




BMJ Open Association between sexual and reproductive health education in peer group and comprehensive knowledge of HIV among adolescent girls in rural eastern Ethiopia: a community-based cross-sectional study

Nebiyou Fasil ¹, Alemayehu Worku,² Lemessa Oljira ³, Amare Worku Tadesse ^{4,5}, Yemane Berhane⁶

To cite: Fasil N, Worku A, Oljira L, *et al.* Association between sexual and reproductive health education in peer group and comprehensive knowledge of HIV among adolescent girls in rural eastern Ethiopia: a community-based cross-sectional study. *BMJ Open* 2022;**12**:e063292. doi:10.1136/bmjopen-2022-063292

► Prepublication history for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2022-063292>).

Received 04 April 2022
Accepted 22 September 2022



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For numbered affiliations see end of article.

Correspondence to

Nebiyou Fasil;
nebiyoufasil@addiscontinental.edu.et

ABSTRACT

Objectives This study examined the association between sexual and reproductive health (SRH) education in peer-group discussion and comprehensive knowledge of HIV among young adolescent girls in rural eastern Ethiopia.

Design The study analysed data from a large quasi-experimental study involving 3290 young adolescent girls aged 13–17 years. The intervention targeted adolescent girls aged 10–14 years. Data were collected using a comprehensive HIV knowledge tool adopted from the demographic and health survey questionnaire. Multi-level mixed-effect logistic regression analysis was employed to examine associations using STATA/SE V.14 statistical software.

Setting West Hararghe, rural Ethiopia.

Participants 3290 adolescent girls.

Results Magnitude of comprehensive knowledge of HIV among those who received SRH education and those who did not receive SRH education was 16.78% (95% CI 14.41% to 19.45%) and 14.01% (95% CI 12.38% to 15.81%), respectively. Overall, 14.84% (95% CI 13.4% to 16.39%) of the adolescent girls aged 13–17 years had comprehensive knowledge of HIV. The odds of having comprehensive HIV knowledge were higher (1.36 times) among adolescent girls who received SRH education compared with those who did not receive SRH education (adjusted OR 1.36, 95% CI 1.01 to 1.84) after controlling for selected potential confounders. Odds of having comprehensive HIV knowledge were also higher (1.73 times) among older adolescent girls (adjusted OR 1.733 95% CI 1.098 to 2.735) and (3.89 times) among those who attended secondary school (adjusted OR=3.889 95% CI 1.836 to 8.235) compared with young adolescent girls and the uneducated, respectively.

Conclusions Comprehensive knowledge of HIV among young adolescent girls was very low. Providing SRH education for young adolescent girls improved their comprehensive knowledge of HIV in rural eastern Ethiopia. Initiating sexual education at an early age would benefit HIV prevention efforts.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The study used standard outcome measurement, enabling better comparison among other studies.
- ⇒ The study did not assess health promotion exposure through media as a covariate which other studies have assessed.
- ⇒ The study was also conducted in few rural districts in eastern Ethiopia; hence generalisability is restricted only to rural communities with similar contexts.

INTRODUCTION

It is estimated that more than half of new HIV infections worldwide occur among youth aged 15–24 years old¹ with the adolescent girls and young women being 5–14 times more likely to be infected with HIV than their male peers.² In Ethiopia, with a rapidly growing youth population, HIV prevalence among youth is estimated to be at 2.9%.³ The increased risk of HIV among adolescent girls is attributed to the many challenges they face including gender inequality, unfavourable social norms, early marriage, low access to education and limited access to condoms.⁴

