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Risk factors for childhood underweight: A cross-sectional design-based logistic regression analysis

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ABSTRACT

Childhood undernutrition, especially underweight, remains a major public health concern in Yemen, worsened by ongoing conflict and economic hardship. This study aimed to identify risk factors associated with underweight among children under five years of age using data from the 2022–2023 Yemen Multiple Indicator Cluster Survey (MICS), which included 19,561 children. Survey-weighted logistic regression was used to analyze the data, accounting for the complex survey design. Initial Chi-square tests were followed by bivariate and multivariable regression models to estimate unadjusted and adjusted odds ratios (UORs and AORs) with 95% confidence intervals (CIs). Results showed that male children had a higher risk of being underweight (AOR = 1.12, 95% CI: 1.04–1.21). Children aged 36–47 months were at the greatest risk compared to those aged 0–5 months (AOR = 1.87, 95% CI: 1.60–2.20). Household wealth was a strong predictor, with children from the poorest households having nearly four times the odds of being underweight compared to those from the richest households (AOR = 3.80, 95% CI: 3.04–4.74). Maternal education, access to improved water and sanitation, and availability of a hand-washing place were not statistically significant. These findings highlight the importance of addressing child sex, age, and poverty in efforts to reduce undernutrition and promote child health in Yemen's challenging context.

1. Introduction

Childhood underweight, defined as having a weight-for-age more than two standard deviations below the WHO Child Growth Standards, may be caused by stunting, wasting, or a combination of both (Meyers et al., 2013). It remains a significant global health issue, especially in low- and middle-income countries. In 2022, about 148.1 million children under five were stunted, 45 million were wasted, and 37 million were overweight, with 22.3% affected by stunting and 13.7 million experiencing severe wasting. In the Eastern Mediterranean region, underweight prevalence varies, particularly in conflict-affected countries like Yemen.

Childhood undernutrition in Yemen is critical, with approximately 2 million children suffering from acute malnutrition, including 325,000 under five years old with severe acute malnutrition (SAM) (UNICEF, 2020). The ongoing conflict, economic hardship, food insecurity, and limited access to healthcare have exacerbated the situation, making Yemen one of the countries with the highest malnutrition rates in the world (UNICEF, 2020). The World Bank reports that over 17 million people in Yemen face food insecurity, with 3.5 million experiencing severe malnutrition.

Yemen's underweight prevalence among children has reached alarming levels, with a rate as high as 39%. Studies show that the percentage of underweight children has significantly increased during the ongoing conflict (El Bcheraoui et al., 2018). Yemen is among the countries with the highest childhood underweight rates in the Middle

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East and North Africa (Jones-Antwi and Cunningham, 2023), highlighting the urgent need for targeted nutrition interventions.

This study aims to identify and analyze risk factors influencing childhood underweight in Yemen, using data from the 2022–2023 Multiple Indicator Cluster Survey (MICS). By utilizing the most recent nationally representative data, it provides an up-to-date and comprehensive understanding of childhood underweight in the context of Yemen's ongoing conflict and humanitarian crisis. Despite limited attention to this issue, this research seeks to address critical knowledge gaps. Its significance lies in providing insights that can guide targeted interventions to reduce childhood underweight. The study's findings will inform policies and programs addressing the root causes of this health concern. The following sections will outline the study design, analytical approach, results, and broader implications.

2. Methods

2.1. Study setting and design

This study employs a retrospective cross-sectional design, utilizing data from the 2022/2023 Multiple Indicator Cluster Survey (MICS) for Yemen. The survey was conducted by the Central Statistics Office of Yemen in collaboration with UNICEF. MICS, an international household survey initiative developed by the United Nations, aims to provide nationally representative, cross-sectional data on a wide range of health and socio-demographic indicators, with a particular emphasis on women and children. The Yemen 2022/2023 MICS collected data from a nationally representative sample of households using a stratified, multistage cluster sampling design, ensuring reliable and comprehensive insights into the population's health and living conditions. Detailed information on the survey's methodology, design, and sampling procedures is available in UNICEF (2023). For this study, a total of 19,561 children under five years of age were included in the analysis. Further details about the Yemen 2022/2023 MICS, including data accessibility and key findings, are available in (UNICEF, 2023).

