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HIGHLIGHTS

1. Impact of Bilharzia Storytelling on Community Awareness
2. Language Communication Abilities in Children and Adolescents with Down Syndrome
3. Seasonality Data for Improving Maternal Health
4. Challenges and Needs of the Implementation of National Older Person's Policy
5. Unspoken Pain in Post-Conflict Mental Health Practice



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Its mission is to serve as a knowledge sharing platform for national and international public health scientific information. Content published under RPHB will be used to control and address potential public health outbreak threats and strengthen health systems through real time availability of information.

This will allow more and effective communication between policy makers, researchers and health practitioners.

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Dear readers,

Public health progress is most meaningful when it reflects the lived realities of populations across the life course and responds to the social, cultural, and structural contexts in which health and illness occur. Rwanda has made remarkable advancement in strengthening its health system and improving population health outcomes. Yet, as the country advanced toward universal health coverage and equity-driven development, there is a growing need for evidence that illuminates how policies, programs, and services are experienced by diverse and often vulnerable groups.

This issue of the Rwanda Public Health Bulletin (RPHB) brings together different studies that collectively underscore the importance of inclusive, context-responsive public health practice across the life span. The articles span early childhood to older age, and address communicable diseases, maternal health, mental health, disability, and social policy—highlighting how health outcomes are shaped not only by clinical interventions, but also by communication, awareness, seasonality, policy implementation, and lived experience.

The assessment of language communication abilities among children and adolescents with Down syndrome, as perceived by parents, foregrounds the critical role of caregivers' perspectives in understanding developmental needs and informing inclusive education and health services. Community-based storytelling to enhance awareness of schistosomiasis among school-aged children demonstrates the value of culturally appropriate, participatory approaches in addressing neglected tropical diseases. Together, these studies reaffirm the importance of tailoring interventions to local contexts to enhance understanding, acceptance, and impact.

At the systems and policy level, the qualitative exploration of challenges in implementing the National Older Person's Policy in Kigali reveals persistent gaps between policy intent and practice, particularly in addressing the complex health and social needs of an ageing population. Complementing this, the analysis of seasonality data for maternal health decision-making illustrates how routine health information, when thoughtfully analyzed, can generate actionable insights to improve service planning and maternal and newborn outcomes.

Finally, the field reflection on post-conflict mental health practice gives voice to unspoken psychological pain, reminding us that healing and recovery extend beyond biomedical indicators and require trauma-informed, person-centered care.

Collectively, these articles emphasize that effective public health action must be inclusive, grounded in local evidence, and attentive to the lived experiences of individuals and communities at every stage of life. They call on researchers, policymakers, and practitioners to continue strengthening context-responsive approaches that leave no one behind.

May this publication serve as both a source of knowledge and a call to action for policymakers, health professionals, researchers, and communities to continue investing in inclusive, evidence-based, and person-centered health care in Rwanda.

Yours sincerely,

The seal of the Rwanda Biomedical Center (RBC) is circular. It features a central emblem with a sun, a mountain, and a river, surrounded by the text 'RWANDA BIOMEDICAL CENTER' and 'Rwanda Biomedical Center'. The seal is blue and white.

Prof. Claude Mambo Muvunyi, MD, PhD
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Evaluation of Impact of Bilharzia Storytelling on Community Awareness of schistosomiasis among primary school-aged children in Bugesera District, Rwanda, 2024

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ABSTRACT

INTRODUCTION: Schistosomiasis remains a significant public health concern in low- and middle-income countries, particularly in Rwanda. This study aimed to assess the effectiveness of storytelling based educational intervention in improving knowledge, attitudes, and practices (KAP) related to schistosomiasis prevention among school-aged children in Bugesera District.

METHODS: This was a cross-sectional interventional study conducted in Bugesera District, Rwanda. Baseline data were collected through surveys from 341 students, while the end line was collected from 303 students aged 7-15 years. SPSS version 25 was used to analyze the frequencies of the demographic variables and the distribution of the knowledge, attitude, and practice variables of the participants. Pearson Chi-square tests were performed to determine the association between sociodemographic characteristics and the level of knowledge, attitude, and practice at a 95% confidence level.

RESULTS: Disease awareness increased from 14.7% to 98.3%, with parents emerging as the primary information source (96.0%). Understanding of transmission routes improved substantially, with recognition of water contact risks increasing from 3.8% to 92.1%. Risk perception increased (52.0% to 72.1%) while fear levels decreased (82.0% to 71.5%). Behavioral changes were significant: swimming in water bodies decreased from 35.8% to 7.3%, regular toilet use increased from 76.5% to 89.8%, and lake water usage for drinking dropped from 33.7% to 15.5%.

CONCLUSION: The storytelling-based intervention demonstrated exceptional effectiveness in improving schistosomiasis-related KAP among school children in Rwanda, surpassing outcomes reported in comparable African studies.

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INTRODUCTION

Schistosomiasis, or Bilharzia, is a significant global public health issue, particularly in tropical and subtropical regions where poverty and limited access to clean water and sanitation perpetuate its transmission [1,2]. Caused by parasitic worms released from freshwater snails, the disease infects humans through skin contact with contaminated water. Over 250 million people worldwide require preventative treatment, with the vast majority of cases and the greatest burden occurring in Africa [3]. School-aged children are disproportionately affected, constituting a large portion of the over 123 million infected children [4-6]. Consequently, the primary global control strategy for the past two decades has been preventive chemotherapy, using drugs like Praziquantel, targeted at this age group [7,8].

In Rwanda, a tropical nation where schistosomiasis is endemic, the disease remains a persistent challenge. It is a recognized contributor to anemia and hospitalization, with recent mapping indicating an infection rate of approximately 36% for the prevalent *Schistosoma mansoni* species [8,9]. As one of Rwanda's key Neglected Tropical Diseases, the national response has included mass drug administration in schools [10]. However, despite achieving high treatment coverage, re-infections among children continue. This persistence could highlight a critical gap: chemotherapy alone is insufficient if children continue to engage in high-risk water-contact behaviors due to a lack of knowledge [10-12].

This gap underscores the need for complementary strategies, such as community education and awareness campaigns, to instill lasting behavioral change. While Rwanda has employed various methods, including community health worker programs and One Health initiatives, awareness levels among children and teachers remain critically low, at around 3%. This knowledge deficit is a major obstacle to elimination [10-12]. It is within this context that the “*Bilharzia Storytelling Lab*” emerged as an innovative Behavior Change Communication program. Recognizing that traditional methods had not sufficiently increased awareness, this initiative aimed to leverage the engaging power of storytelling and comics to educate school-aged

children. The project involved distributing over 2,500 illustrated notebooks with prevention messages and hosting storytelling contests in three schools in the Bugesera District. Therefore, this study was designed to evaluate the impact of this novel storytelling-based educational program on the knowledge, attitudes, and practices regarding schistosomiasis among its primary targets: school-aged children in a high-risk area of Rwanda.

METHODS

Study Design and Setting

This study involved the evaluation of the impact of the storytelling program using a pre-test and post-test cross-sectional study design. Data collection was carried out using a semi-structured survey questionnaire. The study was conducted in Bugesera district, one of the seven districts in the Eastern province of Rwanda. This district was selected due to its high susceptibility to schistosomiasis infections, attributed to the presence of numerous freshwater bodies, particularly Lake Rweru.

Study Population and Sample

The study population comprised 2,549 school-aged children from the three selected schools [Groupe Scolaire (GS) Nyiragiseke, Ecole Primaire (EP) Kivusha, and Ecole Primaire (EP) Mugina] in Bugesera District. A random sampling method was employed, with the sample proportionally distributed among the three schools. The inclusion criteria specified students aged between 8 and 22 years.

Data Collection Procedures

A baseline study was initially conducted on students' knowledge, attitude, and perception of Bilharzia in October 2023. Following this, project activities, comprising teachings and competitions, were implemented, and the post-interventional data were collected from June 16 to June 17, 2024, to evaluate their impacts.

Data collection was conducted by a trained research team using a paper-based, administered-assisted questionnaire with multiple-choice questions. The questionnaire was available in both English and Kinyarwanda to accommodate participant preferences. The study measured three key dependent variables: knowledge, attitudes, and practices of the students regarding Bilharzia. Pre and post-intervention results were compared to

evaluate the impact of the educational activities.

KAP scaling and scoring.

The knowledge, attitude, and practice were scored 1 for the correct response and 0 for the false response. The total scores were summed and categorized as poor and good for the scores below and above the average, respectively [13,14].

Data Analysis

Data was entered into Microsoft Excel for cleaning and subsequently analyzed using SPSS. Descriptive statistics were used to summarize participant characteristics. Knowledge levels, attitude groups, and practice levels were determined by calculating the overall scores of correct and specific answers. Bivariate analysis with Pearson Chi-square (χ^2) tests was used to compare knowledge, attitude, and practice across the socio-demographic characteristics. A pre-specified alpha significance level (two-tailed p-value) of 0.05 was used, and 95% confidence intervals were reported.

Ethical Considerations

The study's ethical clearance was obtained from Kepler College, Rwanda. Additional approval

was sought from the National Health Research Committee with reference number: NHRC/2023/PROT/037. Participation was voluntary, and responses were treated as anonymous and confidential. Written informed consent forms were obtained from parents/guardians of each participant under the age of 18 years.

RESULTS

Baseline characteristics of participants: The evaluation of the study encompassed a total of 303 participants, revealing demographic patterns across age, gender, education, location, and socioeconomic status. Age distribution showed 86.5% were 15 years or younger, while 13.2% were 16 or above, aligning with the focus on school-aged children. Gender distribution demonstrated remarkable balance and represents both sexes to be adequately represented in the research findings. The socioeconomic status of participants, measured through the Ubudehe categories, revealed interesting patterns (Table 1). Among the three schools that participated, GS Nyiragiseke, EP Kivusha, and EP Mugina represented with 47.5%, 30% and 22.4% respectively.

Table 1: Socio-demographic characteristics of participants

Variables	Post Intervention		
	n	%	
Age category	≤ 15	262	86.5
	> 16	40	13.2
Gender	male	148	48.8
	female	155	51.2
Educational level	primary 4	117	38.6
	primary 5	101	33.3
	primary 6	85	28.1
School name	GS Nyiragiseke	144	47.5
	EP Mugina	68	22.4
	EP Kivusha	91	30.0
Sector	Gashora	2	0.7
	Rweru	301	99.3
Ubudehe category	Category 1	23	7.6
	Category 2	68	22.4
	Category 3	151	49.8
	Category 4	1	0.3
	Do not know	60	19.8
	Total	303	100

Comparison of the knowledge in the baseline vs. and post-intervention evaluation: A remarkable transformation in knowledge and awareness

about schistosomiasis was observed between the pre-intervention and post-intervention periods of the study. Initially, only 14.7% of participants

Table 2: Comparative knowledge distribution on the signs and symptoms, transmission, and prevention

Variables		Baseline		Post-Intervention	
		n	%	n	%
Have heard about Bilharzia before	No	29	85.3%	5	1.7%
	Yes	50	14.7%	298	98.3%
The source of information about Bilharzia	Parent	11	3.2%	291	96.0%
	School	18	5.3%	2	0.7%
	Friends	5	1.5%	8	2.6%
	Community health workers	11	3.2%	3	1.0%
	Radio	14	4.1%	5	1.7%
	Others	1	0.3%	5	1.7%
	Have you been infected with bilharzia	No	45	90.0%	289
	Yes	5	10.0%	9	3.0%
Family members have been infected	No	40	81.6%	288	96.6%
	Yes	9	18.4%	10	3.4%
Mode of transmission	Playing in waterbodies	13	3.8%	279	92.1%
	Drinking rainwater	22	6.5%	183	60.4%
	Eating too much salt	7	2.1%	54	17.8%
	Water snake bite	11	3.2%	225	74.3%
	Going to the toilet barefoot	15	4.4%	240	79.2%
	Stepping in urine	14	4.1%	242	79.9%
	Eating raw mangoes	6	1.8%	43	14.2%
	Praying in fire	4	1.2%	43	14.2%
	Not wearing shoes	14	4.1%	265	87.5%
	Urinating in water bodies	12	3.5%	238	78.5%
	Others	20	5.9%	6	2.0%
	Activities that lead to being infected	Fishing in lake	21	6.2%	254
Cultivating rice		18	5.3%	279	92.1%
Drawing lake water		22	6.5%	252	83.2%
Swimming in a lake		19	5.6%	267	88.1%
Washing in the lake		21	6.2%	252	83.2%
Others		7	2.1%	7	2.3%
Treatment	Taking medications	25	7.3%	251	82.8%
	Consulting a health center	42	12.3%	286	94.4%
	Traditional medicines	8	2.3%	57	18.8%
	Traditional healers	5	1.5%	28	9.2%
	Roasted roots	4	1.2%	24	7.9%
	Others	1	0.3%	2	0.7%
Prevention	Avoiding open defecation	20	5.9%	252	83.2%
	Avoiding stepping into water bodies	30	8.8%	291	96.0%
	Others	16	4.7%	7	2.3%

had heard about Bilharzia, but this awareness underwent a dramatic shift post-intervention, with 98.3% of participants becoming familiar with the disease. This substantial increase indicates the intervention's effectiveness in raising basic awareness about Bilharzia among the target population.

Parents have emerged as the primary information source, increasing dramatically from 3.2% (n=11) to 96.0% (n=291). Other information sources, including schools, community health workers, and radio, showed decreased relative importance post-intervention, though this may reflect the overwhelming shift toward parental information sharing.

Regarding personal experience with the disease, both direct infection and family member infection rates showed notable changes. Self-reported

Bilharzia infections decreased from 10.0% (n=5) to 3.0% (n=9), while reported family member infections declined from 18.4% (n=9) to 3.4% (n=10). This reduction might indicate either improved prevention practices or enhanced diagnostic accuracy in identifying the disease.

Knowledge about transmission modes showed remarkable improvement across multiple categories. Understanding of key transmission routes increased substantially: recognition of playing in water bodies as a risk factor rose from 3.8% (n=13) to 92.1% (n=279), and awareness of risks from not wearing shoes increased from 4.1% (n=14) to 87.5% (n=265). Importantly, participants also showed increased awareness of other legitimate transmission risks, such as urinating in water bodies (from 3.5% to 78.5%) and going barefoot to toilets (from 4.4% to 79.2%).

