RESEARCH

Healthcare providers' implementation of severe acute malnutrition guidelines and the factors associated with it among healthcare providers working at public health facilities of South Wollo Zone, Northeast Ethiopia, in 2024

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Abstract

Background Health workers must implement severe acute malnutrition (SAM) guidelines to provide quality services for acutely malnourished children. Healthcare providers must adhere to the national severe acute malnutrition guidelines while treating patients. However, limited data are available on the healthcare providers' implementation of severe acute malnutrition guidelines and the contributing factors in Ethiopia. Previous research on the topic focused on document reviews and small sample size. Therefore, this study aims to investigate the implementation of severe acute malnutrition guidelines and the factors associated with it among healthcare providers working in public health facilities in South Wollo Zone, Northeast Ethiopia, in 2024.

Methods A facility-based cross-sectional study was conducted from 1 March to 30 April 2024. Data were collected from 611 randomly selected healthcare providers using an observation checklist and structured questionnaire and using a multi-stage sampling technique. Data entry was done using EpiData version 4.6, and data were exported to SPSS version 27 for analysis. Logistic regression was utilized to identify factors affecting the implementation of severe acute malnutrition guidelines. In bivariable analysis, variables with a *P*-value less than 0.2 were considered for multivariable analysis. The significance level was determined in the final multivariable analysis on the basis of the adjusted odds ratio (AOR) with its 95% confidence interval (CI) at a *P*-value of less than 0.05.

Results A total of 611 healthcare providers were included in the study, resulting in a 92.6% response rate. The study revealed that 62% (95% CI 58.2, 66.1) of healthcare providers implemented the severe acute malnutrition guidelines effectively. Factors such as training on guidelines (AOR = 7.49; 95% CI 4.29, 13.08), the presence of guidelines in the work room (AOR = 3.87; 95% CI 2.38, 6.33) and the job satisfaction of healthcare providers (AOR = 2.3; 95% CI 1.32, 4.03) were determinants associated with healthcare providers' implementation of the severe acute malnutrition guidelines.

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Conclusions Less than two thirds of healthcare providers successfully implemented severe acute malnutrition guidelines. This will contribute to further complications, increased default rates, longer stays on treatment and poor SAM treatment outcomes. Factors that influenced the implementation of these guidelines included job satisfaction among healthcare providers, training on guideline updates and the availability of guidelines in the workplace. Healthcare providers working on SAM treatment should implement SAM guidelines according to the guideline standards to improve better outcomes of SAM treatment. To improve adherence to severe acute malnutrition guidelines, district health offices, zonal health departments and regional health bureaus should provide training on the guidelines, distribute printed copies and implement various staff motivation strategies.

Keywords Implementation, Severe acute malnutrition guideline, Factors, Health worker, Northeast Ethiopia

Introduction

Severe acute malnutrition (SAM) is the most extreme and visible form of undernutrition. The presence of at least one of the following clinical and anthropometric parameters indicates the presence of this nutritional disorder: bilateral pitting oedema of nutritional origin, severe wasting [weight for height (WFH) < −3 standard deviations (SD)], and a mid-upper-arm circumference (MUAC) < 11.5 cm in children under 5 years old [1]. Severe acute malnutrition is a preventable and treatable cause of childhood morbidity and mortality. SAM case management is crucial for lowering the high incidence of acute malnutrition, curing the child's illness and preventing further medical complications and deaths [2].

Healthcare providers play a significant role in health education and promotion, case diagnosis and intervention and the counselling of and follow-up with SAM clients. The degree to which healthcare providers accurately follow SAM criteria while managing acutely malnourishment in children is known as adherence to SAM guidelines [1, 3]. Healthcare providers must adhere to and implement each specific procedure according to the national SAM guidelines during the case management process to minimize the burden of the problem [4].

The Ethiopian government developed national guidelines for SAM to provide standardized service and decrease the problem nationwide. It is critical to evaluate the degree of adherence of providers to guidelines to improve the treatment outcomes of children with SAM [5]. Six dimensions are used to measure adherence to SAM guidelines: adherence to proper counselling, adherence to the assessment of medical complications, adherence to routine medication and treatment, adherence to conducting proper appetite tests, adherence to general and anthropometric assessment and adherence to admission criteria [1].

AAccording to findings from the WHO partnering with African countries, healthcare providers' implementation of SAM guidelines varies across countries [1, 6]. Research done on healthcare providers' adherence to guidelines revealed the prevalence of good adherence to SAM guidelines in Bangladesh (90%) and Pakistan (68%), respectively [7, 8]. In Colorado, USA, the adherence of healthcare providers to child nutrition guidelines was 82.6%. Of Canadian nurses who provided nutritional services to paediatric patients, 95% have adhered to the treatment protocol [9, 10].

Performance scores of health workers from different African countries in terms of treating SAM cases reported that only 40.2% of health workers implemented the SAM guidelines well; in Mali, the adherence rate was 79.5% [11–13]. In multiple African nations, the percentage of healthcare providers that followed SAM guidelines well was 75% [14]. In a 2019 multi-country assessment, 75% of healthcare providers met the guidelines for acute malnutrition; in a subsequent multi-country evaluation of providers' adherence to guidelines, just 14% met the guidelines for malnutrition [14, 15].

