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A Comparison between the 2015 and 2021 Nepal Health Facility Surveys

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ACRONYMS

BHCCs	basic health care centers
CI	confidence interval
DHS	Demographic and Health Survey
DoHS	Department of Health Services
GoN	Government of Nepal
IMNCI	Integrated Management of Neonatal and Childhood Illness
LMIS	Logistic Management Information System
MoHP	Ministry of Health and Population
NDHS	Nepal Demographic and Health Survey
NHFS	Nepal Health Facility Survey
NMR	Neonatal Mortality Rate
ORS	oral rehydration solution
PHCCs	primary health care centers
SARA	Service Availability and Readiness Assessment
SDG	Sustainable Development Goals
U5MR	Under-5 Mortality Rate
WHO	World Health Organization

ABSTRACT

This study assesses changes in service availability, service readiness, infection prevention and control, adherence to the process of care, and caregiver satisfaction with child curative services in health facilities of Nepal. We conducted an analysis using data from two nationally representative comprehensive Nepal Health Facility Surveys conducted in 2015 and 2021. We used a simple additive index that produced scores by adding binary variables. The scores for service readiness, infection prevention and control, adherence to the process of care, caregiver satisfaction, and their background characteristics were compared between the two surveys to determine any significant difference. Availability of services was high in both surveys and did not change significantly. The child curative service readiness improved significantly in all provinces, with public hospitals showing the most improvement. Facilities that performed regular quality assurance activities, conducted staff management meetings, conducted management committee meetings, and had systems in place to determine opinions showed higher service readiness. The infection prevention and control score also increased significantly in all provinces. Adherence to the process of care score increased significantly, especially in public hospitals and Primary Health Care Centers. Caregiver satisfaction in public health facilities increased significantly in 2021, with the highest increase seen in Karnali Province. The treatment of diarrhea and pneumonia differed slightly between 2015 and 2021. Continued investment and support for public hospitals, Primary Health Care Centers, and Basic Health Care Centers are recommended to sustain and enhance their child curative service readiness. Regular quality assurance activities, staff management meetings, and management committee meetings should be maintained to ensure ongoing improvement. Furthermore, it is crucial to ensure adherence to the facility-based Integrated Management of Neonatal and Childhood Illnesses protocol for treating common illnesses such as diarrhea and pneumonia.

Key words: child health, service availability, service readiness, process of care, caregiver satisfaction, Nepal Health Facility Survey

KEY INDICATORS

Change in key indicators of child curative services for children under age 5

	2015	2021	Difference	*p* value
Availability of three services (child curative, growth monitoring, and child vaccination)	87.9	86.2	-1.7	NS
Availability of child curative services	99.4	99.4	0.0	NS
Availability of growth monitoring services	92.7	90.5	2.2	NS
Availability of child vaccination services	91.4	89.3	2.1	NS
Frequency of child curative services (5 or more days per week)	99.2	98.8	-0.4	NS
Readiness of child curative services	58.7	64.4	5.7	***
Trained staff and guidelines	41.5	38.7	-2.8	NS
Equipment	64.1	71.5	7.4	***
Diagnostics	15.8	25.7	9.9	***
Medicines and commodities	80.6	86.8	5.4	***
Infection prevention and control score	32.1	65.1	33.0	***
Soap and running water or alcohol-based hand disinfectant	54.0	97.3	43.3	***
Latex gloves	79.1	93.5	14.4	***
Needle destroyer/needle cutter	3.3	29.3	26.0	***
Waste receptable	6.4	24.9	18.5	***
Medical masks	17.7	80.4	62.7	***
Adherence to process of care score (age 0–59 months)	29.1	34.2	5.1	***
Taking client history	58.0	65.1	7.1	***
General danger signs asked by provider or mentioned by caregiver	15.6	19.6	4.0	**
Information asked to caregiver	12.0	16.3	4.3	***
Provider performed physical examination on the sick child	38.6	41.8	3.2	*
Counseling given to the caregiver	18.8	26.4	7.6	***
Adherence to process of care score (age 0–2 months)	33.6	40.1	6.5	NS
Taking client history	49.3	58.8	9.5	NS
General danger signs asked by provider or mentioned by caregiver	31.8	39.5	7.7	NS
Information asked to caregiver	18.0	26.2	8.2	*
Provider performed physical examination on the sick child	42.0	47.0	5.0	NS
Counseling given to the caregiver	24.4	29.9	5.5	NS
Adherence to process of care score (age 2–59 months)	28.9	33.9	5.0	***
Taking client history	58.4	65.3	6.9	***
General danger signs asked by provider or mentioned by caregiver	14.7	18.8	4.1	**
Information asked to caregiver	11.7	15.9	4.2	***
Provider performed physical examination on the sick child	38.4	41.6	3.2	*
Counseling given to the caregiver	18.5	26.3	7.8	***
Caregiver satisfaction score	85.4	89.0	3.6	***

* $p < .05$, ** $p < .01$, *** $p < .001$; NS = not significant

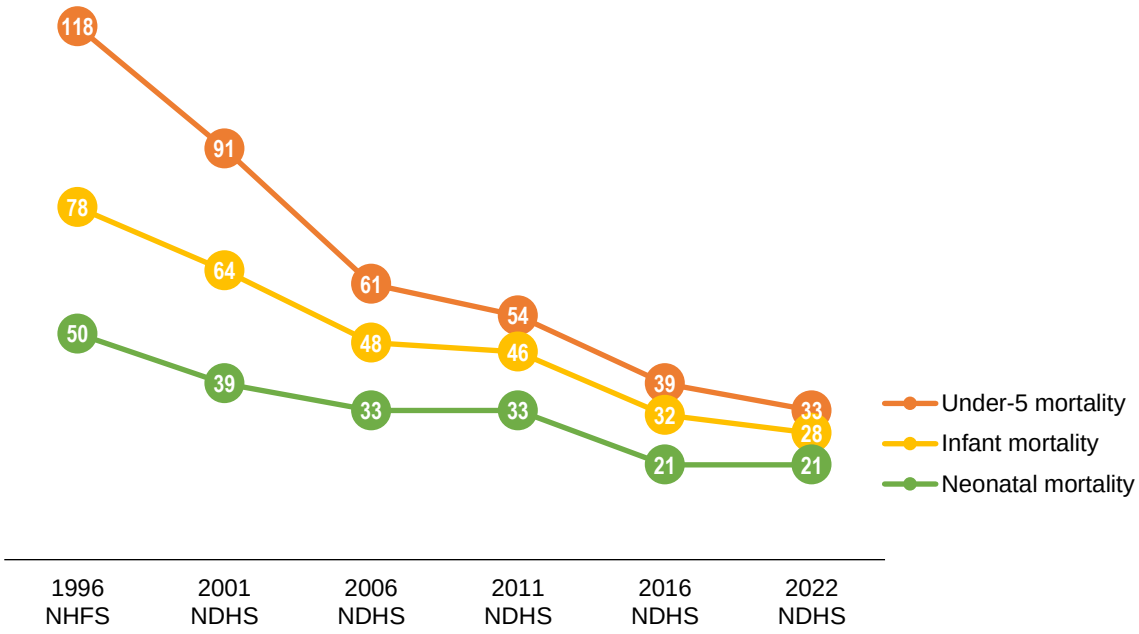
1 INTRODUCTION

Remarkable strides have been made in lowering the under-5 mortality rate (U5MR) and neonatal mortality rate (NMR) around the world, with the U5MR dropping by 59% (from 93 deaths per 1,000 live births in 1990 to 37.7 in 2019) and the NMR declining by 52% (from 36.6 deaths per 1,000 live births in 1990 to 17.5 in 2019).[1] South Asia and sub-Saharan Africa accounted for 26% and 55%, respectively, of the total U5MR. These two regions, which were responsible for over 80% of global under-5 deaths in 2019, accounted for 51% of the global under-5 population.[1] The government of Nepal has set specific targets for Sustainable Development Goal (SDG) 3.2.1, which aims to decrease the under-5 mortality rate to 20 deaths per 1,000 live births by 2030. For SDG 3.2.2, the government's objective is to lower the neonatal mortality rate to 16 deaths per 1,000 live births by 2022 and subsequently to achieve a rate of 12 deaths per 1,000 live births by 2030.[2]

