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Malnutrition Risk Screening In HIV/AIDS Patients Using Modified SGA-HIV: A Scoping Review

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A B S T R A C T

Introduction: Human immunodeficiency virus (HIV) is a condition that targets the immune system. Individuals with HIV are at risk of malnutrition when their CD4 counts drop below 200. **Purpose:** This study seeks to explore the efficacy of Modified SGA-HIV in assessing the risk of malnutrition in HIV/AIDS patients. **Methods:** A comprehensive search was conducted across multiple databases, including ScienceDirect (346), EBSCO-host (47), ClinicalKey Nursing (11), PubMed (98), and Google Scholar (284) covering the period from 2018 to 2024. The Joanna Briggs Institute (JBI) Critical Appraisal was used to assess and analyze the methodological quality of the articles. **Findings:** The initial database search using PRISMA Literature Review yielded 786 articles, which were refined to exclude duplicates (665), screen for relevance based on title/abstract (98), and finally assess the eligibility of full-text articles (n = 27), resulting in the identification of four (4) relevant articles. **Conclusion:** The analysis of these four articles supports the effectiveness of Modified SGA-HIV in screening for malnutrition risk in HIV/AIDS patients.

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1. INTRODUCTION

HIV is a virus that attacks the immune system, namely the CD4 white blood cells in the body. HIV lowers immunity, making people more susceptible to opportunistic infections by killing CD4 cells. About 38.4 million people worldwide were HIV-positive as of 2021 (World Health Organization, 2023). 10,525 out of 941,973 individuals in Indonesia who underwent HIV testing between January and March 2022 were determined to have HIV/AIDS (Afriana et al., 2023). HIV affects several facets of human health, including diet. Malnutrition is a risk for people living with HIV who experience opportunistic infections, anemia, diarrhea, and CD4 counts < 200 (Alebel et al., 2020). Moreover, individuals with HIV on antiretroviral therapy (ARV) frequently face an increased risk of mortality and malnourishment (Kebede, 2022).

For HIV/AIDS patients, malnutrition is a serious obstacle to reaching the Sustainable Development Goals (SDGs). Malnutrition in HIV patients must be addressed because it can make health problems worse (Odwee et al., 2020). From the moment of diagnosis, all HIV/AIDS patients should have their risk of malnutrition screened. HIV has a major impact on nutritional status from the beginning of infection (Alebel et al., 2020). HIV and AIDS cause complex metabolic changes, decreased food intake, increased energy needs, and nutritional malabsorption, all of which contribute to weight loss.

For those living with HIV, it is critical to provide adequate nutritional support and early detection of malnutrition risk top priority. HIV management should incorporate routine nutritional assessments to gauge the severity of insufficiency and choose suitable interventions. Nutritional assessment, counseling, and care support for malnourished patients should be provided as part of a complete HIV/AIDS health program (Teklu et al., 2020). As the world's greatest cause of immunodeficiency, malnutrition significantly impairs immune function and raises the risk of developing acquired immunodeficiency syndrome (AIDS) (Sashindran & Thakur, 2020).

A huge number of HIV patients do not receive treatment for malnutrition, which is mostly because there are no easy and thorough screening techniques available to determine nutritional status. Some HIV and AIDS care centers lack the necessary expensive and easily accessible technology, such as dual-energy x-ray absorptiometry (DEXA), stable isotopes, and bioelectrical impedance measurement, to assess nutritional status in HIV-infected persons reliably. The perfect dietary evaluation instrument should be simple, non-invasive, practical, and yield results immediately. It should also be easily available to all. To successfully identify HIV-positive persons at risk of malnutrition, a quality assessment tool that incorporates various nutritional indicators is required (Mokori et al., 2011). The SGA-HIV Questionnaire is useful because it provides a thorough assessment of nutritional status, is affordable, and is simple to administer. The SGA-HIV questionnaire can be a useful tool for determining the risk of malnutrition in HIV/AIDS patients when paired with the findings of laboratory tests (Meireles et al., 2012; Ugwu et al., 2022).

