



Patient Knowledge, Experience and Preferences towards HIV Differentiated Care Service in Kiambu County, Kenya

Beatrice May Onyango¹, Joseph Wang'ombe¹, Collins O. Odhiambo^{*2,3}

¹School of Public Health, College of Health Sciences, University of Nairobi, Nairobi, Kenya

²Department of Clinical Medicine and Therapeutics, University of Nairobi, Nairobi, Kenya

³Institute of Mathematical Sciences, Strathmore University, Nairobi, Kenya

*Correspondence should be addressed to Collins O. Odhiambo; codhimbo@strathmore.edu

Received 03 December 2020;

Accepted 31 December 2020;

Published 01 January 2021

Abstract

Background: Differentiated service delivery, a model fashioned to address the specific requirements of the continuum of HIV prevention, care and treatment for a sub-type of clients, was rolled out in Kenya in 2016. **Objective:** The aim of the study was to determine patient knowledge, experience and preference towards differentiated service delivery for the category of patients who had completed a year of HIV treatment and were considered to be doing well and enrolled in differentiated services in facilities implementing the model in Kiambu County. **Method:** The study used mixed method descriptive cross-sectional survey to identify the determinants of satisfaction among stable HIV positive patients enrolled in differentiated service delivery. In the qualitative arm, a structured questionnaire was administered to 404 participants across six health care facilities who were HIV positive male or female patients above 20 years had been enrolled in differentiated service delivery. Analysis for quantitative data was two pronged; exploratory analysis to get preliminary patterns followed by inferential statistics to analyse relationship between variables of interest. Qualitative data was collected concurrently through Focused Group Discussions (FGDs) randomly selected from the same pool of patients involved in quantitative arm. On completion, triangulation was done to identify prevailing themes in qualitative and significant values in quantitative data. **Results:** High levels of patient satisfaction were reported. 99% of participants reported being either satisfied (45%) or being Very satisfied (54%) n=404. Knowledge in HIV condition and treatment, Knowledge of differentiated services, waiting time, savings in time and cost as well as health care worker respect had the strongest associations to satisfaction with differentiated services. **Conclusion:** Patients enrolled in differentiated service are satisfied with the services offered under the model.

Keywords: Differentiated Care, HIV, Patient Satisfaction, Qualitative Data, Antiretroviral therapy

Introduction

The global HIV burden stands at an estimated 36.9 million People Living with HIV (PLHIV) and 1.8 new infections annually [1]. Since its discovery, it continues to be a communicable disease of public health concern [1] being termed as one of the greatest threat to humankind and a fast growing epidemic at one point. By 2005, over 40 Million people were living with HIV and an estimated 3.1 Million deaths had taken place that year alone. Sub-Saharan Africa contributes 66% of the global HIV burden and Kenya contributes 7% of new HIV infections in East and Central Africa after South Africa (33%), Malawi (16%) and Tanzania (8%). In 2017, Kenya had an estimated 1.5 Million PLHIV and 53,000 new infections took place [1]. Since the introduction of antiretroviral therapy in the early 1980's, continuous research in the pharmaceutical field has meant that the drugs have continued to be more effective, safer and easier to access [2]. These improvements have also continued to

influence policy affecting treatment and management of HIV that have contributed greatly to a decline in infection rates and AIDS related mortality and resulted in improved health outcomes for those infected with the virus.

The criteria used to determine whether an individual qualified for antiretroviral therapy was initially based on CD4 levels (a measure of a type of immunity cells in the blood used to determine a person's degree of immunosuppression) or on clinical staging (a set of standardized classification of HIV associated clinical diseases that guide medical decision making for patients with HIV/AIDS) especially for resource limited settings without access to laboratory services [3]. In 2006, CD4 levels of below 250 cells/mm³ or Clinical stage 3 or 4 warranted ART but opted to delay treatment for a patient with CD4 counts of more than 350 cells/mm³ [3] but research demonstrated a high risk of HIV associated mortality if ART is started at very low CD4 cell counts due to delay in immune-reconstitution and in 2011, the CD4 cut-off for ART initiation was revised to 350 cells/mm³ in line with WHO

recommendations [4]. In 2013, WHO again recommended even higher CD4 linked treatment considerations of starting treatment for all patients with CD4 levels of less than 500 cells/mm³ regardless of clinical staging [5].

Clinical and Laboratory monitoring for HIV patients was largely characterized by regular and frequent appointments of intense initial 2,4,8 and 12 weeks clinical appointments until a patient has stabilized on therapy, 6 monthly CD4 monitoring and even once they have stabilized, monthly drug pick-ups for those on ART or Co-trimoxazole for those not on ART [3]. There had been revisions of up to 3-monthly appointments in some settings over time, but it still remained inefficient especially in Sub-Saharan Africa which is still the most affected by HIV because the changes in policy over the years led to, among others benefits, improved treatment outcomes and reduction in HIV related mortality inferring higher survival rates that saw a steady rise in the number of patients being managed for HIV in addition to non-communicable diseases in a health care system that is already burdened [6]. This paved way for modification of HIV service delivery.

In 2016, International AIDS society published a decision framework for antiretroviral therapy delivery in a different way informed by client and health care worker perspectives collected in the previous model of frequent clinical monitoring. Healthcare workers were concerned about high and rising patient workload contributed to by largely stable clients, quality of care for many patients per day, limited resources (space, time, work force) while the patients were concerned expressed concerns with long waiting time for ART refills, why they needed to take drugs and come to the clinic when they did not feel unwell, fear of loss of employment because of frequent clinic visits and dissatisfaction with access to treatment. This delivery model was called Differentiated Service Delivery (DSD) [7]. Differentiated service delivery refers to service-delivery models that are adapted to address the specific requirements of the continuum of prevention, care and treatment for a subgroup of clients [8]. In HIV, it is defined as a client centered approach aimed at improving clinical outcomes for the patients and increasing efficiency of the health system as the core principles. It is assumed that when there health care provision is organized around the needs and preferences of the patient, it will increase retention and viral suppression and for the health care system; re-allocation of resources after a reduction of the clinical burden from stable patients [7].

For targeted care to be given in differentiated service model, patients are categorized into groups. The first categorization takes place at enrollment after a positive HIV test. Services are tailored depending on whether the patient is enrolled with advanced disease or are well. Those with advanced disease either present with opportunistic infections or complicated clinical issues that require close monitoring, consultant review or referral to first stabilize them before starting HIV treatment. Those categorized as well require a less vigorous approach with more emphasis on early ART start and adherence. In addition to a standard package of care, each arm receives a differential care [9].

