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Hand-Washing at Critical Times and Associated Factors Among Mothers/Caregivers of Under-Five Year Children in Nefas Silk Lafto Sub-City, Addis Ababa, Ethiopia

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Abstract

Background: Hand washing is the simplest, most affordable, and most effective means of limiting the spread of infections. Despite increasing efforts to improve hand washing at critical times (after defecation, after handling child/adult feces or cleaning child's bottom, after cleaning the environment, before preparing food, and before eating food), mothers/caregivers of under-five children fail to conduct it; but the reason appears unclear. Thus, this study sought to identify hand washing at critical times and associated factors among mothers/caregivers of under-five children in Nefas Silk Lafto Sub-City, Addis Ababa, Ethiopia.

Methods: A facility-based cross-sectional study was conducted on April 1-15, 2019, and 312 mothers/caregivers participated. A pretested questionnaire was used to collect data from participants by interviewer-administered technique and the data were analyzed with the Statistical Package for Social Science version 20. The factors were determined by conducting logistic regression and the crude odds ratio (COR) and adjusted odds ratio (AOR) with their respective 95% confidence intervals. All statistical tests were conducted at a 5% level of significance.

Results: The study revealed that 232 (74.4%; 95% CI [69.6%-79.2%]) mothers/caregivers washed their hands at critical times. The illiterate mothers/caregivers and mothers/caregivers who lacked tap water inside the home or the backyard had 66% (AOR = 0.34; 95%CI [0.17-0.69]) and 62% (AOR = 0.38; 95%CI [0.18-0.80]) reduced odds of washing hands at critical times, respectively. Mothers/caregivers from middle had (AOR = 4.56; 95%CI [1.84-11.33]), richer had (AOR = 5.61; 95%CI [2.11-15.30]), and the richest had (AOR = 6.14; 95%CI [2.24-16.72]) times increased likelihood of washing hands at critical times than the poorest.

Conclusion: The majority of mothers/caregivers practiced hand washing at critical times, and improving maternal literacy, household economy, and availability of water sources in the backyard are needed to maintain and enhance the practice.

Keywords

Addis Ababa, critical times, factors, hand washing, Nefas Silk

Background

Globally, about 1.7 billion cases and 525,000 deaths of under-five children occur per year due to diarrhea secondary to poor hygiene.[1] In developing countries, 80% of the disease burden is associated with poor domestic and personal hygiene.[2] More than 2 million people, mostly children, die yearly due to diarrhea; the same numbers of children also die from acute respiratory infections.[3] In Ethiopia, more than 250,000 children die per year and 60% to 80% of all deaths were attributed to poor

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sanitation and hygiene, and 70,000 under-five deaths per year in 2018 were due to diarrhea only.[4–6]

Hand washing is easy, do-yourself, and an affordable task for every community member. It is an effective means of stopping or limiting the spread of infections via feces, body fluids, and inanimate objects.[7] Hand washing with soap under running water is one of the most effective measures against infectious diseases like diarrhea.[8,9] It is easy to do, safe, cheap, and not time-consuming, and it can be effectively adopted by any socio-economic class and any community.[10,11] It is also generally acceptable across many population groups and socio-cultural backgrounds.[9] Consistent practice of proper hand washing with soap and running water has great potential of keeping a family, especially mothers and children away from germs and hence ill health. Mothers/caregivers engage in different activities like cleaning child's bottom, cleaning the home compound and environment, having contact with domestic animals, and visiting toilet that interacts hands with microorganism; thus, they are expected to properly wash their hands at critical moments.[10]

Five moments are considered critical times to wash hands; after defecation, after handling child/adult feces or cleaning child's bottom, after cleaning the environment, before preparing food, and before eating food.[10,12–14]

Evidence also shows that hand washing at critical times reduces rates of diarrheal diseases like cholera and dysentery by 41%.[15] It also has a better reward; 3.35 dollar investment in hand washing gives a backward benefit of 11.0 dollar investment in latrine construction, 200 dollar investment in water supply, and millions of dollars investment in immunization. However, proper hand washing with water and soap at critical times is inadequate; 0-34%.[16] According to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) joint monitoring program estimate on household drinking water, sanitation and hygiene, only 8% of Ethiopians had basic hand washing practice (with water and soap or substitutes) and the richest and urban residents practiced better hand washing than their counterparts.[17]