In Ethiopia, in Dehana district, 75% of 63 observed health workers implemented the SAM guidelines well [16]. In a medical record review study done at Adama, of 200 SAM cases, only 31 (15.5%) properly adhered to Ministry of Health (MOH) guidelines [17]. According to assessment results on severe acute malnutrition management protocol for severe acute malnutrition from a self-administered questionnaire, of 132 health workers in Welkite, Ethiopia, 39 (29.5%), 27 (20.5%) and 39 (29.5%) of healthcare providers used WHO guidelines, United Nations International Children's Emergency Fund (UNICEF) guidelines and Ethiopian SAM management guidelines, respectively, and the rest [27 (20.5%)] did not use any guidelines at all. However, nearly half of [65 (49.2%)] of participants knew little about SAM management guidelines. In a similar study done at Addis Ababa Public Hospital with 196 health workers, 67.7% and 53.8% of them had inadequate knowledge of and poor practice when it came to management of SAM, respectively [18, 19].

Case mortality rates from SAM continue to be high in places with limited resources. One of the causes of high case fatalities from SAM was healthcare providers'

misuse of the guidelines [20, 21]. A facility-based treatment of SAM cases demands critical care for improved outcomes and survival of children [22]. A high rate of case fatalities is the consequence of healthcare providers not sticking to the guidelines. Among healthcare providers who did not follow WHO severe acute malnutrition guidelines while managing SAM, the case fatality rate from SAM was 59%, and if they used these guidelines, the fatality rate lowered to 16%. Default rates for SAM treatment were increased by 8% among children treated by community health workers with poor adherence to the guidelines. Improperly managed severe acute malnutrition in children leads to other medical complications and delayed recovery time, as well as a decreased recovery rate [21, 23].

In health facilities that implemented WHO and national SAM guidelines, child mortality rates due to SAM were low. In contrast, there is a high occurrence of further comorbidity and a high mortality rate in those health facilities that did not proceed according to the national and WHO acute malnutrition guidelines. After the WHO severe acute malnutrition guidelines were put into practice, the case fatality rate for SAM decreased from 46% to 21% [24, 25]. The risk of death for a child experiencing malnourishment is 11 times greater than that of a child in good nutritional health. Without appropriate response, childhood SAM leads to poor academic competitiveness, low self-esteem and long-term effects on cognitive function [26–28]

Health workers' implementation of SAM guidelines was affected by different factors; age, experience, job satisfaction, level of education, unavailability of materials in the working area, poor healthcare provider skills, poor monitoring and supervision, poor documentation, relation to the working head, inadequate training and lack of essential resources determine the inconsistency of adherence to SAM guidelines [29, 30]

Healthcare providers' implementation of SAM guidelines is crucial to maintaining the health of sick children. Community health workers (CHWs) play a role in the detection of SAM and referral of children with SAM in many countries. However, distance to health facilities remains a significant obstacle to carers attending treatment services, resulting in SAM treatment coverage rates below 40% in most areas of intervention. More healthcare providers working at the lower-level health facilities did not follow each step of the guidelines during severe acute malnutrition management [23, 31].

Initiatives undertaken to improve healthcare providers' adherence to guidelines on SAM include updating the guidelines, building the capacity of healthcare providers, expanding service to lower-level health facilities and allocating funding for monitoring and evaluation services.

However, there is still a problem with the implementation of guidelines. This lack of implementation may result in misdiagnosis, mistreatment and delays in potentially life-saving treatments [1, 32, 33].

There is limited information about healthcare providers' implementation of SAM guidelines and the factors that influence it. Previous research on the topic focused on chart reviews and small samples, so it is difficult to generalize the results because Ethiopian healthcare providers do not always use proper record-keeping [17, 34, 35]. Therefore, this study aimed to assess the degree of implementation of SAM guidelines and its associated factors among healthcare providers providing treatment for severe acute malnutrition at public health facilities in South Wollo Zone of Northeast Ethiopia through observation and interviews with an adequate sample size.

Methods and materials
Study design and setting
An institution-based cross-sectional study was conducted in South Wollo Zone, Northeast Ethiopia. The zone is 401 km north of Addis Ababa and 480 km from the regional capital, Bahir-Dar. According to the zone's health department report, there are 20 district health offices, 132 health centres and 523 health posts. More than 5700 healthcare providers are working at different health facilities. SAM treatment is given by all health facilities through the Outpatient Therapeutic Program (OTP) and by some stabilization centres (SC). From the selected six districts, there are 147 health facilities and 930 healthcare providers currently assigned to and working at SAM treatment. The study was carried out from 1 March to 30 April 2024.

Study participants and selection procedure
All healthcare providers working in SAM treatment in public health facilities in South Wollo Zone were the source population. All healthcare providers with a diploma or higher who work in SAM treatment in selected district health facilities in South Wollo Zone were the participants of this study, but those who were temporarily assigned for less than a month to cover for another healthcare provider when the assigned provider was absent due to illness permission were excluded.

We computed the sample size twice, with the first objective using single proportion formula and the second objective using Epi Info version 7.2.6 software. To fill the gaps in the small sample size of the previous study, we took the largest sample size.

