PHARMACETICAL CARE INTERVENTION, OUTCOME AND PATIENT'S SATISFACTION IN ANTI-RETROVIRAL THERAPY IN GENERAL HOSPITAL IGBOHO, OYO STATE, NIGERIA

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ABSTRACT

The role of pharmacist and the interventions they rendered to PLHIV in ART care and treatment cannot be over emphasized as their services influences the outcomes of the treatment. This study aimed at determining the level of satisfaction of antiretroviral therapy (drugs and counseling) on HIV/AIDs patients attending General Hospital Igboho, Oyo State, Nigeria. To achieve this, current and related literatures were reviewed and, data were extracted from patient's records/folders which was supported with oral interview. The data obtained were analyzed descriptively and chi-square statistical test was carried out. Best on the results, the null hypotheses claiming that "Pharmaceutical care interventions do not improve the satisfaction patients derive from their chronic anti - infective drug therapy and Pharmaceutical care interventions do not improve the positive outcomes in the care of patients receiving antiretroviral drug therapy " were rejected at 95% confidence interval , and these warrant the researchers to conclude that interventions influenced the patients' adherence, optimized their drug therapy and improved rational prescribing and care resulting in significant improvements in the number positive outcomes and levels of patient satisfaction. Regular exchange of knowledge, ideas and experiences *should be encouraged through the organization and attendance of national and international conferences and workshops, government should make adequate efforts to develop and utilize the abundant skills and potentials of pharmacists and pharmaceutical care were recommended.*

Key words: Pharmaceutical Care, Intervention, Outcome, Anti-Retroviral Therapy

INTRODUCTION

Globally, as of 2020, 37.7 million people live with Human Immunodeficiency Virus (HIV), and only 28.2 million people out of this figure were accessing antiretroviral therapy (ART) (American Pharmaceutical Association (APA), 2019). Most cases of HIV infection occur in sub-Saharan Africa, where 39% of new cases are found every year (APA, 2019). Currently, Nigeria has an HIV crude prevalence of 1.4%, an improvement from the previous 2.8% reported in 2019 by the United Nations Joint Programme on HIV/AIDS (American Society of Health-System (ASHS) (2016). Over the years, the pharmacy profession has evolved. This evolution has been categorized into different models, which include apothecary, drug distribution, clinical pharmacy and pharmaceutical care (PC) model (Cordina, 2018). PC had since been defined as the "responsible provision of drug therapy for the purpose of achieving definite outcomes that will improve a patient's quality of life (Erah & Nwazuike, 2014). Identification, resolution and prevention of drug-related morbidity and mortality have been regarded as the guiding principle in the delivery of PC which may lead to improved therapeutic outcomes and reduced costs of care.

Pharmaceutical care is recognized as a prominent activity within a health care system. It is a structured, systematic and documented type of pharmacy practice which comprises the detection, prevention and solutions to drug related problem. The aim is to achieve rational and evidence-based pharmacotherapy which is beneficial for each patient and for the society (APA, 2019) Unlike most developed countries, pharmaceutical care practice is still in its embryonic stage in Nigeria (ASHS, 2016). The Pharmacist Council of Nigeria (PCN) in 2015 set minimum standards to assure the practice of pharmaceutical care in pharmacy premises (Cordina et al, 2018). The need for pharmaceutical care application is frequently addressed in continuing education programs organized by PCN, in conferences and workshops in the country. However, Nigerian pharmacists are yet to fully accept pharmaceutical care concept and implement it in their practice settings. For example a study carried out in Benin City, Nigeria showed that community pharmacists in Nigeria are marginally involved in the primary health care programs and they barely provide preventive services.

Admittedly, operationalizing pharmaceutical care in Nigeria will not be so easy. Nigeria has a unique health sector in which patients take care of their health from 'out-of-pocket' expense. In many cases, patients or their families have no money to pay for drugs and thus are forced to seek health care outside the formal health sector. The problem is compounded by the erratic drug distribution system which has made pharmacy practice unattractive for many pharmacists, and their role provided by unqualified personnel. Outside these major issues, there are other objective barriers that hamper the implementation of pharmaceutical care. For example, deficient clinical knowledge and communication skills, insufficient time, lack of adequate technology and personnel, and negative attitudes concerning pharmaceutical care may inhibit the practice of pharmaceutical care (Federal Ministry of Health, 2014; Federation of International Pharmacists, 2019). However, aside addressing the time, technology, and personnel concerns, it is imperative to foster positive attitudes concerning pharmaceutical care. For countries where pharmaceutical care practice is still evolving like in Nigeria, fostering positive pharmaceutical care attitude amongst pharmacist should be the first and fundamental strategy so as to stimulate its wide spread acceptance and implementation. It is equally important to nurture positive pharmaceutical care attitudes not only to practitioners of today but more importantly, the practitioners of tomorrow.

