



RESEARCH ARTICLE

Attitudes toward and medical decisions on uptake of pre-exposure prophylaxis among young Ghanaians: A quasi-experimental one group study

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ABSTRACT

This study examined attitudes toward pre-exposure prophylaxis (PrEP) and medical decision making about PrEP uptake among educated young Ghanaians in Lower Manya Krobo Municipality (LMKM) to prevent HIV/AIDS. Lower Manya Krobo Municipality has a history of high HIV infection. There is paucity of studies on attitudes towards and medical decisions on PrEP among Ghanaians. PrEP is currently not approved in Ghana and West Africa generally. Efforts are, however, being made to study the possible use of the intervention in Ghana, against a background of generalized HIV infection, and increasing infection among the youth. We used primary data administered through mostly closed-ended questionnaires to 261 respondents. A quasi-experimental one group study was adopted. Respondents were asked the same questions on attitudes towards and medical decisions on PrEP before and after watching a six-minute YouTube video on PrEP. ANOVA was used to examine statistical significance between the paired, pre-and-post data. The Wilcoxon signed rank test helped with conclusions about the mean difference between the paired responses. The findings corroborated with previous literature regarding high sexual risk among the young people. There was a statistically significant effect of the video on attitudes and medical decisions regarding use of PrEP. It seemed that if PrEP were available, the study participants would uptake it to proactively protect themselves from HIV infection. They also had a higher inclination of using PrEP if a medical officer recommended its use, and its side effects were minimal. Statistically significant gendered differences showed that female respondents were less concerned about being stigmatized as having HIV if they took PrEP and were also more likely to respond favorably to the recommendation of a physician to use the intervention, compared to their male counterparts. Public education on PrEP use should consider the involvement of a medical figure.

Keywords: HIV/AIDS; pre-exposure prophylaxis (PrEP); quasi-experimental design, youth; Lower Manya Krobo Municipality; Ghana

Introduction

Pre-exposure prophylaxis (PrEP) has proven effective in reducing the spread of HIV among high-risk people who are HIV-negative. Studies indicate that when used as recommended, PrEP significantly reduces the risk of HIV acquisition^{1,2}. Yet several challenges prevent the utmost uptake of PrEP. Lack of awareness, knowledge of how to use PrEP, and misinformation about PrEP, even among healthcare providers, have been reported^{3,4}. HIV-related stigma also prevents people from practicing safer sex, including PrEP uptake⁵⁻⁷. Cultural values such as disapproval of sex at a young age, and especially before marriage⁸, social norms and poor social network support^{9,10}, and poverty¹¹ are also some of the barriers to an effective PrEP uptake.

In Africa, PrEP uptake has been slow despite its great need. In fact, over 50% of people living with HIV reside in Africa, and the youth, especially young women, represent one of the fastest-growing populations with HIV^{11,12}. Generally, African youth do not perceive themselves as at risk for HIV, and the females often do not know the serostatus of their male sexual partners^{11,13}. However, some PrEP programs that focus on population-specific barriers have been successful in reducing HIV risks^{14,15}, and particularly among women¹⁶⁻¹⁸. Identifying the barriers to and facilitators of PrEP uptake and creating intervention programs that teach how to overcome the barriers and maximize hindrances to its uses are important health promotion strategies. This study uses one group quasi-experimental data to examine attitudes toward PrEP and medical decision about PrEP uptake among educated young Ghanaians in Lower Manya Krobo Municipality (LMKM), an area with an unfavorable history with HIV/AIDS^{19,20}. We examine the impact of a short PrEP information video endorsed by the Centers for Disease Prevention and Control²¹, among some young Ghanaians, then analyze the differences between males and females, and provide some recommendations to stakeholders on ways to improve PrEP uptake among Ghanaian adolescents and young adults.

Today, HIV is no longer a death sentence because of the availability of antiretroviral drugs. However, people living with HIV still face a certain level of stigma, depending on the settings. Research studies on African populations still report stigma and discrimination against people living with HIV²²⁻²⁵. Also, an important number of African young adults, especially girls, are infected with HIV every day. In fact, 63% of all new HIV infections worldwide occurred in sub-Saharan African women and girls in 2022²².

