

# BMJ Open Access to mass media and teenage pregnancy among adolescents in Zambia: a national cross-sectional survey

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## ABSTRACT

**Objective** Teenage pregnancies and childbirths are associated with negative health outcomes. Access to health information enables adolescents to make appropriate decisions. However, the relationship between access to health information through mass media and teenage pregnancy has not received much attention in existing literature. We therefore examined the association between access to mass media and teenage pregnancy in Zambia.

**Design** Cross-sectional.

**Setting** Zambia.

**Participants** Weighted sample of 3000 adolescents aged 15–19 years.

**Outcome measure** Teenage pregnancy that included adolescents who were currently pregnant or had had an abortion or had given birth in the last 5 years preceding the survey.

**Results** Out of 3000 adolescents, 897 (29.9%, 95% CI: 28.1% to 31.3%) were pregnant or had ever been pregnant. Majority of the adolescents resided in rural areas (55.9%) and had secondary education (53.6%). Adolescents who had exposure to internet, newspapers or magazines, radio and television were 10.5%, 22.6%, 43.1% and 43.1%, respectively. Adolescents who had daily access to newspapers or magazines (adjusted OR (AOR): 0.33, 95% CI: 0.13 to 0.82) or using internet (AOR: 0.54, 95% CI: 0.30 to 0.95) were less likely to be pregnant or to have had a pregnancy compared with those with no access to newspapers and internet, respectively.

**Conclusion** Our study suggests that internet use and reading of newspapers or magazines may trigger behavioural change as an effective approach to reducing teenage pregnancy. Behavioural change communicators can implement mass media campaigns using newspapers, magazines and the internet to publicise adolescent health messages that can encourage adolescents to adopt healthy behaviours and prevent teenage pregnancies.

## INTRODUCTION

Globally, over 16 million girls aged 15–19 years give birth each year, contributing nearly 11% of all births worldwide.<sup>1 2</sup> At least 90% of these births occur in low/middle-income countries (LMICs) and sub-Saharan Africa has among the highest prevalence of teenage pregnancy globally.<sup>2–5</sup> Teenage pregnancies

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This is the foremost nationwide analysis that explores the association between mass media exposure and teenage pregnancy.
- ⇒ The study used a subsample of adolescents from the latest nationally representative sample, making the findings generalisable for female Zambian adolescents.
- ⇒ The temporal relationship between the outcome variable and the independent variables could not be established due to the cross-sectional nature of the survey.
- ⇒ The Zambia Demographic and Health Survey did not collect information on what social media sites and content of information were accessed by those using the internet.

and childbirths are associated with negative maternal and perinatal health outcomes such as preterm delivery, low birth weight and death.<sup>2 6 7</sup> Teenage pregnancy is further associated with social problems such as school dropouts which prevent the affected teenagers from achieving their full social and economic potential.<sup>1</sup> Children born to adolescents are more likely to have lower school achievement and drop out of high school.<sup>8</sup>

In LMICs, limited access to sexual and reproductive health (SRH) information, especially among adolescents, undermines efforts to bring healthcare services closer to the people which further negatively affects progress towards universal health coverage.<sup>9–11</sup> Although Zambia has registered an increase in the use of mass media among the young population through initiatives such as information communication technology (ICT) clubs in schools and the integration of ICTs into the education curriculum,<sup>12</sup> there are still challenges of low access. Only 24.4% and 3.8% of women in urban and rural areas, respectively, reported ever using the internet and 46%

of all women have no weekly access to the three traditional mass media channels (radio, television (TV) and newspapers).<sup>13</sup>

Mass media has been acknowledged globally as a cost-effective communication channel<sup>9 14</sup> and it has been used successfully in various health programmes in LMICs.<sup>9 10 15–18</sup> However, there is also some documented evidence of inconsistent outcomes of mass media campaigns,<sup>9 19</sup> and some authors have argued that the effects observed are short term.<sup>10 20 21</sup> Furthermore, mass media is among the strategies used to promote utilisation of family planning through increased awareness, sensitisation and debunking of myths leading to a desired behavioural change.<sup>22</sup> Lou *et al* analysed data from three Asian countries and reported that access to and use of mass media have an influence on sexual intercourse-related knowledge, attitudes, and behaviours of adolescents and young adults.<sup>23</sup> Although the association between mass media exposure and teenage pregnancy has not been studied in Zambia, some studies have examined the association of mass media and sexual reproductive health among the youth. Using Demographic and Health Survey (DHS) data of three countries (Kenya, Nigeria and Zambia), Somefun *et al* analysed influence of media exposure on HIV testing among the youth and documented a positive association between exposure to mass media and HIV testing.<sup>24</sup> Van Rossem and Meekers also analysed data from Zambia DHS (ZDHS) 2002 and reported that exposure to family planning and HIV radio and TV programmes was associated with higher odds of using condoms for both men and women.<sup>25</sup> Worku *et al* analysed East African countries' DHS data to assess prevalence and associated factors of teenage pregnancy in the region and further documented exposure to mass media to be associated with less odds of teenage pregnancy.<sup>26</sup> However, Worku *et al* did not focus on mass media as main exposure but combined mass media as one variable, making it impossible to examine the association of the different mass media with teenage pregnancy.

