



Patient's Characteristics that Influence Provider Initiated HIV Testing and Counselling Service Uptake in Siaya County, Western Kenya

Vincent O. Ibworo^{1*} and Anne Ayieko Ibworo²

¹Department of Public Health and Community Development, Maseno University, Maseno, Kenya.

²Department of Public Health, Jaramogi Oginga Odinga University of Science and Technology, Kenya.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

Editor(s):

- (1) Dr. Abdel-Hady El-Gilany, Mansoura University, Egypt.
- (2) Dr. Carla Maria Ferreira Guerreiro da Silva Mendes, Nurse Director at Centro Hospitalar de Setúbal, Portugal.
- (3) Dr. Asmaa Fathi Moustafa Hamouda, Jazan University, Saudi Arabia.

Reviewers:

- (1) Tsubanova Natalia, National University of Pharmacy, Ukraine.
 - (2) Yewew Alemu, Injibara University, Ethiopia.
 - (3) Rukhshan Khurshid, Shalamar Medical & Dental College, Pakistan.
- Complete Peer review History: <https://www.sdiarticle4.com/review-history/77098>

Original Research Article

Received 08 September 2021

Accepted 16 November 2021

Published 19 November 2021

ABSTRACT

Introduction: Human Immunodeficiency Virus (HIV) / Acquired Immunodeficiency Syndrome (AIDS) contributes 29.3% of all deaths in Kenya and is among leading causes of mortality in the Country. Kenya National HIV prevalence is at 4.9% with 38% of people living with HIV unaware of their HIV status, hence the need to assess patient's characteristics that influence Provider Initiated HIV Testing and Counseling (PITC) service uptake.

Methodology: This was a cross sectional study design done in Siaya County western Kenya. Data was collected from 369 patients using structured questionnaire and variable characteristics summarized descriptively.

Results: 55.0%(203) of patients were aged 18-27 years and 70%(258) were female. Those with basic education were 77.5%(286) and 51.3%(189) were married. Patients aged 28-37 years were twice more likely to take up PITC services (OR=2.084, 95%CI=0.137-2.964, p-value=<0.001). The

*Corresponding author: Email: ibworovin@gmail.com;

singles (OR=8.509, 95%CI=0.275-1.350, p-value=0.033) were nine times more likely to take up PITC services as compared to the married. Patients with secondary school education (OR=1.640, 95%CI=0.163-1.701, p-value=0.021) were more likely to take up PITC services as compared to those with primary level of education. Employed patients were more likely to take up the PITC services as compared to those in business (OR=3.549, 95%CI=0.005-0.736, p-value=0.027). Repeat HIV testers were four times more associated with PITC service uptake as compared to the first time testers (OR=4.350, 95%CI=1.259-1.822, p-value=0.018). Knowledge on HIV was twice more associated with the uptake of PITC service as compared to HIV stigma reduction (OR=2.403, 95%CI=0.251-1.682, p-value=0.018).

Conclusion: Patients aged 28-37 years, secondary school education, single never married, being employed, a repeat HIV tester and having knowledge on HIV were factors influencing PITC service uptake. Siaya county government needs to design communication strategies targeting the elderly, illiterate, married and put in place mobilization and advocacy approaches that will increase public knowledge on HIV testing.

Keywords: HIV; provider initiated HIV testing and counseling; service uptake; Western Kenya.

LIST OF ABBREVIATION

AIDS	:Acquired Immunodeficiency Syndrome
ART	:Antiretroviral Therapy
CI	:Confidence Interval
3 Cs	:Consent Counseling and Confidentiality
DTC	:Diagnostic Testing and Counseling
HIV	:Human Immunodeficiency Virus
HTS	:HIV Testing Services
OPD	:Out Patient Department
OR	:Odds Ratio
PITC	:Provider Initiated HIV Testing and Counseling
PLHIV	:People Living with HIV
PMTCT	:Prevention of Mother To Child Transmission of HIV
VCT	:Voluntary HIV Counseling and Testing

