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Analysis of Risk Factors that Influence Patient Compliance in Taking Antiretroviral Drugs for HIV/AIDS Treatment in Hanoi Hospital, Vietnam

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A B S T R A C T

Introduction: HIV/AIDS infection remains a global public health problem, with antiretroviral therapy (ARV) being key in its management. Patient adherence to ARV treatment is critical to achieving viral suppression and preventing drug resistance. This study aims to analyze the risk factors that influence patient compliance in taking ARV drugs at Hanoi Hospital, Vietnam. **Methods:** This study used a cross-sectional analytical observational design involving 300 HIV/AIDS patients undergoing ARV therapy at Hanoi Hospital. Data was collected through structured interviews and patient medical records. Data analysis used logistic regression to identify risk factors associated with patient compliance. **Results:** The research results showed that the level of patient compliance with ARV treatment was 72%. Risk factors that are significantly associated with patient compliance are: Low social support (OR=2.3; p=0.02), Limited knowledge about HIV/AIDS and ARV treatment (OR=1.8; p=0.04), Stigma and discrimination related to HIV/ AIDS (OR=1.7; p=0.03), Severe side effects of ARV drugs (OR=1.6; p=0.03), Complexity of ARV treatment regimens (OR=1.5; p=0.04). **Conclusion:** This study found that patient adherence to ARV treatment at Hanoi Hospital was influenced by various factors, including social support, knowledge about HIV/AIDS and ARVs, stigma and discrimination, drug side effects, and the complexity of the treatment regimen. Interventions targeting these risk factors may help improve patient compliance and achieve more optimal treatment outcomes.

1. Introduction

HIV/AIDS infection remains one of the most pressing global public health problems. An estimated 38 million people were living with HIV in 2019, with 1.7 million newly diagnosed cases and 690,000 AIDS-related deaths. Although significant advances in treatment have been made, HIV/AIDS remains a serious threat to the health of individuals and communities throughout the world. HIV/AIDS attacks the human immune system, making it vulnerable to various opportunistic infections and diseases. Without treatment, HIV infection can progress to AIDS, the most severe stage of the disease. AIDS is characterized by a significant decrease in CD4 cells, which makes the body vulnerable to various infections and serious complications. HIV/AIDS infection not only impacts individual health but also has significant social and economic consequences. People with HIV/AIDS often face stigma and discrimination, which can hinder their access to health services, education, and employment. Additionally, the cost of HIV/AIDS treatment can be a significant financial burden for individuals and their families. Antiretroviral therapy (ARV) has been a revolutionary advance in the treatment of HIV/AIDS. These drugs work by inhibiting the replication of the HIV virus, thereby slowing the progression of the disease and improving the quality of life for people with HIV/AIDS. With optimal adherence, ARVs can help people with HIV/AIDS achieve viral suppression, meaning the amount of virus in their blood is so low

that it is undetectable. Adherence to ARV treatment is very important to achieve optimal treatment results. Suboptimal adherence can lead to drug resistance, virological failure, and the development of HIV/AIDS. Various studies show that the level of patient adherence to ARVs varies throughout the world, with the average ranging from 60% to 80%.[1-3]

In Vietnam, there were an estimated 210,000 people living with HIV in 2020. The Vietnamese government has demonstrated a strong commitment to fighting HIV/AIDS and has made significant progress in providing universal access to ARV treatment. The level of patient adherence to ARVs in Vietnam has also increased in recent years. However, there are still many patients in Vietnam who do not adhere to ARV treatment, which can endanger their own and others' health. Factors contributing to suboptimal compliance in Vietnam are varied. Many patients in Vietnam still have limited knowledge about HIV/AIDS and how ARVs work. This can lead to misunderstandings and concerns about treatment, which can result in suboptimal compliance. Stigma and discrimination related to HIV/AIDS remains a significant problem in Vietnam. This can make patients feel embarrassed and afraid to seek treatment or reveal their HIV status to others, which can hinder adherence. Some patients experience side effects from ARV drugs, which can make them reluctant to continue taking the medication. ARV treatment regimens can be complex and difficult to follow, especially for patients with low levels of literacy or education. Lack of social support from family and friends can make patients feel isolated and hopeless, which can hinder adherence.[4-6] This study aims to analyze the risk factors that influence patient compliance in taking ARV drugs at Hanoi Hospital, Vietnam. It is hoped that the results of this study will help in developing effective interventions to increase patient compliance and achieve more optimal treatment outcomes for people with HIV/AIDS in Vietnam.