Despite the global efforts employed in promoting interventions against teenage pregnancy such as uptake of family planning, the progress is slow.<sup>22</sup> In Zambia, 13% and 2.2% of adolescents have sexual intercourse and are married before age 15 years, respectively. The low contraceptive prevalence rate in this age group puts Zambian adolescents at an increased risk of teenage pregnancies.<sup>13</sup> Given the documented increase in the use of mass media among the young Zambians,<sup>12</sup> we aimed to examine the association between access to mass media and teenage pregnancy in Zambia. The study also examined the association between other socioeconomic variables and access to mass media and teenage pregnancy using data from the 2018–2019 ZDHS. The findings will be crucial in identifying ways of reducing teenage pregnancies by increasing mass media exposure and the effectiveness of other socioeconomic characteristics.

## METHODS

### Data

The 2018–2019 ZDHS data were used to examine the association between mass media exposure and teenage pregnancy using a subsample of adolescents aged 15–19 years. The 2018–2019 ZDHS data were collected between 18 July 2018 and 24 January 2019.<sup>13</sup> The ZDHS is nationally representative and is conducted every 5 years to monitor and evaluate population, health and nutrition indicators in LMICs.<sup>27</sup> The data used for this study were collected using the women's questionnaire in which information on individuals, household characteristics, nutrition and reproductive health history of women of reproductive age (15–49 years) was captured.<sup>13 27</sup> Standardised sampling procedures are employed with a two-stage stratified method that resulted in the random selection of a representative sample of 13 625 households.<sup>13</sup> 'The first stage involved 545 cluster (sample points) selection which consisted of enumeration areas (EAs) using a sampling frame that was used during the 2010 census of population and housing'.<sup>13</sup> The EAs in the first stage were selected with a probability proportional to their size within each sampling stratum with the second stage having household selection using systematic sampling.<sup>13</sup> Our secondary analysis included only adolescents aged 15–19 years. A total of 13 683 women aged 15–49 years in the sampled households who consented to participate in the survey were interviewed. Of the 13 683 women, 10 683 were aged 20–49 years; hence, our secondary analysis included a weighted sample of 3000 adolescents aged 15–19 years. A detailed description of the sampling process can be obtained in the 2018–2019 ZDHS report at the DHS programme website.<sup>28</sup>

### Variables

#### Outcome variable

The outcome variable was teenage pregnancy that included adolescents who were currently pregnant or had an abortion or had given birth in the last 5 years preceding the survey and coded as one (1) and zero (0) for those who had never had a pregnancy.<sup>29</sup>

#### Exposures

Adolescents were asked whether they use the internet (yes or no), own a mobile phone (yes or no), read a newspaper or magazine, listen to radio or watch TV (almost every day, at least once a week, less than once a week or not at all).

#### Covariates

We included determinants of teenage pregnancy basing on available literature and data.<sup>29–31</sup> Eleven variables were considered and of these, two were community-level factors that included: place of residence (rural and urban) and the 10 provinces of Zambia. Three household-level factors included: household size (less than six and six and above), sex of household head (male and female) and wealth index that was categorised into quintiles

that ranged from the poorest to the richest quintile. Six individual-level factors that included: age (15–17 and 18–19 years), working status (yes and no), marital status (married including those legally and not legally married but living with their partners and not married including those divorced, separated and widowed), education level (no education, primary and post-primary (tertiary only had two adolescents so it was combined with secondary)), knowledge of any modern contraceptive (yes and no) and engaging in risky sexual behaviour (yes and no). Adolescents were considered to have engaged in ‘risky sexual behaviour’ if they reported to have engaged in sex with more than one partner or had transactional sex or had inconsistent condom use or had alcohol consumption at last sexual intercourse or had sexual intercourse before age 16 years.<sup>32–34</sup>

### Data analysis

Analysis was conducted using SPSS V.25.0 statistical software’s complex sample function in order to account for the multistage cluster study design. Proportions and frequencies were tabulated for all the independent variables. To assess the association of each independent variable with teenage pregnancy, bivariable logistic regression was conducted and we presented crude OR, 95% CI and p values. Multivariable logistic regression was conducted with mass media and other sociodemographic independent variables with a p value of <0.25 at bivariable level. Adjusted ORs (AORs), 95% CI and p values were calculated with statistical significance level set at p value of <0.05. All variables in the model were assessed for collinearity, which was considered present if the variables had a variance inflation factor greater than 5. To ensure validity of our study findings, sampling weights provided by ZDHS were used. Online supplemental file 1 shows the Strengthening the Reporting of Observational Studies in Epidemiology checklist.

### Patient and public involvement

The ZDHS did not involve patients. However, before data collection, the different provincial local authorities were contacted, and their permission sought. The results of the 2018–2019 ZDHS are openly available to the public on the DHS website (<https://www.dhsprogram.com/>).