Health facilities with HIV/AIDS patients and limited resources need to utilize a questionnaire to identify patients at risk of malnutrition promptly. This allows nurses to provide timely attention and preventive measures. Nurses play a crucial role in managing the risk of malnutrition in HIV/AIDS patients by providing evidence-based interventions. Based on this information, the researcher aims to conduct a study on the "Analysis of the Application of the SGA-HIV Questionnaire for Assessing Malnutrition Risk in HIV/AIDS Patients: A Scoping Review". That is a specific focus on Modified SGA-HIV for malnutrition screening.

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2. METHODS

Eligibility Criteria

The literature criteria used in implementing this research include: Samples are HIV/AIDS patients, experimental type research articles, full text in English, the outcome is malnutrition status, and research articles that are still in the review process (under review) are excluded. The articles were been searched from 2018 until 2024.

Information Sources

Articles were searched using the ScienceDirect database (346), EBSCO-host (47), ClinicalKey Nursing (11), and PubMed (98) Google Scholar.

Searching Strategy

The data used to search for literature is through selection based on keyword searches including 1) Malnutrition assessment, malnutrition screening, nutritional risk tools, nutrition screening tool, 2) Nutritional status, malnutrition status, risk malnutrition, 3) HIV/AIDS patient, people living with HIV/AIDS.

Article Screening

Quality assessment of systematic reviews involves utilizing the PRISMA checklist to determine the selection and alignment of studies with the objectives. Each of the (n) collected systematic reviews undergoes methodological quality analysis using the PRISMA checklist, which comprises a set of questions designed to evaluate study quality. Assessment criteria are rated as 'yes', 'no', 'unclear', or 'not applicable'. Researchers conduct a critical appraisal to evaluate eligible studies. Studies meeting at least 50% of the critical appraisal criteria, with a predetermined cutoff value, are included based on the inclusion criteria. Low-quality studies are excluded by researchers to prevent bias and uphold the validity of the results and review recommendations.

Data Extraction and Critical Appraisal

Using the checklist form supplied by The Joanna Briggs Institute Critical Appraisal tool for cross-sectional studies (8 questions), three reviewers (VL, RD, and AR) independently assessed each publication to guarantee quality (Joanna Briggs Institute, 2024). Studies that achieved a quality assessment score of more than 60% of the total were included in the analysis.

3. RESULT

Search Results and Included Studies

The initial search returned 786 studies from different databases. Following the screening process, the authors ruled out 780 studies that did not meet the inclusion criteria. Consequently, 4 studies were considered for this scoping review. The PRISMA flow diagram in Figure 1 illustrates the number of studies retrieved.

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Study Characteristics

The data extraction is based on Table 1, which includes authors, year of study, country, sample, design, and results. Upon review, it was observed that all studies were cross-sectional. These studies were carried out in Nigeria, Uganda, and India. The age of respondents in the five articles centered on the adult age group, specifically 21-65 years in article 1, 18-55 years in article 2, 20-29 in article 3, Furthermore, article 4 presented a distribution of respondents in both the adolescent group (10-19 years) and adults (20-64 years).

