



Factors influencing uptake of pre-exposure prophylaxis(PrEP) among adolescents and young women in Suba sub-County, Homabay County.

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Abstract

Background: Pre-exposure prophylaxis (PrEP) is a new biomedical intervention used for prevention of HIV acquisition in HIV-seronegative high-risk individuals using antiretroviral drugs before HIV exposure. In the wake of rising HIV infections in adolescents and young women, Pre-exposure Prophylaxis (PrEP) provides an opportunity to reduce the HIV epidemic.

Method: A descriptive cross-sectional study design involving 394 adolescents boys, girls and young women aged 15-24years was conducted in Suba sub County, Homabay County, Kenya, between September 2017 to December 2019. A systematic random sampling technique was used to select the participant and purposive sampling technique was also used to select health care providers in Suba sub-County health facilities. The study utilized the quantitative and qualitative methods of data collection. A structured questionnaire was administered to the participants and key informant interview targeting the health care providers was used to collect the data. SPSS (Statistical package for social scientists) version 23 was used for analysis and chi-square test was used to determine the relationship and associations among the variables. Qualitative data was analysed through content analysis by examining emerging themes.

Results: The key influencing factors to PrEP uptake were: 77(28%) of the respondents aged 19 years and above preferred PrEP services to be offered in designated room in the facility whilst 28(24%) of respondents aged 15-18years preferred youth friendly clinics, 33(28%) of clients had stigma of being branded HIV positive, 101 (26%) had fear of pills, staff attitude to offer PrEP services to the adolescents before parental consent, MOH staff were not able to see PrEP clients, inconsistency facilities operation hours and poor road network.

Conclusion: The most identified influencing factors to PrEP uptake were staff shortage, Lack of partner disclosure of HIV status to their spouses, terrain, inadequate staff training, lack of parental consent for HIV test to age below 18 years, PrEP provision point and poor adherence to PrEP drug. Ministry of Health should capacity-built HCP on PrEP provision before programme roll out to upscale PrEP uptake in all the facilities including private.

Keywords: Service delivery, PrEP uptake, Kenya.

Background of Study: Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS) pandemic is a serious Public Health problem which results in socio-economic and health problems. From 1984 when HIV/AIDS was discovered, the pandemic continues to spread. Globally about 36.9 million people were living with HIV by 2017 and every week around 7000 young women aged 15-24years become infected with HIV (UNAIDS, 2018).

Pre-exposure prophylaxis (PrEP) is a new biomedical intervention used for prevention of HIV acquisition in HIV-seronegative high-risk individuals using antiretroviral drugs before HIV exposure (Molina J.M & Cheret A., 2015). In the wake of rising HIV infections in adolescents and young women, PrEP provides an opportunity to realize the goal of shutting down the HIV epidemic, the focus needs to be directed at all age categories with specific, targeted innovative interventions to address the unique challenges for each age set. In Africa, implementation of PrEP has largely focused on adolescent girls and young women, sex workers and men who have sex with men. Despite efforts to increase access to prevention programmes, there are over 1.5 million new HIV infections annually. In Africa, it was estimated that women had a twofold greater risk for HIV acquisition during unprotected vaginal intercourse compared with men. Female sex workers (FSW) were 13.5 times more likely to become HIV infected compared to other women. Therefore, developing new HIV prevention methods that would empower adolescents and women to protect themselves was a priority for public health (UNAIDS,2018)

In Kenya there were 1, 493,382 peoples living with HIV (Healthy Nation, 2018). New infections stood at 52,767 annually. Homabay County had overall HIV prevalence of 25.7 % (NASCO, 2017) where HIV prevalence among women in the County was higher at (27.8%) than that of men at (24.0%), indicating that women were more vulnerable to HIV infection than men in the County. Homa Bay County contributed to 10.4% of the total number of people living with HIV in Kenya and was ranked the second highest nationally. By the end of 2015, a total of 158,077 people were living with HIV in the County, with 22% being young people aged 15-24 years and 6% being children under the age of 15years (County profile, 2016).

Suba sub-County had an HIV prevalence of 23.5% generally. Estimated number of people living with HIV were 13171,1978 among adults, adolescents and children respectively in 2018 (NASCO,2018 estimates). In 2015, the World Health Organization (WHO) released a series of recommendations supporting the use of Tenofovir containing drugs as pre-exposure prophylaxis (PrEP) to prevent the acquisition of HIV1. In July 2016, Kenya launched the new Guidelines on the use of Antiretroviral Drugs for treatment and prevention of HIV infection, which recommended the immediate initiation into ART and the provision of PrEP to all those at substantial ongoing risk of acquiring HIV infection. There was limited PrEP implementation experience in the context of Developing Countries, Kenya had an opportunity to be part of 2 clinical trials and 2 demonstration projects from

which the evidence generated uniquely positioned Kenya as an early adopter for the delivery of PrEP within the Public Health System. A number of direct biomedical mechanisms had proven efficacy in preventing transmission at the biological level; condoms at 90 to 95%, voluntary medical male circumcision at 60 to 75%, Pre-exposure prophylaxis (PrEP) at 95% to 99%, dapivirine vaginal ring at 30 to 35%, antiretroviral treatment (ART) as secondary prevention at 96 %. (Sineud. Delany-Moretlwe, James Hargreaves, Anne Stangle & Mitzy Gafos, *et al.*, (2014)

In Suba sub-County, an estimated 1656 people including discordant couples, male and female sex workers and youths at risk of HIV infection had so far taken up the daily HIV prevention PrEP (EKMS).