First, the sample size was determined using a single population proportion formula, with a 95% confidence level, 5% margin of error and 75% (P=level of adherence

on severe acute malnutrition guideline at Dehana District) [16]. These figures are substituted in the following formula:

$$n = \left(Z\frac{\alpha}{2}\right)2\,p\,(1 - p)\Big/ d2$$
$$n = (1.96)2xP\,(1 - P)\Big/(0.05)2$$
$$n = (3.8416)0.75(1-0.75)\Big/(0.05)2$$
$$n = 288.$$

Considering a non-response rate of 10%, the final sample size was 317.

Where:

n = estimated sample size.

z = level of statistical significance that set up level 0.05, that is, 1.96.

P = level of adherence to the severe acute malnutrition guideline.

For the second objective, taking the variable job satisfaction as a significant factor in a previous cross-sectional study related to guideline adherence gives a larger sample size over other factors [36]. Epi Info version 7.2.6 software was used to determine the sample size. Considering a 95% confidence level, 80% power and 1.82 adjusted odds ratio (AOR), the proportion of the outcome among the unexposed and exposed was 53.6% and 32.8%, respectively [36]. Then the sample size for the second objective was 400, and adding a 10% non-response rate, that gives us 440.

The larger sample size came from the second objective. Therefore, we took the larger sample size so the finding would be more representative and generalizable. From this, due to multi-stage sampling (first six districts randomly selected in South Wollo Zone and then 660 study participants randomly selected) and considering the 1.5 design effect, $440 \times 1.5 = 660$. Thus, the final sample size was 660 healthcare providers (Table 1).

A multi-stage sampling technique was employed. First, six districts were selected from 20 districts of South Wollo Zone using the lottery method. In those six districts, there are 930 healthcare providers across 147 health facilities (33 health centres and 114 health posts) providing SAM treatment. The district health office provided each district health facilities and the total number

of healthcare providers working in those health facilities to treat SAM. A simple random sampling technique was used to select study participants. The sample was allocated to each district proportionally (Fig. 1).

Where N = health   workers   involved   in   SAM management.

n = sample size from each health facility.

HF = health facilities.

Data collection tools and procedures

Direct observation and face-to-face interviews using a prepared checklist and structured questionnaire were used to collect the data. The checklist was developed using the 2019 Ethiopian guidelines for severe acute malnutrition [1]. In addition, the structured questionnaire was developed by reviewing different literature [11, 29, 37]. The questionnaire contains socio-demographic, professional and work-related factors that affect the healthcare provider's adherence to SAM guidelines.

The dependant variable (implementation of SAM guidelines) was captured through observation, and independent variables (associated factors) were captured through interviews. The checklist was used to observe the study participants (healthcare providers) first, and the structured questionnaire was used for the follow-up interview for independent variables. Observation took place during medical service given to children with SAM. Six trained health professionals [three nurses with bachelor's of science (BSc) and three health officers] collected data after taking training for 2 days on observation and interviewing techniques by a principal investigator.

Data quality management

Before the data collection, we took a 5% pretest outside of the study area in Harbu District, North Wollo Zone. The questionnaire's phrasing and sequencing was modified on the basis of pretest results. The six data collectors and two supervisors (both Master of Public Health (MPH)) took training on observation, the interview technique and the overall data collection process for 2 days. During data collection, the questionnaires and checklists were checked for completeness by the supervisors. To minimize the Hawthorn effect, the first three client–provider interaction observations per healthcare provider

Table 1 Sample size determination via the second objective to study the implementation of SAM guidelines and associated factors among healthcare providers in South Wollo Zone, Northeast Ethiopia, in 2024

