Demographic Determinants of Knowledge, Attitudes, and Practices of Early Diagnosis of Severe Acute Malnutrition among Caregivers in South Sudan

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Abstract

Severe Acute Malnutrition (SAM) poses a critical threat to child health in South Sudan, with early diagnosis essential for effective intervention. Caregivers' knowledge, attitudes, and practices (KAP) toward early SAM diagnosis are shaped by various demographic factors. This study examined these determinants among 422 mothers and caregivers in Juba County, South Sudan, using a cross-sectional design with multistage sampling. Structured questionnaires assessed KAP, and logistic regression analyzed associations with demographic variables. Educational attainment was a key determinant, with caregivers who completed primary education exhibiting higher levels of adequate knowledge (98.4%) compared to illiterate caregivers (95.2%, p=0.017). Attitudes were significantly influenced by income; caregivers earning less than $10 monthly were 42% less likely to have positive attitudes compared to higher-income counterparts (AOR = 0.583, p=0.011). Practices varied with age, as younger caregivers (≤18 years) demonstrated poorer practices (7.1% with poor practices) compared to those aged 19–29 (3.3%, p=0.012). Marital status also played a significant role, with unmarried caregivers more likely to exhibit poor practices (AOR = 0.621, p=0.001). Despite disparities, 96% of respondents reported positive attitudes toward early SAM diagnosis. Education, income, and social factors significantly influenced KAP, highlighting gaps in practical application among vulnerable groups. Interventions should focus on educational programs for illiterate caregivers, economic empowerment for low-income families, and mentorship for younger and unmarried mothers. Future studies should assess the impact of these strategies on reducing SAM prevalence in similar fragile contexts.

Keywords: Attitudes, Caregivers, Knowledge, Practices, Severe Acute Malnutrition, South Sudan.

Introduction

Globally, malnutrition in all its forms is a leading cause of poor health and a significant contributor to child mortality, particularly in low- and middle-income countries [1]. Severe Acute Malnutrition (SAM) is one of the most critical health concerns, accounting for approximately 60% of deaths among children under five, with two-thirds of these deaths occurring in the first years of life [2, 3]. SAM is caused by inadequate intake of energy, protein, and essential nutrients [3]. Recognizing its impact, the World Health Organization (WHO) established maternal and child nutrition targets in 2012 to reduce the prevalence of malnutrition by 2025. These objectives include reducing anemia in women by 50%, lowering low birth weight by 30%, halting increases in childhood overweight, increasing exclusive breastfeeding rates by 50%, reducing stunting by 40%, and maintaining childhood wasting at less than 5% [4]. However, progress has been insufficient to

meet these goals. Current estimates indicate that 45.4 million children under five are wasted and 149.2 million are stunted globally [5].

The burden of SAM disproportionately affects low- and middle-income countries (LMICs), where 91% of stunted and 92% of wasted children under five reside [2]. Sub-Saharan Africa experiences the highest prevalence of malnutrition, and South Sudan stands out with 22.7% of children under five being wasted well above the regional average of 6% [5]. This situation is exacerbated by political instability, conflict, displacement, and food insecurity, which undermine agricultural productivity and economic stability [6-8]. The COVID-19 pandemic further intensified these challenges by reducing nutrition service coverage by 40% in 2020 [10, 11].

SAM imposes a significant mortality burden in South Sudan due to delayed diagnosis and inadequate intervention [16]. Early detection and management are crucial, yet caregivers' knowledge, attitudes, and practices (KAP) regarding malnutrition diagnosis are poorly understood, particularly in fragile settings [17]. There is an urgent need to identify and address demographic factors that influence caregivers' ability to detect and respond to malnutrition effectively. Community-based approaches such as the "family MUAC" strategy have been implemented in many LMICs to address SAM [18]. This method empowers families to use Mid-Upper Arm Circumference (MUAC) tapes for early detection of malnutrition [19]. The approach has been shown to improve early referral rates and facilitate timely interventions [2]. Despite its potential, the effectiveness of the strategy depends on caregivers' ability to understand and use the tools correctly, as well as their overall attitude toward malnutrition management.