Methods

Location of Study

The study was conducted in Suba sub-County, which is located along Lake Victoria, Homabay County, Kenya. The sub County borders Uganda to the West and Tanzania to the South West. It had a high HIV prevalence of 23.5% against a total national HIV prevalence of 4.8%. The total population of sub County was estimated to be 125,745(60,358 males and 65,387 females) (DHIS2). The population of adolescents boys, girls and young women aged between 15-24years was estimated to be 25,878. (DHIS2) The economic activities in this locality were fishing, farming, and business. There were 24 health facilities offering PrEP and HIV care and treatment services. The Sub County had a poor road network, islands, and terrains, which at times made the facilities inaccessible.

Research Design

A study design is the plan of action the researcher adopts for answering the research questions and it sets up the framework for study or is the blueprint of the researcher (Kerlinger, 1973). This study employed a descriptive cross-sectional study design using structured quantitative data collection tool which targeted adolescents boys, girls and young women who were aged 15-24years, HIV uninfected, and residents of Suba -sub-County. The study also employed the use of key informant interviews with health service providers to understand the challenges of service provision and retention into PrEP programming in all the 24 health facilities in Suba sub-County offering PrEP services.

Study Population

According to (Ogula, 2005), a population refers to any group of institutions, people or objects that have common characteristics.

The study population were adolescent boys, girls and young women who were HIV uninfected, visited health facilities in Suba for various health services and HIV service providers both who were residents of Suba

subcounty.

Data collection instruments

A structured questionnaire and a key informant interview guide were employed by the researcher to collect data from the target population. All data collection tools were pre-tested before use and any translation into local languages was carried out by the language translation experts.

Data collection procedure

Healthcare workers at the facilities identified the eligible participants who consented to participate in the study. Then research assistant administered a paper questionnaire in order to capture the data. It was an interviewer-administered and self-administered for those who requested to do so but was under the supervision of the research assistant.

Data management and analysis

Data was cleaned, coded, then entered into SPSS (Statistical Package for Social Sciences) version 23 for analysis. This study was dealing with both quantitative and qualitative data. Presentation of quantitative data was done using tables, graphical displays and summary statistics while for qualitative data thematic analysis was done. Inferential statistics such as Chi-square was also used in testing the relationships and associations among variables respectively.

Results

Socio-demographic factors

In total 394 participants were selected to participate in the study and all completed the study questionnaires. One hundred and Sixteen(29%) were aged 15-18 years while, 278(70%) were aged 19 and above years. The majority, 245 (62%) of the respondents were females while, 149(38%) were males. More than half 227(58%) of the study respondents were single, with 153(39%) being married, another 7(2%) divorced or separated, while only 3(0.8%) were cohabiting.

Two hundred and twenty-six (57%) of the respondents had attained secondary education, 53(14%) had attained university education, 112(28%) had primary education, while only 3(0.8%) had nursery education.

Majority 283(72%) of the respondents accessed the facilities on foot while the rest 31(9%) used bicycle, 70(18%) motorcycle, 9(2%) cars and with only 1(0.3%) who used boat.

More than half 210(53%) of the respondents were unemployed, while 105(27%) were on business, 40(10%) employed and almost 38(10%) the same number were students who had no engagement and only 1(0.3%) had no response. Majority 386(98%) of the respondents were Christians with 8(2%) being Muslims. Table 1 summarizes

the socio-demographic characteristics of the respondents

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Table 1: Socio-Demographic Characteristics of Respondents

Characteristics	Categories	n (%)
Age	15-18 years	116(29.4)
	19 and above years	278(70.6)
Gender	Male	149(37.8)
	Female	245(62.2)
Marital status	Married	153(38.8)
	Divorced/separated	7(1.8%)
	Widowed/widower	4(1.6)
	Single	227(57.6)
	Cohabiting	3(0.8)
	Highest Level of education	Nursery
	Primary	112(28.4)
	Secondary	226(57.4)
	University	53(13.5)
Transport means	walking	283(71.8)
	Bicycle	31(7.8)
	Car	9(2.3)
	Motorcycle	70(17.8)
	Others (boat)	1(0.3)
Source of income	Business	105(57.4)
	Employed	40(10.2)
	unemployed	210(53.3)
	Others(student)	38(9.6)
	No response	1(0.3)
Religion	Christians	386(98)
	Muslims	8(2)
Totals		394(100)

Socio-demographic characteristics and service delivery factors on health care provider preferences.

Most, 43(37%) of the respondents aged 15-18years preferred to be seen by males during health services provision, while the rest 33(28%) preferred females, 17(15%) an older provider, 21(18%) younger provider and 2(1.7%)

others. One hundred and eleven (40%) of the respondents aged 19 and above years preferred males, while the few 74(27%) preferred females, 51(18%) an older provider, 26(9%) younger provider and 16(6%) other providers. Half 75(50%) of males preferred to be seen by males during service provision, whilst, the rest 33(22%) preferred females, 14(9%) an older provider, 19(13%) younger provider and 10(7%) preferred other providers. Less than half, 79(32%) of females preferred males, while the rest 74(30%) preferred females, 54(22%) an older provider, 28(11%) younger provider and 10(4%) other providers.

Most, 87(38%) of those in single marriages preferred to be seen by males, whilst the rest 62(27%) preferred females, 43(19%) an older provider, 28(12%) younger provider and 7(3%) other providers. Sixty-six (43%) of those married preferred to consult males during service provision while the rest 36(24%), preferred female, 25(16%) an older provider, 15(10%) younger provider and 11(7%) other providers. Majority, 3(75%) of the widows/widowers preferred females and 1(25%) preferred males only. Most 5(71%) of those in separated/divorced marriages preferred to be seen by females and 2(29%) a younger provider. Most, 2(67%) of those in cohabiting marriages preferred to be seen by a younger provider and 1(33%) female. Less than half 1(33%) of those with nursery education preferred both females, an older provider and a younger provider during health services provision in the health facilities. Most 83(37%) of those with primary education preferred to be seen by males during health services provision, whilst, the rest 34(30%) preferred females, 16(14%) both an older provider and younger providers and 3(3%) other providers. Eighty-three (37%) preferred to be seen by males but the rest 58(26%) preferred females, 44(19%) an older provider, 28(12%) younger provider and 13(6%) other providers.

