimate partner violence, sexually transmitted infections, teenage pregnancy, early childbirth, unsafe abortions, and violations of their sexual and reproductive health rights among adolescent girls in sub-Saharan Africa [17,19].

In many African contexts, a woman's decision to get married at an early age is influenced by social, cultural, and economic factors. Early marriages are still recognized and practised from a cultural perspective in South Africa, where they are still common in places such as KwaZulu-Natal, the Eastern Cape, and Limpopo[20,21]. A study in KwaZulu-Natal found that child marriage is seen as a legitimate traditional practice, resulting in lawful customary marriages[14]. Tradition and culture play an important role in influencing people's views of human rights and national issues in South Africa[22]. The South African government and judicial system recognize customary law as legitimate, although it is subordinated to the national constitution. Certain customary marriage practices, like *ukuthwala*, have been declared unlawful for violating the terms of the constitution[23]. By upholding the rights of girls and other vulnerable populations and addressing structural injustices that increase the risks of girl marriage, social workers, who provide social services to families and children on the front lines, can play a critical role in reducing and preventing girl marriage [24].

The magnitude of early marriage has declined over the years in South Africa. Statistics from the Demographic and Health Surveys show that the prevalence of early marriage declined from 12.7% in 1998, to 9.8% in 2003, and finally 6.5% in 2016[25-27]. This decline could be attributed to changes in cultural and traditional views regarding early marriage as well as the increase in the legal punishments of such acts[23,28]. Although statistics show a low (and declining) prevalence of early marriages in South Africa, information on early marriages remains important from a policy and monitoring point of view. Moreover, some of the statistics on early marriage could be low because early marriage may be hidden and not reported (to the police and in surveys)[23]. Besides the information from reports, such as the Demographic and Health Surveys, there is a dearth of studies on the determinants of early marriage in South Africa. The available statistics on early marriages come from the South Africa Demographic and Health Survey. The statistics show that 6% of females marry before reaching the age of 18 and 1% before reaching the age of 15. Moreover, the average age at first marriage has been rising very rapidly over the past few years in South Africa as a result of the country's significant urbanization and educational expansion[29,30]. The Singulate Mean Age at Marriage has risen for both sexes over the last three decades[31]. Between 1996 and 2016, the male Singulate Mean Age at Marriage ascended from 30 to at least 33 years, while the female Singulate Mean Age at Marriage increased slightly from around 28 to 30 years[31]. The urgency of this study lies in the fact that studying child marriage is critical due to its enduring impact on the lives of young girls around the world. Child marriage cheats young girls of many opportunities in life; once married, they quickly become mothers and may not

be able to continue with school. Research into the determinants of child marriage is crucial to inform policies and drive efforts towards ending this harmful practice. Therefore, this study aims to examine the determinants of early marriage among women aged 20-49 years in South Africa.

Methods

Data source, sampling technique, and sample size

Secondary data from the 2016 South Africa Demographic and Health Survey (SADHS) are used in this study. The SADHS is a nationally representative household survey that collected important demographic and health data. The SADHS collected data on socio-demographic characteristics from both women and men; various questionnaires were used to collect this data including the household survey, the individual women's questionnaire, the male's questionnaire, the caregiver's questionnaire, and the biomarker questionnaire[27]. The SADHS sample was stratified and selected based on two stages; with probability proportional to size sampling of primary sampling units in the first stage and systematic sampling of dwelling units in the second stage[27]. In the SADHS, 8514 women aged 15-49 years were interviewed[27]. However, this study focused on a weighted sample of 7087 women aged 20-49 years; thus, excluding a weighted sample of 1427 women aged 15-19 years. The age range of 20-49 has been used elsewhere[32].

Outcome variable

We used early marriage as our outcome variable in the study. We considered those who got married before the age of 18 as marrying early. The variable includes both formal marriages and informal unions (cohabitation). This variable is coded 1 if the woman got married before age 18 and 0 otherwise.

Explanatory variables

Twelve independent variables were selected for this study based on the literature review on this topic; these include the respondent's age, population group, education, employment, educational difference (between respondent and partner), age at first sex, parity, HIV status, household wealth, place of residence, and province. We briefly describe these variables in Table 1. These variables were included based on their previous statistical associations with early marriage in previous studies[33-35].

