

A Facility-Based Cross-Sectional Study on the Implementation of the IMNCI Program in Public Health Centers of Soro District, Hadiya Zone, Southern Ethiopia

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Background: Integrated Management of Neonatal and Childhood Illnesses (IMNCI) is one of the child health programs and it provides an integrated approach and focuses on the well-being of the whole child. Globally, nearly nine million children pass away every year with preventable and treatable conditions. IMNCI program is provided by the health facilities to aid children under five years of age from illness. This study is aimed at assessing the implementation of the IMNCI program in public health centers of Soro District, Hadiya Zone, Southern Ethiopia.

Methods: The implementation of the IMNCI program was studied using a facility-based cross-sectional study design integrating both qualitative and quantitative data collected from 9 public health centers in Soro district, Hadiya Zone, Southern Ethiopia. A total of 390 (92%) caregivers were included in the study by the proportion of under-five outpatient coverage from each public health center. Data were collected through face to face interviewer-administered questionnaires, document review checklist, observation checklist, and in-depth interview guide.

Results: Based on agreed criteria resources' availability was 80.11% and judged as fair. Less than 50% of health centers (HCs) had cotrimoxazole and gentamycin. The compliance of health workers was 85.5% and judged as good. Below 85% of prescribed drugs were given correctly for the classified disease. Counseling on medication and follow updates were given for less than 80% of caretakers. The overall satisfaction of clients on IMNCI was 79.5% according to the judging criteria. The caretakers who took less than 30 minutes to reach the health center on foot (AOR=7.7, 95% CI [3.787–15.593]), caretakers who waited for less than 30 minutes to see the health care provider (AOR=2, 95% CI [1.00–3.77]), the caretakers who found prescribed drugs in HCs pharmacy (AOR = 3.7, 95% CI [1.91–7.34]), the caretakers who have less than four family size (AOR=2, 95% [1.109–4.061]) were more satisfied in IMNCI services, whereas, caregivers who measured the weight of child were negatively associated with satisfaction (AOR= 0.24, 95% CI [0.13–0.45]).

Conclusion: This study found that the overall implementation of the Integrated Management of Neonatal and Childhood Illnesses was good. All health centers had trained health workers, ORS, paracetamol, vitamin A, chart booklet, and IMNCI guidelines were available; however, cotrimoxazole, gentamycin, ampicillin, and mebendazole were less abundant drugs in health centers. Further, a large-scale study is required to be conducted in future in other districts to ensure proper implementation of the IMNCI program in Ethiopia.

Keywords: IMNCI, healthcare provider, practice, Hadiya zone, southern Ethiopia

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Introduction

IMNCI is a program provided by a health facility to aid children under five years of age suffering from illness. It emphasizes the wellbeing of children who suffer from illness and it promotes prevention mechanisms to the caregivers. The preventive and curative feature is included in the program which supports to diminish loss, infection, and disability of children.¹ Globally, nearly nine million children die every year with preventable and treatable conditions.² In sub-Saharan countries especially Tanzania, the mortality rate of under five years of age is lower from 133 per 1000 live births in 2005 to 81 in 2010 in Mainland, Tanzania.^{3,4}

Compliance is the major problem in the implementation of the program specially observed on six key sections of the protocol, such as adjacent seating of the child/caretaker, obtaining the history, checking immunization status, measuring temperature, checking weight, and counseling caretakers.^{5,6} Low health care worker compliance, inadequate referral and counseling, and imperfect training are major constraints for service.^{4,7} Understanding of mothers on identifying the illness of their children that is relate to poor counseling has a major impact on under-five mortality. Regarding caregiver satisfaction, major factors are related to the shortage of availability of drugs in the facility.⁸

In Ethiopia, the mortality rate of under-five children is one of the highest, which is more than 321,000 every year; among them, more than 70% is caused by diarrhea, pneumonia, measles, malnutrition, and malaria.⁹ Most of the deaths are frequently occurred due to pneumonia and diarrhea, so preventing these diseases will decreases under-five mortality up to 90% within the year of 2020.¹⁰ According to the Ethiopian demographic health survey (2016) report the health facilities in Southern Nations, Nationalities, and Peoples' Region (SNNPR) who are giving treatment for under five-year children from symptoms of diarrhea, fever, and acute respiratory infection were 43.2, 36.7, and 46.5, respectively,^{9,11} which indicated that less number of clients were served.

