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Prevalence of Population health with disability donating blood at Regional Center for Blood Transfusion Kigali, Rwanda

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ABSTRACT

Blood transfusion is as vital as any medical treatment and plays a critical life-saving role in HealthCare. This study determined the prevalence of donors with disability visiting Regional Center of Blood Transfusion in Kigali. A facility-based cross-sectional mixed-methods design was used. Quantitative data were collected using structured questionnaires administered to 342 people with disabilities and analyzed using descriptive statistics, chi-square tests, and logistic regression. Qualitative data were obtained through focus group discussions and key informant interviews and were analyzed thematically. Participants were aged 18–60 years (mean 32 years), 54.7% were Single and 69.8% were Male. On type of population health with disabilities, most donors (61.5%) were persons with visual disability, followed by physical disability (14.5%) while hearing disability was represented by 8.6%. Nearly a half of participants were single 54.7% (185), followed by married/cohabitating individuals who made up the second-largest group 34.3% (116). The prevalence of donors with disability was 4% and among them, the majority (85.5%) were repeated donors while 14.5% were first-time donors. The majority of population health with disabilities had low health information about blood donation (65.4%) with mean score knowledge of 48.5%. This was strongly associated with lower education (χ^2=129.86, P<0.001) and donation status. First-time donors had 2.1 higher odds of low information (AOR = 2.1, 95% CI: 1.87–2.50, P = 0.002). RCBT and RBC should implement accessible, disability-inclusive educational campaigns to improve knowledge of PWDs about blood donation.

Keywords: Disability, Population Health with Disability, Blood Donation.

1. INTRODUCTION

Blood donation is a critical component of healthcare and plays a vital role in saving numerous lives (Akshay et al., 2023). Numerous surgical procedures such as surgical procedures, emergency care, oncological therapy and other health conditions are facilitated through blood transfusion (David et al., 2024). The annual blood donation collection worldwide is about 112.5 million units. However, this varies widely with geography and economic state (Nourmohammadi et al., 2022) (Franchini et al., 2021). For instance, it was found that high-income countries report collection rates 9 times higher than in LMICs. This implies a huge disparity in blood banking infrastructure and public health campaigns (Naranja et al., 2021). There remains a deficit in safe blood availability. The challenge of attaining safety

of blood and occurrence of transfusion related infections aggravates this problem (Kandasamy et al., 2020).

Developing countries are facing severe shortage of blood supply and they are not able to meet the target of 1 percent donation of total population set by WHO (WHO, 2025). In Africa, only 5.2 blood units are collected per 1,000 people. This figure is far less than the 33 blood units per 1,000 people collected in developed countries. Furthermore, it is way below the WHO recommendation of 10-20 units per 1,000 people. This scarcity is particularly due to healthcare infrastructure and supply chain challenges (Akenroye et al., 2023). Approximately 15% of the global population, equating to over one billion individuals, experience life with a disability. This number will continue to grow due to the aging population and increased chronic and long-term health conditions (WHO, 2025). This emphasizes how crucial it is to engage this group in the habit of blood donation to achieve sustainability in the future.

In sub-Saharan Africa, individuals with disabilities encounter substantial healthcare access challenges stemming from financial hardship, practical, and social obstacles, further exacerbated by transportation limitations and often negative attitudes from healthcare providers (Harrison et al., 2020). Despite governmental and non-governmental organizations' efforts in Rwanda to improve healthcare access for all citizens, individuals with disabilities continue to face heightened challenges in acquiring essential health information and services (Hunt et al., 2023). While studies have examined blood donation practices within Rwanda's general population, there is a significant gap on participation of PWDs in blood donation.

2.0 MATERIALS AND METHODS

2.1.0 Materials

2.1.1 Prevalence of Population health with disability donating blood

According to WHO (2025), of the 118.5 million blood donations collected globally each year, high-income countries account for 40%, despite representing only 16% of the world's population. Blood donation frequency shows relationship with overall national income of the country. Poor countries have a donation rate of less than 5 per 1,000 people. LMICs have a donation rate of 6.6 per 1,000 people. On the contrary, developed nations show much higher donation rates, with an average of 31.5 donations per 1,000 inhabitants (Asamoah-Akuoko et al., 2017).

In sub-Saharan Africa, blood donations are usually voluntary, with less than 0.5% of the population donating blood. The reason for the high rates of mortality on the continent can be largely linked to unavailability of blood for transfusion (Kayizzi et al., 2024). WHO recommends that the countries should collect blood units equal to 1 % of their total population, annually to meet their blood product needs.