The family MUAC strategy has demonstrated promise as a cost-effective and scalable solution for early SAM detection. However, its success is contingent on training and empowering caregivers to use the approach effectively [5]. Strengthening community outreach and addressing barriers such as low literacy levels and socio-economic challenges can further enhance its impact [16]. The scalability of the family MUAC approach is hindered by resource constraints, disruptions due to conflict, and socio-political instability in South Sudan [17]. Furthermore, existing research often focuses on treatment outcomes rather than prevention or early detection [21-25]. There is also limited data on how demographic factors influence caregivers' KAP, which is essential for tailoring interventions to the needs of vulnerable populations.

Despite the challenges, community-based strategies like the family MUAC approach have increased awareness of malnutrition and empowered caregivers to participate in early detection efforts. These initiatives have contributed to earlier diagnosis and treatment, thereby reducing the severity of malnutrition cases presented at health facilities [2].

This study aims to examine the demographic determinants influencing caregivers' knowledge, attitudes, and practices (KAP) in Juba County, South Sudan, to generate evidence-based recommendations for enhancing early detection and management of severe acute malnutrition (SAM). There is a scarcity of data on how demographic factors such as education, income, and marital status shape caregivers' KAP in fragile, conflict-affected settings like South Sudan. By addressing this gap, the study shifts focus from treatment outcomes to prevention and early diagnosis, emphasizing the pivotal role of caregivers in mitigating SAM. This comprehensive analysis highlights the complex relationship between demographic factors and caregiving behaviours, offering critical insights for designing effective interventions in resource-limited and conflict-affected contexts.

Materials and Methods

Study Design

This study employed a cross-sectional design, particularly suited for assessing the prevalence and determinants of knowledge, attitudes, and practices (KAP) within a defined population at a single point in time. The cross-sectional approach enabled researchers to capture a snapshot of caregivers' KAP regarding early diagnosis of SAM, offering critical insights into demographic factors influencing these outcomes. This design is cost-effective and allows for the simultaneous examination of multiple variables, making it ideal for resource-constrained settings such as Juba County, South Sudan. The quantitative nature of the study allowed for structured data collection through interviewer-administered questionnaires, ensuring consistency in responses and reducing biases associated with self-reported data. Multistage sampling was incorporated to enhance representativeness, while the systematic random sampling approach ensured a fair selection of participants.

Study Area

The research was conducted in Juba County, South Sudan, the capital, located on the White Nile. Juba County spans 20.08 square miles and has a population of 522,700, with 48% male and 52% female residents. The county is multi-ethnic, with livelihoods including small businesses, cultivation, cattle-keeping, technical vocations, and informal economy activities. Despite being the nation's capital, Juba County faces severe food insecurity, hosts large numbers of internally displaced persons (IDPs) and returnees, and remains reliant on food imports and humanitarian aid.

Study Population

The study targeted caregivers of children under five years of age, as this group is at the highest risk for SAM. Participants were residents of Juba County who had been caregivers for children aged six months to five years for at least six months and provided informed consent. Individuals who were ill or unable to provide consent were excluded.

Sample Size and Sampling Procedures

The sample size was determined using the Kish-Leslie formula for cross-sectional studies, assuming a 50% prevalence of nutritional knowledge among caregivers. This calculation resulted in a sample size of 384, with an additional 10% added for potential non-responses, yielding a final sample size of 422 respondents. All 422 respondents completed the questionnaire.

Multi-stage sampling was employed for participant selection. The first stage involved purposively selecting four Payams based on their involvement in the family MUAC initiative and accessibility. Within each selected Payam, three villages (Bomas) were randomly chosen. Systematic random sampling was then used to select households within the villages, with a sampling interval of 11 calculated based on an estimated 4,000 households per village. The first household was selected randomly, and every 11th household was assessed for eligibility. This approach ensured geographical representativeness and minimized selection bias.

Data Collection Tools and Methods

Data collection utilized a pre-coded, interviewer-administered questionnaire developed following WHO and UNICEF guidelines for the Community-Based Management of SAM framework. The tool included structured questions covering socio-demographic characteristics, knowledge, attitudes, and practices related to SAM detection. To enhance accessibility, the questionnaire was translated into Dinka and Juba Arabic, the predominant local languages. Pre-testing was conducted with 15 households to ensure the clarity, reliability, and appropriateness of the tool. Adjustments were

made based on pre-test findings to improve its accuracy.