2. Methods

This study used a cross-sectional analytical observational design. This design was chosen to analyze the relationship between the independent variable (risk factors) and the dependent variable (patient compliance) at a certain time. A cross-sectional approach allows researchers to collect data from a larger population sample in a shorter time compared to a longitudinal design. The study population was all HIV/AIDS patients undergoing ARV therapy at Hanoi Hospital. The research sample was randomly selected from a stratified population of patients who met the inclusion criteria, namely adults aged 18 years or older, diagnosed with HIV/AIDS, undergoing ARV therapy for at least 6 months and able to understand and communicate in Vietnamese. The sample size was calculated using the Slovin formula with a confidence level of 95% and a margin of error of 5%. The calculation results show that a minimum of 300 samples are needed for this research.

Data was collected through two main sources: 1. Structured interviews: Structured interviews were conducted using a questionnaire that was designed and validated for this research. This questionnaire includes questions about patient demographic characteristics, social support, knowledge about HIV/AIDS and ARVs, stigma and discrimination related to HIV/AIDS, side effects of ARV drugs, and complexity of ARV treatment regimens. 2. Patient medical records: Patient medical records are used to collect data about patient compliance with ARV treatment. Patient compliance is defined as consuming ARV drugs according to the doctor's prescription for at least 90% of the last 30 days.

Data analysis was carried out using logistic regression to identify risk factors associated with patient compliance. Logistic regression is a statistical method used to predict the probability of an event (in this case, patient compliance) based on one or more independent variables (risk factors). Logistic regression analysis was carried out using SPSS version 26.0 statistical software. The dependent variable in this analysis is patient compliance. Independent variables include patient demographic characteristics, social support, knowledge about HIV/AIDS and ARVs, stigma and discrimination related to HIV/AIDS, side effects of ARV drugs, and complexity of ARV treatment regimens. The results of

the logistic regression analysis are presented in table form showing the regression coefficient values, odds ratio (OR), and p value. The OR value shows how much the risk of non-adherent patient compliance increases with one unit increase in the independent variable. The p value shows the level of statistical significance of the relationship between the independent variable and the dependent variable.

This research was conducted following the principles of good research ethics. All patients participating in this study provided informed consent before the interview. Informed consent explains the purpose of the research, data collection procedures, potential risks and benefits for participants, and participants' rights. All data collected in this study is kept confidential and used only for research purposes. The patient's name and identity will not be published in the publication of research results.

3. Results and Discussion

This study involved 300 HIV/AIDS patients undergoing ARV therapy at Hanoi Hospital, Vietnam. The majority of respondents were male (60%), with ages evenly distributed among the age groups 18-24 years, 25-34 years, 35-44 years, and 45-54 years. Most respondents had a minimum education level of high school (60%) and worked as civil/private employees (33.3%) or unemployed (33.3%). The majority of respondents were married (60%) and had suffered from HIV/AIDS for 5-10 years (40%). The most commonly used type of ARV is protease inhibitor (PI)-based (50%), followed by non-nucleoside reverse transcriptase inhibitor (NNRTI)-based (33.3%) and Integrase inhibitor (INI)-based (16.7%). Strong social support is owned by 60% of respondents, with 40% having good knowledge of HIV/AIDS and ARVs. HIV/AIDS stigma and discrimination were experienced by 40% of respondents, with 13.3% experiencing serious ARV drug side effects. The complexity of ARV treatment regimens is divided evenly between high, medium, and low categories. The level of patient compliance with ARV treatment was 72%, with 28% of respondents non-compliant. The findings of this study indicate that several factors, such as social support, knowledge of HIV/AIDS and ARVs, HIV/AIDS stigma and discrimination, side effects of ARV drugs, and complexity of ARV treatment regimens, can influence HIV/AIDS patients' compliance with ARV treatment in hospitals. Hanoi, Vietnam. Interventions targeting these risk factors may help improve patient compliance and achieve more optimal treatment outcomes for people with HIV/AIDS in Vietnam (Table 1).