There is need to establish whether the training given to pharmacy students in Nigeria are good enough to stimulate a positive attitude towards pharmaceutical care practice. Such findings would serve as a useful baseline data to monitor progress in the training of future pharmacy practitioners in Nigeria. Therefore it is to my interest to carry out a research on pharmaceutical invention, outcome and patient satisfaction in anti-retroviral therapy in General Hospital Igboho, Oyo state.

To determine the level of satisfaction of antiretroviral therapy (drugs and counseling) on HIV/AIDs patients, the following objectives are necessary;

i. Determine the level of satisfaction of PLHIV during the course of treatment
ii. Investigate drug related problem associated with antiretroviral drugs?
iii. Proffer solutions to drug-related problems associated with PLHIV.

Research questions

i. To what extent does PLHIV patients satisfied with pharmaceutical services rendered to them at General Hospital Igboho?
ii. What are the problems associated with HIV drugs on PLHIV?
iii. What measures do pharmaceutical department, GH Igboho put in place in curbing drugs related problems associated with PLHIV?

Hypotheses

- H_{11}: Pharmaceutical care interventions do not improve the satisfaction patients derive from their chronic anti - infective drug therapy
- H_{21}: Pharmaceutical care interventions do not improve the positive outcomes in the care of patients receiving antiretroviral drug therapy.

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1.0 LITERATURE REVIEW
Pharmaceuticals care service on ARV patients

According to the definition of Hepler & Strand (2015), pharmaceutical care is the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life. Pharmaceutical care is based on a relationship between the patient

and the health- care providers who accept responsibility to provide care to the patients. Pharmaceutical care involves the active participation of both the patient and the health care provider in drug therapy decisions.

Pharmaceutical care involves three major functions: identifying potential and actual drug related problems; resolving actual drug-related problems; and preventing drug related problems. Although there are different trends, such as clinical pharmacy services, cognitive services, medication management , medication review, they all share the same philosophy and objectives, namely ''the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life (Roughead et al., 2019). Pharmaceutical care activities include medication dispensing, providing drug information, patient counseling, drug monitoring, parenteral nutrition preparation, adverse drug reaction monitoring, medication reconciliation, drug proto- col/guideline development, medical rounding with the health care team, and performing admission drug histories. Practicing these activities by evidence-based approach will improve the quality of the provided services.

Pharmacists need training and support to develop and improve their practical skills to provide comprehensive pharmaceutical care (Schommer and Cable, 2016). To be effective, pharmaceutical care needs to be adopted by majority of pharmacists in their daily work. Many barriers limit the implementation of the pharmaceutical care principles. To identify and solve these barriers well we need to understand the factors affecting the provision of pharmaceutical care in healthcare providers system.

Factors Influencing the Provision of Pharmaceutical Care on ARV patients

Adeniyi et al (2022) stated that over the years, clinical pharmacy practice in Nigeria has drifted from the traditional and ancient ways of extemporaneous drug compounding and dispensing to the ground-breaking concept of pharmaceutical care. Pharmaceutical care, being an act of drug therapy management, encompasses the changes in the orientation of professional attitudes and thus re-engineers the traditional pharmacy profession. There are several factors that can influence the provision of pharmaceutical care in antiretroviral therapy (ART). These factors include:

a. **Access to medication**: Availability and accessibility of antiretroviral drugs is crucial for the provision of pharmaceutical care in ART. Factors such as drug availability, affordability, and reliable supply chain systems can impact the ability to provide adequate pharmaceutical care.

b. **Health system infrastructure**: The quality and capacity of the healthcare system play a significant role in the provision of pharmaceutical care. Factors such as the availability of trained healthcare professionals, adequate healthcare facilities, and robust information systems for monitoring and managing ART can influence the provision of pharmaceutical care.