The 2nd categorization takes place after the patient completes one year of ART at which point the patient is subjected through a criteria to classify them as stable or unstable. Again, the classification determines the care requirements. The criterion includes clinical presentation, adherence score, viral suppression, age, and nutritional status, completion status of Isoniazid preventive therapy and pregnancy status for women.

In Kenya, when differentiated care was introduced, a patient had to be aged 20 years or over with a Body Mass Index

(BMI) of not less than 18.5, have completed a year of treatment on their current regimen, have no active opportunistic infections in the last 6 months, adherent to scheduled clinic appointments for the last 6 months, completed 6 months of Isoniazid preventive therapy (IPT), achieved a viral load (VL) of less than detectable levels in their most recent laboratory investigations (in the last 6 months), not be pregnant or breastfeeding and the health care team is comfortable with their progress to be considered. All others would be considered unstable though there is guidance available for stable pediatrics and adolescents in the recently disseminated 2018 ART guideline that extends the age limit for enrollment of stable adolescent from the age of 15 into DSD [9].

Differentiated Service Delivery is sensitive to the package of care offered, location of services and frequency of services. This is different from the previous model of service delivery that seemed to give similar services at a location determined by the health care worker at frequent intervals to all despite different needs. This shift aimed to achieve four major goals especially for the stable patient; reducing frequency of visits to the facility, increasing access to treatment services, task shifting and optimizing the continuum of services.

Patient satisfaction is defined as “evaluation based on fulfillment of expectation” and because it is subjective, there lacks a standard way to measure and quantify it. Many factors influence fulfillment on the part of the patient but it is important because it is linked to adherence and treatment outcomes.

While some studies have found no significant correlation between patient satisfaction and socio-demographic characteristics, others have been able to show that indeed, this correlation exists. Majority of studies have shown that older patients report higher satisfaction as opposed to younger patients in some settings [10]. A study in Cameroon measuring client satisfaction with HIV services was able to break it down further and found that overall satisfaction was higher among those aged 31-40 and those above 51 years. Correlation between gender and satisfaction has been varied. In the Cameroon study, being female and employed showed higher satisfaction but when gender was not considered, being unemployed led to higher satisfaction possibly because they were under no pressure to report to a place or deliver on some work. Results have shown contradiction in education level and marital status [10] though these studies have been done in other health care settings other than HIV and most certainly not in differentiated service delivery. These characteristics are important because the prevalence of HIV among women in Kenya is higher than that of men. More so, the differentiated service model largely targets those aged 20 years and above; ages that are presumably engaged in income generation who stand to benefit from less frequent hospital visits.

Information exchange is a determinant of how knowledgeable the patient is concerning their disease. The education acquired by passing information makes for better understanding of the patient for self-care especially in a fast changing environment owing to on-going research.

This support for self-management has been shown to have a positive influence on interaction with providers. Because interaction with the health system is limited in the DSD, it is important to determine how well the patients understand their treatment goals and role in self-care. Accessibility, availability and affordability are determinants of access. Accessibility is concerned with organization of the health system to aid in utilization of the service resources (availability) with minimal consumer barriers of cost (affordability). Convenient location, short waiting time and easy of getting appointments have been associated with

satisfaction. This is of importance in differentiated service delivery because decentralization of ART delivery at community level and fast tracked ART refill specifically address access, and by extension reduce cost by spending less on transport and not being disengaged from their source of livelihood if employed. Because the model allows for the patient to come back to the health facility before their schedule return date in case of illness or any concern, it would be important to determine the ease of making such an appointment should it be required.

While one of the building blocks of differentiated service delivery is reducing the frequency of clinic visit, it is interesting to note that studies have found that high frequency of clinic visits led to patient satisfaction possibly because of psychological aspect of reassurance from qualified personnel. It would not be surprising to find patients enrolled in differentiated services who have not appreciated having spaced interaction with the health system.

There is without a doubt a positive correlation between patient satisfaction and availability of resources and for differentiated service delivery, it is to determine if the continuum of services has been optimized enough to allow the patient receive all the required services on the day appointed and not have to return and spend more on transport especially if the service is not offered near them. Communication is closely associated with patient knowledge through information sharing to the patient and allowing for interaction. Adequate information on illness, treatment and tests has been strongly associated with patient. Respect for patient preferences in treatment options, timing of treatment and overall patient involvement in their medical decision has been shown to improve satisfaction [10] moreover, a strong correlation has been shown to exist between good provider- patient interaction and patient knowledge of their condition and treatment options [11] because of the joint effort in developing treatment objectives and this remains an important component in DSD.

Healthcare worker, especially doctors and nurses, come under high scrutiny on their affective behavior and has even proven to be of more importance to patients rather than competence. Being polite, kind courteous, sympathetic, friendly and concerned were highly associated with satisfaction while the perception that one has received incorrect treatment lowered satisfaction. While long waiting time decreases satisfaction, there exists a positive association between longer times spent in consultation with a clinician during a patient visit and satisfaction [10]. This is of concern because with the limited interaction between having just 2

clinical review appointments requires comprehensive evaluation and a friendly atmosphere to encourage openness.

In HIV settings, and more specifically differentiated Services, evidence shows reduction in patient waiting time and provision of quality care by health care workers because of decongestion of health care facilities but these have focused mainly on the benefits to the health system. Studies have however not considered patients' perceptions, or experience and satisfaction with the model despite the model being patient centered and the significance of patient satisfaction for program success.

Kiambu had a population of 1.83 Million according to the 2016 report on County HIV estimates by National Aids Control Council [12] It was ranked 17th highest in HIV incidence in the country of between 1.31 and 2.60 per 1000. It ranked 6th among counties with highest HIV burden for individuals aged above 15 years and 8th highest contributor to pediatric HIV burden with a prevalence of 4% in the Kenya HIV estimates report for 2018. At the time of the study, it had over 50,000 people above 15 years living with HIV and slightly over 5,000 children and contributed about 700 new infections annually of adolescents and young persons aged 15-24 years. The county's ART coverage stood at 61% for adults, up from 40% in 2015, and 81% for pediatrics [12].

It was anticipated that the findings from this study would inform better implementation of Differentiated service delivery in Kiambu to drive success of the program especially since there were no known studies that has documented patients' knowledge, experiences and practices in HIV differentiated services.

The general objective of the study was to assess determinants of patient satisfaction among stable patients enrolled in differentiated service delivery in Kiambu County.