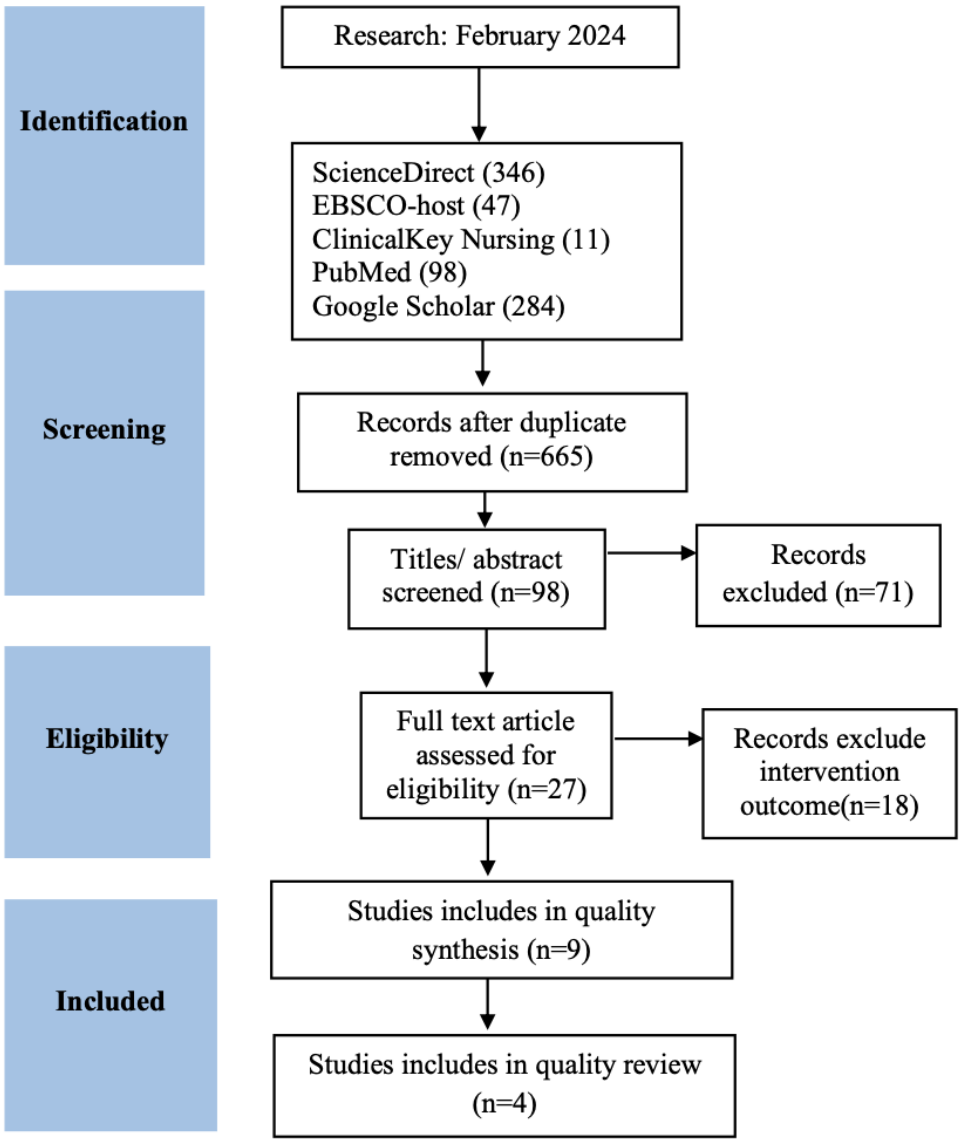

Figure 1. Steps for Article Screening Using PRISMA

Risk of Bias Assessment

Based on the risk of bias assessment, the overall study showed a low risk of bias. Among these studies, several studies reported follow-up assessments with the lowest score being 87.5% (Table 1).

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Table 1. Summary of Results and Research Quality

Author, year	Country	Design Study (Quality Value)	Sample	Method	Results
Ugwu et al. (2022)	Nigeria	cross-sectional study 8/8 (100%)	75 patients	The use of nutritional status assessment using the SGA-HIV questionnaire. Albumin and Hb values are known from blood tests associated with the patient's CD4 value.	Measuring and monitoring malnutrition in HIV patient can be done by SGA-HIV. Nutritional status and several elements of the patient's CD4 value in patients undergoing ARV therapy can be measured with this questionnaire.
Odwee et al. (2020)	Uganda	cross-sectional study 7/8 (87,5%)	253 patients	HIV positive patients underwent a nutritional survey using BMI, arm circumference and the Subjective Global Assessment (SGA) questionnaire.	SGA can identify nutritional status in HIV patients with the results that most adult patients experience malnutrition.
Pokharel & Shettigar (2019)	India	cross-sectional study 8/8 (100%)	66 patients	Patients were divided into 2 groups. Nutritional status assessment using PG-SGA, laboratory results were assessed. The intervention group was given nutritional counseling.	The difference in patient CD4 values and PG-SGA values shows that there is a relationship between the nutritional status and immunity of HIV patients.
Iheme (2023)	Nigeria	cross-sectional study 8/8 (100%)	300 patients	Nutritional status measurements were carried out using the SGA and BMI questionnaires.	There is a positive correlation between SGA and BMI. There is a positive relationship between SGA score and quality of life.

