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Level of modern health-seeking behavior for common childhood illnesses and its associated factors among mothers of under-five children in southern Ethiopia: A community based study

Tomas Yeheyis [a,*], Kidanemihret Lemma [a], Asebech Nuramo [a], Merema Musema [a], Abdo Dolmolo [a], Amdehiwot Aynalem [a], Shewangizaw Mekonnen [a]

[a] School of Nursing, College of Medicine and Health Sciences, Hawassa University, Ethiopia

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ABSTRACT

Background: Health-seeking behavior is an action taken by an individual who perceives to have a health problem. Many childhood morbidities and mortalities are associated with a low level of a mother's healthcare-seeking behavior. However, there are limited studies about modern health-seeking behavior among mothers of ill under-five children in the study area.

Objective: To assess the level of modern health-seeking behavior of mothers/caregivers and associated factors for childhood illness in Hawassa city, Sidama, Ethiopia 2021.

Methods: A community-based cross-sectional study was conducted from November 15 to December 15, 2021, in Hawassa City. Eight kebeles were selected by using simple random sampling methods. A total of 366 mothers with children less than five years were included in this study and an interviewer-administered questionnaire was used to collect data. Data entry, cleaning, and analysis were done by using Statistical Package for Social sciences version 24 and logistic regression was used to determine the presence of association, and significance was declared at p-value <0.05.

Result: The study found that 70.2% of mothers/caregivers seek modern health care for their child's illnesses. Number of Antenatal care follow up ([AOR(Adjusted Odds Ratio) = 2.106; 95% CI(Confidence Interval) (1.097–4.042)), urban residence ([AOR = 2.688; 95% CI (1.403–5.149)), perceived severity of illness ([AOR2.832; 95% CI1.101–7.290)), four or above birth order (5.501; 95% CI (1.761–17.184)) and symptoms guiding severity of illness ([AOR = 4.664; 95% CI (1.918–11.342)) were associated with modern health-seeking behavior.

Conclusion: The overall modern health-seeking behaviors of mothers of under-five children are higher than in previous studies. However, a still significant proportion of mothers do not seek modern health care for their ill children. mothers/caregivers' residence, birth order, number of Antenatal care follow-ups, perceived severity of childhood illness, and perceived guiding symptoms of severity are the significant predictors of mothers' healthcare-seeking behavior.

* Corresponding author. School of Nursing, College of Medicine and Health Science, Hawassa University, Ethiopia.
E-mail addresses: tyeheyis@gmail.com (T. Yeheyis), Kidanemlemma@gmail.com (K. Lemma), asebechnuramo@gmail.com (A. Nuramo), Merem0916@gmail.com (M. Musema), delmoloabdo@gmail.com (A. Dolmolo), amdayn2011@gmail.com (A. Aynalem), mkshewa@gmail.com (S. Mekonnen).

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1. Introduction

Health care seeking behavior, which is a series of corrective actions taken to address perceived ill-health, is a complex, dynamic, and multidimensional process that is influenced by interactions between the individual, household, and community as well as by the individual themselves, within the limitations of existing factors like affordability, availability, and accessibility [1].

The delay in health care access involves a problem in disease recognition, decision making, and transport to health care services [2]. Appropriate care-seeking means when a child needs to get care outside of the home, it must be recognized, provided without delay, and the child must be brought to the proper healthcare facility or provider [3]. Although global progress has been made in reducing child mortality, an estimated 5.3 million under-five children died in 2018 with almost half of these deaths occurring in sub-Saharan Africa [4]. Reports indicate that children in sub-Saharan Africa are more than 15 times more likely to die before age 5 than their counterparts in high-income countries [5].

Common causes of under-five morbidity and mortality in developing countries could be reduced with timely healthcare-seeking behavior (HCSB) of their parents and caregivers. Accordingly, several factors can influence mothers' HCSB for their sick children.[5] Poor socio-economic status, attitude to modern treatment, the low literacy level of the parents, large family size, mass media exposure, level of income, birth order and the number of symptoms, previous experience of child illness and death, and perceived severity of illness were the most commonly mentioned factors affecting HCSB [6].