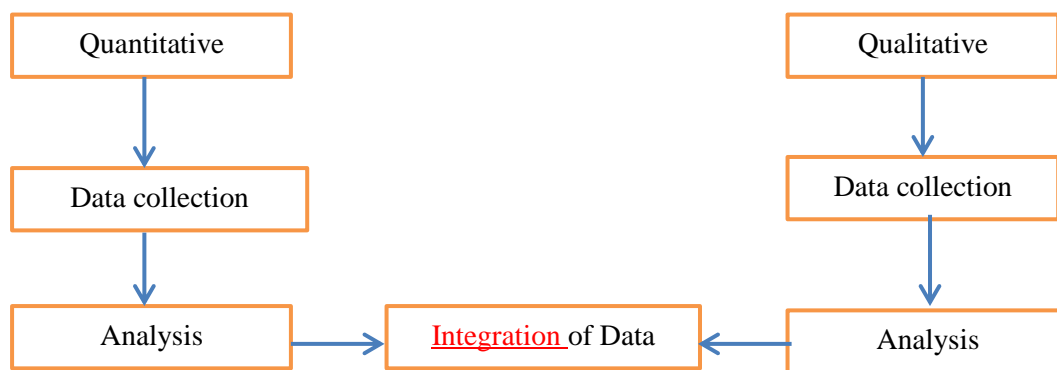
Materials and Methods

3.1 Study design

The study was a cross-sectional survey that applied mixed methods concurrent triangulation approach. Qualitatively, data were collected using a structured researcher administered questionnaire and quantitative data was collected using an FGD guide.

Qualitative data was collected concurrently and on completion, prevailing themes generated manually. Triangulation was then done to identify prevailing themes in qualitative and significant values in quantitative data.

This study design was used in order to attain depth and understanding of the issues for corroboration.



Research design: adapted and modified from (W.Creswell, 2000)

3.2 Study Area

Kiambu County, one of the 47 counties in Kenya, covers an area of 2,543.5 km² with 12 sub-counties. It borders Nakuru, Kajiado, Muranga, Nyandarua and Nairobi Counties. As at 2016, it was

home to over 1.8 M inhabitants [13]. It had an estimated 70,000 PLHIV in 2016 and the estimates as per 2018 HIV estimates report were about 59,000 and is ranked 17th highest contributor nationally to the total number of people living with HIV with a prevalence of

4% in 2017 down from 5.6% in 2015. An estimated 1,500 patients had been enrolled in differentiated Service delivery across 6 facilities ^[13].

3.3 Study population

The study population was active HIV positive patients aged 20 years and older receiving treatment and enrolled in differentiated service delivery in the following health care facilities: Kiambu County Referral Hospital, Karuri Sub-county Hospital, Wangige Sub-county Hospital, Kigumo Sub-County hospital, Ngewa Health Center and Gichuru Health Center

3.4 Inclusion criteria

The study included HIV positive male or female patients 20 years and above, who had been on treatment for more than 1 year, consented to and enrolled in differentiated service delivery.

3.5 Exclusion criteria

Respondents who met the inclusion criteria but got diagnosed with an opportunistic infection, or had a detectable viral load or were critically ill during the visit were excluded from the study

3.6 Sample size

Large scale population studies have not been done in differentiated service delivery to help in sample quantification. Because the population is unknown, sample size was derived by computing the minimum sample size required for accuracy in estimating population with specified relative precision ^[14] by considering the

standard normal deviation set at 95% confidence level (1.96), percentage picking a choice or response (50% = 0.5) and the confidence interval (0.05 = ±5). The formula used was: $n = z^2 * p(1-p) / c^2$ Where: z = standard normal deviation set at 95% confidence level p = percentage picking a choice or response c = confidence interval

$$\begin{aligned} \text{Necessary Sample Size} &= (Z\text{-score})^2 * \text{Std Dev}^2 / (\text{margin of error})^2 \\ &= ((1.96)^2 * (.5(.5))) / (.05)^2 \\ &= (3.8416 * .25) / .0025 \\ &= .9604 / .0025 \\ &= 384.16 \\ &= 385 \text{ respondents were needed} \end{aligned}$$

3.7 Sample selection

Multi-stage sampling was done for the quantitative section of the study. The first stage was to determine the number of facilities that will participate in the study. At the time of the study, only 7 facilities had fully implemented differentiated services for HIV patients and so purposive sampling was done. All the 7 facilities were selected to participate as follows; 6 study sites and one facility was used to pre-test the study questionnaire

The second stage was to determine the number of participants per facility was proportionately determined as in table 1.

Table 1: Sampling

Facility	No. of patients enrolled on DSD	Sample size determination per facility	Sample size per Facility
Kiambu C.R.H	1000	$\frac{10000 \times 385}{1465}$	263
Karuri Sub-county Hospital	300	$\frac{300 \times 385}{1465}$	79
Ngewa Sub- County Hospital	50	$\frac{50 \times 385}{1465}$	13
Kigumo Sub-County Hospital	50	$\frac{50 \times 385}{1465}$	13
Gichuru Health Center	50	$\frac{50 \times 385}{1465}$	13
Ngewa Health Center	15	$\frac{15 \times 385}{1465}$	4
TOTAL			385

Finally, at facility level, systematic sampling was done; the first stable patient was selected randomly and thereafter, every 3rd stable patient enrolled for differentiated services attending clinic was approached for participation in the study.

For the qualitative section of the study, focused group discussions were conducted. Systematic sampling was also used to identify participants. The 1st patient was selected randomly and the 5th patient thereafter was invited to sit in a focused group discussion. Should they have declined; the next patient was requested to participate. The focused group discussions had 7 to 10 participants. A total of 9 focused group discussions were conducted.

3.8 Data collection tools and techniques

The tool used for data collection for the quantitative section was a modified version of the Customer Satisfaction Survey included in the Differentiated Care Operational Guide manual ^[15]. The questionnaire was researcher administered and contained a Likert scale for majority of the 32 questions. Each questionnaire took approximately 20 minutes to be administered from consent process to completion. A Focused Group discussion guide which consisted

of 10 questions was developed for qualitative data collection. It captured the desired thematic areas and contained the goals, required settings and the open ended questions for the discussions. The sessions had a moderator and a note taker who had an audio recorder. Research assistants recruited to assist in data collection were either diploma holders in a health related field or had worked in a health related program with experience in data collection; conducting focused group discussions and researcher administered questionnaires. They were trained on the purpose of the study and ethical considerations for conducting research. They were also trained on the data collection tool, how to conduct questionnaire interviews (interviewer administered questionnaire) and focused group discussions.

3.9 Validity

During selection of the study participants for qualitative and quantitative sections of the study, randomization was done to reduce bias. Validity of the data was also optimized through pre-testing the study questionnaire, training of the research assistants and researcher assisted questionnaire to make sure that the right data was collected to the extent possible.