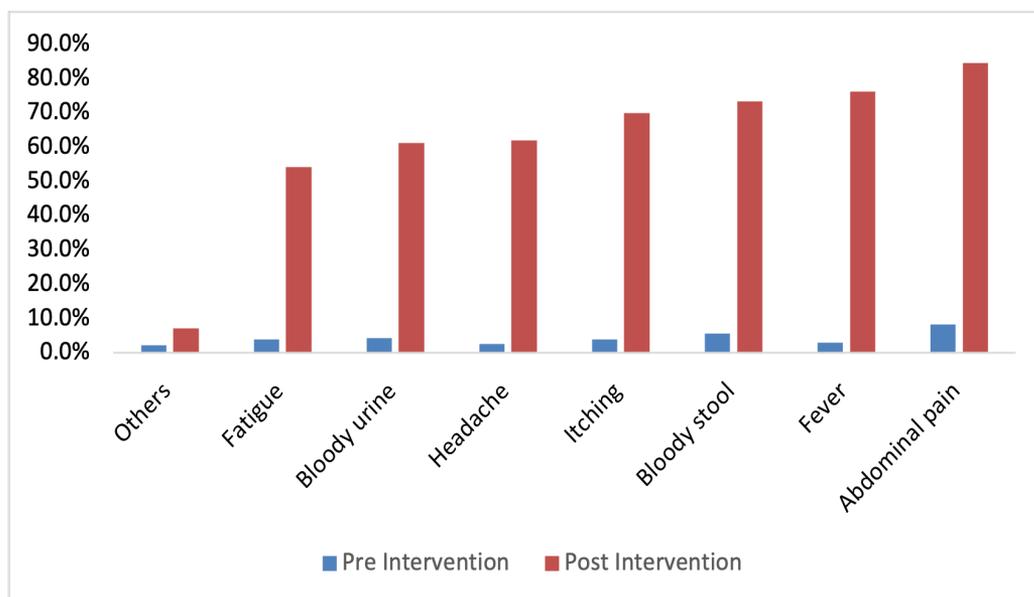


Figure 1: Trend in the knowledge of the signs and symptoms of schistosomiasis

Table 3: Analysis of perceptions and attitudes towards schistosomiasis

Variables		Baseline		Post Intervention	
		n	%	n	%
Easy to get infected	yes	26	52.00%	215	72.10%
Getting treated	yes	50	100.00%	289	97.00%
Discuss	yes	48	96.00%	288	96.60%
Hard to change behavior	yes	19	38.00%	107	35.90%
Fear of getting infected	yes	41	82.00%	213	71.50%
Many children get infected	yes	3	6.00%	10	3.40%
Infection is not age-dependent	yes	16	32.00%	223	74.80%

Awareness of high-risk activities demonstrated similar improvements. Recognition of risky behaviors increased significantly across all categories: rice cultivation awareness rose from 5.3% to 92.1%, swimming in lakes from 5.6% to 88.1%, and fishing activities from 6.2% to 83.8%. This comprehensive improvement suggests successful education about practical risk factors in daily activities.

Regarding treatment knowledge, awareness of appropriate interventions has improved significantly. Recognition of the importance of consulting health centers increased from 12.3% to 94.4%, and knowledge about medication-based

treatment rose from 7.3% to 82.8%. Interestingly, awareness of traditional treatment methods also increased, though to a lesser extent, with traditional medicine awareness rising from 2.3% to 18.8%. Prevention knowledge showed substantial improvement, particularly in two key areas: avoiding stepping in water bodies increased from 8.8% to 96.0%, and awareness of avoiding open defecation rose from 5.9% to 83.2% (Table 2).

Signs and symptoms of schistosomiasis:

Understanding of signs and symptoms showed substantial enhancement post-intervention. Recognition of key symptoms increased

Table 3: Practice pre- and post-storytelling program

Variables		Baseline		Post Intervention	
		n	%	n	%
Do you work in swamps and stagnant water bodies	No	135	39.6%	170	56.1%
	Yes	206	60.4%	133	43.9%
How often do you wear shoes when walking in swamps and stagnant water bodies	Never	103	30.2%	30	9.9%
	Sometimes	45	13.2%	59	19.5%
	Always	59	17.3%	44	14.5%
How often do you defecate in a toilet	Always	261	76.5%	272	89.8%
	Sometime	150	44.0%	40	13.2%
Swim in water bodies	No	219	64.2%	280	92.7%
	Never	19	5.6%	9	3.0%
	Sometimes	103	30.2%	13	4.3%
	Always	0	0.0%	0	0.0%
Source of water for respondents' drinks	Swamps	45	13.2%	22	7.3%
	Lakes	115	33.7%	47	15.5%
	Rivers	16	4.7%	7	2.3%
	Community water access point	144	42.2%	153	50.5%
	Natural water retrieval point	16	4.7%	4	1.3%
	Household/Neighbor water supply latrine	77	22.6%	83	27.4%
	Other sources	14	4.1%	1	0.3%
Source of water respondents use at home	Swamps	85	24.9%	48	15.8%
	Lakes	256	75.1%	178	58.7%
	Rivers	12	3.5%	13	4.3%
	Community water access point	34	10.0%	52	17.2%
	Natural water retrieval point	8	2.3%	2	0.7%
	Household/neighbor water supply latrine	20	5.9%	33	10.9%
	Other sources	17	5.0%	2	0.7%

dramatically: abdominal pain awareness rose from 8.2% to 84.5%, fever from 2.9% to 76.2%, and bloody stool from 5.6% to 73.3%. This improved symptom recognition could facilitate earlier detection and treatment seeking (Figure 1).

Pre- and post-storytelling program participants' attitudes:

The study revealed significant shifts in participants' perceptions and attitudes toward *Bilharzia* between the pre-and post-intervention periods. The proportion of participants who believed it was easy to get infected increased from 52.0% (n=26) to 72.1% (n=215). This substantial increase suggests enhanced awareness of transmission risks and vulnerability to the disease following the intervention.

Regarding treatment accessibility and attitudes, there was a slight shift in perspectives. Initially, all participants (100%, n=50) believed they could get treated for *Bilharzia*, while this percentage showed a marginal decrease to 97.0% (n=289) post-intervention (Table 3)

The willingness to discuss *Bilharzia* remained consistently high throughout both periods, with 96.0% (n=48) of participants initially willing to discuss the disease, and this openness was maintained at 96.6% (n=288) post-intervention. Perceptions about behavioral change showed minimal variation between the two periods. Initially, 62.0% (n=31) of participants did not consider it hard to change behavior related to *Bilharzia* prevention, which slightly increased to 64.1% (n=191) post-intervention. Fear of infection

showed an interesting shift, with the proportion of participants expressing fear decreasing from 82.0% (n=41) to 71.5% (n=213). Understanding of infection patterns across age groups showed substantial changes. The belief that many children get infected decreased markedly, with those who disagreed increasing from 52.0% (n=26) to 67.4% (n=201). Notably, uncertainty about this aspect decreased from 42.0% (n=21) to 29.2% (n=87). The most dramatic shift was observed in the understanding of age-dependent infection patterns, with recognition that infection is not age-dependent, increasing from 32.0% (n=16) to 74.8% (n=223).

Practice pre- and post-storytelling program:

The study revealed significant changes in risk-related behaviors and water usage patterns between the pre-and post-intervention periods. One of the most notable shifts occurred in exposure to high-risk environments, with participants reporting reduced engagement in activities involving swamps and stagnant water bodies, decreasing from 60.4% (n=206) to 43.9% (n=133).

Footwear habits showed meaningful changes in post-intervention. The proportion of participants who never wore shoes decreased dramatically from 30.2% (n=103) to 9.9% (n=30), indicating improved protective behavior. However, the percentage of those always wearing shoes remained relatively stable, slightly decreasing from 17.3% (n=59) to 14.5% (n=44), while occasional shoe-wearing increased from 13.2% (n=45) to 19.5%

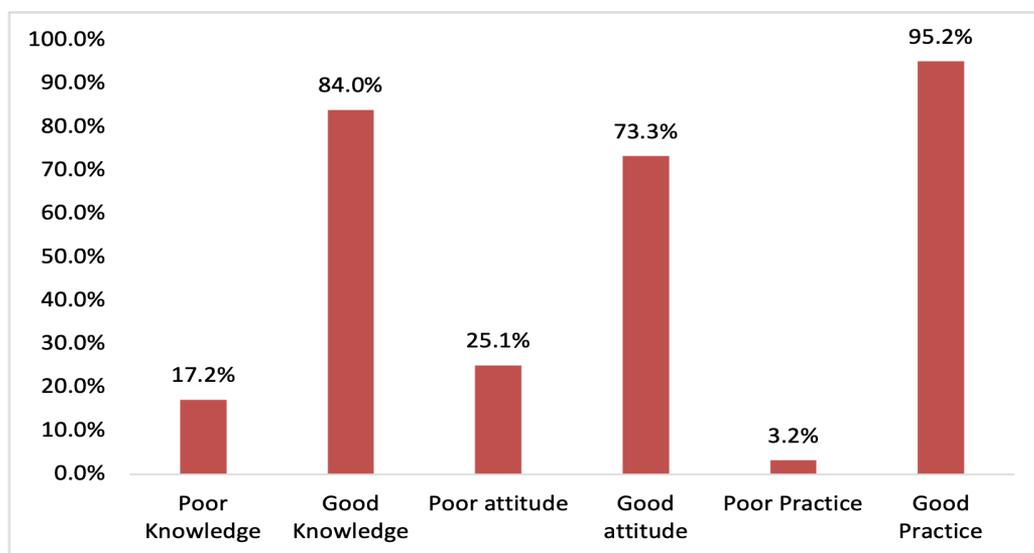


Figure 2: Post-intervention levels of knowledge, attitude and practice

Table 5: Association between socio-demographic characteristics and the knowledge about schistosomiasis

Demographics		Knowledge level		Total	X ²	OR (95%CI)	P-value
		Poor knowledge	Good knowledge				
Age	≤15	31 86.1%	231 86.8%	262 86.8%	0.015	0.93(0.342-2.577)	0.536
	>16	5 13.9%	35 13.2%	40 13.2%			
Gender	Male	20 54.1%	128 48.1%	148 48.8%	0.458	1.26(0.636-2.528)	0.308
	Female	17 45.9%	138 51.9%	155 51.2%			
Educational level	Primary 4	21 56.8%	96 36.1%	117 38.6%	7.313	0.610(0.271-1.372)	0.26
	Primary 5	6 16.2%	95 35.7%	101 33.3%			
	Primary 6	10 27.0%	75 28.2%	85 28.1%			
Ubudehe category	Category 1	3 8.1%	20 7.5%	23 7.6%	0.41	1.026(0.247-4.258)	0.98
	Category 2	9 24.3%	59 22.2%	68 22.4%			
	Category 3	17 45.9%	134 50.4%	151 49.8%			
	Category 4	0 0.0%	1 0.4%	1 0.3%			
	Don't know	8 21.6%	52 19.5%	60 19.8%			
School	GS.	18 48.6%	126 47.4%	144 47.5%	0.205	0.728(0.380-1.966)	0.9
	Nyiragiseke	9 24.3%	59 22.2%	68 22.4%			
	EP Mugina	10 27.0%	81 30.5%	91 30.0%			
	EP Kivusha	2 5.4%	0 0.0%	2 0.7%			
Sector	Gashora	2 5.4%	0 0.0%	2 0.7%	14.47	8.6(6.29-11.74)	0.015*
	Rweru	35 94.6%	266 100.0%	301 99.3%			

*Statistically significant at $p < 0.05$, OR: Odd ratio, CI: Confidence interval, X²: Value of the chi-square test statistics

(n=59).

Sanitation practices demonstrated substantial improvement. The proportion of participants always using toilets for defecation increased from 76.5% (n=261) to 89.8% (n=272), while occasional toilet use decreased significantly from 44.0% (n=150) to 13.2% (n=40).

Recreational water contact behaviors showed

remarkable changes. Swimming in water bodies decreased substantially, with those avoiding such activities increasing from 64.2% (n=219) to 92.7% (n=280).

Perhaps most significantly, water sourcing patterns showed a shift toward safer options. For drinking water, reliance on high-risk sources decreased substantially: lake water usage dropped from

Table 6: Association between socio-demographic characteristics and attitude about schistosomiasis

		Attitude level		Total	X ²	OR (95%CI)
		Poor attitude	Good attitude			
Age Category	≤15	189	68	257	0.75	0.695(0.305-1.582)
		85.5%	89.5%	86.5%		
	>16	32	8	40		
		14.5%	10.5%	13.5%		
Gender	Male	103	42	145	1.78	0.701(0.415-1.183)
		46.4%	55.3%	48.7%		
	Female	119	34	153		
		53.6%	44.7%	51.3%		
Educational level	Primary 4	90	23	113	2.58	0.613 (0.319-1.179)
		40.5%	30.3%	37.9%		
	Primary 5	72	28	100		
		32.4%	36.8%	33.6%		
	Primary 6	60	25	85		
		27.0%	32.9%	28.5%		
Ubudehe category	Category 1	16	7	23	1.59	0.361(0.718-2.485)
		7.2%	9.2%	7.7%		
	Category 2	50	16	66		
		22.5%	21.1%	22.1%		
	Category 3	113	35	148		
		50.9%	46.1%	49.7%		
	Category 4	1	0	1		
		0.5%	0.0%	0.3%		
	Don't know	42	18	60		
		18.9%	23.7%	20.1%		
School	GS. Nyiragiseke	101	38	139	0.88	1.33(0.718-2.485)
		45.5%	50.0%	46.6%		
	EP Mugina	50	18	68		
		22.5%	23.7%	22.8%		
	EP Kivusha	71	20	91		
		32.0%	26.3%	30.5%		
Sector	Gashora	1	1	2	0.63	0.33(0.021-5.493)
		0.5%	1.3%	0.7%		
	Rweru	221	75	296		
		99.5%	98.7%	99.3%		

OR: Odd ratio, CI: Confidence interval, X²: Value of the chi-square test statistics

33.7% (n=115) to 15.5% (n=47), and swamp water usage decreased from 13.2% (n=45) to 7.3% (n=22). Conversely, use of community water access points increased from 42.2% (n=144) to 50.5% (n=153).

Household water sourcing patterns similarly showed positive changes. Lake water usage for

household purposes decreased from 75.1% (n=256) to 58.7% (n=178), while utilization of community water access points increased from 10.0% (n=34) to 17.2% (n=52). Usage of household/neighbor water supply systems also showed an increase from 5.9% (n=20) to 10.9% (Table 4).