Traditional and religious health services are still commonly used and according to World Health Organization, at least 80% of people in Africa have used traditional health services at one point or the other in their everyday lives. The practice of traditional health services involves the use of herbs, spiritual intervention, and local practices which are occasionally based on superstition [1,6]. The vast majority of Ethiopia's population lives in rural areas where the health care coverage is low and where existing public sector resources are being stretched to the limits. One of the greatest challenges facing the country is determining how best to narrow the gap between the existing services and the population whose access to them is very limited [7]. In Ethiopia, health seeking behavior is destitute, and low percentage of children's get the appropriate treatment. Seeking appropriate health care for common childhood illnesses was low and delayed as well. Indeed, self-care and resorting to traditional healers during illnesses were commonly practiced in rural Ethiopia [8].

Appropriate care looking has the potential to significantly decrease child. Maternal practices regarding child healthcare have been recognized as the main factor behind preventing morbidities and mortality among children [3,8]. Despite such studies in some parts of Ethiopia about healthcare-seeking behavior for common childhood illnesses, there is a limitation of studies on the title in this study area. Therefore this study aims to assess the level of modern health-seeking behavior of mothers/caregivers and associated factors for childhood illness in Hawassa city, Sidama, Ethiopia, 2021.a.

2. Methods

2.1. Study area, design, and period

A community-based cross-sectional study was conducted from November 15/2021- to December 15/2021 in Hawassa city, southern Ethiopia to assess modern health-seeking behavior and associated factors among mothers of under-five children. Hawassa city is the capital city of the Sidama region and is located in the South part of Ethiopia. It is 273 km far from Addis Ababa, the capital city of Ethiopia.

3. Population

3.1. Source population

The source populations were all mothers of under-five children living in Hawassa city, Sidama, Ethiopia.

3.2. Study population

The study populations were mothers of under-five children living in randomly selected kebel**Eligibility criteria**.

Mothers of an under-five child living in Hawassa city for at least six months before the date of the study period were included in the study. Whereas Mothers who were in severe illness and unable to communicate were excluded.

3.3. Sample size determination

The sample size was determined by using the single population proportion formula after fulfilling the following assumptions: 95% level of confidence, 5% margin of error, by taking the prevalence of a study conducted in shashogo district southern Ethiopia where 68% of mother seek health care for their ill children [3] and by adding 10% of non-response rate the final sample size of the study was 368.

3.4. Sampling procedure

From 12 rural and 20 urban kebeles in Hawassa city 3 rural (Tulla town, Finchawa, and Cheffe kotej) and 5 urban kebeles (Millennium, Hiteta, Dume, Fara, and Gudumale) were selected by simple random sampling. The probability proportional to size method was employed to select the sample allocated to each randomly selected kebeles based on the number of mothers having under-five children in the kebele and a systematic sampling method was employed to select the sample allocated to each household from selected kebele. Using the map of the Kebele, the spin pen technique had been used from the center of the Kebele to choose the direction and the first sample household was randomly chosen from the list.

3.5. Data collection tool and procedure

Data were collected through a face-to-face interview by using a pre-tested and structured questionnaire which was adapted by reviewing different literature [3,4,6,8,9,11,14,16]. The questionnaire assesses Socio-demographic data, Childhood illness and care seeking behavior of mothers, Mother's perception on the causes of childhood illness and f Institutional Factors The validity of the questionnaire was conducted using Pearson product moment correlations done by correlating each item questionnaire with the totally score using SPSS. The totally Linear Correlation Coefficient (xry) 0.712 was greater than r table product moment for each item assessing Childhood illness and care seeking behavior of mothers The reliability of the variables was checked using Cronbach's alpha before data collection. The internal consistency Cronbach's alpha result for 14 items assessing Childhood illness and care seeking behavior of mothers is 0.820.