Social vulnerability also puts young people, students, the unemployed, and women at risk of HIV in different resource-challenged settings²⁶⁻²⁸. Social and structural factors such as poverty, gender inequality, and human rights violations all increase the likelihood of young people, students, and other vulnerable populations becoming infected with HIV^{29,30}. Hence, it is important to disseminate PrEP in Africa, especially among people who are at risk of becoming HIV infected.

For PrEP use to be accepted and adhered to, Machado et al.³¹ advised that each country and program should research and understand the peculiar characteristics of

their target populations to discover the attitudes and perceptions of people. This should be centered around what they think, how they feel, and their perspectives surrounding PrEP and risky sexual behavior. The purpose of our quasi-experimental one group study is to examine attitudes and medical decisions about PrEP among Ghanaian students aged 18-35 in LMKM. Study participants were asked to watch a video on PrEP, after collecting baseline data and then post-intervention data were collected. The study is guided by the following questions: 1. Will watching the video change attitudes toward PrEP uptake among students? 2. Will watching the video change students' medical decisions about PrEP? 3. Will there be any differences between male and female students after watching the video?

Setting

Lower Manya Krobo Municipality (LMKM) is in the south-eastern area in Ghana. It had a population of 121,478 in 2021³². Agriculture is the main economic activity. LMKM is of particular interest because it has led in the rates of the HIV infection in Ghana nearly all the time^{19,33}. For instance, in 2018, the HIV/AIDS prevalence rate was 2.66% nationally while it was 5.6% in LMKM^{33,34}. Also, HIV prevalence in LMKM was reported to be over 1.7 above the national average among Ghanaians aged 15 to 49 in 2022³⁵. Given its HIV history, the Ghanaian government has established HIV testing, counselling, treatment, and referral facilities and specially trained personnel in the municipality^{36,37}. It is important to note that some previous authors have attributed the high rates of HIV/AIDS in the study catchment area to economic insecurity and reverse social disorganisation due to the entrenched effect of HIV/AIDS in the area over time³⁸⁻⁴⁰.

Methods

STUDY DESIGN AND SAMPLING

A population of ten post-basic schools were in the study's catchment area at the time of data collection. A pre-data collection recognizance survey was conducted to visit all post-basic schools in the study district/municipality, and to explain details of the study to identified heads/owners of each school. In Ghana, a post-basic school is a school that enrolls students beyond the first nine years of formal schooling, excluding kindergarten. During the visits, approved Institutional Review Board (IRB) documents, a brief synopsis of the study's proposal, and the draft questionnaire were shown to and left with the heads of each school. The Proprietor of a female-only school declined for her students to participate in the study, citing concerns of parents on talking to their children about sex-related issues. The remaining nine schools were used, after permission had been granted by the respective school authorities.

Post-basic, in-school young people were used because PrEP was not in use officially in Ghana at the time of the study and it was reasoned that in-school population may have a higher probability to have read about it, given the proliferation of smart phones and internet at school, compared with out-of-school youth. The inclusion criteria were for a student to be aged 18-35 years (the delineation of 'youth' by Ghana's Youth Policy), consent to be part of the study, and for the school's Proprietor or Head to agree for the study to be undertaken in their school. IRB approvals of the study were obtained from

both the University of North Texas and the University of Ghana, Legon's Ethical Committee for the Humanities.

Sampling for the study was combined purposive, quota and random—based initially on the number of students enrolled in each consenting school, and the male-female ratio for each co-ed school. Students were initially informed of the study by the schools' Head or Proprietor. Those who consented to be part of it were initially assembled, screened for age, and randomly selected to fit the number of males and females needed per school. Selected students were grouped in a big classroom for each school, and briefed about the study, without the school authorities being present. They were informed that the study was voluntary, there would be no penalty for opting out of it, and could opt out anytime they choose to, even if they started. No student opted out at that stage. Then they were asked to sign the consent forms. After this, each student was seated comfortably on a chair with a desk and spaced from their other schoolmates. The students self-administered the first part of the questionnaire, after which a short YouTube video that explains PrEP and its utility was shown to them as a group. The same questions were answered after watching the video. The second author and two trained, post-graduate research assistants (RAs) were on stand-by to answer any questions that the respondents had.