Table 7: Association between socio-demographic characteristics and practice about schistosomiasis

		Practice level		Total	X ²	OR (95%CI)	P-value
		Poor practice	Good practice				
Age Category	<=15	3	259	262	0.463	0.976(0.976-1.002)	0.652
		100.0%	86.6%	86.8%			
	>16	0	40	40			
		0.0%	13.4%	13.2%			
Gender	male	3	145	148	3.173	0.98(0.957-1.003)	0.115
		100.0%	48.3%	48.8%			
	female	0	155	155			
		0.0%	51.7%	51.2%			
Educational level	primary 4	1	116	117	2.642	2.795(0.249-31.338)	0.267
		33.3%	38.7%	38.6%			
	primary 5	0	101	101			
		0.0%	33.7%	33.3%			
	primary 6	2	83	85			
		66.7%	27.7%	28.1%			
Ubudehe category	category 1	0	23	23	10.471	1(0.0001-1.00)	0.033*
		0.0%	7.7%	7.6%			
	category 2	3	65	68			
		100.0%	21.7%	22.4%			
	category 3	0	151	151			
		0.0%	50.3%	49.8%			
	category 4	0	1	1			
		0.0%	0.3%	0.3%			
	don't know	0	60	60			
		0.0%	20.0%	19.8%			
School	GS.	2	142	144	1.304	0.944(0.084-10.591)	0.521
		66.7%	47.3%	47.5%			
	EP Mugina	1	67	68			
		33.3%	22.3%	22.4%			
	EP Kivusha	0	91	91			
		0.0%	30.3%	30.0%			

*Statistically significant at $p < 0.05$. OR: Odd ratio, CI: Confidence interval, X²: Value of the chi-square test statistics

The KAP scores: Post-intervention, the mean scores of the participants on the knowledge about the transmission, signs and symptoms, treatment, and prevention of schistosomiasis were 13.5 +3, with a minimum of 5 and a maximum of 17. The participants' mean scores on attitudes about schistosomiasis were 5.3 +1.7, with a minimum of 1 and a maximum of 9. The mean scores of the participants on the practice regarding schistosomiasis prevention were 10.2 +1.17, with a minimum of 5 and a maximum of 13. The study population demonstrated a robust

understanding, with 87.8% of participants exhibiting good knowledge levels, while only 12.2% showed poor knowledge. A significant majority of participants (73.3%) displayed good attitudes toward schistosomiasis, with only 25.1% showing poor attitudes. This stark contrast between knowledge and attitude levels indicates a potential disconnect between understanding the disease and developing positive attitudes towards prevention and control measures. Perhaps most surprisingly, the practice component showed exceptionally positive results, with an overwhelming 99% of

participants demonstrating good practices, and merely 1% showing poor practices (Figure 2).

Association between the socio-demographic characteristics and the knowledge, attitude, and practice of schistosomiasis:

Most participants (86.8%) were aged 15 years or younger. Age showed no significant association with knowledge ($X^2=0.015$, $OR=0.93$, $p=0.536$), attitudes ($X^2=0.75$, $OR=0.695$, $p=0.254$), or practices ($X^2=0.463$, $OR=0.976$, $p=0.652$). Gender distribution, educational level, and all of these sociodemographic characteristics showed no association with KAP domains. Socioeconomic status showed a significant association only with practices ($X^2=10.471$, $OR=1.00$, $p=0.033$). Participants attended GS. Nyiragiseke (47.5%), EP Kivusha (30.0%), and EP Mugina (22.4%), with no significant associations across KAP domains. The geographical sector showed significant associations in knowledge ($X^2=14.47$, $OR=8.6$, $p=0.015$) and practices ($X^2=201.33$, $OR=3001$, $p=0.001$), with 99.3% of participants from the Rweru sector, though showing no significant association with attitudes ($X^2=0.63$, $OR=0.33$, $p=0.446$) (Tables 5, 6 and 7).

DISCUSSION

School-based interventions for schistosomiasis control have gained increasing attention worldwide, with storytelling emerging as an innovative educational approach. This study, conducted in three schools demonstrates remarkable success in transforming knowledge, attitudes, and practices (KAP) regarding schistosomiasis through storytelling interventions.

The baseline survey indicated a generally low level of awareness, poor attitude, and poor practice; the results were almost similar to Botswana, Tanzania, and many other sub-Saharan African countries [15–17]. The intervention achieved extraordinary improvements in disease awareness, from 14.7% to 98.3%, surpassing results from similar studies in Tanzania, where awareness increased to 85.6% [18]. Notably, the emergence of parents as primary information sources (3.2% to 96.0%) reflects a unique aspect of the Rwandan intervention, contrasting with studies in Uganda, where school-based education remained the primary information channel [19]. However, the study conducted in Ethiopia about schistosomiasis prevalence, a

systematic review showed that certain regions in the south experience high rates of 25.9%, suggesting that targeted treatment and control strategies remain essential for further reduction of the disease burden.

Another major difference between articles on schistosomiasis, especially in low-resource settings, was that one of the major challenges was to specifically predict if the reduction in prevalence rate was attributed to the education strategies or other implemented strategies nationally. Furthermore, the comprehensive improvement in understanding transmission routes (water contact risks increasing from 3.8% to 92.1%) parallels findings were reported by Anyolitho et al., where 98% of the participants knew the modes of transmission [20]. Similarly, symptom recognition improvements (abdominal pain awareness: 8.2% to 84.5%) contrast with results from Botswana, where a big number of children didn't know that bloody urine is a symptom of this disease [15].

The study revealed interesting attitude shifts, with increased risk perception (52.0% to 72.1%) accompanied by decreased fear levels (82.0% to 71.5%), indicating good attitude levels. This balanced outcome contrasts with the findings of Alemu [21]. The maintained high willingness to discuss the disease (96.0% to 96.6%) reflects successful destigmatization, similar to results from Ethiopian school-based programs [22].

The intervention's impact on practices was particularly noteworthy. The reduction in high-risk water contact (swimming decreased from 35.8% to 7.3%). Previous theories from Tanzania [18] and Uganda [20] also showed some similarities. Sanitation practices showed remarkable improvement, with regular toilet use increasing from 76.5% to 89.8%, comparable to WASH intervention outcomes in Swaziland [14].

The study's finding of significant associations between socioeconomic status (Ubudehe category) and practices ($p=0.033$), but not with knowledge or attitudes, contrary to observation by Alemu et al., where the male gender was also associated with the awareness level [21]. The lack of gender-based differences contrasts with findings from Swaziland schools, where gender significantly influenced both knowledge and practices [14].

This study also has limitations. One major limitation is that some variables in practice rely on self-reporting responses, which are subject to social desirability bias. The lack of objective

verification methods limits the reliability of these practice-related findings. Secondly, the study experiences an attrition rate of approximately 11%, with 38 participants lost to follow-up between baseline and endline. This can raise concern about potential selection bias, particularly if those who dropped out differed systematically from those who remained. Such limitations should be considered when interpreting the study's conclusions and generalizability. The behavioral findings should be understood within the Rwandan context, where these reported results could normally be expected as positive behavior changes due to other health-promoting initiatives, such as campaigns encouraging shoe-wearing, which were not explored in this study.

CONCLUSION

This study demonstrates that storytelling-based interventions can be remarkably effective in improving schistosomiasis-related knowledge, attitudes, and practices among school children in Rwanda. The intervention achieved exceptional results across multiple dimensions, with knowledge improvements. This psychological equilibrium, combined with maintained high levels of disease discussion willingness, suggests that storytelling can effectively address both educational and emotional aspects of disease prevention.

Behavioral changes were particularly impressive, with substantial reductions in high-risk water contact and improved sanitation practices exceeding outcomes from conventional educational approaches. While socioeconomic status showed significant correlation with practices, the intervention's effectiveness across gender groups suggests its potential for broad-based implementation. Future research should explore the long-term sustainability of these behavioral changes and the potential for scaling this approach to other endemic regions.

Availability of data and materials: Obtained from the corresponding author upon reasonable request.

Author contributions: BB and NY conducted the study proposal development, BB, NY and EN collected the data. BB, DN and ET participated in the data analysis. All the authors contributed to the manuscript writing and review under the guidance of LN and DN.

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Levels of Language Communication Abilities in Children and Adolescents with Down Syndrome Attending Three Selected Special Schools in Kigali as Perceived by Parents, 2024

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ABSTRACT

INTRODUCTION: Down Syndrome is a genetic disorder commonly associated with low cognitive development, oral motor anomalies, and hearing issues, all of which contribute to language communication challenges. This study aimed to determine the levels of language communication abilities, including comprehension, production, and pragmatics, among children and adolescents with Down Syndrome attending three selected special schools in Kigali as perceived by parents.

METHODS: A quantitative cross-sectional study enrolled 40 participants from three special schools in Kigali. Descriptive statistics summarized demographics and language abilities. Pearson's Chi-square and Fisher's exact tests assessed associations between age groups and pragmatics, comprehension, production, and examined gender differences across defined age categories in children.

RESULTS: The results indicate that the majority of children and adolescents (n=16, 40%) were classified at Level 1 (Mild) for language comprehension. In terms of language production, most 14 (35%) children and adolescents were at Level 4 (Moderate-Severe). For language pragmatics, most 17 (42.5%) children and adolescents fell into Level 5 (Severe). Statistically significant differences were observed in language production between the 5–12 and 13–17 age groups ($p=0.05$). Similarly, significant differences in language pragmatics were found between the 5–12 and 13–17 age groups ($p=0.01$).

CONCLUSION: This study highlights the varying levels of language communication abilities among children and adolescents with Down Syndrome. These findings underscore the need for targeted interventions to enhance language skills in individuals with Down Syndrome, mainly the need for speech and language therapy, as supported by evidence, to be an effective management strategy.

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INTRODUCTION

Down Syndrome is one of the most prevalent neurodevelopmental genetic disorders in children, and it is the most frequent genetic cause of intellectual disability [1]. The symptoms for children with Down Syndrome include developmental motor and language delay, specific verbal memory problems, and general cognitive deficiencies. Additionally, comorbidities are more likely to affect children with Down Syndrome, worsening their cognitive deficiencies [1].

Worldwide, there is an increase in the number of people with Down Syndrome, including children, where statistics show that the incidence of children with Down Syndrome is one in 1000 births [2]. There is, however, little information available on its frequency in Africa; Huete-García and Otaola-Barranquero [3], in a systematic review of Demographic assessment of down syndrome found that in South Africa and Nigeria 1 in 865 live births are impacted, with prevalence ranging from 1.33 to 1.8 per 1000 live births. The prevalence of Down Syndrome in Rwanda is underreported [4]. Children with Down Syndrome can have improved quality of life when the interventions are provided as early as possible [5].

Almost all people with Down Syndrome struggle to communicate normally due to low cognitive development, oral motor anomalies, and hearing issues [6]. Impairments in the development of nonverbal communication behavior may result in fewer opportunities for experiencing contingent relationships and are strong predictors of caregiver response. Thus, the parents may not view their children as social interaction partners [7]

There have been contradictory reports about the receptive vocabulary abilities of people with Down Syndrome. A study by Onnivello et al [8] emphasized that children and teenagers with Down Syndrome understand spoken words at a level similar to that of children typically developed without Down Syndrome.

However, the comparative study on nonverbal communication skills in children with Down syndrome showed that the Down Syndrome group revealed a significant impairment in the expressive language score but not in the receptive language measure [9]. Children with Down Syndrome may have trouble expressing themselves effectively in unfamiliar situations and with new people if they struggle to use context. This could be especially

difficult when they start school and are exposed to different contexts [10]. Furthermore, it is important to educate children with Down Syndrome on pragmatic communication skills in addition to language form and content [10]. A systematic review carried out by Seager et al. [11] highlighted that language proficiency at school entry is a strong predictor of future academic and psychosocial outcomes in typically developing children. Given this, limited language skills could similarly impact the educational and social outcomes of children with Down Syndrome. Despite the critical role of communication, there is a lack of data on this aspect in children with Down Syndrome in Rwanda. This study provided the baseline information on aspects of language communication abilities of children and adolescents with Down Syndrome in special schools. This will enhance the understanding within special school settings and inform targeted interventions to address identified challenges. The aim of this study was to explore the language communication abilities of children and adolescents with Down Syndrome attending three selected special schools in Kigali, as perceived by their parents. Specifically, it examined parental perceptions of language comprehension, expressive abilities, and pragmatic use of language. The study also investigated the relationship between age groups and language communication levels.

METHODS

Study Design

This was a cross-sectional quantitative study. The cross-sectional study is conducted at a single point in time and is a reasonably time and resource-efficient strategy [12].

Study Setting

The study settings were three special schools: Special school is defined as a school for children who have physical or learning problems [13]: Home of the Virgin of the Poor (HVP), Gatagara, Gikondo, Heroes Day Care Center, and Izere Mubyeyi Organization. HVP Gatagara Gikondo is the branch of HVP Gatagara located in the Kicukiro district that delivers medical and health services, but it also has special schools that have children with intellectual challenges and limitations in everyday activities, including class participation [14]. Heroes Day Care Center is a

special school for non-governmental organizations located in the Gasabo district. It delivers a variety of services to children with disability, including Down Syndrome [15]. Izere Mubyeyi is a non-profit organization in the community of Kicukiro district that gathers children with disability and provides special needs, including education and class participation [16].

Study Participants and Eligibility Criteria

The study included parents and caregivers of children and adolescents with Down Syndrome aged between 5 and 18 years, all attending the selected special schools. The age range of 5 to 18 years was chosen because children typically develop foundational language skills by age 5 [17], while age 18 marks the end of adolescence [18]. This criterion ensured that children and adolescents were within a critical developmental period for assessing language communication abilities. During the participant selection phase of the study, children and adolescents with Down syndrome were identified across all designated study sites. This identification process was conducted in collaboration with the school administration delegate. Once eligible children and adolescents were identified, the research team recorded the contact details, specifically the addresses of their parents or primary caregivers. This information was essential for establishing communication, obtaining informed consent, and data collection. The entire selection and recruitment process is illustrated in detail in the accompanying Figure 1 below, which outlines each step of the participant inclusion.

Sampling Approach

A total population sampling, also known as a

census, was employed, and this is a sampling technique in which all people who fulfill the inclusion criteria are recruited for the study, and is primarily used in situations where the cases being examined are limited [19]. Therefore, each participant who met the criteria and was willing to participate was included, making 40 participants in total.