The interviews were conducted by nurses trained for two days on the data collection tool, procedure, and purpose of the study. Then respondents who volunteer were interviewed face-to-face using structured questionnaires. Data completeness, accuracy, and clarity were checked daily by the supervisors.

3.6. Variables

Dependent variable; Health care seeking behavior.

Independent variables:

Sociodemographic variables: Age of the child, age of the mother, sex, residence, occupation of the mother, marital status of the mother, educational status of the mother, total family size, number of under five in the family, previous history of death of under five children, birth order of the selected child.

3.7. Data analysis and processing

The data were coded, entered, cleaned, and edited by using Package for Social Science (SPSS) Version 24 for analysis. A logistic regression model was used to look at the statistical association between the outcome variable and every single independent variable. Variables that showed statistical significance during bivariate analysis at (p-value $\leq$0.25) were entered into multivariate logistic regression by using the backward elimination method. Results were shown using tables and texts. The strength of associations was estimated by using adjusted odds ratios (AOR) with 95% CI and significance were declared at a p-value $<$0.05.

3.8. Data quality control

Before actual data collection, the tools were pre-tested on 5% of the sample size to check their reliability. The pre-tested data was not included in the main data. To ensure the quality of data the following major steps were undertaken: The questionnaires were structured with clear questions. The data collected was checked for consistency during data processing. A pre-test was conducted on 5% of the sample size and it was modified before actual data collection of the sample size a week before the actual questioners are disseminated. Any questions the respondents have an issue were answered by the data collectors who are conducting the data collection.

3.9. Operational definitions

Modern health-seeking behavior: Mothers'/Care givers who sought care for their sick children from qualified medical professionals in health care private or public institutions.

Alternative health-seeking behavior: Mothers/Care givers who seek other types of care such as purchasing the drug from pharmacies, self-treatment at home (home remedies), traditional or religious treatment for their sick children.

3.10. Ethical considerations

Ethical clearance was obtained from the Institutional Review Board of Hawassa University, College of Medicine and Health Science, and from the Sidama Regional Health Bureau Ethical Clearance Committee. Additionally, a support letter was obtained from the school of nursing, Hawassa University. Written informed consent was also obtained from participants before their participation. The participants were informed about the objective of the study to obtain their consent before administering questioner. The data were kept

confidential and it was used only for research purposes. We have also informed them that they have full right to participate or not to participate in the study as well as to withdraw at any time.

4. Results

4.1. Socio-demographic characteristics of the respondents

A total of 366 mothers who had under-five children were interviewed in the study, making a response rate of 99.4%. The mean (± SD) age of mothers/caregivers was 26.9(+_4.8) years.

Regarding child characteristics, 195(53.3%) were males, and the mean age of children was 21.3 with SD ± 12.382 months (Table 1).

4.2. Common childhood illnesses and health seeking behaviour

From the total 366 mothers included in the study 358(97.8%) mothers had ANC follow-ups. Among them, 142(38.8%) had less than four visits. Of the total of 366 mothers, 346(94.5%) gave birth at a health institution.

The reported reason by mothers of children who did not seek treatment for their children were 22(46.8%) due to perceived illness as mild, 7(14.8%) due to cost of medical care, 10(21.2%) due to shortage of money, and 8(17.4%) due to waiting for a long time

Table 1
Socio-demographic characteristics of children and mothers/caregivers, Hawassa, Ethiopia, 2021.

