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Original Research Article

Adherence to HIV pre-exposure prophylaxis (PrEP) among key populations: an analytical cross-sectional study in Matayos Sub County, Busia County, Kenya

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ABSTRACT

Background: A large percentage of the new cases of HIV/AIDs in Kenya are attributed to Key Populations (KPs). In Kenya, KPs contribute 33% of all new infections of HIV. It is with this realization that in 2017 the government of Kenya launched The Pre-Exposure Prophylaxis (PrEP) for HIV. The study aimed at assessing the factors influencing adherence to PrEP by KPs in Matayos sub-county, Busia County, Kenya.
Methods: An analytical cross-sectional study that utilized a mixed-method data collection approach (n=343) was used to assessing the factors influencing adherence to PrEP by KPs in Matayos sub-county, Busia County, Kenya.
Results: The level of adherence to PrEP using the Morisky Medical Adherence Scale-4 was established to be 37% among all KPs and 36%, 37% and 52% among CSWs, MSMs and PWIDs respectively. Chi-square analysis revealed significant relationship between Level of education (p=0.05), marital status (p=0.001), KP category (p=0.034), occupation (p=0.014), stigma (p=0.00), the perceptions of side effects (p=0.011), facility accessibility (P= 0.00), side effects (p=0.001) and adherence to PrEP. Among the MSMs condom use was established to have association to PrEP adherence (p=0.00).
Conclusions: The study concluded that socio-demographic, individual characteristics, and clinical factors influence adherence to pre-exposure prophylaxis among key populations. The study recommended that key populations need more information on how to use pre-exposure prophylaxis, how it works, the side effects, what to do in case they experience the side effects and why adherence to pre-exposure prophylaxis is important.

Keywords: Key populations and adherence, Pre-exposure prophylaxis

INTRODUCTION

The Joint United Nations Programme on HIV/AIDS report of 2017 indicates that 36.9 million people live with Human Immunodeficiency Virus (HIV/AIDs) globally. It is estimated that 1.8 million new infections of HIV are reported annually around the globe translating to approximately 5000 new infections per day.[1] HIV related deaths annually have reduced by 54% between the years 2004 and 2018 Approximately 53% of PLWH by 2017 lived in Eastern and Southern Africa. The decline in life expectancy in Africa is mainly attributed to the HIV epidemic. SSA, hosts 71% of the global HIV infection burden.[2]

In Kenya by the year 2018, about 1.3 million people in Kenya were living with HIV/AIDs. According to the KENPHIA 2018 report, Kenya has a prevalence rate of

4.9%. In Kenya, 7 Counties had the highest burden of HIV which include Homa Bay County 19.6%, Kisumu County 17.5%, Siaya County 15.3%, Migori County 13.0%, Busia County 9.9%, Turkana County 6,8% and Kisii County 6.1%.[3] Within these seven counties, the HIV burden varies and is more in specific segments of the population, especially the key populations (KPs).[4]

Kenya has a spread HIV epidemic among the adult population, but Key Populations (KPs) carry the huge burden of the virus. They have a higher risk of exposure to HIV infection and transmission.[5] In Kenya, the Key Populations consists of Female Sex Workers (FSW), Male Sex Workers (MSW), Men Who have Sex with Men (MSM), and the People Who Inject Drugs (PWID). HIV prevalence is persistently high among KPs ranging from an estimated 18.2% among MSMs, 29% among FSW, and 18.7% among PWID. Busia county HIV prevalence is 9.9 percent making it 5% higher compared to the national HIV prevalence.[3]

Pre-exposure prophylaxis (PrEP) is an HIV prevention approach used to reduce the rates of new HIV infections among HIV negative people.[6] The method consists of antiretroviral drugs administered before a person exposes himself/herself to the risk of HIV infection to reduce the risk of disease and continues to use the medication for the period they are exposed to the risk of infection.[6] PrEP involves the use of two co-formulated antiretroviral drugs that is Tenofovir Disoproxil Fumarate (TDF) and Emtricitabine (FTC), with the brand name Truvada.[1]

METHODS

Study setting

Matayos Sub County in Busia County was the setting for the study. Of the 3839 total estimated number of KPs in Busia County, 1554 CSWs, 72 PWIDs, and 160 MSMs reside in Matayos Sub-County and were enrolled on PrEP. Survivors Organization a Community-Based Organization (CBO), ADT DIC, Apokoor Dispensary, Madende Health Centre, Igara Dispensary, Busia County Referral Hospital, Osieko DIC, Rukala DIC, Busangwa DIC and Khajula DIC that works with KPs, and PrEP were used to reach KPs seeking PrEP services in Matayos Sub County.