Description of Study Variables and Statistical Methods

Dependent variables included practices related to early SAM detection, assessed through an observation checklist to determine whether caregivers correctly measured mid-upper arm circumference (MUAC) and identified bilateral limb swelling. Practices were categorized as good or poor. Independent variables included socio-demographic characteristics such as age, education, marital status, and socioeconomic status. Knowledge was assessed using a 10-question composite score, with scores of 5 or higher categorized as adequate knowledge. Attitudes were evaluated using a three-point Likert scale, with scores of 5 or higher indicating positive attitudes.

Data entry was conducted using Microsoft Excel 2021, and statistical analysis was performed with Stata version 14.1. Univariate, bivariate, and multivariable logistic regression analyses were used to examine associations between variables. Odds ratios (ORs) were calculated to assess relationships, with p-values less than 0.05 considered statistically significant. Confounding effects were evaluated by comparing adjusted and crude ORs, with a cut-off difference of 10%.

Quality Control

Data quality was ensured through rigorous pre-testing of the questionnaire, comprehensive training of research assistants, and daily review of completed questionnaires for accuracy and completeness.

Ethical Considerations

Ethical approval for the study was obtained from the UCU Institutional Review Board (IRB) and local authorities in Juba County. Informed consent was obtained from all participants prior to their involvement in the study. Confidentiality was strictly maintained throughout, and participants were informed of their right to withdraw from the study at any time without penalty.

Results

Social Demographic Characteristics of Mothers/Caregivers

The demographic characteristics of sampled mothers and caregivers in Juba County revealed significant variations in age, religion, education, marital status, occupation, and family income (Table 1). The majority of mothers fell within the 19 to 29 age range, making up 59% of the sample, while only a small fraction were below 18 years (6.6%) or above 46 years (0.5%). Most mothers identified as Christians (93.8%), with a minority practising Islam (5.7%).

Educational attainment among mothers was notably low, with over half (54.0%) being illiterate. A smaller percentage had completed secondary education (14.2%), and only 1.7% had attained tertiary education. Marital status data showed that a majority of mothers were married or cohabiting (80.6%), while others were unmarried (12.1%), separated or divorced (3.6%), or widowed (3.8%). Employment among mothers was also limited, with 77.5% unemployed, 16.8% working as daily labourers, and only 2.4% holding formal employment.

Fathers' educational and occupational statuses varied, with 37.9% being illiterate, 11.6% having completed primary education, 22.3% having completed secondary education, and 27.5% having achieved tertiary qualifications. In terms of employment, 60.7% of fathers were unemployed, 16.8% worked as daily labourers, and 18.0% were formally employed. Family income levels were predominantly low, with 70.1% earning less than $10 monthly, 17.8% earning between $11 and $20, 6.9% earning between $21 and $40, and only 5.2% reporting an income above $40. These findings highlight socio-economic challenges that may influence health and nutritional practices in the region.

Table 1: Social Demographic Characteristics of Mothers/Caregivers

Parameter	Category	Number (%)
Mothers' Age	18 and below	28 (6.6%)
	19 – 29	244(59.0%)
	30 – 45	148(35.0%)
	Above 46	2 (0.5%)
Religion	Christian	396 (93.8%)
	Muslim	24(5.7%)
	Others	2(0.5%)
Mothers Educational Status	Illiterate	228 (54.0%)
	Completed Primary	127 (30.1%)
	Completed Secondary	60 (14.2%)
	Tertiary (Degree or Diploma)	7 (1.7%)
Mother's Marital Status	Not married	51 (12.1%)
	Married/Cohabiting	340 (80.6%)
	Separated/Divorced	15(3.6%)
	Widow	16(3.8%)
Mother's Occupation	Unemployed	327 (77.5%)
	Daily Worker/Labourer	71(16.8%)
	Employed	10 (2.4%)
	Others	14(3.3%)
Father's Educational Status	Illiterate	160 (37.9%)
	Completed Primary	49 (11.6%)
	Completed Secondary	94 (22.3%)
	Tertiary (Diploma or Degree)	116 (27.5%)
	Other	3 (0.7%)
Father's Occupation	Unemployed	256 (60.7%)
	Daily Worker/Labourer	71 (16.8%)
	Employed	76 (18.0%)
	Other	19 (4.5%)
Family Income	<10$	296 (70.1%)
	11-20	75 (17.8%)
	21-40	29 (6.9%)
	>40$	22(5.2%)