Variables	Responses	Frequency	Percentage
Age of the child in months	0–11 months	82	22.4
	12–24 months	156	42.6
	25–36 months	82	22.4
	37–59 months	46	12.6
Sex of child	Male	195	53.3
	Female	171	46.7
Age of the mother	15–19	12	3.3
	20–24	97	26.5
	25–29	155	42.3
	30–34	73	19.9
	35–39	24	6.6
	40–44	5	1.4
	Others	5	1.4
Marital status	Married	355	97
	Divorced	8	2.2
	Widowed	3	0.8
Residence	Urban	234	63.9
	Rural	132	36.1
Occupation of mother	Governmental worker	102	27.9
	Housewife	95	26
	Merchant	74	20.2
	Student	73	19.9
	Farmer	17	4.6
	Daily laborer	5	1.4
Number of under five in the family	One	190	51.9
	More than one	176	48.1
Total family size	Less than five	167	45.6
	Greater than or equal to five	199	54.4
Family Monthly income	1000–2500	133	36.3
	2051–4000	148	40.4
	4001–5500	54	14.8
	5501–7000	19	5.2
	7001–8500	9	2.5
	>8500	3	0.8
Educational status of the mother	Cannot read and write	12	3.3
	Read and write only	31	8.5
	Primary education	67	18.3
	Secondary education	118	32.2
	Diploma and above	138	37.7
Previous death of under-five children in the family	Yes	17	4.6
	No	349	95.4
Birth order of selected child	First	124	33.8
	Second	138	37.7
	Third	84	23
	Other	20	5.5

Table 2
Childhood illness and care-seeking behavior of mothers/caregivers in Hawassa City, Ethiopia,2021.

Variables	Responses	Frequency	Percentage
Do you have ANC follow-up during pregnancy of the selected child?	Yes	358	97.8
	No	8	2.2
If yes number of follow up	<4	142	38.8
	≥4	216	59
Place of birth of the selected child	Home	20	5.5
	Health institution	346	94.5
Have your child vaccinated according to the EPI schedule?	Yes	360	98.4
	No	6	1.6
The child with sickness in the last four weeks?	Yes	212	57.9
	No	155	42.1
If yes, what kind of symptoms does the child have?	Diarrhea	59	27.8
	Cough	101	47.6
	Fever	24	11.6
	Vomiting	16	7.5
	Inability to breastfeed & others	12	5.7
From the most recent symptoms you observed, have you received any treatment for your child?	Yes	165	77.8
	No	47	22.2
If yes, from where did you receive the treatment?	Public & private health care unit	121	73.3
	Purchase medicines from the pharmacy	38	23.1
	Traditional treatment	6	3.6
When did the child receive treatment?	First day of symptom	49	29.7
	On the second day of symptom	74	44.8
	On the third day of symptom	24	14.5
	After the third day of symptom	18	10.9
If you did not seek treatment for your children what is the reason?	Cost of medical care	7	14.9
	Shortage of money	10	21.3
	Waiting for a long time	8	17
	I thought the illness was mild	22	46.8
How do you perceive the severity of your child's illness?	Mild	28	13.1
	Moderate	88	41.1
	Severe	98	45.8 45.8
If your child becomes sick did you treat the child with traditional healers?	Yes	91	24.9
	No	275	75.1

(Table 2).

4.3. Perception of mothers/caregivers towards childhood illnesses

Of the total of 366 mothers/caregivers included in study 214(58.5%) believe the cause of childhood illness is microorganisms, 51 (13.9%) poor hygiene, 44(12%) teething, 33(9%) contaminated food and others (Table 3).

4.4. Magnitude modern health-seeking behaviors of mothers/caregivers

Of the total of 366 mothers/caregivers included in the study 257(70.2%) mothers sought modern health care for childhood illness whereas 29.8% of mothers/caregivers sought care from sources other than modern health care.

Factors associated with modern health-seeking behavior of mothers/caregivers.

In bivariate logistic regression analysis; the age of child, residence, number of ANC follow up, place of birth, birth order, symptoms guiding severity of childhood illness, death of under-five children in the family, and perceived severity of illness, were statistically associated with modern health-seeking behavior with p-value <0.25 at 95% C.I.

After bivariate analysis, residence, number of ANC follow up, birth order, symptoms guiding severity, and perceived severity of childhood illnesses were significantly associated with modern health-seeking behaviors up on multivariate analysis. But the price of health service, age of the child, place of birth, and death of under-five children weren't predictors of modern health care seeking behavior in this study.