Study design and participants

The study used an analytical cross-sectional design that utilized mixed method which employed both qualitative and quantitative data collection methods. To be included in the study one had to be 18 years and above and willing to participate in the study. You also had to be identified as a Key Population, enrolled on PrEP, and must have lived in Busia County for at least 6 months. The study took a period of 9 months (Nov 2021 to July 2022).

Sampling

Busia County was purposively sampled among the 47 counties in Kenya. The reason for choosing Busia County includes the county had a PrEP program being implemented among KPs and had a prevalence rate of 9.9 % of HIV infection, which is higher compared to the national prevalence of 4.9% according to NASCOP. Matayos Sub County was equally selected using a purposively as it hosts the most significant number of PLWH in Busia County. KPs segment of the population was sampled to participate in the study as the PrEP program is majorly focused on the KPs due to their role in the spread of HIV.[7] Systematic random sampling was applied to select KPs enrolled on PrEP in each health facility or DIC.

Measurement

The Morisky scale-4 was used to determine the level of adherence to PrEP by the respondents. The scale had four questions with dichotomous response categories of yes or no. The rationale behind the four items is that drug errors of omissions may occur in any or all the four ways that is forgetting, carelessness, stopping the drug when feeling better or starting to use the drug when feeling worse or at risk. A score of below 2 in the four items indicates adherence and a score of 3 and 4 indicates nonadherence.

Data analysis

Quantitative data was cleaned and coded using MS Excel software. The data analysis incorporated both descriptive and inferential statistics. The analysis used descriptive statistics to describe the data. Inferential statistics were used to draw conclusions for the study. The study further utilized univariate analysis to describe and summarize the essential characteristics of the respondents. Bivariate analysis (chi-square test) was used to examine the relationship between dependent and independent variables. Thematic analysis following the five stages of thematic analysis: - familiarization, identification of the themes, indexing, charting, mapping, and interpretation was used to analyse qualitative data.

RESULTS

Socio-demographics

Majority (73%) of the participants were between the 18 to 27 years old, twenty percent 28 to 32 years and 7% were above 33 years as shown in Table 1 below. 82% were female and 18% were male. Majority of the KPs who participated in the study were CSWs (85%), 8% were MSMs while 7% were PWIDs. Among the participants 60% were single, 29% separated, 5% divorced and 9% were married. 33% of the participants indicated that they were either unemployed or self-employed, 20% were in paid employment while 14% were students as illustrated in Table 1. Majority of respondents had college/university

education and secondary education 40% and 39% respectively, 19% had primary education while 2% had no formal education. A half of the participants had been enrolled on PrEP for 5 months and below, 24% between 6 to 8 months, 11% 9 to 11 months, 5% 12 to 14 months and 3% more than 15 months.

Table 1: Socio-demographic characteristics of respondents.

Variable	Response	Frequency	Percentage (%)
Age (years)	18-22	123	36
	23-27	129	37
	28-32	68	20
	33 and above	23	7
Gender	Male	63	18
	Female	280	82
Key Population Type	CSWs	291	85
	MSMs	27	8
	PWIDs	25	7
Marital Status	Married	31	9
	Single	206	60
	Separated	90	26
	Divorced	16	5
Occupation	Unemployed	112	33
	Self Employed	113	33
	Paid Employment	69	20
	Students	48	14
Level of Education	No formal education	6	2
	Primary	65	19
	Secondary	134	39
	College / University	138	40
Duration on PrEP (Months)	3 -5 Months	196	57
	6– 8 months	82	24
	9 – 11 months	36	11
	12 – 14 months	17	5
	15- 18 months	12	3