4. DISCUSSION

Since its discovery in 1983, the human immunodeficiency virus (HIV) is expected to have caused 40.4 million fatalities globally by the year 2022 (Swinkels et al., 2024). This is a substantial amount, and HIV might pose a threat to world health if untreated. On the other hand, the HIV pandemic has been addressed in large part thanks to developments in research and development as well as the widespread availability of highly active antiretroviral therapy (HAART). Similarly, advancements in the management of HIV and other opportunistic diseases have turned them into chronic illnesses that can be controlled. Nowadays, people living with HIV can live long and healthy lives, and one of the population's top health priorities is preventing chronic diseases (Swinkels et al., 2024).

The most recent report from the World Health Organization shows a steady decrease in HIV infection and mortality rates worldwide. Nonetheless, a few nations are witnessing a rise in the number of infections, especially in areas where HIV stigma is intense (Swinkels et al., 2024). The UNAIDS Global AIDS Update (2023) states that there has been an increase in the number of HIV-positive individuals as a result of better treatment and education levels. Two-thirds of the projected 39 million HIV-positive individuals worldwide are expected to live in Africa by 2022 (van Heuvel et al., 2022). The risk of chronic illnesses, especially cardiac and neurological disorders, is increased by HIV infection. Antiretroviral therapy (ART) can effectively postpone the advancement of HIV disease; nevertheless, they are not a cure, and they may have negative effects. Additionally, continuous and consistent use of the healthcare system is required (Swinkels et al., 2024).

HIV is a virus that belongs to the genus Lentivirus family of retroviridae. It mainly targets T-lymphocyte helper cells (CD4+), causing a severe type of immune suppression that is typified by the ongoing loss of these cells. Many of the disease's clinical symptoms are brought on by this compromised immune system. Untreated HIV infection eventually progresses to acquired

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immunodeficiency syndrome (AIDS), a condition in which the immune system loses its ability to fight off infections. Opportunistic infections finally cause the patient to die (Van Heuvel et al., 2022). Blood, amniotic fluid, breast milk, semen, pre-ejaculate, rectal fluid, and vaginal fluid are among the body fluids that can spread HIV. Additionally, infected medical equipment, such as reused syringes, can spread the infection during pregnancy and childbirth, as well as during sexual activity (World Health Organization, 2021).

According to the National Institutes of Health (NIH) in the United States, HIV infection progresses in three stages: acute HIV infection, chronic (or asymptomatic) HIV infection, and AIDS (National Institutes of Health, 2024). Up to 90% of people get at least one mild, nonspecific symptom within the first four weeks after contracting HIV; these symptoms usually go away on their own and don't require medical attention (National Institutes of Health, 2024). According to Swinkels et al. (2024), the most often reported acute symptoms include fever, exhaustion, muscular aches, skin rash, headache, sore throat, swollen lymph nodes, joint discomfort, night sweats, and diarrhea. These symptoms are listed in descending order of frequency. Just before to the peak of viremia, these symptoms usually appear 2 to 4 weeks (with a range of 4 days to 8 weeks) following viral infection and last for an average of 18 days (Swinkels et al., 2024).