More than half 28(53%) of those with university education preferred to be seen by males, while the rest 14(26%) of them preferred females, 7(13%) an older provider and 2(4%) both younger provider and other providers. Thirty-seven (17%) of those in business preferred to be seen by females than 14(18%) males, 10(13%) an older provider and younger provider and 7(9%) other providers. Almost half, 18(45%) of those employed preferred males more than 9(23%) females, 7(18%) an older provider, 5(13%) younger provider and 1(3%) other providers. Eighty-three (49%) of those unemployed preferred to be seen by males during health service provision other than 56(27%) females, 42(20%) an older provider 23(11%) younger provider and 6(3%) other providers. Twelve (32%) of others (students) preferred to be seen by males than 5(13%) females, 9(24%) both an older provider and younger provider.

One hundred and fifty-three (40%) of Christians preferred to be seen by males during health services provision than 103(27%) females, 65(17%) an older provider, 47(12%) younger provider and 18 (5%) other providers. Three (43%) of Muslims preferred to be seen by both females and older provider, with only 1(14%) preferred male HCP. Table 2 summarizes socio-demographic characteristics and service delivery factors on health care provider preferences.

Table 2: Socio-demographic characteristics and service delivery factors on health care provider preferences.

Socio-demographic characteristics	Categories	Health care provider of preferences					Total n (%)
		Male n (%)	Female n (%)	An older provider n (%)	Younger provider n (%)	Others n (%)	
Age	15-18 years	43(37)	33(28)	17(15)	21(18)	2(1.7)	116(100)
	19 & above years	111(40)	74(27)	51(18)	26(9)	16(6)	278(100)
Gender	Male	75(50)	33(22)	14(9)	19(13)	10(7)	149(100)
	Female	79(32)	74(30)	54(22)	28(11)	10(4)	245(100)
Marital status	Single	87(38)	62(27)	43(19)	28(12)	7(3)	227(100)
	Married	66(43)	36(24)	25(16)	15(10)	11(7)	153(100)
	Widow/widower	1(25)	3(75)	0(0)	0(0)	0(0)	4(100)
	Separated/Divorced	0(0)	5(71)	0(0)	2(29)	0(0)	7(100)
	Cohabiting	0(0)	1(33)	0(0)	2(67)	0(0)	3(100)
Highest level of education	Nursery	0(0)	1(33)	1(33)	1(33)	0(0)	3(100)
	Primary	43(38)	34(30)	16(14)	16(14)	3(3)	112(100)
	Secondary	83(37)	58(26)	44(19)	28(12)	13(6)	112(100)
	University	28(53)	14(26)	7(13)	2(4)	2(4)	53(100)
Source of income	Business	14(18)	37(47)	10(13)	10(13)	7(9)	78(100)
	Employed	18(45)	9(23)	7(18)	5(13)	1(3)	40(100)
	Unemployed	83(40)	56(27)	42(20)	23(11)	6(3)	210(100)
	Others (students)	12(32)	5(13)	9(24)	9(24)	3(8)	38(100)

	No response	0(0)	0(0)	0(0)	0(0)	1(100)	1(100)
Religion	Christians	153(40)	103(27)	65(17)	47(12)	18(5)	386(100)
	Muslims	1(14)	3(43)	3(4)	0(0)	0(0)	7(100)

Socio-demographic characteristics and service delivery factors on time to be spent by HCP.

Majority 82(71%) of the respondents aged 15-18 years preferred to be seen by health care providers within an hour, while the rest 20(17%) preferred one to two hours, 10(9%) more than 2hours, none preferred 4hours and only 4(3%) had no response. Most,214(77%) of the respondents aged 19 and above years preferred to be seen by HCP within an hour, however others 54(19%) preferred 1-2 hours, 7(3%) more than 2 hours,1(0.4%) 4 hours. Majority 108(72%) of the male respondents preferred to be seen by HCP within an hour, 30 (20%) preferred 1-2 hours, 9(6%) more than 2 hours and 2(0.8%) had no response. One hundred and eighty-eight (78%) of the females' respondents mostly preferred to be seen within an hour by HCP, while the rest 44(18%) preferred 1-2hours, 8 (3%) more than 2 hours and 4(2%) had no response.

One hundred and sixty-one (71%) of those in single marriages preferred to be seen by HCP within an hour, but the rest 48(21%) preferred 1-2 hours,14(6%) more than 2hours, non-preferred 4 hours and 4(2%) had no response. All 4(100%) of the widows/widowers only preferred to be seen by the HCP within an hour. Four (57%) of those who separated/divorced preferred to be seen by HCP within an hour, while only 3(43%) preferred to be seen within 1-2 hours, non-preferred more than 2 hours and 4 hours and non-had no response. Most 2(67%) of those in cohabiting marriages preferred to be seen by HCP within 1-2 hours and only 1(33%) preferred to seen within an hour by HCP, non-preferred 4hours and non-had no response.

All 3(100%) of those with nursery education preferred only to be seen by HCP within an hour, non preferred 1-2 hours, more than 2hours and 4 hours and non-had no response. Majority 92(82%) of those with primary education preferred to be seen by HCP within an hour, while the rest 16(14%) preferred 1-2hours, 3(3%) more than 2 hours, non preferred 4 hours and only 1(0.9%) had no response. One hundred and sixty-four (73%) of those with secondary education preferred to be seen by HCP within an hour, while the rest 46(20%) preferred 1-2 hours, 10(4%) more than 2 hours, 1(0.4%) 4 hours and only 5(2%) had no response. Most 37(70%) of those with university education preferred to be seen by HCP within an hour, but the rest,12(2%) preferred 1-2 hours, 4(8%) more than 2 hours, non-preferred 4 hours.