## RESULTS

### Sociodemographic characteristics of study population

Out of 3000 adolescents, 897 (29.9%; 95% CI: 28.1% to 31.3%) were pregnant or had ever been pregnant. The mean age of adolescents was 17.0 (SD 1.4) years. Majority of the adolescents resided in rural areas (55.9%), were not working (82.6%), not married (85.4%), had post-primary education (53.9%), and were aged between 15 and 17 years (57.8%). More detailed characteristics of study participants are shown in [table 1](#).

### Mass media use

Majority of the adolescents have no exposure to internet (89.5%), newspapers (77.5%), radio (56.9%) or TV

**Table 1** Background characteristics of adolescents as per 2018 Zambia Demographic and Health Survey

Characteristics	N=3000	Percent
Teenage pregnancy		
Yes	897	29.9
No	2103	70.1
Mobile phone use		
Yes	944	31.5
No	2056	68.5
Listening to radio		
Almost every day	386	12.9
At least once a week	499	16.6
Less than once a week	409	13.6
Not at all	1707	56.9
Reading newspaper		
Almost every day	100	3.3
At least once a week	274	9.1
Less than once a week	303	10.1
Not at all	2323	77.5
Watching TV		
Almost every day	808	26.9
At least once a week	296	9.9
Less than once a week	190	6.3
Not at all	1706	56.9
Internet use		
Yes	316	10.5
No	2684	89.5
Household size		
6 and above	2017	67.2
Less than 6	983	32.8
Residence		
Urban	1323	44.1
Rural	1677	55.9
Provinces		
Central	297	9.9
Copperbelt	491	16.4
Eastern	342	11.4
Luapula	253	8.4
Lusaka	475	15.8
Muchinga	191	6.4
Northern	248	8.3
North Western	186	6.2
Southern	327	10.9
Western	190	6.3
Working status		
Not working	2477	82.6
Working	523	17.4

Continued

**Table 1** Continued

Characteristics	N=3000	Percent
Marital status		
Not married	2563	85.4
Married	437	14.6
Education level		
Secondary	1618	53.9
Primary education	1283	42.8
No education	99	3.3
Wealth index		
Richest	709	23.6
Richer	655	21.8
Middle	585	19.5
Poorer	541	18.0
Poorest	510	17.0
Age		
15–17	1735	57.8
18–19	1265	42.2
Sex of household head		
Male	2166	72.2
Female	834	27.8
Risky sexual behaviour		
No	1647	54.9
Yes	1353	45.1
Knowledge of any modern contraceptive		
Yes	2845	94.8
No	155	5.2
TV, television.		

(56.9%). Exposure to newspapers/magazines was the lowest at 22.5% of which only 3.3% had exposure almost every day. Although exposure to radio and TV both are at 43.1%, being exposed to TV almost every day is at 26.9% compared with 12.9% for being exposed to radio almost every day.

### Associations between access to mass media and teenage pregnancy

Results from multivariable logistic regression (table 2) showed that exposure to newspapers or magazines and internet use were significantly associated with teenage pregnancy. Adolescents who had daily exposure to newspapers or magazines (AOR: 0.33, 95% CI: 0.13 to 0.82) and using internet (AOR: 0.54, 95% CI: 0.30 to 0.95) had less odds of being pregnant or have had a pregnancy compared with those with no exposure to newspapers and internet, respectively.

Other socioeconomic variables such as engaging in risky sexual behaviour, age, wealth quintiles, marital status, knowledge of modern contraceptives and residence were

significantly associated with teenage pregnancy. Adolescents without knowledge of any modern contraceptive (AOR: 0.26, 95% CI: 0.08 to 0.80) had less odds of being pregnant compared with those with knowledge of any modern contraceptive. Adolescents aged 18–19 years (AOR: 3.22, 95% CI: 2.44 to 4.25), residing in urban areas (AOR: 1.64, 95% CI: 1.07 to 2.50), married (AOR: 12.67, 95% CI: 7.90 to 20.30), belonging to the poorest wealth quintile (AOR: 6.70, 95% CI: 2.76 to 16.24), and engaging in risky sexual behaviour (AOR: 26.31, 95% CI: 19.58 to 35.36) were associated with higher odds of being pregnant or have had a pregnancy compared with those aged 15–17 years, in rural areas, not married, in the wealthiest quintile and not engaging in risky sexual behaviour, respectively.