A study conducted in debark town, Amhara regional state in 2018 showed that 52.2% of study participants practiced hand washing with water and soap/substitutes at critical times and the practice was enhanced by a desirable attitude, presence of water for washing hands and a good knowledge of hand washing and its benefits.[18] A study conducted in Wondogenet woreda, Oromia region showed that 87% of mothers of under-five children practiced hand washing at critical times and their practice was enhanced by maternal literacy.[19] Another study carried out in Benchmaji zone, in Southern Nations Nationalities and People's Region (SNNPR) showed that 34.6% of the participants practiced hand washing at critical times and literate mothers had 90% reduced odds of practicing hand washing at critical times.[20]

Studies in Ethiopia used insignificant moments (after food preparation) or practically inconvenient moments like washing hands after sneezing, coughing, and touching clothes as critical times and others used four or five moments and revealed inconsistent findings on level and factors associated with hand washing at critical times among mothers of under-five children. Besides this, little is known about the practice among mothers/caregivers of under-five children in Nefas Silk Lafto Sub-City (NSLSC), Addis Ababa, Ethiopia. Therefore, the current study aimed at assessing hand washing practice at critical times (after visiting the toilet, after cleaning a child's bottom, before preparing food, before eating/feeding and cleaning compound) and associated factors among mothers of under-children in NSLSC, Addis Ababa, Ethiopia.

Methods

Study area: Nefas Silk Lafto Sub-City is one of the ten sub-cities in Addis Ababa. It borders the Kolfe Keranio, Lideta, Kirkos, Bole, and Akaki-Kaliti sub-cities. The sub-city is located between coordinates 8°56′57″ latitude and 38°43′58″ longitude. It is divided into 13 woredas and has total area coverage of 68.30 km^2 (26.37 square miles) hectares of land. The total population of the sub-city was estimated to be 366,006 with male to female ratio of 1:1 in 2021. A population is being served by 10 public health centers, 2 public hospitals, 34 private clinics and health coverage of the sub-city is 100%.[21] Regarding the water supply, about 95% of households get water from an improved source (piped water sources) and the estimated domestic per capita water consumption was 52 l/c/day. An improved sanitation coverage was below 10% (8%) in the sub-city and a hygiene index was medium (53%),[22] and there were no sustainably functioning public hand washing facilities in the sub-city.

Study design and period: Institution-based cross-sectional study was carried out on April 1-15, 2019.

Study populations: A study populations were who visited health facility during the survey period.

Sample size determination: The sample size was calculated manually using the single population proportion formula ($n = \frac{(\frac{z_1}{2})^2 p(1-p)}{d^2}$) with the following assumptions; the expected proportion (p) of hand washing practice at critical times 89.6%,[19] 5% significance level (z = 1.96), 5% margin of error (d), 2 design effect and 10% expected nonresponse rate gave us a sample size of 315.

Sampling procedures: Nefas Silk Lafto sub-city had 10 public health centers and 4 health centers (1 health center from each Woreda; woreda 1, 2, 4, and 12) were randomly selected by simple random sampling. The total sample required from each health center was allocated proportionally to the size of the under-five children in each health center catchment. The mothers/caregivers presenting to the health centers with their children for immunization and other childcare services were interviewed. They were selected with an interval of three via a systematic random sampling technique.

Study variables: The dependent variable was hand washing at critical times. The independent variables were maternal literacy, paternal literacy, availability of tap water in the backyard, access to health education on hand washing, maternal knowledge on the purpose of hand washing at critical times,

average family size, number of live children, and household wealth.

Definition of terms: Mother/caregivers or fathers who could only read and write to those who achieved higher degrees were considered literate while those who could not read and write were considered as illiterate. A mother/caregiver had knowledge on the purpose of hand washing if she had information or heard of hand washing and believed that hand washing could prevent disease prevention. Health extension workers (nurses with a diploma in academic qualification and trained on urban health extension packages) and other health professionals were considered as health workers.

Data collection: Data were collected by pre-oriented certified nurses with a diploma in academic qualification with strong supervision and follow-up by the supervisor and the investigators. A pretested structured questionnaire was used to collect the data and the interview was administered to the respondents in the Amharic language. One day orientation was given to the data collectors and a supervisor on the objective of the study, how to approach and interview the participants and keep the quality of the data. Before collecting the actual data, 5% of the sample size was pretested at other health facilities to validate the tool and the necessary correction was made to data collection tool. Data on socio-demographic/economic, information, and knowledge related to hand washing and hand washing practice of mother/caregiver were collected on a daily basis via interviewing a mother during the month of December 2019.

