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Use of USG Methods and Ishikawa Diagrams in Analysis of Clinical Problems

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Abstract

Human Immunodeficiency Virus (HIV) remains a serious global public health issue, with more than 40 million deaths from HIV-related illnesses since the beginning of the AIDS pandemic. Although entiretroviral therapy has been proven to reduce morbidity, mortality, and transmission rates, HIV treatment outcomes in various regions, including Indonesia, are still suboptimal. This study aims to evaluate HIV treatment outcomes in Karimun Regency and identify the root causes that affect program success using USG and Ishikawa diagrams. Through qualitative analysis using in-depth interviews, observations, and Focus Group Discussions (FGDs) with stakeholders related to HIV/AIDS programs, five main categories of causes were found, namely (1) people, in the form of lack of updated knowledge and information as well as limited resources; (2) costs in the form of lack of budget support from local governments and high initial treatment costs; (3) methods in the form of lack of continuous supervision, less than optimal recording and reporting, and weak policies at the regional level; (4) machines in the form of network constraints and operators inputting and reporting SIHA; and (5) the environment, in the form of lack of advocacy and cooperation across programs, across sectors and NGOs and limited access to services. This study demonstrates that the use of ultrasound and the Ishikawa Diagram can map and analyze problems in a structured and comprehensive manner. These results can be used as a reference in developing more targeted strategies to optimize HIV treatment outcomes and reduce transmission rates, morbidity, and mortality in the community.

Keywords: HIV/AIDS, Treatment, Achievements, Ultrasound, Ishikawa Diagram

Introduction

Human Immunodeficiency Virus (HIV) remains a global public health problem [1]. More than 40 million people have lost their lives to HIV-related illnesses since the start of the Acquired Immune Deficiency Syndrome (AIDS) pandemic [2]. According to the World Health Organization (WHO), in 2022, there were approximately 39 million people worldwide living with HIV. Of these, 1.3 million people contracted HIV during that year, and 630,000 people died from HIV-related illnesses during the same period [1].

Antiretroviral therapy can reduce the risk of virus transmission and reduce morbidity and mortality in patients [3]. In general, as many as 76% of the total number of individuals living with HIV in 2022 have access to treatment [2]. Without treatment, individuals infected with HIV can progress to AIDS and often experience various complications in a number of body systems, such as neurocognitive disorders, dyslipidemia, atherosclerosis, kidney failure, and so on [4]. Furthermore, people with HIV/AIDS are also more susceptible to various infections, such as tuberculosis, candidiasis, toxoplasmosis, and cryptococcosis, and are at risk of developing several types of cancer, such as lymphoma and Kaposi's sarcoma. These infections are among the main factors causing HIV/AIDS patients to require hospitalization [5].

In recent years, various international organizations have set targets to end the HIV epidemic. In 2014, the Joint United Nations Programme on HIV/AIDS (UNAIDS) launched the “95-95-95” targets, which aim to achieve that by 2030: 95% of people living with HIV worldwide will know their infection status, 95% of those diagnosed will receive ongoing antiretroviral therapy, and 95% of those on therapy will achieve viral suppression [6].

HIV/AIDS prevention efforts in Indonesia encompass two major aspects: prevention (promotive-preventive) and control (curative-rehabilitative). This HIV/AIDS prevention program is a challenge for the government to achieve the strategic goal of

eliminating HIV/AIDS by 2030, namely 95-95-95, the Global Commitment in Sustainable Development Goals (SDGs), and the achievement of Universal Health Coverage. The HIV/AIDS prevention strategy consists of Three Zeros, Fast Track, STOP (Torch, Test, Treat, Monitor) and this HIV/AIDS program is also the Minimum Service Standard in the Health Sector that must be met [7].

This article aims to monitor progress, identify barriers, and design solutions to achieve HIV elimination as a public health problem by 2030, as per the UNAIDS 95-95-95 targets. By analyzing HIV treatment outcomes, factors influencing the program's success can be identified and recommendations can be developed for future program improvement. The USG and Ishikawa diagrams are effective methods for identifying, analyzing, and resolving a problem by formulating the various causal factors that contribute to the emergence of a particular problem or impact.