1.1 Trends in Childhood Mortality in Nepal

The child mortality rate in Nepal decreased significantly from 1996 to 2022. Nepal has reduced under-5 mortality by 72% according to the Nepal Demographic Health Survey (NDHS).[3] During the same period, infant mortality in Nepal dropped by nearly two-thirds and neonatal mortality by nearly three-fifths. In Nepal, between 1996 and 2022, the under-5 mortality rate decreased from 118 to 33 deaths per 1,000 live births; infant mortality from 78 to 28 deaths per 1,000 live births; and neonatal deaths from 50 to 21 deaths per 1,000 live births (Figure 1). The under-5 and infant mortality have declined uniformly, although the neonatal mortality rate remained constant between the 2006 and 2011 NDHS and between the 2016 and 2022 NDHS.

Figure 1 Trends in childhood mortality in Nepal (per 1,000 live births), 1996–2022



In Nepal, 85% of all deaths among children under the age 5 occurred before their first birthday, with 64% occurring during their first month of life.[3] To reduce neonatal mortality further, health systems and services need to be strengthened. Coverage, quality, and equity of care must be improved during the

prenatal period and at birth; and high quality, equitable care should be expanded for small and sick newborns and in the first week of life, which can prevent disabilities as well as save neonates' lives.[4] This analysis focuses on examining changes in service readiness, adherence to the process of care, and client satisfaction with child curative services in order to better understand current trends in quality of care.

1.2 Status of Service Utilization for Children in Nepal

In 2022, the NDHS reported that among children under the age of 5 who had experienced illnesses in the 2 weeks preceding the survey, 25% of those with symptoms of acute respiratory infection did not seek advice or treatment. Additionally, 22% of children with a fever were not taken to a health facility for advice or treatment, and 43% of those with diarrhea did not receive treatment or advice from a health facility or provider.[3] Nepal has implemented an Integrated Management of Neonatal and Childhood Illness (IMNCI) strategy to address childhood diseases. However, there are gaps in service quality, equitable distribution of service, and the supply chain.

1.3 Rationale and Objectives

The IMNCI program has a vision to provide targeted services to 90% of the estimated population by 2030.[5] These services include the application of chlorhexidine gel to newborns, treatment with oral rehydration solution (ORS) and zinc for children under age 5 with diarrhea, and antibiotics for children under age 5 with pneumonia.[5] The IMNCI program is one of the basic health care services that should be provided by local governments free of cost to its people.[6]

The general objective of this study is to examine the changes in the curative services for sick children in the following areas: service availability, service readiness, infection prevention and control, adherence to the process of care, and caregiver satisfaction between 2015 and 2021.

The specific objectives of this study are:

- Assess the changes in the child curative service availability
- Assess the changes in infection prevention and control measures for child curative services
- Assess the changes in the child curative service readiness
- Assess the changes in providers' adherence to the process of care during child curative service delivery
- Assess the changes in caregivers' satisfaction with child curative services

2 METHODOLOGY

2.1 Data Collected in 2015 and 2021 NHFS

We analyzed data from two consecutive NHFS conducted in 2015 and 2021. The surveys provide information about the availability of essential healthcare services and the readiness of health facilities to provide quality services. Both nationally representative surveys collected data from hospitals, primary health care centers (PHCC), health posts (HP), community health units (CHU), urban health centers, and HIV testing and counseling centers across the seven provinces of Nepal. The standalone HIV testing and counseling centers were not included in this analysis. The surveys included both public and private facilities.

The surveys used random samples of 1,000 health facilities in 2015 and 1,633 health facilities in 2021. Details of sampling procedures for both surveys can be found in the final reports of these surveys.[7,8] The details of the sample size in the current study are shown in Table 1.

Table 1 Survey year and sample size of health facilities, providers, and clients

Sample size/survey year	NHFS 2015	NHFS 2021
At facility level		
Total number of surveyed facilities	963	1,576
Number of facilities (after excluding standalone HIV testing and counseling centers)[1]	940	1,565
Number of facilities that offer curative services for sick children	934	1,554
At providers level		
Total number of interviewed child health service providers	3,296	4,964
At clients level		
Observation/exit interview of curative services for sick children (under age 5)	2,186	2,383
Observation/exit interview of curative services for children age 0–2 months[2]	106	90
Observation/exit interview of curative services for children age 2–59 months[2]	2,077	2,289

[1] A few "don't know" cases were dropped during the process of disaggregating children into age groups of age 0–2 months and age 2–59 months.
[2] We excluded standalone HIV testing and counseling centers because they do not provide child curative services.

The data for the analysis of child curative care service provision were collected with the following methods:

- The Inventory Questionnaire collected information on staffing, staff training, infrastructure and equipment, medicines, supplies, and services offered in health facilities.
- Interviews with service providers at the surveyed health facilities collected information on their qualifications, professional experience, working conditions in the facility, and perceptions of the service delivery environment.
- Observation of services provided to sick children to assess if the service providers adhered to service delivery guidelines and standards.
- Exit interviews with the caregivers of the sick children on their experience of care.

2.2 Description of Variables

The study adapted the WHO Service Availability and Readiness Assessment (SARA) framework to contextualize the analysis of service readiness and availability.[9] Our study used the Government of

Nepal (GoN)/Ministry of Health and Population (MoHP)'s IMNCI protocol[10] and the GoN/MoHP's health facility quality improvement module for strengthening health services to define the variables. The analysis was conducted exclusively with health facilities that provide child curative services.

Service Availability

For this study, availability of child health services was defined as having curative care services, child growth monitoring, and child vaccination services, and the availability of all three services combined for at least 1 day in a week.

Service Readiness

In order to be ready to provide child health services, there are certain physical and human resources necessary at a facility. We defined service readiness with the following criteria: (i) the presence of trained staff and adherence to guidelines; (ii) the availability of necessary equipment; (iii) access to diagnostic tests; and (iv) the availability of medicines and commodities. Each of these criteria includes multiple items that are considered in the assessment of service readiness. For detailed information about the tracer items, see Appendix 1.

Infection Prevention and Control

Infection prevention and control is an essential aspect of providing high-quality healthcare services and a prerequisite for person-centered care. Since infection prevention and control procedures require basic supplies, we developed an infection prevention and control score that includes the availability of items such as soap and running water, alcohol-based hand disinfectant, latex gloves, needle destroyers or cutters, waste receptacles, and medical masks.

Adherence to the Process of Care

Adherence to the process of care was assessed with an observation questionnaire. Observers monitored sick children consultations to determine if providers were delivering quality services, paying attention to the information provided, and if recommended procedures were followed. However, observers did not assess the accuracy of the information or the interpretation of examination findings. Based on the IMNCI protocol of the GoN/MoHP, adherence to the process of care is defined by the following indicators: (i) symptoms asked by the provider or mentioned by the caregiver; (ii) general danger signs asked by the provider or mentioned by the caregiver; (iii) information given to the caregiver; (iv) physical examination of the child by the provider; and (v) counseling given to the caregiver. Details can be found in Appendix 2.