Data analysis: The educational status of mothers/caregivers was categorized into poorly literate and literate because some of the expected cells violated chi-square assumption (contained value less than five) when the highest grade point achieved was assumed. The wealth index (indicator of living standard of household) was constructed through principal component analysis (PCA) from household assets. We ranked the extracted component into quintiles (five tiles); each quintile holding 20% of households, and the household that belongs to the first quintile was categorized as the poorest and the households that belong to the second, third, fourth, and fifth quintiles were categorized as poor, middle, rich, and the richest, respectively. The value/score one was assigned for a moment when a mother/caregiver had washed her hands with water and soap/substitutes and zero was assigned if a mother/caregiver did not. The scores were summed up to five and a mother/caregiver who had a total score of five was considered as washed her hands at critical times. If the sum of scores is less than five, a mother/caregiver was treated as did not wash her hands at critical moments. Descriptive statistics had been used to describe the study variables and logistic regression was undertaken to identify the factors associated with hand-washing practices. Multi-collinearity test among independent variables was checked at variance inflation factor less than 10 or tolerance greater than 0.1 and a chi-square test was carried out to check expected cells adequacy by cross-tabulation. The model fitness was checked by the Hosmer and Lemshaw model fitness test at nonsignificant p-value and a chi-square test was conducted to check the expected cells adequacy. Findings of descriptive analysis were presented by frequency and percentage, mean or median and the regression outputs were presented by crude and adjusted odds ratios with their 95% confidence intervals. In multivariable analyses, the level of significance was set at $P = .05$.

Quality assurance: Translation and back translation of the questionnaire from English to Amharic and back to English by different individuals to check consistency was undertaken. At the end of each data collection day, data were checked for completeness and consistency, and a discussion with the research assistants was carried out. A unique identification number was assigned to each questionnaire after editing and checking completeness and consistency. After entering the data into SPSS 20, 10% sample was checked for correct entry and cleaning was also continued up to the end of the descriptive analysis.

Results

Three hundred and twelve mothers/caregivers of children participated in the study and this gave a response rate of 99%. The mean age of the respondents was 28(±6) years and the minimum and maximum ages were 18 and 50 years, respectively, and one-fourth belonged to the age category of 24 years and below. Regarding educational attainments of the respondents, more than three-fourths (77.9%) were literate and 30.1%, 43.9%, and 3.9% of the study participants attained primary (grade 1-8), high school, and certificate and above, respectively. About one-third (32.7%) of the respondents were government employed and the majority (64.7%) of them were multi-Para. Concerning the Economic status as indicated by household wealth index, 20.2% fall under the poorest category, 28.8% poor, 18.9% middle, 15.1% rich, and 17.0% fall in the richest economic groups. More than three-fourths; 77.9% of the fathers were at least able to write and read (Table 1).

Information Related to Hand Washing

Majority of the respondents; 84.3% had ever heard of hand washing, and half (52.6%) of them got information on hand washing at critical times in the last 1 year. The source of information were health workers; health extension workers and other health professionals (48.1%), schools (15.0%), media (9.0%), religious institutions (7.0%), and neighbors and friends (1.9%) (Table 2).

Knowledge Regarding Hand Washing

Close to three-fourths of the respondents; 69% were washing hands to prevent illness or infestation by germs. Only 10.8% of the study participants thought that hand washing is trustworthy to prevent disease for the entire community, and 4.5% mentioned that washing hands gives a sense of cleanliness and confidence. Respondents pointed out that disease occurrences can be prevented by hand washing; 29.5%, 51.0%, and 1.9% of them mentioned that typhoid, diarrhea, and respiratory

Table 1. Sociodemographic Characteristics of Respondents, Nefas Silk Lafto Sub-City, Addis Ababa, Ethiopia, 2019 (n = 312).