### DISCUSSION

This study assessed the association between exposure to mass media and teenage pregnancy in Zambia. Majority of the adolescents have no exposure to internet (89.5%), newspapers (77.5%), radio (56.9%) or TV (56.9%). The prevalence of teenage pregnancy in Zambia was 29.9% (95% CI: 28.1% to 31.3%), similar to that of studies conducted in Sudan (31%), Ethiopia, (28.6%) and Turkey (29%).<sup>2 35 36</sup> However, our study found a higher prevalence compared with the overall pooled prevalence of adolescent pregnancy in Africa (18.8%), East Africa (21.5%) and Latin America (6.4%) as shown by a systematic review by Kassa *et al.*<sup>37</sup> The differences in accessibility of modern contraceptives, societal attitude towards the adolescent contraceptive use and knowledge of adolescents of the SRH issues could possibly explain the observed higher prevalence in Zambia. Among the mass media variables, exposure to newspapers/magazines and internet was the significant one and this was associated with less odds of teenage pregnancy.

Internet use was associated with less likelihood of teenage pregnancy. It is a popular observation that parents in most African communities rarely communicate about reproductive health with their children; hence, adolescents tend to rely on informal sources for information about their sexuality.<sup>38</sup> Furthermore, traditional sexual education in Zambia deprives women of any bargaining power and hence the use of condom, frequency of sexual intercourse and practices are decided by the male partner. Different internet resources such as web pages, social media platforms, bulletin boards, and chatrooms may contain health information and provide access to information for a potentially large number of adolescents.<sup>38 39</sup> Internet enables adolescents to have a high degree of interactivity and offers an anonymous, confidential and easily accessible space to find sensitive information about their sexuality.<sup>38</sup> Internet enables adolescents to explore sensitive topics online while ensuring their privacy is protected.<sup>38 40</sup> Besides being a source of health information that aids in sexual health promotion, contraceptive literacy and individual adolescent counselling via web

**Table 2** Associations between media exposure and teenage pregnancy among adolescents in Zambia as per ZDHS 2018

Characteristics	Teenage pregnancy n=897	Univariable OR (95% CI)	P value	Adjusted model AOR (95% CI)
Mobile phone use			0.173	
No	626 (69.8)	1		1
Yes	271 (30.2)	0.92 (0.74 to 1.15)		1.05 (0.70 to 1.57)
Listening to radio			<0.001	
Not at all	583 (65.0)	1		1
Less than once a week	97 (10.8)	<b>0.60 (0.45 to 0.80)</b>		0.78 (0.51 to 1.20)
At least once a week	116 (12.9)	<b>0.59 (0.44 to 0.78)</b>		0.75 (0.47 to 1.18)
Almost every day	101 (11.3)	<b>0.68 (0.50 to 0.94)</b>		0.80 (0.48 to 1.35)
Reading newspaper			<0.001	
Not at all	776 (86.5)	1		1
Less than once a week	69 (7.7)	<b>0.58 (0.38 to 0.89)</b>		0.98 (0.57 to 1.67)
At least once a week	45 (5.0)	<b>0.40 (0.27 to 0.59)</b>		0.73 (0.43 to 1.25)
Almost every day	7 (0.8)	<b>0.15 (0.07 to 0.31)</b>		<b>0.33 (0.13 to 0.82)</b>
Watching TV			<0.001	
Not at all	671 (74.8)	1		1
Less than once a week	55 (6.1)	<b>0.64 (0.44 to 0.93)</b>		1.19 (0.58 to 2.44)
At least once a week	62 (6.9)	<b>0.41 (0.25 to 0.68)</b>		0.90 (0.48 to 1.68)
Almost every day	109 (12.2)	<b>0.24 (0.17 to 0.35)</b>		1.13 (0.55 to 2.31)
Internet use			<0.001	
No	860 (95.9)	1		1
Yes	37 (4.1)	<b>0.28 (0.19 to 0.42)</b>		<b>0.54 (0.30 to 0.95)</b>
Age			<0.001	
15–17	296 (33.0)	1		1
18–19	601 (67.0)	<b>4.40 (3.62 to 5.36)</b>		<b>3.22 (2.44 to 4.25)</b>
Residence			<0.001	
Rural	637 (71.0)	1		1
Urban	260 (29.0)	<b>0.40 (0.30 to 0.53)</b>		<b>1.64 (1.07 to 2.50)</b>
Marital status			<0.001	
Not married	502 (56.0)	1		1
Married	395 (44.0)	<b>37.93 (26.72 to 53.85)</b>		<b>12.67 (7.90 to 20.30)</b>
Wealth index			<0.001	
Richest	54 (6.0)	1		1
Richer	178 (19.8)	<b>4.51 (2.82 to 7.23)</b>		<b>2.27 (1.19 to 4.33)</b>
Middle	215 (24.0)	<b>7.05 (4.59 to 10.82)</b>		<b>4.03 (1.86 to 8.75)</b>
Poorer	211 (23.5)	<b>7.75 (5.06 to 11.86)</b>		<b>4.54 (1.99 to 10.39)</b>
Poorest	239 (26.6)	<b>10.74 (6.99 to 16.50)</b>		<b>6.70 (2.76 to 16.24)</b>
Risky sexual behaviour			<0.001	
No	61 (6.8)	1		1
Yes	836 (93.2)	<b>42.30 (30.87 to 57.98)</b>		<b>26.31 (19.58 to 35.36)</b>
Sex of household head			<b>0.028</b>	
Male	676 (75.4)	1		1
Female	221 (24.6)	<b>0.79 (0.65 to 0.98)</b>		1.03 (0.76 to 1.41)
Provinces			<0.001	