3.11 Data Quality Assurance

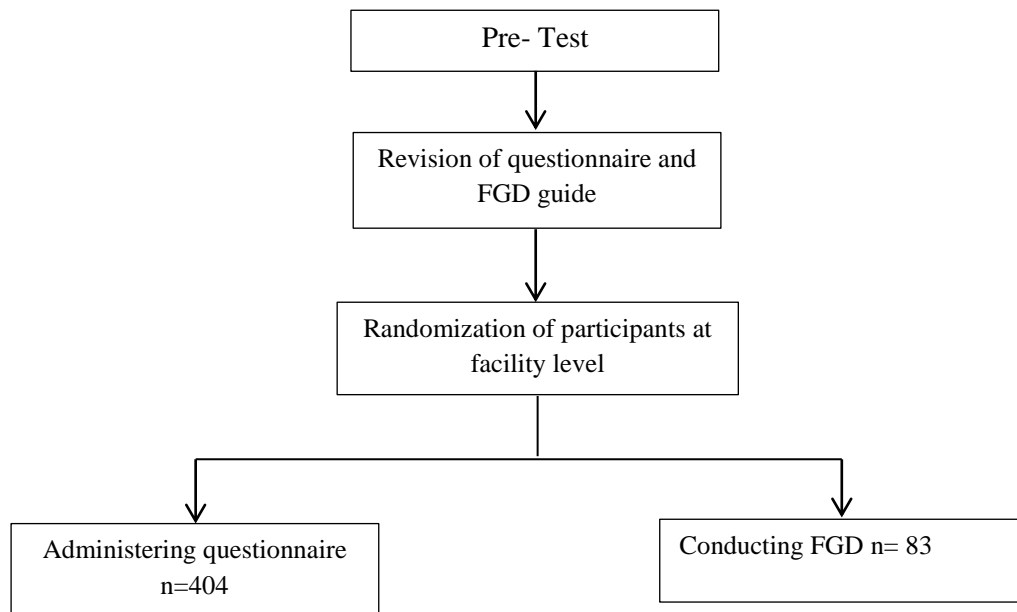
Research assistants were trained prior to data collection. A pilot pre-test was conducted in a selected facility not part of the study and revisions were done to the questionnaire to ensure the tool collected the information intended to answer the research question. On a daily basis, before data was keyed in, questionnaires were checked for completeness and consistency.

3.12 Data collection

Data collection took place from October 2019 to November 2019. Prior communication about the study had been made to county and sub county HIV coordinators as well as medical superintendents,

nursing service managers and Comprehensive Care Center In-Charges for the various facilities involved in the study. Research assistants reported to the facility in-charges and CCC in-charges to make their presence known before commencing on data collection. Prior arrangements were done to allocate a private room for interviews and FGD's at the appropriate time. At the end of each interaction, each study participant signed a sign-up sheet and daily, at the end of the exercise, the CCC in-charge signed and stamped a facility sign-up sheet as proof that the research assistants were present and carried out the required activities.

3.13 Study flow



3.14 Data Analysis

Analysis for quantitative data was two pronged; exploratory analysis to get preliminary patterns followed by inferential statistics to analyze relationship between variables of interest. For qualitative analysis, prevailing themes were generated manually. Once data had been collected, analysis was done in two steps using SPSS. Step One: Simple descriptive statistics. This was summary of patient characteristics and captured age, gender, marital status, employment status and knowledge of HIV and Differentiated services. Step two: Inferential statistics. Test of association: Chi-square was used to test association of each ordinal variable (in this case, each question was treated as a variable) against overall patient satisfaction in differentiated service delivery. Continuous data was not considered. Ordinal Regression: This was to be done after tests of association in line with the overall objective of the study to determine significant predictors of satisfaction among patients enrolled in differentiated service delivery.

The variables did not conform to a normal distribution and only 1% of respondents registered dissatisfaction, the assumptions of multivariate normality [16] and the minimum required events per variable [17] necessary for regression analysis were violated and as such, ordinal regression could not be implemented.

3.14.2. Qualitative data

Transcripts from the focused group discussions were reviewed manually from the reports generated from each FGD. Where clarifications needed to be made, the recording taken during the discussions were reviewed. Prevailing themes were generated manually. Finally, to incorporate findings from the qualitative arm of the study, the prevailing themes were compared and triangulation was then done on the significant values from the quantitative data analyzed. Overall patient satisfaction, being the dependent variable, was collected as ordinal data; ordered 0-4 ranging from very dissatisfied to very satisfied.

Results and Discussion

This section describes findings obtained after analysis of data collected through interviewer assisted questionnaires and the prevailing themes identified after analysis of the focused group discussions.

4.1 Socio-demographic characteristics of study participants

Table 2: Socio-demographic characteristics (categorical data)

Variables	n=404	%
Gender		
Male	92	23
Female	312	77
Other	0	

Age		
20-29yrs	19	4.
30-39yrs	115	28.5
40-49yrs	168	41.6
50-59yrs	78	19.3
≥ 60 yrs	24	5.9
Marital Status		
Single	122	30
Married	163	40
Separated	59	15
Widowed	60	15
Edu. Level		
None	13	3
Primary	204	51
Secondary	150	37
College/Uni.	37	9
Employed		
Yes	289	71.5
No	115	28.5
HIV Knowledge		
Knowledgeable	190	47
Very knowledgeable	212	52
DCM Knowledge		
Not Knowledgeable	12	3
Uncertain	11	2
Knowledgeable	207	52
Very Knowledgeable	172	43

Table 2 shows the socio-demographic distribution of the study participants. Majority (77%) of the study participants were female. Almost half (41.6%) were aged between 30-39 years with a mean age of 43.7%. Two-fifths were married, and 51% of the participants had attained primary level of education.

Seventy one percent of the study participants were employed. Most of the participants reported knowledge of DSD with 52% being knowledgeable and 43% very knowledgeable.

Table 3: Socio-demographic characteristics (continuous data)

		Time it takes to get to the facility	Time spent at the facility	Age at last birthday
N	Valid	404	404	404
	Missing	0	0	0
Mean		57.425	54.06	43.77
Std. Deviation		42.4282	50.715	9.309
Minimum		1.5	3	21
Maximum		300.0	300	78

The mean age for participants in this study was 43.77. It took an average of 57 minutes to reach the facility and participants spent an

average of 54 minutes while at the facilities as seen in table 3.