Rwanda has a population of around 12 million. The target is 120,000 blood units a year for Rwanda. In 2022, the Blood Transfusion Center collected 78,838 units, 99.46% of hospital demand was met. The BTD’s plan for 2020-2025 targets fulfillment of 100% by 2025 of these demands (Emmanuel et., 2025).

A deficit in data exists regarding the prevalence of blood donation within the population of individuals with disabilities. An estimated 1.3 billion individuals live with a disability, representing approximately 16% of the global population (Health, 2021). A large part of the population is often unequally impeded from accessing complete health information, including important data about blood donation mechanism, eligibility, and the effect of their donation on societies (Kayizzi et al., 2024). In spite of their need, their specific requirements and apprehensions are often neglected within public health interventions and

research regarding blood donation (Waggiallah, 2023). Their involvement in blood donation is essential in addressing the global under-supply of blood products.

2.1.2 Level of health information to population health with Disability to Donate blood at central blood Banks

Blood donation campaigns, which rely on effective marketing and recruitment strategies such as social media outreach and donor experience sharing, are vital for attracting new donors and disseminating information to enhance blood supply, particularly when demand is high (Dorle et al., 2023). Key obstacles to blood donation among PWDs typically stem from a lack of adequate information and understanding regarding its importance and processes, low awareness of its benefits, common myths and fears about potential negative health effects from donating, and unfavorable societal perceptions (Abderrahman et al., 2014).

Harrison et al. 2020 has indicated that PWDs get excluded from important health information because of attitudinal barriers and poor communication in health environments. The lack of readily available and suitably designed information often leads to lower involvement in essential health programs, like blood donation camps, among PDs (Hunt et al., 2022). Marginalization is widespread and shows that there is a need for inclusive strategies to facilitate equitable access to health education about blood donation for PWDs (Dassah et al., 2022).

There is a significant lack of regional studies that directly measure the level of health information specifically among people with disabilities regarding blood donation. Most existing studies on blood donation knowledge, attitudes, and practices (KAP) focus on the general population without disaggregating data for PWds. Most Blood Collection Center don not systematically collect data on disability status among donors, making it difficult to assess the actual level of health information reaching this population or to evaluate their donation experiences (Philip et al., 2026).

2.2.3 Conceptual framework

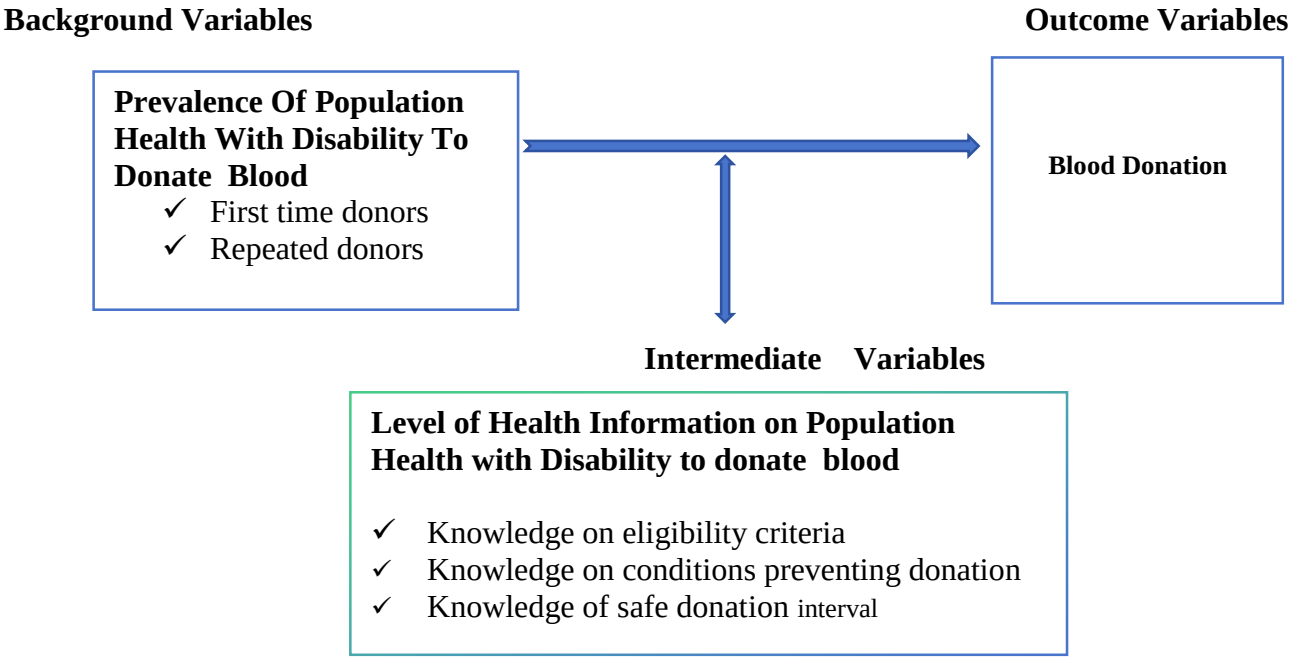


Figure2. 1 Conceptual Framework, Source: (Silali, 2025).