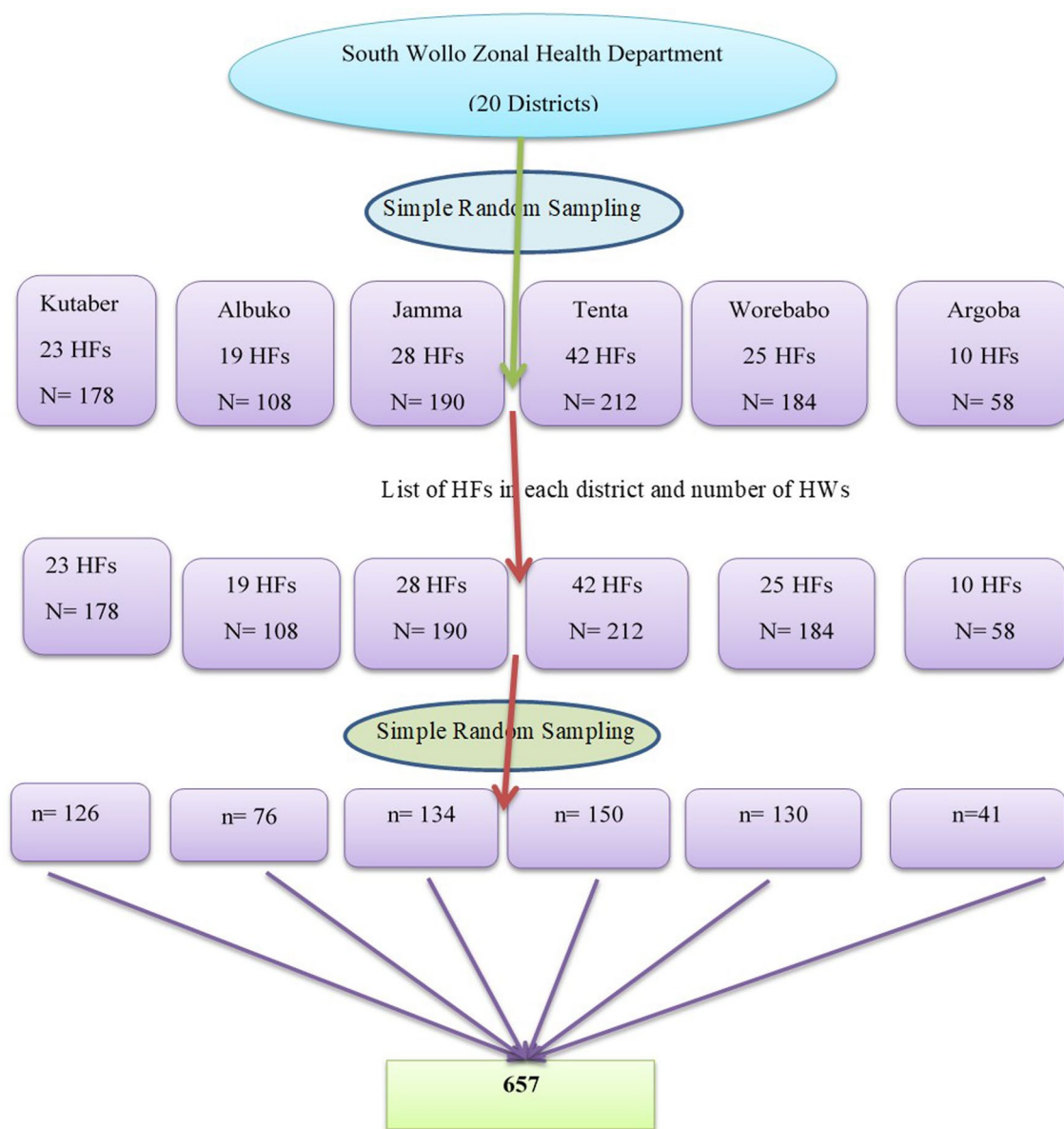| Variables	Proportion of the outcome		AOR	Calculated sample size	Sample size with a 10% non-response rate	Design effect	Citations
	Unexposed (%)	Exposed (%)					
Job satisfaction	53.6	32.8	1.82	400	440	660	[36]
Interest in work	57.5	32	1.72	134	147	221	[36]

Fig. 1 Schematic presentation of sampling procedure regarding the assessment of the implementation of SAM guidelines and associated factors among healthcare providers in South Wollo Zone, Northeast Ethiopia, in 2024

were dropped from the analysis [38]. The data quality control measures were employed in the data processing and analysis process by checking different values, such as the sum of observations and extreme values.

Study variables

The dependent variable was the implementation of the severe acute malnutrition guideline (well/poorly).

Implementation of the severe acute malnutrition guideline was measured by 37 items prepared from SAM guidelines. The items are classified under six

dimensions: implementation of anthropometric assessment, adherence to medical complication assessment, implementation of assessment appetite test and implementation of admission criteria, implementation of routine medication and treatment and adherence to counselling. Each item has a "yes" or "no" response, giving a score of 0–37. A score of 1 was given for a "yes" and 0 for a "no". Implementation-related checklists were prepared using the Ethiopian guidelines for management of severe acute malnutrition version 2019 [1]. Healthcare providers' implementation of

SAM guidelines was divided into two categories: "well implemented", which scored higher than the mean, and "poorly implemented", which scored lower than the mean [36].

Independent variables include socio-demographic factors (age, sex, work experience in the profession, educational level, profession and average monthly income); profession-related factors (training on SAM guidelines, presence and use of guidelines in the room as working guidance, intention to stay in the profession, interest in working in the therapeutic feeding unit (TFU), job satisfaction and education while working); and workplace-related factors (workload, rotation to another working unit, relation to the nearby working head, monitoring of SAM activities, health facility type and health facility location).

The level of job satisfaction of healthcare providers was assessed by 18 items. Thus, healthcare providers who answered at the mean and above the mean score classified as "satisfied", and those who scored less than the mean on the basis of the summative score of the questions assessing healthcare providers' job satisfaction classified as "not satisfied" [39].

Data processing and analysis

Data entry was done using EpiData version 4.6, and data were exported to SPSS version 27 for analysis. Frequency, percentage, mean and standard deviation were computed using descriptive statistics and presented using a frequency distribution table, pie chart and graph. We used logistic regression to identify factors affecting the implementation of SAM guidelines. Bivariable logistic regression was performed for each independent variable to the outcome variable. In bivariable analysis, variables with a P-value less than 0.2 were candidates for multivariable analysis. The significance level was determined in the final multivariable analysis, on the basis of the AOR with its 95% confidence interval (CI) at a P-value of less than 0.05. A Hosmer–Lemeshow goodness-of-fit test was used to check model fitness (value = 0.546).

Results

Characteristics of the study participants

A total of 611 healthcare providers were included in this study, resulting in a response rate of 92.6%. The mean age of the participants was 29.4 years (SD ± 4.3), and 78.9% were female. Among the participants, 383 (62.7%) were health extension workers, followed by 138 (22.6%) nurses. Additionally, 94% of the participants worked at rural health facilities, with 63.2% working at health posts.