The adherence to the process of care is analyzed among children under age 5, and further classified into two age groups: age 0–2 months and age 2–59 months, according to the IMNCI protocol. We have adherence to process of care indicators among children age 0–2 months and age 2–59 months since care for these two age groups is different according to IMNCI protocol. In addition, treatment for diarrhea and pneumonia was assessed for those diagnosed with these conditions on the day of the visit. In this analysis, the correct treatment for pneumonia includes use of amoxicillin, while the correct treatment for children with diarrhea includes zinc and ORS.[*]

[*] While this is the current national protocol for treatment of acute respiratory infection (ARI), the recommended treatment of ARI in 2015 was cotrimoxazole.

Caregiver Satisfaction

Another aspect of the quality of care is caregiver satisfaction, which was assessed before the caregiver left the facility. Interviewers asked caregivers of sick children for their opinions about the consultation process and the quality of services received. Specifically, interviewers read a list of common reasons for caregivers' dissatisfaction and ask caregivers to rate if each issue posed a major problem, minor problem, or was not a problem during their child's consultation. Clients could also report that they don't know. Caregiver satisfaction was measured using the responses obtained in these caregivers exit interviews. These 11 questions (see Appendix 3) were used to construct the caregiver satisfaction score.

Background Characteristics

At the facility level, the background characteristics or variables of the study included facility types, managing authority, ecological region, province, and if the facility performed regular quality assurance activities, conducted staff management meetings at least once every 6 months, conducted management meeting with management committee members at least once every 6 months, had systems to determine opinions, and had external supervision in the facility in the previous 4 months. These characteristics were used for the service readiness and infection prevention and control scores in which the facility was the unit of analysis. In addition to considering the adherence to the process of care and caregiver satisfaction scores, we also considered the provider category (provider type, training received), child characteristics (age, gender), and caregiver characteristics (age, caste, education, time of visit) as background characteristics, where applicable. The definition of these background characteristics or variables can be seen in Appendix 4 and the descriptive tables for these variables in Appendices 5–7.

2.3 Data Analysis

To generate the scores for service readiness, infection prevention and control, adherence to the process of care, and caregiver satisfaction, we dichotomized each item and assigned a code of 1 if it was present (such as availability of trained staff, guidelines, medicine, diagnostics, equipment, and infection prevention and control items), had occurred (for adherence to the process of care), or indicated no problems (for client satisfaction questions). If the item was not present, had not occurred, or indicated problems, we assigned a value of 0. "Don't know" cases were also assigned a value of 0. To facilitate comparison, we developed scores with a simple additive index, a common approach to creating composite scores. This procedure involves adding all binary indicators, dividing the total number of indicators, and then multiplying by 100 to obtain a score (%).

We presented descriptive analyses of child curative care services, along with the background characteristics, availability of different items, and scores of the service readiness, infection prevention and control, adherence to the process of care, and caregiver satisfaction. In addition, we compared all aspects of quality-of-care and background characteristics in the NHFS 2015 and NHFS 2021 to determine significant differences. We used t-tests to assess the statistical significance between the 2 years. Only significant differences (percentage points) were discussed between the two surveys, with statistical significance determined by a p value < .05 and 95% confidence interval (95% CI). Since the health facilities sample was stratified, sampling weights were calculated based on sampling probabilities for each sampling stratum. To ensure the actual representation of the survey results, we applied sampling weights and considered the complex sample design during analysis. The analysis was conducted using STATA 17.0.

2.4 Ethical Considerations

The Nepal Health Research Council ethical review board and ICF institutional review boards reviewed and approved the 2015 and 2021 NHFS. For this analysis, we used a de-identified dataset from the DHS website (www.dhsprogram.com). Therefore, no separate ethical approval was required for this analysis. In both surveys, the interviewers obtained informed consent from the health facility in charge, service providers, and the caregivers who were observed or had exit interviews. Interviews were conducted by interviewers who were trained to administer questionnaires with privacy and confidentiality.

3 RESULTS

3.1 Child Health Service Availability

In both surveys (2015 and 2021), nearly all facilities in Nepal offered child curative care services, and the majority offered child growth and child vaccination services (Figure 2). While there was a slight decrease in child growth monitoring and vaccination services from 2015 to 2021, this change was not statistically significant. Figure 2 also shows that 88% of health facilities in 2015 offered all three services. This was 86% of facilities in 2021, but the difference was not significant.

The availability of child curative care services was universal (99.4%) in both surveys (Figure 2). This refers to having the service available at least 1 day a week. The service was also universally available in facilities in both surveys when availability was measured as 5 days or more in a week. We also observed high levels (approximately 90% or above in both surveys) of child growth monitoring services and child vaccination services.

Figure 2 Change in service availability of child health services (%), 2015 and 2021 NHFS

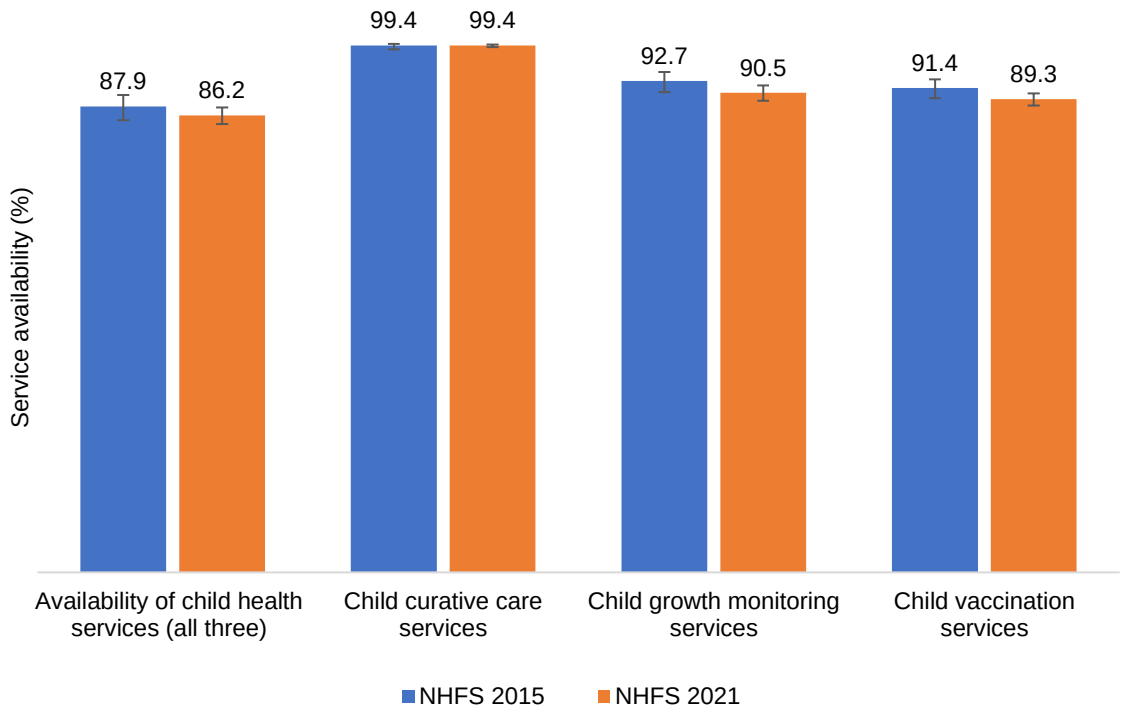


Table 2 presents the changes in the availability of child health services (including child curative care, child growth monitoring, and child vaccination) by facility background characteristics. Significant changes were observed in Karnali Province. Specifically, the availability of child health services experienced a decrease of 6 percentage points in 2021 compared to 2015.