Early sexual debut makes adolescent girls more vulnerable to the risks of sexually transmitted infections (STIs) including HIV.⁵ Adolescents in low-income countries, especially in rural areas, often have limited school-based sexuality education,⁶ low uptake of HIV testing, inconsistent condom use behaviour, unprotected first sexual intercourse and multiple sexual partners due to a lack of comprehensive sexual reproductive knowledge.^{7,8} Worldwide, population-based studies show that more than 90% of people have ever heard of AIDS, but much less fully understand

the HIV transmission and prevention methods which are crucial for the control of new HIV infections.⁹ Evidence from sub-Saharan Africa shows that in-depth knowledge of HIV is generally low.¹⁰ Improved understanding of the level of HIV knowledge and the determinants provide a platform for designing impactful interventions to prevent and reduce HIV infections.^{11 12} A systematic review of studies conducted in Africa, Asia, and Latin America has also shown that school-based sexual health education programmes improves HIV knowledge.^{13 14} However, comprehensive knowledge of HIV was rarely assessed among unmarried and very young adolescent girls in low-income settings. The International HIV/AIDS Alliance's theory of change indicates that person-centred HIV interventions are important to improve HIV knowledge and reduce HIV incidence.¹⁵ Without the increase in the coverage of effective HIV prevention interventions, adolescent infections are projected to go up by 13%, leading to 3.5 million new infections by 2030.¹⁶

This study draws data from an implementation project undertaken to improve adolescent girls' sexual and reproductive (SRH) health. This study aims to examine the association between Adolescent girls' comprehensive knowledge of HIV and receiving SRH health education from peer-group.

METHODS

Study design and participants

The study used data extracted from a cross-sectional survey conducted at the end of an implementation project in the Western Hararghe Zone, Oromia Region, Ethiopia. The end-line survey was conducted from September to November 2019. The study was conducted in the West Hararghe zone of the Oromia regional state in Eastern Ethiopia. The majority of the population in this area belongs to the Oromo ethnic group and follows the Islam faith. Around 85% of the people in rural areas depend on subsistence agriculture for a living. The proportion of adult women with comprehensive knowledge of HIV in the region is 17.3%, while the proportion of women who have tested for HIV in the past 12 months is 15.4%.¹⁷ The Abdiboru project implemented interventions in the study areas (Boke, Chiro, Doba and Mesela districts) to improve the SRH of adolescents. The Abdiboru intervention included organising young adolescent girls into girls' peer groups to discuss SRH issues, including STIs and HIV, among other things. The study recruited peer-group leaders and trained them on the SRH module so they would be able to discuss these matters with their peers during the girls' club meetings. Adolescent girls who did not participate in the girls' peer groups while being in the intervention district and girls from the control district will serve as the comparison group. The intervention was implemented over 3 years and targeted adolescent girls in the age group of 10–14 years. This cohort of girls who received the interventions were in the age group 13–17 years at the time of the survey. The study used a

multistage sampling method to select the study participants. In the first stage, 114 clusters (neighbourhoods, locally referred to as local development zone) were selected using simple random sampling after obtaining a complete list of the clusters in the selected districts from the respective district health office. In the second stage, a complete household listing was done in the selected clusters to identify households with eligible adolescent girls. Then, 30 households with eligible adolescent girls were randomly selected from the freshly prepared list using a computer-generated random number. If there were more than one eligible adolescent girl in the household, one was selected randomly using lottery method.

Data protection

For participants below the age of 15 years, additional parental/guardian-informed verbal consent was obtained. All interviews took place in a private setting to ensure confidentiality. The data were deidentified when extracted from the larger dataset for this study.

Data collection tools, procedures and data management

Data were collected using a structured and pretested interviewer-administered questionnaire that was translated into the local language, Affaan Oromo, for field use. The translation was checked by a panel of public health experts who were fluent in both languages. In addition, the appropriateness of the wordings was checked during the training of field workers and pretest.

Interviewers and field supervisors were trained for 2 weeks on survey procedures, study tools and related issues. A pretest was done in a similar setting, not included in the main study, to test the appropriateness of the questions, language, flow and understandability. Adolescent girls were interviewed at their residential compound in a private space. The Open Data Kit, an electronic data collection programme, was used to collect the data. Data were uploaded on a secure server from the field whenever internet service was available.