The average working experience of the participants was 6.2 years (SD ± 4.7) (Table 2).

Profession-related characteristics of the study participants

Of the healthcare providers, 480 (78.6%) received training on the updated 2019 SAM guidelines. Nearly two thirds (63.5%) of healthcare providers who participated in this study did not use the guidelines as a working guide. More than three fourths [471 (77.1%)] of participants were interested in giving care in a therapeutic feeding unit. However, 336 (55%) of the healthcare providers were not satisfied with their job (Table 3).

Workplace-related characteristics of the study participants

The study findings showed that 128 (20.9%) healthcare providers had a high work load. Nearly half [301 (49.3%)] of healthcare providers feel dissatisfaction about rotation into other working units in the year. Among the participants, 443 (72.5%) have a good relationship with their working head, followed by 85 (13.9%) who have a poor relationship. Among the study participants, 386 (63.2%) of them were working at the health post, followed by 225 (36.8%) at the health centre, and 579 (94.1%) of the participants were working at rural health facilities (Table 4).

Implementation of SAM guidelines

Of the dimensions used to assess the implementation of SAM guidelines, 423 (69.2%) participants adhered to the general and anthropometric assessment criteria. More than half [347 (56.8%)] of participants implemented the medical complication assessment criteria well. The maximum good implementation of SAM guidelines scored was on adherence to admission criteria; 567 (92.8%) correctly classified the cases and complied with the admission criteria following the guidelines. The lowest "well" implementation score was on adherence to proper counselling, which was 327 (54%) of study participants (Fig. 2).

Implementation of SAM guidelines by health extension workers and other providers

In this study, of the total 37.8% of poor implementation of SAM guidelines, 24.7% was contributed by Health Extension Worker (HEWs) and the rest (13.1%) by other providers. The prevalence of poor adherence to SAM guidelines among HEWs themselves was 39.4%.

Implementation of SAM guidelines and its associated factors

The magnitude of implementing SAM guidelines well among healthcare providers working in public health

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Table 2 Socio-demographic characteristics of healthcare providers in South Wollo Zone, Northeast Ethiopia, in 2024 (*N* = 611)

Variables	Category	Frequency	Percent
Sex of participant	Male	129	21.1
	Female	482	78.9
	Total	611	100.0
Age (years) of participant	< 24	42	6.9
	24–29	299	48.9
	30–35	169	27.7
	36–40	89	14.6
	> 40	12	2.0
	Total	611	100.0
Educational status of the participant	Diploma	466	76.3
	Bachelor's degree	145	23.7
	Total	611	100.0
Field of specialization	Nurse	138	22.6
	Health officer	80	13.1
	Midwifery	10	1.6
	HEW	383	62.7
	Total	611	100.0
Work experience	< 2 years	164	26.8
	3–5 years	169	27.7
	> 6 years	278	45.5
	Total	611	100.0
Monthly income in ETB	< 5000	250	40.9
	5001–10000	353	57.8
	> 10000	8	1.3
	Total	611	100.0

HEW Health extension worker

facilities in South Wollo Zone was 62.2% (95% CI 58.2, 66.1) (Fig. 3).

Twelve variables had a *P*-value less than 0.2 in bivariable analysis. In multivariable logistic regression, three variables were significantly associated with the implementation of SAM guidelines. Training on SAM guidelines, having SAM guidelines available in the work room and job satisfaction were significant predictors of implementation of SAM guidelines.

Healthcare providers who had received training on updated Ethiopian SAM guidelines were 7.49 times more likely to implement the guidelines than those who had not yet received training (AOR = 7.49; 95% CI 4.29, 13.08). Study participants who had the SAM guidelines in their work room were 3.87 times more likely implemented the guidelines as compared with those who did not have the guidelines in their work room (AOR = 3.87; 95% CI 2.38, 6.33). Finally, healthcare providers who were satisfied with their jobs were 2.3 times more likely implemented the guidelines than those who were dissatisfied with their jobs (AOR = 2.3; 95% CI 1.32, 4.03) (Table 5).

Discussion

One way to access health and nutrition services and reduce morbidity and mortality of the children due to SAM is to implement SAM guidelines properly [1]. Of healthcare providers, 62.2% implemented Ethiopian SAM guidelines well. Participation in training on SAM guidelines, the presence of guidelines in the work room and job satisfaction were factors related to the implementation of SAM guidelines when treating children in South Wollo Zone public health facilities.

The overall magnitude of healthcare provider implementation of SAM guidelines is 62.2% (95% CI:58.2;66.1), Fig. 3. This result is lower as compared with studies done in Ghana (94.6%) [12], in Pakistan (75%) [8], in Bangladesh (90%) [7] and in Dehana District in Ethiopia (75%) [16]. The difference between studies done in Ghana might be due to variation in the measurement of SAM guidelines implementation. In Ghana, implementation of SAM guidelines was assessed by adherence to dosage, adherence to referral and adherence to consultation, whereas in this study, implementation of SAM guidelines was assessed by six dimensions, as stated above [12].