Pre-and post-data were collected from a sample of 261 students in April 2019. Participants were at least 18 years old and fluent in English. A series of statements (see Tables 2 and 3) that assessed participants' willingness towards and medical decision on uptake of PrEP were used for this study. The second author and two trained post-graduate RAs collected the data. It took on average 47 minutes to complete the pre-and post-treatment surveys, excluding the viewing of the video clip. Participants received five Ghana cedis (\$1.2) approved at the time of filing for ethical approval in August 2018 as incentive to participate in the study. This amount would be enough to buy a snack at the time of the study.

DATA ANALYSIS

The answer options for the attitudes toward PrEP and medical decision about PrEP uptake statements in Table 2 were recoded whereby Yes =3; Don't know =2, and No = 1 for all the statements except statements #4 (I

would wait until other people were taking PrEP before I use it myself) and #5 (I would be concerned that people will think I have HIV if I am taking a HIV medicine) for attitudes and statement #3 (I would be very uncomfortable taking HIV medicines when I don't have HIV) for medical decision. We reverse coded the answer options for these 3 statements to: Yes=1, Don't know =2, and No=3. Recoding the answer options makes it easier to understand the scores (the higher the scores, the more comfortable one was with PrEP). Reverse coding the three answer options mentioned above, participants who said yes were not comfortable with PrEP, and those who said no were more comfortable. Higher scores indicate being more comfortable with PrEP uptake.

The Wilcoxon signed rank test⁴¹ and ANOVA between subjects were used to test whether the mean difference between the paired data was statistically significant. We used ANOVA between subjects to assess the difference between posttest scores and pretest scores for all participants to answer the research questions 1 and 2, namely, a.-- Will watching the video change attitudes toward PrEP uptake among students? b.-- Will watching the video change students' medical decisions about PrEP? and between male and female participants for question 3. which is c. -- Will there be any differences between male and female students after watching the video?

Results

Table 1 presents the demographic characteristics of study participants. The average age was about 20 years (20.4). They were about 18 years old (17.79) on average when they had their first sexual intercourse. They were mostly high school seniors (70.9%) and almost all the participants self-identified as heterosexuals (99.2%). While about 48% have ever had sex at the time of the study, only 10% have heard about PrEP. Most of the participants (62.4%) had had at most two sexual partners in their lifetime. Most of the study participants did not use a condom during sex in the last 6 months prior to the study (71.4%), and 12% had ever had sexually transmitted infection. About 21% (20.6%) of the participants reported to have been forced to have sex or performed sexual act on someone. Only 30% had ever been tested for HIV.

Table 1. Descriptive statistics of study population

Variable	N	Mean/Valid %
Age in years	261	20.4
Age at first sexual intercourse	124	17.79
Educational attainment		
High school senior	183	70.9
Nursing training	41	15.9
Technical college	23	8.9
Other (not specified)	11	4.3
Have you ever had sexual intercourse?		
Yes	126	48.3
No	135	51.7
Sexual orientation		
Heterosexual	120	99.2
Bisexual	1	0.8
Number of people have ever had sex with		
1-2	78	62.4
3-4	29	23.2
5-6	7	5.6
7+	11	4.8

Variable	N	Mean/Valid %
Number of people have had sex with last 6 months		
0	44	34.9
1	62	49.2
2	13	10.3
3+	7	5.6
Used condom during each sexual encounter in last 6 months?		
Yes	32	28.6
No	80	71.4
Have you ever had sexually transmitted infection?		
Yes	15	12.1
No	109	87.9
Have ever been forced to have sex or perform sexual act on someone?		
Yes	53	20.6
No	204	79.4
Have you ever been tested for HIV?		
Yes	78	30.0
No	182	70.0
Have you ever heard of PrEP?		
Yes	26	10.1
No	232	89.9