Knowledge of Early SAM Diagnosis

The study examined the relationship between demographic characteristics and mothers'/caregivers' knowledge of early diagnosis of SAM. Table 2 summarizes the associations observed. Mothers' educational status was significantly associated with knowledge levels (X^2 = 9.185, p = 0.017). Specifically, mothers who had completed primary education were significantly more likely to exhibit adequate knowledge compared to those who were illiterate (AOR = 0.632, 95% CI [0.61–1.10], p = 0.001). This finding highlights the importance of education in equipping caregivers with the skills and information necessary for recognizing early signs of malnutrition. On the other hand, demographic factors such as age, marital status,

and occupation did not show significant associations with knowledge levels, suggesting that education might play a more pivotal role than other socio-demographic factors.

Table 2: Association between Demographic Characteristics and Knowledge of Early SAM Diagnosis

Attribute	Category	Knowledge		Pearson Chi-Square		Odd ratio/Confidence Interval	
		Inadequate Knowledge	Adequate Knowledge	Chi2	P-Value	OR 95%CI); P-value	AOR (95%CI); P-value
Mother's Age	18 and below	0(0%)	28 (100%)	0.610	0.894		
	19 – 29	3(1.2%)	241(98.8%)				
	30 – 45	1(0.7%)	147(99.3%)				
	Above 46	0(0%)	2(100%)				
Mother's Religion	Christian	4(1.0%)	392(99.1%)	0.265	0.876		
	Muslim	0(0%)	24(100%)				
	Others	0(0%)	2(100%)				
Mother's Educational Status	Illiterate	2(0.9%)	226(98.1%)				
	Completed Primary	2(1.6%)	125(98.4%)	9.185	0.017**	0.421(0.41-1.20);0.001	0.632(0.61-1.10);0.001**
	Completed Secondary	0(0%)	60(100%)				
	Tertiary (Degree or Diploma)	0(0%)	7(100%)				
Mother's Marital Status	Not married	1(2%)	5(98%)	0.670	0.833		
	Married/Cohabiting	3(0.9%)	337(99.1%)				
	Separated/Divorced	0(0%0	15(100%)				
	Widow	0(0%)	16(100%)				
Mother's Occupation	Unemployed	3(0.9%)	320(99.1%)	0.393	0.942		
	Daily Worker/Labourer	1(1.4%)	70(98.6%)				
	Employed	0 (0%)	10(100%)				
	Others	0(0%)	14(100%)				
Father's Educational Status	Illiterate	3(1.9%)	157(98.1%)	3.086	0.544		
	Completed Primary	0(0%)	49(100%)				
	Completed Secondary	1(1.1%)	93(98.9%)				
	Tertiary (Diploma or Degree)	0(0%)	116(100%)				
	Other	4(0.9%)	3(100%)				
Father's Occupation	Unemployed	3(1.2%)	253(98.8%)	1.206	0.751		
	Daily Worker/Labourer	1(1.4%)	70(98.6%)				
	Employed	0(0%)	76(100%)				
	Other	0(0%)	19(100%)				
	<10$	3(1.0%)	293(99.0%)	0.620	0.892		

Family Income	11-20	1(1.3%)	74(98.7%)			
	21-40	0(0%)	29(100%)			
	>40$	0(0%)	22(100%)			

<center>** Significant at the 0.001 level of significance</center>

Attitudes towards Early SAM Diagnosis

The analysis explored the relationship between demographic characteristics and attitudes toward early Severe Acute Malnutrition (SAM) diagnosis, uncovering significant findings in several areas. According to the results in Table 3, Mothers' educational status was significantly associated with their attitudes (χ^2 = 0.9668, p = 0.014), with illiterate mothers being more likely to have negative attitudes compared to those who completed primary education (AOR = 0.685, 95% CI [0.155–1.790], p = 0.013). Mothers with secondary or tertiary education uniformly displayed positive attitudes. Mothers' occupation also showed a significant relationship (χ^2 = 9.934, p = 0.019), where daily laborers were slightly more likely to exhibit negative attitudes compared to unemployed mothers (AOR = 0.485, 95% CI [0.145–1.620], p = 0.248), although the overwhelming majority across all occupational groups maintained positive attitudes. Family income was another significant factor (χ^2 = 8.555, p = 0.013), with families earning less than $10 monthly being more likely to have negative attitudes compared to those in higher income brackets (AOR = 0.583, 95% CI [0.145–1.760], p = 0.011). Families earning above $10 generally showed positive attitudes.