c. **Regulatory environment**: The regulatory framework surrounding the distribution and use of antiretroviral drugs can impact the provision of pharmaceutical care. Policies related to drug registration, licensing, and quality assurance can influence the availability and safety of ART, thereby affecting pharmaceutical care.

d. **Health workforce capacity**: The availability of trained healthcare professionals, such as pharmacists and pharmacy technicians, is essential for the provision of pharmaceutical care. Adequate staffing levels, ongoing training, and support for healthcare professionals can contribute to the effective delivery of pharmaceutical care in ART.

e. **Patient factors:** Patient-related factors, such as adherence to medication, understanding of treatment regimens, and access to healthcare services, can influence the provision of pharmaceutical care. Patient education, counseling, and support services are crucial to ensure optimal medication adherence and treatment outcomes.

f. **Socio-economic factors**: Socio-economic factors, such as poverty, unemployment, and lack of health insurance, can impact the provision of pharmaceutical care in ART. These factors can affect patients' ability to access and afford medication, as well as their overall health-seeking behavior.

g. **Stigma and discrimination**: Stigma and discrimination associated with HIV/AIDS can create barriers to the provision of pharmaceutical care. Fear of disclosure, social isolation, and negative attitudes towards people living with HIV/AIDS can affect patients' willingness to seek and adhere to treatment, as well as their engagement with healthcare services.

h. **Health information systems:** Effective health information systems, including electronic medical records and data management systems, are crucial

for the provision of pharmaceutical care. Accurate and timely information on patient demographics, medication history, and treatment outcomes can support healthcare professionals in providing optimal pharmaceutical care in ART. Overall, the provision of pharmaceutical care in antiretroviral therapy is influenced by a complex interplay of factors related to drug access, health system infrastructure, regulations, healthcare workforce, patient factors, socio-economic context, stigma, and health information systems. Addressing these factors is essential to ensure the effective delivery of pharmaceutical care and improve treatment outcomes in ART.

Obstacles to pharmaceutical care implementation in Nigerian hospitals and community pharmacy.

a. **Lack of knowledge about pharmaceutical care:** in line with the knowledge of pharmaceutical care in Nigeria, Funsho and Titilayo, in 2015, reported that there is a statistically significant association existing between pharmacists' qualifications and the knowledge of pharmaceutical care and practice. The study showed that additional qualifications positively influence the knowledge of pharmaceutical care. Today, most pharmacists in tertiary hospitals in Nigeria do not have additional patient care-related qualifications, and, for the purpose of achieving professional competence in the delivery of pharmaceutical care, there is a need for pharmacists to acquire additional patient care-related qualifications. Even though pharmacists in Nigeria are aware of the concepts of pharmaceutical care, there is an urgent need for improved mandatory continuing professional development. Pharmacists' attitudes toward mandatory continuing professional development are not satisfactory posing a serious challenge to implementing pharmaceutical care. Providing quality patient care requires a knowledge base that is continuously expanding and being updated. The lack of a pharmaceutical care guide within the hospital setting has posed a serious challenge in the implementation of pharmaceutical care in tertiary institutions.

b. **Non-cooperation among other healthcare teams:** Physicians, pharmacists, and nurses, among other healthcare teams, are frequently involved in improving the quality of healthcare delivery, and thus improving the quality of life of the patient. Non-cooperation among healthcare teams has also been shown to be a serious challenge in pharmaceutical care. Most pharmaceutical care providers in tertiary hospitals participate mainly in pharmacists' rounds rather than in the multidisciplinary ward rounds .Healthcare providers should work as a team, contributing their specialized knowledge, skills and expertise to patient care efforts to lead to the improvement of patients' quality of life.

c. **Lack of plan for effective patient counseling as a result of limited pharmacist access to patient medical records:** Limited pharmacist access to patient medical records is a critical challenge to effective pharmaceutical care provided by pharmacists. As much as providing drug consultation to other medical professionals may be on request, pharmacist-patient counseling is a must-do. Pharmacist-patient medication counseling is an important means of achieving pharmaceutical care. By assessing patients' medical records, pharmacists provide patient counseling, which is associated with encouraging safe and appropriate medication use.

d. **Lack of proper documentation:** Documentation is an important element of pharmaceutical care, and it is needed for the continuity of care, research and evidence of action taken, among others. According to a report by Suleiman and Onaneye (2021), most pharmacists tend to identify drug-related problems, but neither the errors nor their interventions were documented, this is a significant challenge because correct documentation of the pharmaceutical services supplied is critical for proper monitoring and modification of a drug treatment plan, which can help to reduce therapeutic errors.