The implementation of the IMNCI program in the SNNPR program was active in 684 health centers in 2016.¹² However, there is still a gap in addressing the program to all the cases of under-five children. Annual health report of Hadiya zone 2016, Soro district had only 45% of the under-five case were seen at health centers and IMNCI implementation constraints were a shortage of

essential drugs in HCs, shortage of IMNCI trained health professional. This data indicate the annual report of the Zonal Health Department (ZHD) from supportive supervision and inventory assessment.

There was no similar research conducted in the study area, therefore, this study findings will provide basic information for the regional health office, Hadiya zone, and Soro district to make an informed decision on availability, compliance, and satisfaction dimensions. The findings will also help the health center managers to fill gaps for improvement of the program to meet the client's need and of the stakeholders. It also provides baseline information on the program for researchers.

Methodology

Study Area

The study was conducted in the Soro district Hadiya zone, southern Ethiopia. Soro district is one of the 10 districts in the Hadiya zone, which is located 32 kilometers far from zonal town, Hosanna 235 kilometer from Addis Ababa, the capital city of Ethiopia. The total population of the study area is 188,858, out of which, 94,363 and 94,495 are men and women, respectively.¹³ The study was conducted from March 5–April 3, 2017.

Study Design

The facility-based cross-sectional study design was employed. Both qualitative and quantitative methods were applied. Explanatory concurrent triangulation was used as a complementarity purpose. The data were collected concurrently, but quantitative data was weighed more heavily in the analysis than the qualitative.^{14,15} The three dimensions used for this study were availability, compliance, and satisfaction.

Populations and Sampling

The target population of this study included all public health centers in Soro district and all under-five years age child caretakers/mothers found in Soro district. The source populations were all health centers in Soro district, all caretakers who accompany the under-five child attended in selected health centers, all under-five children who received the IMNCI program, all documents related to IMNCI program in the health centers, all health workers in selected HCs of Soro district and all HCs managers in Soro district and all case team leaders in Soro district HCs were the source of population.

The study populations were under-five year's age caretakers/mothers who come to IMNCI service in selected HCs during the study period for an exit interview, selected under-five year's age cases from documents of IMNCI register book in the selected health center, and selected health workers who implement IMNCI program in selected HCs for the quantitative method of analysis. The study populations for the qualitative method were Head of HCs in selected HCs, case team coordinators in selected HCs, district health office maternal, and child health focal person.

Sample Size Determination

All nine health centers found in the Soro district were selected for this study. Two key informants per health center and one district health office focal person were selected for in-depth interviews. A total of 90 observations were conducted at the time of data collections. Two health workers were observed per health center who specifically involved in the IMNCI service. Eighteen IMNCI service providers were observed by PI when they provided the service. Each service provider was observed for five clients consecutively starting from the first client during direct observation sessions. Resource inventory is accompanied by interviews for assessing the availability of resources in the health center. The sample size of documents was similar to observed cases, 90 cases of under-five year's of age were reviewed from IMNCI register books to support observation results. The sample size for mothers/caretakers determined by using a single population proportion formula considering 50% population proportions. A total of 95% confidence level and 0.05 margin of error used for sample size determination. In total, 50% was considered because of no study done in the study area on the IMNCI implementation evaluation.

$$n = \frac{(z_{\alpha/2})^2 p(1-p)}{d^2} = 3.8419 \times \frac{0.5(0.5)}{0.0025} = 384$$

Sampling Procedure/Technique

Hadiya zone had 11 districts from which, Soro district was selected with non-probability sampling method purposively, because of having a large population size than that of other districts. Soro district has 9 public HCs, and all 9 HCs were selected for this study. The selected sample of exit interviews from each health center was drawn by proportional of outpatient coverage of under-five clinic in each health center. The mother/caregiver was included for exit interviews after completing the service. The first case

was selected conveniently, and the rest cases were included consecutively in to study until the sample size reached.