Table 3 Profession-related factors of healthcare providers in South Wollo Zone, Northeast Ethiopia, in 2024 (*N*=611)

| Variables	Category	Frequency	Percent
Trained on updated Ethiopian SAM guidelines of 2019	Yes	480	78.6
	No	131	21.4
	Total	611	100.0
Presence and use of guidelines as work guidance in the room	Yes	223	36.5
	No	388	63.5
	Total	611	100.0
Reason they do not use the guidelines as work guidance	No printed guidelines in the room	385	63.0
	I do not need guidelines as my work guidance	3	0.5
	Total	388	63.5
Interested in staying in their profession	Yes	386	63.2
	No	225	36.8
	Total	611	100.0
Reason for not staying in their profession	Low payment	182	29.8
	Lower payment than other professions	30	5.1
	I am studying another profession	7	1.1
	I decided to resign from government work	6	1.0
	Total	225	37.0
Interested in working in TFU	Yes	471	77.1
	No	140	22.9
	Total	611	100.0
Job satisfaction	Satisfied	275	45.0
	Dissatisfied	336	55.0
	Total	611	100.0
Reason for dissatisfaction	Poor leadership/governance	79	12.9
	Low salary	235	38.5
	High workload	6	1.0
	Low incentives	16	2.6
	Total	336	55.0
Education while working	Yes	49	8
	No	562	92

Similarly, differences in Pakistan may be due to variation in socio-demographic characteristics and the dimension of measuring the implementation of SAM guidelines [8]. The possible variation in Dehana District in Ethiopia might be due to differences in the sample size. In Dehana District only 63 health workers were observed, whereas in this study 611 health workers were observed [16]. The finding is also lower than the national target (90%); this implies that SAM patients were not properly managed according to national standards. This may lead to high default rates, death, complications, increased hospital stays and poor treatment outcome [1]. This finding is higher than a study done in Adama (15.5%); this difference might be due to the data collection method: the previous study collected from medical records of SAM case management, and poor documentation practice might have contributed to this variation [17, 34]. However, the current study used a fully prepared observation checklists based on the SAM guideline and all six dimensions, with 37 items. In addition, the discrepancy might be due to differences in the study setting and sample size variation [17].

Healthcare providers' participation in training on the SAM guidelines was positively associated with the implementation of it. The finding is similar to studies done in South Africa and Ghana [29, 40]. The possible justification for this finding may be that the guidelines were too vast and difficult to address without training, and the result implies that, for healthcare providers who received the training, the likelihood of implementation is good. Shreds of evidence indicated that training had a positive impact on improving the quality of health services, and inadequate training was one of the major causes of poor management in severe acute malnourishment in children [30, 41].

Table 4 Work-related factors of healthcare providers in South Wollo Zone, Northeast Ethiopia, in 2024 (*N*=611)

Variables	Category	Frequency	Percent
Workload	Yes	128	20.9
	No	483	79.1
	Total	611	100.0
Rotation to other working units in the year	Yes	402	65.8
	No	209	34.2
	Total	611	100.0
Feeling good about the rotation of working units within one health facility	Yes	310	50.7
	No	301	49.3
	Total	611	100.0
Relation to nearby working head	Good	443	72.5
	Bad	85	13.9
	Neutral	83	13.6
	Total	611	100.0
Type of health facility	Health centre	225	36.8
	Health post	386	63.2
	Total	611	100.0
Location of the health facility	Urban	32	5.2
	Rural	579	94.8
	Total	611	100.0
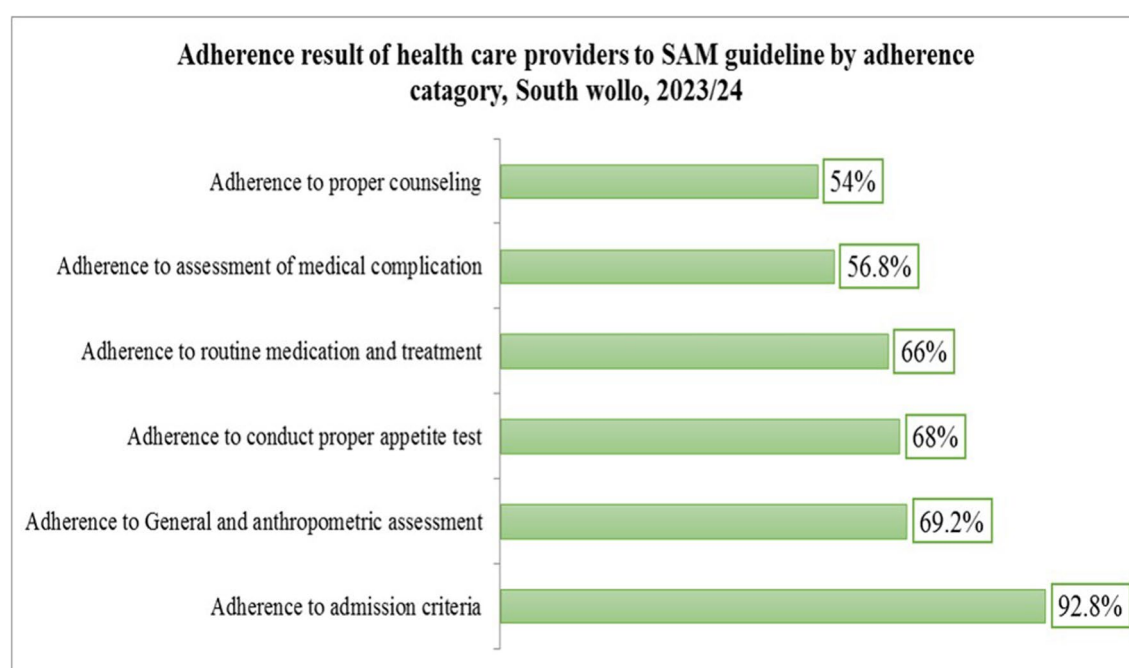
Fig. 2 Implementation of SAM guidelines among healthcare providers according to adherence dimension, South Wollo Zone, Northeast Ethiopia, in 2024