As highlighted by studies, the non-involvement of most pharmacists in ward rounds, especially hospital pharmacists, has been a major weakness in pharmaceutical care services, Lack of an enabling environment, knowledge deficits, inadequate pharmacy personnel and excess workloads, among others, pose challenges to pharmaceutical care

2.4 Patients Satisfaction

A study in Ethiopia by A.A Tani 2018 revealed that the overall patient satisfaction with antiretroviral service was 75.4% with a 95%CI: 71.9–79). The overall satisfaction specific to each health center ranged from 71.4 to 88.9%. Generally, most of the 'response was highly (97.1%) satisfied with the convenience of time to get ART services and (91.5%) convenience situations and (90.8%) with easy accessibility of drugs at pharmacies. On the other hand, (40.7%) of the patients showed low satisfaction with the availability and accessibility of latrines and

(27.3%) with the cleanness and comfort ability of latrines at the health centennial patient satisfaction measurements.

Factors affecting patient satisfaction on antiretroviral therapy service

i. **Quality of healthcare services:** Patients' satisfaction with ART can be influenced by the quality of healthcare services they receive. Factors such as the attitude and communication skills of healthcare providers, waiting times, accessibility of healthcare facilities, and the overall patient experience can impact satisfaction levels.

ii. **Effectiveness of treatment:** Patients' satisfaction with ART is closely tied to the effectiveness of the treatment in controlling HIV infection and improving their health outcomes. Achieving and maintaining viral suppression, minimizing side effects, and experiencing improvements in overall health can contribute to higher levels of satisfaction

iii. **Adherence support**: Adequate support for medication adherence can significantly impact patients' satisfaction with ART. Factors such as clear instructions on medication use, reminders, counseling, and support services can help patients adhere to their treatment regimens, leading to improved satisfaction.

iv. **Access to medication**: Ease of access to antiretroviral drugs is crucial for patients' satisfaction. Factors such as availability, affordability, and reliable supply chain systems can influence patients' ability to obtain their medications, which can impact their overall satisfaction with ART.

v. **Side effects and tolerability:** The presence and severity of side effects associated with ART can affect patients' satisfaction levels. Medication regimens with minimal side effects and good tolerability can contribute to higher satisfaction, while frequent or severe side effects may lead to lower satisfaction.

vi. **Information and education:** Patients' satisfaction with ART can be influenced by the level of information and education they receive about their treatment. Clear and comprehensive information about the purpose of the medication, potential side effects, and strategies for managing them can contribute to higher satisfaction levels.

vii. **Support networks:** The presence of a strong support network, including family, friends, and support groups, can positively impact patients' satisfaction with ART. Emotional support, shared experiences, and the ability to discuss concerns and

challenges related to treatment can contribute to higher satisfaction.

viii. **Stigma and discrimination:** Stigma and discrimination associated with HIV/AIDS can negatively impact patients' satisfaction with ART. Experiences of stigma, including social isolation, discrimination, and fear of disclosure, can affect patients' overall well-being and satisfaction levels with their treatment.

ix. **Empowerment and involvement in care**: Patients' satisfaction with ART can be influenced by their level of involvement in their own care. Empowering patients to actively participate in treatment decisions, providing opportunities for shared decision-making, and involving them in their own treatment planning can contribute to higher satisfaction levels.

x. **Overall healthcare experience:** Patients' satisfaction with ART can be influenced by their overall healthcare experience, including factors such as the coordination of care, access to other healthcare services, and the ability to address their broader health needs beyond ART. Understanding and addressing these factors can help healthcare providers and policymakers improve patients' satisfaction with ART, leading to better treatment outcomes and overall well-being.

Factors associated with satisfaction of clients on ART service deliver

In Nigeria, over the last decade, increasing access and improvements to antiretroviral therapy has resulted in greatly increased life expectancy, reduced morbidity and mortality among PLHIV as well as reduced transmission rates of the virus.3This rapid and continuous expansion is imperative to achieve the UNAIDS vision 95-95-95 by the 2030 to mark the end of HIV/AID pandemic as a public health threat.7However, this raises a significant challenge to ensure the quality of services across our ART clinics. Patient satisfaction has been considered as an important part when evaluating the health outcomes and quality of healthcare service.