Method

This residency activity was conducted in Karimun Regency, in November 2025. Interviews were conducted with the person in charge of the HIV AIDS program and the Head of the Disease Prevention and Control Division of the Karimun Regency Health Office, the person in charge of the HIV AIDS program in all services, both Community Health Centers and Hospitals in Karimun Regency. Data were collected through interviews using an interview guide that had been prepared by the researcher to explore and dig deeper into the topic to be studied. In addition, observations were also carried out by the researcher and the researcher conducted a Focus Group Discussion (FGD). Problem identification used the USG method (Urgency, Seriousness, Growth) and the Ishikawa Diagram.

The process of prioritizing problems using the USG method includes several aspects: (1) Urgency, namely whether or not the problem is urgent to be resolved; (2) Seriousness, namely looking at the impact caused by the problem; (3) Growth, namely the level of development of the problem, namely whether the problem has developed in such a way that it is difficult to prevent. The USG method uses a scoring technique based on a Likert scale of 1-5, namely 1 is very small; 2 is small; 3 is medium; 4 is large; and 5 is very large for each aspect. The final value is formulated by adding all aspects, namely U + S + G. Kaoru Ishikawa was a pioneer in the field of quality management in Japan in the 1960s who developed the Ishikawa Diagram. This diagram is known as one of the seven main tools in quality control [8]. The Ishikawa diagram usually formulates the main problem to be studied in the frontmost element. The main influencing factors are placed as branches that extend from the main line of the diagram. The final shape of this diagram resembles a fish skeleton, hence the name "Fishbone Diagram". In the next stage, the main elements that impact the problem are grouped into subcategories, then depicted as small branches connected to the main bone of the diagram [9]. That is why the Ishikawa diagram is used to compile the process of identifying and analyzing the causes of a problem in depth and systematically [10, 11].

Results and Discussion

Problem identification is the initial step in program evaluation. A problem is defined as a statement about a situation that does not meet expectations. Priority root causes are identified using the ultrasound scoring method (Table 1). The priority root cause identified is the low level of HIV/AIDS treatment coverage. This is caused by various interrelated factors, including individual factors, health services, and social and structural factors.

Table 1: Determination of Problem Priorities in the HIV AIDS Program Unit at the Karimun District Health Office

Problem	(U) *Urgency*	(S) *Seriousness*	(G) *Growth*	Amount	Ranking
HIV AIDS Treatment Achievements Remain Low	5	5	4	14	I
Suboptimal screening of HIV patients across the entire population	4	4	5	13	II
Low Success Rate of HIV AIDS Treatment / Suppressed Virus	3	3	3	9	III

The problem prioritization process involves weighting issues based on time availability, severity, and development. Based on the results of the weighting process for each identified issue, the priority issue for which a proposed solution will be developed is "The low level of HIV/AIDS treatment coverage, which has not yet reached the national target" (Table 1).

Identification of the root cause of a problem uses the Ishikawa cause-and-effect diagram method, the Ishikawa Diagram. The Ishikawa Diagram is a visual tool for identifying, exploring, and graphically depicting in detail all causes related to a problem (Fig 1).

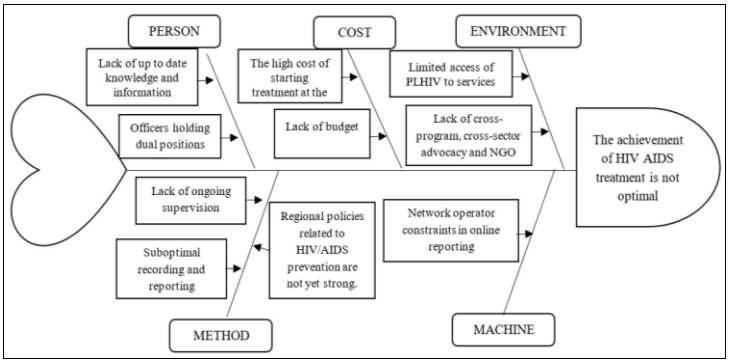

Fig 1: Ishikawa Diagram

The factors causing the less than optimal achievement of HIV/AIDS treatment in Karimun Regency have been identified.and classified into five categories related to People, Cost, Method, Machine, and Environment.

1. People. Potential causes identified from the people category are:

a. The human resource burden of HIV/AIDS program holders who work multiple jobs.