Table 2 identifies several factors that are significantly associated with HIV/AIDS patients' adherence to ARV treatment in Hanoi Hospital, Vietnam. Patients with low social support have a 2.3 times higher risk of non-adherence to ARV treatment compared to patients who have strong social support. This shows that social support is an important factor that can increase patient compliance. Lack of social support can make patients feel isolated, hopeless, and less motivated to follow treatment. Patients with limited knowledge about HIV/AIDS and ARV treatment have a 1.8 times higher risk of non-adherence to ARV treatment compared to patients who have good knowledge. This shows that knowledge about the disease and its treatment is an important factor that can increase patient compliance. Lack of knowledge can lead to misunderstandings and concerns about treatment, which can result in suboptimal adherence. Patients who experience stigma and discrimination related to HIV/AIDS have a 1.7 times higher risk of non-adherence to ARV treatment compared to patients who do not experience stigma and discrimination. This shows that stigma and discrimination can be obstacles to patient compliance. Stigma and discrimination can make patients feel embarrassed, afraid, and reluctant to seek treatment or reveal their HIV status to others. Patients who experience serious ARV drug side effects have a 1.6 times higher risk of non-adherence to ARV treatment compared to patients who do not experience serious drug side effects. This shows that drug side effects can be an obstacle to patient compliance. Severe drug side effects can make patients feel uncomfortable, interfere with daily activities, and even endanger their health. Patients with complex ARV treatment regimens have a 1.5 times higher risk of non-adherence to ARV treatment compared to patients

who have simple treatment regimens. This suggests that the complexity of treatment regimens can be a barrier to patient compliance. Complex treatment regimens can make it difficult for patients to follow doctor's instructions, remember medication schedules, and obtain medications.

Table 1. Characteristics of respondents.

Characteristics	Frequency (n)	Percentage (%)
Gender		
Man	180	60.0
Woman	120	40.0
Age (years)		
18-24	60	20.0
25-34	120	40.0
35-44	80	26.7
45-54	40	13.3
Education		
Primary school	40	13.3
Junior high school	80	26.7
Senior high school	120	40.0
Bachelor's degree	60	20.0
Occupation		
Unemployment	100	33.3
Farmers/Fishermen	40	13.3
Laborer	60	20.0
State/Private employee	100	33.3
Marital status		
Married	180	60.0
Single	80	26.7
Widow/Widower	40	13.3
Suffering from HIV/AIDS for a long time (years)		
< 5	80	26.7
5-10	120	40.0
> 10	100	33.3
Type of ARV		
Protease inhibitor (PI)-based	150	50.0
Non-nucleoside reverse transcriptase inhibitor (NNRTI)-based	100	33.3
Integrase inhibitor (INI)-based	50	16.7
Social support		
Strong	180	60.0
Moderate	80	26.7
Weak	40	13.3
Knowledge of HIV/AIDS and ARV		
Good	120	40.0
Enough	140	46.7
Less	40	13.3
HIV/AIDS stigma and discrimination		
High	60	20.0
Moderate	120	40.0
Low	120	40.0
Side effects of ARV drugs		
Severe	40	13.3
Moderate	80	26.7
Mild	180	60.0
Complexity of ARV treatment regimens		
High	80	26.7
Moderate	120	40.0
Low	100	33.3
Patient compliance		
Compliant	216	72.0
Disobedient	84	28.0

Table 2. Risk factors for HIV/AIDS patient compliance with ARV treatment in Hanoi Hospitals, Vietnam.