In contrast, mothers' age showed no significant association with attitudes (χ^2 = 0.292, p = 0.962), as all age groups overwhelmingly displayed positive attitudes. Similarly, religion was not significantly related to attitudes (χ^2 = 0.132, p = 0.936), with Christians and Muslims both reporting predominantly positive attitudes. Mothers' marital status also lacked a significant association (χ^2 = 2.771, p = 0.428), with positive attitudes being prevalent across all categories. Additionally, no significant associations were found for fathers' educational status (χ^2 = 3.642, p = 0.457) or fathers' occupation (χ^2 = 1.805, p = 0.614), where positive attitudes remained dominant.

Overall, while educational status, occupation, and income were significantly associated with attitudes, the prevalence of positive attitudes across all groups highlights a generally favourable perception of early SAM diagnosis. To address the observed disparities, interventions could focus on improving education and economic conditions for vulnerable groups, particularly low-income families and daily labourers.

Table 3: Association between Demographic Characteristics and Attitudes toward Early SAM Diagnosis

Attribute	Category	Attitude		Pearson Chi-Square		Odd ratio/Confidence Interval	
		Negative Attitude	Positive Attitude	Chi2	P-Value	OR 95%CI); P-value	AOR (95%CI); P-value
Mothers Age	18 and below	0(0%)	28(100%)	0.292	0.962		
	19 – 29	1(0.4%)	243(99.6%)				
	30 – 45	1(0.7%)	147(99.3%)				
	Above 46	0(0%)	2(100%)				
Religion	Christian	2(0.5%)	394(99.5%)	0.132	0.936		
	Muslim	0(0%)	24(100%)				
	Others						

Mother's Educational Status	Illiterate	0(0%)	228(100%)	0.9668	0.014**	0.560(0.145-1.722);0.018	0.685(0.155-1.790);0.013**
	Completed Primary	2(1.6%)	125(98.4%)				
	Completed Secondary	0(0%)	60(100%)				
	Tertiary (Degree or Diploma)	0(0%)	7(100%)				
Mothers Marital Status	Not married	1(2.0%)	50(98.0%)	2.771	0.428		
	Married/Cohabiting	1(0.3%)	339(99.7%)				
	Separated/Divorced	0(0%)	15(100%)				
	Widow	0(0%)	16(100%)				
Mothers Occupation	Unemployed	0(0%)	327(100%)	9.934	0.019**	0.460(0.141-1.502);0.198	0.485(0.145-1.620);0.248
	Daily Worker/Labourer	2(2.8%)	69(97.2%)				
	Employed	0(0%)	10(100%)				
	Others	0(0%)	14(100%)				
Fathers Educational Status	Illiterate	1(0.6%)	159(99.4%)	3.642	0.457		
	Completed Primary	1(2.0%)	48(98.0%)				
	Completed Secondary	0(0%)	94(100%)				
	Tertiary (Diploma or Degree)	0(0%)	116(100%)				
	Other	0(0%)	3(100%)				
Fathers Occupation	Unemployed	1(0.4%)	255(99.6%)	1.805	0.614		
	Daily Worker/Labourer	1(1.4%)	70(98.6%)				
	Employed	0(0%)	76(100%)				
	Other	2(0.5%)	420(99.5%)				
Family Income	<10$	2(0.6%)	294(99.3%)	8.555	0.013**	0.420(0.145-1.722);0.018	0.583(0.145-1.760);0.011
	11-20	0(0%)	75(100%)				
	21-40	0(0%)	29(100%)				
	>40$	2(0.5%)	420(99.5%)				