1. INTRODUCTION

Human Immunodeficiency Virus (HIV) / Acquired Immunodeficiency Syndrome (AIDS) has continued to cause health burden globally with 690 000 people having died from AIDS-related illnesses. There were approximately 38 million people across the globe with HIV/AIDS by 2019, of these, 36.2 million were adults and 1.8 million were children (<15 years old). An estimated 1.7 million individuals worldwide acquired HIV in 2019, marking a 23% decline in new HIV infections since 2010. Approximately 81% of people with HIV globally knew their HIV status in 2019. The remaining 19% (about 7.1 million people) still need access to HIV testing services [1].

HIV/AIDS contributes 29.3% of all deaths in Kenya and is among leading causes of mortality in the Country [2]. The Kenya National HIV prevalence is at 4.9% with 6.6% prevalence among women and 3.1% prevalence among men

which translates to 1.3 million adults living with HIV [3]. Among Kenya's 47 counties, Siaya is amongst counties with the highest HIV prevalence of 21% in the Country, with an estimated 123,000 PLHIV, and 4000 new HIV infections. By September 2017, the county had a population ART coverage of 71% while Home-based HIV testing conducted in the county between May 2016 and July 2017 achieved 86% HIV testing uptake among eligible individuals against 62% National HIV testing service uptake [4]. To intensify and promote HIV prevention strategies, the Government continued to encourage Provider Initiated HIV Testing and Counseling (PITC) services which is a Health facility based approach of HIV testing and counseling offered by healthcare workers to all persons (both patients, friends and their attending relatives) attending healthcare facilities as a routine standard component of medical care regardless of their presenting conditions. It's a HIV Testing Services (HTS) approach aimed at accelerating accessibility of HIV testing services

to the community since the traditional method of Voluntary Counseling & Testing (VCT) did not yield significant results in terms of increasing awareness and service uptake. Implementation of PITC approach is informed by the continued HIV problem, although Kenya has made some significant strides in increasing awareness of individual HIV status, approximately 38 percent of people living with HIV in Kenya still do not know if they are infected with HIV [5]. Kenya is still struggling with how to control the spread of HIV and have put in place different preventive and promotive measures. One of these measures is to increase public and individual awareness of the HIV status through counseling and testing. WHO and UNAIDS strongly support the continued scale up of client-initiated HIV testing and counseling, but recognizes the need for additional innovative and varied approaches. Health facilities represent a key point of contact with HIV infected people and the public who need HIV prevention, treatment, care and support. The uptake of regular client initiated HIV testing and counseling has been limited by low coverage of services, fear, stigma and discrimination, and the perception by many people that they are not at risk. Increased scale-up and access of HIV testing and counseling services is both a public health and a human rights imperative in which without a major service increase in health facilities, universal access to HIV prevention, treatment and care will remain just a noble goal [6].

Increasing community HIV testing services remains an important approach in combating the HIV menace especially in high burden Counties of western Kenya. Despite all the collective efforts by the Government and other health partners in Kenya to have more people counseled and tested, the number still remains low at 62% [5]. This reduced uptake of HIV testing and counseling services hinders patients from accessing HIV care and treatment. Kenya has opted for several approaches over the years to increase public awareness of HIV status with new strategies being tried ranging from Voluntary HIV Counseling and Testing (VCT) to Diagnostic Testing and Counseling (DTC) and recently Provider Initiated HIV Testing and Counseling (PITC). In its efforts to increase uptake of HIV testing and counseling services, the Government

of Kenya adopted PITC as a routine approach in all public health facilities although this approach of HIV testing has raised concerns with its acceptability, privacy and the processes. It's on this basis that this research was conducted to determine patients' characteristics (age, gender, marital status, level of education, source of income, being first time tester/repeat tester) that influenced PITC service uptake in public health facilities of Siaya County, western Kenya.