Most 81(77%) of those in business preferred to be seen by HCP within an hour, while others 19(18%) preferred 1-2hours,4(3.8%) more than 2hours, non-preferred 4 hours and only 1(1%) had no response. Thirty-two (80%) of

those employed preferred to be seen by HCP within an hour, while the rest 7(18%) preferred 1-2 hours, non preferred more than 2 hours, 1(2%) 4 hours and non-had no response. Most 150 (71%) of those unemployed preferred to be seen by HCP within an hour, however the rest 44(21%) preferred to be seen within 1-2 hours,11(5%) more than 2 hours, non-preferred 4 hours and only 5(2%) had no response. Majority 32(84%) of others(students) preferred to be seen by health care provider within an hour, while the rest 4(11%) preferred 1-2 hours, 11(5%) more than 2 hours, non-preferred 4 hours and non-had no response.

Majority 289(75%) of Christians preferred to be seen within an hour by HCP, whilst the rest 73(18%) preferred 1-2 hours, 17 (4%) more than 2 hours, 1(0.4%) 4 hours and non-had no response. Most 7(88%) of the Muslims preferred to be seen within an hour by the HCP, while the rest 1(12%) preferred to be seen within 1-2 hours, non preferred more than 2 hours and 4 hours and non-had no response. Table 3 summarizes socio-demographic characteristics and service delivery (Time to be spent by HCP).

Table 3: Socio-demographic characteristics and service delivery factors on time to be spent by HCP.

Socio-demographic characteristics	Categories	Time to be spent by HCP					Total n (%)
		Less than 1hr n (%)	1-2 hrs n (%)	>2 hrs n (%)	4hrs n (%)	No response n (%)	
Age	15-18 years	82(71)	20(17)	10(9)	0(0)	4(3)	116(100)
	19 &above years	214(77)	54(19)	7(3)	1(0.4)	2(0.7)	278(100)
Gender	Male	108(72)	30(20)	9(6)	0(0)	2(0.8)	149(100)
	Female	188(78)	44(18)	8(3)	1(0.4)	4(2)	245(100)
Marital status	Single	169(71)	48(21)	14(7)	0(0)	4(2)	227(100)
	Married	126(82)	21(14)	3(2)	1(0.7)	2(1)	153(100)
	Widow/widower	4(100)	0(0)	0(0)	0(0)	0(0)	4(100)
	Separated/Divorced	4(57)	3(43)	0(0)	0(0)	0(0)	7(100)
	Cohabiting	1(33)	2(67)	0(0)	0(0)	0(0)	3(100)
Highest level	Nursery	3(100)	0(0)	0(0)	0(0)	0(0)	3(100)

of education	Primary	92(82)	16(14)	3(3)	0(0)	0(0.9)	112(100)
	Secondary	164(73)	46(20)	10(4)	1(0.4)	5(2)	226(100)
	University	37(70)	12(22)	4(8)	0(0)	0(0)	53(100)
Source of income	Business	81(77)	19(18)	4(3.8)	0(0)	1(1)	105(100)
	Employed	32(80)	7(18)	0(0)	1(2)	0(0)	40(100)
	Unemployed	150(71)	44(21)	11(5)	0(0)	5(2)	210(100)
	Others(students)	32(84)	4(11)	2(5)	0(0)	0(0)	38(100)
Religion	Christians	289(75)	73(18)	17(4)	1(0.3)	0(0)	386(100)
	Muslims	7(88)	1(12)	0(0)	0(0)	0(0)	8(100)

Socio-demographic characteristics and service delivery factors on preferable point for PrEP provision

Majority 28 (24%) of the respondents aged 15-18 years preferred mostly to be seen at the youth friendly clinic, whilst the rest 10(9%) preferred to be seen at OPD, 13(11%) CCC, 25(22%) HTS room, 23(20%) designated room in the facility, 1(0.9%) IPD and 16(14%) community and non-preferred other departments. Most 77(28%) of the respondents aged 19 and above years preferred to be seen at the designated room in the facility for PrEP services, while others 54(19%) preferred to be seen at OPD, 40(14%) CCC, 47(17%) HTS room, 1(0.4%) IPD 31(11%) community, 27(10%) youth friendly clinic and only 1(0.4%) had no response to this question during the time of the interview. Thirty-five (23%) of the males preferred to be seen at OPD for PrEP services, while the rest 16(11%) preferred to be seen at designated room in the facility, 17(28%) HTS room, 28(19%) CCC, 25(17%) community and 13(9%) youth friendly clinic. Majority 68(28%) of the females preferred to be seen at designated room in the facility, whilst, the rest 29(12%) preferred OPD, 28(11%) CCC, 44(18%) HTS room, 2(0.8%) IPD, 34(14%) community, 39(16%) youth friendly clinic and only 1(0.4%) preferred other departments apart from the above.

Majority 52(23%) of the respondents in single marriages preferred to be seen at the designated room in the facility other than 24(11%) OPD, 2(0.9%) IPD, 28(12%) CCC, 48(21%) HTS room, 30(13%) community and 43(19%) youth friendly clinic for PrEP services provision. Less than half 47(31%) of the married preferred to be seen at the designated rooms in the facilities, while others 40(26%) preferred OPD, 21(14%) CCC, 21(14%) HTS room non-preferred IPD for PrEP services. Majority, 3(75%) of the widows/widowers preferred to be seen at the

designated rooms in the facilities and 1(25%) HTS rooms only. Consequently 2(29%) of those in separated/divorced marriages preferred designated rooms in the facilities, while the rest 1(14%) preferred to be seen in OPD, 2(28%) CCC, 1(14%) HTS room and community and non-preferred IPD and youth friendly clinic for PrEP services. More than half 2(67%) of those in cohabiting marriages preferred to be seen in youth friendly clinic with only 1(33%) those who preferred other departments for PrEP services.