Results for the Wilcoxon signed rank tests are in Table 2. The video significantly changed participants' attitudes and medical decisions regarding the uptake of PrEP for HIV prevention. Study participants agreed that they would be good at adhering to a daily PrEP regimen to protect themselves from HIV (pretest mean =2.04; posttest mean =2.43). They would be proactive in initiating PrEP usage if it was available (pretest mean =1.93; posttest mean =2.26). Also, they believed that taking a daily HIV medicine would be a good way to protect themselves from getting HIV (pretest mean =1.93; posttest mean =2.34). Furthermore, participants showed enhanced confidence in taking PrEP after watching the video. They would be less concerned that people would think they have HIV if they were taking PrEP (pretest mean =1.67; posttest mean =1.87) and would not wait until other people were taking PrEP

before they use it themselves (pretest mean =2.11; posttest mean =2.33).

Furthermore, participants significantly became more favorable to medical decisions regarding PrEP uptake after watching the video. They displayed a greater inclination to consider taking PrEP if recommended by their doctors (pretest mean =2.34; posttest mean =2.62). They also would take PrEP if they had minor side effects and these effects went away after taking it for a few weeks (pretest mean =1.72; posttest mean =1.96). They, additionally, would be more comfortable taking PrEP if they knew just how their health would be affected (pretest mean =2.14; posttest mean =2.38). They would also be more comfortable taking HIV medicine when they don't have HIV (pretest mean =1.64; posttest mean =1.89).

Table 2. Attitudes toward and medical decisions to uptake PrEP (N=261)

Attitude questions	Mean		Wilcoxon test	P-Value
	Pretest	Posttest		
1. I would be one of the first people to use PrEP if it were available	1.93	2.26	-4.20	0.000
2. Taking a daily HIV medicine would be a good way to protect myself from getting HIV	1.93	2.34	-6.04	0.000
3. I would be very good at remembering to take a daily HIV pill to protect myself from getting HIV	2.04	2.43	-5.02	0.000
4. I would wait until other people were taking PrEP before I use it myself	2.11	2.33	-4.35	0.000
5. I would be concerned that people will think I have HIV if I am taking a HIV medicine	1.67	1.87	-3.176	0.001
6. If I was taking PrEP, I would feel more comfortable about having sex with someone who is HIV positive.	1.60	1.70	1.903	0.057
Medical decision questions				
1. If my doctor suggested that I take PrEP to protect myself from getting HIV I would take it	2.34	2.62	-4.20	0.000
2. I would take PrEP even if I had minor side effects that went away after taking it for a few weeks.	1.72	1.93	-3.75	0.000
3. I would be very uncomfortable taking HIV medicines when I don't have HIV	1.64	1.89	-3.89	0.000
4. I would be more comfortable using PrEP if I knew just how it would affect my health	2.14	2.38	-3.62	0.000

The results in Table 3 provide an analysis of the attitudes toward and medical decisions to uptake PrEP among male and female study participants. Comparing male

and female participants, results shows that only one attitude and one medical decision questions were statistically significant. More female participants agreed

that they would be less concerned about people thinking that they had HIV if they were taking an HIV medicine compared to their male counterparts, after watching the video. Also, more females agreed that they would take PrEP to protect themselves from getting HIV if their doctors suggested it, compared to their male

counterparts. It is worth noting that more women also agreed that they would be very good at remembering to take daily HIV pill to protect themselves from getting HIV, but the p-value is 0.065. All the other questions did not show a significant difference between the male and female participants statistically

Table 3 Attitudes toward and medical decisions to uptake PrEP among males and females (N=261).