2. MATERIALS AND METHODS

2.1 Study Site and Design

This was a cross sectional study design aimed at determining patients' characteristics that influence PITC service uptake in Siaya County western Kenya. Siaya County is one of the six Counties in Nyanza region of western Kenya, with a land surface area of approximately 2,530 km² and water surface area of approximately 1,005 km². It borders Busia County to the north west, Vihiga and Kakamega counties to the north east, Kisumu County to the south east and Homa Bay County across the Winam Gulf to the South. The water surface area forms part of Lake Victoria (the third largest fresh water lake in the world). It approximately lies between latitude 0° 26' South to 0° 18' north and longitude 33° 58' and 34° 33' East [7]. Siaya County has the highest HIV prevalence of 21% against the National prevalence of 4.9% [5].

2.2 Sampling

This study was done in three health facilities that were purposively selected because they were: i) the largest health facilities with the highest workload, ii) PITC service was being offered to patients on routine basis and iii) their geographical location which enables them to service most patients from the County. A sample size of 369 patients was identified from a sample frame of 7183 patients seeking PITC services on a monthly basis in the three selected health facilities i.e. Siaya County Referral Hospital (4,813), Bondo Sub-County Hospital (1,576) and Yala Sub-County Hospital (794). Magnani, (1997) sample size formula calculation was used:

$$n = \frac{t^2 \times P(1 - P)}{m^2}$$

n = the required sample size

t = confidence level of 95% (standard value of 1.96)
 P = estimated PITC uptake at 60%
 M = margin of error at 5 % (standard value 0.05) (Magnani, R 1997)

$$n = \frac{t^2 P (1 - P)}{m^2} = \frac{1.962 \times 0.6 (0.4)}{(0.05)^2} = \frac{3.8416 \times 0.24}{0.0025} = 368.79 = 369$$

Sample size = 369

Chart 1: This sample was then distributed proportionately to the three health facilities according to their monthly workload:

Health facility	Health facility workload proportion (monthly workload/Total workload 100)=g	Individual health facility Sample size (g*N)
Siaya County Referral Hospital	4813/7183*100 = 67%	67%*369 = 0.67*369 = 247
Bondo Sub-County Hospital	1576/7183*100 = 22%	22%*369 = 0.22*369 = 81
Yala Sub-County Hospital	794/7183*100 = 11%	11%*369 = 0.11*369 = 41
		N=369

These participants were picked on first come basis as they exited the OPD after seeking PITC services until when the required sample size was achieved.

2.3 Inclusion Criteria

Patients aged 18 years and above who were seeking PITC services in the selected health facilities.

2.4 Data Collection Methods

Structured questionnaire was used to collect data and the selection of this tool was guided by the nature of data to be collected, time, resources and the objective of the study. The questionnaire assessed: age, marital status, education, source of income and whether one was first time tester or repeat tester. Collection of data was done with the help of two research assistants who were experienced in various methods of data collection. The research assistants were selected based on: academic qualification, research experience, gender balance and local residency. They were trained for four days on data collection procedures, study design, study objectives and how to administer the questionnaires. The units of observation were patients seeking PITC services in the selected health facilities. Pre-testing of the questionnaires was done in Kisumu County Referral Hospital and the feedback was used to adjust and re-frame the questionnaires.

2.5 Data Analysis

Data was cleaned, coded and entered through Ms.-access then exported to excel for item description; analysis was done by descriptive statistics using SPSS version 23. Pearson's Chi-square test (χ^2), calculated as $\chi^2 = \sum \frac{(O-E)^2}{E}$ where:

O: Observed value

E: expected value

\sum : summation

was used to assess whether there was a significant association between PITC service uptake and the independent variables, rejecting the null hypothesis of "no association" at the confidence level of 95%, equivalent to α 0.05, before a bivariate logistic regression was run to measure the size of this association by way of odds ratios. The same level of statistical confidence was employed to determine factors that would significantly influence PITC service uptake; that is, a factor would be regarded to be a significant patient characteristic if the associated p-value from the binary logistic regression was less than the threshold of 0.05.