4.2 Patient characteristics and satisfaction

Table 4: Patient characteristics and satisfaction

		Extent of Satisfaction with Differentiated services				Total	P Value
		Very Dissatisfied	Dissatisfied	Satisfied	Very Satisfied		
Age Bands	20-29	0	0	7 (3.8%)	12 (5.5%)	19 (4.7%)	0.853
	30-39	2 (67%)	1 (100%)	50 (27.3%)	62 (28.6%)	115 (28.5%)	
	40-49	0	0	80 (43.7%)	88 (40.6%)	168 (41.6%)	
	50-59	1 (33%)	0	36 (19.7%)	41 (18.9%)	78 (19.3%)	
	>60	0	0	10 (5.5%)	14 (6.5%)	24 (5.9%)	
Total		3	1	183	217	404	
Gender	Male	1(33%)	0(0.0%)	47(26%)	44 (20%)	92 (23%)	0.545
	Female	2(67%)	1(100%)	136(74%)	173(80%)	312(77%)	
Total		3 (100%)	1 (100%)	183	217	404	
Marital Status	Single	1(33%)	0 (0.0%)	44(24%)	77 (36%)	122 (30%)	0.028
	Married/cohabiting	0 (0%)	1 (100%)	76 (42%)	86 (40%)	163 (40%)	
	Separated/Divorced	2 (67%)	0	35 (19%)	22 (10%)	59 (15%)	

	Widowed	0	0	28 (15%)	32 (15%)	60 (15%)	
Total		3	1	183	217	404	
Highest Education Level	None	0	0	7 (3.8%)	6 (2.8%)	13 (3.2%)	0.3
	Primary	1 (33%)	1 (100%)	100 (54.6%)	102 (47%)	204 (50.5%)	
	Secondary	2 (67%)	0	67 (36.6%)	81 (37.3%)	150 (37%)	
	College/University	0	0	9 (4.9%)	28 (12.9%)	37 (9.2%)	
Total		3	1	183	217	404	
Employed or self-employed	Yes	3 (100%)	1 (100%)	118 (64.5%)	167 (77%)	289 (71.5%)	0.027
	No	0	0	65 (35.5%)	50 (23%)	115 (28.5%)	
Total		3	1	183	217	404	
Extent to which one would say they have been taught and know about their condition of HIV and treatment they are on	Knowledgeable	0	0	151 (83%)	39 (18.1%)	190 (37.3%)	0.00
	Very knowledgeable	3 (100%)	1 (100%)	31 (17%)	177 (81.9%)	212 (52.7%)	
Total		3	1	182	216	402	
Extent to which one would say they have been taught and know about differentiated care	Not knowledgeable	0	0	11 (6%)	1 (0.5%)	12	0.00
	Uncertain	0	0	9 (4.9%)	2 (0.9%)	11 (2.7%)	
	Knowledgeable	0	0	154 (84.6%)	53 (24.5%)	207 (51.5%)	
	Very knowledgeable	3 (100%)	1 (100%)	8 (4.4%)	160 (74.1%)	172 (42.8%)	
Total		3	1	182	216	402	

Table 4 shows that 40.6% of the study participants who said they were very satisfied with the differentiated services were aged between 40-49 years and 80% were female. The married/cohabiting study participants (40%) indicated they were very satisfied. Forty-seven percent (47%) reporting being very satisfied had primary level education, while 77% of the participants

who were employed or self-employed reported being very satisfied with the differentiated services.

Those who reported most satisfaction with DSD were also the ones who had more awareness about their HIV condition and treatment (81.9%) and considered themselves as being very knowledgeable about DSD (74.1%)

Table 5: Responses to questions testing knowledge of HIV and DSD

Responses to questions testing knowledge of HIV and DSD		
Would there still be need for one to use condoms when having sexual intimacy with a HIV positive partner and both of you are on ARV's?	Yes	384 (95%)
	No	19 (5%)
N		403
How does HIV treatment work in the body	Destroys all the HIV in the body	5 (1%)
	Reduces the amount of HIV in the body and boosts the immune system	396 (98%)
	Makes the nervous system more effective	2 (1%)
N		403
What does having an 'Undetectable viral load' mean?	Other people can't tell you have HIV	3 (1%)
	The level of the virus in the blood is so low it can't be detected and passing it to others is hard	400 (99%)
N		403
On a refill appointment, would there be need to see the clinician if you are not unwell?	Yes	363 (91%)
	No	38 (9%)
N		401
What is the frequency of clinic visits in DSD as compared to the previous appointment system for those considered 'stable'?	Less frequent	390 (96%)
	Just the same	7 (2%)
	More frequent	7 (2%)
N		404

Majority of participants expressed knowledge in the rationale of condom use despite concordant positive status with sexual partner (95%), the mechanism of drug action (98%) and viral suppression (99%). Where differentiated services are concerned, only 9%

indicated there would be no need to see a clinician on a re-fill appointment as is the desired practice and 96% indicated that clinic visit in DSD were less frequent as seen in table 5.