Continued

Table 2 Continued

Characteristics	Teenage pregnancy n=897	Univariable OR (95% CI)	P value	Adjusted model AOR (95% CI)
Western	82 (9.1)	1		1
Southern	142 (15.8)	1.02 (0.62 to 1.67)		1.67 (0.85 to 3.29)
North Western	67 (7.5)	0.73 (0.49 to 1.09)		0.67 (0.40 to 1.12)
Northern	66 (7.4)	<b>0.47 (0.32 to 0.70)</b>		0.67 (0.32 to 1.41)
Muchinga	56 (6.2)	<b>0.55 (0.36 to 0.84)</b>		0.72 (0.36 to 1.45)
Lusaka	71 (7.9)	<b>0.23 (0.14 to 0.38)</b>		0.86 (0.42 to 1.76)
Luapula	77 (8.6)	<b>0.58 (0.39 to 0.85)</b>		0.81 (0.48 to 1.38)
Eastern	138 (15.4)	0.89 (0.61 to 1.28)		0.96 (0.56 to 1.64)
Copperbelt	104 (11.6)	<b>0.35 (0.23 to 0.53)</b>		1.66 (0.90 to 3.06)
Central	94 (10.5)	<b>0.61 (0.42 to 0.88)</b>		1.16 (0.68 to 1.98)
Working status			<0.001	
Not working	632 (70.5)	1		1
Working	265 (29.5)	<b>2.98 (2.44 to 3.66)</b>		1.39 (0.97 to 1.99)
Education level			<0.001	
Post-primary	380 (42.3)	1		1
Primary education	476 (53.1)	1.92 (1.54 to 2.40)		0.90 (0.63 to 1.28)
No education	41 (4.6)	2.35 (1.48 to 3.74)		0.74 (0.32 to 1.71)
Household size			<0.001	
6 and above	518 (57.7)	1		1
Less than 6	379 (42.3)	<b>1.82 (1.44 to 2.28)</b>		0.71 (0.50 to 1.01)
Knowledge of any modern contraception			<0.001	
Yes	886 (98.8)	<b>1</b>		1
No	11 (1.2)	<b>0.17 (0.08 to 0.36)</b>		<b>0.26 (0.08 to 0.80)</b>

Bold significant at p value less than 0.05.

AOR, adjusted OR; TV, television; ZDHS, Zambia Demographic and Health Survey.

chat, the internet can as well be used to purchase contraceptives.<sup>41 42</sup>

Since most health programmes use mainstream mass media, the content of these mainstream media can be improved and be made available on various social media platforms such as Facebook and on different websites by those using the internet. Social media platform access by adolescents is on the rise<sup>43 44</sup> and we recommend further studies to look at the effect of social media platforms on teenage pregnancy. Adolescents who had almost daily access to newspapers or magazines were less likely to have had a teenage pregnancy compared with those without any access to newspapers or magazines. Newspapers or magazines are usually printed in many languages which enables a wide readership that represents a time-honoured means of disseminating printed information.<sup>45</sup> They can contribute maximally to adolescent health education by publishing articles on diverse issues.<sup>45</sup> This exposure enables adolescents to have greater access to SRH information which empowers them and enables them to make positive SRH decisions and also become

aware of availability of the different SRH services including family planning.<sup>30 46</sup> The culture of reading is not particularly common in many African communities. There is, therefore, the possibility that adolescents who read newspapers and magazines are academically inclined or focused on their studies. Such adolescents would rarely indulge in risky sexual behaviours. Studies have documented that exposure to mass media is associated with increased utilisation of modern contraceptives<sup>9 22 47 48</sup> as mass media is likely to lead to exposure to family planning messages capable of challenging negative attitudes to contraceptives.<sup>47</sup>

The observed association between watching TV and listening to radio with teenage pregnancy at bivariable analysis level was lost when socioeconomic variables were included during multivariable analysis. This indicates that socioeconomic variables have an influence on teenage pregnancy by affecting how these mass media messages are received or accessed, used and interpreted by respondents. This finding is in agreement with other studies conducted in similar contexts.<sup>22</sup> Lim *et al* showed

that mainstream media such as TV and radio were the least comfort source of SRH information for adolescents and internet was the most comfortable source.<sup>49</sup> The non-significance observed with watching TV and listening to radio could be partly attributed to media messages not addressing cultural and practical barriers to behaviour change, limited involvement of adolescent peers and role models who can easily influence the adolescents as they easily relate to them and limited engagement of local people or communities to ensure context-specific and epidemiologically appropriate SRH messages.<sup>9</sup> Furthermore, the SRH information provided by radio and TVs may increase awareness and sensitisation<sup>18</sup> but fail to motivate adolescents to behavioural change hence the need to focus on behavioural change in the communities.<sup>21</sup>