Level of adherence

The Morisky scale-4 was used to determine the level of adherence to PrEP by the respondents. 37% of the participants were adherent to PrEP while 63% (216) were non-adherent. Among the CSWs 35% were adherent and 65% were not adherent to PrEP. More than half of the PWID were adherent to PrEP (52%) while 37% of the MSMs were adherent. The study indicated that the longer a KP is on PrEP the higher the adherence rate. 100% of KPs who had been on PrEP for more than 13 months were adherent while 44% of those who had been enrolled on PrEP for between 10 to 12 months where adherent. Among KPs who had been enrolled on PrEP for between 7 to 9 months 61% adherent. The group with the highest percentage of non-adherent KPs was that enrolled for a period of between 3 to 6 months with 70% non-adherent.

Socio-demographic factors and the adherence to PrEP by KPs

Half of the participants aged 33 and above were adherent to PrEP. However, the study established that the age of the KP wasn't a determinant for adherence to PrEP (p=0.84) as shown in Table 2 below. KPs with no formal education had the higher percentage of non-adherence to PrEP. KPs with mid-level college education 46% were adherent, primary education had 43% adherence level, secondary education 28% and university education recorded the highest levels of adherence at 69%. Education had an association with PrEP adherence (p=0.05). Widowed KPs had a higher adherence rate at 56% followed by married KPs at 48% and separated and single KPs 32% and 36% adherence levels respectively. Marital status had a significant statistical relationship with PrEP adherence (P=0.011) as illustrated in Table 2 below. All the participants who reported to receive support from family members were adherent while those who received support from friends, partners and those who did not receive any support had 31%, 38% and 40% adherence levels. There was significant relationship between the fear of stigma, place of residence, disclosure of PrEP use with adherence to PrEP (p=0.000), while also the occupation of the KPs was a big determinant for adherence to PrEP (p=0.014). In addition, KP's type was established in the study to have influence on the adherence to PrEP (P=0.034) as shown in Table 2.

Table 2: Socio-demographic characteristics and PrEP adherence by KPs (n=343).

Independent variable	Response	Proportion		Dependent variable – adherence to PREP		Statistical significance
Social-demographic factors		**Adherent (n= 37%)**	**Non adherent (n=63%)**	**Adherent (n= 127)**	**Non adherent (n=216)**	
Age (years)	18-22	15	85	18	105	X^2=44.26 DF=3 P=0.84
	23-27	45	55	58	71	
	28-32	57	43	39	29	
	33-37	52	48	12	11	
KPS category	CSWS	36	64	104	187	X^2=2.61 DF=2 P=0.034
	MSMS	37	63	10	17	
	PWIDS	52	48	13	12	
Marital status	Married	48	52	15	16	X^2=5.25 DF=3 P=0.011
	Separated	32	68	29	61	
	Single	36	64	74	132	
	Widowed	56	44	9	7	
Level of education	Middle lev college	41	59	50	72	X^2=16.59 DF=4 P= 0.05
	No formal education	0	100	0	6	
	Primary	43	57	28	37	
	Secondary	28	72	38	96	
	University	69	31	11	5	
Occupation	Paid employment	43	57	30	39	X^2=13.69 DF=4 P=0.014
	Self employed	42	58	47	66	
	Student	16	84	7	37	
	Unemployed	38	62	43	69	
Fear of stigma	No	37	63	29	50	X^2=0.004 DF=1 P=0.00
	Yes	63	37	98	166	