4.3 Access and patient satisfaction

Table 6: Access and patient satisfaction

		Extent of satisfaction with differentiated services				Total	P Value
		Very Dissatisfied	Dissatisfied	Satisfied	Very Satisfied		
Description of distance between residence and health facility	Very far	0	0	10 (5.5%)	18 (8.3%)	28 (7%)	0.00
	Far	0	0	34 (18.8%)	46 (21.3%)	80 (20.1%)	
	Uncertain	0	0	38 (21%)	3 (1.4%)	41 (10.3%)	
	Near	1 (100%)	1 (100%)	89 (49.2%)	97 (44.9%)	188 (47.1%)	
	Very near	0	0	10 (5.5%)	52 (24.1%)	62 (15.5%)	
Total		1	1	181	216	399	
Reason for choice of facility despite far distance	Only facility around			4 (9.1%)	12 (30.8%)	16 (19.3%)	0.62
	Only one offering HIV services near			13 (29.5%)	7 (17.9%)	20 (24.1%)	
	Better services			21 (47.7%)	18 (46.2%)	39 (47%)	
	Fear of /Stigma			3 (6.8%)	0	3 (3.6%)	
	Friendly HCW			3 (6.8%)	2 (5.1%)	5 (6%)	
Total				44	39	83	
Description of waiting time	Too long	0	0	5 (2.7)	4 (1.9)	9 (2.2%)	0.00
	Long	0	1 (100%)	18 (9.8%)	26 (12.1%)	45 (11.2%)	
	Uncertain	0	0	7 (3.8%)	3 (1.4%)	10 (2.5%)	
	Short	3 (100%)	0	149 (81.4%)	82 (38.1%)	234 (58.2%)	
	Very Short	0	0	4 (2.2%)	100 (46.5%)	104 (25.9%)	
Total		3	1	183	215	402	
Queuing to see all carders of health care providers on refill days (other than drug collection)	Yes	2 (66.7)	1 (100%)	87 (47.8%)	127 (58.8%)	217 (54%)	0.119
	No	1 (33.3%)	0	95 (52.2%)	89 (41.2%)	185 (46%)	
Total		3	1	182	216	402	
Satisfaction with waiting time	Very Dissatisfied	0	0	3 (1.6%)	2 (0.9%)	5 (1.2%)	0.00
	Dissatisfied	0	1 (100%)	17 (9.3%)	11 (5.1%)	29 (7.2%)	
	Uncertain	0	0	8 (4.4%)	0	8 (2%)	
	Satisfied	1 (30%)	0	151 (82.5%)	72 (33.2%)	224 (55.4%)	
	Very Satisfied	2 (67%)	0	4 (2.2%)	132 (60.8%)	138 (34.2%)	
Total		3	1	183	217	404	
Receipt of all needed services during a clinical visit	Yes	3 (100%)	1 (100%)	176 (96.2%)	206 (96%)	386 (96%)	0.984
	No	0	0	7 (4%)	8 (4%)	15 (4%)	
Total		3	1	183	214	401	
Extent to which spaced appointments of differentiated services saved time?	Very Little	0	0	3 (1%)	1 (0.5%)	4 (1%)	0.00
	Little	0	0	8 (4%)	1 (0.5%)	9 (2.2%)	
	Uncertain	0	0	4 (2%)	1 (0.5%)	5 (1.2%)	
	Much	0	1 (100%)	117 (63%)	32 (14.8%)	150 (37.2%)	
	Very Much	3 (100%)	0	51 (30%)	181 (84%)	235 (58.3%)	
Total		3	1	183	216	403	
Extent to which spaced appointments of differentiated services saved cost	Very Little	0	0	2 (1%)	0	2 (1%)	0.00
	Little	0	0	11 (6%)	1 (0.5%)	12 (3%)	
	Uncertain	0	0	4 (2%)	1 (0.5%)	5 (1%)	
	Much	0	0	108 (59%)	31 (14%)	139 (34%)	
	Very Much	3 (100%)	1 (100%)	58 (32%)	183 (85%)	245 (61%)	
Total		3	1	183	216	403	

Participants whose distance between residence and health facility was near (44.9%) indicated that they were very satisfied with differentiated services, those who were very satisfied (46.2%) despite far distance indicated their reason was because of better services at the facility, while (46.5%) were very satisfied because of very short waiting time. Over half (58.8%) of the participants reported queuing to see all carders of health care providers on refill

days (other than drug collection), (60.8%) indicated they were very satisfied with waiting time, (96%) indicated receipt of all needed services during a clinical visit. Participants reporting very high satisfaction indicated that the spaced appointments had saved them time were 84% while those who indicated that the spaced appointments had saved them cost were (85%) as seen in table 6.

4.4 Health care worker characteristics and patient satisfaction

Table 7: Health care worker characteristics and patient satisfaction

		Extent of satisfaction with differentiated services				Total	P Value
		Very Dissatisfied	Dissatisfied	Satisfied	Very Satisfied		
Did participants feel comfortable interacting with HCW	Yes	3 (100%)	1 (100%)	182 (99.5%)	214 (99.5%)	400 (99.5%)	0.998
	No	0	0	1 (0.5%)	1 (0.5%)	2 (0.5%)	
Total		3	1	183	215	402	

Extent to which HCW were respectful during interactions	Disrespectful	0	0	1 (0.5%)	0	1 (0.2%)	0.00
	Uncertain	0	0	1 (0.5%)	0	1 (0.2%)	
	Respectful	0	0	140 (76.5%)	24 (11.1%)	164 (40.6%)	
	Very Respectful	3 (100%)	1 (100%)	41 (22.4%)	193 (88.9%)	238 (58.9%)	
Total		3	1	183	217	404	
If patients felt the HCW listened to and understood them	Yes	3 (100%)	1 (100%)	182 (99.5%)	217 (100%)	403 (99.8%)	0.75
	No	0	0	1 (0.5%)	0	1 (0.2%)	
Total		3	1	183	217	404	
If patients felt HCW were competent to treat them	Yes	3 (100%)	1 (100%)	182 (99.5%)	217 (100%)	403 (99.8%)	0.75
	No	0	0	1 (0.5%)	0	1 (0.2%)	
Total		3	1	183	217	404	
Perception that time spent with the HCW is enough	Yes	3	1	182 (99.5%)	217 (100%)	403 (99.8%)	0.75
	No	0	0	1 (0.5%)	0	1 (0.2%)	
Total		3	1	183	217	404	
Perception that HCW create an atmosphere that allows one to ask questions and seek clarifications	Yes	3	1	182 (99.5%)	217 (100%)	403 (99.8%)	0.75
	No	0	0	1 (0.5%)	0	1 (0.2%)	
Total		3	1	183	217	404	
Perception that health goals and decisions are made jointly	Yes	3 (100%)	1 (100%)	183 (100%)	215 (99.1%)	402 (99.5%)	0.63
	No	0	0	0	2 (0.9%)	2 (0.5%)	
Total		3	1	183	217	404	

A large proportion of the participants (99.5%) felt comfortable interacting with HCW additionally, 88.9% who indicated that HCW were respectful during interactions were very satisfied with the differential services. All (100%) of the study participants indicating that they felt the HCW listened to and understood them, were competent to treat them and that time spent with the HCW was enough with an atmosphere that allowed one to ask questions and seek clarifications were very satisfied with the differentiated services. Ninety nine percent felt very satisfied because of perception that health goals and decisions are made jointly as seen in table 7.

Variables with a P value less than 0.05 were considered to have significant correlation with satisfaction. These variables were marital status (P= 0.028), employment status (P= 0.027), knowledge of HIV management and treatment (P=0.00). Knowledge of differentiated services (P=0.00), proximity to health facility (P=0.00), waiting time (P=0.00), extent to which

differentiated services saved time (P=0.00) and cost (P=0.00) and health care worker respect (P=0.00) (Table 4, 6, 7)

4.5 Overall patient satisfaction with differentiated services

Overall patient satisfaction with differentiated services was high at 99% with majority reporting being either satisfied (45.2%) or very satisfied (53.7%)

4.6 Directional and symmetric tests

Variables that showed significant p values in relation to patient satisfaction with differentiated services were further subjected to tests to determine the strength of the relationship to satisfaction. Variables that had a Somers'd value 0 to +/- 3 were considered to have a weak relationship, +/- 0.31 to +/- 0.7 a moderate relationship and up to 1 a strong relationship.

Variables that had a phi value of +/- 0.01 to 0.29 weak considered to be weak, +/- 0.3 to 0.39 were moderate, +/- 0.4 to 0.69 were strong and above that were considered to be very strong.