Human resources (HR) responsible for HIV/AIDS programs in various health facilities, particularly at the community health center (Puskesmas) or primary care level, often face excessive workloads due to having to juggle multiple programs simultaneously. This directly impacts the effectiveness of HIV/AIDS program implementation. The dual workload borne by HIV/AIDS program managers poses a significant challenge to disease control.

Staff shortages were also identified as a major resource challenge for successful HIV program implementation. Healthcare providers reported being overwhelmed by the frequent introduction of new programs. This challenge was exacerbated by temporary staff shortages, such as during maternity leave. A healthcare provider separately noted that staff shortages were also partly due to the freezing of certain positions following resignations [12].

b. Lack of knowledge and up-to-date information regarding developments in HIV/AIDS prevention.

One of the main obstacles in HIV/AIDS control efforts at the service and community levels is limited access to and understanding of the latest information on HIV prevention. This lack of knowledge occurs not only among the general public, but also among health workers, local policymakers, and community cadres/facilitators. Without accurate and up-to-date information, various parties involved in HIV/AIDS prevention, from health workers, policymakers, to the community, cannot make appropriate decisions and actions. Access to the latest information is a critical foundation for ensuring an effective, evidence-based, and sustainable HIV response.

In a study conducted in rural Malawi, 69% (29 of 42) of the health workers providing care and treatment had received ART training in the previous 2 years. All health workers providing care and treatment at each of the three clinics and hospital D had been trained in ART, compared with 23.5% (4 of 17) of the health workers trained at Hospital E [13].

2. Costs. The identified causes of costs are:

a. Lack of budget support from local government.

Lack of budgetary support from local governments has prevented many aspects of HIV treatment programs from running optimally, from service availability to treatment sustainability to patient retention. Adequate regional funding is crucial for achieving HIV control targets, such as the 90-90-90 or 95-95-95 targets set by UNAIDS (achieving 95% diagnosis, 95% treatment, and 95% viral suppression).

A literature review of 23 countries found that more efficient allocation of HIV resources could reduce cumulative new HIV infections by an average of 18% in the years to 2020 and 25% in the years to 2030, along with an estimated 25% reduction in deaths for both time periods. However, in most countries, this is still insufficient to meet national strategic plan targets, with modeling suggesting that budget increases of up to 185% would be required [14].

b. The high cost of starting treatment at the hospital for PLHIV

Although HIV treatment (especially antiretrovirals/ARVs) is provided free of charge by the government, many people living with HIV (PLWHA) still face barriers to initiating treatment at health facilities, particularly hospitals. One major barrier is the high initial costs, which are often invisible but significantly burdensome for people living with HIV, especially those from vulnerable economic groups.

The estimated point-of-care (POC) cost of Tenofovir (TFV) is USD $13 per client, assuming a clinic volume of 20 individuals initiating ART per month. The largest cost component of POC TFV testing is the test strip consumables, which account for 53% of the test cost. POC TFV testing can be performed at a reasonable cost, requiring less than 10 minutes of healthcare provider time, and therefore may be feasible for implementation in clinics in South Africa [15].

3. Method. The method obtained as the cause is:

a. There is still a lack of ongoing supervision by the Health Service

Ongoing supervision by the Health Office (Dinkes), both at the district/city and provincial levels, is a crucial component in ensuring that HIV treatment services are operating according to standards. However, in many cases, this supervision is not conducted regularly and comprehensively, directly impacting the quality and outcomes of HIV treatment.

In contrast to the research conducted by the researchers, national-level supervision visits for care and treatment services were reported quarterly, and district-level audits were conducted monthly [13]. Monitoring conducted by the Medan City Health Office has been running optimally. This is evidenced by the implementation of routine monthly monitoring. Furthermore, monitoring is carried out not only when problems arise in the field, but also when there are no problems. The Medan City Health Office continues to monitor the HIV/AIDS response program in Medan City [16].

b. Suboptimal recording and reporting of HIV/AIDS programs

Recording and reporting are key components of the HIV/AIDS program monitoring and evaluation (MONEV) system. However, in many regions, this process is not optimal, both in terms of data completeness, timeliness, information quality, and its use in decision-making.