Observation of two HWs that provided IMNCI service was selected conveniently at the time of study per HCs. In the case of two or more health workers found in the IMNCI service room; two of them were selected randomly by lottery method, and then observed one after the other consecutively. The selected HWs were observed for 5 cases for their performance on compliance of the IMNCI guideline. The document review was used to support the observation study; Six observed under-five children were selected during observation and reviewed from the IMNCI register book per health center. Two key-informants per health center and one from the district health office MCH coordinator were selected purposely. The purposes of selection for key informants were based on having more information about the program related to their position.

Inclusion and Exclusion Criteria

Inclusion criteria: All mothers/Caretakers came to health centers for IMNCI service during the study period and all health care providers specifically working in IMNCI were involved.

Exclusion criteria: Service providers with less than 3 months of the service year, whose documents did not have full information, caretakers unable to respond due to health problems, and those below 15 years old were excluded from the study.

Data Collection

Based on study objectives and research questions, document review and observation checklist were adapted from national IMNCI guidelines, and the UNICEF survey checklist.¹⁶ The structured questionnaire for the exit interview was adapted from the program evaluation study books.¹⁵ The tool was written in English then translated to Amharic and then retranslated to English to check the consistency.

Data Quality Assurance

A pretest was done for 21 (5%) of the total sample size to keep the reliability of the data. Additionally, Cronbach's alpha (0.873) was used for exit interview questionnaires. Document review and observation checklists were checked manually, some variables and terminologies were also adjusted.

The collected data were reviewed and checked for completeness before data entry. Data were coded and entered into Epidata version 3.1 then transported to SPSS version 20 for processing. The overall satisfaction level was calculated by the demarcation threshold formula; the satisfied categories were taken from the threshold score 45 and above, and dissatisfied categories were registered from the threshold score lower than 45.¹⁷ Five points of likers items (1 to 5) show from least to the highest level of satisfaction.

$$\frac{\text{Highest total score} - \text{lowest total score} + \text{lowest score}}{2}$$

Binary logistic analysis was used to check for association with the single variable with the outcome variable. Hosmer and Lemeshow test was used to check the goodness-of-fit of the model. Variables having an association with dependent variable $P < 0.25$ were selected for multivariate logistic regression analysis and used to assess by statistical significance (adjusted odds ratio). The strength of association was measured with AOR at 95% CI, and its significance variables were less than p-value 0.05. The qualitative data was analyzed manually using thematic analysis with particular dimensions and results were presented in a narrative form. The transcribed data reports were checked by the peer debriefing method and member check.

Ethical Considerations

Ethical clearance was granted from Jimma University Institutional Review Board with approval number IHRPGH/668/2017. A permission letter was given by the Soro district health office and informed consent was obtained from participants. Kept the participant's confidentiality, and participation was voluntary and gave the right to withdraw at any point in the study. Jimma University Institutional Review Board approved participants under the age of 18 years to provide informed consent on their own behalf, and the informed consent included publication of anonymised responses.

Results

The response rate of caretakers was 390 (92.4%), and 90 (100%) direct observation was undergone for 18 HWs at nine health centers and supported by document review of observed cases. Fifty-four observed cases were analyzed and recruited to this study.

Availability of Resources

A total of 38 health workers were trained in the IMNCI service. All of nine health centers had more than one IMNCI trained health workers, but 11 (28.9%) IMNCI trained health workers were taken the training before two years. Thirty years male health center head said that "... we have good proportional HWs that trained in IMNCI program because here, there are NGO's that support the program like IFHP and IMC in current situation ..."