Table 2 Change in service availability of child health services (%), by facility background characteristics, 2015 and 2021 NHFS

Variable	2015 NHFS (N = 934) %	95% CI	2021 NHFS (N = 1,554) %	95% CI	Difference (percentage points)	*p* value
Availability of child health services (all three)	87.9	[85.3, 90.1]	86.2	[84.6, 87.7]	-1.7	NS
Facility types						
Public hospitals	86.3	[76.8, 92.2]	73.9	[60.7, 83.8]	-12.4	NS
PHCCs	94.7	[90.6, 97.0]	97.8	[94.3, 99.2]	3.1	NS
BHCCs	92.9	[89.8, 95.1]	91.8	[90.2, 93.1]	-1.1	NS
Private hospitals	25.9	[18.0, 35.8]	21.1	[15.1, 28.7]	-4.8	NS
Managing authority						
Public	92.8	[90.0, 94.9]	91.4	[89.9, 92.8]	-1.4	NS
Private	25.9	[18.0, 35.8]	21.1	[15.1, 28.7]	-4.8	NS
Ecoregion						
Mountain	93.1	[86.1, 96.7]	86.2	[80.7, 90.4]	-6.9	NS
Hill	92.0	[89.0, 94.2]	89.1	[86.9, 91.0]	-2.9	NS
Terai	80.2	[74.5, 84.9]	81.7	[78.1, 84.9]	1.5	NS
Province						
Koshi	88.0	[80.9, 92.8]	85.9	[82.4, 88.8]	-2.1	NS
Madhesh	80.4	[69.6, 88.0]	87.3	[81.0, 91.8]	6.9	NS
Bagmati	85.9	[81.4, 89.5]	82.1	[77.7, 85.9]	-3.8	NS
Gandaki	92.6	[85.0, 96.5]	86.8	[82.1, 90.4]	-5.8	NS
Lumbini	89.6	[82.4, 94.0]	87.8	[84.5, 90.5]	-1.8	NS
Karnali	97.5	[96.1, 98.4]	92.0	[89.3, 94.1]	-5.5	***
Sudurpashchim	89.1	[81.2, 93.9]	85.4	[81.3, 88.7]	-3.7	NS
Performed regular quality assurance activities						
Yes	91.9	[86.1, 95.4]	92.2	[88.1, 95.0]	0.3	NS
Conducted staff management meeting at least once every 6 months						
Yes	87.8	[83.2, 91.3]	91.3	[89.1, 93.0]	3.5	NS
Conducted meeting with management committee member at least once every 6 months						
Yes	91.3	[86.0, 94.7]	91.8	[89.5, 93.6]	0.5	NS
System to determine client opinions						
Yes	84.2	[80.0, 87.5]	86.8	[84.5, 88.7]	2.6	NS
External supervision in the last 4 months						
Occurred	86.3	[82.5, 89.4]	88.9	[86.7, 90.7]	2.6	NS

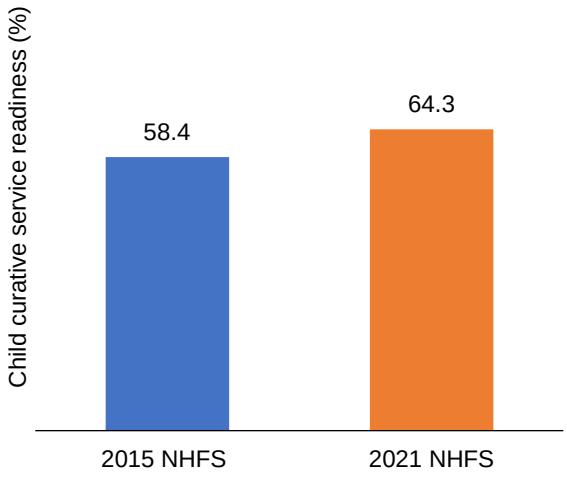
PHCCs = primary health care centers; BHCCs = basic health care centers
* $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant

3.2 Child Curative Care Service Readiness

The readiness of child curative care services was measured with a simple additive index, which incorporated staff training and guidelines, equipment, diagnostics, and medicines and commodities. Figure 3 shows the change in service readiness for child curative care services for 2015 and 2021. The service readiness score for child curative services increased significantly by 6 percentage points in 2021.

Table 3 shows the child curative service readiness by facility background characteristics. The child curative service readiness increased significantly for all facility characteristics, although there was no significant change between the surveys among private facilities.

Figure 3 **Change in child curative care service readiness score (%), 2015 and 2021 NHFS**



Note: *p* value of the difference between the surveys is $p < .001$.

The child curative service readiness in health facilities managed by public authorities significantly increased by 6 percentage points in 2021. By facility type, public hospitals, PHCCs, and BHCCs significantly improved child curative service readiness by 5, 8, and 6 percentage points, respectively. There was also a significant improvement in service readiness in the Mountain, Hills, and the Terai regions by approximately 6 percentage points. Similarly, the service readiness significantly increased in all provinces with the highest increase found in the Sudurpaschim, Madhesh, and Lumbini provinces (between 7–9 percentage points increase), and the lowest found in Gandaki Province (increased by 3 percentage points) (Table 3).

Table 3 shows that the child curative service readiness significantly increased in 2021 among the facilities that performed regular quality assurance activities and conducted management committee meetings (both increased by 8 percentage points), conducted staff management meetings and external supervision (both increased by 6 percentage points), and facilities having a system to determine client opinions (increased by 4 percentage points).

Table 3 Change in child curative care service readiness (%), by facility background characteristics, 2015 and 2021 NHFS