3.0 METHODS

3.1 Study Design

A descriptive cross-sectional research design and triangulation was used. A mixed-methods approach was employed, combining both quantitative surveys and qualitative interviews to collect data. The quantitative component involved administering structured questionnaires to assess the prevalence, assess knowledge levels about blood donation, Socio-culcural factors contributing to blood donation among PWDs and readiness of RCBT to accommodate PWDs. In Qualitative approach, a subset of participants was approached to explore their experiences and perspectives in greater details. Furthermore, Secondary data were systematically collected from the archival records of RCBT/Kigali using a researcher-developed retrospective questionnaire designed to capture historical donation status.

3.2 Study area

This work was carried out in RCBT/Kigali located in Nyarugenge District. This center started in 1976, recommended by WHO under the name of CNTS (Centre de Transfusion Sanguine). It came Blood Transfusion Division in 2011 as a division of Rwanda Biomedical Center under the MoH (RBC, 2024). Kigali City has three districts namely Kicukiro, Gasobo and Nyarugenge. Kigali City has 1,745,555 inhabitants, which is 13.17% of Rwandas' total population. Nyarugenge District is predominantly an urbanized district and 15.6% of the population is rural. The district includes entirely urban sectors such as Gitega, Kimisagara, and Muhima, and Nyakabanda. Kanyinya, Kigali and Mageregere sectors have Urban and rural characteristics (NISR, 2023).

The Rwandan population makes up 99.11% of the population in Kigali City while foreigners making up 0.89%. In the Nyarugenge District, Christianity is the dominant religion (81.58% of the population). It has 34.86% Catholic, 25.90% ADEPR, 7.01% Protestant, 9.19% Adventisit and 4.62% of other Christians. The other religions in the country include Islam and Jehovah's Witnesses, while 3.84% of the people have no religion (NISR, 2023). Almost half of the population, 47.9%, went to primary school. According to NISR (2023) the data indicates that a further 9.5% has never attended any form of schooling. On the other hand, 2.9% has attended a nursery school. The employment-to-population ratio in Nyarugenge District is 56.2% (NISR, 2023).

3.3 Target Population

The target population consist of legal age (18 yrs and above) population health with disability able to respond to the survey. The study population included all individuals with any type of disabilities attending Blood donation at RCBT/Kigali during the period of the study.

3.3.1 Inclusion criteria

Having a diagnosed disability and having visited the RCBT/Kigali within the period of study is the main criteria. This included visual impairment ranging from low vision (requiring eyeglasses) to complete blindness, hearing impairment ranging from hard of hearing to total deafness, physical disability,etc. This study included also healthcare professionals working at the blood transfusion center as secondary participants to gain their perspectives on the issue through interviews.

3.3.2 Exclusion criteria

Healthy individuals without disability and people with severe cognitive impairments that may prevent them from providing informed consent or participating in the study effectively.

3.4 Sampling techniques and sample size

3.4.1 Sample size determination

Based on our sample size calculation, random sampling was used. Taro Yamane formula (Yamane, 1967) was used to calculate the sample size

n = N/(1+N(e)2

n =N/[1+N(e2)],where

n = the sample size,

N = total population (600) estimated number of people with disabilities attending RBTC in 3months,

e = error. (0.05) then

n=600/(1+600(0.5)2

n=600/[1+600(0.0025)]= 342

The sample size was 342 of Population health with disabilities attending regional blood transfusion center in Kigali.

3.4.2 Sampling Techniques

This study utilized purposive and census sampling to select participants. The secondary data were collected using retrospective forms. For the qualitative component, a purposive sampling technique was used to select participants with common caracteristics (types of disability, education level and donation status). Key informants was selected based on their ability to provide rich, contextual insights about the topic. Sampling for FGDs and in-depth interviews was continue until thematic saturation was reached. This mix of sampling methods gave us a good overall understanding and detailed insights into the study's goals.

3.5 Research instruments

The study employed both quantitative and qualitative data collection instruments. A semi-structured questionnaire for surveys were used in combination with other instruments for Key Informant Interview (KIIs) and focus group discussion guides. These instruments were developed based on existing literature, national health surveys, and WHO-recommended tools for assessing blood donation. The questionnaire consists of the different sections such as socio-demographic characteristics, level of health information on blood donation, socio-cultural factor influencing blood donation and health system’s readiness to accommodate PWDs.