Measures of comprehensive knowledge of HIV

The outcome variable was comprehensive knowledge of HIV based on questions adopted from the 2016 Ethiopian demographic and health survey. Adolescent girls who knew consistent use of condoms during sexual intercourse (said 'yes' to 'Can people reduce their chance of getting the AIDS virus by having just one uninfected sex partner who has no other sex partners?'), having just one uninfected faithful partner can reduce the chances of getting HIV (said 'yes' to 'Can people reduce their chance of getting the AIDS virus by using a condom every time they have sex?'), said 'yes' to a healthy-looking person can have HIV, and rejected (said 'no') to the two most common local misconceptions about transmission or prevention of HIV (mosquito bites can transmit HIV and a person can become infected by sharing food with a person who has HIV) were considered having comprehensive knowledge.¹⁷

Covariates

For exposure to SRH education in peer group discussion, adolescent girls who were a member of the peer group and said 'yes' to attending discussion sessions on STI, including HIV (its mode of transmission, prevention and treatment) during their girls' group meeting were considered to have been exposed to SRH education. Other covariates considered in the analysis include the place of residence, wealth status (lowest, second, middle, fourth, highest) calculated using principal component analysis, adolescent girl's age, education (never attended school, grade 1–8, grade 9–12), marital status (ever married, never married), perceived confidence in communication (no/little confidence, moderate confidence, high confidence), perceived confidence in negotiation skills (no/little confidence, moderate confidence, high confidence) and contact with health extension workers (yes, no).

Statistical analyses

The data were analysed using STATA/SE V.14.0. For the outcome variable (comprehensive HIV knowledge) percentage with a 95% CI was calculated. The intra-class correlation coefficient was found to be statistically significant, hence multilevel mixed-effect logistic regression model was used for the final analysis. Cluster-ID was considered a random component. Initially, a bivariate analysis was done, and conceptually relevant covariates were included in the multivariable analysis. Association was described using an OR with 95% CIs, and statistical significance was declared at $p < 0.05$. Appropriate weighting was done to account for the complex survey design and analysis.

Patient and public involvement

No patient involved.

RESULTS

A total of 3290 adolescent girls participated in the study, with a response rate of 96.2%. The majority of the respondents were never married (90.65%), had primary school education (54.83%) and were followers of the Islam faith (87.77%) (table 1).

Regarding adolescent girls' perceived communication skills level, half of them reported having high confidence in their communication skills level. Only 9.4% of girls reported that they ever had contact with health extension workers.

Among girls who participated in the study, 29.93% of adolescent girls reported being exposed to SRH-STI (mode of transmission+prevention and treatment+HIV) education during their group meetings (table 2).

Comprehensive knowledge of HIV among adolescent girls

Among adolescent girls who were asked about their knowledge of HIV prevention methods, 67.1% (95% CI 64.73 to 69.39%) correctly said having just one uninfected partner can reduce the chance of getting HIV, while

Table 1 Background characteristics of adolescent girls, west Hararghe, eastern Ethiopia, 2019

Characteristics	Frequency	Per cent (weighted)
Place of residence		
Mesela district	1116	32.71
Chiro and Doba districts	1093	39.27
Boke district	1081	28.02
Household wealth status		
Lowest	594	20.66
Second	594	19.59
Middle	587	19.72
Fourth	590	20.11
Highest	591	19.92
Religion		
Christian	342	12.23
Muslim	2948	87.77
Adolescent girls' age		
13	940	24.49
14	792	21.95
15	751	25.2
16	474	14.73
17	333	13.52
Adolescent girls' marital status		
Never married	3067	90.65
Ever married	223	9.35
Adolescent girls' educational status		
Never attended	194	12.1
Primary ^{1–4}	1804	51.97
Junior secondary ^{5–8}	1150	31.24
Secondary ^{9–12}	142	4.69

28.44% (95% CI 25.56% to 31.52%) correctly said consistent condom use reduce the chance of getting HIV. With regards to the misconceptions about HIV, 39% (95% CI 36.25% to 41.82%) correctly answered the questions 'Can people get the AIDS virus from mosquito bites?' and 'Can people get the AIDS virus by sharing food with a person who has AIDS?'. The magnitude of comprehensive knowledge of HIV among those exposed and not exposed to SRH education in the peer-group discussion was 16.78% (95% CI 14.41% to 19.45%) and 14.01% (95% CI 12.38% to 15.81%), respectively. Overall, 14.84% (95% CI 13.4% to 16.39%) of the adolescent girls had comprehensive knowledge of HIV (figure 1). Subanalysis of in-between age groups also showed that magnitude of comprehensive knowledge among 13–14 years old and 15–17 years old girls was 12.75% (95% CI 10.9% to 14.86%) and 17.11% (95% CI 14.95% to 19.52%), respectively.