Most 2(67%) of those with nursery education preferred to be seen in the community with only 1(33%) who preferred PrEP services to offered in OPD, whilst non-preferred IPD, HTS room, CCC and designated rooms at the facilities. Most 36(32%) of the respondents with primary education preferred PrEP services to be offered at the designated rooms in the facilities, while the rest 25(22%) preferred OPD, 12(11%) CCC, 13(12%) HTS room, 11(10%) community, 15(13%) youth friendly clinic for PrEP services with non who wanted services at the OPD and other departments. Majority 54(24%) of the respondents with secondary education preferred PrEP services to be offered at the HTS room with 53(23%) who wanted the services to be offered at the designated room in the facilities whilst , 26(12%) preferred services to be offered at CCC , 28(12%) community and 1(0.4%) both IPD and other departments. Most 15(28%) of the respondents preferred to be seen in CCC, while others 9(17%) preferred PrEP services to be offered in OPD, 11(21%) designated room in the facility, 5(11%) youth friendly clinic, 1(2%) IPD and 6(11%) community.

Majority 100(46%) of the respondent who were Christians preferred PrEP services to be offered at the designated rooms in the facilities, while the rest 71(18%) preferred PrEP services to be offered in HTS room, 64(17%) OPD, 47(12%) community, 54(14%) youth friendly clinic, 2(0.5%) IPD and other departments Most 6(75%) of the respondents who were Muslims preferred PrEP services to be offered in CCC with only 1(13%) who preferred PrEP services to be offered at youth friendly clinic and HTS room. Table 4: summarizes socio-demographic characteristics and service delivery on preferable point for PrEP provision.

Table 4: Socio-demographic characteristics and service delivery factors on preferable point for PrEP provision.

Socio-demographic characteristics	Categories	Preferable point for PrEP provision								Total (%)
		OPD n (%)	CCC n (%)	HTS room n (%)	Desig- nated room n (%)	IPD n (%)	Com- munity n (%)	Youth friendly clinic n (%)	Oth- ers n (%)	
Age	15-18 years	10(9)	13(11)	25(22)	23(20)	1(0.9)	16(14)	28(24)	0(0)	116(100)

	19 & above years	54(19)	40(14)	47(17)	77(28)	1(0.4)	31(11)	27(10)	1(0.4)	278(100)
Gender	Male	35(23)	25(17)	28(19)	32(21)	0(0)	13(9)	16(11)	0(0)	149(100)
	Female	29(12)	28(11)	44(18)	68(28)	2(0.8)	34(14)	39(16)	1(0.4)	245(100)
Marital status	Single	24(11)	28(12)	48(21)	52(23)	2(0.9)	30(13)	43(19)	0(0)	227(100)
	Married	40(26)	21(14)	21(14)	47(31)	0(0)	13(8)	10(7)	1(0.6)	153(100)
	Widow/widower	0(0)	3(75)	1(25)	0(0)	0(0)	0(0)	0(0)	0(0)	4(100)
	Separated/Divorced	1(14)	2(29)	1(14)	2(29)	0(0)	1(14)	0(0)	0(0)	7(100)
Education level	Cohabiting	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	2(67)	1(33)	3(100)
	Nursery	1(33)	0(0)	0(0)	0(0)	0(0)	2(67)	0(0)	0(0)	3(100)
	Primary	25(22)	12(11)	13(12)	36(32)	0(0)	11(10)	15(13)	0(0)	112(100)
	Secondary	29(13)	26(12)	54(12)	53(23)	1(0.4)	28(12)	34(15)	0(0)	226(100)
	University	9(17)	15(28)	5(9)	11(21)	1(2)	6(11)	6(11)	0(0)	53(100)
Religion	Christians	64(17)	47(12)	71(18)	100(26)	2(0.5)	47(12)	54(14)	1(0.3)	386(100)
	Muslims	0(0)	6(75)	1(12.5)	0(0)	0(0)	0(0)	1(12.5)	0(0)	8(100)

Key informant interview guide.

From the KII to HCP, the themes of lack of space to offer PrEP services emerged whereby it was found that about two facilities had no space with lack of confidentiality due to congestion of the rooms hence they could not offer PrEP services to clients at the time of interview. HCP stated that:

My facility just have one building that am offering other services and at the same time it is my drug store, my place to sleep and the roof of the facility is leaking especially during the rainy season, whereby most of my commodities are usually destroyed and so I do not think I can be able to start PrEP services and am also fearing workload because am alone in this facility with support staff only (HCP1).

Socio-demographic characteristics and service delivery factors on preferable time for PrEP provision

Majority 58(50%) of the respondents aged 15-18 years preferred PrEP services to be offered over the weekends while 35(30%) of them preferred PrEP services to be offered in the morning, 11(9.5%) preferred afternoon and 12(10%) evening. Most 100(86%) of the respondents aged 19 and above years preferred PrEP services to be offered in the morning, while the rest 95(34%) preferred the services to be offered over the weekends and 52(19%) preferred services to be offered in the evening with only 17(11%) preferred PrEP services to be offered in the afternoon. Most 58(39%) of the male respondents preferred PrEP services to be offered over the weekends, while 49(33%) preferred the services to be offered in the afternoon and 25(17%) preferred in the evening. Majority, 95(39%) of the female respondents preferred the PrEP services to be offered over the weekends, while the rest 86(35%) preferred the services to be offered in the morning, 39(16%) preferred in the evening and only 25(11%) preferred in the afternoon.