2.6 Study Limitation

Inadequate secondary data on the patient characteristics that influence PITC service uptake in public health facilities of Siaya county made it difficult to conduct a concise literature review.

3. RESULTS

The objective of this study was to assess the patients' characteristics that influenced PITC service uptake in the three main health facilities of Siaya County, western Kenya. There was 100% (369) response rate in all the variables.

Most of the patients at 55.0%(203) were aged 18-27 years with 7.6%(28) aged > 47%. Regarding gender, more than half of the patients were female 70%(258). Among the patients interviewed 43.1%(159) had completed primary level education and 34.4%(127) had completed secondary level education while 0.6% (2) had no formal education. Half of the patients seeking PITC services were married at 51.3% (189), with 41.3% (152) being single who had never married. The divorced and widowed combined accounted for 7.5% (28). The study also showed that 33.1% (122) of patients had business as their source of income compared to 28.1%(103) whose sources of income was employment. Most patients seeking PITC services had been tested before at 71.9%(265) and 28.1 %(104) were first time testers as shown in Table 1.

Patients aged 28-37 years were twice more likely to take up PITC services as compared to those aged 18-27 years (OR=2.084, 95%CI=0.137-2.964, p-value=<0.001) while male patients were less likely to take up PITC services as compared to the females (OR=0.624, 95%CI=0.0315-1.104, p-value=<0.001). The study also showed those that were single and never married (OR=8.509, 95%CI=0.275-1.350, p-value=0.033) were nine times more likely to take up PITC services as compared to the married. Patients with secondary school level of education (OR=1.640, 95%CI=0.163-1.701, p-value=0.021) were more likely to take up PITC services as compared to those with primary level of education. The employed patients were more likely to take up the PITC services as compared to those in business (OR=3.549, 95%CI=0.005-0.736, p-value=0.027) while patients who had farming as their source of income were less likely to take up the PITC services (OR=0.463, 95%CI=0.025-0.358, p-value=<0.001). Being a repeat HIV tester was four times more associated with PITC service uptake as compared to the first time testers (OR=4.350, 95%CI=1.259-1.822, p-value=0.018) as shown in Table 2.

Table 1. Descriptive statistics of patients seeking PITC services

Variables	category	N=369 n	%
Age (years)	18-27	203	55.0
	28-37	99	26.8
	38-47	39	10.6
	>47	28	7.6
Gender	Male	111	30.0
	Female	258	70.0
Education	Primary	159	43.1
	Secondary	127	34.4
	College	81	21.9
	None	2	0.6
Marital status	Married	189	51.3
	Divorced	17	4.4
	Single never married	152	41.3
	Widow	11	3.1
Source of income	Employed	103	28.1
	Business	122	33.1
	Farming	70	18.8
	Spouse	74	20.0
Testers	Repeat testers	265	71.9
	First testers	104	28.1

Table 2. Association between patients' characteristics and PITC service uptake

Variables	category	OR	95%CI		p-value
			Lower CI	Upper CI	
Age (years)	18-27	Ref			
	28-37	2.084	0.137	2.964	<0.001*
	38-47	4.612	0.098	1.072	0.095
	>47	0.720	0.064	0.762	0.734
Gender	Female	Ref			
	Male	0.624	0.0315	1.104	<0.001*
Education	Primary	Ref			
	Secondary	1.640	0.163	1.701	0.021*
	College	0.397	0.913	1.225	0.069
	None	0.215	0.683	1.040	0.070
Marital status	Married	Ref			
	Single never married	8.509	0.275	1.350	0.033*
	Divorced	0.624	0.008	1.184	0.076
	Widow	9.136	0.022	0.474	0.091
Source of income	Business	Ref			
	Employed	3.549	0.005	0.736	0.027*
	Farming	0.463	0.025	0.358	<0.001*
	Spouse	0.126	0.008	0.479	0.069
Testers	First testers	Ref			
	Repeat testers	4.350	1.259	1.822	0.018*