Characteristics	Frequency	Percentage	
Maternal education	Illiterate	69	22.1
	Literate	273	77.9
Age of respondents	≤24 years	78	25.0
	25-34 years	180	57.7
	≥35 years	54	17.3
Age of child in months	6 months or below	140	44.9
	6-12 months	130	41.7
	Above 12 months	42	13.4
Marital status of respondent	Single	49	15.7
	Married	238	76.3
	Divorced	20	6.4
	Widowed	5	1.6
Maternal occupation	Merchant	149	47.8
	Private employed	13	4.2
	Daily laborer	24	7.7
	Government employed	102	32.7
	House wife	17	5.4
	Other	7	2.2
Religion	Orthodox	172	55.1
	Muslim	75	24
	Protestant	57	18.3
	Other	8	2.6
Parity	Primipara	110	35.3
	Multipara	202	64.7
Family size	<5	102	32.7
	≥5	210	67.3
Economic status of the household	The poorest	63	20.2%
	Poor	90	28.8
	Middle	59	18.9
	Rich	47	15.1
	The richest	53	17.0
Paternal Education	Illiterate	69	22.1
	Literate	243	77.9

Table 2. Source of Information on Hand Washing, NSLSC, Addis Ababa, Ethiopia, 2019 (n = 312).

Source of information on hand washing	Frequency	Percentage
Health workers	150	48.1
Schools	47	15.0
Television and radio	28	9.0
Religious institutions	22	7.0
Neighbors and friends	6	1.9
Other sources	10	3.2

problem, respectively, can be prevented by proper hand washing.

Hand Washing Practice

All of the respondents reported that they used to wash their hands as needed; most of them (98.1%) replied that they washed hands with water and soap. Concerning the moments of hand washing, 100%, 99%, 95.5%, 91.3%, and 74.4% of the respondents washed hands with water and soap after cleaning child's bottom, before eating, after visiting toilet, before preparing food, and after cleaning the compound, respectively (Table 3).

Table 3. Reported Hand Washing Practices of the Respondents in NSLSC, Addis Ababa, Ethiopia, 2019 (n = 312).

Characteristics	Frequency	%
Washed hands only with water	6	1.9
Washed hands with soap and water	306	98.1
Washed hands after toilet	298	95.5
Washed hand before preparing food	285	91.3
Washed after cleaning compound	232	74.4
Washed hands before eating	310	99
Handed washing after cleaning child's bottom	312	100

Among mothers/caregivers of the children who responded to the interview, 232 (74.4%; 95% CI [69.6%-79.2%]) practiced hand washing at critical times during the study period. Regarding water sources for domestic purposes, majority of households; 89.1% were using tap water. The remaining 4.5%, 3.5%, and 2.9% of households mentioned that they were using rainwater, spring, and dug well, respectively. Mothers/caregivers in the study area reported that they had faced problems related to hand washing practice at critical times with water and soap; 36.5% faced inadequate water supply, 52.9% could not find soap when needed, 8.7% had inadequate time to wash hands at critical times, and 1.9% faced other challenges.

Factors Associated with Washing Hands at Critical Times

Eight variables (maternal literacy, paternal literacy, availability of water in the backyard, access to health education by mothers/caregivers on hand washing, maternal knowledge on purpose of hand washing at critical times, average family size, number of living children the mother gave birth to and household wealth status) were included in bi-variable binary logistic regression and six variables (maternal literacy, paternal literacy, availability of water source in the back yard, access to health education by mothers/caregivers on hand washing at critical times, maternal knowledge on purpose of hand washing at critical times and household wealth status) had *P*-value below .25 and became a candidate for multivariable binary logistic regression model. Ultimately, three variables (maternal literacy status, availability of tap in the backyard of the household and household's economic status as measured by wealth index) were found to be statistically significant determinants of hand washing at critical times among mothers/caregivers of under-five children in the study area. Poor levels of literacy mothers/caregivers had 66% reduced (AOR = 0.34; 95%CI [0.17-0.69]) odds of washing hands at critical times than literate mothers. Mothers/caregivers who did not own a water supply in their backyard had 62% (AOR = 0.38; 95%CI [0.18-0.80]) reduced odds of

hand washing at critical times than their counterparts. As compared to the mothers from the poorest households, those from middle, richer, and richest households had 4.56 (AOR = 4.56; 95%CI [1.84-11.33]), 5.61 (AOR = 5.61; 95%CI [2.11-15.30]) and 6.14 (AOR = 6.14; 95%CI [2.24-16.72]) times increased likelihood of washing hands at critical times (Table 4).

Discussion

The current study was carried out to identify the magnitude and factors associated with hand washing at critical times among mothers/caregivers of under-five children in NSLSC, Addis Ababa, Ethiopia. The study witnessed that about three fourth (74.4%) of the respondents were washing their hands at critical times, and their practice was determined by maternal literacy, availability of taped water, and household economic status.