The results of this study showed that the presence of guidelines in the work room as guidance was significantly associated with healthcare providers' implementation of SAM guidelines. The healthcare providers who had printed SAM guidelines in their work room and used them as a reference were 3.87 times more likely to implement the guidelines as compared with their counterparts. The possible reason for this result could be that
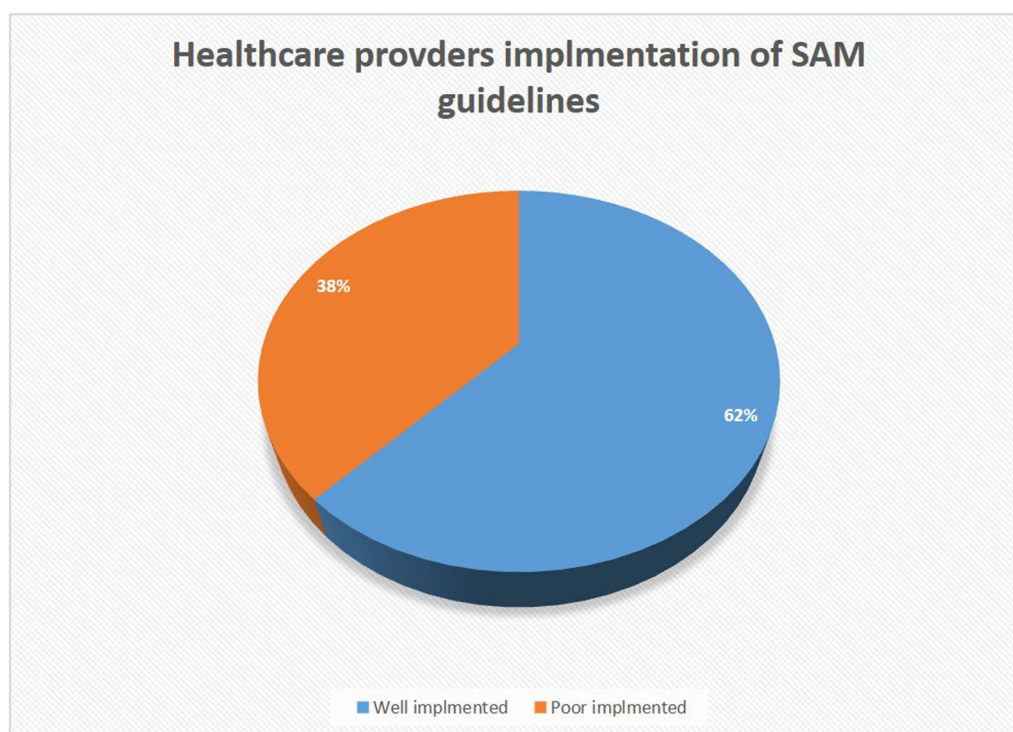
Fig. 3 Overall implementation of SAM guidelines among healthcare providers working at public health facilities in South Wollo Zone, Northeast Ethiopia, in 2024

the likelihood of minimizing healthcare providers' recall problems may be high because they refer to the issues from the guidelines in their service room. Healthcare providers were providing different healthcare services to their clients; in this case, memorizing each applicable task may be difficult for them. Because of this, compared with their peers, providers who use the guidelines as working guidelines in their room adhered well to the SAM guidelines.

This study indicated that job satisfaction was significantly associated with implementation of SAM guidelines among healthcare providers. Healthcare providers who were satisfied with their job were 2.3 times more likely to implement the guidelines than their counterparts. A satisfied and highly motivated health professional is the pillar of better performance and patient satisfaction in the healthcare system. Besides, job satisfaction is crucial for optimal health service provision and achievement of health institution goals, thereby ensuring qualified and equitable service for all clients [42]. The possible justification might be due to healthcare providers with job satisfaction feeling positive about their clients and treating them according to guidelines. Frederick Herzberg's theory states that internal motivation in the workplace, as opposed to extrinsic reasons, drives employees to be happy in their jobs over the long run. Because they are

passionate about what they do, those healthcare providers with job satisfaction are more dedicated to their clients [43].

Limitations of the study

This study lacks qualitative findings. In addition, the study participants were healthcare providers, and thus, the study did not include the client side. Observation bias and the dichotomization of the result into two categories are limitations of the study. In regard to overcoming the limitations, increasing the sample size and dropping the first three client–provider interactions per provider were strategies to minimize these limitations. However, the findings of this study provide insightful information regarding healthcare providers' level of implementation of the updated Ethiopian 2019 SAM guideline standards.