Most 105(46%) of those in single marriages preferred PrEP services to be offered over the weekends, 66(29%) preferred in the morning, while 20(9%) preferred in the afternoon and 36(16%) preferred in the evening. Sixty-seven (44%) of the married preferred PrEP services to be offered in the morning, while 44(29%) preferred over the weekend with few 19(12%) who preferred in the afternoon and 23(15%) preferred in the evening. More than half 4(57%) of those separated/Divorced preferred PrEP services to be offered in the evening and 3(43%) preferred over the weekends. Only 1(33%) of those in cohabiting marriages preferred PrEP services to be offered over the weekend and similar number 1(33%) preferred afternoon and over the weekends. Three (100%) of those with nursery education preferred services to be offered over the weekends. Most 42 (38%) of those with primary education preferred to be seen in the morning while the rest 35(31%) preferred the services over the weekend, 21(19) preferred in the evening and with only 14(12%) those who preferred the services to be offered in the afternoon. Almost half 23(43%) of the respondents with University education preferred PrEP services to be offered in the morning while the rest 8(15%) preferred the services to be offered in the evening and 18(34%) preferred over the weekends and with only 4(8%) those who preferred the services to be offered in the afternoon.

Majority 47(45%) of those in business preferred PrEP services to be offered in the morning, 27(26%) preferred the services to be offered over the weekends, while 17(16%) preferred in the evening and only 14(13%) who preferred in the afternoon. Nineteen (48%) of those employed preferred the PrEP services to be offered in the morning while the rest 6(15%), preferred in the evening, 12(30%) preferred over the weekends. Most 95(45%) of the respondents who were unemployed preferred the PrEP services to be offered over the weekends with almost the same number 62(30%) preferred the services to be offered in the morning, while 20(10%) preferred the services to be offered in the afternoon and 33(16%) preferred in the evening. Half 19(50%) of others (students) preferred PrEP services to be offered over the weekends with 7(18%) who preferred services to be offered in the morning. 4(11%) of the respondent preferred the services in the afternoon and 8(21%) preferred services in the

evening.

Most, 150(39%) of Christians preferred PrEP services to be offered over the weekends with almost the similar number 133(34%) who preferred the services to be offered in the morning, while the rest 40(11%) preferred the services to be offered in the afternoon and 63(16%) preferred in the evening. Majority 3(38%) of the Muslims preferred PrEP services to be offered over the weekends, 2(25%) of them preferred the services to be offered in the morning and afternoon and only 1(12%) who preferred the services to be offered in the evening.

Table 5 summarizes socio-demographic characteristics and services delivery on preferable time for PrEP provision.

Table 5: Socio-demographic characteristics and service delivery factors on preferable time for PrEP provision

		Preferable time for PrEP services provision				
Socio-demo-graphic characteristics	Categories	Morning n (%)	Afternoon n (%)	Evening n (%)	Weekends n (%)	Total n (%)
Age	15-18 years	35(30)	11(10)	12(10)	58(50)	116(100)
	19 & above years	100(86)	31(11)	52(45)	95(34)	278(100)
Gender	Male	49(33)	17(11)	25(17)	58(39)	149(100)
	Female	86(35)	25(10)	39(16)	95(39)	245(100)
Marital status	Single	66(29)	20(9)	36(16)	105(46)	227(100)
	Married	67(44)	19(12)	23(15)	44(29)	153(100)
	Widow/widower	1(25)	2(50)	1(25)	0(0)	4(100)
	Separated/Divorced	0(0)	0(0)	4(57)	3(43)	7(100)
	Cohabiting	1(33)	1(33)	0(0)	1(33)	3(100)
Highest level of education	Nursery	0(0)	0(0)	0(0)	3(100)	3(100)
	Primary	42(38)	14(12)	21(19)	35(31)	112(100)
	Secondary	70(31)	24(11)	35(15)	97(43)	226(100)
	University	23(43)	4(8)	8(15)	18(34)	53(100)

Source of income	Business	47(45)	14(13)	17(16)	27(26)	105(100)
	Employed	19(48)	3(8)	6(15)	12(30)	40(100)
	Unemployed	62(30)	20(10)	33(16)	95(16)	210(100)
	Others (students)	7(18)	4(11)	8(21)	19(50)	38(100)
Religion	Christians	133(34)	40(11)	63(16)	150(39)	386(100)
	Muslims	2(25)	2(25)	1(12)	3(0.4)	8(100)

Key informant interview guide.

Further enquiry on KII, also the themes on facilities daily operations emerged, where it was found generally that most of them operate 24hours. Two of the facilities had their operations done for 8hours a day while 8 facilities had operations for 24hours a day but closed during weekends. A health care provider stated that:

My facility operates eight hours a day from Monday to Friday, then I do close the facility over the weekends because am alone and cannot work throughout the week without an off, so I usually take weekend off. (HCP 18)

Further, KII interviews with HCPs, themes on poor road network emerged, where generally they stated that the road network coverage was not suitable for most of those seeking PrEP drugs services. On the 24 facilities where the research was conducted only two (Opemle and NYS) had good road networks. Those with fair road network were Seka, Nyatoto, Kisegi, Kigwa and God Bura Health Centre. A health care provider stated that:

My facility is located on top of the hill in hard to reach areas of this sub County and accessing the facility is very difficult, the topography has very bad terrain even some times getting these drugs is very hard especially during the rainy seasons even the motorcycle cannot reach this facility and the population around here are also not aware of this PrEP drug (HCP 7)

On further enquiry, the themes on PrEP drug supply emerged revealed that, most of the facilities in Suba Sub-County got their drug supplies monthly whereas Kisegi sub County hospital got its supply quarterly. Two facilities that did not offer PrEP drugs had no drug supplies at the time of the research. Magunga Sub County hospital, Mikuyu Health Centre and Nyamadede Health Centre experienced stock out of PrEP drugs within the last 3 months. At the time of research, Mikuyu and Nyamadede health Centre had drug stock out and this caused low PrEP uptake whereas 79.2% had not gotten stock out in the last 3 months. Majority of the facilities in Suba did not offer laboratory services for PrEP follow up. HCP stated that:

I get enough supply but my problem has been late reporting from partners who usually borrow drugs from our store but some do not give me the reports on time at the end of the month hence I get stock out earlier before the next supply. At the same time reagents for creatinine follow up for PrEP clients is not usually available and the supply has been in consistent (HCP 1).