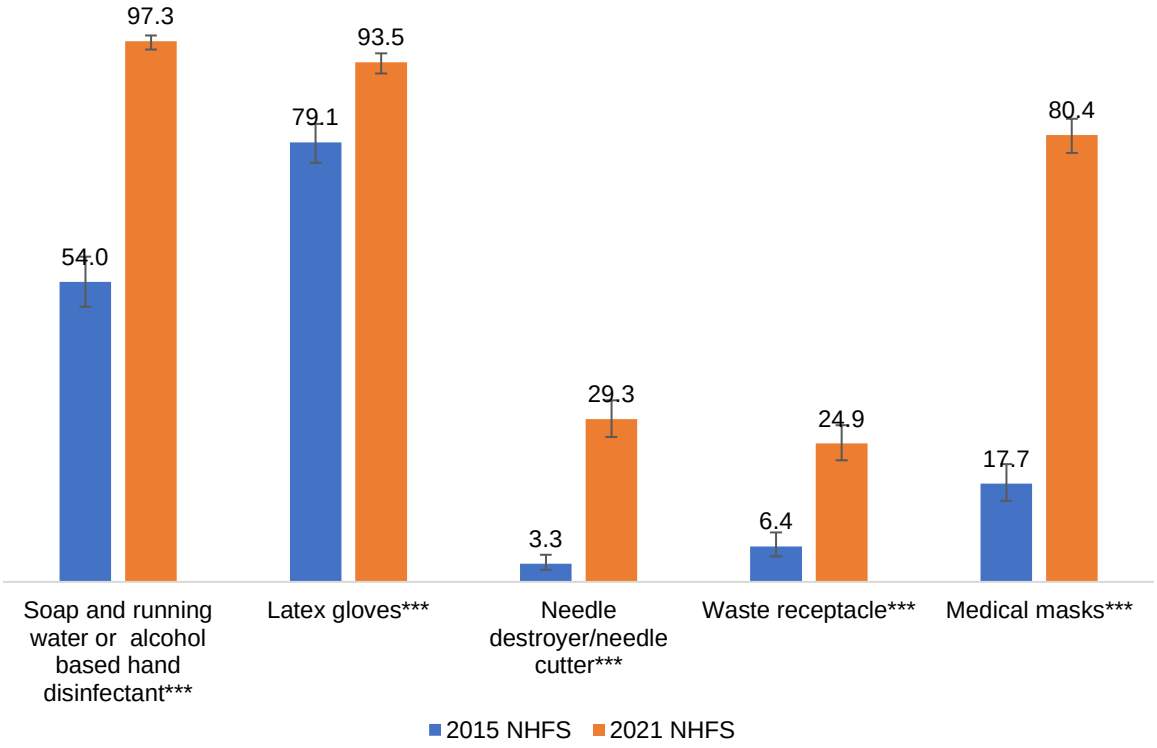
Variable	2015 NHFS (N = 934) % [95% CI]	2021 NHFS (N = 1,554) % [95% CI]	Difference (percentage points)	*p* value
Child curative care services readiness	58.7 [57.7, 59.7]	64.4 [63.6, 65.3]	5.7	***
Facility types				
Public hospitals	75.3 [73.1, 77.6]	80.5 [78.6, 82.5]	5.2	**
PHCCs	73.4 [71.6, 75.1]	81.0 [79.7, 82.3]	7.6	***
BHCCs	57.6 [56.5, 58.6]	63.7 [62.7, 64.7]	6.1	***
Private hospitals	58.1 [54.1, 62.0]	59.4 [56.7, 62.1]	1.3	NS
Managing authority				
Public	58.8 [57.7, 59.8]	64.8 [63.9, 65.7]	6.0	***
Private	58.1 [54.1, 62.0]	59.4 [56.7, 62.1]	1.3	NS
Ecoregion				
Mountain	57.9 [56.0, 59.9]	64.2 [61.8, 66.6]	6.3	***
Hill	59.3 [58.0, 60.6]	64.9 [63.8, 66.0]	5.6	***
Terai	58.2 [56.3, 60.1]	63.9 [62.1, 65.6]	5.7	***
Province				
Koshi	58.1 [55.7, 60.5]	62.6 [60.0, 65.2]	4.5	*
Madhesh	53.5 [50.8, 56.1]	61.3 [58.6, 64.0]	7.8	***
Bagmati	59.5 [57.4, 61.5]	63.4 [61.5, 65.4]	3.9	*
Gandaki	61.9 [59.2, 64.6]	65.2 [63.3, 67.1]	3.3	*
Lumbini	61.3 [59.2, 63.4]	68.5 [66.8, 70.3]	7.2	***
Karnali	57.8 [54.7, 60.9]	61.8 [59.7, 63.9]	4.0	*
Sudurpashchim	60.8 [58.0, 63.6]	69.1 [67.1, 71.2]	8.3	***
Performed regular quality assurance activities				
Yes	62.0 [60.3, 63.7]	70.1 [68.3, 71.9]	8.1	***
Conducted staff management meeting at least once every 6 months				
Yes	61.0 [59.2, 62.7]	67.2 [66.0, 68.4]	6.2	***
Conducted meeting with management committee member at least once every 6 months				
Yes	59.9 [58.2, 61.6]	67.3 [66.1, 68.5]	7.4	***
System to determine client opinions				
Yes	60.7 [59.1, 62.2]	66.9 [65.8, 68.0]	6.2	***
External supervision in the last 4 months				
Occurred	60.1 [58.9, 61.4]	65.8 [64.7, 66.9]	5.7	***

PHCCs = primary health care centers; BHCCs = basic health care centers
* p < .05, ** p < .01, *** p < .001, NS = not significant

3.2.1 Score of staff and guidelines, equipment, diagnostic tests, medicines, and commodities for child curative service

Figure 4 shows the change in scores of guidelines and trained staff, equipment, diagnostic tests, medicines, and equipment for child curative services. Except for the IMNCI-trained staff and guidelines, the availability of other three indicators (equipment, diagnostic tests, medicines and commodities) increased significantly in 2021 compared to 2015. The availability of equipment, diagnostics, medicines and commodities all showed significant increases by 7, 10, and 5 percentage points. Tracing indicators for the quality and availability of trained staff, guidelines, equipment, diagnostic tests, and medicines and commodities for child curative service are shown in Appendix 8.

Figure 4 Change in score of staff and guidelines, equipment, diagnostic tests, medicines and commodities for child curative service (%), 2015 and 2021 NHFS

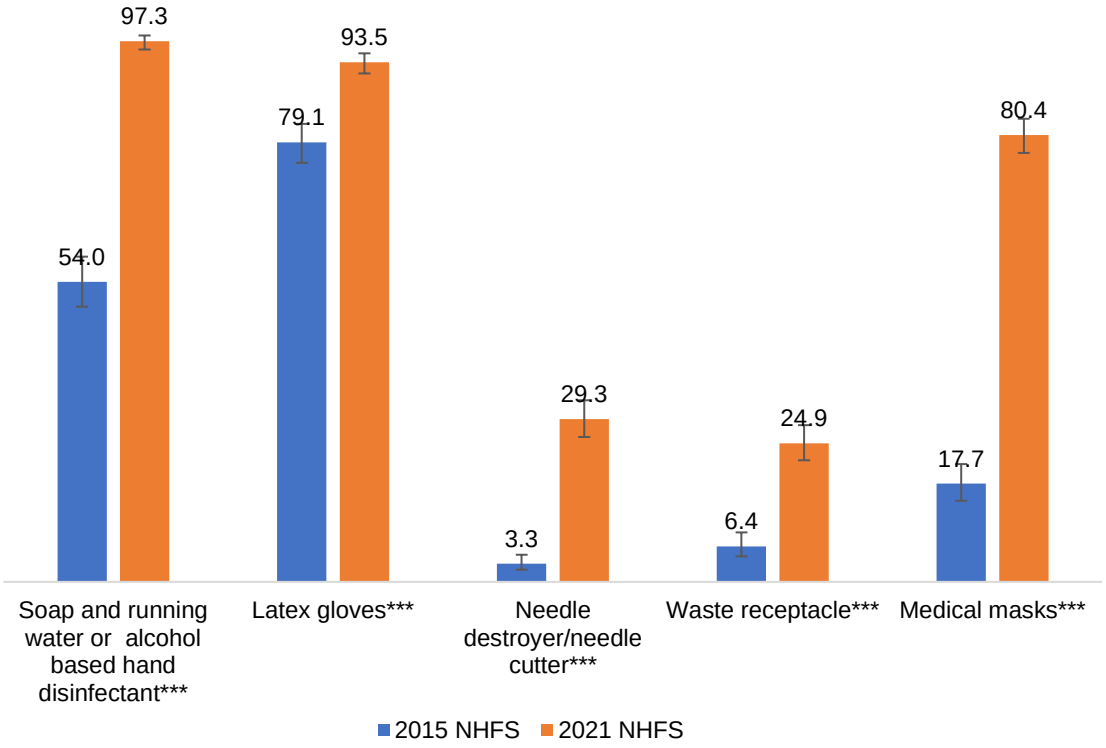


Note: Asterisks in figure indicate the *p* value of the difference between the surveys with ***$p < .001$.

3.2.2 Availability of items for infection prevention and control for child curative care services

Figure 5 shows the change in the availability of items for infection prevention and control for child curative care services. Each of the five instruments for infection prevention and control increased significantly in 2021 compared to 2015. Medical masks increased by 63 percentage points, followed by soap and running water or alcohol-based hand disinfectants (increased by 43 percentage points), and needle destroyers/needle cutters (increased by 26 percentage points). Both latex gloves and waste receptacles increased significantly by 18 and 14 percentage points, respectively.

Figure 5 Change in availability of items for infection prevention for child curative care services (%), 2015 and 2021 NHFS



Note: Asterisks in figure indicate the *p* value of the difference between the surveys with ****p* < .001.