Research conducted in Bandung City on TB/HIV patients aligns with the findings of the researchers, namely that the system at General Hospital X, Bandung City, is not yet fully integrated between departments or subsystems. The existing data reporting process is still limited to online submissions, not real-time, and not directly integrated. The hospital does not yet have

information regarding the distribution of TB/HIV cases. Consequently, staff are unable to monitor and map the distribution of TB/HIV cases [17].

c. Regional policies are not yet strong enough to support HIV/AIDS programs.
Regional policies are a crucial foundation for the implementation of sustainable and effective HIV/AIDS programs. However, in many regions, regional policies remain weak or do not fully support HIV/AIDS response efforts. This contributes significantly to suboptimal program outcomes, including treatment, prevention, and stigma reduction. Without strong policies at the regional level, HIV/AIDS response will continue to rely on national policies and external assistance.
Research conducted in Jember Regency found that HIV/AIDS prevention policies involve implementing various programs designed to reduce the spread of the disease, raise public awareness, and provide support to people living with HIV/AIDS (PLWHA). The local government plays a key role in formulating and implementing these policies, which include creating regional regulations, conducting outreach, educating the public, and providing health services [18].

4. Machine. The machine factor that causes the SIHA application reporting input is hampered by operators and the network.
The SIHA application is the official platform of the Indonesian Ministry of Health, used for digitally recording and reporting HIV/AIDS and STI program data. This system is crucial for achieving ARV drug distribution, patient retention, and epidemiological analysis. The availability of a digital reporting system like SIHA is a major step forward in HIV/AIDS data management. However, without adequate operator support and a stable internet connection, its functionality will not be optimal. Ensuring smooth data input is key to having valid, timely, and usable data that can save lives and strengthen HIV programs in the region.
Research conducted in Central Java Province, using the SIHA 2.1 Application will help improve the performance of Health workers in Health Service Facilities, business expectations have a significant positive effect on the interest in using the SIHA 2.1 application with a p-value of 0.0001. With the ease of use of the SIHA 2.1 application, it is more accepted and used by Health Workers in Health Service Facilities in Central Java [19].

5. Environment. Environmental factors that cause this are:
a. Lack of advocacy and cross-program and cross-sector collaboration and supporting NGOs
HIV/AIDS control is not solely the responsibility of the health sector, but also requires a cross-program and cross-sector approach, as well as active collaboration with NGOs and community organizations. Unfortunately, the lack of advocacy and coordination between stakeholders remains a major obstacle, preventing optimal HIV treatment services in many regions. Without strong cross-sector collaboration and advocacy, HIV treatment programs will operate in isolation, be inefficient, and fail to reach all target groups. Collaboration and shared commitment are key to the success of sustainable HIV/AIDS control in the regions.
The importance of a community-based approach to reducing stigma is evident in the context of research interventions in Indonesia. The involvement of religious and community leaders in HIV/AIDS education programs has proven effective in several areas. Interviews with community leaders revealed that transparency and the involvement of religious leaders have helped reduce stigma among communities, particularly in rural areas [20].

b. Limited access of PLHIV to available services
Although HIV/AIDS treatment services, such as antiretroviral therapy (ARV), are readily available in many health facilities, many people living with HIV/AIDS (PLWHA) still face barriers to accessing these services. This limited access is not only a matter of facility availability, but also involves geographic, social, economic, and structural factors. The availability of services will not have a significant impact if it is not accompanied by equitable and equal access for all PLWHA. To achieve success in combating HIV/AIDS, it is crucial to eliminate geographic, financial, social, and structural barriers to access.
One factor influencing the utilization of VCT services for HIV/AIDS among pregnant women in Indonesia is limited access. Limited access to VCT equipment and facilities occurs in several community health centers (Puskesmas) in Indonesia. This naturally makes pregnant women reluctant to utilize available services, even if they have sufficient knowledge [21].

Conclusion

The first step in evaluating a program is identifying the problem. Prioritized root causes are identified using the USG scoring method. Prioritizing problems is done by weighting them based on time availability, severity, and development. After the root cause of the problem is identified, the next step is to identify the root cause using the Ishikawa diagram. Using the Ishikawa diagram in problem-solving allows for the identification of various causal factors involved in complex problems. This diagram groups these factors into several separate categories, such as people, costs, methods, machines, and the environment. This approach provides a systematic analytical framework for finding the root cause. This method has proven effective in depicting cause-and-effect relationships, making it easier for researchers to focus on solutions more precisely and efficiently. Furthermore, the Ishikawa diagram also supports team collaboration by organizing causal factors neatly and easily understood.

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