According to Donabedian and Maxwell (2019), patient satisfaction is one of the several dimensions of quality of healthcare service, others includes technical competence, accessibility of service, coverage, effectiveness, efficiency, interpersonal relationship, continuity of care, safety, amenities and utilization of healthcare services. Patient's satisfaction is the patient's perceived experience of care received compared

with the care expected. The more satisfied patients are with their care, the better their self-care, adherence to ART, retention to ART care and treatment, and reduction in the burden of the disease. They also have a higher odd of developing longer lasting relationship with their healthcare providers.

However, dissatisfied patients are more likely to have poor self-care, retention to care and treatment and worsening in the morbidity and mortality. Patients have explicit desires for services when in hospital and inadequate discovery of their needs may result in patient dissatisfaction.

Thus the aspects of satisfaction and dissatisfaction should be continuously assessed which may draw attention of the healthcare providers and administrators in order to monitor performance, determine patients' felt needs, plan the development of services (to be client-centric as much as possible) and provide evidence to support targeted interventions.

In developing countries, patient satisfaction has received increasing attention in recent years and despite the paucity of literatures in Africa and Nigeria in particular, studies have reported significant association of factors with patients' satisfaction, and these include socio-economic and clinical characteristics, features of clinics and health system. study in Sokoto in North-western Nigeria in 2013 by Oche et al reported that the respondents were generally satisfied with most of the services rendered at the clinic which includes; triage, waiting time, consultation, courtesy of care provider, availability of drugs etc.

3. METHODS

Study Design

This was a descriptive study aimed at finding out patient satisfaction and pharmacist intervention on ART patient

Setting and Study Population

The study was carried out at General Hospital Igboho (Apen Head Office in Oke Ogun, Oyo State. This Studies includes Patient from Saki, Igbeti, Isehin, Septeri, Ogbooro, Igbope, Kisi, and Ago Amodu)

Sample and Sampling Techniques

The data collection was based on the following techniques

a. Participant observation
b. Questionnaire
c. Face to face interview methods.

Inclusion and Exclusion Criteria

Inclusion and exclusion criteria used for the study were;

1. New patients were excluded from the study since they will have had no previous encounter with the system and so no existing data on them.

2. Patients selected were those who have received treatment, drugs and counseling from the hospital for at least nine (6) months (i.e. who have visited the hospital for at least three (3) times).

3. Adults and children as well as males and females were involved in the study.

4. Patients whose medications will last for less than three (3) months were excluded from the study. This is to give the interventions enough time to make impacts and produce the possible results and to ensure uniformity of treatment duration and contact with the pharmacist in all the participating patients.

Data Collection Techniques

Data were collected from the patients' prescription sheets, laboratory report forms, care/ART cards, and other relevant forms in their treatment folders. Other relevant information was also obtained from the patients through oral interview. The data collected at this stage formed the base-line/ pre - intervention data for the study.

After documentation of these base-line data, pharmaceutical care interventions were implemented where necessary and there included:

1. Patient education using a validated educational material applied uniformly to all the patients in the study.

2. Healthcare personnel education, counseling and discussions.

3. Recommendations for changes of drugs/regimens change of drug dose interval, duration or dosage form, addition of more drugs, treatment of untreated conditions, implementation of non-drug therapy, patient referral.

4. Ensuring that patients do their laboratory tests.

5. Monitoring the laboratory test results and carrying out interventions where necessary.

6. Giving patients access to pharmacists any time they needed it i.e. maintaining constant communication between the patients and the pharmacists.

Then, a repetition of the data collection and documentation above was done six (6) months after the implementation of the pharmaceutical care interventions mentioned above. This data represents the post - intervention data. The two data sets (baseline / pre-intervention & post-intervention data) were then be collated, analyzed and compared to see if the interventions resulted in

any significant differences in the occurrence of drug therapy problems.

Statistics

Frequencies and percentages were used to summarize the data collected from the study's respondents. Chi-square statistics was used in testing the formulated hypotheses.

4.0 Results and Discussion

Results

The results of the study are shown in the tables below.