3.1.3 Infection prevention and control score by background characteristics

The score of infection prevention and control was measured with a simple additive index. This index included the availability of items such as soap and running water, alcohol-based hand disinfectant, latex gloves, needle destroyers or cutters, waste receptacles, and medical masks. Table 4 shows the change in infection prevention and control scores of child curative care services by background characteristics. The infection prevention and control score of child curative care services significantly increased by 33 percentage points in 2021 (Table 4). In addition, the infection prevention and control score for child curative care services increased significantly by all facility background characteristics.

The infection prevention and control score of child curative care services of health facilities managed by public authorities increased by 34 percentage points in 2021, whereas private facilities improved by 20 percentage points. By facility type, BHCCs, public hospitals, and PHCCs had significantly improved infection prevention and control scores by 34, 33, and 32 percentage points, respectively. There was also a significant improvement in the infection prevention and control scores in the Terai Region (increased by 34 percentage points), Hills (increased by 33 percentage points), and Mountains (increased by 30 percentage points). All provinces had a significant increase in their infection prevention and control scores, with the highest increase found in Karnali and the lowest in Koshi (Table 4).

Table 4 shows that the infection prevention and control score for child curative services significantly increased in 2021 among the health facilities that conducted management committee meetings (increased by 37 percentage points), performed regular quality assurance activities (increased by 34 percentage points), conducted external supervision in the last 4 months (increased by 33 percentage

points), had a system to determine client opinions (increased by 32 percentage points), and conducted staff management meetings (increased by 31 percentage points).

Table 4 Change in infection prevention and control score of child curative care services (%), by facility background characteristic, 2015 and 2021 NHFS

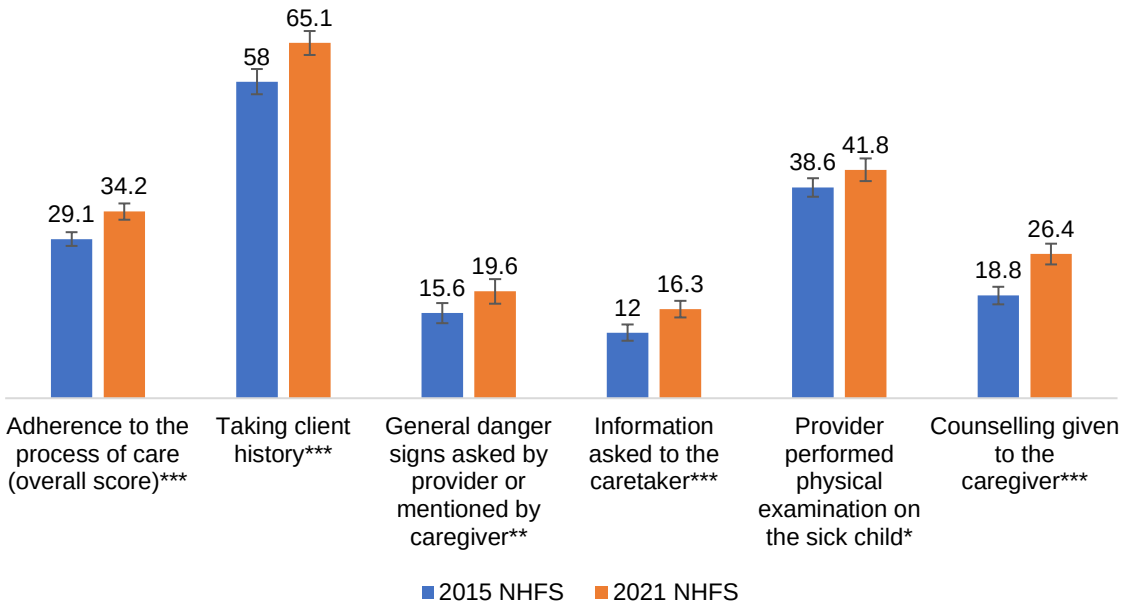
Variable	2015 NHFS (N = 934) %	95% CI	2021 NHFS (N = 1,554) %	95% CI	Difference (percentage points)	*p* value
Infection prevention and control score	32.1	[30.4, 33.8]	65.1	[63.7, 66.4]	33.0	***
Facility types						
Public hospitals	40.4	[35.4, 45.4]	73.4	[69.3, 77.5]	33.0	***
PHCCs	32.2	[29.0, 35.5]	64.3	[61.4, 67.2]	32.1	***
BHCCs	30.6	[28.7, 32.5]	64.6	[63.0, 66.1]	34.0	***
Private hospitals	48.6	[42.7, 54.5]	68.8	[65.7, 71.9]	20.2	***
Managing authority						
Public	30.9	[29.1, 32.7]	64.8	[63.4, 66.2]	33.9	***
Private	48.6	[42.7, 54.5]	68.8	[65.7, 71.9]	20.2	***
Ecoregion						
Mountain	32.3	[28.4, 36.3]	62.3	[58.3, 66.3]	30.0	***
Hill	34.2	[31.7, 36.8]	67.4	[65.6, 69.1]	33.2	***
Terai	29.0	[26.2, 31.8]	62.6	[60.0, 65.3]	33.6	***
Province						
Koshi	30.7	[26.9, 34.6]	56.8	[53.5, 60.0]	26.1	***
Madhesh	23.3	[19.3, 27.3]	60.5	[56.4, 64.6]	37.2	***
Bagmati	37.2	[33.5, 41.0]	72.9	[69.8, 76.0]	35.7	***
Gandaki	41.4	[35.1, 47.7]	70.7	[67.0, 74.4]	29.3	***
Lumbini	34.9	[31.2, 38.6]	63.8	[60.5, 67.2]	28.9	***
Karnali	30.4	[25.6, 35.1]	68.1	[64.3, 72.0]	37.7	***
Sudurpashchim	25.6	[20.5, 30.6]	62.7	[59.7, 65.7]	37.1	***
Performed regular quality assurance activities						
Yes	34.9	[30.6, 39.2]	69.2	[66.1, 72.3]	34.3	***
Conducted staff management meeting at least once every 6 months						
Yes	36.2	[33.2, 39.1]	66.9	[65.0, 68.8]	30.7	***
Conducted meeting with management committee member at least once every 6 months						
Yes	31.1	[28.3, 34.0]	68.1	[66.2, 70.0]	37.0	***
System to determine client opinions						
Yes	34.5	[32.0, 36.9]	66.6	[64.7, 68.5]	32.1	***
External supervision in the last 4 months						
Occurred	33.1	[30.9, 35.3]	65.7	[63.9, 67.4]	32.6	***

PHCCs = primary health care centers; BHCCs = basic health care centers
* $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant

3.3 Adherence to the Process of Care

Adherence to the process of care (%) for five indicators of child curative care services is shown in Figure 6. In this section, we describe these indicators for sick child care services for all children under age 5. However, the following sections also describe these indicators among children age 0–2 months and age 2–59 months since care for these two age groups is treated differently according to IMNCI protocol. Figure 6 shows that there was a significant increase in all five indicators between 2015 and 2021. The adherence to the process of care score significantly increased from 29% in 2015 to 34% in 2021 (increasing by 5 percentage points). (For details, refer to Appendix 9.)

Figure 6 Change in indicators of adherence to the process of care (%) for child curative care for children under age 5, 2015 and 2021 NHFS



Note: Asterisks in figure indicate the *p* value of the difference between the surveys with * p < .05, ** p < .01, *** p < .001.

Adherence to the process of care score was calculated with the five indicators—taking client history, general danger signs asked by provider or mentioned by caregiver, information asked from the caregiver, provider performed physical examination on the child, and counseling given to the caregiver.