Socio-demographic characteristics and respondents service delivery factors reasons for not taking PrEP.

Thirty three (28%) of the respondents aged 15-18years had not taken PrEP due to stigma, while the rest 25(22%) were not on PrEP drug due to fear of pills, 3(3%) lack of health facility offering PrEP services in their locality, 2(2%), package of the PrEP drug, 26(22%) felt not at risk of HIV infection and only 5(4%) had shortage of drugs in their facilities. Less than half 66(43%) of respondents aged 19 and above years had not taken PrEP due to stigma, while the rest 63(41%) were not on PrEP drug due to fear of pills, 6(4%) religious beliefs, 14(9%) due to lack of health facility offering PrEP services and 6(4%) drug shortage. Less than half 35(23%) of the males felt that they were not at risk of HIV infection, while the rest 33(28%) had not taken PrEP drugs due to stigma, 42(28%) fear of pills, 6(4%) lack of health facility offering PrEP services, 2(1%) package of the drug and only 1(0.7%) had not taken PrEP due to drug shortage. Seventy-one (29%) of females felt to be not at risk of HIV infection hence were not on PrEP drugs. Whilst, the rest 58(23%) had not taken PrEP drugs due to stigma, 64(26%) fear of pills, 3(1%) lack of health facility and 4(2%) shortage of drugs.

Seventy five (33%) of those in single marriage had not taken PrEP drugs due to fear of pills, while the rest 61(27%) had not taken PrEP drug due to stigma, 5(22%) package of drugs, 57(25%) due to drug shortage, 12(5%) religion, 6(3%) lack of health facility, 9(4%) felt not at risk. Half, 2(50%) of the widows/widowers had not taken PrEP due to stigma related issues and 1(25%) felt to be not at risk of HIV infection. Half 2(50%) of those in separated/divorced marriages had not taken PrEP drug due to religious beliefs, while the rest 1(25%) had not taken PrEP due to fear of pills and 1(25%) stigma. Most 1(50%) of those in cohabiting marriages had not taken PrEP due to stigma.

One (50%) of respondents with nursery education had not taken PrEP drug to both stigma and religious beliefs. Thirty-five (28%) of those with primary education had not taken PrEP drug due to stigma, 30(28%) fear of pills, 4(3%) religious beliefs and 2(2%) package of drugs. Most, 60(27%) of those with secondary education had not taken PrEP drugs due to fear of pills, 54(25%) stigma, 53(24%) drug shortage and 11(5%) religious beliefs. Less than half 17(32%) of those in university had not taken PrEP drugs due to package of drugs, while others 16(30%) had not taken PrEP due to fear of pills and 10(19%) stigma.

One hundred and four (27%) of Christians felt that they were not at risk of HIV infection hence did not take PrEP, while the rest 101(26%) had not taken PrEP due to fear of pills, 91(19%) stigma, 17(4%) religious beliefs, 9(2%) package of drugs and 8(2%) lack of health facility. Only 5(1%) had not taken PrEP drug due to drug shortage at the

time of data collection, 51(13%) had no response to this question. More than half 5(63%) of Muslims had not taken PrEP due to religious beliefs and 5(25%) felt to be not at risk of HIV infection hence did not take PrEP drug. Only 1(12%) had no response to this question. Table 6 summarizes socio-demographic and respondents knowledge assessment (Reasons not taking PrEP).

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Table 6: Socio-demographic characteristics and respondents service delivery factors on reasons for not taking PrEP.

Socio-demographic characteristics	Categories	Reason for not taking PrEP							Totals n (%)
		Religion n (%)	Stigma n (%)	Fear of pills (%)	Lack of health facility n (%)	Package of drugs n (%)	Drug shortage n (%)	Not at risk n (%)	
Age	15-18 years	3(3)	33(28)	25(22)	3(3)	2(2)	5(4)	26(22)	116(100)
	19 & above years	14(9)	66(43)	63(41)	6(4)	6(4)	6(4)	0(0)	155(100)
Gender	Male	7(5)	33(22)	42(28)	6(4)	2(1)	1(0.7)	35(23)	149(100)
	Female	10(4)	58(23)	64(26)	3(1)	6(2)	4(2)	71(29)	245(100)
Marital status	Single	12(5)	61(27)	75(33)	6(3)	5(22)	57(25)	9(4)	225(100)
	Married	5(0.5)	60(39)	28(18)	5(3)	6(4)	20(3)	40(26)	154(100)
	Widow/widower	2(50)	1(25)	0(0)	0(0)	0(0)	1(25)	0(0)	4(100)
	Separated/Divorced	2(50)	1(25)	0(0)	0(0)	0(0)	0(0)	1(25)	4(100)
	Cohabiting	1(50)	0(0)	0(0)	0(0)	0(0)	0(0)	1(50)	2(100)
Highest level of education	Nursery	0(0)	1(50)	0(0)	0(0)	0(0)	0(0)	1(50)	2(100)
	Primary	4(3)	33(28)	30(26)	0(0)	2(2)	0(0)	0(0)	116(100)
	Secondary	11(5)	54(25)	60(27)	7(3)	5(2)	53(24)	30(14)	220(100)
	University	2(4)	10(19)	16(30)	2(4)	17(32)	0(0)	6(11)	53(100)
Religion	Christians	17(4)	91(24)	101(24)	9(2)	8(2)	5(1)	155(40)	386(100)
	Muslims	5(63)	0(0)	0(0)	0(0)	0(0)	2(25)	1(12)	8(100)

Discussion

The current study realized inadequate staff training on PrEP, this supports Pinto & Berringer, *et al.*, (2018) who found that cognitive barriers hindering PrEP uptake included: knowledge gap, attitudes, and beliefs about PrEP. The "purview paradox" was identified as key barrier. HIV specialists often did not see HIV-negative patients, while primary care physicians, who often see uninfected patients were not trained to provide PrEP.