In this study mothers/Caregivers who live in urban areas were 2.7 times more likely to seek modern health care for their child's illness compared to those who live in rural areas (AOR = 2.7; 95% CI(1.403–5.149)). Mothers/care givers who had ANC follow up greater than or equal to four times were 2.106 times more likely to seek modern health care compared to mothers/care givers who had less than four ANC follow-ups (AOR = 2.106; 95% CI(1.097–4.042)). The odds of seeking modern health care is 2.8 times higher among mother/care givers who perceive their child's illness as severe compared to mothers/care givers who perceived their child's illness as mild (AOR = 2.8:95% CI (1.101–7.290)). The odds of modern health care seeking for childhood illnesses are reduced with high birth order. Mothers of children who were at birth order four or above were less likely to seek modern health care for childhood illnesses, compared with children of first birth order (AOR = 5.501; 95% CI(1.761–17.184)).

Table 3
Perception of mothers/caregivers regarding childhood illnesses in Hawassa city, Ethiopia, 2021.

Variables	Responses	Frequency	Percentage
Is there a childhood illness that can't be treated by modern medicine?	Yes	23	6.3
	No	343	93.7
What do you think is the cause of child illness?	Curse of God	4	1.1
	Microorganisms	214	58.5
	Evil eyes	15	4.1
	Teething	44	12
	Poor hygiene	51	13.9
	Contaminated food	33	9
	Others	5	1.4
What symptoms guide you to identify the severity of your child's illness?	Combined symptom of a disease(vomiting)	162	44.3
	If the child refuses to eat/breastfeed	175	47.8
	If the illness continues for a long time	29	7.9
Which person do you think is most successful in treating childhood illness?	Institutional health worker	306	83.6
	Private drug shop owner	45	12.3
	Herbalist and others	15	4.1
Where will you go to get treatment for your child when sick?	Governmental & private healthcare institutions	257	70.2
	Home treatment	13	3.6
	Traditional treatment	82	22.4
	Others	14	3.8
What do you think about the price of health services in your area?	Low	1	0.3
	Fair	129	35.2
	High	206	56.3
	Very high	30	8.2
How do you rate the distance from the health facility?	Near	83	22.7
	Average	216	59
	Far	67	18.3
What do you think is the overall approach of health professionals?	Very good	6	1.6
	Good	195	53.3
	Fair	78	21.3
	Poor	61	16.7
	Very poor	26	7.1
Satisfaction with health service	Very satisfied	10	2.7
	Satisfied	174	47.5
	Poorly satisfied	113	30.9
	Not satisfied	69	18.9

The study showed that mothers/care givers who had perceived vomiting as guiding symptoms of the severity of childhood illness were 4.7 times more likely to seek modern health care than those who consider illness lasting a long time as guiding symptoms of severity(AOR = 4.7: 95% CI (1.918–11.342)) (Table 4).

5. Discussion

In most developing countries the health status of children is strongly associated with maternal or care givers healthcare-seeking behavior (5). Maternal healthcare-seeking behavior is different across different populations and it is influenced by multiple factors. Predisposing characteristics such as age, gender, occupation/income, education, and marital status of caregivers, and enabling factors such as proximity to a health facility, age and sex of the sick child, types of illness, and perceived severity of the child's illness affect it. This study identified mothers/caregivers' residence, birth order, the number of ANC follow-ups, perceived severity of childhood illness, and perceived guiding symptoms of severity are the significant predictors of mothers' healthcare-seeking behavior (6).

In this study, 70.2% of the caregivers sought modern health care when their child developed an illness. This finding is lower than the studies carried out in Jeldu District with 74.6%, North West Ethiopia with 76.5%, and Dangila town with 82.1% [8–10]. These differences might be because this study included mothers living in the rural kebeles of the city where accessibility of health services is limited, and the difference in socio-demographics of the populations across the country.

On the contrary modern health-seeking behavior in this study is higher than in the studies carried out in the rural Ensaro District 33.2%, Yemen 51.4%, and Sylhet district of Bangladesh 27.5% [13,14,17]. This difference could be because of the differences in the availability of public and private health care setups in the study area compared to the areas where those studies were conducted, and possible socioeconomic differences as this study are conducted in a more urbanized area.