Attitude questions	Mean		Anova F test	P-Value
	Male	Female		
1. I would be one of the first people to use PrEP if it were available	0.26	0.31	0.175	0.676
2. Taking a daily HIV medicine would be a good way to protect myself from getting HIV	0.45	0.39	0.230	0.633
3. I would be very good at remembering to take a daily HIV pill to protect myself from getting HIV	0.22	0.47	3.423	0.065
4. I would wait until other people were taking PrEP before I use it myself.	0.33	0.15	1.772	0.184
5. I would be concerned that people will think I have HIV if I am taking a HIV medicine	0.06	0.38	1.078	0.001
6. If I was taking PrEP, I would feel more comfortable about having sex with someone who is HIV positive	0.17	0.07	0.631	0.428
Medical decision questions				
1. If my doctor suggested that I take PrEP to protect myself from getting HIV I would take it.	0.03	0.44	1.193	0.001
2. I would take PrEP even if I had minor side effects that went away after taking it for a few weeks.	0.27	0.23	0.124	0.725
3. I would be very uncomfortable taking HIV medicines when I don't have HIV	0.17	0.32	1.063	0.304
4. I would be more comfortable using PrEP if I knew just how it would affect my health.	0.16	0.29	0.918	0.339

Discussion

Many studies have examined knowledge of and attitudes toward PrEP in Africa, but most of the studies have been conducted among people in southern and eastern African countries^{8,11,42-45} and among men who have sex with men^{7,46}. This study uses a one-group quasi-experimental design to assess attitudes toward and medical decisions on the uptake of PrEP among young Ghanaian adults in LMKM, an area with an unfavorable HIV prevalence. The LMKM stands out in the debilitating effect of HIV/AIDS on the socio-economic fabric and livelihoods of residents in the catchment area.^{37,39} Findings in this study aim to add to the sparse literature on PrEP uptake in West Africa, especially Ghana. While the study participants mostly came from a population with an HIV unfavorable history, they had a low level of PrEP knowledge. Nevertheless, PrEP is currently not in use in Ghana. Thus, not knowing about it practically takes nothing away from them, with respect to its potential to have been of benefit to protecting them against infection with the virus.

However, watching the video increased their knowledge and led to some positive attitudes toward PrEP uptake and making medical decisions with regards to possible uptake of PrEP. The video with information on PrEP thus, served as a critical intervention to their possible safety, if it were in use, and provides a policy nuance for Ghana's decision regarding the use of PrEP. For instance, our participants would be proactive in initiating PrEP usage if it was available. They also displayed a greater inclination to consider taking PrEP if recommended by their doctors. The pointers to the influence of a recommendation by a physician underscores the effect of credible information. Physicians are in fact, trained to have command over their recommendations for medications and patient safety, ordinarily.

Hence, public education on PrEP may go a long way to improve the odds of Ghanaian young adults and women who are at risk of getting HIV if PrEP is introduced in the country. Awareness of PrEP may also increase among all population groups, especially, among at-risk populations. A possible introduction of the intervention in Ghana to aid the fight against HIV/AIDS is also warranted as there is a generalized HIV/AIDS epidemic (more than 1% of the general population are infected) and as PrEP is known to have aided HIV infection control in countries in which it is in use⁴⁷.

Conversely, while respondents of this study would be one of the initiators to use PrEP if available and would be less likely to wait until others were taking PrEP before they use it themselves, it is important to note that the uptake of PrEP is a complex decision to be made and people who show high level of interest may still not be ready for it. As indicated by Rolle et al.⁴⁸, showing high interest in PrEP does not necessarily mean following up with uptake. In fact, in their study of young Black MSMs in Atlanta, Georgia, even when structural barriers are lifted, uptake of PrEP was still low among people who showed high interest in uptake.

In drug administration typically, issues such as potential side effects, prescription-related control, access-related issues such as access to a health facility and to qualified technical persons to do the prescription, as well as financial access and geographical access to a place where the medicine of interest is available for retail are all important. In Ghana, these types of healthcare-related access do not come on a silver platter, particularly for young, unemployed persons in a typically lowly endowed financial community.

It is also critically important to note that the discourse regarding PrEP use has connotations for sexual involvement, in our part of the world where HIV is mostly acquired through sexual intercourse. In this regard, the Ghanaian cultural narrative is caught up in a double wedge where young persons are stigmatized for being sexually involved, and at the same time, some of them are known to be highly sexually experienced even to the point of engaging in sexual risk that puts them in danger of contracting sexually transmitted diseases, including HIV⁸. Hence it is important for stakeholders to bear this in mind and strategically work with young Ghanaians who are at risk of HIV to understand not only the benefits of PrEP but also ways to reduce barriers for PrEP uptake.