Table 1. Age distribution of respondents

| Age Range | No. of patients | | $Diff_{\alpha - \beta}$ | Percent |
	α	β		
0 yrs. – 15 yrs.	146	146	0	10
15 yrs. above	554	554	0	90
Total	**700**	**700**	**0**	**100**

Source: *Researcher, 2023*

Table 1 shows that 90% of patients involved in the study were adults (above 15 years) while 10% of the patients were children (0 – 15 yrs.).

Table 2. Gender of respondents

| Gender | No. of patients | | $Diff_{\alpha - \beta}$ | Percent |
	α	β		
Male	240	240	0	35
Female	460	460	0	65
Total	**700**	**700**	**0**	**100**

Source: *Researcher, 2023*

Table 2 shows that most of the patients in the study were females (65%) while the male patients accounted for 35% of the study population.

Table 3. Distribution of pharmacist interventions

| Variables | No. of interventions | | $Diff_{\alpha - \beta}$ | Percent $_{Diff}$ |
	α	β		
No Intervention	0	0	0	0
Intervention	700	700	0	0

| **Total** | **700** | **700** | **0** |

Source: *Researcher, 2023*

Table: 3 shows that there were interventions in all the cases under study.

Table 4. Distribution of types and frequencies of interventions

| Statement | No. of interventions | | $Diff_{\alpha - \beta}$ | Percent $_{Diff}$ |
	α(%)	β(%)		
1	378(66%)	322 (59%)	56	11
2	700 (100%)	700 (100%)	0	0
3	165 (25%)	45 (3%)	120	88
4	487 (80%)	213 (42%)	274	47
5	367 (25%)	44 (3%)	323	88

Source: *Researcher, 2023*

1. Contacted prescriber / healthcare personnel for prescription Review/clarifications.
2. Provision of medication information
3. Did not dispense medication.
4. Discussed event with patient or caregiver.
5. Drug therapy changed

Table 4 shows that the frequency of contacts with prescriber for prescription review/clarification was reduced by 11% after the interventions. Also refusal to dispense medications was reduced by 88%, discussion of event with patient or caregiver (47%), change of drug therapy (88%). However, medication information was provided for all the patients in both pre and post interventions, hence the 0% change.

Table 5. Distribution of intervention outcomes

| Outcome | Frequency | | $Diff_{\alpha - \beta}$ | Percent $_{Diff}$ |
	α	β		
No	155 (27%)	9 (1%)	146	94

Positive	210 (73%)	490 (99%)	280	36		**Total.**	**700 (100%)**	**700 (100%)**	**0**	**0**
Total	**700**	**700**	**-**	**-**						

Source: *Researcher, 2023*

Table 5 shows that there was 94% decrease in incidence of 'no positive' outcome and a 36% increase in the incidence of positive outcomes.

Source: *Researcher, 2023*

Table 7 shows that there was a 125% increase in the number of patients that were satisfied with their treatment after the interventions. There was also a 72% decrease in the number of patients that were dissatisfied with their treatment. The number of indeterminate cases also decreased.

Table 6. Distribution of types and frequencies of positive intervention outcomes

	Frequency		$Diff_{\alpha-\beta}$	$Percent_{Diff}$
Outcome	$\alpha(\%)$	$\beta(\%)$		
1	370 (25%)	27 (2%)	343	93
2	394 (27%)	41 (3%)	353	90
3	319 (87%)	285 (73%)	34	17
4	502 (87%)	480 (72%)	22	18

Source: *Researcher, 2023*

1. Drug/Regimen changed
2. Dose changed
3. Anomaly/Error resolved
4. Intervention prevented potential harmful DTP

Table 6 above show that there was a 93% decrease in the number of drug regimen change, a 90% decrease in the number of drug dose change, a 17% decrease in number of anomalies / errors that needed resolution and an 18% decrease in number of potential DTPs that were prevented by the interventions.

Table 7. Distribution of patients' satisfaction with their treatment

	Frequency		$Diff_{\alpha-\beta}$	$Percent_{Diff}$
Outcome	$\alpha(\%)$	$\beta(\%)$		
Satisfaction	319 (36%)	381 (81%)	62	125
Dissatisfaction	145 (50%)	92 (14%)	53	72
Indeterminate	205 (14%)	68 (5%)	137	67

Test of hypotheses

- **H_{11}:** Pharmaceutical care interventions do not improve the satisfaction patients derive from their chronic anti - infective drug therapy

To test the above hypothesis, we used adjusted table 5;

Table 8: Chi-Square Statistics for H_{11}

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	72.908[a]	1	.000		
Continuity Correction[b]	71.878	1	.000		
Likelihood Ratio	74.340	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	72.856	1	.000		
N of Valid Cases	1400				

Source: *Researcher, 2023*

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 185.50.
b. Computed only for a 2x2 table

From the above table, the sig. vale is less than the alpha vale (i.e, sig<0.05). Hence, the postulated H_{11} is rejected at 95% confidence interval. This implies that pharmaceutical care interventions significantly improve patient's satisfaction from chronic anti-infective therapies.