OR= odds ratio; *Significant at $p \leq 0.05$

Table 3. Association between the benefits of PITC service and PITC service uptake

	N=369 n	%	OR	95%CI		p-value
				Lower CI	Upper CI	
Stigma reduction	161	43.6	Ref			
Knowledge on HIV	113	30.6	2.403	0.251	1.682	0.018*
Easy service accessibility	91	24.7	0.492	0.420	1.081	0.740
Others	4	01.1	4.050	1.283	2.530	0.080

3.1 Benefits of PITC Service

The study indicated 43.6%(161) of patients reported PITC services as having helped in reducing HIV related stigma and 30.6% (113) felt it increased their knowledge on HIV. Less than half of the patients 24.7%(91) reported that PITC had made it easy for them to access HIV testing services. Knowledge on HIV was twice more associated with the uptake of PITC service as compared to HIV stigma reduction (OR=2.403, 95%CI=0.251-1.682, p-value=0.018) as shown in Table 3.

4. DISCUSSION

This study revealed that patients aged 28-37 years were more likely to take up PITC services.

This finding is similar to a study done in Kenya which showed increased service uptake among the 25-34 years old [8,9]. However, this finding is contrary to studies done in South Africa and Uganda which demonstrated low HIV testing service uptake among those age < 40 years with increased service uptake among the elderly [10,11,12]. The probable reason of the elderly seeking HIV testing services more than their counterparts would be because of lack of fear as a result of low perception of risks and confidence based on their stable sexual relationships.

According to this study, male patients were less likely to take up PITC services. This finding is in line with a study done in Sub-Saharan Africa which showed low service uptake among men as

compared to females [13,5]. The increased service uptake among women could be because of their better health seeking behavior and increased HIV campaigns and public sensitization targeting women especially at maternal and child health and PMTCT clinics [14]. On the other hand, a study done in Nigeria showed increased service uptake among men which could be as a result of targeted campaign approach towards men by the government [15].

According to this study, having secondary school level of education was more associated with PITC service uptake and this could be because of intervention approaches targeting the literate in our communities and in the health facilities. This finding is similar to a study done in Zambia which revealed secondary school educational attainment to be a strong predictor of HIV testing service uptake [16]. The same is seen in a study done in Bukina Faso which demonstrated that educated patients were more likely to seek HIV testing services than those not educated [17].

The single and never married patients were more likely to take up PITC services. This finding is similar to a study done in Ethiopia which showed increased HIV testing service uptake among those who were singles [18]. This could be because of the perception that single people are at a higher risk of contracting HIV and numerous campaigns by government and other stakeholders targeting the singles than the married. On the contrary studies in Malawi and Tanzania have shown married patients have higher service uptake [19,20].

Patients who had employment as a source of income were more associated with PITC service uptake. This finding is in agreement with a study done by Detsis et al, which showed that employed patients had higher uptake of HIV testing services [21]. Similarly, most employed patients had health insurances which increased their access to HIV testing services [22].

Being a repeat HIV tester was more associated with PITC service uptake. The increased uptake of services among the repeat testers could be as a result of; patient confidence to the healthcare workers and counseling from the previous tests. This finding is similar to a study done in Kenya which showed increased uptake of HIV testing service among repeat testers [23,24]. Another study done in Sub Saharan Africa showed most patients with increased HIV testing service uptake were repeat testers. This was attributed

to history of HIV exposure or individual perception of being at lower risk of contracting HIV [25].

Knowledge on HIV was associated with PITC service uptake. Counseling which is one of the three C's in HIV testing provided patients with information on HIV leading to service uptake [26]. Equally increased knowledge about HIV improved patients' positive attitude towards HIV testing services [27,28].

5. CONCLUSION

The objective of this research was to find out patient's characteristics that influenced PITC service uptake. Patients aged 28-37 years, secondary school level of education, single never married, being in employment, a repeat HIV tester and having knowledge on HIV were factors influencing PITC service uptake in major health facilities of Siaya County, Western Kenya.