From the inventory checklist, MUAC was the only medical equipment found more than one from all health centers. At least one functional thermometer, weight scale, stethoscope, and timer were available in 8 (88.9%), 8 (88.9%), 7 (77.8%), and 7 (77.8%) of the health centers, respectively. Supplies for ORT corner to mix ORS, cups, spoon, and plastic bags were available in all HCs. Drugs available for last 3 months in all health centers were vitamin A, ORS, zinc sulfate, and paracetamol, whereas, an oral antibiotic like amoxicillin, ciprofloxacin, and cloxacillin were available in 8 (88.9%), 5 (55.6%), 4 (44.4%) and 1 (11.1%) of HCs, respectively.

A 29 years' Male Health Center Head said that

... So much difficult to avail all types of drugs in the health centers because this health center had limited budget, which is generated from the client based income, we give cost-free service for clients by purchasing from ours that is why we face stock out drugs in our store ...

and 26 years' Female case team coordinator said that

... sometimes health workers prescribe other drugs out of the national guideline recommendation because of unavailability of recommended drugs in the health center pharmacy ...

All health centers had separate consultation room, electric power or solar energy, IMNCI register book, and chart booklet. Functional piped water sources available in 8 (88.9%) of health centers, from which only 2 (22.2%) of HCs had water sources inside the under-five room.

Compliance with Guideline

Out of 18 (100%) observed health workers 9.6 (53.7%) were female and all 18 (100%) health workers were trained with the IMNCI guidelines. About 47 (87%) and 38 (70.4) of clients were measured for their weight and temperature, respectively. Only three cases were observed for infants less than 2 months, from which all of them were correctly assessed for breathing count in 1 minute,

umbilical cord redness and draining pus, skin pustules, movement of the child, Jaundice, diarrhea, and feeding problems, however, one infant did not measure for axillary temperature and immunization status. From observed three cases very severe disease and local bacterial infection were correctly classified, also two jaundice cases were correctly classified but misclassified for one local bacterial infection and one local infection. Considering that one case was classified for two or more diseases at a time (Figure 1).

Classification and Treatment

Health workers were correctly classified Malaria, dehydration, diarrhea, malnutrition, and anemia for 50 (92.6%) 48 (88.9%), 49 (90.7%), 48 (89%), and 50 (92.6%) of sick under-five child respectively as shown in (Figure 2).

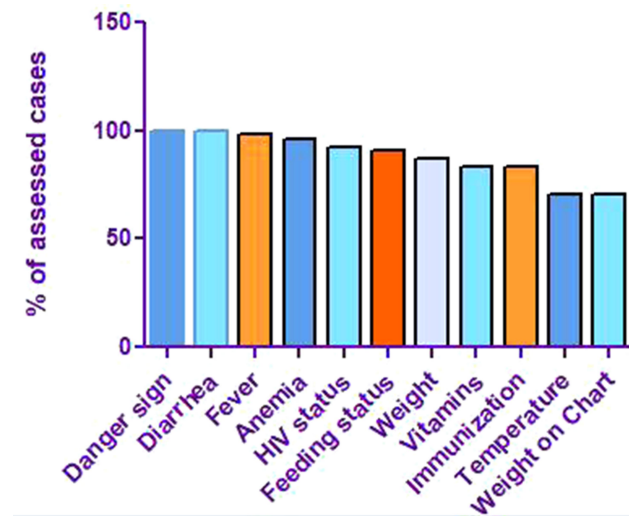


Figure 1 Assessment of sickness under-five children compliance to national guidelines of IMNCI in Soro district, 2017.

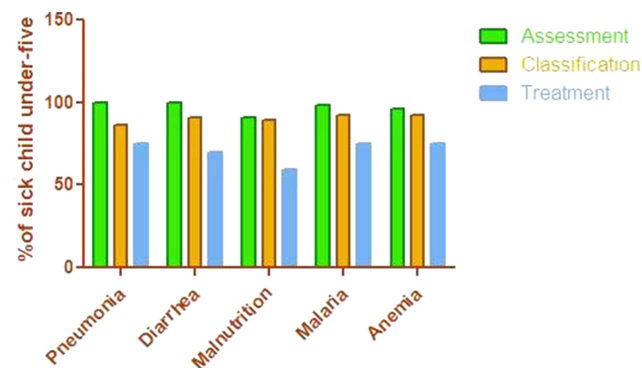


Figure 2 Compliance of disease assessment, classification and treatment for sick under-five children to national IMNCI guidelines, Soro Districts, 2017.