3.6 Piloting of Research instruments

Prior to the main data collection, the research instruments was piloted with a small, representative sample of PWDs in Neighboring District (Gasabo). This crucial preliminary phase aims to assess the clarity, relevance, and cultural appropriateness of the questions, ensuring they are easily understood by participants with diverse types of disabilities. Feedback from this process was used to refine and validate the instruments, thereby enhancing the reliability and validity of the data collected for the main study on factors contributing to low health information on blood donation among this population.

3.7 Testing for validity, reliability and establishment of trustworthiness

3.7.1 Reliability

To ensure consistency of the research instruments, several reliability checks were conducted. A pilot study was conducted and all tools were pretested on 30 people to assess clarity, comprehension of questions and estimate the time required for completion. Feedback from the pretest informed revisions in question wording, flow, and structure to improve clarity, cultural sensitivity, and ease of administration.

3.7.2 Validity

The accuracy of the questionnaire was ensured through review and validation of a group of experts such as academic advisors, public health specialist, specialist in blood donation and disability specialist. The questionnaire was translated into Kinyarwanda and then back-translated into English to maintain content validity. Face validity was assessed during pre-testing with a group of people of the same characteristic to ensure that the tool is clear, culturally appropriate, and logically arranged. The gathered feedback informed the optimization of the tools prior to comprehensive data acquisition.

In the qualitative component of the study, emphasis was placed on ensuring trustworthiness. This was achieved through strategies such as triangulation to enhance credibility, assessing transferability to determine the applicability of findings in similar contexts, ensuring dependability to support consistency over time, and ensuring verifiability via objective and transparent data examination.

3.8 Ethical Consideration

The study was approved by School of Postgraduate MKU and ethical clearance (Ref: MKU04/ERC?0713) was obtained from MKU Ethical committee and Blood Transfusion Division Center. All respondents were assured that the study is solely for academic purposes, and assured that their answers will be handled with firm discretion. Data was anonymously coded to prevent any link to individual participants. Participationn was entirely voluntary, with no negative consequences for those who choose not to participate. Respondents were informed of the study 'goals, their rights, and any minimal risks involved, such as the time commitment alongside the potential benefits, including contributing to the enhancement of blood donation services.

4.0 RESULTS AND FINDINGS

4.1 Socio-demographic Characteristics of the Participant

The response rate was 98.8%, representing 338 respondents from an initial target population of 342. The age of respondents ranged from 18 to 60 years, with a mean age of 32 years and a median age of 28 years. The majority of donors were concentrated in the 21–30 year age group, which accounted for 43.2% (146).

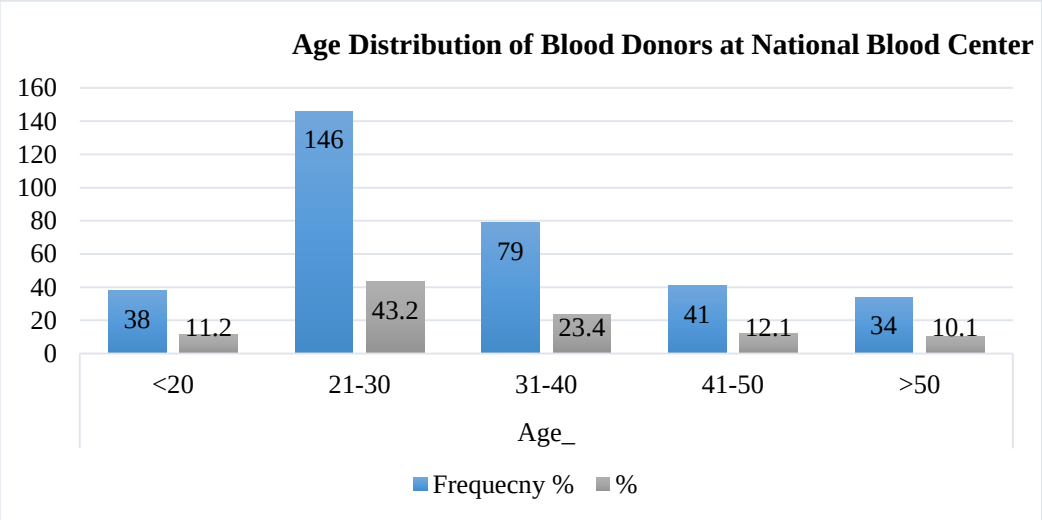


Figure4. 1 Age Distribution of Blood Donors at National Blood Center

About gender, the majority of respondents were Male, represented by 69.8% (236) while 30.2% (102) were Female with Significant contribution of P value 0.002 donation of blood at regional blood donor center.