However, as much as exposure to media has been suggested to be effective in disseminating SRH information, some studies have shown increased engagement in risky sexual behaviour depending on the content being broadcast hence the need to regulate internet and mass media use.<sup>30 50</sup> Different studies examined the effects of mass media on adolescent sexual behaviour have shown that exposure to media has influences on their sexual behaviour which could be positive or negative depending on the content<sup>1 51 52</sup> and in some contexts, non-significant.<sup>21</sup> Mercy and Mugambi analysed association between social media and teenage pregnancy among secondary school students in Kenya and documented high access to social networking sites, and this contributed to increased teenage pregnancy prevalence since most of the students accessed sexually explicit content and less of directed academic information.<sup>53</sup> Chandra *et al* further showed that without control of content, accessing sexual content on television was associated with higher odds of teenage pregnancy, which was similar to that of Lin *et al*<sup>54</sup> in Taiwan with mass media exposure increasing the odds of risky sexual behaviour.<sup>55</sup> To ensure effective use of mass media campaigns and that appropriate SRH information is passed on, we suggest that information dissemination professionals and other adolescent health practitioners should promote and prioritise pro-health internet sites addressing different adolescent health needs as a health information resource. However, there is a need for guided internet access when adolescents use it.

### Strengths and limitations

This is the foremost nationwide analysis that explores the association between mass media exposure and teenage pregnancy. Therefore, it can be used as a yardstick and motivation for further studies on related subject matter in order to ensure effective reduction in teenage pregnancies. Second, we used a subsample from the most current nationally representative data; hence, the findings are generalisable to all adolescents in Zambia. However, use of cross-sectional data only enables the establishment of associations but not causal relationships and the self-reported answers risked the possibility of recall bias. Besides providing information on use of internet, ZDHS

did not collect information on what specific social media sites or content was accessed by those using the internet which information would be crucial to analyse. Lastly, the dataset did not include information about the content of mass media that the adolescents were accessing.

### CONCLUSION

One-third of adolescents in Zambia were or had been pregnant at the time of the survey which shows that teenage pregnancy is more prevalent in Zambia compared with the African and sub-Saharan average of 19%. Exposure to newspapers or magazines and internet use were associated with less odds of teenage pregnancy. To ensure effective use of mass media campaigns and that correct SRH information is passed on, we would like to recommend the need for SRH workers to be highly involved in the production of SRH mass media content, encourage and support provision of newspapers/magazines containing SRH sections to adolescents in schools/adolescent health units in health centres and to subsidise internet access costs as a way of increasing access. Further research is needed to understand the effects of other mass media such as social media on adolescent pregnancy.

Socioeconomic variables such as older age, engaging in risky sexual behaviour, low wealth index, marriage, knowledge on modern contraceptives and urban residence were significantly associated with teenage pregnancy. Findings show that factors are multidimensional, as they are related to the individual adolescents, household and the community which are beyond the control of adolescents. Multisectoral activities across sectors that encourage delayed marriage and contraceptive use, discourage risky sexual behaviour and empower households financially to reduce household poverty with urban areas being more targeted are essential. The Zambian government and the different stakeholders need to ensure that efforts are made to accommodate married and pregnant girls in schools. Having knowledge of any contraceptive method was associated with more odds of teenage pregnancy which could be due to inadequate knowledge, barriers to accessing and using contraceptives, including stigma and discrimination by contraceptive providers hence the need to strengthen the quality of contraceptive counselling, increase access to adolescent-friendly health units that can enable adolescents to easily access contraceptives. Additionally, the use of qualitative research can provide a better understanding of the complexities of adolescent pregnancy. Since the study participants were already pregnant during the survey, we recommend cohort studies that can further inform policy regarding casual relationships between access to mass media and teenage pregnancy. These studies can be designed to include social media platforms in addition to the traditional mass media.