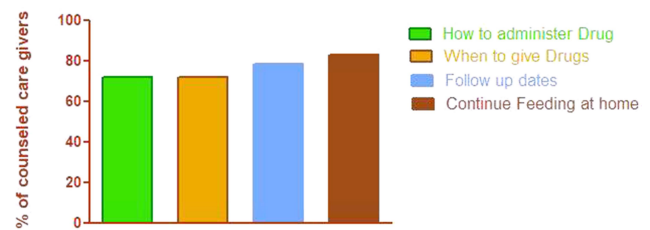


Figure 3 Compliance of caretakers/mothers counseled for sick children Care in Soro district, 2017.

Counseling of Caretakers

The caretaker counseled on how to administer medication were 39 (72.2%), and 39 (72.2%) were received counseling on when to give medication. About 36 (66.7%) of cases were given first dose medication at the health center. Follow updates were given for about 42 (77.8%) sick children. HWs Observed for using chart booklets while giving the service were 53 (98.1%) (Figure 3).

An interview from 35 years' female case team coordinator said that

.... assessment of the sick child was sometimes missed with the unavailability of some medical equipment. It is so difficult to follow the steps in the guideline without the availability of medical equipment.

Satisfaction Dimensions

Socio-Demographic Characteristics of Participants

About 186 (45%) caretaker age was between 26 and 30 years old. More than half 270 (65.4%) of the caretakers were living in rural areas (Table 1).

Service-Related Factors

About 271 (69.5%) caretakers were responded that waiting time stayed to get the service was less than 30 minutes. The temperature was taken for 249 (63.8%) of the sick child and who get the prescribed drugs inside the health center pharmacy were 205 (52.6%) (Table 2).

Satisfaction Level of Caretakers

The overall satisfaction of IMNCI services was 80.9% calculated by the demarcation threshold. More than two-thirds (78.5%) of caretakers were satisfied with the waiting time of the IMNCI service and 82.6% of caregivers were satisfied with getting counseling on identifying danger signs of sick under-five children to return HCs immediately. About 84.4% of caregiver was satisfied with overall service to decide to

Table 1 Sociodemographic Characteristics of the Participants for Evaluating Implementation of IMNCI Services in Soro District, Hadiya Zone Health Centers, 2017 (N=390)

Variable	Category	Frequency	Percentage
Age	15–20 years	14	3.4
	21–25 years	71	17.2
	26–30 years	186	45.0
	31–35 years	82	19.9
	36–40 years	38	9.2
	Above 41 years	22	5.3
Sex	Male	67	16.2
	Female	346	83.8
Educational status	Illiterate	165	42.3
	Primary school	180	46.2
	Above secondary school	45	11.5
Address	Rural	270	65.4
	Urban	143	34.6
Marital status	Currently married	346	88.7
	Currently unmarried	44	11.3
Family size	Three and less	300	76.9
	Four and above	90	23.1
Occupational status	Farmer	102	24.7
	House keeper	168	40.7
	Merchant	81	19.6
	Gov't employee	41	9.9
	Private employee	10	2.4
	Other specify	11	2.7
Mode of transport to HC	By foot	345	83.5
	By motor bicycle	37	9.0
	By car	2	0.5
	Horse	26	6.3
	Other	3	0.7
Time to reach HCs	Greater than 30 min	90	23.1
	Less than 30 min	300	76.9
Previous Health facility attendance	First time	124	30.0
	Twice	106	25.7
	Three	93	22.5
	Four	46	11.1
	Above five times	44	10.7