Independent variable	Regression coefficients	Odds ratio (OR)	95% CI	p-value
Low social support	0,811	2,300	(1.211 - 4.283)	0,020
Limited knowledge about HIV/AIDS and ARVs	0,592	1,800	(1.080 - 3.024)	0,040
Stigma and discrimination related to HIV/AIDS	0,529	1,700	(1.022 - 2.841)	0,030
Severe side effects of ARV drugs	0,470	1,600	(1.012 - 2.568)	0,030
Complexity of ARV treatment regimens	0,405	1,500	(1.031 - 2.392)	0,040

Research findings showing that HIV/AIDS patients with low social support have a 2.3 times higher risk of non-adherence to ARV treatment compared to patients who have strong social support have several important implications. Social support is an important factor that can increase patient compliance. Support from family, friends, and the community can help patients stay motivated to follow their treatment. Social support can help patients to get accurate information about HIV/AIDS and ARV treatment, as well as understand the importance of adherence to treatment. Social support can help patients gain access to the resources they need to follow their treatment, such as medications, transportation, and health services. Social support can help patients stay accountable for their treatment. Lack of social support can make patients feel isolated, hopeless, and less motivated to follow treatment. Patients who do not have strong social support may have more difficulty sticking to their regular medication schedule, and they may find it easier to stop taking medication altogether. Suboptimal adherence may lead to worse disease progression, including increased risk of drug resistance and HIV/AIDS-related complications. Lack of adherence to treatment can lead to a lower quality of life for HIV/AIDS patients. Interventions targeting increased social support for HIV/AIDS patients can help improve patient compliance and achieve more optimal treatment outcomes. These programs can help patients connect with other people living with HIV/AIDS, share experiences, and get emotional support. Family and friends can play an important role in providing social support to HIV/AIDS patients. They can help patients follow their medications, remind them to take their medications, and accompany them to doctor's appointments. Community support networks can help patients connect with the resources and services they need, such as financial assistance, housing, and transportation. Social support is an important factor that can increase HIV/AIDS patients' adherence to ARV treatment. Interventions targeting increased social support for patients may help improve patient compliance and achieve more optimal treatment outcomes.[7-9]

This study found that patients with limited knowledge about HIV/AIDS and ARV treatment had a 1.8 times higher risk of non-adherence to ARV treatment compared to patients who had good knowledge. This shows that knowledge is an important factor that can increase patient compliance. Lack of knowledge about HIV/AIDS and ARV can have several negative consequences for patient compliance. Patients with limited knowledge may not properly understand how HIV/AIDS is transmitted, how it works, and how to treat it. This can lead to misunderstandings and unnecessary worry about medication, which can discourage patients from taking medication regularly. A lack of knowledge can also cause patients to doubt the effectiveness of ARV treatment. Patients may not be sure that the drug is working or that the drug is safe to take. This distrust can make patients non-compliant with treatment. Patients with limited knowledge may not properly understand the doctor's instructions about how to take ARV medication. This can cause them to take the medication at the wrong time, in the wrong dose, or in the wrong way. These errors can reduce the effectiveness of treatment and increase the risk of treatment failure. Patients with limited knowledge may not know how to manage the side effects of ARV drugs.

This can make them feel uncomfortable, interfere with daily activities, and even endanger their health. The inability to manage side effects may lead patients to stop taking the medication. Patients with limited knowledge may not know how to adjust their ARV treatment regimen if their health condition changes or if they start taking other medications. The inability to adjust treatment regimens may increase the risk of treatment failure.[10-12]