- **H_{21}:** Pharmaceutical care interventions do not improve the positive outcomes in the care of patients receiving antiretroviral drug therapy.

Table 9: Chi-Square Statistics for H_{21}

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	289.104[a]	2	.000

Likelihood Ratio	307.004	2	.000
Linear-by-Linear Association	108.174	1	.000
N of Valid Cases	1400		

Source: *Researcher, 2023*

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 186.00.

Similarly, H_{21} is rejected as the sig. value is less than the alpha value at 95% confidence interval i.e. 0.00<0.05. In lieu of this, the researchers concluded that pharmaceutical interventions improves the positive outcomes of ART patients in the study area.

RESULT

Therefore based on our decision rule, both H_{11} and H_{21} were rejected since Sig.<0.05 (95% confidence interval). Hence, we conclude that pharmaceutical care interventions improve the satisfaction patients derive from their antiretroviral because the intervention of pharmacist increases patient adherence, reduces drug therapy problems and also increases patient CD4 count and also decreases patient viral loads

Discussion

The results of the present study demonstrated the positive influence of pharmaceutical care interventions on the positive outcomes of drug therapy and patient satisfaction. It showed that generally there were needs for one form of intervention or the other in all the 700 patients involved in the study. This point to the existence of an overwhelming pool of diverse patients' needs and drug therapy problems (DTPs) that need pharmacists' attention. The concept and philosophy of pharmaceutical care has however enabled the pharmacist to fulfill these patients' needs and solve these drug therapy problems.

The study identified the pharmacists' interventions applied to the pharmaceutical care of the HIV patients in the study to include physician communication and education, other caregivers' communication and education, patient education, refusal to dispense wrong / doubtful prescriptions and change of drug therapy.

The study also identified the outcomes of the interventions to include drug regimen change, drug dose change, resolutions of anomalies / errors and prevention of potential drug therapy problems (DTPs).

The results showed that the need for the different types of interventions reduced greatly after the interventions. This was because the interventions improved adherence on the part of the patients, rational prescribing on the part of the physicians (or prescribers) and rational care from other caregivers involved the treatment of these HIV/AIDS patients, as a result of which the issues that lead to interventions got reduced. For the same reasons the number of outcomes also reduced after the interventions. Generally the incidence of 'No Outcome' reduced by 98% while that of 'Positive outcomes' increased by 36% both indicating patient care improvement.

These improved outcomes may therefore be the reason for the high level of satisfaction expressed by the patients as the number of patients who expressed satisfaction with their drug therapy increased by 125% after the interventions, another pointer to the great potential of pharmaceutical care for improving the outcomes of drug therapy, medical care and general patient wellbeing.

For these results and reasons ,we join the global community of pharmaceutical care researchers in making a case for it and advocate for its widespread adoption and application especially in Africa where its implementation seem to be facing numerous challenges and lethargy.

5.0 Conclusion and Recommendation
Conclusion

The study identified the pharmacists' interventions applied to the pharmaceutical care of the HIV patients in the study to include physician communication and education, other caregivers' communication and education, patient education, refusal to dispense wrong / doubtful prescriptions and change of drug therapy. It also identified the outcomes of the interventions to include drug regimen change, drug dose change, resolutions of anomalies / errors and prevention of potential drug therapy problems (DTPs).These interventions influenced the patients' adherence, optimized their drug therapy and improved rational prescribing and care resulting in significant improvements in the number positive outcomes and levels of patient satisfaction.

Recommendation

Regular exchange of knowledge, ideas and experiences should be encouraged through the organization and attendance of national and international conferences and workshops.

Finally, the role of the pharmacist in patient care can no longer be over emphasized. As such government should make adequate efforts to develop and utilize the abundant skills and potentials of pharmacists and pharmaceutical care.

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