6. RECOMMENDATIONS

- Siaya county government and other stakeholders need to design communication strategies that target the elderly and the married who are not actively seeking PITC services.
- Design communication messages using local dialect aimed at reaching out to the less literate in the community.
- Design mobilization and advocacy approaches to increase public knowledge on HIV testing services.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

Participants who met the inclusion criteria were informed of the study objectives, the possible benefits and duration of the study; they were free to participate or opt out. Those willing to

participate signed a written informed consent to show their acceptance and willingness to participate in the study.

ETHICAL APPROVAL

Approval was given by Great Lakes University of Kisumu Ethical Review Committee and permission to enter health facilities was granted by County Health Department and health facilities medical superintendents. Participants' anonymity was guaranteed through patient coding and confidentiality was assured by the use of none identifiers instead of names of participants. The rights of the study participants were safeguarded by explaining to them that they were free to withdraw from the study at any time if they so wished and they would have nothing to lose. The principal researcher maintained sole custody to all the collected data.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. UNAIDS. Global HIV/AIDS statistics-2018 fact sheet. Geneva; 2019.
2. Kenya Ministry of health. Kenya Health Sector Strategic and Investment Plan 2018 – 2023.Nairobi; 2013.
3. Kenya Ministry of health. Kenya AIDS Indicators Survey 2017. Nairobi; 2017.
4. Kenya Ministry of health. Kenya HIV Estimate Report 2018. Nairobi; 2018.
5. Kenya Ministry of health. Kenya AIDS Response Progress Report 2018. National AIDS Control Council, Nairobi; 2018.
6. Odhiambo J, Kizito W, Njoroge A, Wambua N, Nganga L, Mburu M, De Cock KM, et al. Provider-initiated HIV testing and counselling for TB patients and suspects in Nairobi, Kenya. *The International Journal of Tuberculosis and Lung Disease*. 2008;12(3):S63-S68.
7. County Government of Siaya, Kenya. Siaya County Integrated Development Plan II, 2018-2022. Siaya; 2018.
8. Kariuki RM, Rithaa GK, Oyugi EO, Gachathi DM. What is the level of uptake of partner notification services in HIV testing in selected health facilities in Gatanga Sub County, Muranga County–Kenya; a retrospective study. *BMC infectious diseases*. 2020;20(1):1-7.
9. Schatz E, Knight L. “I was referred from the other side”: Gender and HIV testing among older South Africans living with HIV. *PLoS One*. 2018;13(4):e0196158.
10. Marinda E, Simbayi L, Zuma K, Zungu N, Moyo S, Kondlo L, Briggs-Hagen M, et al. Towards achieving the 90–90–90 HIV targets: results from the south African 2017 national HIV survey. *BMC Public Health*. 2020;20(1):1-12.
11. Mafigiri R, Matovu JK, Makumbi FE, Ndyababo A, Nabukalu D, Sakor M, Wanyenze RK, et al. HIV prevalence and uptake of HIV/AIDS services among youths (15–24 years) in fishing and neighboring communities of Kasensero, Rakai District, south western Uganda. *BMC public health*. 2017;17(1):251.
12. Kurth AE, Lally MA, Choko AT, Inwani IW, Fortenberry JD. HIV testing and linkage to services for youth. *Journal of the International AIDS Society*. 2015;18:19433.
13. Pulerwitz J, Gottert A, Kahn K, Haberland N, Julien A, Selin A, Pettifor A, et al. Gender norms and HIV testing/treatment uptake: evidence from a large population-based sample in South Africa. *AIDS and Behavior*. 2019;23(2):162-171.
14. Treves-Kagan S, El Ayadi AM, Pettifor A, MacPhail C, Twine R, Maman S, Lippman SA, et al. Gender, HIV testing and stigma: the association of HIV testing behaviors and community-level and individual-level stigma in rural South Africa differ for men and women. *AIDS and Behavior*. 2017;21(9):2579-2588.
15. Anthony OK, Adetayo T, Folajinmi O, Onu Eugene A, Uchendu O, Ikenna N, Ogbang D, et al. Gender and HIV testing service uptake: Trend in Northern Nigeria. *J AIDS Clin Res*. 2016;7(638):2.
16. Muyunda B, Musonda P, Mee P, Todd J, Michelo C. Educational attainment as a predictor of HIV testing uptake among women of child-bearing age: Analysis of 2014 demographic and health survey in Zambia. *Frontiers in public health*. 2018;6:192.
17. Kirakoya-Samadoulougou F, Jean K, Maheu-Giroux M. Uptake of HIV testing in Burkina Faso: An assessment of individual and community-level determinants. *BMC Public Health*. 2017;17(1):486.
18. Tekletsadik E, Fantahun M, Shaweno D. Is community conversation associated with