Table 2 Health Center Attendance of Sick Child for IMNCI Program in Health Centers of Soro District Hadiya Zone, 2017 (N=390)

Variables	Category	Frequency	Percentage
Frequency of child sickness with any case of under-five disease	Once	32	8.2
	Twice	119	30.5
	Three	163	41.8
	Above four	43	11.0
	Not ever sick	33	8.5
Frequency of sick under-five child to attend IMNCI service since birth	Once	86	22.1
	Twice	116	29.7
	Three	75	19.2
	Above four	20	5.1
Temperature is taken	Not ever sick	93	23.8
Waiting time	Yes	249	63.8
	No	141	36.2
Availability of prescribed drugs	1–30min	271	69.5
	Greater than 30 min	119	30.5
Consultation time	Yes	205	52.6
	No	185	47.4
Counseling is given on extra fluid and feeding	1–30min	220	56.4
	Greater than 30min	170	43.6
Weight measured	Yes	220	56.4
	No	170	43.6
	Yes	106	27.2
	No	284	72.8

come to this health center by next time. Caretakers were satisfied with consultation time, availability of drugs in HC pharmacy, and availability of medical equipment's 91.5%, 62.3%, and 73.6%, respectively.

Factors Associated with Caretaker's Satisfaction

Educational status, weight measured, waiting time, availability of the prescribed drug, consultation time, family size (child), counseling received giving extra fluid, continue feeding and time to reach HC on foot (walking) were variables selected for multivariate analysis of client satisfaction on IMNCI services.

Multivariate Analysis of Variables Associated with IMNCI Service Satisfaction

Caretakers who were measured their weight of sick children were 58% less satisfied than those who measured their child

weight AOR=0.42, CI 95% (0.19, 0.94). Caretakers who waited less than 30 minutes preceding consultation with health care providers were 2 times more satisfied than waited more than 30 minutes AOR= 2, CI 95% (1.01, 3.77). Caretakers who got prescribed drugs from health center pharmacy were nearly 4 times more satisfied than those who did not get AOR= 3.7, CI 95% (1.91, 7.34). The caretaker who took less than 30 minutes to reach the health center were 7.7 times more satisfied than compared to those who took greater than 30-minute AOR=7.7, CI 95% (3.79, 15.59). The caretaker who had three and less family size was more satisfied compared to those who had larger than three family size AOR=2 CI, 95% (1.10, 4.06) (Table 3).

Judgment Matrix for the Overall Implementation of IMNCI Program

IMNCI service was measured by looking at three dimensions (availability, compliance, and satisfaction). From 100%, availability (30), compliance (35), and satisfaction (35) were given and the result found was 24.0%, 30.4%, and 27.8% for the above three dimensions, respectively. The percentage found in each dimension was converted to their respective weight and summation was made.

Discussion

Overall satisfaction level of the caregiver in the IMNCI service of Soro district, Hadiya zone was 80.9%, however,

studies in Ethiopia have reported that overall satisfaction levels were ranging from 52% to 57% in 2006.¹⁸ Predictor of caregiver satisfaction was waiting time, availability of prescribed medications, time taken to reach health center from home on foot, Family size, and weight measurements of the sick child was found to have a statistically significant association. The caretaker who took less than 30 minutes to reach the health center on foot was nearly 8 times more satisfied than those who took more than 30 minutes. A similar finding was observed in the Jimma zone on health service utilization indicated that clients who were a shorter distance to the health center were 2.9 times higher chance to get health service.¹⁹

Caretakers who waited less than 30 minutes to get service of IMNCI in HCs were 2 times more satisfied than those who were waited greater than 30 minutes. This finding was consistent to study finding in Wolayta Teaching Hospital on the satisfaction of Caretakers/ mothers in outpatient service including under-five clinics indicates that caretakers waiting for the time less than or equal to 30 minutes in waiting area preceding consultation were to be more satisfied than those who were waited for 60 minutes.²⁰ Caretakers were more frustrated proceeding to consultation with health workers about to know their child's health status. The studies used to compare with this finding were not conducted specifically in under-five children, but it assessed satisfaction in all outpatient services including under-five services.