Table 8: Results of direction and symmetric tests

Variable	P Value	Phi	Somers D
Marital Status	0.028	0.215	-.112
Employment status	0.027	.151	-.121
Knowledge of HIV and treatment	0.000	.651	.610
Knowledge of Differentiated services	0.000	.710	.635
Distance between home and facility	0.000	.396	.139
Waiting time	0.000	.547	.350
Time saving	0.000	.572	.526
Cost saving	0.000	.572	.525
Health Care Worker respect	0.000	.676	.636

From the analysis results in table 7, marital status, employment status and proximity to the health facility did not have a strong association with satisfaction. Knowledge of HIV and treatment literacy, knowledge of DSD, waiting time, perception of saving in time and cost as well as health care worker respect had moderate to strong relationship to satisfaction of differentiated services.

The data did not meet the assumption of multivariate normality and the independent variables in the analysis did not meet the minimum required events per variable and as such, ordinal regression was not necessary

4.7 Prevailing themes

Reduction in waiting time leading to time saving, the reduction in frequency of clinic visits leading to savings in cost and health care worker respect were brought out strongly in the focused group discussions. Similarly, they were also identified as having strong association to satisfaction in the quantitative arm of the study.

Conclusions

5. Discussion

It is documented from a number of studies that measurements of overall satisfaction generally tend to be high- over 90 (as is the case in this study) and this is thought to be because the consumers of the services are uncritical and allow deterioration of services before expressing dissatisfaction [18].

5.1 Patient characteristics and satisfaction

The ability of a patient to be able to self-care while on DSD is critical in its implementation. This ability largely depends on the patient's knowledge of their condition as well as the components of DSD.

Health education and coaching is a prerequisite to self-efficacy to enable improved quality of life [19]. Patient knowledge stood out to be the patient characteristic strongly associated with satisfaction. This was for both knowledge of condition ($P < 0.001$), which needs to be understood by the patient before they are introduced to longer appointments, and knowledge of components of differentiated services ($P < 0.001$). Additional questions gauging specific knowledge components on HIV and DSD revealed contrary information to the prior findings.

Although majority of the respondents considered themselves knowledgeable on DSD (95% $n=402$) responses revealed that 90% did not understand the client flow (not seeing a clinician) during a refill appointment. This may be due to a default client flow structure at the facility that necessitates a client to pass through the clinicians rooms during a refill appointment or clinicians roles (dispensing treatment).

Variables that had a positive Somers' d value were considered to have a positive directional relation with patient satisfaction. As such, despite marital ($d = -0.112$, $\phi = 0.215$, $p < 0.05$) and employment status ($d = -0.121$, $\phi = 0.151$, $p < 0.05$) having some correlation with satisfaction, the association was not considered to be strong. Further, it showed that those who were single and those unemployed were likely to be more satisfied than those who were married/ cohabiting or employed.

5.2 Access and patient satisfaction

Studies have found that the close proximity does not always lead to satisfaction [20] possibly because of ease of access and perception in cost saving. In this study, while distance between residence and facility showed some positive association to satisfaction ($p < 0.05$) on further analysis ($\phi = 0.396$, $d = 0.139$), the association was found to be weak meaning it is not necessarily a determinant of satisfaction in differentiated services.

Waiting time ($\phi = 0.547$, $p < 0.05$), its overall reduction from the previous model, was a strong determinant of patient satisfaction. Participants also reported being very satisfied with the current waiting time. The study did not measure satisfaction at the different waiting times between one health care provider to the next, rather, it sought to determine satisfaction with overall waiting time as time spent from the time one arrives at the facility to the time one exits the health facility. A study conducted in Uganda on cost effectiveness of a pharmacy refill program compared to a standard of care program as part of its study, conducted a time and motion survey to estimate worker and patient time use, reported an overall reduction in lost patient time [21].

While it was not the purpose of this study to determine the extent to which cost and time has been saved while receiving care under DSD, participants considered perceived savings in cost and saving in time to be the greatest benefits they experienced in this model. Differentiated services have been documented to be cost effective for both the health care system and the patient as well as compared to the previous standards of care model that had higher transport costs for the patient due to the frequent clinic visits [21].

Modification of behavior to protect dignity and safety is not uncommon among HIV positive patients because of fear of stigma and discrimination. They experience biases that restrict employment activities and achievement of other goals [22]. Participants in the study expressed the infrequent clinic visits as having a positive workplace influence and perceived stigma reduction because their absenteeism was not glaring and they no longer had to explain why they had to attend clinic visits so frequently.

There seemed to be a contrast between what participants understood as the requirement and the actual practice. From the questionnaire, participants generally felt they did receive all services they required but this did not seem to be consistent with discussions held during the focused group discussions. The discussions brought out cases of drug stock outs that necessitated a separate visit to get a refill, also, those with co-morbidities needed to seek treatment and consultation elsewhere because their drugs were not accessible through the HIV clinic.

With Human resources for health being less the WHO recommendation [23] DSD was to address this challenge by distribution of roles across carders and incorporate engagement of lay workers to handle [24], among other roles, ART distribution [15]. This benefit, however, may not be fully experienced yet 54% of the participants reported queuing to see all carders of staff during a refill visit. This may be due to the fact that the same staff may be attending to them as a clinician and well as dispensing drugs in the same sitting. Similarly, 91% felt there would still be need to see a clinician during a refill appointment even if they were not ill yet ideally the visit should be an express visit where just vital signs are measured, adherence is assessed and drugs dispensed [15]. Patient flow in this case may need to be assessed in order to reduce the waiting time even further.

Unfriendly health care workers have at times been the cause of poor communication that may affect the quality of care; in contrast, a positive relationship between service providers and patients has a great effect on patient retention in care because it gives a sense of trust allowing for honesty [25]. Of all the health care worker related characteristics, health care worker respect ($\phi = 0.676$, $d = 0.636$, $p < 0.005$) was a significant determinant to satisfaction; not surprisingly, numerous studies identified respectful patient-health care worker relations as a facilitator to anti-retroviral adherence which contributes greatly to positive health outcomes [26]. Given the length of time between appointments and the retrospective nature of some of the questions (especially touching on time) recall bias was a possible limitation. The study however relied on triangulation from the qualitative arm of the study to compare the general responses on timelines

With the assumption that an individual attends clinic in a facility they already like and are satisfied with, to eliminate bias while seeking satisfaction with the delivery model, data collection was done in several facilities.