Patients with HIV usually enter a chronic phase of the disease after infection. Most individuals stay asymptomatic throughout this phase and eventually get AIDS (Darmawati, 2020). On the other hand, they frequently have persistent generalized lymphadenopathy and may feel nonspecific weariness. According to Chadburn et al. (2013 and Engsig et al. (2014), generalized lymphadenopathy is defined as lymph node enlargement in at least two noncontiguous sites—apart from the inguinal nodes—for a duration of three to six months, without any other lymphoproliferative or viral causes. Furthermore, conditions like oropharyngeal candidiasis, recurrent vulvovaginal candidiasis, leukoplakia, disseminated cutaneous herpes simplex virus, cervical dysplasia, or cervical carcinoma in situ can occur in patients with chronic HIV infection but not AIDS (DeKoven et al., 2023; Diaz et al., 2023; Sax et al., 2020). HIV patients frequently experience severe cutaneous symptoms, such as seborrhoeic dermatitis, bacillary angiomatosis, varicella-zoster virus reactivation, and molluscum contagiosum infection (Wensing et al., 2022).

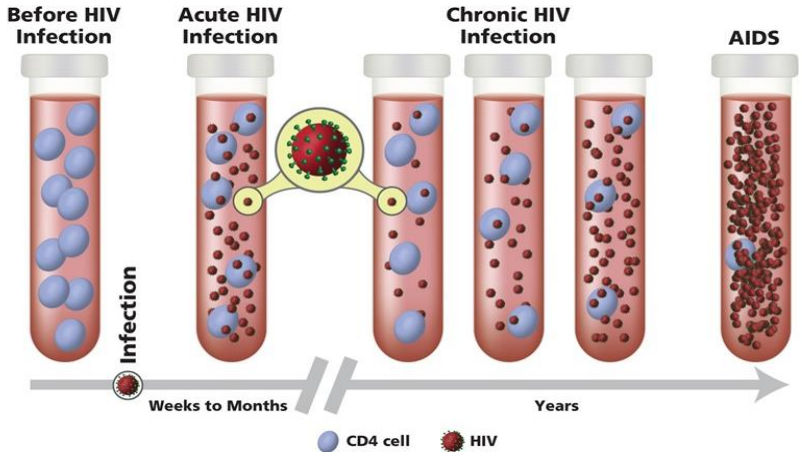

Figure 2. HIV cell development. Source: (*The Stages of HIV Infection | NIH*, n.d.) *HIV Progression*. Taken from https://hivinfo.nih.gov/understanding-hiv/fact-sheets/stages-hiv-infection

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HIV eventually develops into the more severe form of AIDS. The CDC lists aggressive cervical cancer, pulmonary candidiasis, gastrointestinal candidiasis (apart from thrush), and a few other specific disorders as conditions that constitute AIDS. As total lymphocyte counts gradually decline, these AIDS-defining diseases typically develop when CD4 counts fall below 200 cells/mm3, indicating advanced untreated HIV disease (Saag, 2021; Margot et al., 2017; Siedner et al., 2021).

Please keep the following details in mind: HIV testing detects acute infection (stage 0) and validates the diagnosis. For those six years of age and above, phases 1 through 3 are determined by the CD4 count. The table below illustrates the many criteria that apply to children ages 1 to 5 years old and newborns under 1 year old.

Comprehending and managing HIV infection can have a substantial effect on a person's life, including physical aspects like the length of time the patient has been HIV positive and their nutritional status. HIV patients frequently have increased metabolic activity after diagnosis without receiving adequate nutritional support, which increases their risk of developing severe malnutrition (Tadesse & Toma, 2023). Because their immunological function is strongly correlated with their nutritional health, individuals living with HIV/AIDS are therefore at risk for malnutrition and opportunistic infections. Thus, to support comprehensive treatment and promote patient recovery, a thorough assessment of malnutrition is required.