Further, the gendered difference in our findings whereby more females than males would take PrEP to protect themselves from getting HIV if their doctors suggested it speaks to the reality of females facing stiffer social backlash on being infected with HIV, and specifically so in the study areas^{25,36,49}. This implies higher vulnerability of females and may underscore the higher need for females to take advantage of PrEP to protect themselves against HIV infection. Furthermore, young females in Africa, Ghana, and for that matter, the study district, are more exploited sexually and thus face greater sexual risk from HIV infection^{27,50}. The study community we used is also more patriarchal^{19,25,36,51}, possibly explaining the young females' higher propensity to use PrEP if a doctor recommended it, compared to their male counterparts. In Ghana, doctors, particularly those practicing in rural and peri-urban areas such as the study's catchment area, are mostly males. Listening to the voice of a male doctor, and in the same vein, needing a voice to lead the females in the study to consider using PrEP attest to the mostly patriarchal culture of the study community.

While most attitudes and medical decisions regarding PrEP uptake did not show significant gender differences, concerns about stigma and adherence to medical advice were notably different, with females being less concerned about stigma and having higher likelihood of following medical recommendations compared to their male counterparts. These insights can inform targeted interventions to address specific concerns and improve PrEP uptake across different genders. In this study, more females being less concerned about possible HIV-related stigma is interesting because previous authors who have studied HIV-related issues in the study's catchment area have noted literally the absence of HIV-related stigma for the male respondents, while the reverse was true for their female respondents^{36,49}. Future studies may have to unravel the nuances underlying HIV-related gender differences in stigmatization and PrEP uptake in the study area, if not for Ghana as a whole.

Limitations of the study

The main limitation of the study is that it is both retrospective and prospective. Respondents may have forgotten details of past lifestyle events they reported. Similarly, when experienced in the true setting, they may act differently from what they said, regarding the possible use of PrEP. Also, the study is cross-sectional, hence it is not possible to make attribution to causality in the findings. Furthermore, the purposive sampling makes

our findings lack external validity to non-respondents outside the study municipality including, out-of-school-youth, even within the study municipality^{25,36,49}. Finally, social desirability may be in effect whereby study participants gave answers that they felt would be helpful for the study and/or might be socially accepted.

Conclusion

This study examined attitudes toward PrEP and medical decision making about PrEP uptake among educated young Ghanaians in the LMKM catchment area in the Eastern Region of Ghana. PrEP is currently not in use in Ghana. However, attempts are being made to study its implications for Ghana's fight against its generalized HIV/AIDS pandemic. This is against the background of high proportion of HIV/AIDS infections in sub-Saharan Africa in general, and particularly the increasing significantly higher infections among the youth aged 15-24 years, in the sub-region^{35,52}. In conclusion, our study has affirmed previous researchers in the region, that the sexual lifestyle of many young people is very risky and careless^{53,54}. Thus, the option of having PrEP for preventing HIV-infection would be necessary.

Our quasi-experimental one group approach found that effective health education on PrEP would go a long way in facilitating the adoption and use of PrEP among Ghanaian youth. This should include education on its side effects, which effects should be minimal, etc. Furthermore, recommending PrEP by a physician would greatly boost the chances of its acceptance among the respondents. Importantly, we found some statistically significant attitudinal differences between male and females. Compared to males, females were less concerned about being stigmatized for having HIV should they be seen to be taking PrEP. Also, compared to the male participants, females had more positive attitudes towards taking PrEP to protect themselves against HIV, on the recommendation of their physician. This gender differences may be informed by documented gendered differences in experiencing HIV/AIDS in Ghana, including the study municipality^{19,25,36}.

Before Ghanaian health authorities take a policy decision on adopting PrEP, there is the need for widespread, effective health education and further studies among both the general public and key populations affected by HIV/AIDS. This should include information on the potential side effects of the intervention. Actively involving physician-figures in mass media and small-group based social and behavioral health communication and education on PrEP is highly recommended when the time comes to implement PrEP in Ghana.

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