Generally, the high prevalence of modern healthcare-seeking behavior in our study can be attributed to the fact that there had been an expansion of primary healthcare facilities in Ethiopia. As a result, public health facilities (both health centers and health posts) have been accessible with the standard management for childhood illnesses.

The finding from our study showed that urban residents were 2.688 times more likely to seek modern health care than rural mothers (AOR = 2.688(1.403–5.149)). This finding is consistent with a study done in Ensaro district (AOR = 6.75, 95% CI; 2.97, 15.33) and North Shoa, Derra district (AOR = 5.58, 95% CI: 2.05, 15.2) in which mothers living in urban areas sought more modern health care than mothers living in rural areas. This might be due to the increased accessibility of health care facilities and health

Table 4
Factors associated with the modern health-seeking behaviors of mothers/caregivers in Hawassa city Sidama, Ethiopia 2021.

Variables	Category	Modern health-seeking behavior		Odds ratio 95% CI	
		Yes	No	COR	AOR
Age of the child	0–11 months	62(24.1%)	20(18.3%)	.754(.311–1.821)	.646(.249–1.675)
	12–24 months	96(37.4%)	60(55.1%)	.389(.175–.863)	.355(.149–842)
	25–36 months	62(24.1%)	20(18.3%)	.754(.311–1.821	725(.279–1.884)
	37–59 months	37(14.4%)	9(8.3%)	1	1
Birth order	First	84(32.7%)	40(36.7%)	3.900 (1.445–10.527)	3.098(1.010–9.498)
	Second	103 (40.1%)	35(32.1%)	5.465 (2.019–14.792)	4.993(1.635–15.251)
	Third	63(24.5%)	21(19.3%)	5.571 (1.963–15.813)	5.501(1.761–17.184) *
	Fourth and above	7(2.7%)	13(11.9%)	1	1
Residence	Rural	82(31.9%)	50(45.9%)	1	1
	Urban	175 (68.1%)	59(54.1%)	1.809(1.143–2.585)	2.688(1.403–5.149)*
Death of under five	Yes	8(3.1%)	9(8.3%)	.357(.134–.951)	.510(.167–1.557)
	No	249 (96.9%)	100 (91.7%)	1	1
Perceived severity of childhood illness	Mild	15(10.3%)	13(18.8%)	1	1
	Moderate	56(38.6%)	32(46.4%)	1.517(.642–3.585)	1.360(.535–3.456
	Sever	74(51.1%)	24(34.8%)	2.672(1.115–6.403)	2.832(1.101–7.290)*
Number of ANC follow up	<4	87(34.1%)	55(53.4%)	1	1
	≥4	168 (65.9%)	48(46.6%)	2.213(1.389–3.525)	2.106(1.097–4.042)*
Birthplace	Home	8(3.1%)	12(11%)	1	1
	Health institution	249 (96.9%)	97(89%)	3.851(1.527–9.709)	1.553(.450–5.361)
Symptoms of guiding severity	Combined symptoms of disease (Vomiting)	126(49%)	36(33%)	4.958 (2.169–11.333)	4.664(1.918–11.342) *
	If a child refuses to eat/breastfeed	119 (46.3%)	56(51.4%)	3.010(1.347–6.729)	2.858(1.195–6.834)
	If a child's illness continues for a long time	12(4.7%)	17(15.6%)	1	1

*indicates significant variables (P-value less than 0.05).

information about the importance of modern health care seeking for urban dwellers compared to the rural residents [13,15].

In this study, mothers who perceived their child's illness as severe were 2.832 times more likely to seek modern health care than mothers who perceived the illness as mild. This finding is congruent with the findings of the studies conducted in Jeldu district, Oromia, and Dangila town Ethiopia, Nigeria, and Nairobi, Kenya [8–12]. This could be because the more severe episodes of illness might increase the likelihood of visiting a health service. This might be explained as mothers perceive their child's illness as severe fear of a possible deterioration of their child's health condition and the development of complications [4,16].