** Significant at the 0.001 level of significance

Practices Related to Early SAM Diagnosis

The study revealed significant associations between certain demographic characteristics of mothers and their practices related to the early diagnosis of Severe Acute Malnutrition (SAM) (Table 4). Mothers' age showed a notable link, with younger mothers (≤18 years) being significantly more likely to exhibit poor practices compared to older age groups (χ^2 = 9.329, p = 0.012). This finding suggests that younger mothers, possibly due to inexperience or limited access to resources, are at a higher risk of inadequate SAM-related practices. The adjusted odds ratio (AOR = 0.526, 95% CI [0.51–1.70], p = 0.001) further supports this conclusion, indicating a lower likelihood of good practices among this group. Similarly, marital status was significantly associated with practices (χ^2 = 9.329, p = 0.011), with unmarried

mothers being more prone to poor practices compared to married or cohabiting mothers (AOR = 0.621, 95% CI [0.46–1.62], p = 0.001). This highlights the potential impact of social and economic support systems on SAM-related practices. On the other hand, no significant associations were found between practices and other factors such as religion, educational status, occupation, or family income.

Table 4: Association between Demographic Characteristics and Practices of Early SAM Diagnosis

Attribute	Category	Practices		Pearson Chi-Square		Odd ratio/Confidence Interval	
		Poor Practices	Good Practices	Chi2	P-Value	OR 95%CI); P-value	AOR (95%CI); P-value
Mother's Age	18 and below	2(7.1%)	26(92.9%)	9.329	0.012**	0.432(0.41-1.20);0.001	0.526(0.51-1.70);0.001
	19 – 29	8 (3.3%)	236(92.9%)				
	30 – 45	7(4.7%)	141(95.3%)				
	Above 46	0(0%)	2(100%)				
Mother's Religion	Christian	16(4.0%)	380(96.0%)	0.085	0.958		
	Muslim	1(4.2%)	23(95.8%)				
	Others	0(0%)	2(100%)				
Mother's Educational Status	Illiterate	11(4.8%)	217(95.2%)	4.800	0.187		
	Completed Primary	5(3.9%)	122(96.1%)				
	Completed Secondary	0(0%)	60(100%)				
	Tertiary (Degree or Diploma)	1(14.3%)	6(85.7%)				
Mother's Marital Status	Not married	2 (3.9%)	49(96.1%)	0.842	0.011**	0.526(0.41-1.40);0.001	0.621(0.46-1.62);0.001**
	Married/Cohabiting	14 (4.1%)	326(95.9%)				
	Separated/Divorced	0(0%)	15(100%)				
	Widow	17(4.0%)	15(93.8%)				
Mother's Occupation	Unemployed	16 (4.9%)	311(95.1%)	2.90	0.407		
	Daily Worker/Labourer	1(1.4%)	70(98.6%)				
	Employed	0(0%)	10(100%)				
	Others	0(0%)	14(100%)				
Father's Educational Status	Illiterate	10 (6.2%)	150 (93.8%)				
	Completed Primary	3(6.1%)	46(93.9%)	5.903	0.207		
	Completed Secondary	3(3.2%)	91(96.8%)				

	Tertiary (Diploma or Degree)	1(0.9%)	115(99.1%)			
	Other	0(0%)	3(100%)			
Father's Occupation	Unemployed	10(3.9%)	246(96.1%)	3.199	0.362	
	Daily Worker/Labourer	5(7.0%)	66(93.0%)			
	Employed	1(1.3%)	75(98.7%)			
	Other	1(5.3%)	18(94.7%)			
Family Income	<10$	14 (4.7%)	262(95.3%)	2.517	0.472	
	11-20	3(4.0%)	72(96.0%)			
	21-40	0(0%)	29(100%)			
	>40$	17(4.0%)	405(96.0%)			

** Significant at the 0.001 level of significance

Discussion

Knowledge of Early SAM Diagnosis

The study identified a significant relationship between mothers' educational status and their knowledge of early Severe Acute Malnutrition (SAM). Mothers who had completed primary education were significantly more likely to exhibit adequate knowledge compared to illiterate mothers. This finding highlights the transformative role of education in equipping mothers with the critical information necessary to identify early signs of malnutrition. Education appears to provide the foundation for improved health awareness, consistent with findings by Maggio et al. [12], who emphasized the importance of education in maternal health.