Out of 312 respondents, 74.4% were washing their hands at critical times. The finding is lower than what was shown by a study conducted in Wondongent Woreda in Oromia Regional state; 87%.[19] This may be due to the current study respondents had lower knowledge on diarrhea can be prevented by hand washing (51%) than 100% in Wondogent Woreda. Other possibilities might be small area covered (single kebele) by a study carried out in Wondogenet woreda than the current case; where several kebeles or four woredas participated and lower prevalence in some kebeles or woredas might have masked higher prevalence of hand washing at critical times among other kebeles or woredas in a current study area.

The finding shown by a current study is higher than what was witnessed by a study conducted in Benchmaji in May to August 2017; 34.6%.[20] The setting difference may affect the practice where the level of health interventions like health education and promotion, and health-related information and services dissemination are more easily accessed in a current setting than Benchmaji. Other reason may be the time interval between the two studies during which attention was given to water, hygiene, and sanitation because hygiene and sanitation-related health problems hold top positions on morbidity list.

The recent finding is higher than what was observed in Debark town, Amhara regional state, Ethiopia; 52.2%[18] and the difference may be due to a study in Debark town used moments like occasions after sneezing, touching clothes which are inconvenient for hand washing in addition to five moments used in the current study to measure safe hand washing among respondents. Other possibilities may be better access to basic services like water, soap and information regarding hand washing in the current setting than Debark town.

The current finding is higher than the finding showed by a study carried out in Nigeria in 2015; 30%.[23] This may be explained by difference in household's possession of water supply in home or backyard; 53.9% of households owned water supply in their home while majority (89.1%) of households in a current study area had water source in their home or backyard. Other possibilities may be the time interval between the studies when different health interventions concerning hygiene and sanitation had been carried out, and the setting difference; rural and urban residents participated in the study in Nigeria, but respondents in the current study were solely urban residents. The finding is also higher than the magnitude revealed by another study carried out in Nigeria in 2016; only 32% of caregivers were observed to have safe hand washing.[24] The difference may be due to the presence of one extra parameter (washing hands before administering a drug to a child), and self-reporting in a current case may result in exaggerated value while using structured observations to measure hand washing at critical times among mothers/caregivers of under-five children in Nigeria case may reveal a value close to reality.

The current finding showed a higher proportion of hand washing at critical times as compared to finding (40%) revealed by a study carried out in Pakistan.[25] The inconsistency may be due to the difference in residence of respondents, 37.5% respondents were living rural in the latter study. The other possibility may be difference in a literacy rate among study participants (relatively a higher literacy rate in our case; 78% to 70%. The difference in access to protected water supply may also be another possibility; in a current study, about 90% of the respondents were accessing water from tap while 74.5% of respondents in Pakistan had access to protected water source in general.

The current study witnessed that maternal literacy enhanced hand washing practice at critical times. This is consistent with studies conducted in Kirkos sub-city, Addis Ababa,[26] Gondar comprehensive specialized hospital, Gondar town, North West Ethiopia,[27] Wondogenet Woreda in 2014,[19] and WHO and UNICEF joint estimate on progress of household drinking water, hygiene, and sanitation.[17] But the finding contrasts a study carried out in Mizan town, Benchmaji zone, SNNPR in 2017 where literate mothers had 90% reduced odds of practicing safe hand-washing than their counterparts.[20] This may be due to differences in the study settings; the current study was done in place where health-related information can be easily disseminated to and accessed by the residents, and the current setting has better access to water and other supplies required for hand washing.

The current study showed that hand washing practice among mothers/caregivers of the under-five children is positively associated with household's economic status. The wealthier the household, the mother had a better hand washing practices at critical times and this agrees with WHO and UNICEF joint monitoring program estimate for 2000-2020 on progress of household drinking water, sanitation, and hygiene; wealthier households and urban residents had better basic hygiene than their counterparts.[17] This finding is in agreement with evidence shown by a study carried out in Holy family hospital, Rawalpindi, Pakistan.[25] Wealthier households can afford purchasing of soap and can avail water at households even by purchasing.

Our study showed that availability of taped water in home or in backyard was directly related to hand washing at critical times and agrees with findings from Debark town,[18] study carried out in Mareka district.[28] This finding is also consistent with a study carried out in Nigeria.[23]

Table 4. Factors Associated with Hand Washing at Critical Times among Respondents in NSLSC, Addis Ababa Ethiopia, 2019.