2.2. Study variables and measurement

The primary outcome variable in this study is underweight status, defined as a binary variable categorized as either "yes" (underweight) or "no" (not underweight). Underweight status is assessed based on the weight-for-age Z-score (WAZ). Children are classified as moderate or severely underweight if their WAZ is more than two standard deviations below the median of the WHO reference population. To ensure data quality, children were excluded from the analysis if their weight or age measurements were missing, unreported, or implausible, defined as WAZ values falling outside the range of -6 to +6. The explanatory variables in this study include child-related factors such as the child's age, categorized into age groups in months (0–5, 6–11, 12–23, 24–35, 36–47, 48–59), and the child's sex (male or female). Household-related factors encompass the residential area (urban or rural), household wealth index (poorest, second, third, fourth), source of drinking water (improved or unimproved), sanitation facility (improved or unimproved), and the availability of a place for handwashing (observed or unobserved). Maternal-related factors include functional difficulties among women aged 18–49 years (categorized as having functional difficulties or not) and the mother's educational level, classified as pre-primary or none, primary education, lower secondary education, upper secondary education, or higher.

2.3. Statistical analysis

Descriptive statistical analysis was conducted to summarize the characteristics of the study sample and to assess the prevalence of underweight across the different categories of explanatory variables. The Chi-square test was employed to examine the bivariate associations between underweight status and various child, maternal, and household factors. Further, the statistical analysis was carried out using a two-model approach to evaluate the relationship between underweight status and the explanatory variables. Model 1, the bivariate survey logistic regression, was employed to assess the association between underweight status and each explanatory variable individually. This model reported unadjusted odds ratios (UORs) along with their 95% confidence intervals (CIs). Model 2, the multivariable survey logistic regression, was used to examine the combined effects of all explanatory variables, presenting adjusted odds ratios (AORs) with their 95% CIs. Survey logistic regression was chosen over ordinary logistic regression to appropriately account for the complex survey design, which included clustering, stratification, and the differential weighting of observations, ensuring valid and reliable estimates. Statistical significance was determined at a p-value of <0.05. All analyses were conducted using IBM SPSS Version 26.

3. Results

3.1. Descriptive statistics

Table 1 provides an overview of the study sample, which includes 19,561 children under five years of age. Of these, 18,413 had valid weight and age data. Most children live in rural areas (72.5%) compared to urban areas (27.5%), and the sample is nearly evenly divided by sex (51.3% male, 48.7% female). The age groups show a relatively balanced distribution, with the largest proportion of children aged 12–23 months (20.3%) and 24–35 months

(21.0%), while the smallest group consists of children aged 48–59 months (17.7%). A significant portion of mothers have low education levels, with 40.6% having pre-primary or no education. Most children (86.8%) have mothers without functional difficulties, while 11.3% have mothers reporting functional difficulties. The household wealth index reveals a more even distribution across quintiles, with 24.0% of children in the poorest category and 16.7% in the richest quintile. Access to improved drinking water is available to 79.0% of children, while 21.0% lack access to improved resources. Similarly, 60.0% of households have improved sanitation facilities, and 40.0% do not. The place for handwashing is observed in 89.6% of cases, with 10.4% reporting unobserved hand-washing facilities.

Table 1: Study sample characteristics among underweight children

Variables		Number of children	
		Count	Percent
Area	Urban	5071	27.5%
	Rural	13342	72.5%
Sex	Male	9455	51.3%
	Female	8958	48.7%
Age (months)	0-5	1816	9.9%
	6-11	1984	10.8%
	12-23	3743	20.3%
	24-35	3870	21.0%
	36-47	3742	20.3%
	48-59	3257	17.7%
Mother's education	Pre-primary or none	7484	40.6%
	Primary education	4688	25.5%
	Lower secondary education	2230	12.1%
	Upper secondary education	3156	17.1%
	Higher	847	4.6%
	Missing	8	0.1%
Functional difficulties (age 18-49 years)	With functional difficulties	2077	11.3%
	Without functional difficulties	15991	86.8%
	Missing	345	1.9%
Wealth index quintile	Poorest	4415	24.0%
	Second	2828	20.8%
	Third	3488	18.9%
	Fourth	3603	19.6%
	Richest	3069	16.7%
Improved source of drinking water	Unimproved	3867	21.0%
	Improved	14545	79.0%
Improved sanitation facility	Unimproved	7361	40.0%
	Improved	11050	60.0%
	Missing	1	0.0%
Place for handwashing	Unobserved	1907	10.4%
	Observed	16505	89.6%