Table 5 presents the adherence to the process of care score for child curative services by background characteristics. In 2021, there was a significant increase in the adherence to the process of care score for child curative services compared to 2015, across all different background characteristics such as facility, provider, child, and caregiver characteristics, but not for all categories. In terms of health facilities managed by public authorities, there was a significant increase of 5 percentage points in the adherence to the process of care score in 2021. This increase was observed mostly in public hospitals and PHCCs (at an increase of 6 percentage points), followed by BHCCs (which showed an increase of 5 percentage points). Private facilities had a higher adherence to the process of care score (37% in 2015 and 40% in 2021) compared with public facilities (28% in 2015 and 33% in 2021), but there was no significant improvement. There was also a significant improvement in the adherence to the process of care score in the mountains (which increased by 7 percentage points), hills (which increased by 6 percentage points), and the Terai (which increased by 4 percentage points). Sudurpaschim Province had the highest increase (10 percentage points), followed by the Madhesh, Gandaki, and Karnali provinces, which increased by 6 percentage points. There was no significant change in the Koshi, Bagmati, and Lumbini provinces. Although improving significantly, Madhesh Province had low adherence to the process of care score in both years compared to other provinces (Table 5).

Table 5 indicates a significant increase in the adherence to the process of care score in 2021 among facilities that had a system to determine client opinions (with an increase of 5 percentage points). Significant differences were observed in staff management meetings and management committee

meetings (both increasing by 5 percentage points), and external supervision conducted in the previous 4 months (increasing by 4 percentage points).

In terms of provider characteristics, there were significant increases in the adherence to the process of care score for providers such as medical officers (an increase of 7 percentage points) and paramedics/nurses (an increase of 5 percentage points). Among children age 2–59 months, there was a significant increase in the adherence to the process of care score from 29% in 2015 to 34% in 2021. There were significant increases observed in both male (5 percentage points) and female (6 percentage points) children from 2015 to 2021. Within caregiver characteristics, caregivers age 20–29 (increasing by 6 percentage points) and age 30–39 (increasing by 3 percentage points) had significant increases in the adherence to the process of care score from 2015 to 2021. The adherence to the process of care score among caregivers by caste/ethnicity showed significant increases with the Terai/Madhesh (8 percentage points), Brahmin/Chettri (6 percentage points), and Janajati (4 percentage points) castes (Table 5).

Although caregivers with more than secondary education had higher adherence to the process of care in both surveys, there were no significant differences between 2015 and 2021. However, adherence to the process of care by providers significantly increased by caregivers with no education (an increase of 4 percentage points), basic education (an increase of 5 percentage points), and secondary education (an increase of 4 percentage points) from 2015 to 2021. In 2021, adherence to the process of care increased by 5 percentage points among children visiting the facility for the first time. In addition, the significant differences between 2015 and 2021 were higher among caregivers whose homes were located close to a health facility (an increase of 6 percentage points) (Table 5).

Table 5 Change in adherence to the process of care score (%) of child curative care services among children under age 5, by background characteristics, 2015 and 2021 NHFS

Variable	2015 NHFS (N = 2,186) % 95% CI	2021 NHFS (N = 2,383) % 95% CI	Difference (percentage points)	*p* value
Adherence to the process of care score	**29.1 [27.9, 30.4]**	**34.2 [32.7, 35.7]**	**5.1**	***
Facility characteristics				
Facility types				
Public hospitals	30.4 [27.9, 33.0]	36.5 [34.6, 38.5]	6.1	***
PHCCs	29.3 [27.3, 31.3]	34.9 [33.2, 36.5]	5.6	***
BHCCs	27.0 [25.2, 28.8]	31.8 [29.9, 33.7]	4.8	***
Private hospitals	36.6 [34.0, 39.3]	39.6 [35.8, 43.5]	3.0	NS
Managing authority				
Public	27.9 [26.5, 29.3]	33.0 [31.5, 34.4]	5.1	***
Private	36.6 [34.0, 39.3]	39.6 [35.8, 43.5]	3.0	NS
Ecoregion				
Mountain	31.8 [28.7, 35.0]	38.6 [35.4, 41.8]	6.8	**
Hill	32.5 [30.9, 34.2]	39.0 [36.9, 41.0]	6.5	***
Terai	25.4 [23.4, 27.5]	29.4 [27.4, 31.3]	4.0	**
Province				
Koshi	33.2 [29.9, 36.6]	34.3 [31.2, 37.3]	1.1	NS
Madhesh	19.4 [16.4, 22.4]	25.6 [22.7, 28.5]	6.2	**
Bagmati	32.8 [30.6, 35.0]	37.7 [33.3, 42.2]	4.9	NS
Gandaki	33.8 [29.5, 38.1]	40.1 [37.3, 42.9]	6.3	*
Lumbini	31.2 [28.2, 34.1]	34.7 [31.9, 37.6]	3.5	NS
Karnali	29.3 [24.7, 33.8]	35.7 [32.1, 39.4]	6.4	*
Sudurpashchim	32.0 [29.4, 34.6]	42.3 [38.9, 45.7]	10.3	***
Performed regular quality assurance activities				
Yes	33.9 [31.5, 36.2]	35.1 [31.6, 38.6]	1.2	NS

Continued...

Table 5—*Continued*

Variable	2015 NHFS (N = 2,186) %	95% CI	2021 NHFS (N = 2,383) %	95% CI	Difference (percentage points)	*p* value
Conducted staff management meeting at least once every 6 months						
Yes	29.7	[27.5, 31.8]	34.8	[32.6, 37.0]	5.1	**
Conducted meeting with management committee member at least once every 6 months						
Yes	29.1	[26.7, 31.5]	34.4	[31.9, 36.8]	5.3	**
System to determine client opinions						
Yes	31.4	[29.7, 33.1]	35.9	[34.1, 37.8]	4.5	***
External supervision in the last 4 months						
Occurred	29.9	[28.4, 31.4]	33.9	[31.9, 35.8]	4.0	**
Providers Characteristics						
Provider type[1]						
Pediatrician	35.2	[32.9, 37.5]	38.0	[35.9, 40.1]	2.8	NS
Medical officer	30.8	[28.4, 33.2]	38.2	[34.1, 42.2]	7.4	**
Nurse/paramedic	27.3	[25.6, 28.9]	32.0	[30.2, 33.8]	4.7	***
Specialist other than pediatrician	39.8	[30.2, 49.4]	35.0	[30.7, 39.3]	-4.8	NS
Received in-service training on IMNCI in last 24 months						
Received	30.0	[27.0, 33.0]	35.3	[31.9, 38.7]	5.3	*
Child characteristics						
Age of child in months						
Under 2 months	33.6	[29.2, 38.0]	40.1	[34.9, 45.3]	6.5	NS
2–59 months	28.9	[27.6, 30.2]	33.9	[32.4, 35.4]	5.0	***
Sex of child						
Female	28.5	[26.7, 30.4]	34.2	[32.3, 36.1]	5.7	***
Male	29.6	[28.3, 31.0]	34.1	[32.4, 35.9]	4.5	***
Caregiver characteristics						
Age of caregivers						
Less than 20	28.2	[24.0, 32.4]	32.5	[28.0, 37.0]	4.3	NS
20–29	29.8	[28.3, 31.2]	35.6	[33.8, 37.5]	5.8	***
30–39	30.4	[28.4, 32.5]	33.8	[31.6, 36.1]	3.4	*
40 and above	24.2	[20.9, 27.5]	28.2	[24.5, 31.8]	4.0	NS
Caste/Ethnicity						
Brahmin/Chettri	31.8	[30.1, 33.5]	37.7	[35.9, 39.5]	5.9	***
Terai and other Madhesh	21.8	[19.2, 24.3]	29.7	[26.4, 33.1]	7.9	***
Dalits	28.8	[25.9, 31.8]	31.0	[28.4, 33.6]	2.2	NS
Newar	34.2	[30.6, 37.8]	36.4	[31.3, 41.5]	2.2	NS
Janajati	33.4	[31.1, 35.6]	37.0	[34.4, 39.6]	3.6	*
Muslim	22.9	[17.3, 28.5]	27.7	[23.7, 31.7]	4.8	NS
Others	27.1	[22.5, 31.7]	35.7	[28.6, 42.8]	8.6	NS
Education of caregivers						
No education	25.0	[22.8, 27.2]	29.2	[26.9, 31.6]	4.2	**
Basic education	30.8	[29.0, 32.7]	35.8	[33.6, 38.1]	5.0	***
Secondary	32.2	[30.6, 33.7]	36.4	[34.5, 38.3]	4.2	**
More than secondary	33.5	[28.6, 38.3]	42.1	[35.3, 48.8]	8.6	NS
Time of visit						
First visit	29.1	[27.7, 30.5]	34.2	[32.7, 35.8]	5.1	***
Follow-up visit	29.6	[27.0, 32.2]	33.2	[30.0, 36.3]	3.6	NS
Health facility close to home						
No	34.5	[32.1, 36.9]	35.3	[32.6, 38.0]	0.8	NS
Yes	28.4	[27.0, 29.8]	34.0	[32.4, 35.6]	5.6	***