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#### REFERENCES

- Wado YD, Sully EA, Mumah JN. Pregnancy and early motherhood among adolescents in five East African countries: a multi-level analysis of risk and protective factors. *BMC Pregnancy Childbirth* 2019;19:59.
- Ayanaw HabituY, YalewA, Azale BisetegnT. Prevalence and factors associated with teenage pregnancy, northeast Ethiopia, 2017: a cross-sectional study. *J Pregnancy* 2018;2018:1714527–7.
- Mezmur H, Assefa N, Alemayehu T. Teenage pregnancy and its associated factors in eastern Ethiopia: a community-based study. *Int J Womens Health* 2021;13:267–78.
- Shibanuma A, Yeji F, Okawa S, *et al*. The coverage of continuum of care in maternal, newborn and child health: a cross-sectional study of woman-child pairs in Ghana. *BMJ Glob Health* 2018;3:e000786.
- Gunawardena N, Fantaye AW, Yaya S. Predictors of pregnancy among young people in sub-Saharan Africa: a systematic review and narrative synthesis. *BMJ Glob Health* 2019;4:e001499.
- Sserwanja Q, Kawuki J. Prevalence of underweight and associated factors among lactating women in Ethiopia: a mini-review. *Journal of Advances in Medicine and Medical Research* 2020;32:1–9.
- Sserwanja Q, Musaba MW, Mukunya D. Prevalence and factors associated with modern contraceptives utilization among female adolescents in Uganda. *BMC Womens Health* 2021;21:61.
- Mathewos S, Mekuria A. Teenage pregnancy and its associated factors among school adolescents of Arba Minch town, southern Ethiopia. *Ethiop J Health Sci* 2018;28:287–98.
- Zamawe COF, Banda M, Dube AN. The impact of a community driven mass media campaign on the utilisation of maternal health care services in rural Malawi. *BMC Pregnancy Childbirth* 2016;16:21.
- Meekers D, Van Rossem R, Silva M, *et al*. The reach and effect of radio communication campaigns on condom use in Malawi. *Stud Fam Plann* 2007;38:113–20.
- Sserwanja Q, Mukunya D, Nabachenje P, *et al*. Continuum of care for maternal health in Uganda: a national cross-sectional study. *PLoS One* 2022;17:e0264190.
- UNZA Repository. Young people and the digital age: an investigation of the ‘Sociability’ of teenagers in Lusaka, 2018. Available: <http://dspace.unza.zm/handle/123456789/5277>
- Zambia Statistics Agency - ZSA, Ministry of Health - MOH, University Teaching Hospital Virology Laboratory - UTH-VL, ICF. Zambia demographic and health survey 2018, 2020. Available: <https://www.dhsprogram.com/pubs/pdf/FR361/FR361.pdf>
- Sood S, Shefner-Rogers C, Skinner J. Health communication campaigns in developing countries. *Journal of Creative Communications* 2014;9:67–84.
- Umeano-Enemuoh JC, Uzochukwu B, Ezumah N, *et al*. A qualitative study on health workers’ and community members’ perceived sources, role of information and communication on malaria treatment, prevention and control in Southeast Nigeria. *BMC Infect Dis* 2015;15:437.
- Gupta N, Katende C, Bessinger R. An evaluation of post-campaign knowledge and practices of exclusive breastfeeding in Uganda. *J Health Popul Nutr* 2004;22:429–39.
- Reijer P, Chalimba M, Nakwagala AA. Malawi goes to scale with anti-AIDS clubs and popular media. *Eval Program Plann* 2002;25:357–63.
- Sserwanja Q, Musaba MW, Mutisya LM, *et al*. Continuum of maternity care in Zambia: a national representative survey. *BMC Pregnancy Childbirth* 2021;21:604.
- Asp G, Odberg Pettersson K, Sandberg J, *et al*. Associations between mass media exposure and birth preparedness among women in southwestern Uganda: a community-based survey. *Glob Health Action* 2014;7:22904.
- Hornik R, McAnany E. Theories and evidence: mass media effects and fertility change. *Communication Theory* 2001;11:454–71.
- Raut MK. Interpersonal communication and contraception: insights and evidences from Bangladesh demographic and health survey, 2011. *Indian J Public Health* 2015;59:220–4.
- Ajaero CK, Odimegwu C, Ajaero ID, *et al*. Access to mass media messages, and use of family planning in Nigeria: a spatio-demographic analysis from the 2013 DHS. *BMC Public Health* 2016;16:427.
- Lou C, Cheng Y, Gao E, *et al*. Media’s contribution to sexual knowledge, attitudes, and behaviors for adolescents and young adults in three Asian cities. *J Adolesc Health* 2012;50:S26–36.
- Somefun OD, Wandera SO, Odimegwu C. Media exposure and HIV testing among youth in sub-Saharan Africa: evidence from demographic and health surveys (DHS). *Sage Open* 2019;9:215824401985155.
- Van Rossem R, Meekers D. The reach and impact of social marketing and reproductive health communication campaigns in Zambia. *BMC Public Health* 2007;7:352.
- Worku MG, Tessema ZT, Teshale AB, *et al*. Prevalence and associated factors of adolescent pregnancy (15–19 years) in East Africa: a multilevel analysis. *BMC Pregnancy Childbirth* 2021;21:253.
- Sserwanja Q, Mukunya D, Habumugisha T, *et al*. Factors associated with undernutrition among 20 to 49 year old women in Uganda: a secondary analysis of the Uganda demographic health survey 2016. *BMC Public Health* 2020;20:1644.
- DHS. The DHS program. Available: <https://www.dhsprogram.com/>
- Uwizeye D, Muhayiteto R, Kantarama E, *et al*. Prevalence of teenage pregnancy and the associated contextual correlates in Rwanda. *Heliyon* 2020;6:e05037.
- Ahinkorah BO, Kang M, Perry L, *et al*. Prevalence of first adolescent pregnancy and its associated factors in sub-Saharan Africa: a multi-country analysis. *PLoS One* 2021;16:e0246308.
- Yakubu I, Salisu WJ. Determinants of adolescent pregnancy in sub-Saharan Africa: a systematic review. *Reprod Health* 2018;15:15.
- Chawla N, Sarkar S. Defining “High-risk Sexual Behavior” in the Context of Substance Use. *Journal of Psychosexual Health* 2019;1:26–31.
- SHRH Africa Trust (SAT). Age of consent: legal review Zambia country report. Available: <https://www.satregional.org/wp-content/uploads/2018/05/Age-of-consent-Zambia.pdf> [Accessed Dec 2020].