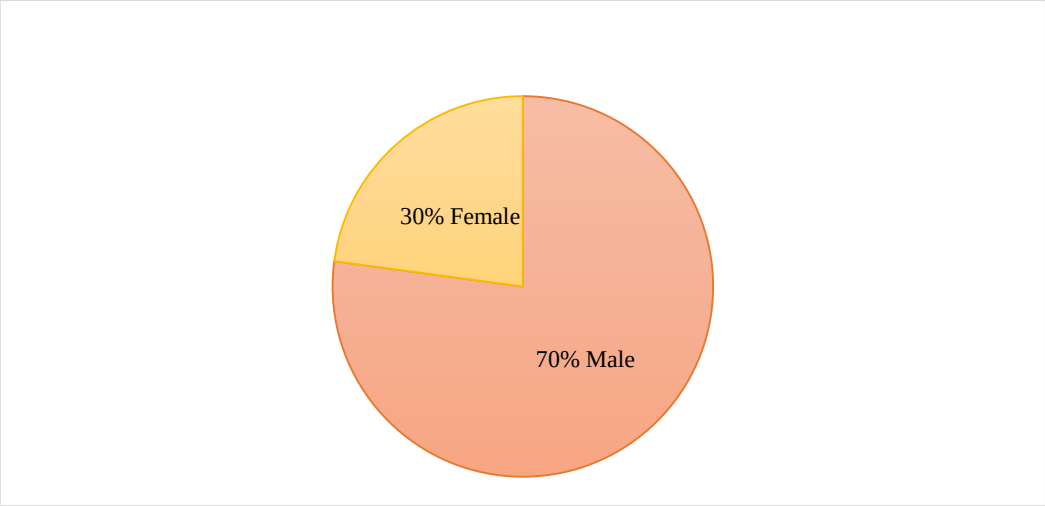


Figure4. 2 Gender Distribution of Blood Donor at National Blood Center

This distribution indicates that most 190 (55.6%) of respondents attended secondary, and only few 5 (1.5%) donors did not have formal education. Lower education was strongly associated with low information on blood donation (χ^2=129.86, P<0.001)

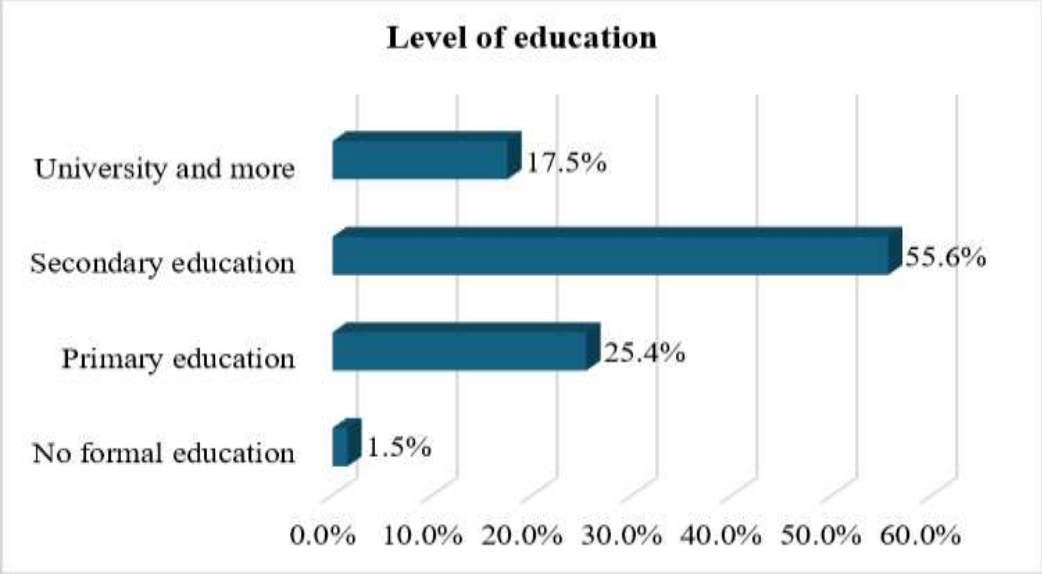


Figure4. 3 Education level of distribution of Blood Donors at RCBT

The majority of participants were single 54.7% (185), followed by married/cohabitating individuals who made up the second-largest group 34.3% (116).