The study found that both males and female preferred to take an hour with the health care provider during service provision, this was in agreement with Bajunirwe, *et al.*, (2017), who found that long waiting hours was affecting service provision including PrEP.

The study found that males preferred to be seen mostly in outpatient while females preferred designated room in the facility due to stigma of being branded HIV positive since PrEP drugs were dispensed in the same room with ARVs for HIV positive clients. The study also indicated that there was lack of space to offer PrEP services, this agrees with Pilgrim, *et al.*, (2014) during his interview with HCP in Tanzania, they described clinical environments which lack of respect and confidentiality when providing care to adolescents during service provision was a barrier to PrEP uptake in their clinics.

The current study revealed that staff had negative attitude to offering PrEP services to the adolescents and key population, whereby the adolescents were sent back to bring the parents for consent before an HIV test, also key population clients were sent back to get services at the DICE and also some thought it was the work of the partners not for the ministry of health staff to offer PrEP services, this agrees with Bajunirwe, *al.*, (2017) on his interview with HCPs where he found that some were inattentive to adolescents, and some required parents to be present before providing services to adolescents. HCPs felt that long waits would hinder PrEP access, a noted barrier to existing sexual and reproductive health services.

This current study also revealed that there was erratic supply of PrEP drug and lack of laboratory services for PrEP follow up to most facilities at the time of the research, this was in agreement with Bajunirwe, *et al.*, (2017) on his interview with HCPs he found that in Mbeya and those working in dispensaries expressed concerns about not having the appropriate equipment to monitor the major side effects of PrEP. HCPs were also concerned about the potential for PrEP drug slow uptake and these barriers would turn off poor adherence to PrEP.

Conclusion

The key factors influencing PrEP uptake from the study were staff shortage, Lack of partner disclosure of HIV status to their spouses, terrains, inadequate staff training, lack of parental consent for HIV test to age below 18 years, drug shortage, poor adherence and retention into care. The County governments should improve road network to the facilities to improve accessibilities to the facilities for health services. The ministry of health should put in place strategies to target each age and gender categories on matters concerning PrEP in order to improve on PrEP uptake across board. The facility administration should set aside youth-friendly clinics for the youth for

health services especially PrEP and HIV services in order to improve PrEP uptake. Health care providers training and mentorship should be done by the Ministry of Health before programme roll out to capacity built them with information on PrEP for quality of service provision. PrEP services should be offered in other departments by clinical team not in HIV care clinics to reduce client's stigma of being branded HIV positive as perceived by some clients. Long waiting hours should be minimized by posting more staffs by County governments to improve on service delivery. Tools, commodities and registers should be available by County health records and laboratory departments timely in all the facilities to facilitate clients clinical follow up, good records and reporting. The Ministry of Health should upscale PrEP services in all the facilities including governments, private and faith-based to capture all population. The administration should set aside a separate clinic in the facilities for the couples in order to equip them with information on health matters concerning discordant and concordant couple's HIV status hence this would improve PrEP uptake. The Ministry of Health should design information related to PrEP to enable the health promotion officers to sensitize and advocate for PrEP uptake at the community level, institutions, schools and churches to improve on client awareness on the PrEP availability and benefits. Further research on the subject area can be done by researchers in different areas with different economic activities, culture, and tribe so that results can be compared and generalized. Once Suba sub County achieves the above influencing factors then we expect a reduction in HIV epidemic in near future in Suba sub County and Country at large.

Additional files

Additional file 1: Study Questionnaire for the PrEP participants on their socio-demographic and service delivery factors influencing PrEP uptake.

Additional file 2: Key informant interview guide (KII) for the health care providers to find out the service delivery challenges influencing PrEP uptake.

Abbreviations

ART-Anti-retro-viral therapy, DHIS2- District Health Information System, DICE-Drop in Centre, HCP- Health Care Providers, HIV- Human Immunodeficiency Virus, JOOUST- Jaramogi Oginga Odinga University of Science and Technology, NASCOP- National Aids control council, Prep-pre exposure prophylaxis, SPSS- Statistical Package for Social Sciences, UNAIDS- Joint United Nations Programme on HIV/AIDS, WHO-World Health Organizations-Key informant interview

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Availability of data and materials

The authors wish not to make data public since the participants were guaranteed high degree of confidentiality during the time of data collections.

Author contributions

EAO designed, carried out the study at Suba sub County health facilities, managed, analyzed data and drafted the manuscript. JAO and GA gave the guidance throughout from designing of the study, data analysis and drafting of the manuscript. Both authors read and approved the final manuscript.

Ethical approval and consent to participate

Ethical approval for the study was obtained from the Ethical Committee of JOOUST Ref.No.7/13/ERC/10/2019 (b), National Commission for Science Technology and Innovation (NACOSTI), License No. NACOSTI/P/19/2600 and the Ministry of Health Homabay County, Reference No.MOH/RA/VOL.3(009).

A written informed consent form was developed and administered to all participants. Healthcare workers at the facilities identified the eligible participants who consented to participate in the study. Then research assistant administered a paper questionnaire in order to capture the data. It was an interviewer-administered and self-administered for those who requested to do so but was under the supervision of the research assistant. They were guaranteed that their privacy was protected by a strict standard of anonymity.

Consent for publication

This is not applicable in this study since the authors-maintained anonymity during data collection and management. No specific individual's details are presented in this work.

Competing interests

Authors declare that they have no competing interests

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