Health systems factors and the adherence to PrEP by KPs

The study established statistically the PrEP service health facility did not have any association with adherence to PrEP by KPs (p=0.38). Among those who visited CBOs for PrEP services 36% were adherent, FBOs 80% adherent, GoK facility 81% adherent while those getting the services from private facilities 58% were adherent as detailed in Table 3. Majority (60%) of the KPs who received PrEP services at night were adherent, in the evening 43% adherent, afternoon 17% adherent, anytime 42% adherent, mid-day 73% adherent while morning hours 23% adherent. Moreover, participants who spent less than 30 minutes when seeking PrEP services majority were adherent (68%), compared to those who spent 30 minutes to 1 hour 33% adherent and 1 to 2 hours 26% adherent. Statistically, the time scheduled for PrEP clinic, attitude of the health care provider offering PrEP services and time spent in the health facility while seeking PrEP services do not have any association to the adherence to PrEP by KPs (P=0.38, p=0.98, p=0.87 respectively). Accessibility to the facility where the KPs get PrEP services 76% of those who indicated not accessible were adherent while 39% of KPs who stated that their PrEP service point was accessible were adherent. Statistically therefore, the accessibility of the PrEP services facility that is distance, cost and time had significant influence on adherence to PrEP by KPs (P=0.00). The study established that the side effects associated with PrEP had equally a statistical significance to PrEP adherence by KPs (P=0.001) as shown in Table 3.

Level of knowledge on PrEP by KPs

Most of the participants (50%) indicated that the effectiveness of PrEP in preventing HIV is 70-90%. 74% of the participants indicated they have received health education on PrEP with 27% reporting to never have received health education on PrEP. Among those who reported to have received health education 66% received health education on every visit while 30% and 4% received health education every 3 months and 6 months respectively. Additionally, 43% of the respondents

indicate that their source of information on PrEP is media, 39% friends, 34% health providers and 26% peer educators. More than half of those who indicated that PrEP protection from HIV was 70%-90% were adherent. KPs who indicated that PrEP protects a person by 100%, 33% were adherent while 67% were non-adherent. However, the study established that the level of protection from HIV by PrEP had no statistical significance to adherence to PrEP by KPs (p=0.20). Statistically, receiving health education during PrEP service delivery was established to have a significance on the level of adherence by the Key Populations (p=0.00) as shown in Table 4. The study also established the number of times the KPs received health education on PrEP (p=0.29), levels of satisfaction with the information they receive during health education (p=0.56) and the source of information on health education (p=0.95) did not have any statistical significance to adherence to PrEP by KPs. On the other hand, 36% of those who had knowledge of PrEP side effects were adherent to PrEP compared to 38% who were adherent and reported not to have knowledge of side effects of PrEP. Knowledge of side effects was also measured for significance and the study established that knowledge on side effects had a significance influence of the adherence to PrEP by KPs (p=0.00) as shown in Table.4.

Table 3: Health facility environment and PrEP adherence by KPs (n=343).

Independent variable	Respondent response	Proportions		Dependent variable		Statistical significance
		Adherent (n= 37%)	Non adherent (n=63%)	Adherent (N= 127)	Non adherent (n=216)	
PrEP service health facility	CBO	36	64	36	60	χ^2= 48.06
	FBO facility	80	20	16	4	df =4
	GoK Facility	81	19	26	112	P=0.38
	NGO Facility	53	47	27	24	
	Private health facilities	58	42	22	16	
Accessibility	No	76	24	9	29	χ^2=3.26 df=1
	Yes	39	71	118	187	p= 0.00
PrEP services scheduled time	At night	60	40	3	2	χ^2= 46.24
	Evening	43	67	15	20	df=5
	Afternoon	17	83	7	35	p= 0.37
	Anytime	42	58	39	54	
	Mid-day	73	27	35	13	
	Morning Hours	23	77	28	92	
Time spent during PrEP services visit	Less than 30 minutes	68	32	44	21	χ^2=33.99
	1 hour to 2 hours	26	74	31	90	df=2
	30 minutes to 1 hour	33	77	52	105	p=0.98
Side effect KPs are most worried about	Infertility	44	56	12	15	χ^2=21.29
	Abdominal pain	69	31	11	5	df=7
	Bone Weakness	25	75	1	3	p=0.001
	Headache	30	70	16	37	
	Kidney Failure	23	77	7	24	
	Liver Failure	81	19	7	29	
	Weight Loss	64	36	9	5	
	None	40	60	64	98	

Table 4: Level of Knowledge on PrEP and adherence to PrEP by KPs.