Fig. 1 illustrates the prevalence of underweight children across Yemen's governorates, with an overall prevalence of underweight at 40.7%. While some areas, such as Almaharah and Hadramaut, exhibit relatively low underweight prevalence, others, particularly Sana'a City, have alarmingly high rates, with more than 70% of children classified as underweight. Governorates like Raymah, Hajjah, and Al Jawf also show notably high levels of underweight, suggesting that child malnutrition is a serious issue in these regions.

3.2. Association between prevalence of underweight and child, maternal, and household characteristics

Table 2 presents the results from the chi-square test examining the association between underweight prevalence and various child, maternal, and household variables. Children from rural areas have a higher underweight prevalence (44.1%) compared to those from urban areas (32.0%). Sex also plays a role, with males having a slightly higher prevalence (41.8%) compared to females (39.7%), and this difference is statistically significant (p = 0.004). Regarding the child's age, the prevalence increases with age, peaking in the 36-47 months group (45.4%) and remaining high in the 48-59 months group (42.4%). Lower maternal education levels are associated with higher underweight prevalence, with children of mothers with pre-primary or no education showing the highest rates (47.3%). No significant association was found between maternal functional difficulties and underweight (p = 0.61). The wealth index reveals a clear trend, with children from the poorest households showing a significantly higher prevalence (56.7%) than those from wealthier households (26.8%). Children lacking access to improved drinking water (50.6%) and sanitation (47.2%) are more likely to be underweight, while unobserved hand-washing facilities are also linked to higher prevalence (49.7%).

3.3. Modelling the risk factors of underweight status among children

Table 3 presents the unadjusted and adjusted prevalence odds derived from univariate and multivariate survey logistic regression analyses. It highlights the relationships between various factors and the likelihood of underweight status among children under five years of age. The unadjusted odds ratios, derived from univariate survey logistic regression analysis (Model 1), highlight key factors associated with underweight status among children.