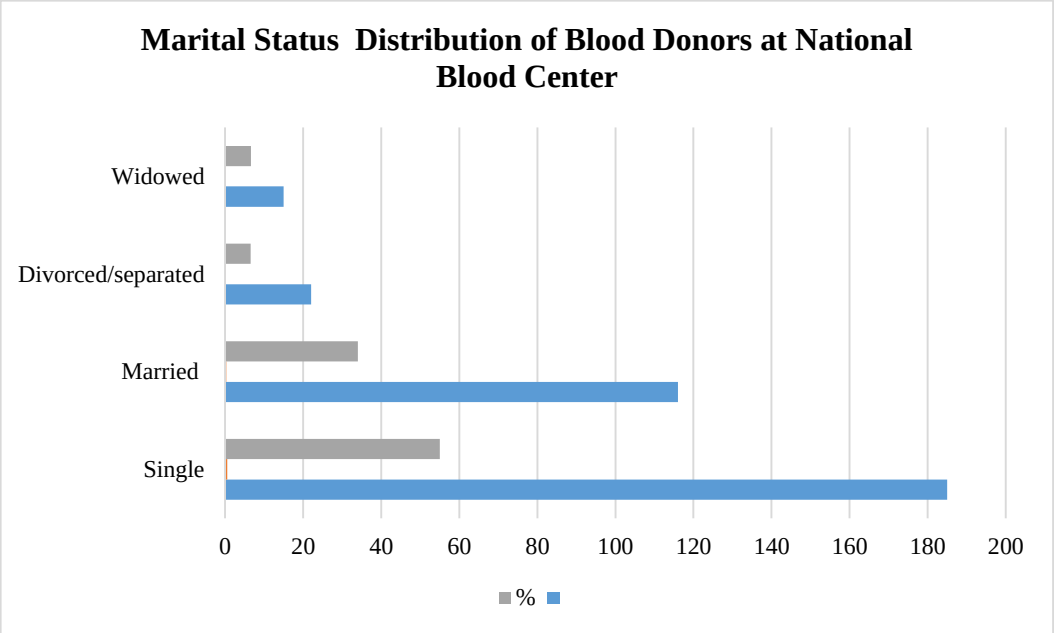


Figure4. 4 Marital Status Distribution of Blood Donors at RCBT

On type of population health with disabilities, donating blood most donors 61.5% were persons with visual disability, followed by physical disability (14.5%) while hearing disability was represented by 8.6%.

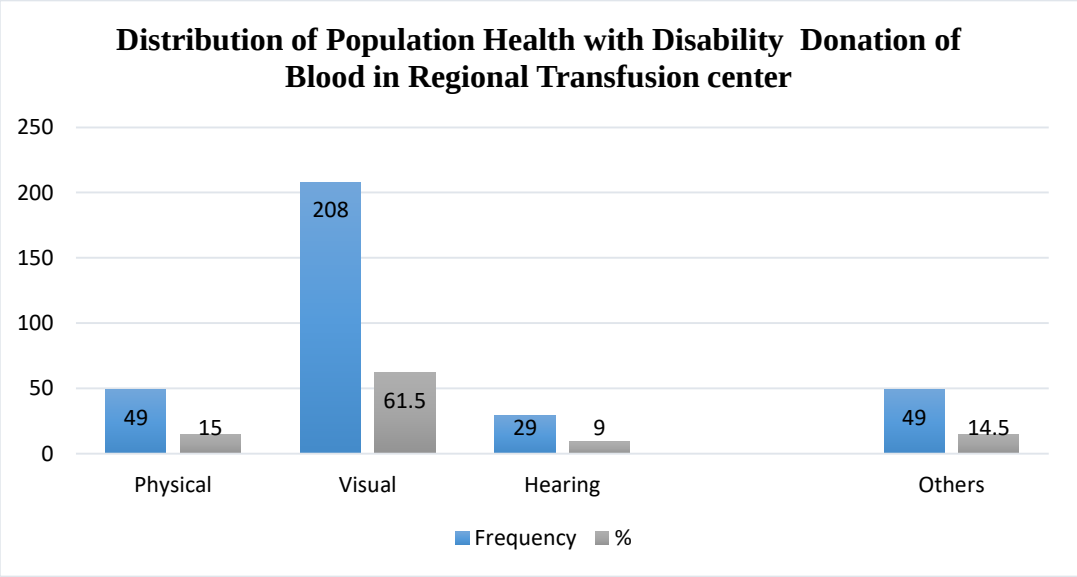


Figure4. 5 Distribution of Population Health with Disability Donation of RCBT

4.2 Prevalence of Population Health with Disabilities Donating Blood at Regional Center Blood Transfusion

Secondary data from our retrospective questionnaire revealed that in the last decade (2015 to 2025**),** out of eight thousand six hundred and eighty (8,680) blood donors who donated blood to regional blood center in Kigali, only three hundred and forty-six (346) were main population health with disabilities

with a prevalence of 4% (346) contribution of blood donors from the population health with disability from the Kigali city. This was also discussed during FGDs by repeated donor at the facility:
"I have been donating blood at this Center for the past five years, every four months. In all that time, I rarely see someone on a crutch or in a wheelchair coming to donate. Maybe it is not that they do not want to help; I think they are not made to feel welcome, or maybe they think they are not allowed." FGDs held on *13th Feb 2026.*