Table 2. HIV Stages

Stage	CD4 count (cells/µL)	Symptom
I	> 500	Patients with enlarged lymph nodes (>1 cm) in two or more noncontiguous sites (excluding inguinal lymph nodes) may present with no symptoms at all or with persistent generalised lymphadenopathy.
II	200 – 499	At this point, patients may have moderate, less than 10% of their body weight lost without explanation, recurrent respiratory infections, mild to moderate herpes zoster exacerbations, angular cheilitis, recurrent oral ulcerations, pruritic papular eruptions, seborrhoeic dermatitis, or fungal nail infections.
III	< 200	At this point, patients may have severe invasive bacterial infections (such as pneumonia, empyema, osteomyelitis, meningitis, and bacteremia), acute necrotising ulcerative stomatitis, gingivitis, or periodontitis, or unexplained anaemia, neutropenia, or thrombocytopenia lasting longer than one month. They may also experience significant weight loss (>10% of body weight), chronic diarrhoea of unknown origin, persistent fever, oral candidiasis, leukoplakia, pulmonary tuberculosis, and severe invasive bacterial infections.

Patients with HIV are asked to complete the Modified Subjective Global Assessment-HIV (MSGA-HIV) questionnaire to determine their risk of malnutrition. In 2022, Risyda Zakiyah Hanim, a medical-surgical nursing specialist student at the University of Indonesia's Faculty of Medicine, conducted research on the MSGA-HIV questionnaire. A total of 57 respondents participated in the validity and reliability test of the questionnaire. Eight questions had computed r values higher than the r table value (using df = n - 2, where n = 57, giving us df = 55, and the r table value of 0.2609), according to the validity test results. Furthermore, a value of 0.884 was obtained from the reliability test using Cronbach's alpha, suggesting extremely strong instrument dependability (numbers above 0.6 are regarded as very good). Here is a detailed look at the MSGA-HIV instrument in Table 3.

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In areas where nutritional resources are scarce, managing HIV patients well through nutrition is essential. The provision of nutritious food has been recognized as a concern, with malnutrition being a major issue in many developing countries. Concurrent illnesses like HIV make this challenge much more difficult (Weldegebreal et al., 2018). Improving PLHIVs' dietary status can have a significant positive impact on their prognosis. Thus, maintaining a balanced diet is essential for PLHIV to be as healthy as possible (Anand & Puri, 2014). The Subjective Global Assessment is a tool used to assess HIV patients' nutritional health. Healthcare practitioners will find this SGA-based evaluation tool to be more straightforward and reliable. According to research by Lovesley et al. (2023), the SGA questionnaire can be used in a hospital setting.

Table 3. Malnutrition Risk Screening in HIV Patients Using MSGA-HIV

Number	Questions	The scores		Assessment Results
		0	1	
1	Is there a history of unintentional weight loss in the last 3 months?	No	Yes	
2	Have there been any changes in eating patterns (portions) in the last 3 months?	There is a decrease in diet	Same as before	
3	Have there been any changes in appetite in the last 3 months?	No	Yes	
4	History of digestive symptoms in the last 3 months	There isn't any	Vomiting or Diarrhea	
5	Body Mass Index (BMI)	20 – 25	< 18 female or < 20 male	
6	Diseases that affect nutritional needs	There isn't any	Cancer or TB or Others	
7	There are signs of malnutrition	There isn't any	Paleness, Hair loss, Candidiasis or other Symptoms	
8	Latest CD4 or Viral Load Value *	*Undetected* or > 400	*Detected* or > 400	
9	Arm circumference value	> 23,5 cm	< 23,5 cm	
Total Score				

Notes:
- * = not required to be filled in
- Total Score 0 – 3 = low risk of malnutrition
- Total Score 4 – 8 = moderate risk of malnutrition
- Total Score > 8 = high risk of malnutrition

In many different nations, the use of malnutrition screening in primary healthcare has proven useful. A cheap, simple-to-use instrument for assessing nutritional status is the Subjective Global Assessment-HIV (SGA-HIV) questionnaire. It has been demonstrated to lower the prevalence of malnutrition among patients and provide thorough information that affects nutritional status. SGA is also used to evaluate HIV patient's nutritional health, both when they are taking antiretrovirals (ARVs) and when they are not (Ugwu et al., 2022). Research in Ghana found that 56% of persons living with HIV (PLHIV) are required to make dietary improvements. This is consistent with a study by Geofrey Maila in a comparable rural area of Zambia, which found that up to 64.4% of respondents had diets that needed to be improved (Abdulai et al., 2024; Maila et al., 2021).