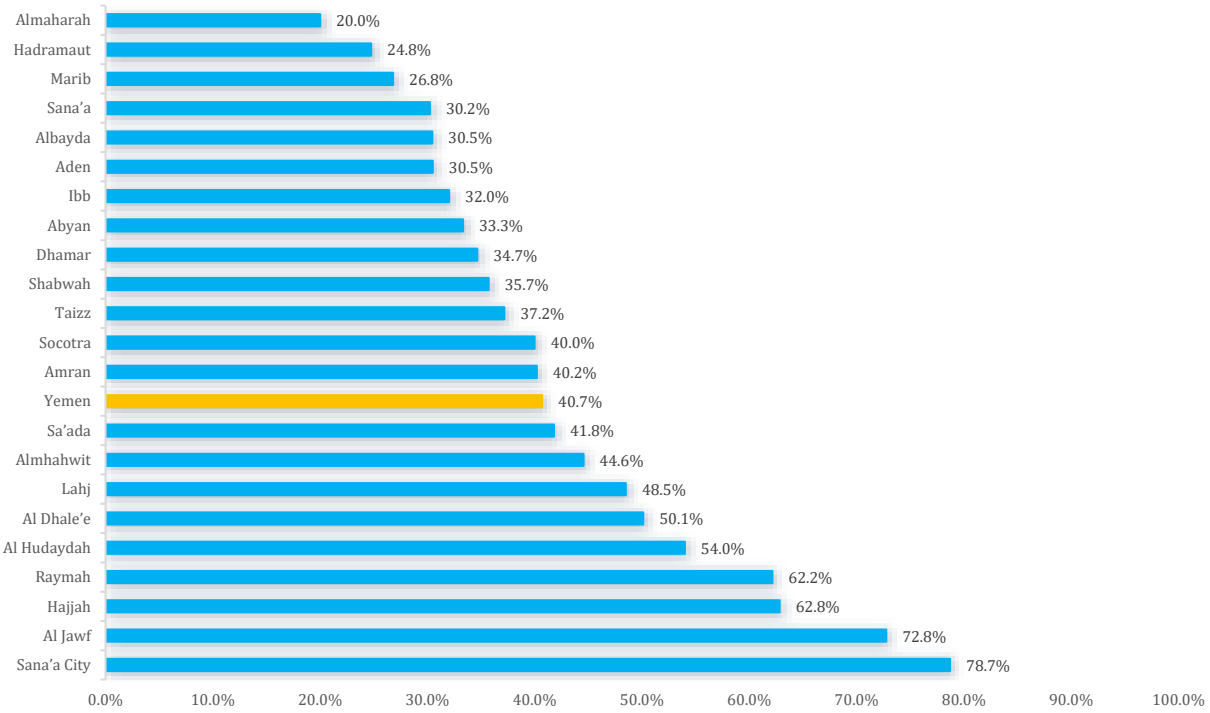

Fig. 1: Prevalence of underweight among Yemen's governorates

Table 2: Association between prevalence of underweight and child, maternal, and household characteristics

Variables	Prevalence of underweight		Chi-square statistic	*P*-value
	Count	Percent		
Residential area				
Urban	1622	32.0%	222.029	<0.005
Rural	5879	44.1%		
Child's sex				
Male	3948	41.8%	8.38	0.004
Female	3553	39.7%		
Child's age (months)				
0-5	579	31.9%	118.061	<0.005
6-11	708	35.7%		
12-23	1528	40.8%		
24-35	1606	41.5%		
36-47	1698	45.4%		
48-59	1382	42.4%		
Mother's education				
Pre-primary or none	3542	47.3%	265.307	<0.005
Primary education	1827	39.0%		
Lower secondary education	827	37.1%		
Upper secondary education	1046	33.1%		
Higher education	258	30.5%		
Functional difficulties (age 18-49 years)				
Has functional difficulties	856	41.2%	0.26	0.61
Has no functional difficulties	6497	40.6%		
Wealth index quintile				
Poorest	2505	56.7%	836.003	<0.005
Second	1688	44.0%		
Middle	1290	37.0%		
Fourth	1195	33.2%		
Richest	824	26.8%		
Source of drinking water				
Unimproved	1957	50.6%	197.44	<0.005
Improved	5544	38.1%		
Sanitation facility				
Unimproved	3473	47.2%	210.77	<0.005
Improved	4028	36.4%		
Place for handwashing				
Unobserved	947	49.7%	70.101	<0.005
Observed	6554	39.7%		

Children residing in rural areas were 67% more likely to be underweight compared to their urban counterparts (UOR=1.67, 95% CI=1.49–1.88). Male children were 9% more likely to be underweight than females (UOR=1.09, 95% CI=1.01–1.17). Age-specific differences were observed, with older children facing progressively higher odds of being underweight compared to infants aged 0–5 months, ranging from 19% higher odds for children aged 6–11 months (UOR=1.19, 95% CI=1.00–1.41) to 77% higher odds for those aged 36–47 months (UOR=1.77, 95% CI=1.52–2.06). Maternal education showed a strong inverse relationship, as children of mothers with no or low education were up to 2.06 times more likely to be underweight than those whose mothers had higher education (UOR=2.06,

95% CI=1.63–2.59). Children from the poorest households were 3.58 times more likely to be underweight compared to those from the wealthiest households (UOR=3.58, 95% CI=3.06–4.18), and those in the middle and second wealth quintiles also had increased odds (UOR=1.60, 95% CI=1.39–1.84 and UOR=2.14, 95% CI=1.85–2.48, respectively). Additionally, children in households without improved drinking water sources were 66% more likely to be underweight (UOR=1.66, 95% CI=1.46–1.90), and those without improved sanitation facilities had 56% higher odds (UOR=1.56, 95% CI=1.39–1.74). Finally, households without a designated hand-washing facility further increased the likelihood of underweight status by 50% (UOR=1.50, 95% CI=1.30–1.72).