Data Collection Tool

The Functional Communication Measure (FCM) tool was utilized as the primary instrument for data collection. “The tool comprises three key components: language comprehension, language production, and language pragmatics. It employs a seven-level rating scale to assess communication abilities, ranging from Level 0, which represents independence, to Level 6, indicating profound difficulty. The levels are defined as follows: Level 0 (Independent), Level 1 (Mild), Level 2 (Mild-Moderate), Level 3 (Moderate), Level 4 (Moderate-Severe), Level 5 (Severe), and Level 6 (Profound)” [20]. The researcher assessed each child's communication abilities based on the responses provided by their parents or caregivers and assigned scores using the grading scale of the Functional Communication Measure (FCM) tool. The Functional Communication Measure (FCM) tool demonstrates strong psychometric properties. Its internal reliability is evidenced by a high Cronbach's alpha of 0.90. The test-retest reliability, reflecting consistency over time, is supported by an intraclass correlation coefficient (ICC) of 0.94 with a 95% confidence interval. Additionally, the interrater reliability, indicating agreement among different raters, shows an ICC of 0.73 with a 95% confidence interval. Significant results were observed regarding validity between

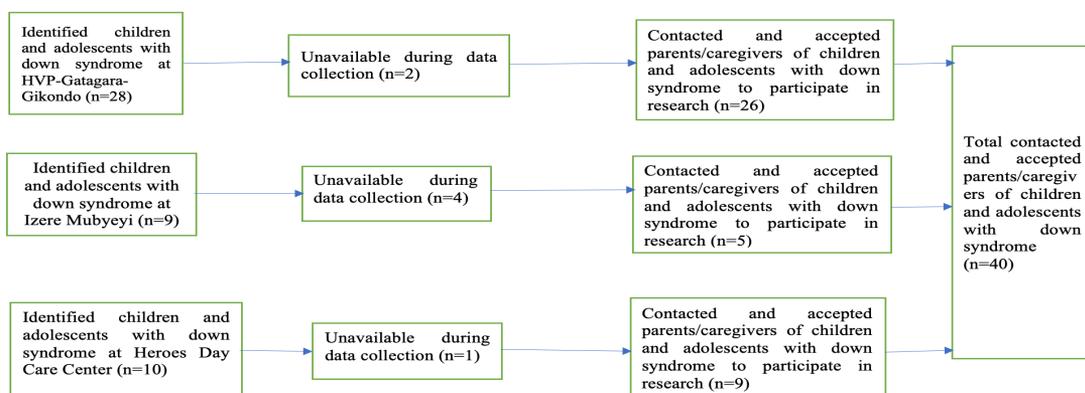


Figure 1: Flowchart for the selection process of participants

initial and repeat testing, meeting at least the 0.05 significance level [21].

Procedures of Data Collection

After obtaining ethical approval and permission from the identified study sites, the researcher received contact information for parents of children and adolescents with Down Syndrome from the schools' records. One available parent or caregiver per child was then approached, either in person or over the phone, with confidentiality maintained throughout. They were given consent forms to sign when they agreed, indicating their willingness to participate. Informed consent was obtained from all participants, either written or verbal. Following this, parents or caregivers were asked questions about their child's communication abilities based on the data collection tool.

Data Analysis

Data analysis was conducted using SPSS version 21 (IBM Inc., NY, USA). Descriptive statistics were used to summarize demographic data, including school, age group, gender, and three language communication components, namely: comprehension, production, and pragmatics. To evaluate statistical significance, Pearson's Chi-Square and Fisher's exact tests were applied to assess associations between age groups (5–12, 13–17 years) and language communication abilities (pragmatics, comprehension, production). The association of gender and language communication abilities was also determined. The level of significance was set to be $p \leq 0.05$.

Ethical Consideration

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of the University of Rwanda, College of Medicine

and Health Sciences, under the reference number CMHS/IRB/142/2024. Permission to access contact information for parents or caregivers of children or adolescents with Down Syndrome was sought from the relevant study settings through formal request letters. Parents and caregivers of the children and adolescents were approached to take part in the study. The purpose of the study was clearly explained to them, and they were assured that their personal information would be kept private and confidential. Since the children and adolescents had cognitive impairments and could not give their own assent forms, the researchers asked for permission from their parents or caregivers instead. Participation was completely voluntary, and consent was given freely. The researchers made sure to treat all children and adolescents with respect and followed the principles of care, fairness, and protection throughout the study. Participants were encouraged to ask questions or share any concerns at any time before, during, or after the study. They were also told that they could stop participating at any point without facing any negative consequences. It was made clear that there were no direct benefits or risks from being part of the study. The study followed ethical guidelines based on the Declaration of Helsinki to ensure the rights and well-being of all participants were protected [22].

RESULTS

Demographic characteristics

Table 1 presents the demographic characteristics of children and adolescents with Down Syndrome. The majority of children and adolescents attended HVP-Gatagara Gikondo 26 (65%), followed by Heroes Day Care Center 9 (22.5%) and Izere Mubyeyi 5 (12.5%). The number of children 5-12

Table 1: Demographic information of children and adolescents with Down Syndrome

	Variables	Frequency (n)	Percentage (%)
Special Schools	Izere Mubyeyi	5	12.5
	Heroes Day Care Center	9	22.5
	HVP Gatagara Gikondo	26	65
Age range	5-12	27	67.5
	13-17	13	32.5
Gender	Male	18	45
	Female	22	55

Table 2: Parents' perceived response on language comprehension, language production, and language pragmatics of their children with down syndrome

	Variables	Frequency (n)	Percentage (%)
Language Comprehension	Level 0: Independent	4	10
	Level 1: Mild	16	40
	Level 2: Mild-Moderate	14	35
	Level 3: Moderate	2	5
	Level 4: Moderate-Severe	3	7.5
	Level 5: Severe	1	2.5
Language Production	Level 1: Mild	1	2.5
	Level 2: Mild-Moderate	5	12.5
	Level 3: Moderate	9	22.5
	Level 4: Moderate-Severe	14	35
	Level 5: Severe	5	12.5
	Level 6: Profound	6	15
Language Pragmatics	Level 2: Mild-Moderate	3	7.5
	Level 3: Moderate	10	25
	Level 4: Moderate-Severe	8	20
	Level 5: Severe	17	42.5
	Level 6: Profound	2	5

years old was 27 (67.5%), and adolescents were 13 (32.5%). The females accounted for 22 (55%), and the males accounted for 18 (45%) (Table 1).

Parents' perceived responses to language comprehension, language production, and language pragmatics

Table 2 summarizes the findings on language comprehension, production, and pragmatics among children and adolescents with Down Syndrome. The results indicate that the majority of children (n=16, 40%) and adolescents were classified at Level 1 (Mild) for language comprehension. In terms of language production, most 14 (35%) children and adolescents were at Level 4 (Moderate-Severe). For language pragmatics, the largest group, 17 (42.5%) children and adolescents, fell into Level 5 (Severe).

Association between age groups and language comprehension, production, and pragmatics

The study found no significant difference in language comprehension between age groups (5-12 years and 13-17 years), and in all language communication between male and female children. However, there was a significant difference in language production between the two age groups ($p=0.05$), and there was also a significant

difference in language pragmatics between the two age groups ($p=0.01$) (Table 3).

DISCUSSION

This study assessed the perceived levels of language comprehension, production, and pragmatic abilities among children and adolescents with Down Syndrome attending selected special schools in Kigali. The findings offered valuable insights into the language communication abilities of children with Down Syndrome and explored the associations between demographic information and language communication.

The results revealed that the majority 16 (40%) children and adolescents were classified at Level 1 (Mild) for language comprehension meaning that they comprehend 80-90% of conversation in broad contexts, minimal errors are noted in understanding of language structures (semantic, syntactic, morphologic, pragmatic), minimal errors are noted in phonological awareness and/or metalinguistic skills and is a full conversational participant. This is consistent with findings from Deckers et al. in a study titled 'Predictors of receptive and expressive vocabulary development in children with Down syndrome [23]. Receptive vocabulary (language comprehension) is often

Table 3: Association between language communication and demographic information of children and adolescents with Down syndrome

Variables		Language Comprehension							X ²	P-Value
		Level 0: Independent	Level 1: Mild	Level 2: Mild- Moderate	Level 3: Moderate	Level 4: Moderate-Severe	Level 5: Severe	Total		
Age,	Age 5–12	2	11	9	1	3	1	27	2.84	0.82
years	Age 13–17	2	5	5	1	0	0	13		
Sex	Male	2	7	5	2	2	0	18	4.37	0.56
	Female	2	9	9	0	1	1	22		
Variables		Language Production							X ²	P-Value
		Level 1: Mild	Level 2: Mild- Moderate	Level 3: Moderate	Level 4: Moderate- Severe	Level 5: Severe	Level 6: Profound	Total		
Age,	Age 5–12	0	1	6	10	5	5	27	10.41	0.05
years	Age 13–17	1	4	3	4	0	1	13		
Sex	Male	0	2	2	7	3	4	18	4.48	0.52
	Female	1	3	7	7	2	2	22		
Variables		Language Pragmatics							X ²	P-Value
		Level 2: Mild- Moderate	Level 3: Moderate	Level 4: Moderate-Severe	Level 5: Severe	Level 6: Profound	Total	Total		
Age,	Age 5–12	0	6	4	15	2	27	11.89	0.01	
years	Age 13–17	3	4	4	2	0	13			
Sex	Male	2	4	3	9	0	18	2.92	0.63	
	Female	1	6	5	8	2	22			

p<0.5: Statistically significant

relatively stronger compared to expressive language, but still significantly delayed compared to typically developing peers. This supports prior research indicating that spoken language comprehension in individuals with Down Syndrome is often comparable to that of typically developing peers matched for mental age [7,9]. However, a study conducted by Witecy and Penk [24], on language comprehension in children, adolescents, and adults with Down syndrome, has shown that on standardized tests of receptive vocabulary, children and adolescents with Down Syndrome tend to perform more poorly than younger, nonverbal, mentally age-matched peers. This aligns with the study findings, suggesting a spectrum of comprehension ability within the Down Syndrome population (some individuals perform on par with their mental-age peers, while others lag behind). Nonetheless, the majority demonstrate relatively strong comprehension skills, indicating that comprehension is less impaired than other domains of language. While comprehension challenges exist, they appear less pronounced than those related to language production. Regarding age-related differences, the study found no statistically significant difference in Language comprehension between children 5–12 years and adolescents 13–17 years.

Language production was found to be significantly impaired in the study population; most 14 (35%) children and adolescents were at Level 4 (Moderate-Severe), which means they communicate basic needs in routine contexts; Self-monitoring is evident approximately 25% of the time. These results are in agreement with prior research in a systematic review of speech, language, and communication interventions for children with Down syndrome from 0 to 6, showing that children with Down Syndrome often struggle across multiple facets of speech production [11]. Although children with Down Syndrome typically begin to babble at expected ages, they tend to experience delays in producing clear, intelligible single words compared to their typically developing peers [11,24]. Notably, there was a statistically significant difference in production abilities between children aged 5–12 years and adolescents aged 13–17 years. These findings suggest a trend of age-related improvement in language production among children and adolescents with Down Syndrome, further reinforcing the importance of ongoing

support and training throughout development. Pragmatic language skills were the most impaired domain, the largest group 17 (42.5%) children and adolescents fell into Level 5 (Severe) meaning the child can initiate and/or respond to communication approximately 25% of the time, even in familiar settings with a familiar communication partner; may whine or abandon topic and interaction if not immediately understood, requires encouragement to maintain interaction, maximum dependence on communication partner. These findings are consistent with those of Smith [25], who reported significantly lower pragmatic language scores among children with Down Syndrome when compared to typically developing peers across various subdomains. Particularly notable were difficulties in understanding social context and engaging in reciprocal communication. Significant differences were found in pragmatic abilities between age groups. Adolescents aged 13–17 exhibited stronger pragmatic skills than children in the 5–12 years groups. These improvements with age suggest a natural progression in social communication abilities. Older children were better able to interpret context, take conversational turns, and maintain dialogue. Moraleda et al. [10] noted that while language communication abilities in individuals with Down Syndrome may improve with age, early difficulties, especially in pragmatics, tend to persist. Smith [25] also found that pragmatic communication deficits are evident from early childhood, with distinct language profiles emerging by age six.

The systematic review by Moraleda et al. [26], on Language Intervention in Down Syndrome, found that speech and language therapy substantially improves communication skills among individuals with Down Syndrome. Therefore, the health institutions in Rwanda, especially RBC and concerned schools and their partners, need to establish and expand access to professional speech and language therapy services in Rwanda. This includes integrating speech therapy into special education programs, training more local speech-language pathologists, and developing context-specific intervention programs tailored to the needs of individuals with Down Syndrome. Additionally, promoting social interaction, early intervention, and inclusive educational opportunities should be prioritized within national policies to support holistic language development and enhance long-term communication outcomes.

This study is the first of its kind in Rwanda to investigate perceived language communication abilities in children and adolescents with Down Syndrome. It provides crucial baseline data to inform interventions and policy development. However, the findings are not generalizable to the national level due to the study's small sample size and limited geographic coverage. Additionally, data were primarily based on parent or caregiver reports, which may introduce reporting bias. Future research should include direct assessments of language abilities and involve larger, more diverse samples to capture a national perspective.

CONCLUSION

The study found that language production and pragmatic abilities in children and adolescents with Down Syndrome improve with age, particularly during adolescence. While comprehension appears relatively preserved, production and pragmatic skills remain areas of concern, especially during early childhood. Speech and language therapy is supported by evidence to be an effective management strategy, though it remains underdeveloped in Rwanda. The study emphasizes the pressing need for coordinated efforts among key stakeholders to enhance support for children and adolescents with Down Syndrome in special schools. It calls on the Ministry of Education to prioritize the development of speech-language pathology services through targeted capacity-building initiatives. At the same time, special school administrations are encouraged to adopt early, sustained, and holistic interventions encompassing social interaction and inclusive learning environments. Equally important is the active involvement of parents, whose consistent support and collaboration are vital in reinforcing language development and fostering meaningful progress both at school and at home. A national commitment to expanding these services is essential to address communication challenges and foster inclusive growth for individuals with Down Syndrome across Rwanda.

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Author's contributions

G.D and H.M, worked on the idea conception, overall supervision and final approval of the version to be submitted for publication, design, data analysis and interpretation, writing of the manuscript, and approval of the version to be submitted. N.J, B.P, N.P.M and N.F contributed to the manuscript writing and editing, and approval of the version to be submitted.

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The Use of Seasonality Data Analysis for Decision-making for Improved Maternal Health in Rwanda, 2025

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ABSTRACT

INTRODUCTION: Rwanda's high coverage of facility-based deliveries and strong routine health information systems provide a unique opportunity to examine seasonal patterns in maternal and newborn health service utilization and translate these findings into actionable health system planning.

METHODS: National routine data on health facility deliveries, Bacillus Calmette–Guérin (BCG) vaccination, and first antenatal care visits (“new registrations”) were extracted from the Health Management Information System (DHIS2) for financial years 2012/13–2024/25. Monthly totals were aggregated at the national level and analysed descriptively using visual inspection of trends and calculation of five- and ten-year monthly averages to identify recurring seasonal patterns.