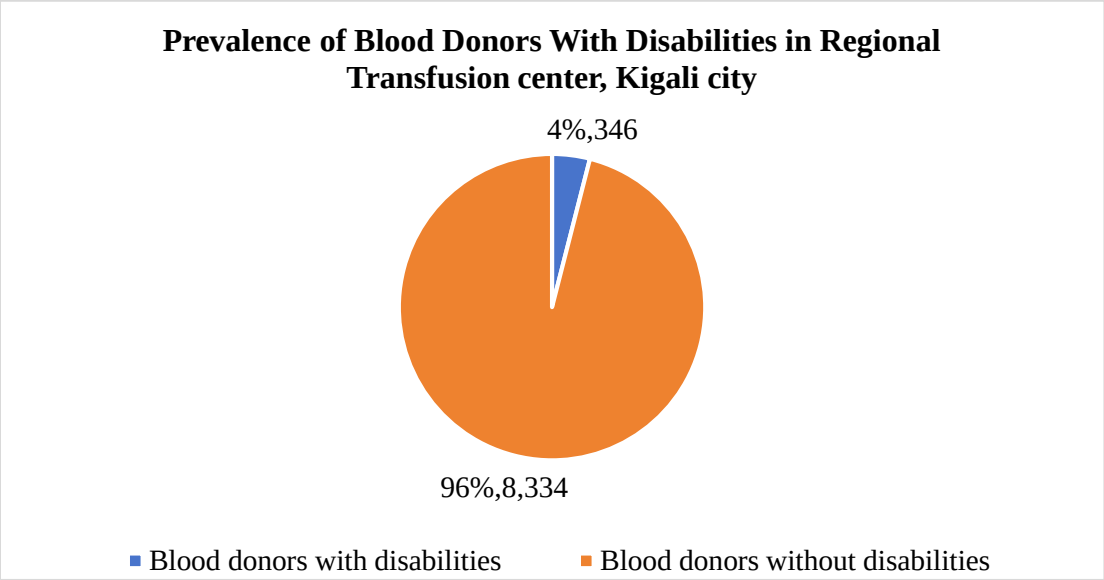


Figure4. 6 Prevalence of Blood Donors With Disabilities in Regional Transfusion center, Kigali city .

Result demonstrated that for the past decade (2015 to 2025**)** majority of blood donors (7465) 85.5% were repeated donors, while 1302 (14.5%) were first-time donors. A significant association between donation status and level of information about blood donation was found. First-time donors had 2.1 higher odds of low information (AOR = 2.1, 95% CI: 1.87–2.50, P = 0.002).

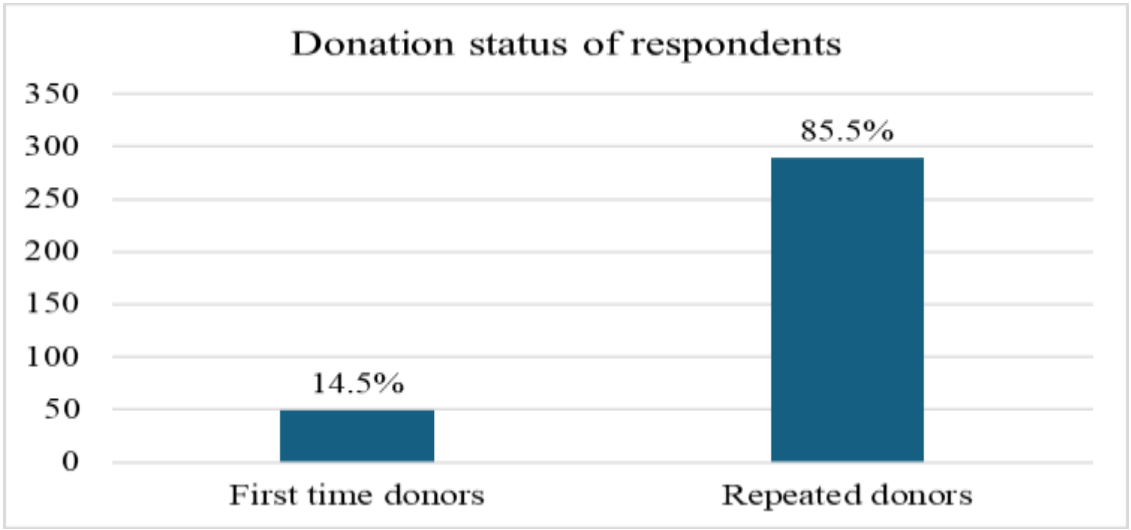


Figure4. 7 Distribution of Blood Donors in the Regional Blood Donor for the Last decade (2015 to 2025)