The adjusted analysis, derived from multivariate survey logistic regression analysis (Model 2), highlights significant associations between children's age, sex, and household wealth index with underweight status. Male children had 12% higher odds of being underweight compared to females (AOR = 1.12, 95% CI: 1.04–1.21). The odds of being underweight increased with age; children aged 36–47 months had 87% higher odds (AOR = 1.87, 95% CI: 1.60–2.20), and those aged 48–59 months had 62% higher odds (APOR = 1.62, 95% CI: 1.38–1.90) compared to infants aged 0–5 months. Household wealth was strongly associated with underweight status, as children in the poorest households had 3.8 times higher odds (AOR = 3.80, 95% CI: 3.04–4.74), while those in the second and middle wealth quintiles had 2.33 (95% CI: 1.91–2.84) and 1.74 (95% CI: 1.44–2.09) times higher odds, respectively, compared to children in the richest households. These findings underscore the critical need for poverty alleviation initiatives and targeted nutritional support programs, particularly in the poorest households, as part of broader humanitarian efforts to mitigate childhood underweight in Yemen's conflict-affected regions. In contrast, maternal education, access to improved drinking water, improved sanitation facilities, and having a designated hand-washing place showed no statistically significant associations after adjustment, with confidence intervals including the null value.

In summary, the factors that significantly impact the likelihood of underweight among Yemeni children are their sex, age, and household wealth. While maternal education and access to improved water, sanitation, and hand-washing facilities were initially significant, they did not remain associated with underweight after adjusting for other factors. The next section will discuss these results in the context of existing literature and explore their implications for policy and practice.

Table 3: Survey logistic regression results of modeling factors associated with the underweight prevalence

Variables	Unadjusted odds ratio (UOR)			Adjusted odds ratio (AOR)		
	Odds Ratio	95% confidence interval		Odds ratio	95% confidence interval	
		Lower	Upper		Lower	Upper
Area						
Rural	1.67***	1.49	1.88	0.86	0.75	1.00
Urban		1.00			1.00	
Sex						
Male	1.09*	1.01	1.17	1.12 ***	1.04	1.21
Female		1.00			1.00	
Age (months)						
6-11	1.19***	1.00	1.41	1.25 ***	1.05	1.50
12-23	1.47***	1.25	1.74	1.55 ***	1.31	1.84
24-35	1.51*	1.31	1.75	1.60 *	1.37	1.86
36-47	1.77*	1.52	2.06	1.87 *	1.60	2.20
48-59	1.57*	1.35	1.83	1.62 *	1.38	1.90
0-5		1.00			1.00	
Mother's education						
Pre-primary or none	2.06***	1.63	2.59	1.19	0.94	1.50
Primary education	1.46***	1.16	1.84	1.05	0.83	1.33
Lower secondary education	1.35*	1.04	1.74	1.13	0.87	1.45
Upper secondary education	1.13	0.89	1.44	0.96	0.76	1.23
Higher education		1.00			1.00	
Wealth index quintile						
Poorest	3.58***	3.06	4.18	3.80 ***	3.04	4.74
Second	2.14***	1.85	2.48	2.33 ***	1.91	2.84
Middle	1.60***	1.39	1.84	1.74 ***	1.44	2.09
Fourth	1.35***	1.16	1.58	1.36 ***	1.16	1.61
Richest		1.00			1.00	
Improved source of drinking water						
Unimproved	1.66***	1.46	1.90	0.98	0.85	1.12
Improved		1.00			1.00	
Improved sanitation facility						
Unimproved	1.56***	1.39	1.74	0.99	0.88	1.12
Improved		1.00			1.00	
Place for handwashing						
Unobserved	1.50***	1.30	1.72	1.10	0.98	1.25
Observed		1.00			1.00	

*: Significant at 0.05; ***: Significant at 0.005

4. Discussion

The findings of this study provide critical insights into the factors influencing childhood underweight in Yemen. Utilizing the most recent nationally representative data from the 2022-2023 Yemen MICS, the study identified key determinants such as the child's sex, age, and household wealth index. These findings not only confirm some established patterns in global and regional contexts but also

offer nuanced implications specific to Yemen's complex humanitarian crisis.