Determinants of comprehensive knowledge of HIV among adolescent girls

The weighted mixed-effect logistic regression analysis showed that the odds of having comprehensive HIV

Table 2 The perceived skill level and exposure characteristics of adolescent girls of west Hararghe, eastern Ethiopia, 2019

Characteristics	Frequency	Per cent (weighted)
Adolescent girls' perceived negotiation skill level		
Little/no confidence	418	12.9
Moderate confidence	1253	37.36
High confidence	1615	49.74
Adolescent girls' perceived communication skill level.		
Little/no confidence	415	12.56
Moderate confidence	1279	38.41
High confidence	1590	49.03
Adolescent girls exposed to SRH education in peer group discussions		
Yes	986	29.93
No	2304	70.07
Ever had contact with health extension workers		
Yes	306	9.59
No	2984	90.41
SRH, sexual and reproductive health .		

knowledge among adolescent girls exposed to SRH education in peer-group was 36% higher than those not exposed to SRH education discussion (adjusted OR 1.36, 95% CI 1.01 to 1.84). Moreover, the odds of having comprehensive HIV knowledge among adolescent girls attending secondary school were higher (3.89 times) compared with those who never attended school (adjusted OR 3.89, 95% CI 1.84 to 8.23). Older adolescents also had higher (1.73 times) odds of having comprehensive HIV knowledge compared with younger adolescents (adjusted OR 1.73, 95% CI 1.09 to 2.73). (table 3)

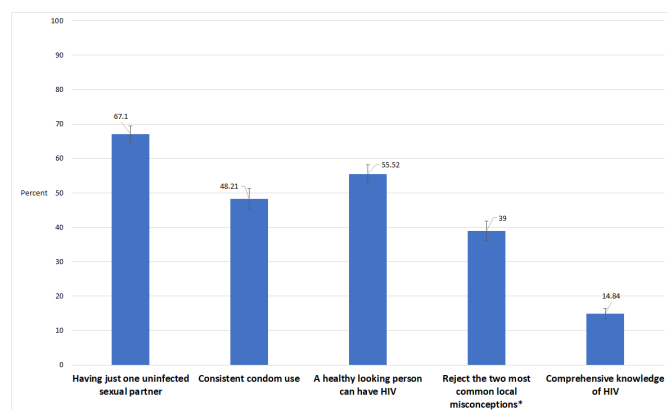


Figure 1 Adolescent girls' knowledge level on HIV in West Hararghe, Ethiopia in 2019. *Two most common local misconceptions: HIV can be transmitted by mosquito bites and a person can become infected by sharing food with a person who has HIV.

DISCUSSION

Only 14.84% (95% CI 13.4% to 16.39%) of the young adolescent in rural eastern Ethiopia had comprehensive knowledge of HIV. Exposure to SRH education in peer-group discussion was significantly associated with Comprehensive knowledge. In addition, the odds of having comprehensive HIV knowledge were greater among older adolescent girls (adjusted OR 1.733 95% CI 1.098 to 2.735) and those who attended secondary school (adjusted OR 3.889 95% CI 1.836 to 8.235).

The comprehensive HIV knowledge level among 15–17years old girls was slightly lower compared with the Ethiopian DHS in 2016.¹⁷ This might be because the current study was only among rural adolescent girls, while the DHS involved both rural and urban populations; girls from Urban areas tend to have better comprehensive knowledge, which could be due to better access to media and essential health promotion services.^{18 19} Other studies also showed comprehensive HIV knowledge is generally low among adolescent girls in Ethiopia^{20 21} and also lower than the average for sub-Saharan Africa, which is 41%.²² This might be because of poor access to education, media and healthcare facilities.²³ It could also be because the health extension programme implementation, which contains HIV education as one of the packages, usually targets mothers through home-to-home visits instead of adolescents.²⁴ But, other studies from Kenya²⁵ and Uganda²⁶ reported a much higher level of comprehensive HIV knowledge, 48.8% and 51.9%, respectively.