Statistical analysis

We used Stata version 14 for the statistical analyses. For this study, three types of analyses were selected; univariate, bivariate, and multivariate analyses. To assess the prevalence of early marriage among women in South Africa, a bivariate analysis with a chi-square test (χ^2) was used. Due to the hierarchical structure of the dataset, multilevel logistic regression was used to examine individual and community-level factors influencing early marriage among women in South Africa. The dichotomous nature of the dependent variable and the hierarchical structure of the data were taken into account when selecting the use of multilevel modelling. A two-level model, with individuals (level 1) nested within communities (level 2), was adopted in this study. The two-level model is denoted as:

$$log\left[\frac{\pi_{ij}}{1-\pi_{ij}}\right] = \beta_0 + \beta_1 x_{ij} + \beta_2 x_{ij} \ldots + u_{0j} + e_{0ij}$$

Where π_{ij} is the likelihood that an i^{th} woman in the j^{th} community got married before turning 18; β_0 is the intercept, β_n is the regression coefficient, x_{ij} signifies the explanatory factors, u_{0j} stands for community level errors, and e_{0ij} indicates individual-level errors. We fitted four models. The null model (model 0) was fitted to examine community variability without including explanatory factors. For the individual-level factors, Model 1 was fitted. For factors at the community level, model 2 was fitted. In Model 3, we fitted the individual and community-level factors. Variation between individual and community levels was measured by the intra-cluster correlation coefficient (ICC), the proportional change in variance (PCV), and the median odds ratio (MOR). The measures of association (fixed effects) in the multivariate multilevel models, estimate the associations between the probability of getting married early and explanatory factors (individual and community factors) and are given as adjusted odds ratios (AOR) with their 95%

confidence intervals (CIs). To select the best-fit model, we used the deviance (-2LL) and Akaike Information Criterion (AIC). The Variance Inflation Factor (VIF) was used to test for multicollinearity in the explanatory factors. We found no collinearity between the variables; the mean VIF value was 1.46, the minimum VIF was 1.03, and the maximum VIF was 2.67.

Results

Prevalence of early marriage

Table 2 presents the prevalence of early marriage by background explanatory factors. The results showed that early marriage was statistically associated with age, level of education, spousal/partner educational differences, age at first sex, parity, household wealth, community poverty, place of residence, and province ($p<0.001$). The findings showed that early marriage increased with age. Women aged 40-49 had a higher rate of early marriage (9.8%), whereas those aged 20-24 had a prevalence of 3.6%. Women in the 'other' (Indian or White) population group had a higher prevalence of early marriage (7.6%), followed by those in the black African population group (6.6%). Moreover, the findings showed that early marriage was higher among women with lower levels of education (or none); women with primary education had a higher prevalence (17.5%) of early marriage, followed by women with no formal education (11.0%). In terms of spousal/partner education differences, women who had a partner who is not educated had a greater prevalence of early marriage (15.0%), whereas women who had a partner who was better educated had the lowest prevalence (5.0%) of early marriage. Furthermore, the prevalence of early marriage was higher (10.1%) among women who had their first sexual experience before turning eighteen.

Additionally, the study showed that early marriage increased with parity. Women who had ever given birth to five or more children had a higher prevalence of early marriage (20.9%), whereas those who had never given birth had a lower prevalence (1.5%) of early marriage. Early marriage also decreased with household wealth. Women from poor households had a higher prevalence of early marriage (8.4%), followed by women from households with an average wealth (6.4%), while women from rich households had the lowest prevalence (4.6%) of early marriage. Moreover, early marriage increased with community poverty status. Women from communities with high poverty status had a higher prevalence of early marriage (7.8%), and those from communities with low poverty status had the lowest prevalence (5.2%) of early marriage. There were also geographical differentials in early marriage. The findings showed that women from rural areas had a greater prevalence (7.9%) of early marriage. In terms of the province, women from Limpopo had the highest prevalence of early marriage (10.5%), followed by those from Mpumalanga (9.5%), the North West (7.8%), and Gauteng (7.4%). The Eastern Cape province (5.7%), Western Cape (4.1%), and KwaZulu-Natal (3.1%) had a low prevalence of early marriage.