The analysis revealed that male children were more likely to be underweight than females, a finding consistent with existing research. A study conducted by Thurstans et al. (2022) found that, although the differences were small, boys were more likely to be undernourished than girls overall. Similarly, Thurstans et al. (2020) noted that undernutrition is more common among boys than girls in most settings studied, though the extent of these differences varies. Additionally, societal gender norms and feeding practices may play a role in some contexts, though these factors can vary widely across different cultures and regions (Jabbour et al., 2023). The observed higher risk of underweight among male children highlights the importance of considering gender differences when designing and implementing nutrition interventions. To ensure equitable outcomes, nutrition programs should address these disparities by incorporating gender-sensitive approaches. Community-based education and awareness campaigns can promote gender-sensitive feeding practices, ensuring that both boys and girls receive adequate nutrition and are not disadvantaged by biological or societal factors.

The study finds that all age groups from 6 months to 59 months show significant unadjusted and adjusted odds ratios for underweight status, which aligns with the literature highlighting the age-specific risks of child malnutrition. Research consistently demonstrates that the prevalence of underweight and wasting tends to peak during the second year of life, with studies showing a downward trend thereafter. Another study conducted in Ghana also supports the notion that mortality risks vary significantly across different age groups, with children aged 36-47 months being especially at risk when considering contextual factors such as maternal health and autonomy (Achana et al., 2024). Considering these findings, expanding the coverage of child health and nutrition programs, such as supplementary feeding and micronutrient supplementation, for children under five years old could prevent underweight and improve overall health outcomes. Scaling up programs like the Integrated Management of Childhood Illness (IMCI) and adapting them to the local context would be vital for addressing age-specific nutritional and health needs, ultimately improving child survival rates.

One of the most significant findings of this study is the strong association between household wealth and childhood underweight, emphasizing the critical role of economic disparities in shaping child health outcomes. Children from the poorest households were nearly four times more likely to be underweight compared to those from the richest households, a trend consistently observed across various studies in low- and middle-income settings. For example, research by Chowdhury et al. (2018) and Li et al. (2020) has established a socioeconomic gradient in child nutrition, with children from lower wealth quintiles facing significantly higher odds of being underweight. Similarly, Farooq et al. (2020) reported a strong negative correlation between household wealth and child underweight status. These findings underscore the urgent need for poverty alleviation initiatives, such as cash transfer programs, food aid, and income-generating activities, targeted at the most vulnerable households. Such interventions are particularly relevant in Yemen, where conflict has exacerbated poverty and food insecurity. Collaborative efforts between international donors, government agencies, and local organizations are essential to ensure equitable access to resources and services for the poorest families, mitigating the risk of underweight and improving child nutritional outcomes.

The analysis of this study reveals that children residing in rural areas face a higher risk of being underweight compared to their urban counterparts. This aligns with previous research reporting that rural children face greater risks of being underweight or experiencing poor nutritional status compared to urban children (Karunanayake et al., 2016; Dave et al., 2024). Another study revealed that children in rural areas have significantly higher rates of stunting and underweight compared to their urban counterparts, largely due to lower maternal education levels and poorer access to healthcare and nutrition (Nahar and Zahangir, 2024). Further research findings have suggested that while rural areas often appear to have worse health outcomes compared to urban regions, this difference is not always statistically significant after adjusting for other variables (Weeks et al., 2023; Pierce et al., 2023).

The findings of this study highlight the need for regionally tailored interventions that address the unique challenges of rural areas. These could include expanding healthcare services, improving infrastructure, enhancing transportation and supply chain networks, and integrating nutrition support with agricultural development programs to improve food security and dietary diversity in rural households. By targeting the root causes of child underweight in rural areas, such interventions could help bridge the rural-urban divide and improve children's nutritional outcomes.