RESULTS: Clear and consistent seasonality was observed in health facility deliveries and BCG vaccination across the thirteen-year period. Deliveries were substantially lower than the monthly average in January (–2,354 deliveries) and markedly higher in May (+2,866 deliveries), with BCG vaccination closely mirroring this pattern. In contrast, first antenatal care visits demonstrated a different seasonal distribution, with higher-than-average registrations in January and lower attendance between July and September, indicating misalignment between early antenatal attendance and subsequent peak delivery periods.

CONCLUSION: The findings support targeted, low-cost interventions, including the strategic scheduling of maternity staff leave and training, adjustments to supply-chain ordering practices, refinements of data quality outlier detection tools, and intensified sensitization for early antenatal care during optimal periods. Routine seasonality analysis should be integrated into evidence-based planning to strengthen maternal and newborn health outcomes.

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INTRODUCTION

Seasonality of malaria and other vector-borne diseases, as well as conditions linked to nutrition, is well documented [1,2]. Seasonality of maternal

and child health indicators is less well researched. Maternal and child mortality are key indicators used to track progress in improving maternal and child health towards the global health targets, such as the Sustainable Development Goals (SDG),

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particularly SDG 3 [3]. To meet these targets, evidence-based interventions that are context-specific are required. Correct interpretation of available data is an important starting point [4].

Rwanda is a landlocked country in Central/East Africa with a population of 14.1 million [5]. Rwanda has made significant improvements in maternal and child health in the past twenty years. The Rwanda Demographic Health Surveys show a steep decline in both maternal and child mortality [6]. However, ambitious national targets, as outlined in the Health Sector Strategic Plan (2024/25-2028/9) [6], aim to reduce maternal mortality to 60 per 100,000 live births and under-five child mortality to 20 per 1,000 live births by the end of 2029 [7].

The Demographic Health Surveys are conducted every five years in Rwanda [8]. Meanwhile, routine data is collected from health facilities. The platform used since 2012 to manage routine health data is DHIS2. This data system enables the analysis of trends in key indicators, which have been tracked for the past thirteen years. Measures are taken to improve data quality, both formally in Data Quality Reviews and informally through communication between the Monitoring and Evaluation Units and those entering data into the system at the peripheral level. The World Health Organisation (WHO) Data Quality Tool has been uploaded onto the DHIS2 platform and is used by data managers to monitor for data entry errors.

The objective of this study was to provide evidence-based recommendations to improve maternal outcomes in Rwanda. The specific objective was to determine the seasonality patterns of delivery, BCG vaccine, and prenatal services in Rwanda from financial years 2012/13 to 2024/25, from which to base the recommendations.

METHODS

Study Design and Setting

The study was conducted in Rwanda due to the good quality of routine data [9] and high health facility delivery rates [10].

Data Source

The data source was the Rwanda Health Management Information System. The data elements selected for the study were Health facility deliveries, BCG vaccination, and New Registrations. These data elements received

good quality performance review scores in recent years, i.e., less than a five percent discrepancy between register entries and Health Management Information System (HMIS) reports. Health facility delivery and BCG national rates are over 95% [10]. BCG vaccinations are given at birth, before the mother and baby are discharged from the hospital after delivery. This implies a close link between BCG vaccination and health facility delivery. The indicator "*New Registration*" refers to the first antenatal visit a woman attends during her pregnancy.

Data Collection Tools and Procedures

Data for each indicator were downloaded from the District Health Information System 2 (DHIS2) into Excel for the financial years 2012/13 -2024/25. The DHIS2 is the platform used in Rwanda to collect and store health data for the Health Management Information System. The total number for each service (antenatal care, deliveries, and BCG vaccination) for each month from 2012/13 to 2024/25 was downloaded from DHIS2. The total number of services provided nationally for this entire period is included.

Data Analysis

The data was aggregated at the national level for each financial year. The financial year in Rwanda begins on July 1st and ends on June 30th. Microsoft Excel was used to create a separate worksheet for each indicator. Data was inserted in the relevant column for the month and year. Line graphs were generated, with one line representing each year, to support the interpretation of the results. The analysis was by visual inspection. Both five and ten-year average monthly values were calculated per indicator.

Ethical Considerations

This study used secondary data from the Health Management Information System. This data does not have any individual patient details. The study was conducted as a routine evaluation by the officers responsible for data management and interpretation.

RESULTS

The trends in each of the three indicators, Health Facility Deliveries, BCG vaccination, and New Registrations, are presented in two graphs, one from 2012/13-2018/19 and the other from 2019/20-

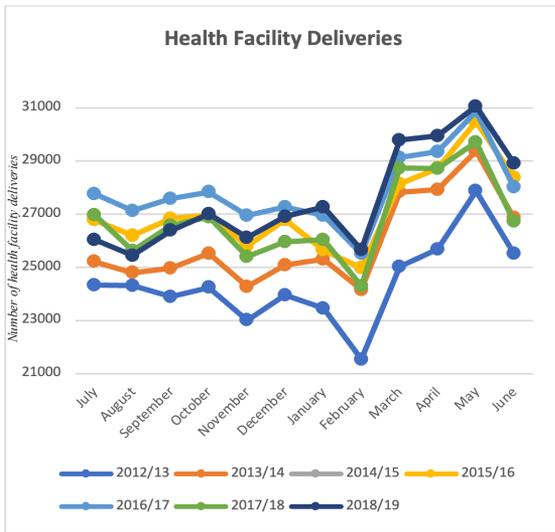


Figure 1: Number of health facility deliveries FY2012/13-FY2018/19 (Source: HMIS)

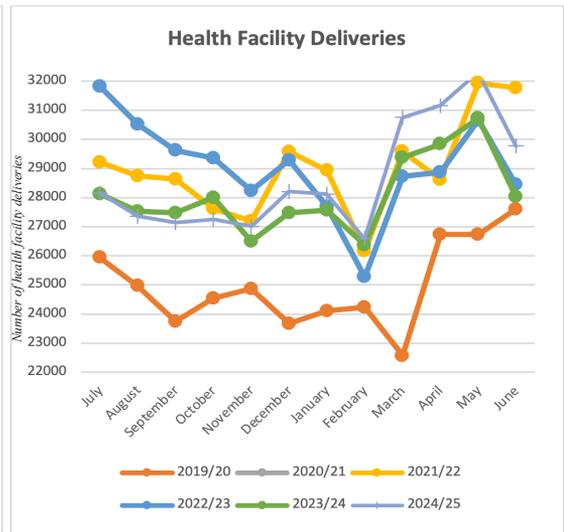


Figure 2: Number of health facility deliveries FY2019/20-FY 2024/25 (Source: HMIS)

2024/25. The graphs combining all ten years were found to be too congested.

Health Facility Deliveries

The monthly average number of health facility deliveries over the thirteen years was 27,357. In February, there were an average of only 25,003 deliveries during the same time period, 2,354 fewer deliveries than expected. In May, there were an average of 30,223 deliveries from FY 2012/13 to 2024/25. This is 2,866 more deliveries than expected. The pattern was consistent for both February and May compared to other months throughout the thirteen years. The trend is shown

in Figures 1 and 2.

As expected, the seasonality pattern of BCG vaccination was similar to that of Health Facility Deliveries, since babies are vaccinated before they and their mothers are discharged post-delivery. Babies who do not live long enough to be vaccinated and multiple pregnancies (twins, triplets, etc.) are not taken into account in this study. Figures 3 and 4 show the same trends as health facility deliveries.

Antenatal Care Visits

The antenatal care visits are presented by the data

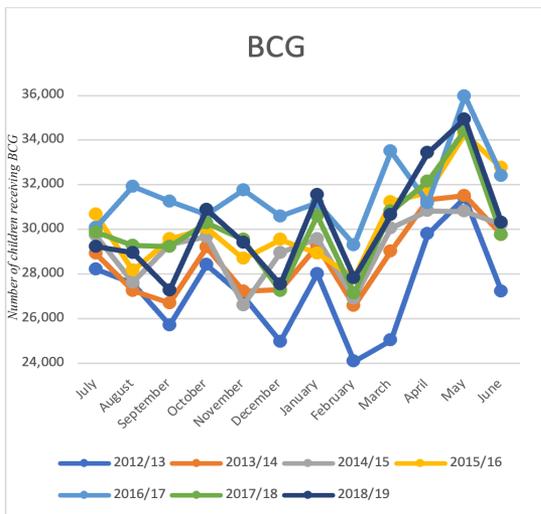


Figure 3: Number of children receiving BCG vaccine FY2012/13-FY2018/19 (Source: HMIS)

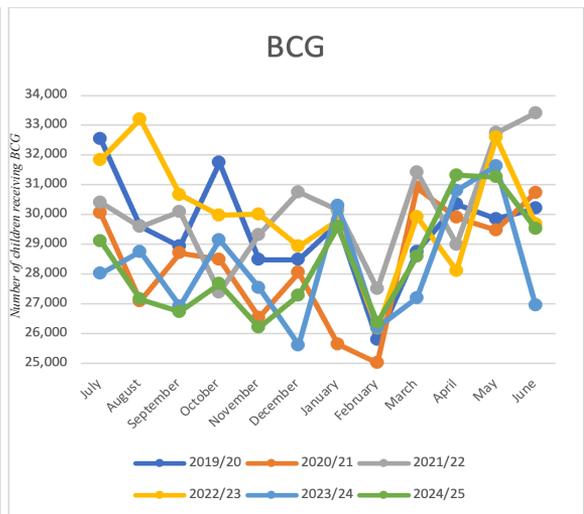


Figure 4: Number of children receiving BCG vaccine FY 2019/20-2024/25 (Source: HMIS)

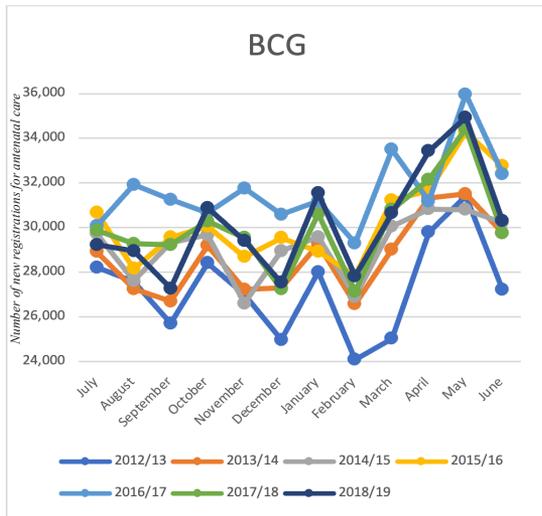


Figure 5: Number of new registrations for antenatal care FY2012/13-FY2018/19 (Source: HMIS)

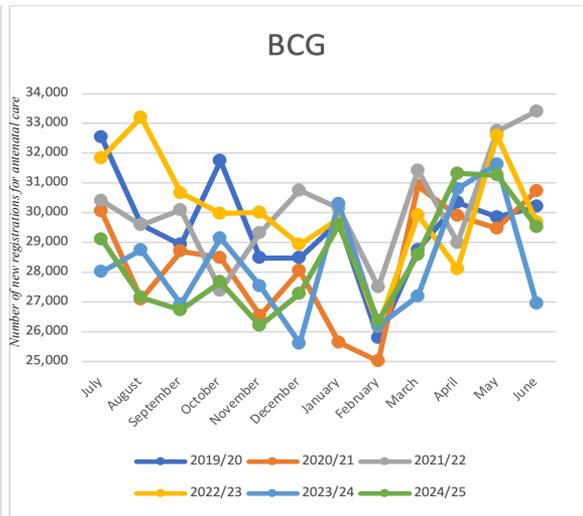


Figure 6: Number of new registrations for antenatal care FY2019/20-FY2024/25 (Source: HMIS)

element New Registrations. The average number of New Registrations over the thirteen years was 31,547. A seasonal pattern was observed. There was a high prenatal registration in January, with 5,143, above the monthly average for the time period. Lower-than-average registrations were found in July, August, and September (1,854, 1,632, and 1,678, respectively, below the monthly average for FY2012/13-2024/25). This seasonal trend does not follow the same pattern as deliveries, if first antenatal visit was in the first trimester of pregnancy as recommended by the WHO. Figures 5 and 6 show the seasonality trends for antenatal care for FY2012/13 to FY2024/25

DISCUSSION

The results of the seasonality analysis clearly showed seasonal trends in health facility deliveries in Rwanda. As expected, the number of newborns vaccinated for BCG follows the same seasonal patterns. However, a higher first antenatal visit would be expected in September to November, aligning with the seasonality pattern of deliveries. This is not observed in the data from 2012/13 to 2024/25. The consequences of these seasonality patterns for health system management and the introduction of interventions are discussed in this section.

The first consequence is related to health workers in maternity units. Health Centres and hospitals in Rwanda have a fixed number of staff per cadre recommended for each type of health facility. Not

all those positions are filled. Staff contracts provide for one month of leave per year. In addition to annual leave, staff may be granted days off for sickness and personal reasons, such as attending funerals. In addition to these absences, Non-Governmental and International Organisations offer off-site training to staff. The facilitators for these trainings are often drawn from the senior obstetricians and midwives working on the wards of hospitals. The Ministry of Health also invites senior obstetricians and other maternity staff to workshops, meetings, and training sessions. The results from this study suggest that permission for staff leave and training/meetings from maternity units in health centres and hospitals should be scheduled to avoid the high workload months of April to June, in favour of January and February.

In Rwanda, almost a quarter of deliveries are conducted by Caesarean Section [10]. These are performed in the District, Referral, and Teaching Hospitals, as well as a few selected health centers. Over half of maternal deaths in Rwanda occur post-cesarean section [10]. The need to consider the timing of leave and trainings/meetings for staff involved in Caesarean sections during peak delivery months is, therefore, even more crucial. In addition, the results suggest that non-urgent major surgeries should be planned outside the peak delivery months, particularly in May, to reserve the operating theatres for Caesarean Sections whenever possible.

Another consequence relates to the supply chain. Systems recommended for ordering supplies are

typically based on the consumption of medicines and supplies for the previous three months. The Logistics Management Information System “can generate a summary report and a requisition order with suggested replenishment quantities” [10]. If these recommendations are followed to order supplies for the maternity units from April to June, i.e., using the consumption of the months January to March, shortages of essential medicines and supplies are likely to occur.

Another health system that will be affected by the seasonality of Mother and Child Health Indicators is the monitoring of data quality. The World Health Organization data quality tool contains a system to monitor data outliers. In this context, data outliers are entries in the Health Management Information System that are two standard deviations (2SD) from the other entries. For example, if a health centre reports around 50 deliveries each month, with a range of 45-55 deliveries, but for one month, 75 was entered, the data outlier tool will highlight the number 75. The expectation is that the data manager of that health facility will follow up by checking the data source, usually the health facility registers. All data managers have been trained on the use of this data quality tool. However, the increase in the number of deliveries in May is often more than 2 standard deviations (SD) above the norm. The tool, therefore, requires adjustment to the seasonality patterns.