Determinants of early marriage

Table 3 shows the multilevel model for the individual and contextual factors determining early marriage among women aged 20-49 years in South Africa. The null model (model 0) showed some variation in early marriage among women aged 20-49 across the clusters, (variance = 0.420 [95% CI 0.25 to 0.71]). As indicated by the ICC, 11.32% of the variability in the odds of early marriage is due to community-level factors. In Model 3, the ICC reduced to 5.8%; this showed that in the last model, the inclusion of community-level factors was still important in better explaining early marriage. Moreover, the full model explained approximately 52 per cent (51.9) of the variability in early marriage. The MOR results confirmed that community factors influenced the likelihood of early marriage. Model 3 had the lowest deviance (-2LL) and AIC, the final (full) model and was the best-fitting model. Therefore, in this study, we interpret the results related to the final model.

The findings indicate that women from the black African population group were less likely [AOR: 0.41, 95% CI: 0.24-0.69] to be married before the age of eighteen compared to those from the 'other' (Indian or White) population group. Additionally, women from the coloured population group were less likely [AOR: 0.43, 95% CI: 0.22-0.83] to be married before the age of eighteen compared to women from the 'other' population group. In terms of education, women with primary education were more likely [AOR: 2.96, 95% CI:

Table 1: Description of the study variables

Variable	Description	Coding
Individual-level factors		
Age group	Age of respondent	1=20-24 2=25-29 3=30-39 4= 40-49
Population group	Race	1=Black African 2=Coloured 3=Other
Level of education	Highest level of education attained by the respondent	0=No education 1=Primary 2=Secondary+
Employment status	Current employment status of the respondent	0=Unemployed 1=Employed
Spousal/partner's educational difference	Educational difference between woman and spouse/partner	1=Partner better educated 2=Wife better educated 3=Equally educated 4= Neither educated 5=Cannot be determined
Age at first sex (below age 18)	First sex by age 18	0=No 1=Yes
Parity	Children ever born	0= 0 1= 1-2 1= 3-4 3= 5+
HIV status	Test results from the human immunodeficiency virus (HIV) test	0=Negative 1=Positive
Household wealth	Household socioeconomic status	1=Poor 2=Average 3=Rich
Community-level factors		
Community poverty status	Community socioeconomic status (constructed based on a percentage of households with the lowest poverty levels in the cluster and categorised as Low, Moderate and High poverty levels)	1=Low 2=Moderate 3=High
Place of residence	Respondent's place of residence	1=Urban 2=Rural
Province	Respondent's province of residence	1=Western Cape 2=Eastern Cape 3=Northern Cape 4=Free State 5=KwaZulu-Natal 6=Northwest 7=Gauteng 8=Mpumalanga 9=Limpopo

Table 2: Distribution of respondents and prevalence of early marriage by explanatory factors

Variable	Early marriage				Total	χ^2	
	No		Yes			Value	P-value
	%	CI	%	CI			
Individual-level factors							
Age group						71.6	0.000
20-24	96.4	[94.7-97.6]	3.6	[2.4-5.3]	1415 (20.0)		
25-29	94.5	[92.9-95.8]	5.5	[4.2-7.1]	1444 (20.4)		
30-39	93.7	[92.4-94.9]	6.3	[5.1-7.6]	2406 (33.9)		
40-49	90.2	[88.4-91.8]	9.8	[8.2-11.6]	1823 (25.7)		
Population group						2.2	0.333
Black African	93.4	[92.4-94.2]	6.6	[5.8-7.6]	6127 (86.5)		