Adolescent girls exposed to SRH education in peer group discussions had better comprehensive knowledge of HIV than those who reported no exposure. This result was consistent with another cross-sectional study from Eastern Ethiopia.²⁰ Another comparable survey in Kenya showed that primary school HIV education intervention improved HIV-related knowledge.²⁷ Peer-assisted sexual education for adolescents aged 14 years and above in Tanzania also significantly improved HIV knowledge.²⁸ Peer education has also improved HIV knowledge among in-school adolescents in Nigeria.²⁹ A meta-analysis of HIV educational interventions showed that HIV-related knowledge was significantly better among those who received peer education on HIV.³⁰ This could be because if girls are taught within the circle of their peers in these girls' groups, knowledge can be gained as they might feel comfortable being thought with their peers while being cost-effective.³¹

Comprehensive knowledge of HIV was also significantly associated with education level, which is consistent with previous studies conducted in Ethiopia,^{21 23} Kenya and Burundi,³² Cameroon,⁹ Uganda,²⁶ Nigeria,³³ South Africa,³⁴ Bangladesh,³⁵ Pakistan³⁶ and India.³⁷ Data from eight sub-Saharan countries also showed that adolescent girls who were in school had better HIV knowledge than those who were not in school.³⁸ This could be because adolescent girls who stay longer in school might be more exposed to HIV knowledge through the school curriculum and HIV school clubs.³⁹ There has been a growing call for

Table 3 Multilevel mixed-effect regression indicating factors associated with comprehensive knowledge of HIV among adolescent girls, west Hararghe, eastern Ethiopia, 2019

Characteristics	Comprehensive knowledge of HIV		Unadjusted bivariate (weighted)		Adjusted multivariable (weighted)	
	Yes	No	COR (95% CI)	P value	AOR (95% CI)	P value
Adolescent girls' exposed to SRH education in peer group discussion						
Yes	169	817	1.264 (1.013 to 1.576)	0.037	1.359 (1.006 to 1.839)	0.046
No	333	1971	1		1	
Place of residence						
Mesela district	162	954	0.878 (0.666 to 1.157)	0.357	0.842 (0.599 to 1.183)	0.323
Chiro and Doba districts	159	934	0.883 (0.667 to 1.170)	0.388	0.717 (0.499 to 1.029)	0.072
Boke district	181	900	1		1	
Household wealth status						
Lowest	71	523	1		1	
Second	79	515	1.092 (0.738 to 1.618)	0.657	1.058 (0.714 to 1.568)	0.778
Middle	91	496	1.355 (0.956 to 1.919)	0.087	1.279 (0.906 to 1.805)	0.161
Fourth	101	489	1.480 (0.984 to 2.225)	0.059	1.336 (0.902 to 1.979)	0.148
Highest	100	491	1.396 (0.911 to 2.139)	0.125	1.191 (0.776 to 1.825)	0.423
Adolescent girls' age						
13	115	828	1		1	1
14	111	681	1.159 (0.875 to 1.535)	0.302	1.129 (0.837 to 1.523)	0.426
15	120	631	1.360 (0.991 to 1.867)	0.057	1.402 (0.978 to 2.010)	0.065
16	85	389	1.500 (1.080 to 2.082)	0.015	1.336 (0.909 to 1.963)	0.140
17	71	262	2.020 (1.366 to 2.987)	0.001	1.733 (1.098 to 2.735)	0.018
Adolescent girls' marital status						
Never married	459	2608	0.702 (0.499 to 0.987)	0.042	0.956 (0.630 to 1.452)	0.836
Ever married	43	180	1		1	
Adolescent girls' educational status						
Never attended	20	174	1		1	
Primary (1–8)	439	2515	1.692 (1.001 to 2.858)	0.050	1.781 (0.973 to 3.263)	0.061
Secondary (9–12)	43	99	4.623 (2.333 to 9.157)	0.001	3.889 (1.836 to 8.235)	<0.001
Adolescent girls' perceived negotiation skill level						
Little/no confidence	51	367	1			
Moderate confidence	171	1082	1.096 (0.668 to 1.796)	0.716	1.030 (0.636 to 1.670)	0.902
High confidence	280	1335	1.389 (0.838 to 2.302)	0.202	1.018 (0.589 to 1.759)	0.949
Adolescent girls' perceived communication skill level						
Little/no confidence	49	366	1			
Moderate confidence	177	1102	1.076 (0.669 to 1.731)	0.762	1.117 (0.699 to 1.785)	0.643
High confidence	276	1314	1.374 (0.839 to 2.251)	0.207	1.317 (0.764 to 2.268)	0.321
Adolescent girls' contact with health extension worker						
Yes	68	238	1.657 (1.150 to 2.387)	0.007	1.232 (0.289 to 1.813)	0.289
No	434	2550	1		1	