- 34 Farid NDN, Rus Sulaiman Che', Dahlui M, *et al.* Predictors of sexual risk behaviour among adolescents from welfare institutions in Malaysia: a cross sectional study. *BMC Public Health* 2014;14 Suppl 3:S9.
- 35 Adam GK, Elhassan EM, Ahmed AM, *et al.* Maternal and perinatal outcome in teenage pregnancies in Sudan. *Int J Gynaecol Obstet* 2009;105:170–1.
- 36 Canbaz S, Sunter AT, Cetinoglu CE, *et al.* Obstetric outcomes of adolescent pregnancies in turkey. *Adv Ther* 2005;22:636–41.
- 37 Kassa GM, Arowojolu AO, Odukogbe AA, *et al.* Prevalence and determinants of adolescent pregnancy in Africa: a systematic review and meta-analysis. *Reprod Health* 2018;15:195.
- 38 Nwagwu WE. The Internet as a source of reproductive health information among adolescent girls in an urban City in Nigeria. *BMC Public Health* 2007;7:354.
- 39 White M, Dorman SM. Receiving social support online: implications for health education. *Health Educ Res* 2001;16:693–707.
- 40 McKenna KYA, Bargh JA. Plan 9 from cyberspace: the implications of the Internet for personality and social psychology. *Personality and Social Psychology Review* 2000;4:57–75.
- 41 Aicken CRH, Estcourt CS, Johnson AM, *et al.* Use of the Internet for sexual health among sexually experienced persons aged 16 to 44 years: evidence from a nationally representative survey of the British population. *J Med Internet Res* 2016;18:e14.
- 42 Bacchus LJ, Reiss K, Church K, *et al.* Using digital technology for sexual and reproductive health: are programs adequately considering risk? *Glob Health Sci Pract* 2019;7:507–14.
- 43 Chetty-Mhlanga S, Fuhrmann S, Eeftens M, *et al.* Different aspects of electronic media use, symptoms and neurocognitive outcomes of children and adolescents in the rural Western Cape region of South Africa. *Environ Res* 2020;184:109315.
- 44 Pfeiffer C, Kleeb M, Mbelwa A, *et al.* The use of social media among adolescents in Dar ES Salaam and Mtwara, Tanzania. *Reprod Health Matters* 2014;22:178–86.
- 45 Paul S, Singh AB. Coverage of health-related articles in major local newspapers of Manipur. *J Educ Health Promot* 2016;5:3.
- 46 Thin Zaw PP, Liabsuetrakul T, McNeil E, *et al.* Gender differences in exposure to SrH information and risky sexual debut among poor Myanmar youths. *BMC Public Health* 2013;13:1122.
- 47 Ahinkorah BO. Predictors of modern contraceptive use among adolescent girls and young women in sub-Saharan Africa: a mixed effects multilevel analysis of data from 29 demographic and health surveys. *Contracept Reprod Med* 2020;5:32.
- 48 Appiah F, Seidu A-A, Ahinkorah BO, *et al.* Trends and determinants of contraceptive use among female adolescents in Ghana: analysis of 2003-2014 demographic and health surveys. *SSM Popul Health* 2020;10:100554.
- 49 Lim MS, Vella A, Sacks-Davis R, *et al.* Young people's comfort receiving sexual health information via social media and other sources. *Int J STD AIDS* 2014;25:1003–8.
- 50 Landry M, Gonzales FA, Wood S, *et al.* New media use and sexual behavior among Latino adolescents. *Am J Health Behav* 2013;37:422–30.
- 51 Masemola-Yende JPF, Mataboge SM. Access to information and decision making on teenage pregnancy prevention by females in Tshwane. *Curationis* 2015;38:1540.
- 52 Escobar-Chaves SL, Tortolero SR, Markham CM, *et al.* Impact of the media on adolescent sexual attitudes and behaviors. *Pediatrics* 2005;116:303–26.
- 53 Mercy M, Mugambi KAK. Social media and teenage pregnancy among students in secondary schools in Imenti North Sub-County, Meru County, Kenya. *International Journal of Scientific Research and Management* 2016;4.
- 54 Lin W-H, Liu C-H, Yi C-C. Exposure to sexually explicit media in early adolescence is related to risky sexual behavior in emerging adulthood. *PLoS One* 2020;15:e0230242.
- 55 Chandra A, Martino SC, Collins RL, *et al.* Does watching sex on television predict teen pregnancy? findings from a national longitudinal survey of youth. *Pediatrics* 2008;122:1047–54.