Independent variable	Respondent response	Proportions		Dependent variable – adherence to PrEP		Statistical significance
Knowledge		Adherent (n= 37%)	Non adherent (n=63%)	Adherent (n=127)	Non adherent (n=216)	
Level of protection from HIV by PrEP	100%	33	67	18	37	χ^2=39.30
	50% to 65%	23	77	21	72	df=3
	70% to 90%	52	48	88	82	p=0.20

Continued.

Independent variable	Respondent response	Proportions		Dependent variable – adherence to PrEP		Statistical significance
	Below 50%	0	100	0	25	
Do you receive health education?	No	51	49	46	45	χ^2=9.71 df=1
	Yes	32	68	81	171	p=0.00
How often they received health education?	Once in 3 months	12	88	9	66	χ^2=28.69
	During every visit	40	60	67	100	df=3
	Once in 6 months	50	50	5	5	p=0.29
	Non	51	49	46	45	
Satisfaction with the health education received?	Adequate	29	71	22	54	χ^2=30.02
	Not Adequate	0	100	0	11	df=3
	Somehow	15	85	11	60	p=0.56
	Very Adequate	51	49	48	46	
Source of information on PrEP	Peer educators	40	60	25	38	χ^2=6.71
	Friends	44	56	42	53	df=3
	Health providers	39	61	32	50	p=0.95
	Media	27	73	28	75	
Knowledge on the side effects of PrEP	No	38	62	65	107	χ^2=0.09 df=1
	Yes	36	64	62	109	p=0.00

DISCUSSION

Using the Morisky Medication Adherence Scale- 4 (MMSA-4) the study established that KPS adherent to PrEP level is 37%. PrEP adherence level among the different KP categories was 36%, 52% and 37% of CSWs, PWIDs and respectively. The results of the study were comparable with adherence rates of 40% in West China among MSMs and 36% in a meta-analysis study conducted among women in Canada.[8,9] However, the study was found to be inconsistent with the findings in Latin America, South Africa, and Thailand (51%) and in East Africa among sero-discordant couples (82%).[10]

This study assessed whether social demographic characteristics influence adherence to PrEP. The findings of this study were similar to a study conducted in Nairobi, Kenya among seronegative participants which established that level of education (p=0.01) has a significant influence adherence to PrEP. In addition, the study indicated that maturity and age of the KPs had influence on adherence to PrEP which was similar to the findings of this study where those between 18 to 22 years had the highest percentage (85%) of non-adherence to PrEP.[11] Furthermore, the study indicated place of residence of the person (p=0.04) on PrEP influences adherence same to the findings of this study. In addition, indicates in his findings that partners support (p=0.04), disclosure (p=0.04) and relationship status (p=0.04) impact adherence to PrEP positively similar to this study.[11] Another study conducted in Kenya is consistent with this study indicating that occupation of the KPs have an influence of the adherence.[12]

This study evaluated weather health facility factors affect adherence to PrEP among the KPs. Accessibility in this study had a significant influence on adherence to PrEP by KPs. The results of this study were similar to the conclusions of a study conducted in rural Uganda that indicated that participants who lived more than 2 KMs from the PrEP facility service point were less likely to adhere to PrEP (p=0.024).[13] Another study conducted in Kenya; Nyanza is consistent with the findings of this study that distance to the health facility offering PrEP services was a barrier to adherence to PrEP among fishermen enrolled on.[14]

Health education and knowledge of side effects of PrEP in the study had statistical significance to adherence of PrEP among KPs. A study conducted Europe among women at high risk of contracting HIV, 59% of the participants indicated that lack of information about PrEP was the most had a high influence on adherence to PrEP among participants.[15] In a study conducted in Kenya the results were consistent with the result of this study. The study concluded that adherence to PrEP is facilitated by proper and well-structured health education sessions to the PrEP users. In this study in the first 3 months of initiation on PrEP uptake and adherence to PrEP was high at 81% and this was directly attributed to the increased awareness enabled by individual and group health education sessions at the points of service.[16] In this study the KII discussions illustrated the key role training to health care workers and lack of adequate information on PrEP. This was consistent with a qualitative study conducted in Kenya which concluded that nurses need more training on PrEP, adherence counselling and how to manage Key Populations.[14]