The bold values indicate the significant characteristics.
AOR, adjusted OR; COR, crude OR; SRH, sexual and reproductive health.

sequential, age-appropriate HIV education curricula that respond to the preadolescent and adolescent's changing cognitive capabilities and social skills as it will serve as a window of opportunity to intervene early and be effective in inculcating HIV knowledge.⁴⁰ Culturally appropriate school-based SRH education programmes have also been

seen to get more support from parents to improve adolescent SRH outcomes.^{41 42}

Comprehensive knowledge of HIV was also significantly associated with increased age. This result is consistent with another study done in Ethiopia.⁸ Other studies in Burundi and Kenya,³² Nigeria,¹¹ Uganda²⁶ and multicountry



studies from sub-Saharan Africa³⁸ also showed a similar association. Other similar studies from Bangladesh^{35 43} and another study from India³⁷ also identified age as a factor. This might be because as adolescents get older, they are more likely to be exposed to sexual health education and services, which might have increased their HIV knowledge.⁴⁴

Strengths and limitations of the study

The study had a relatively large sample size with a good response rate (96.2%). The study also used standard outcome measurement, enabling better comparison among other studies. Regarding limitations, the study did not assess health promotion exposure through media. The study could also be biased as some adolescent girls may tend to answer certain questions based on their perceived expectations or opinion of their adult interviewers. The study was also conducted in a few rural districts in eastern Ethiopia, hence generalisability is restricted only to rural communities with similar contexts.

Conclusion and policy implications

Overall, less than one-sixth of the young adolescent girls had comprehensive knowledge of HIV. Adolescent girls exposed to SRH education in peer groups had better comprehensive HIV knowledge. Introducing HIV education and communication at an early age can improve comprehensive knowledge of HIV. Further study in different settings is needed to evaluate the feasibility and effectiveness of the intervention for scale-up.

Author affiliations

¹Department of Global Health and Health Policy, Addis Continental Institute of Public Health, Addis Ababa, Ethiopia

²School of Public Health, Addis Ababa University, Addis Ababa, Ethiopia

³School of Public Health, Haramaya University College of Health and Medical Sciences, Harar, Ethiopia

⁴Infectious Disease Epidemiology, London School of Hygiene and Tropical Medicine Faculty of Epidemiology and Population Health, London, UK

⁵Department of Nutrition and Behavioural Sciences, Addis Continental Institute of Public Health, Addis Ababa, Ethiopia

⁶Department of Reproductive Health and Population and Department of Epidemiology and Biostatistics, Addis Continental Institute of Public Health, Addis Ababa, Ethiopia

Acknowledgements The authors would like to acknowledge the Abdiboru project for providing the data for this paper.

Contributors NF, YB and AW were responsible for conceptualising, reviewing, and editing the manuscript. NF, AW and AWT were responsible for data cleaning. NF was responsible for formal analyses and writing the original draft. LO and AWT contributed and critically revised the manuscript. NF accepts full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish. All authors read and given their approval for the publication.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Institutional Review Board of Addis Continental Institute of Public Health (IRB

registration/identification No. 0029). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as online supplemental information.

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ORCID iDs

Nebiyou Fasil <http://orcid.org/0000-0003-2608-7936>

Lemessa Oljira <http://orcid.org/0000-0003-4542-2509>

Amare Worku Tadesse <http://orcid.org/0000-0002-7805-3191>

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