4.3 Level of Health Information among the Population with Disabilities on Quality Donation at the Regional Center for Blood Transfusion

The majority of population health with disabilities had low health information about blood donation (65.4%) with mean score knowledge of 48.5%. About healthy age eligibility to blood donation 159 (46%) knew that the minimum age is 18 years and maximum healthy age to donate blood is 65 years.

When asked about disability and eligibility for blood donation, 118 (35.2%) knew that it depends on type of disability of donor. On pathogenicity and blood donation, 112 (32.5%) of them responded correctly that uncontrolled epilepsy, active infection and recent surgery are among conditions preventing someone to donate. Regarding safe blood donation interval, for the live blood donors the majority 244 (71.9%) knew that it is safe to donate every 3 months.

This was also discussed during the KII discussion by a staff at this facility:

"In my honest opinion, the existing methods of delivering health information on BD are not effective for PWDs. We rely on the same approaches we use for the general population such as posters on walls, verbal explanations during visits, and occasional radio announcements. But these methods do not consider the diverse needs of PWDs. A person with visual impairment cannot read a poster. A person with hearing impairment cannot understand a radio announcement. A person with intellectual disability may struggle with complex medical language". KIIs at RCBT held on 13th Feb 2026.

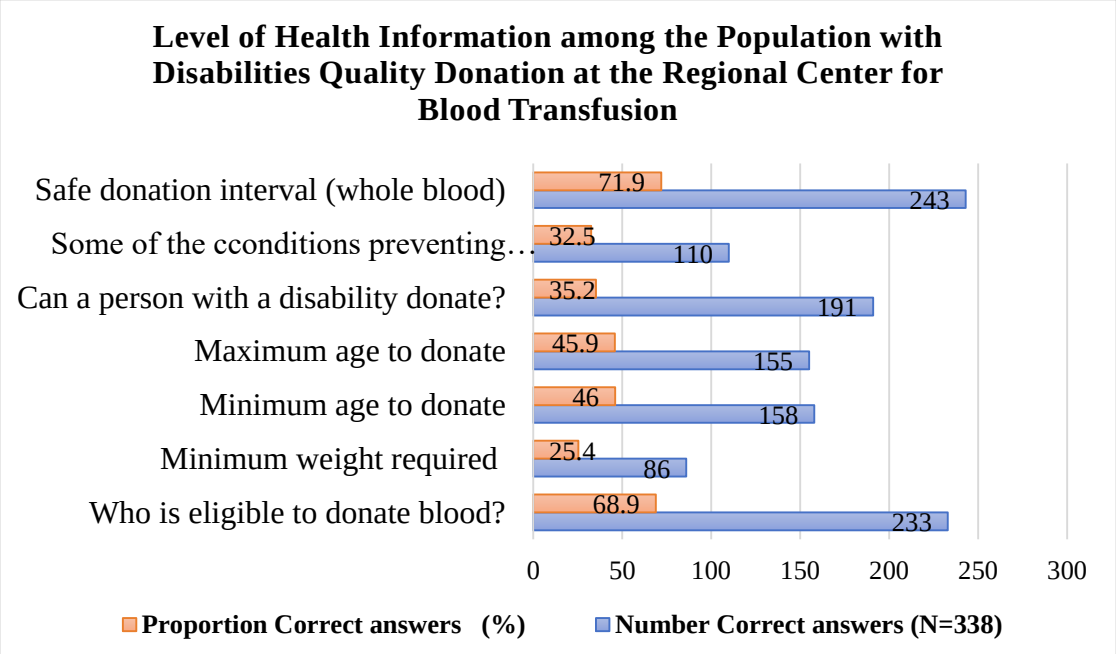


Figure4. 8 Level of Health Information among the Population with Disabilities Quality Donation at the Regional Center for Blood Transfusion

5. CONCLUSION

The study revealed that the majority of persons with disabilities had low health information about blood donation. Knowledge levels were strongly associated with education, type of disability, and donation status. Hearing disabilities were associated with the lowest information levels among participants. The existing methods of delivering health information on blood donation are ineffective for persons with disabilities, as they rely on generalized approaches. RCBT, and RBC should immediately implement

targeted educational campaigns and accessible outreach programs to improve blood donation knowledge among persons with disabilities.

6. ACKNOWLEDGMENTS

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