The unadjusted results showed that lower maternal education levels were associated with significantly higher odds of childhood underweight in Yemen. These results are well-supported by existing literature. A comprehensive study in Yemen demonstrated that the prevalence of malnourished children consistently decreases as mothers' education level increases, confirming the protective effect of maternal education against child undernutrition (Sunil, 2009). This relationship is further substantiated by research examining correlates of child undernutrition in Yemen, which found striking differences in child nutritional status based on maternal education levels. Additionally, a study of rural Yemen revealed that lower maternal education levels were significantly associated with

poor child nutritional outcomes, including underweight status (Al-Sobaihi et al., 2016).

The study findings that lack of improved water sources and sanitation facilities were significant predictors of childhood underweight in the unadjusted analysis are well-supported by existing evidence. Momberg et al. (2021) found that improved water sources were associated with significantly lower odds of underweight compared to non-improved sources. The mechanism behind this relationship is demonstrated by research conducted by Tasnim et al. (2017), which showed that a lack of access to clean water facilities and sanitary latrines significantly increased the risk of infectious diseases and subsequent underweight in children. This is further supported by evidence from Nadeem et al. (2024), which found that a child's risk of being underweight decreases significantly with access to improved water and sanitation facilities, primarily through the reduction of infections and diseases.

The lack of access to improved water sources, sanitation facilities, and unobserved handwashing stations was found to be significantly associated with childhood underweight in the unadjusted analysis. These environmental factors play a crucial role in childhood undernutrition, as inadequate access to clean water and proper sanitation is linked to increased risk of infectious diseases, which in turn affect nutritional status (Bekele et al., 2020). Unimproved drinking water sources and sanitation, along with the absence of handwashing stations, contribute to the spread of childhood underweight, a finding that has been corroborated in similar studies from low-income and middle-income countries (Nadeem et al., 2024; Shrestha et al., 2020). These results highlight the importance of improving environmental conditions to reduce the burden of childhood underweight and improve overall child health outcomes.

The findings of this study have direct implications for policymakers and humanitarian organizations working in Yemen. Given the protracted nature of the conflict, immediate and sustained efforts are required to address the underlying determinants of childhood underweight. Policies should prioritize the integration of nutrition programs with broader humanitarian efforts, including food security, healthcare, and economic support initiatives. Furthermore, ensuring the inclusion of marginalized groups, such as internally displaced persons and households in conflict-affected regions, is vital for equitable program coverage.

5. Conclusion

This study presents vital insights into the complex landscape of childhood underweight in Yemen, drawing from recent national data collected during 2022-2023. The findings reveal that a child's sex, age, and household wealth stand as primary determinants of underweight status, while previously assumed factors such as maternal education and WASH facilities showed less significance than anticipated when accounting for other variables. These results carry substantial implications for policy development and intervention strategies in Yemen. The strong association between household wealth and childhood underweight underscores the need for broader economic support mechanisms and targeted nutritional assistance programs for low-income families. The identified age-related patterns suggest critical windows for intervention, pointing to the importance of age-specific nutritional support and monitoring systems. Future research should consider longitudinal studies to better understand the temporal dynamics of underweight development and explore additional factors such as food security, healthcare access, and the impact of conflict on nutritional outcomes.

6. Strengths and Limitations

This study offers both notable strengths and constraints. The study's foundation on the 2022-2023 Yemen MICS data brings substantial credibility, offering current, nationally representative insights. The clear identification of key factors - from rural living conditions to wealth disparities - provides concrete direction for policy action. Yet, the cross-sectional nature of the data limits our ability to establish cause-and-effect relationships. Still, we acknowledge two key constraints: the cross-sectional design prevents causal inference, and the scope excludes vital contextual elements. These missing components, ranging from conflict impacts to dietary practices and healthcare accessibility, could offer a deeper understanding of childhood underweight patterns in Yemen.

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Compliance with ethical standards

Ethical considerations

Access to the dataset was granted after submitting a formal request via UNICEF’s MICS platform (http://mics.unicef.org/surveys). The 2022-2023 Yemen MICS dataset used in this analysis was publicly available and anonymized to protect the privacy of participants.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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