Coloured	95.7	[93.2-97.3]	4.3	[2.7-6.8]	602 (8.5)		
Other	92.4	[88.5-95.1]	7.6	[4.9-11.5]	358 (5.1)		
Level of education						170.5	0.000
No education	89.0	[81.4-93.7]	11.0	[6.3-18.6]	165 (2.3)		
Primary	82.5	[78.7-85.8]	17.5	[14.2-21.3]	664 (9.4)		
Secondary+	94.8	[94.0-95.5]	5.2	[4.5-6.0]	6258 (88.3)		
Employment status						0.2	0.641
Unemployed	93.4	[92.3-94.3]	6.6	[5.7-7.7]	4,152 (58.6)		
Employed	93.7	[92.4-94.8]	6.3	[5.2-7.6]	2936 (41.4)		
Spousal/partner's educational difference						116.7	0.000
Partner better educated	95.0	[94.1-95.8]	5.0	[4.2-5.9]	5078 (71.7)		
Wife better educated	89.6	[87.0-91.7]	10.4	[8.3-13.0]	1047 (14.8)		
Equally educated	90.2	[87.6-92.3]	9.8	[7.7-12.4]	903 (12.7)		
Neither educated	85.0	[70.5-93.0]	15.0	[7.0-29.5]	45 (0.6)		
Cannot be determined	94.4	[67.3-99.3]	5.6	[0.7-32.7]	13 (0.2)		
Age at first sex (below age 18)						160.9	0.000
No	97.0	[96.2-97.6]	3.0	[2.4-3.8]	3630 (51.2)		
Yes	89.9	[88.5-91.2]	10.1	[8.8-11.5]	3458 (48.8)		
Parity						235.1	0.000
0	98.5	[97.1-99.2]	1.5	[0.8-2.9]	1111 (15.7)		
1-2	94.6	[93.4-95.5]	5.4	[4.5-6.6]	3863 (54.5)		
3-4	91.2	[89.5-92.8]	8.8	[7.2-10.5]	1726 (24.4)		
5+	79.1	[73.3-83.9]	20.9	[16.1-26.7]	387 (5.5)		
HIV status						3.8	0.051
Negative	93.3	[92.4-94.1]	6.7	[5.9-7.6]	6403 (90.3)		
Positive	95.6	[93.3-97.1]	4.4	[2.9-6.7]	684 (9.7)		
Household wealth						31.6	0.000
Poor	91.6	[90.2-92.8]	8.4	[7.2-9.8]	2749 (38.8)		
Average	93.6	[91.8-95.0]	6.4	[5.0-8.2]	1528 (21.6)		
Rich	95.4	[94.1-96.4]	4.6	[3.6-5.9]	2810 (39.7)		
Community-level factors							
Community poverty status						18.2	0.000
Low	94.8	[93.4-96.0]	5.2	[4.0-6.6]	2767 (39.0)		
Medium	93.3	[91.6-94.6]	6.7	[5.4-8.4]	2129 (30.0)		
High	92.2	[90.6-93.5]	7.8	[6.5-9.4]	2192 (30.9)		
Place of residence						13.1	0.000
Urban	94.2	[93.1-95.1]	5.8	[4.9-6.9]	4856 (68.5)		
Rural	92.1	[90.7-93.3]	7.9	[6.7-9.3]	2231 (31.5)		
Province						55.1	0.000
Western Cape	95.9	[93.7-97.4]	4.1	[2.6-6.3]	835 (11.8)		
Eastern Cape	94.3	[92.5-95.7]	5.7	[4.3-7.5]	754 (10.6)		
Northern Cape	92.7	[90.1-94.8]	7.3	[5.2-9.9]	142 (2.0)		
Free State	93.2	[90.8-95.1]	6.8	[4.9-9.2]	371 (5.2)		
KwaZulu-Natal	96.9	[95.3-97.9]	3.1	[2.1-4.7]	1313 (18.5)		
North West	92.2	[88.4-94.9]	7.8	[5.1-11.6]	489 (6.9)		
Gauteng	92.6	[90.2-94.5]	7.4	[5.5-9.8]	1973 (27.8)		
Mpumalanga	90.5	[88.3-92.3]	9.5	[7.7-11.7]	553 (7.8)		
Limpopo	89.5	[86.7-91.8]	10.5	[8.2-13.3]	657 (9.3)		
Total	**93.5**	**[92.7-94.3]**	**6.5**	**[5.7-7.3]**	**7087 (100.0)**		

Note: CI = confidence interval

Table 3: Multilevel determinants of early marriage among women aged 20-49 years in South Africa