Conclusions

Less than two thirds of healthcare providers working in SAM treatment implemented Ethiopian SAM guidelines well. This finding was lower than the nationally expected target of 95%. This will contribute to further complications, increased default rates, longer stays on treatment, death and poor SAM treatment outcomes. Implementation of SAM guidelines among healthcare providers working in SAM treatment was influenced by training on

Table 5 Factors associated with implementation of the SAM guideline among healthcare providers working at public health facilities of South Wollo Zone, Ethiopia, in 2024 (*N* = 611)

Variables	Category	Implementation of SAM guideline		COR (95% CI)	AOR (95% CI)
		Well	Poor		
Sex	Male	88	41	1.4 (0.92, 2.11)	1.5 (0.75,3.04)
	Female	292	190	1	1
Profession	Nurse	89	49	1.18 (0.79, 1.77)	0.85 (0.43, 1.64)
	Health officer	54	26	1.35 (0.81, 2.25)	0.85 (0.33, 2.22)
	Midwifery	5	5	0.65 (0.19, 2.29)	0.43 (0.72, 2.17)
	HEW	232	151	1	1
Monthly income in ETB	< 5000	139	111	0.42 (0.08, 2.1)	0.87 (0.78, 9.81)
	5001–10000	235	118	0.66 (0.13, 3.34)	1.13 (0.11, 11.48)
	> 10,000	6	2	1	1
Experience in years	< 2	86	78	0.65 (0.44, 0.96)	1.09 (0.55, 2.16)
	3–5	119	50	1.4 (0.93, 2.11)	1.27 (0.72, 2.23)
	> 6	175	103	1	1
Trained on SAM guideline	Yes	350	130	9 (5.75, 14.28)	7.49 (4.29, 13.08)[***]
	No	30	101	1	1
Presence of guidelines in the work room	Yes	191	32	6.28 (4.11, 9.6)	3.87 (2.38, 6.33)[**]
	No	189	199	1	1
Interest in staying with the profession	Yes	267	119	2.22(1.58, 3.12)	0.77 (0.41, 1.45)
	No	113	112	1	1
Interest in working in TFU	Yes	321	150	2.94 (1.99, 4.33)	1.61 (0.87, 2.96)
	No	59	81	1	1
Job satisfaction	Satisfied	207	68	2.86 (2.03, 4.06)	2.31 (1.32, 4.03)[*]
	Unsatisfied	173	163	1	1
Work load	Yes	68	60	0.62 (0.42, 0.92)	0.75 (0.45, 1.25)
	No	312	171	1	1
Rotation to other working units	Yes	266	136	1.63 (1.16, 2.29)	1.53 (0.99, 2.37)
	No	114	95	1	1
Relation to near working head	Bad	41	44	0.42 (0.26, 0.68)	0.59 (0.33, 1.04)
	Neutral	35	48	0.33 (0.21, 0.54)	0.56 (0.31, 1.04)
	Good	304	139	1	1

HEW Health Extension Worker; NB: [*] indicates *P* < 0.05; [**] indicates *P* < 0.001; [***] indicates *P* < 0.0001; 1 is referenced to show which category of a variable is used as a comparison, more scholars present it in the table

SAM guidelines, the presence of guidelines in the work room and job satisfaction. Healthcare providers working in SAM treatment should implement SAM guidelines according to the complete guideline standards for better SAM treatment outcomes. They should try to improve the implementation of counselling and assessment of medical complications based on the list of standards in the guidelines. It is better for healthcare providers to put the SAM guidelines in the work room and use them as a reference when providing services. The South Wollo Zonal Health Department and district health offices should give training on SAM guidelines to the newly recruited and untrained healthcare providers. The district health office should distribute printed copies of the SAM guidelines for each health facility that offers SAM treatment. The district should provide motivation for healthcare providers to improve job satisfaction. Researchers should do further investigation using different models and qualitative data to uncover more variables that affect the implementation of SAM guidelines and incorporate client participants to provide more generalizability.

Abbreviations

AOR   Adjusted odds ratio
CHWs   Community health workers
CFR   Case fatality rate
CI   Confidence interval
COR   Crude odds ratio
EDHS   Ethiopian Demographic and Health Survey
MUAC   Mid-upper-arm circumference

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OTP   Outpatient therapeutic program
SDG   Sustainable Development Goals
RUTF   Ready-to-use therapeutic food
SAM   Severe acute malnutrition
SD   Standard deviation
SPSS   Social package statistical software
TFU   Therapeutic feeding unit
UNICEF   United Nations International Children's Emergency Fund
UHC   Universal Health Coverage
WFH   Weight for height
WFL   Weight for length

Availability of data and materials
All data used to analyse this study is available from the first author.

Declarations

Ethics approval and consent to participate
The Wollo University Ethical Review Committee (ERC) granted ethical clearance with reference ሴ\Ч 834/20/16. A formal letter was received from the College of Medicine and Health Sciences of Wollo University and submitted to the South Wollo Health Department to obtain their cooperation. Then, the district health office was given written letter for all selected health institutions. The participants gave written consent; the purpose of the study, benefits, confidentiality and right to withdraw the questionnaire were described and discussed. The names and identifying numbers of the participants were kept private and confidential by not being included on the questionnaire.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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