One of the key findings of the study is related to the first antenatal visit. This service is recommended to take place before the 12th week of pregnancy. In Rwanda, only half of women present for this vital service within the recommended timeframe. Since more babies are delivered in May, more first antenatal visits would be expected to be between October and December. During one week in November each year, Rwanda conducts an intensive campaign to provide maternal and child health services, known as Mother Child Health Week. This would be an ideal time to promote early presentation to a health facility for newly pregnant women. More women in early pregnancy would be reached in the Mother Child Health Weeks conducted in November than in the ones organised in March/April.

The authors recognize that there are limitations to the study. The focus was on the management of health systems to adapt to the seasonality of childbirth. The reasons behind the patterns that emerged were not investigated. However, for

deliveries, the months of high conception fall in the dry season, during which many marriages take place. Further research is proposed to explore the factors contributing to the seasonality of deliveries and the first prenatal visit in Rwanda. The study did not include the data element of home deliveries. This was because the proportion of home deliveries of total deliveries is low. Exclusion of home deliveries did not affect the results of the seasonality analysis in health facilities, nor did it impact the conclusions; however, a further analysis of seasonality in home deliveries is recommended. Finally, the analysis of the data element BCG vaccination did not account for stillbirths, babies who did not survive long enough to receive the BCG vaccination nor multiple pregnancies (such as twins or triplets). In these circumstances, the delivery would have taken place, but the corresponding BCG vaccine would not have been administered, or two vaccinations would have been given in the case of multiple pregnancies. Although this did not affect the conclusion nor recommendations drawn from the study, a thorough analysis of the link between BCG vaccination and health facility delivery is also recommended.

CONCLUSION

Seasonality of deliveries is marked in Rwanda and has an impact on several health systems as described above. The following recommendations are proposed: 1. To relieve the high burden of deliveries in May, training and leave for maternity staff and non-urgent major surgeries should be avoided in the months when most deliveries occur, particularly in District Hospitals. 2. Medicines and supplies should be ordered to take into account the seasonality, i.e. the three-month historical consumption does not apply. 3. The data quality outlier tool in the DHIS2 should be adapted to take the seasonality of deliveries into account. 4. To increase the proportion of antenatal first visits within the first 12 weeks of pregnancy sensitisation and mobile clinics should be provided during the Mother and Child Health weeks in November.

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Challenges and Needs of the Implementation of National Older Person's Policy in Kigali: A qualitative study, 2025

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ABSTRACT

INTRODUCTION: Aging is a vital period of life that people often think about in their retirement years. The global population of this age group has grown significantly. In addition, older persons in low- and medium-income countries (LMICs) confront a number of challenges, including poverty, a scarcity of skilled geriatric experts, food insecurity, disability and health issues, and insufficient long-term care. This study aimed to understand the challenges and needs of implementing Rwanda's national policy for older persons.

METHODS: This study employed a qualitative design, involving ten participants recruited through snowball non-probability sampling methods. Face-to-face semi-structured in-depth interviews were conducted till theme saturation. Inductive thematic analysis was used to analyze data.

RESULTS: This study emerged with two themes with their sub-themes: (1) Challenges hindering the implementation of the policy (awareness and dissemination Issues, financial constraints, lack of coordination and leadership, inadequate legal and structural framework, social and cultural barriers, and healthcare access issues); and (2) needs to facilitate policy implementation (enhanced awareness and education, increased financial and resource allocation, stronger leadership and coordination mechanisms, legal and structural reforms, and social and cultural integration).

CONCLUSION: The efficacy of the national policy for older individuals is constrained by insufficient awareness and distribution efforts, as well as financial constraints. To tackle these difficulties, the study emphasized the necessity for financial budget allocation, awareness initiatives, and coordinated, effective leadership.

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INTRODUCTION

Aging is a critical stage of life that individuals typically consider during their retirement years. In this context, older adults are defined as those aged 60 and above. Globally, there has been a significant

increase in the number of people in this age group. In 2020, there were 1.4 billion people aged 60 and over, and by 2050, this number is projected to rise to 2.1 billion [1]. Additionally, the global population of those aged 80 and over is expected to reach 426 million by 2050 [1].

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Current studies indicate that low- and middle-income countries (LMICs) are expected to experience the highest increase in the older population by 2050, with two-thirds of the world's population projected to be over 60 years old [1]. In Sub-Saharan Africa, the number of people aged 65 and above was 34 million in 2020, and it is projected that by 2050, this number will double, making the region the fastest-growing aging population globally [2]. As part of the Sub-Saharan region, Rwanda is expected to see a similar rise in its elderly population. According to the most recent census, 6.5% of Rwanda's total population, approximately 13,246,394 individuals, are aged 60 years and above [3]. This increase reflects an extended lifespan globally, largely due to advancements in healthcare, lifestyle improvements, and policies aimed at delaying the aging process. However, the aging process for individuals aged 60 and above is often associated with challenges that can negatively impact their quality of life [4]. Older adults in LMICs face various difficulties, including poverty, a lack of trained geriatric professionals, food insecurity, disability and health issues, and insufficient long-term care [5]. Moreover, older adults in these regions bear a higher burden of diseases, particularly cardiovascular, sensory, respiratory, and infectious diseases. Cardiovascular conditions alone account for 30.3% of the total disease burden in individuals aged 60 and above in LMICs [5]. The challenges in providing long-term care for older adults are compounded by the presence of comorbid chronic diseases and a shortage of experts in geriatric health [3]. In response to these challenges, Rwanda has developed various policies and strategies to promote inclusive development for all its citizens. These policies include social security measures that provide income to those who have been employed in the formal sector, particularly individuals aged 60 and above [6]. Additionally, Rwanda introduced a national elderly policy in 2021 to promote equality in pension support, cultural changes, and health accessibility, as this group of people faces a high prevalence of non-communicable diseases (NCDs). This policy aims to raise awareness within communities to ensure physical, economic, and psychological preparedness for aging, improve the health and quality of life of older adults, and provide protection and care through appropriate support services [6].

The implementation of Rwanda's National Older Persons' Policy in Kigali is hindered by persistent barriers that restrict its efficacy. The unmet needs of older individuals further limit the effectiveness of inclusive service delivery and local-level policies. This study provides empirical insights to inform policy development and optimize implementation strategies. It additionally assists stakeholders in formulating adaptive solutions that advance the rights and welfare of older people. This study aimed to understand the challenges and needs associated with implementing the national policy for older persons in Kigali.

METHODS

Study setting

The study was conducted in Kigali, a city with a population of 1,745,555, representing 13.2% of the total national population. Additionally, there are 54,778 residents aged 60 and above living in Kigali [7]. Furthermore, the offices of national policymakers and agencies responsible for implementing elderly policy are located within the city, including those of the aforementioned districts.

Study design

The study was a descriptive qualitative study by design. This design was used to gain an understanding without considering any theoretical framework but the perceptions of the participants. The views on the challenges and needs of implementing the national older persons' policy were gathered from the selected study participants.

Study population and selection criteria

The study population consisted of public and private institutions involved in implementing the elderly policy in Rwanda, including those in Kigali city. Key participants included those responsible for reinforcing the National Older Persons' Policy within the Department of Social Protection at the Ministry of Local Government (MINALOC). Representatives from public institutions were also drawn from the districts of Kicukiro, Gasabo, and Nyarugenge, which make up Kigali City. Private institutions represented in the study included Rwandan Association of Retirees (ARR), St Vincent de Paul association (a worldwide organization made up of lay Catholics who seek personal and spiritual growth by helping

those in need) [9], Nsindagiza organization (that promotes the rights and wellbeing of the elderly, particularly the most vulnerable older women and men in the country) [10], National Commission of Human Rights (NCHR), and the LODA.

Participants were selected if they were responsible for following up, advocacy, and implementing policies for older people within their respective organizations or institutions in Kigali city.

Sampling methods and sample size

The study used a snowball sampling method (chain referral sampling), which is a form of non-probability sampling in which researchers rely on the first participant's information to recruit other participants to participate in their study [13]. The study sample size consisted of 10 participants, which was determined by data saturation. Saturation was achieved when there was no new theme emerging from the participants.

Data collection methods

Researchers collected data through face-to-face semi-structured interviews, guided by an interview guide developed by the research team through consensus, drawing on a review of the available literature related to Rwanda's national policy for older persons. It included open-ended questions and follow-up questions to facilitate the interview process. Probing questions were used when necessary to gather more in-depth information.

Data collection procedures

After obtaining ethical approval and permission to conduct data collection across the aforementioned private and public institutions. The researchers acquired information on potential participants from MINALOC and its implementing partners. To reach other participants, the researchers coordinated with policy officers at MINALOC, who facilitated contact with other relevant participants from LODA, NCHR, ARR, the St Vincent de Paul Society, and the Nsindangiza organization. Upon reaching each participant, the researchers introduced themselves, explained the purpose of the study, and assured them that ethical issues, such as voluntary participation and confidentiality of information, were in place. They then assessed whether the individual met the selection criteria for inclusion in the interview before obtaining consent to participate. During data collection, audio was recorded, and observations and note-

taking were considered. Interview sessions were conducted in Kinyarwanda and lasted between 45 and 60 minutes.

Data analysis

The audio recordings in Kinyarwanda were transcribed by the researcher (AI), with repeated verification against the original recordings conducted by AI to ensure accuracy and fidelity. Subsequently, the transcripts were translated into English by AK and MH, both of whom possess advanced expertise in the English language and translation. Once the English versions were finalized, the data underwent inductive thematic analysis to identify and interpret emerging sub-themes and themes. Six steps of thematic analysis [14] were followed during the data analysis process. Step 1: Researchers (NJ, AI) engaged in a thorough familiarization process by repeatedly reading the transcripts. The transcripts were uploaded and processed using Atlas.ti version 25, which facilitated the subsequent stages of data analysis. Step 2: Researchers generated initial codes, which were succinct descriptors that captured the essence of participants' responses. Each relevant and noteworthy segment of the data was assigned a corresponding code. Supporting quotations were also extracted to substantiate each code. Step 3: The codes were systematically grouped into sub-themes based on conceptual similarities. Step 4: Researchers actively interpreted the sub-themes to identify overarching themes. Step 5: Researchers (AK, MH) reviewed the themes to ensure alignment with the extracted quotations and the broader data set. Additionally, researchers (NJ, AI, AK, and MH) collaboratively named the themes according to their descriptive content. Step 6: The researchers compiled a concise summary report of the findings.

Ethical consideration

Ethical clearance was obtained from the Institutional Review Board (IRB) of the University of Rwanda, College of Medicine and Health Sciences, with reference number CMHS/IRB/134/2024. Then, after I approached the respective institutions to request permission for data collection, these included MINALOC, NSINDAGIZA Program, LODA, NHCR, ARR, St. Vincent de Paul, and Kigali City. Each study participant was briefed on the study's purpose, procedures, voluntary nature, and confidentiality measures. Data were collected

only from individuals who gave their consent. To ensure confidentiality, participants were assigned codes instead of using their names, and they were instructed not to mention their own names or those of others during the interviews. All collected information was securely stored on a password-protected computer used by the researcher. The data was used solely for research purposes. Furthermore, this research was conducted in accordance with the World Medical Association Declaration of Helsinki, which outlines ethical principles for medical research involving human subjects [16].

RESULTS

Demographic characteristics of the study participants

The study included ten participants, who were reached based on data saturation from the selected study participants. The participants were drawn from both public institutions and non-governmental organizations. The participants were evenly split between males and females, with five of each gender. Among them, four were from the public sectors, representing MINALOC, Gasabo, Kicukiro, and Nyarugenge districts. The remaining six participants were from non-governmental organizations, including ARR, Vincent de Paul, Nsindagiza, NCHR, and LODA.

The interviews showed 2 themes with their sub-themes: (1) challenges hindering the implementation of the policy; and (2) needs to facilitate policy implementation (Table 1).

Theme 1: Challenges Hindering Policy Implementation

This theme encompasses six sub-themes that identify the current challenges hindering the implementation of elderly policies in Kigali city: awareness and dissemination issues, financial constraints, lack of coordination and leadership, inadequate legal and structural frameworks, social and cultural barriers, and healthcare access issues (Table 1).

Awareness and dissemination issues: The lack of extensive awareness and proper dissemination of the policy details among all stakeholders, including relevant government agencies, older people, and the general public, is one of the significant barriers to effective enactment of policy, as expressed by the participants:

"The implementation has not been successful due to a lack of dissemination of the information among the policy entities...." (P4)

"The different agencies do not have a common understanding of the policy, and others are not aware of it." (P 9)

Financial constraints for implementing the policy: Financial constraints are a major challenge affecting the implementation of policies aimed at supporting older people. The funding allocated to older persons is often insufficient to meet the needs specified in the policy, resulting in inadequate support for the intended beneficiaries. This financial inadequacy is particularly pronounced in

Table 1: Emerged themes and sub-themes on challenges and needs of implementation of the national older persons' policy

Theme (1)	Sub-themes
Current challenges hindering policy implementation	Awareness and dissemination issues
	Financial constraints
	Lack of coordination and leadership
	Inadequate legal and structural framework
	social and cultural Barriers
	Healthcare access issues
Theme (2)	Sub-themes
Needs to facilitate policy implementation	Enhanced awareness and education
	Increased financial and resource allocation
	Stronger leadership and coordination mechanisms
	Legal and structural reforms
	Social and cultural integration

urban areas, where the cost of living is higher, and pensions and other forms of financial support often fall short of sustaining a decent standard of living for older people. The participants expressed that:

"Pensions are very small, often insufficient to support a family's life. For example, some pensions are as low as 13.5k." (P1)

"The financial support outlined in the policy is insufficient, particularly for older persons living in urban areas." (P10)

Lack of coordination and leadership: Effective policy reinforcement requires strong leadership and coordination across various levels of government and different agencies. Currently, the lack of a cohesive strategy and clear leadership roles results in fragmented efforts, where different bodies operate independently without a unified approach. This results in inconsistencies and gaps in policy execution, diminishing the overall effectiveness of the policy, including the elderly policy. The participants expressed that:

"There is no coordination mechanism, and each level works independently without national coordination." (P6)

"Changes in leadership can also affect its implementation, as new leaders may feel they need to start over." (P1)

Inadequate legal and structural framework: The current application of policy is hindered by the absence of comprehensive laws and structural support mechanisms that can provide clear guidance and authority for the policy's provisions. This gap makes it challenging to enforce the policy and ensure its long-term sustainability. The participants expressed that:

"...The main challenge is the lack of a guiding law to support the policy's implementation." (P 7)

"This policy has a gap as it does not establish a representative committee for older people at all government levels....." (P4)

Social and cultural barriers: Prevailing social attitudes and cultural norms can significantly impede the acceptance and effectiveness of policies designed to support older people. Negative stereotypes and exclusionary practices towards older individuals can prevent them from accessing the benefits and support provided by the policy. Additionally, changes in traditional family structures and caregiving practices contribute to

the challenges faced in this policy. The participants expressed that:

"Government is encouraging society not to exclude them, i.e., the elderly but it is hard to have the same consensus on it." (P3)

"Today, caring for older people is challenging because younger generations do not provide the same level of care as before." (P3)

Healthcare access issues: Limited access to healthcare services is a significant challenge for older people, especially when it comes to managing chronic diseases and requiring special care. The disparity in healthcare benefits between different insurance schemes and the overall lack of tailored healthcare services for older individuals undermine the policy's goal of ensuring their well-being. The participants expressed that:

"Those on RAMA do not have the same benefits as those who retired before RSSB establishment and this hinders them when it comes to access of health care when they are sick." (P1)

"Older people need special care due to chronic diseases, retirement, and isolation." (P6)

Theme 2: Needs to Facilitate Policy Implementation

Under this theme, five sub-themes were identified related to the need to facilitate elderly policy in Kigali city: enhanced awareness and education, increased financial and resource allocation, stronger leadership and coordination mechanisms, legal and structural reforms, and social and cultural integration (Table 1).