- human immunodeficiency virus voluntary counseling and testing service uptake in rural communities in Ethiopia? A comparative cross-sectional study. *North American Journal of Medical Sciences*. 2014;6(2):77.
19. Mandiwa C, Namondwe B. Uptake and correlates of HIV testing among men in Malawi: evidence from a national population-based household survey. *BMC health services research*. 2019;19(1):1-8.
20. Plotkin M, Kahabuka C, Christensen A, Ochola D, Betron M, Njozi M, Wong V, et al. Outcomes and experiences of men and women with partner notification for HIV testing in Tanzania: Results from a mixed method study. *AIDS and Behavior*. 2018;22(1):102-116.
21. Detsis M, Tsioutis CA, Karageorgos S, Sideroglou T, Hatzakis A, Mylonakis, E. Factors associated with HIV testing and HIV treatment adherence: A systematic review. *Current pharmaceutical design*. 2017;23(18):2568-2578.
22. Hamidouche M, Testard PA, Baggaley R, Temime L, Jean K. Monitoring socioeconomic inequalities across HIV knowledge, attitudes, behaviours and prevention: Results from cross-sectional surveys in 18 sub-Saharan African countries. *HIV/AIDS*; 2021. [Cited 2021 Sep 2]. Available:<http://medrxiv.org/lookup/doi/10.1101/2021.08.24.21262532> Google Scholar
23. Rogers AJ, Akama E, Weke E, Blackburn J, Owino G, Bukusi EA, Turan JM. Implementation of repeat HIV testing during pregnancy in southwestern Kenya: progress and missed opportunities. *Journal of the International AIDS Society*. 2017; 20(4):e25036.
24. Harichund C, Kunene P, Simelane S, Abdool Karim Q, Moshabela M. Repeat HIV testing practices in the era of HIV self-testing among adults in KwaZulu-Natal, South Africa. *PloS one*. 2019; 14(2):e0212343.
25. Regan S, Losina E, Chetty S, Giddy J, Walensky RP, Ross D, Bassett IV. Factors associated with self-reported repeat HIV testing after a negative result in Durban, South Africa. *PLoS One*. 2013; 8(4):e62362.
26. Osborn M, Obermeyer CM. Understanding client satisfaction with HIV testing and counseling services: a mixed-methods study in four African countries. *AIDS care*. 2016;28(6):689-694.
27. Sulat JS, Prabandari YS, Sanusi R, Hapsari ED, Santoso B. The impacts of community-based HIV testing and counselling on testing uptake: A systematic review. *Journal of Health Research*. 2018;32(3):152-163.
28. Kuehne A, Koschollek C, Santos-Hövenner C, Thorlie A, Müllerschön J, Mputu Tshibadi C, Bremer, et al. Impact of HIV knowledge and stigma on the uptake of HIV testing—Results from a community-based participatory research survey among migrants from sub-Saharan Africa in Germany. *Plos one*. 2018; 13(4):e0194244.

© 2021 Ibworo and Ibworo; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle4.com/review-history/77098>