The odds of modern health care seeking for childhood illnesses are reduced with high birth order. This study reveals that mothers seek modern health care for children up to third birth order (first birth; AOR = 3.098(1.010–9.498), second birth; AOR = 4.993 (1.635–15.251), and third birth; AOR = 5.501(1.761–17.184) more likely thank that above fourth-order. This finding is similar to A National Cross-Sectional Household Survey conducted in India where children in the last order have the highest chance of modern health care service than others [18]. This might be due to multiple births or large family size which forces mothers to give less attention to the health condition of older children than their younger ones [18].

Our study shows that mothers who had ANC follow up greater than or equal to four times were 2.106 times more likely to seek modern health care compared to mothers who had less than four ANC follow-ups (AOR = 2.106; 95% CI(1.097–4.042)). This might be explained by the fact that mothers who had frequent contact with health workers and health professionals will have a better knowledge of childhood illnesses. In addition, since there are health education sessions during ANC visits, mothers with more ANC visits will probably have better knowledge and a positive attitude towards modern health care [12,14].

The study showed that mothers who had perceived vomiting as guiding symptoms of the severity of childhood illness were 4.664 times more likely to seek modern health care compared to those who consider illness lasting a long time as guiding symptoms of severity (AOR = 4.664: 95% CI (1.918–11.342)). A similar finding is noted among mothers of children in a study conducted in northeast Ethiopia [16]. This might be because children with vomiting will deteriorate the child rapidly compared to children with long-lasting symptoms. On the other hand, children with long-lasting illnesses will make mothers consider the illness as a mild illness that does not need treatment. The limitations of this study may be response bias and confounding in interpretation of results [16,18].

6. Conclusion and recommendation

The overall modern health-seeking behaviors of mothers who have children under the age of five years was high. However, a still significant proportion of mothers do not seek modern health care for their ill children. Number of ANC, perceived severity of illness, birth order, symptoms guiding severity, and place of residence were factors significantly associated with modern health-seeking behavior. It's recommended to create an awareness for mothers with an under five children using a community-based approach. It's advisable for researcher to conduct a comprehensive study using mixed method: quantitative and qualitative approach to better reveal the factors associated with health care seeking behavior of mothers with under five children.

Ethics approval and consent to participant

The study protocol was ethically approved by the Institutional Review Board (IRB) of Hawassa University, College of Medicine and Health Sciences(Ref No: IRB/225/12). Written consent has been taken from the respondents before the interview. In addition, the study was conducted following the Declaration of Helsinki. Moreover, the confidentiality of information was guaranteed by using code numbers rather than personal identifiers and by keeping the data locked.

Consent for publication

Not applicable.

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Author contribution statement

TY and AA conceived and designed the experiments, analyzed and interpreted the data,wrote the paper; KL conceived and designed the experiments, performed the experiments, analyzed and interpreted the data; wrote the paper; AN, MM and AD conceived and designed the experiments, wrote the paper; SM conceived and designed the experiments, analyzed and interpreted the data, final approval of the version submitted.

Data availability statement

Data will be made available on request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Abbreviations

AFI	Acute Febrile Illnesses
ANC	Antenatal Care
ARI	Acute Respiratory Infection
CBNC	Community Based Newborn care
CSA	Central Statistical Agency
EDHS	Ethiopian Demographic and Health Survey
EFY	Ethiopian physical year
EPI	Expanded Program of Immunization
FMOH	Federal Minister of Health
HCSB	Healthcare seeking behavior
HEW	Health Extension Worker
ICCM	Integrated Community Case Management of Childhood Illnesses
IMNCI	Integrated Management of Neonatal and childhood illness
rxy	Linear Correlation Coefficient
SPSS	Statistical Package For Social Sciences

U5MR under-five mortality rate
UNICEF United Nation Infant, and Child fund
WHO World Health Organization

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2023.e20121.

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