Enhanced awareness and education: Improving awareness and understanding of the policy among all stakeholders, including older people, caregivers, and the general public, is crucial for effective implementation. This can be achieved through targeted education and communication strategies that ensure everyone is informed about the policy's objectives, benefits, and how to access them. Raising awareness will help create a supportive environment for older people and ensure they can fully benefit from the policy. The participants expressed this:

"We need to ensure that all elderly people, organizations, and stakeholders are aware of and understand the policy." (P1)

"We need to encourage older people to form

associations to advocate for themselves, even though we have some but they are not sufficient." (P2)

Increased financial and resource allocation:

Ensuring adequate funding and resource allocation is crucial to support the effective implementation of the policy. This includes not only government funding but also contributions from non-governmental organizations and the private sector. Sufficient financial resources will ensure that the necessary services and support are provided to older people, helping to meet their needs and improve their quality of life. The participants expressed this as:

"Increasing funds from all levels, either government or non-government (public and private)." (P 8)

"NGOs should support and finance care for older people, as there are currently no stakeholders doing so." (P 5)

Stronger leadership and coordination mechanisms:

Establishing clear leadership roles and improving coordination among various government levels and agencies is crucial for effective policy execution. A coordinated approach will ensure that all efforts are aligned, resources are utilized efficiently, and there is a unified strategy for achieving the policy's objectives. Strong leadership and effective coordination mechanisms can drive the policy forward and address any emerging challenges effectively among the elderly. The participants expressed that:

"MINALOC should establish implementation strategies that outline activities, responsible persons, timelines, and budgets, and corresponding M&E planification....." (P6)

"Establishing active committees for older persons will help strengthen collaboration between the agencies." (P 10)

Legal and structural reforms: Developing and enforcing laws that provide a clear framework for the application of the policy and protection of older people's rights is necessary. These legal and structural reforms will ensure that the policy has a solid foundation and can be effectively enforced. Such reforms can include establishing representative committees, creating specific laws to protect the rights of older people, and ensuring that clear guidelines are in place for implementing the policy. The participants expressed this as:

"Develop and enforce laws that support older people." (P7)

"The establishment of the guiding law that sets the way of the policy implementation, including committees, creating specific laws to protect older people's rights, and ensuring that there are clear guidelines for implementing the policy." (P9)

Social and cultural integration: Promoting positive social attitudes towards older people and integrating cultural practices that support their well-being is essential for improving the policy's impact. Encouraging respect for older people as valuable members of the community and fostering intergenerational relationships can enhance their social inclusion and support. Cultural integration initiatives can help address social barriers and ensure that older people receive the care and respect they deserve. The participants expressed that:

"Respect elderly people as sources of wisdom and strive for their good health should be prioritized to address social barriers and ensure that older people receive." (P1)

".... Encourage children to stay close to their older family members, promoting home care." (P7)

DISCUSSION

The challenge to implementing the national policy for older persons is the lack of awareness and proper dissemination of policy details among all stakeholders, including relevant government agencies, older individuals, and the general public. This lack of awareness can result in a lack of common understanding of the policy's objectives among different stakeholders and beneficiaries. The limited dissemination of the policy created a gap in several government institutions and among leaders who are implementing it. Thus, the implementing leaders should be aware of any gaps in execution. These findings are consistent with other studies from South Africa and sub-Saharan Africa, which have shown that the lack of widespread awareness and dissemination of elderly policy details underscores a pressing issue in ensuring the effective enactment of the policy [2,17]. To address this challenge, it is crucial to raise policy awareness and understanding through education and other effective communication methods implemented by targeted institutions, organizations, and stakeholders. Furthermore,

raising awareness by organizing associations or organizations for older people can help create a more supportive environment for the elderly. Likewise, it is crucial to ensure that all older persons, their caregivers or other caregivers, and the broader community are fully aware of the policy's objectives and benefits.

Financial constraints pose a significant challenge to the effective implementation of policies designed to support older individuals. Often, the funding allocated for older persons falls short of addressing the needs outlined by the policy, resulting in inadequate support for those intended to benefit. This issue is particularly pronounced in urban areas where higher living costs exacerbate the problem, leaving pensions and other financial aids insufficient to sustain a decent standard of living. Similar to findings reported in Senegal, financial constraints affected support for medical and health protection among the elderly [18]. Ensuring adequate funding and resource allocation is important. This entails not only increasing government funding but also securing contributions from non-governmental organizations and public institutions. This will help to provide the necessary services and support to meet the needs of older people, ultimately improving their quality of life and the effectiveness of the policy.

Effective policy in action necessitates robust leadership and coordination across various levels of government and among different agencies. Currently, the absence of a cohesive strategy and clearly defined leadership roles results in fragmented efforts, where disparate bodies operate independently, leading to inconsistencies and gaps in policy execution. This fragmentation undermines the overall effectiveness of policies, including those designed for older people. These results are comparable to those of other studies, which emphasize the pivotal role of implementers in navigating the complex political landscape and adapting policies to specific situations [19,20]. It is especially important during times of coordination concerns, which can put a strain on public administrations and exacerbate the implementation of various tasks. With clear and unified leadership roles and enhanced coordination among government levels and agencies, efforts will align, ensure efficient resource utilization, and create a strategic framework for achieving policy objectives.

The implementation of current policies

is significantly hampered by the lack of comprehensive laws and structural support mechanisms that provide clear guidance and authority. This absence creates challenges in enforcing the policy and ensuring its long-term sustainability. This gap makes it challenging to enforce the policy and ensure its long-term sustainability. Similarly, studies have stated that this gap in legal frameworks and structural support can lead to difficulties in ensuring policy compliance and longevity [21–23]. Therefore, developing and enforcing laws that establish a robust framework for policy and protect the rights of older individuals is essential. It provides a solid foundation for the policy, including the establishment of representative committees, the creation of specific laws to safeguard the rights of older people, and the formulation of clear implementation guidelines.

Prevailing social attitudes and cultural norms can significantly hinder the acceptance and effectiveness of policies designed to support older individuals. The shifts in traditional family structures and caregiving practices further complicate the execution of policies. These findings are comparable to those of other studies, where prevailing social attitudes and cultural norms can significantly impede the acceptance and effectiveness of policies designed to support older people [24,25]. To enhance the impact of these policies, it is essential to foster positive social attitudes towards older people and incorporate cultural practices that promote their well-being. Encouraging respect for older individuals as valued members of the community and fostering intergenerational relationships can enhance their social inclusion and support.

Limited access to healthcare services poses a significant challenge for older individuals, particularly in managing chronic diseases and accessing specialized care. Disparities in healthcare benefits among various insurance schemes, coupled with a general lack of tailored healthcare services for the elderly, undermine the policy's goal of ensuring their well-being. Similarly, other studies have shown that older persons may have difficulty accessing healthcare due to economic constraints and a lack of a clear government implementation plan for them [19–23]. Equitable and specialized healthcare services can help address the challenges older people face in accessing healthcare by implementing policies

that ensure insurance covers all necessary services for this age group.

This study was constrained by its limited geographical scope, focusing exclusively on Kigali City, stressing the need for future research with a broader geographic reach, including other regions of the country. Despite these limitations, the study provides light on how the National Policy for Older People is being implemented in Kigali. The study's participants, who came from various implementing organizations, including government institutions, non-governmental organizations, and community-based organizations for the aged, contributed to the findings with their unique viewpoints and experiences.

CONCLUSION

This study looked into the challenges and needs of implementing the National Policy for Older People in Kigali City. The findings highlighted limitations to the policy's effective implementation, including funding constraints, inadequate awareness and dissemination initiatives, and gaps in the legal and institutional framework. These variables, taken together, hinder progress toward the policy's objectives. To address these issues, the study identified critical needs that may improve the policy's implementation. These include enhanced financial and resource allocation, comprehensive awareness efforts, and the construction of more effective leadership and coordinating procedures. Meeting these needs will support the policy's effective implementation by including all essential stakeholders, such as elder citizen organizations and governmental entities. Finally, this study identified important prerequisites for implementing the National Policy for Older People in Kigali City. It also emphasizes the critical necessity for strategic actions to solve the highlighted challenges and ensure the policy's objectives are met for the benefit of all stakeholders.

Data availability: The datasets produced and/or analyzed during this study can be obtained from the corresponding author upon request.

Author's contributions: IA developed research proposal, collected data, analyzed data and prepared manuscript. AK and MH monitored and supervised the whole process of the research proposal up to manuscript preparation by providing

the inputs and necessary comments to make the report better. NJ contributed in data analysis, manuscript preparation and editing.

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Unspoken Pain in Post-Conflict Mental Health Practice: A Field Reflection from Rwanda, 2025

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ABSTRACT

Mental health in low- and middle-income countries, particularly in post-conflict contexts like Rwanda, remains challenged by limited access to care and entrenched cultural stigma. This case study, drawn from community-based psychosocial support sessions led by Umuhumurizamutima (trained community counselors), illustrates the therapeutic and cultural complexities of unspoken trauma through the use of the empty chair technique. In one session, a young woman's tears were not for what she expressed but for what she "wasn't able to say," revealing how silence can hold a greater emotional burden than words. Situated within Rwanda's cultural history, where silence often serves as a survival mechanism. This observation underscores that emotional expression does not always equate to healing. The discussion highlights the need for practitioners to recognize unarticulated pain, listen "between the lines," and provide presence-centered, culturally sensitive care. Recommendations call for strengthening decentralized mental health services, expanding lay counselor training, and fostering safe, empathetic spaces where individuals can share their stories without fear. This case contributes to the literature by documenting field-based insights that are rarely captured in formal research, reinforcing the notion that healing lies not only in speaking but also in being heard.

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INTRODUCTION

Globally, mental health remains an underserved priority, particularly in low- and middle-income countries where access to services is limited, and stigma persists [1]. In post-conflict societies such as Rwanda, emotional and psychological wounds are often buried beneath years of silence, not only from genocide-related trauma but also from gender-based violence, abandonment, poverty, and complex grief [2].

Community-based mental health approaches have emerged as vital solutions for addressing

psychological distress by leveraging culturally rooted strategies and fostering local engagement [2,3]. Despite commendable investments by health systems to address mental health issues within communities, many personal and culturally influenced challenges remain underexplored [4]. These deeply personal experiences, often shaped by pain and silence, can serve as bridges for developing more responsive community-based approaches. Such individual stories may act as mirrors, highlighting what remains unaddressed within mainstream or widely recognized therapeutic models [5]. Among the most effective and respected community techniques are those

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derived from the principles of narrative therapy. Narrative therapy values a person's lived experience and story, positioning the therapist as a respectful audience to that narrative [6]. One of the most impactful methods borrowed from Gestalt therapy and often used within this narrative framework is the "empty chair technique." This approach allows individuals to externalize internal conflicts by symbolically addressing an imagined presence, facilitating profound emotional expression and processing [5,7,8,9].

Given the rarity of studies that document reflections from real-life community mental health practices, this communication seeks to inform mental health practitioners about such experiential insights [10]. These field-based observations may guide future interventions and enhance professional sensitivity to contextual and unspoken dimensions of trauma. This case study thus contributes to the growing body of knowledge, often known in practice but undocumented in literature, by showing how the "empty chair technique" can reveal not only articulated trauma but also the deeper pain that often remains unspoken [11].

THE EMPTY CHAIR AND THE UNSPOKEN PAIN

A Case Observation from Community Mental Health Practice in Rwanda

This case is drawn from a series of 15 psychosocial support sessions facilitated in a semi-urban district in Rwanda, conducted in a community safe space between April 18 and May 30, 2025. These sessions were designed to support emotional healing and dialogue around trauma, facilitated by trained community-based counselors known as Abahumurizamutima. With general consent to share anonymized observations for educational and reflective purposes, session 7 was chosen due to the depth of emotional intensity and its strong resonance with broader themes of silence and unspoken trauma observed across other sessions. During this session, a young woman, approximately 26 years old, participated in an "empty chair" activity. She began haltingly, addressing a symbolic figure from her life. As her words unfolded, tears streamed down her face. Eventually, she fell silent. When gently asked about her emotional reaction, she responded:

"I am not crying because of what I have said, but because of what I wasn't able to say."

Her response deeply impacted the community-based counselor (Umuhumurizamutima), emphasizing that even in therapeutic spaces, emotional expression may not equate to emotional release. The real burden, it appeared, was held in the silence, in the words left unspoken.

This case is best understood within the broader cultural framework of Rwanda, where collective history, community cohesion, and silence often intersect. In post-genocide Rwanda, silence can function as a survival mechanism, a culturally shaped form of protection and respect for others. Speaking openly about trauma may be seen as dishonoring the collective narrative or risking re-stigmatization. As a result, individuals, especially women, may experience internalized restrictions on emotional disclosure, even in spaces designed for healing [13].

Abahumurizamutima

Abahumurizamutima facilitating these sessions undergo specialized training that includes foundational psychosocial skills, group facilitation, empathetic listening, and trauma awareness. They are also authorized to refer individuals exhibiting alarming symptoms of mental health illness to formal health centers for further assessment and care. While the Abahumurizamutima themselves are not licensed clinical psychologists, they operate as essential frontline workers within Rwanda's decentralized mental health system, bridging informal community support and formal care services.