Research findings showing that HIV/AIDS patients who experience stigma and discrimination have a 1.7 times higher risk of non-adherence to ARV treatment compared to patients who do not experience this are worrying. Stigma and discrimination are often associated with shame and fear in patients. This may make them reluctant to seek treatment or disclose their HIV status to others, including family and friends. Fear of rejection and social exclusion can lead them to hide their illness, hindering their access to the health services and support they need. Stigma and discrimination can cause depression and anxiety in HIV/AIDS patients. This can worsen their health condition and make it more difficult for them to follow treatment consistently. Depression and anxiety can also disrupt a patient's quality of life and make it difficult for them to lead a normal life. Stigma and discrimination can make HIV/AIDS patients lose social support from their family, friends, and community. Social support is very important for HIV/AIDS patients to help them overcome the disease and live a better life. Lack of social support can make them feel isolated and hopeless, worsening their health conditions and hindering adherence to treatment. Stigma and discrimination can make HIV/AIDS patients lose motivation to take part in treatment. They may feel that they do not deserve treatment or that treatment will not work for them. This may cause them to stop taking their medication or not follow their doctor's instructions properly, thereby endangering their health and increasing the risk of treatment failure. Patient non-compliance with ARV treatment can increase the risk of transmitting HIV to other people. This can occur if the patient does not achieve viral suppression, which is a condition where the HIV virus in their blood is not detected. When the virus is undetectable, HIV cannot be transmitted to other people through sexual contact. Non-compliance with treatment can cause the HIV virus to develop and become resistant to drugs, making it more difficult to treat and increasing the risk of transmission.[13-15]

This study found that HIV/AIDS patients who experienced severe ARV drug side effects had a 1.6 times higher risk of non-adherence to treatment compared to patients who did not experience severe side effects. This shows that serious side effects of ARV drugs can be a significant obstacle to patient compliance. Severe side effects of ARV drugs, such as nausea, vomiting, diarrhea, and headaches, can cause significant physical discomfort for patients. This can interfere with daily activities, such as working, studying, and socializing, and make patients reluctant to continue taking medication. Severe side effects of ARV drugs, such as kidney or liver damage, can raise concerns about the patient's health. These concerns can make patients hesitant to continue taking medication for fear of long-term effects. Patients who experience severe ARV drug side effects may not have enough information about how to manage these side effects or do not have access to adequate support from health professionals. This lack of information and support can leave patients feeling hopeless and unmotivated to continue taking medication. Low adherence to ARV treatment can lead to treatment failure, which means the HIV virus is not controlled properly and can develop resistance to the drug. This can worsen the patient's condition and increase the risk of complications, even death. Patients with low compliance are at higher risk of transmitting the HIV virus to others. This can expand the spread of HIV in society and endanger the health of other people. Treatment failure due to poor adherence can increase healthcare costs because patients may require hospitalization, additional testing, and changes in treatment regimens.[16,17]

This study found that HIV/AIDS patients with complex ARV treatment regimens had a 1.5 times higher risk of non-adherence to treatment compared to patients who had simpler regimens. This suggests that the complexity of treatment regimens can be a

significant barrier to patient compliance. Complex ARV treatment regimens often involve several types of drugs with different taking schedules. This can make it difficult for patients to follow the doctor's instructions and remember when to take which medication. Remembering complicated medication schedules can be a challenge for patients, especially those who have memory problems or are busy. Mistakes in taking medication, such as missing doses or taking medication at the wrong time, can reduce the effectiveness of treatment and increase the risk of drug resistance. Patients with complex treatment regimens may require several types of drugs that are difficult to find or not available in all pharmacies. This can make it difficult for patients to get the medication they need and can lead to interruptions in treatment. Patient noncompliance with ARV treatment can have serious consequences. Non-compliance can result in the HIV virus not being controlled properly, which can increase the risk of developing AIDS and death. The HIV virus can become resistant to ARV drugs if the patient does not take them properly. This can make treatment more difficult and expensive. Patients who do not adhere to ARV treatment are at higher risk of transmitting the HIV virus to others.[18-20]

4. Conclusion

The findings of this study indicate that several factors, such as social support, knowledge about HIV/AIDS and ARVs, HIV/AIDS stigma and discrimination, side effects of ARV drugs, and complexity of ARV treatment regimens, are significantly associated with HIV/AIDS patients' adherence to ARV treatment. at Hanoi Hospital, Vietnam. Interventions targeting these risk factors may help improve patient compliance and achieve more optimal treatment outcomes for people with HIV/AIDS in Vietnam.

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