In this study additionally the nature of the PrEP pill was found to have a high significance to the adherence to PrEP by KPs (p=0.001). This was consistent with the

qualitative indicated that having to take the pill every day affected adherence to PrEP among discordant couple, widows, and female sex workers.[14] In this study majority of the participants (79%) who reported that the colour and size of the PrEP pill were non-adherent while only 21% were adherent. This was also well articulated in the KII by the participants. This finding was different from a study conducted in South Africa where the size of the pill and the colour were significantly associated with good adherence.[17] Furthermore, the study found that side effects of PrEP had a high significance to adherence of KPs to PrEP (p=0.00). This is consistent with a study conducted in South Africa among the MSMs that indicated 74% of the participants stopped using or had issues with adherence because of side effects as their main reason.[18]

The study evaluated individual characteristics (drug and alcohol use, use of condoms and other HIV prevention strategies, number of sexual partners and the perceived risk to HIV by KPs). The study established that 78% missed their daily PrEP pill due to intoxication by alcohol or other drugs. In addition, 64% indicated that condom use affects their adherence to PrEP. When bivariate analysis was conducted alcohol and drug use was found to have significant influence on the adherence to PrEP by KPs (p=0.00). A qualitative study conducted in USA is consistent with this study indicating that alcohol and other substance use is associated with adherence to PrEP.[19] In another study conducted among LGBTQ community indicated that using drugs increased the chances of missing the daily PrEP pill by 55% on the same day and by 60% in the next day.[20]

This study also established that the use of condom has a statistical significance to adherence to PrEP by KPs (p=0.00). On the other hand, increase in the number of sexual partners was on the rise 82% of participants indicated to have one sexual partner before enrolling on PrEP and 63% indicating to have 3 or more sexual partners after enrolling on PrEP. This is consistent with a study conducted in Mississippi that indicated that individual risk behaviors also influence adherence to PrEP.[21] In a study carried out in South Africa indicates that with the use of PrEP and the reduced risk of HIV due to high adherence lowered condom use.[22]

This study has few limitations. The study area being a boarder county with a higher incidence rate of Covid 19 compared to the national incidence made it difficult to collect data because of adherence to MoH Covid 19 protocols. This occasioned data collection to take more days compared to the planned time. The study coincided a lot with other work-related assignments which prolonged the study by two weeks as I was away engaged in end year evaluations of program work. The study may have been limited by the recruitment strategy used where the KPs who had dropped out of the PrEP program were not included. In addition, the participant's recruitment processes also missed KPs who had travelled or were not available during the data collection period.

CONCLUSION

The study concluded that the adherence levels of KPs to PrEP is 37%. In addition, the duration a person has been enrolled on PrEP has an influence on adherence to PrEP by KPs. Statically socio-demographic factors that were found to have an influence on adherence to PrEP include marital status, level of education, occupation, place of residence, disclosure, and fear of stigma. Moreover, accessibility to the PrEP service point and the side effects of PrEP had a significant influence on adherence to PrEP by KPs. In addition, receiving health education during the visits for PrEP services was also influential to the adherence to PrEP. Behavioural factors such as alcohol use, use of condoms and number of sexual partners for the MSMs were influencing adherence to PrEP.

Recommendations

Adherence to PrEP or any other treatment requires teamwork of the KPs, community organizations, health facilities and health care providers and policy makes among other active participants. The specific recommendations from this study include:

KPs need more information on how to use PrEP, how it works, the side effects, what to do in case they experience the side effects and why adherence to PrEP is important.

Health care providers should receive additional training on PrEP, adherence counselling and friendly services delivery.

The Busia County Department of health should create PrEP service points away from the Comprehensive Care Clinic (CCC) and the general out-patient clinic.

More sensitization and awareness creation programs should be done in the community to reduce stigma around PrEP and increase uptake of PrEP among those at risk of HIV.

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