Variable	**Model 0 AOR [95% CI]**	**Model 1 AOR [95% CI]**	**Model 2 AOR [95% CI]**	**Model 3 AOR [95% CI]**
Individual-level factors				
Age group				
20-24		0.72 [0.48-1.07]		0.74 [0.50-1.11]
25-29®		1		1
30-39		0.79 [0.58-1.07]		0.79 [0.58-1.07]
40-49		1.03 [0.75-1.43]		1.03 [0.75-1.41]
Population group				

Black African		0.44 *** [0.26-0.76]		0.41 *** [0.24-0.69]
Coloured		0.41 *** [0.22-0.75]		0.43 ** [0.22-0.83]
Other®		1		1
Level of education				
No education		1.61 [0.84-3.07]		1.72 [0.90-3.28]
Primary		2.81 *** [2.15-3.66]		2.96 *** [2.27-3.85]
Secondary+®		1		1
Employment status				
Unemployed		0.91 [0.74-1.13]		0.92 [0.74-1.13]
Employed®		1		1
Spousal/partner's educational difference				
Partner better educated		0.35 *** [0.26-0.47]		0.37 *** [0.28-0.50]
Wife better educated		0.86 [0.62-1.2]		0.9 [0.65-1.25]
Equally educated®		1		1
Neither educated		1.26 [0.46-3.44]		1.32 [0.49-3.61]
Cannot be determined		0.8 [0.08-7.71]		0.78 [0.08-7.68]
Age at first sex (below age 18)				
No®		1		1
Yes		3.42 *** [2.70-4.33]		3.32 *** [2.63-4.20]
Parity				
0		0.17 *** [0.09-0.30]		0.17 *** [0.09-0.31]
1-2		0.38 *** [0.27-0.53]		0.38 *** [0.27-0.54]
3-4		0.64 *** [0.46-0.88]		0.65 *** [0.47-0.89]
5+®		1		1
HIV status				
Negative®		1		1
Positive		0.58 *** [0.40-0.85]		0.61 ** [0.42-0.89]
Household wealth				
Poor		1.55 *** [1.16-2.07]		1.69 *** [1.16-2.48]
Average		1.35 [0.99-1.84]		1.33 [0.96-1.85]
Rich®		1		1
Community-level factors				
Community poverty status				
Low			0.67 ** [0.48-0.92]	1.26 [0.82-1.93]
Medium			0.77 [0.59-1.01]	1.11 [0.82-1.50]
High®			1	1
Place of residence				
Urban®			1	1
Rural			1.14 [0.86-1.52]	1.05 [0.78-1.41]
Province				
Western Cape			0.9 [0.52-1.56]	1.08 [0.59-1.98]
Eastern Cape®			1	1
Northern Cape			1.29 [0.80-2.08]	1.56 [0.92-2.66]
Free State			1.43 [0.89-2.27]	1.81 ** [1.11-2.95]
KwaZulu-Natal			0.53 *** [0.33-0.85]	0.72 [0.44-1.19]
North West			1.27 [0.81-1.99]	1.45 [0.91-2.31]
Gauteng			1.59 * [1.02-2.48]	1.85 ** [1.16-2.95]
Mpumalanga			1.71 ** [1.13-2.57]	1.99 *** [1.30-3.07]
Limpopo			1.56 * [1.03-2.36]	2.27 *** [1.47-3.49]
Random effects result				
PSU variance (95% CI)	0.420 [0.25-0.71]	0.345 [0.18-0.67]	0.245 [0.11-0.54]	0.202 [0.07-0.56]
ICC %	11.32	9.48	6.92	5.8
MOR	1.86	1.75	1.6	1.54
PCV %	®	17.86	41.67	51.9
Model fitness				
-2LL	3462	2977	3405	2937
AIC	3466	3019	3431	3001
PSU	727	727	727	727

Note: * = *p<0.05*; ** = *p<0.01*; *** = *p<0.001*; ® = reference category; AOR = adjusted odds ratio; CI = confidence interval; ICC = intra-cluster correlation coefficient; MOR = median odds ratio; PCV = proportional change in variance; -2LL = deviance [-2 log-likelihood]; AIC = Akaike Information Criterion; PSU = Primary Sampling Unit

2.27-3.85] to be married before the age of eighteen compared to women with secondary or more education. In terms of spousal or partner's educational difference, women with a better-educated partner were less likely [AOR: 0.37, 95% CI: 0.28-0.50] to be married before the age of eighteen compared to those whose partner is as equally educated. With regards to age at first sex, women who started engaging in sexual activities before the age of eighteen were more likely [AOR: 3.32, 95% CI: 2.63-4.20] to be married before the age of eighteen compared to women who began engaging in sexual activities later (after the age of eighteen).