This particular session was facilitated by a trainer of community-based counselors, known locally as Umutoza w'Abahumurizamutima, who is a mental health professional. The trainer's role is to provide supervision, guidance, and advanced mental health expertise to the counselors, ensuring quality and safety in the support provided.

The deep cultural competence and understanding of local social dynamics held by the Umuhumurizamutima enable them to establish trust and safety, especially in rural and semi-urban areas where professional mental health resources remain scarce or stigmatized [14].

DISCUSSION

While tears in therapeutic spaces are often interpreted as emotional release or breakthrough,

they can also obscure deeper, unresolved layers of pain [15]. In this case, the tears did not stem from words spoken, but rather from the emotional weight of what remained unsaid. This aligns with broader trauma research emphasizing that suppressed narratives can perpetuate psychological distress through mechanisms like repression and dissociation, which delay healing and complicate long-term recovery [16].

Individuals who have endured trauma, whether through conflict, abuse, displacement, or systemic oppression, often develop adaptive emotional defenses such as silence, repression, or dissociation. While these strategies may provide temporary protection, they can hinder authentic healing over time [15]. This case powerfully highlights that silence may sometimes speak louder than words, and underscores the importance for mental health practitioners to listen “between the lines.”

This case affirms that what remains unspoken may carry more therapeutic weight than what is voiced. It also calls for an intentional shift: from interpreting tears as an end-point of emotional release to seeing them as indicators of unexpressed wounds. Moreover, there’s a common societal assumption that emotional expression equals healing. Yet, as this young woman demonstrated, healing requires more than expression; it requires recognition, affirmation, and a safe audience. Her story echoes the urgent need to shift community-based mental health work from task-driven support to presence-centered empathy. As she cried not for what was shared but for what remained unsaid, she gave voice to many others whose silence speaks louder than words.

As recommendations, mental health practitioners, community leaders, and peer support workers must learn that a story isn’t truly a story until it has an audience. We are that audience. And with that role comes a sacred responsibility: to listen without judgment, to validate without rushing solutions, and to offer space rather than pressure.

This case is not just a report; it is a call. A call to acknowledge that healing lies not just in helping people speak, but in ensuring they are heard. We must cultivate intentional, culturally sensitive, and empathetically held spaces that allow the voiceless to find their voice.

To improve mental health service utilization in Rwanda, it is essential to address cultural stigma and structural barriers through decentralized and contextually relevant approaches. Scaling up ongoing integration of mental health into primary care and community systems can significantly enhance access and continuity of care. Additionally, expanding task-shifting models, such as training lay counselors, offers a sustainable solution, especially in underserved areas.

CONCLUSION

This story from a semi-urban community session in Rwanda reminds us that tears do not always mark release; they can signify constraint. Emotional healing requires more than expression; it demands connection. As such, this case urges mental health systems to integrate practices that honor not only verbal disclosures but the emotional gravity of what remains unspoken. Let us not simply aim to extract stories, but to become trustworthy witnesses to them, guiding individuals from silence to strength.

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The Rwanda Public Health Bulletin (RPHB) is a printed and open access, peer-reviewed journal, published as the flagship scientific and technical periodical publication. RPHB is a public health bulletin launched in March 2019 by the Rwandan Ministry of Health, through the Rwanda Biomedical Centre (RBC) in collaboration with the CDC Foundation and with support from Bloomberg Philanthropies Data for Health Initiative.

Mission

To serve as a scientific information dissemination platform of national and international significance, mainly in areas related to the Rwanda Ministry of Health's essential mission to strengthen national and local health systems and improve the health of the people of Rwanda. The Rwanda Public Health Bulletin publishes disease surveillance summaries, public health response guidelines, public health notices, case reports, outbreak reports, original research papers, and policy briefs among others. It generally features issues of importance to its targeted audience, which is health professionals, academic researchers, policymakers and anybody interested in health issues. Articles for publication are received from doctors, nurses, allied health professionals, students, policymakers, government bodies, non-governmental bodies and others.

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INSTRUCTIONS TO AUTHORS

All works submitted to this bulletin will have to belong to the types of articles stated below:

1. ORIGINAL RESEARCH

Referred to as “Primary Research” pioneer in a determined domain. It can be from various aspects: Clinical features, pathophysiology, biochemistry, molecular biology, etc.

THE TITLE

The title of the article should be concise and informative. It should contain enough thoughts on the subject.

ABSTRACT

Abstract of 250 words maximum must accompany each manuscript and be divided into 4 paragraphs with the following headings and MeSH keywords:

Introduction: stating the purposes/aims of the work; the research undertaken, the hypothesis tested or the procedure evaluated.

Materials and methods: briefly stating what was done and what materials were used, including the number of subjects, the methods to assess the data and to control bias.

Results: Providing key findings of the study, including indicators of statistical significance, actual numbers, as well as percentages.

Conclusion: Summarizing in 1 or 2 sentences the work on the basis of the findings. It emphasizes new and important aspects of the study or observations.

THE MAIN TEXT

The text of observational and experimental articles is divided into sections with the following headings: Introduction: should always begin the text, and requires brevity and focuses. It conveys the nature and purpose of the work, and quotes the relevant literature. Only strictly pertinent background

information is necessary for understanding why the topic is important. We suggest the final paragraph clearly states the hypothesis or purpose of the study.

METHODS

Details of clinical and technical procedures should follow the introduction. A clear description of the selection of the observational or experimental subjects should be given. The identification of all aspects of the study, its reasoning, and the related relevance should be explicitly justified. In case, the study was done in a particular way, the guiding principles should all be clarified. Exclusion and inclusion criteria or partial inclusion, the reliability index, the confidentiality index, the analysis step, and the data collection processes should be also carefully specified. This section should provide sufficient details on the methods, instrumentation, procedures, all drugs and chemicals used (including generic names, doses, routes of administration). It should allow other workers to reproduce the study if necessary.

This section should also state the self-evaluation of the study by: independent/consensus readings blinded or unblinded to other information and estimate the fluctuation of recall biases by random ordering of studies.

Be clear about the retrospective or prospective nature of the study. Finally, provide references to established methods, including statistical methods that have been published, forthcoming, or that may not be well known. New description or substantially modified methods may be used however, give reasons for the use of these techniques, and evaluate their limitations. Statistical methods should be described with enough details to enable a knowledgeable reader with access to the original data to verify the reported results. A general description of methods would be defined in the methods section, whereas a specific statistical method used into analysis would be summarized in the results section. Any general use of the computer program should be

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RESULTS

Logical sequence of presentation of results is required in the text; along with tables, and illustrations. Repetition of data from illustrations into the text should be avoided; however, emphasize or summary of only important observations would be helpful. Avoid the ‘non-technical use’ of technical terms in statistics which should be defined and reserved for the right purpose. Moreover, define all those statistical terms aside with or including abbreviations and/or most used symbols. Any complication and/or unexpected finding should be reported and the more possibly explained and the author should report lost to follow up and dropouts from a clinical trial.

DISCUSSION

Use ample subheadings. Emphasize the new and important aspects of the study and the conclusions that follow from them. Avoid repetition of details included in other parts. This section requires the mention of the implication of the findings, and their limitations for future research, involving relating the observations to other relevant studies.

Finally, the conclusions should be linked to the goals of the study; though mostly avoiding:

Unqualified statement not completely supported by the data

Statement on economic benefits and costs unless the report includes economic data and analyses

Claim of priority and alluding to work that has not been completed.

Whereas new hypotheses could be suggested when warranted, but they should be clearly labeled as such and recommendations, when appropriate and needed, may be given.

Acknowledgments

List all contributors who do not meet the criteria of authorship, such as those who provided purely technical help, writing assistance, or a department chair who provided only general support; and their respective contribution will be headed as provided. Everybody must have given written permission to be acknowledged. References: References should be numbered consecutively in the order in which they were first mentioned in the text. They will be identified in the text, tables, and legends by arabic numbers. This bulletin uses the IEEE style (Institute of Electrical and Electronics Engineers) for referencing the citations. It is advised to avoid citations or personal communication unless they provide essential and pertinent information. In all case, the name of the person and date of communication should be cited in parentheses in the text.

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Disease surveillance summaries are reported following the checklist below:

Title: Compose a title that includes the name of the health condition, population, time and place.

Abstract: Provide a structured abstract including the following sub-headings: Background; Objectives; Methods; Results; and Conclusion.

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Context: Summarize the current situation regarding the health condition under surveillance and identify why it is important. Objectives: State the objective of the surveillance report.

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Data quality, missing data and reporting delays: Describe how the data quality was assessed. Explain how missing data were addressed. If data is reported by date of diagnosis or symptom onset, include a statement about whether the data for the most recent periods may be revised.

DATA ANALYSIS

Describe any analytical methods used providing sufficient detail to enable a knowledgeable reader with access to the original data to judge its appropriateness and to assess the reported results.

RESULTS

Descriptive: Provide a summary of the descriptive data, including demographics.

Data Quality: Report on data quality (e.g., completeness, missing data, under reporting)

Analytic data: Provide a summary of the analysis including (when indicated) estimates of trends. When applicable, point estimates should include appropriate indicators of measurement error such as 95% confidence intervals (e.g., average annual percentage change used to describe trends or odds ratios used to describe subgroup differences).

Figures: Create the minimum number of figures to highlight key results. Create a title that includes person, time and place.

DISCUSSION

Key results: Summarize key results with reference to study objectives

Comparison: Consider these findings in relation to the current literature. Strengths and weaknesses: Discuss the strengths and weaknesses of the study (data quality, completeness, sources of

potential bias). Interpretation and generalizability: Provide a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies and other relevant evidence.

Conclusion: Ensure conclusions address objectives and follow from the results.

3. PUBLIC HEALTH NOTICES / OUTBREAK REPORTS

Following the Center for Disease Control recommendations, for public health notices and outbreak reports to be published they need to cover all four components as stated below:

INTRODUCTION

Generally, the introductory paragraph should begin with 1 to 3 sentences establishing the existence of the outbreak or underlying public health problem. E.g., “On January 2, 2008, the Nevada State Health Division contacted CDC concerning surveillance reports received regarding two persons recently diagnosed with acute hepatitis C.” The introductory paragraph also usually contains: a) a statement that an investigation was conducted, when and by whom; b) the most important finding(s); c) the actions taken to stem the outbreak; and d) a statement of the public health implications and actions that should be taken in response to the investigation. Investigation and results: First, present the initial investigation and its findings. This might include: 1) a description of the setting and a statement of how the outbreak came to the attention of health authorities; 2) a clinical description of the index case or initial cases; 3) initial key test results; and 4) hypothesis generation activities and results. Next, summarize the full investigation, including: case definition, case-finding activities, method of investigation, and results. Cases should be counted and described by clinical characteristics, treatment, and outcome, as well as time, place, and person descriptive results. Next, present the methods and results of any analytic epidemiologic studies (e.g.,

cohort or case-control studies). Finally, provide the results of any relevant microbiologic, genetic, or toxicologic results, followed by the results of any testing of environmental samples. Public health response: When appropriate, a brief description summarizing any public health interventions taken and the results of the interventions follows.

DISCUSSION

Same as for a Full Report, except that a Limitations paragraph might not be required for an Outbreak Report.

4. POLICY BRIEFS

This bulletin will use guidelines on reporting/publishing policy notes as they are suggested by the Center for Disease Control (CDC). As the CDC defines them; Policy Notes are intended to announce new official policies or recommendations (e.g., from ACIP or CDC). These reports can be thought of as briefs. Maximum word count at submission is 1,400 words. Up to three tables, figures, or boxes may be included. Policy Notes contain no Discussion or Limitations, and a summary box is not required. Although policy notes or brief might vary, following is a rough guide of what basic notes should have: Introduction: The introductory paragraph should be limited to 150–200 words. It might contain all or some of the following components: a brief introductory statement orienting the reader to the topic and placing it in context, a brief description of the public health problem, a brief statement of the rationale for the policy or recommendation, mention of the most important parts of the policy or recommendations, and one or two sentences stating the conclusions and the public health implications of the new policy or recommendations.

BACKGROUND

The Policy Note should include a paragraph after the introduction that summarizes background information relevant to the policy

or recommendation that can help the reader understand the context and need for the policy or recommendation.

Methods: Should include a summary of the methods used to establish the policy or recommendation, including answers to some or all of these questions: Who was involved in the production of the guidelines or recommendations, and how? What evidence base was considered? What was the rationale for considering this evidence base? Was other evidence excluded from consideration and, if so, why? **Rationale and evidence:** The Policy Note should provide a concise review of the rationale for the policy or recommendation and a descriptive review of the scientific evidence used to establish it. It should include an explanation of how the policy or recommendation adds to, or differs from, relevant policies or recommendations established previously. **Presentation of the policy or recommendation:** The policy or recommendation should state clearly when it takes effect and to whom and under what circumstances it applies.

DISCUSSION OR COMMENT

The Policy Note should comment on the likely impact of the new policy or recommendation and plans for assessment of the policy or recommendation

5. CASE REPORTS

These are reports of an individual patient on their symptoms, treatment reactions on a disease or condition of interest. These reports normally focus on unusual reactions or occurrences. Similar cases to other research reports, case reports might include a literature review of previous similar. Case reports might also address positive patient outcome on particular treatment guidelines or individual impact of a particular intervention. These are mainly used for educational and decision-making purposes. Case reports are normally reported following a checklist found at the CARE Guidelines.

6. CASE STUDIES

We recommend authors to follow the “EQUATOR Network” for ample explanations and guidelines in the writing of such articles. They have to be well-described case studies on health care interventions of public health concern. These could be:

Rigorous assessments of processes and program interventions.

Recommendations on possible health interventions.

Never on individual patient (= case report)

7. COMMENTARIES / OPINION / METHODOLOGY ARTICLES

We recommend authors to follow the “EQUATOR Network” for ample explanations and guidelines in the writing of such articles. Though these articles are moderated, they should be:

Short, focused, opinionated to previous articles or any subject related to the journal entirely. Contemporary and focusing on specific issues. Normally up to 800 words.

Frank critics to the journal are bravely motivated and would be as much as possible published.

8. FORMATTING THE MANUSCRIPT

Please note that articles which are not correctly formatted will be returned to the authors

Format text: Style: No Spacing, Single column, Single Spacing

Font: Single Spacing, Times New Roman - size 12

Titles: Capitals and bold, size 14

Format tables: Times New Roman, Font size 9

No vertical lines. Horizontal lines in the table can be removed. No table should be larger than a single A4 page. Footnote should be size 9 and italic

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