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According to later research, the majority of HIV patients (31%) have seen a decline in the quality of their diet. This decline may be related to the way antiretroviral drugs affect PLHIV's appetite, which causes them to consume more foods high in energy and fewer fruits and vegetables, thus resulting in a significantly lower diet quality (Abdulai et al., 2024). It is well-recognized that low nutritional status might worsen PLHIV clinical outcomes and increase susceptibility to HIV (Militao et al., 2022). It is crucial to have access to a sufficient, secure, and nourishing cuisine that satisfies the nutritional needs of the community to lead an active and healthy life. Due to increased vulnerability to opportunistic infections, chronic declines in CD4 cell count, higher HIV RNA, and recurrent hospitalizations, inadequate nutritional status can lead to mortality among HIV patients (Abdulai et al., 2024).

One of the biggest challenges for those living with HIV/AIDS is malnutrition. Reaching appropriate nutritional conditions in these patients can improve immunological function, lower the risk of opportunistic infections, limit viral progression, improve absorption of antiretrovirals, lower morbidity, and increase survival time (Iheme, 2023). Thus, it is essential to include nutritional support in the overall care of HIV and AIDS. The relationship between nutritional status and quality of life in HIV/AIDS patients is still poorly understood, in contrast to other recognized associations between nutritional status and chronic illnesses. However, studies conducted in underdeveloped countries are showing more and more how enhancing the nutritional condition of HIV/AIDS patients can improve many elements of their quality of life (Bello et al., 2019).

The SGA questionnaire implementation poses no risks or harmful side effects to patients. From an economic standpoint, this screening is also cost-effective. Researchers confirm that there are no obstacles related to the availability of equipment or adequate resources to implement this questionnaire. Similarly, nurses with specific educational backgrounds are not required to complete the malnutrition risk questionnaire.

The Modified Subjective Global Assessment-HIV (MSGA-HIV) questionnaire is a reliable questionnaire that is cheap, easy to apply, provides a comprehensive assessment of nutritional status, and offers more information that influences nutritional status. In addition, the SGA-HIV questionnaire can reduce the prevalence of malnutrition among patients. SGA is also used to assess malnutrition status in HIV patients whether taking ARVs or not (Ugwu et al., 2022). This is in line with the results of the validity and reliability test of this study that the MSGA-HIV questionnaire is valid and reliable for use in assessing the risk of patient malnutrition status.

Health practitioners in HIV and AIDS treatment centers with limited resources can use this low-cost tool to quickly identify patients at risk of developing poor nutritional status so they can provide appropriate care (such as nutrition education and symptom management). The SGA questionnaire can be a reliable and easy-to-apply measuring tool in diagnosing a patient's nutritional status (Duerksen et al., 2021). The questions in this instrument use simple sentences so that they are easily understood by respondents. Shorter questions (9 questions) so that patients can measure the level of risk of malnutrition in a short time (3-5 minutes). This instrument can be implemented by all health workers and various levels of health services.

5. CONCLUSION

Following the analysis of four articles, it was revealed that the Modified Subjective Global Assessment for HIV/AIDS patients is highly recommended for screening malnutrition risk. Health

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practitioners in HIV and AIDS treatment centers with limited resources can use this low-cost tool to quickly identify the status of malnutrition in HIV patients This tool is anticipated to be widely utilized by hospitals to identify malnutrition in HIV/AIDS patients and prevent nutritional imbalances. Researchers are optimistic about the potential for this instrument to become a standard in HIV/AIDS treatment facilities and encourage further research with larger sample sizes.

6. ACKNOWLEDGEMENT

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7. CONFLICT OF INTEREST

The writers disclose no competing interests.

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