Furthermore, the findings showed that early marriage increased with parity. Women who had no children were less likely [AOR: 0.17, 95% CI: 0.09-0.31] to be married before the age of eighteen compared to those who had five or more children. Women who had one to two children were less likely [AOR: 0.38, 95% CI: 0.27-0.54] to be married before the age of eighteen compared to those who had five or more children. Likewise, women who had three to four children were less likely [AOR: 0.65, 95% CI: 0.47-0.89] to be married before the age of eighteen compared to those who had five or more children. Additionally, women who were HIV positive were less likely [AOR: 0.61, 95% CI: 0.42-0.89] to be married before the age of eighteen compared to those who were HIV negative. Moreover, the findings showed that early marriage decreased with household wealth. Women from poor households were more likely [AOR: 1.69, 95% CI: 1.16-2.48] to be married before the age of eighteen compared to women from rich households. In terms of province, women from Limpopo [AOR: 2.27, 95% CI: 1.47-3.49], Mpumalanga [AOR: 1.99, 95% CI: 1.30-3.07], Gauteng [AOR: 1.85, 95% CI: 1.16-2.95], and Free State [AOR: 1.81, 95% CI: 1.11-2.95] were more likely to be married before the age of eighteen compared to women from the Eastern Cape.

Discussion

This study aimed to examine the individual and contextual level determinants of early marriage among women aged 20-24 in South Africa. This section discusses the findings from the bivariate and multivariate analyses. The multilevel model showed variation in early marriage between the individual- and community levels. Although the prevalence of early marriage is generally low in the country, various factors proved to be important determinants of this phenomenon. We found that several factors such as age, level of education, spousal/partner educational differences, age at first sex, parity, household wealth, community poverty, place of residence, and province were associated with early marriage among South African women. Several studies conducted in developing countries have found similar associations[36-38]. Furthermore, this study found that women with primary education were more likely to be married at an early age than those with secondary education or higher. These study findings are consistent with previous research, which indicated that women with primary education or lower tend to be married at an early age than those with higher education [39-42]. Generally, less educated women are more vulnerable to early marriage[34,43]. Women with lower education also tend to have lower levels of autonomy and are usually easily manipulated into situations that are less than ideal. Those who get married at an early age may end up dropping out of school due to the new demands, and the requirements of bearing children, in the marital home[44,45].

We also found that women who had their first sexual intercourse before turning eighteen had higher odds of early marriage. Our findings are consistent with those of previous studies[17,46,47]. This could be explained by that in traditional societies marriage is planned for a girl child as soon as it is discovered that she has had her first sexual intercourse, especially in societies where virginity testing is widespread[35]. In African societies, there is a tendency of forcing a young girl to get married ('forced marriage') once it is discovered that she has had sexual intercourse, with the man who has slept with her, especially if she becomes pregnant with said man[48]. Additionally, we found that the odds of early marriage increased with parity. Women with fewer children are less likely to be married before the age of eighteen than those with many children[49,50]. The findings are a bit strange, which could be due to the inability to measure causality between parity and early marriage (it is impossible to distinguish whether the children are part of the marriage or came before the marriage). Moreover, most young women cannot negotiate

their sexual and reproductive health with their husbands[51,52], and this may lead to an increased fertility rate for those who get married at a young age, possibly to a significantly older husband.