Variable		Wash hands at critical times		COR with 95% CI	AOR with 95% CI
		Yes = 232	No = 80		
Maternal literacy	Low literate	43	26	0.47(0.26-0.84)	0.34(0.17-0.69)[a]
	Literate	189	54	1	1
Paternal literacy	Low literate	48	18	0.89(0.48-1.66)	1.07(0.51-2.27)
	Literate	184	62	1	1
Availability of tap water in the back yard	No	39	21	0.56(0.31-1.04)	0.38(0.18-0.80)[a]
	Yes	193	59	1	1
Mother knows a benefit of hand washing at critical times	No	18	3	2.16(0.62-7.53)	2.00(0.50-7.89)
	Yes	214	77	1	1
Mother got health education on hand washing during health facility visit	No	106	40	0.84(0.51-1.40)	0.73(0.41-1.32)
	Yes	126	40	1	1
Average family size	≥5	73	29	0.81(0.47-1.37)	0.78(0.19-3.14)
	<5	159	51	1	1
Parity	Primi-para	80	24	1.20(0.67-2.03)	1.05(0.65-2.66)
	Multi-para	152	56	1	1
Wealth index	Poorest	36	27	1	1
	Poor	62	29	2.16(1.14-4.10)	1.27(0.63-2.60)
	Middle	50	9	5.70(2.45-13.29)	4.56(1.84-11.33)[a]
	Rich	39	8	20.00(4.50-89.21)	5.61(2.1-15.30)[a]
	Richest	45	7	15.79(4.49-55.29)	6.14(2.24-16.72)[a]

[a]Variables statistically significantly associated with hand washing at critical times.

Study Strength and Limitations

Strength: We deployed experienced enumerators to collect a valid data, and close supervision was carried out by supervisor and investigators.

Limitation: Since the proportion of hand washing at critical times reported under this study was self-reported, and social desirability bias might have been introduced; thus, needs attention. The wider confidence intervals may be due to smaller sample size, as a result, precaution required. A cross-sectional study design captures snapshot and cannot show seasonal variation and temporal relationship; therefore, attention should be paid during generalization of the findings.

Conclusion and Recommendations

About three quarter of mothers/caregivers of under-five children washed their hands at critical times in a current study area, and their practice was determined by maternal literacy, availability of tap water in the backyard or in home, and economic status of the household. Thus, to maintain and enhance hand washing at critical times among mothers and caregivers, the following actions should be implemented by concerned bodies.

- Educational office of NSLSC should work hard to increase maternal literacy and educational attainment of mothers and girls for future.
- The water office of NSLSC is expected to improve households access to tap water
- The government as whole, NSLSC and other responsible bodies need to strive to improve economic status of economically disadvantaged households through income generating activities and social supports.
- We call on researchers to carry out similar study at wider scope.

Abbreviations

AURTI	Acute upper respiratory tract infection
MCH	Maternal and child health
NSLSC	Nefas Silk Lafto Sub-City
UNICEF	United Nation Children's Fund
WASH	Water, sanitation and hygiene
WHO	World Health Organization

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Authors' Contribution

E.W.W. and N.AM conducted the conception and design of the study, supervised data collection and management, data analysis, interpretation of the findings, and wrote the manuscript. Both authors reviewed and approved the manuscript.

Availability of Data and Materials

Dataset we used for analysis of the current study can be freely accessed from Harvard Data verse via a link https://doi.org/10.7910/DVN/TJIPWG.

Consent for Publication

Not applicable (no identifying images and personal details in the manuscript).

Declaration of Conflicting Interests

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

Ethical Considerations

Ethics approval for the study was obtained from the institutional review board (IRB) of Addis Ababa Medical and Business College (Reference number: IRB/022/201) and conducted in line with standardized principles and procedures of national and international guidelines. Written permission letter was received from NSLSC and respective randomly selected woredas. Oral consent was obtained from all the respondents after explaining the purpose of the study, risk/discomfort, and confidentiality of response, right to refuse and terminate participation in the study at any time. The oral consent was obtained, and witnessed by selecting answer "yes" to the question "do you agree to participate?" at the end of the information sheet based the approval granted by IRB. Address of contact person was disclosed for the participants to use when they have any doubt. Data were collected using codes and no name and personal private identifier had been used and the confidentiality of collected data was maintained.

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