To avoid causing unprecedented delays and feelings of coercion to participants, the questionnaire was brief and took only 20 minutes while the FGD took 45 minutes and consent was sought for voluntary participation. The mixed method approach was considered to be strength. The sample size for the quantitative arm was large and representative of the sample facilities while the focused group discussions gave further insights on and a deeper understanding of the responses received from the questionnaires

Ethics approval and consent to participate

Ethical consideration was made for patient information and responses to safeguard against the risk of unintended exposure of their responses and possible fear of victimization by health care workers. Confidentiality and anonymity was maintained at all times during the process of data collection. For both quantitative and qualitative data collection, there were no patient identifiers and the sessions were conducted in a room for privacy where only the study participant and the research assistant were.

Ethical approval was sought from: university of Nairobi and KNH ethical review committee. Approval was also sought from Kiambu County research board and National Commission for Science Technology and Innovation (NACOSTI). Communication was done to the facility management teams of the participating health care facilities and the county approval share as well. Informed consent was sought from the research participants before commencing the data collection.

List of abbreviations

AIDS-	Acquired Immunodeficiency Syndrome
ART-	Anti-Retroviral Therapy
DSD-	Differentiated Service Delivery
FGD-	Focused Group Discussion
HIV-	Human Immunodeficiency Virus
NACC-	National AIDS Control Council
PLHIV-	Persons Living with HIV
UNAIDS-	Joint United Nations Programme on HIV/AIDS
WHO-	World Health Organization

Data Availability

Data will be made available upon request and after publication.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Funding Statement

The authors did not receive any funding for this work.

Authors' contributions

BMO came up with the concept. CO analysed and interpreted the result the result. JW provided overall guidance and review. All were major contributors in writing the manuscript. All authors read and approved the final manuscript.

References

- [1] UNAIDS data (2018). Available at: <http://www.unaids.org/en/resources/documents/2018/unaids-data-2018>.
- [2] Vella, Stefano, Bernard Schwartländer, Salif Papa Sow, Serge Paul Eholie, and Robert L. Murphy. "The history of antiretroviral therapy and of its implementation in resource-limited areas of the world." *Aids* 26, no. 10 (2012): 1231-1241. doi: 10.1097/QAD.0b013e32835521a3.
- [3] WHO (2006) Antiretroviral Therapy for HIV Infection in Adults and Adolescents: Recommendations for a public health approach 2006 revision.
- [4] Kenya Ministry of Health (2011) Guidelines for antiretroviral therapy in Kenya 4. Knight, L. (2008) UNAIDS; the first 10 years, 1996-2006, *Aids*.
- [5] WHO (2013) 'Consolidated guidelines on the use of Antiretroviral drugs for treating and preventing HIV infection. Recommendation for a public health approach', *Who 2013 Consolidated Guideline*, (June). doi: ISBN 978 92 4 150572 7.
- [6] Geldsetzer, P., Ortblad, K. and Bärnighausen, T. (2016) 'The efficiency of chronic disease care in sub-Saharan Africa', *BMC Medicine*. *BMC Medicine*, 14(1), pp. 8–11. doi: 10.1186/s12916-016-0675-6.
- [7] International AIDS Society (2016) Differentiated care for HIV: Frame Works For antiretroviral therapy delivery, Differentiated care for HIV: Frame Works For antiretroviral therapy delivery.
- [8] Torpey, K. et al. (2016) 'a Synopsis of Differentiated Care for Art Program Managers', (July). Available at: <https://www.fhi360.org/sites/default/files/media/documents/resource-differentiated-hiv-care.pdf>.
- [9] NASCOP (2018) Kenya ARV Guidelines 2018.
- [10] Batbaatar, E. et al. (2017) 'Determinants of patient satisfaction: A systematic review', *Perspectives in Public Health*, 137(2), pp. 89–101. doi: 10.1177/1757913916634136.
- [11] Carlin, C. S. et al. (2012) 'Chronic illness and patient satisfaction', *Health Services Research*, 47(6), pp. 2250–2272. doi: 10.1111/j.1475-6773.2012.01412.x.
- [12] NACC (2018) 'Kenya HIV Estimates 2018', *Kais*, pp. 1–28. doi: 10.1111/j.1365-2664.2007.0.
- [13] NACC (2016) Kenya HIV County Profiles 2016. Available at: <http://nacc.or.ke/wp-content/uploads/2016/12/Kenya-HIV-County-Profiles-2016.pdf>.
- [14] S. K. Lwanga, S. L. (1991) 'Sample size determination in health studies: a practical manual', in. *World Health Organization: Geneva*.
- [15] NASCOP (2017) DIFFERENTIATED CARE: Operational Guide.
- [16] Healy, L. M. (2017) Logistic Regression: An Overview. doi: 10.1017/CBO9781107415324.004.
- [17] Austin, P. C. and Steyerberg, E. W. (2017) 'Events per variable (EPV) and the relative performance of different strategies for estimating the out-of-sample validity of logistic regression models', *Statistical Methods in Medical Research*, 26(2), pp. 796–808. doi: 10.1177/0962280214558972.
- [18] Hospital, W. (1994) 'Patient Satisfaction: a Valid Concept!', 38(4), pp. 509–516.
- [19] Cinar, A. B. and Schou, L. (2014) 'Interrelation between Patient Satisfaction and Patient-Provider Communication in Diabetes Management', 2014. doi: 10.1155/2014/372671.
- [20] Am, A. et al. (2015) 'Association Between Orthopaedic Outpatient Satisfaction and Non-Modifiable Patient Factors', pp. 1041–1048.
- [21] Babigumira, J. B. et al. (2011) 'Cost Effectiveness of a Pharmacy-Only Refill Program in a Large Urban HIV / AIDS Clinic in Uganda', 6(3), pp. 1–7. doi: 10.1371/journal.pone.0018193.
- [22] GNP+ (2018) 'HIV Stigma and Discrimination in the World of Work: Findings from the People Living with HIV Stigma Index Evidence Brief', (July), p. 28.

- [23] WHO (2016) 'Global strategy on human resources for health: workforce 2030', Global strategy on human resources for health: workforce 2030. Available at: <http://apps.who.int/iris/bitstream/handle/10665/250368/9789241511131-eng.pdf?sequence=1>.
- [24] Kenya Ministry of Health (2017) 'Task Sharing Policy Guidelines 2017-2030', p. 129.
- [25] Yehia, B. R. et al. (2015) 'Barriers and facilitators to patient retention in HIV care', BMC Infectious Diseases. BMC Infectious Diseases, 15(1), pp. 1–10. doi: 10.1186/s12879-015-0990-0.
- [26] Croome, N. et al. (2017) 'Patient-reported barriers and facilitators to antiretroviral adherence in sub-Saharan Africa', AIDS. Lippincott Williams and Wilkins, pp. 995–1007. doi: 10.1097/QAD.0000000000001416.