Furthermore, we found that HIV-positive women had lower odds of marrying before the age of eighteen. These findings contradict that of a previous study which found no association between HIV and early marriage[53,54]. This contradiction could be due to the inability to measure causality (we cannot determine whether HIV infection occurs before or after early marriage). We also found that early marriage decreased with household wealth status, where women from poor households had higher odds of early marriage than those from rich households. This finding is consistent with that of a previous study which found that women from poor and middle-wealth households had significantly higher odds of early marriage compared to those from rich households[55]. Poor households tend to seek early marriage to improve their socioeconomic status[56-58]. In some cases, young girls may be forced to get married to a wealthy man (usually an older person) as means of bringing wealth to themselves and their families[59]. Such practices only worsen the fight against ending early marriages, especially in societies where young women are seen as sources of wealth and prosperity. Moreover, we found geographical variations in the odds of early marriage. Women from Limpopo, Mpumalanga, Gauteng, and Free State had higher odds of early marriage than women from the Eastern Cape. Regional differences in early marriage have been cited in several studies from developing countries[60-63]. In most cases, early marriages occur in rural regions with high levels of poverty, where they are often linked to cultural, traditional and religious practices[21,52]. Mpumalanga and Limpopo provinces are mainly rural with strong cultural and traditional beliefs. However, the findings for Gauteng, which is a mostly urban province, are quite interesting. Maybe the migration of people from rural provinces into Gauteng could be a factor in the province's high odds of early marriage; more research, qualitative or quantitative, is needed to uncover the factors influencing early marriages in Gauteng.

Strengths and limitations of the study

The study has some strengths and limitations. The main strength is that we used nationally representative data to analyse the multilevel determinants of early marriages in South Africa. We also used multilevel modelling to account for the hierarchical nature of the data. However, the major limitation was that we could not measure causality between the explanatory variables and the outcome variable. It was also not possible to determine whether the characteristics occurred before or after the early marriage.

Conclusion

This study investigated the multilevel determinants of early marriage among women aged 20-49 years in South Africa. We found some variation in early marriage between the individual and community levels. Although early marriage is not common in the country as a whole, it is still a problem that needs to be addressed. The factors associated with early marriage are population group, educational attainment, education difference between the woman and her partner or spouse, parity, age at first sex, HIV status, household wealth, and province. We also found that women from four provinces (Limpopo, Mpumalanga, Gauteng, and Free State) had higher odds of early marriage than women from the Eastern Cape. Public awareness of the many laws that protect children from early marriage and related practices is crucial in these provinces, especially in Limpopo and Mpumalanga. Furthermore, these findings highlight the need for policies that target, not only women and girl children, but everyone within the provinces with higher odds (and prevalence) of early marriage, particularly the populations that still follow traditions related to early marriage. Various government and relevant stakeholder campaigns are needed to target the populations from low-income households as well as those from rural areas; having dialogues that are aimed at speaking about the dangers of early marriage and coming up with long-lasting solutions to protect children from traditional practices such as early and forced marriages is essential.

Abbreviations

-2LL: deviance [-2 log-likelihood]; AIC: Akaike Information Criterion; AOR: Adjusted Odds Ratio; CI: Confidence interval; HIV: Human Immunodeficiency Virus; ICC: Intra-cluster

Correlation Coefficient; IPV: Intimate partner violence; MOR: Median Odds Ratio; PCV: Proportional Change in Variance; PSU: Primary Sampling Unit; SADHS: South African Demographic and Health Survey; SDG: Sustainable Development Goals; SSA: sub-Saharan Africa; VIF: Variance Inflation Factor

Author contributions

SMLM and MT conceptualised the study. SMLM and MT worked on the draft of this paper. SMLM contributed to the data analysis and interpretations. SMLM worked on the discussions. MT supervised this study. All authors read and approved the final draft of this paper.

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Competing interests

We declare no competing interests.

Ethics approval and consent to participate

We used publicly available data from the SADHS in this study. The collection of the SADHS data followed proper ethical procedures, as such further ethical clearance is not required for this study. However, we registered, applied and were granted permission to download the data for this study. The SADHS data collection process requested written and verbal consent from participants aged 18 and older. More information about the data and ethical procedures can be obtained from: https://dhsprogram.com/methodology/Protecting-the-Privacy-of-DHS-Survey-Respondents.cfm.

Availability of data and materials

The data we used in this paper are available from the DHS program website: https://dhsprogram.com/data/dataset/South-Africa_Standard-DHS_2016.cfm?flag=1.

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