Table 3 Variables Showed Adjusted Crude Association with Overall Caretaker Satisfaction on IMNCI Services in Soro District, Hadiya Zone, 2017 (N=390)

Variables Category		Frequency				P-value	AOR	CI	
		Dissatisfy		Satisfy					
		#	%	#	%			Upper	Lower
Family size	Three and less	47	15.7%	253	84.3%	0.023	2.122 I	1.11	4.06**
	Four and above	23	25.6%	67	74.4%				
Availability of prescribed drug	Yes	23	11.2%	182	88.8%	<0.001	3.74 I	1.91	7.34**
	No	47	25.4%	138	74.6%				
Waiting time to get HWs (/min)	1–30min	40	14.8%	231	85.2%	0.04	1.95 I	1.00,	3.77**
	Greater than 30	30	25.2%	89	74.8%				
Weight measured	Yes	34	32.1%	72	67.9%	<0.001	0.24 I	0.13	0.45**
	No	36	12.7%	248	87.3%				
Time to reach HC	Greater than 30m	29	32.2%	61	67.8%	<0.001	7.68 I	3.78,	15.59**
	less than 30min	41	13.7%	259	86.3%				

Notes: **Refers to variables significant in multivariate logistic regression analysis with p-value (p< 0.05).

Regarding the availability of prescribed drugs for a sick child, caretakers who got all prescribed drugs in health center pharmacy were 3.7 times more satisfied than those who did not get, and this finding is almost similar compared to another study finding on associated factors among outpatient department in Wolayita Sodo University teaching hospital, southern Ethiopia, 2015, nearly two-thirds (64.3%) of the respondents did get all prescribed drugs from the hospital pharmacy were more satisfied.²⁰

Caretakers whose sick child's weight not measured were 76% less likely satisfied than those who were measured. As the researcher's best knowledge there were no studies found for this finding, but it needs further study to explain the finding. Caregivers who had three and less family sizes were 2 times more satisfied than those who had four and above family size. This might be related to the economic status of the caregiver. As to the best knowledge of the researcher, there was no similar finding, and so further studies will be necessary to explain it.

Conclusion

Based on judgment criteria overall implementation of the IMNCI program study was judged as good. All health centers had trained health workers, ORS, paracetamol, vitamin A, chart booklet, and IMNCI guideline were available, however, cotrimoxazole, gentamycin, ampicillin, and mebendazole were less abundant drugs in health centers. Medical equipments like a thermometer, weight scale, and stethoscope were not available in all health centers.

Compliance of health workers toward the IMNCI guideline was judged as good. Health workers less complied with counseling of caregivers on feeding, prescribing drugs, and follow updates, also, there were over and under classification, treatment and follow of pneumonia, diarrhea, anemia, malaria, and malnutrition were observed. According to judgment criteria, the satisfaction of caregivers in the IMNCI service was fair. The satisfaction of caretakers was affected by the long waiting time to get a consultation to health workers in the health center, availability of prescribed drugs in health center pharmacy, long walking time to get service of IMNCI, family size, and temperature measurement for the child. Further, a large-scale study is required to be conducted in the future in other districts to ensure proper implementation of the IMNCI program in Ethiopia.

Limitations of This Study

Hawthorne effect would cause health workers to improve performance solely as a result of being observed. However, the bias minimized by increasing the number of observation sessions, and those extra observations were not included in this analysis. Caretakers satisfaction was mainly related to their perception of the service that might not relate to the standards of national guidelines or policy of the nations. Social disability bias due to a consecutive sampling of caregivers.

Data Sharing Statement

The dataset used for this study cannot be shared and in the future, interested parties may request the approval to access the data by writing to Jimma University Institutional Review Board.

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Author Contributions

All authors contributed to data analysis, drafting or revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no competing interests for this work.

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