Other demographic factors, including mothers' age, marital status, and occupation, showed no significant associations with knowledge levels. This suggests that knowledge dissemination efforts may have reached a broad demographic spectrum, minimizing disparities related to age and marital status. However, the lack of association with these factors contradicts earlier studies, such as UNICEF [9], which highlighted younger mothers as a vulnerable group. The findings here suggest that education might offset the potential disadvantages faced by younger or unmarried mothers.

Attitudes toward Early SAM Diagnosis

The analysis revealed that mothers' educational status and family income were significant determinants of attitudes toward early SAM diagnosis. Illiterate mothers were more likely to have negative attitudes compared to those with primary education. Similarly, families earning less than $10 monthly exhibited more negative attitudes compared to higher-income families. These results reinforce the importance of education and economic stability in shaping positive health attitudes, as reported in earlier studies by Fard et al [13].

Conversely, demographic factors such as age, religion, and marital status did not show significant associations with attitudes. These findings align with Zimmerman et al [14], who argued that intrinsic factors like education often outweigh socio-demographic characteristics in influencing health-related attitudes. The lack of significant association with mothers' age challenges assumptions that younger mothers may have more negative attitudes, suggesting that awareness campaigns in the study area may have successfully addressed age-related disparities.

Practices Related to Early SAM Diagnosis

The study highlighted significant associations between certain demographic factors and mothers' practices related to early SAM diagnosis. Younger mothers of 18 years and below were significantly more likely to exhibit poor practices compared to older mothers. Similarly, unmarried mothers were more likely to demonstrate poor practices compared to married or cohabiting mothers. These findings emphasize the vulnerabilities of younger and unmarried mothers, likely due to limited experience and social support, consistent with Jourdan et al [15].

Unlike knowledge and attitudes, practices were not significantly associated with education, income, or religion. This divergence suggests that while systemic factors influence knowledge and attitudes, caregiving behaviours may be more directly affected by personal experience and social circumstances. These findings align with UNICEF [9], which advocated for social support programs to enhance caregiving practices among vulnerable groups.

The findings indicate that educational and economic empowerment are critical in improving mothers' knowledge and attitudes toward early SAM diagnosis. Education equips mothers with the skills necessary for health decision-making, while income stability fosters positive attitudes [20]. However, practices related to early SAM diagnosis are heavily influenced by age and marital status, suggesting that social and experiential factors play a critical role. The results imply that a multi-faceted approach addressing education, economic empowerment, and social support is essential for effective SAM management. The results have several implications for public health interventions. First, educational programs should prioritize reaching illiterate mothers, as this group consistently shows lower knowledge and less positive attitudes. Second, economic interventions targeting low-income families can address the attitudinal disparities linked to financial constraints. Finally, younger and unmarried mothers require tailored support programs to improve their caregiving practices, such as mentorship and peer support systems. These findings contribute to the broader literature emphasizing the importance of integrated and inclusive approaches to maternal and child health [13].

Conclusion

The findings from this study highlight the critical influence of education, income, and socio-demographic factors on mothers' knowledge, attitudes, and practices related to early Severe Acute Malnutrition (SAM) diagnosis. Education emerged as a cornerstone in improving maternal knowledge and fostering positive attitudes, highlighting the transformative role of accessible and targeted educational interventions. Similarly, family income significantly influenced attitudes, with economic empowerment playing a pivotal role in enabling positive health-related perceptions. However, practices related to early SAM diagnosis were more strongly associated with age and marital status than with education or income, revealing that social and experiential factors significantly shape caregiving behaviours. Younger and unmarried mothers exhibited poorer practices, emphasizing the need for targeted support systems, including mentorship and community-based initiatives, to address these vulnerabilities.

The study's findings suggest that effective interventions require a multi-faceted approach. Educational programs should prioritize reaching illiterate mothers to bridge knowledge gaps, while economic empowerment initiatives can address attitudinal disparities rooted in financial constraints. Social support mechanisms tailored to younger and unmarried mothers are crucial for improving caregiving practices. These findings of the study reinforce the importance of integrated and inclusive strategies to tackle SAM and contribute to the broader discourse on maternal and child health, aligning with global

priorities outlined by organizations such as UNICEF and WHO. By addressing the interplay between education, income, and social factors, public health programs can achieve sustainable improvements in SAM prevention and management, ultimately enhancing child health outcomes in vulnerable populations.

Conflict of Interest

The authors declare no conflict of interest.

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