PHCCs = primary health care centers; BHCCs = basic health care centers

Note: The adherence to the process of care score was calculated based on five indicators using a simple additive index. Details can be found in Appendix Table 2.

[1] Due to low numbers, the figures of the Provider subcategory "Others" are not shown in this table.

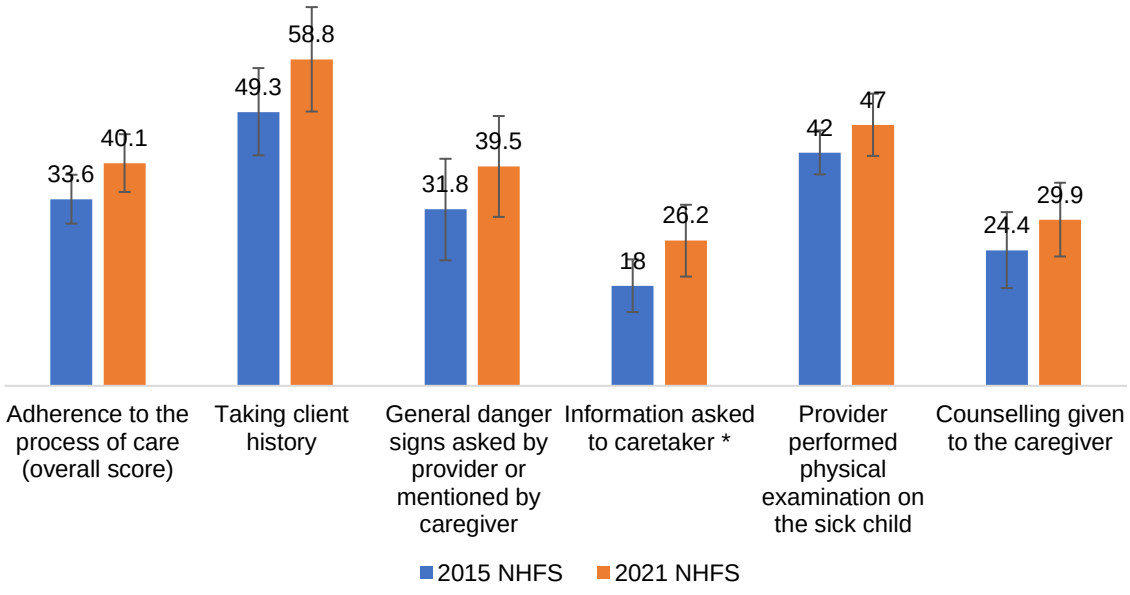
* $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant

3.4 Procedures for the Adherence to the Process of Care Indicators for Children age 0–2 Months and age 2–59 Months

The adherence to the process of care score by age is examined separately for children age 0–2 months and 2–59 months. Further details, including the estimates of the items that compose the scores and the overall score by background variables, are provided in Appendix Tables 10–13.

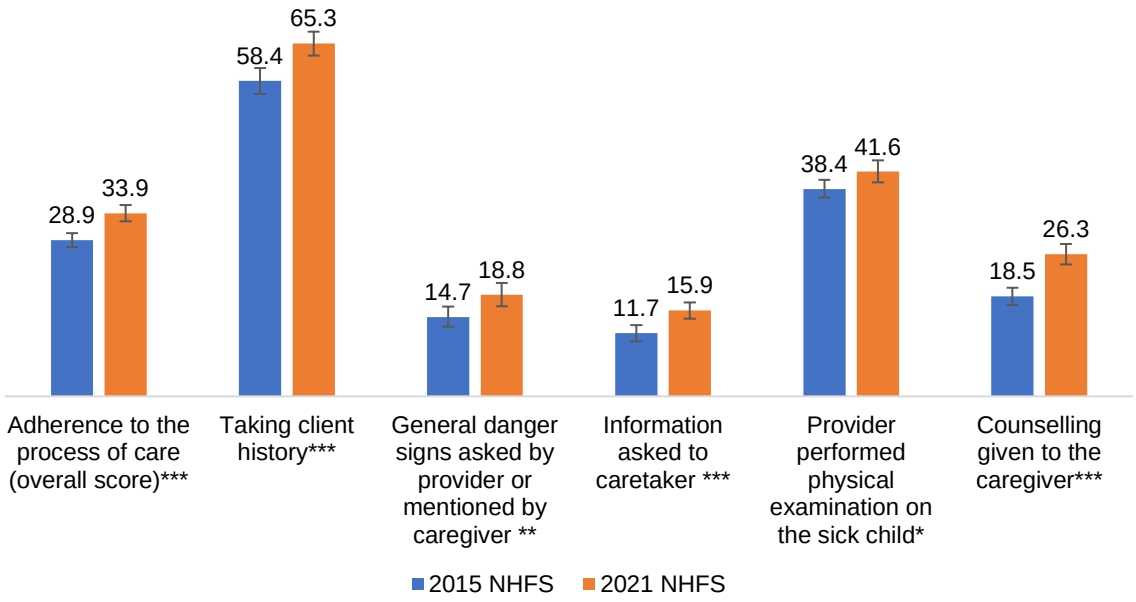
The change in adherence to process of care among children age 0–2 months did not significantly change between the two surveys. In Figure 7, we see that among the five indicators used to measure adherence to the process of care, only information asked from the caregiver increased significantly by 8 percentage points in 2021 compared to 2015. Similarly, the adherence to the process of care score for children age 2–59 months significantly increased from 29% in 2015 to 34% in 2021 (by 5 percentage points) (Figure 8). In Figure 8, we see that all five indicators used to measure the adherence to the process of care among children age 2–59 months increased significantly between the surveys. The largest increase was found in counseling given to the caregiver (increase by 8 percentage points) and symptoms asked by the provider or mentioned by the caregiver (increase of 7 percentage points).

Figure 7 Change in indicators of adherence to the process of care (%) for child curative care service for children age 0–2 months, 2015 and 2021 NHFS



Note: Asterisks in figure indicate the *p* value of the difference between the surveys with * $p < .05$, ** $p < .01$. *** $p < .001$.

Figure 8 Change in indicators of the adherence to the process of care (%) for child curative care service among children under age 2–59 months, 2015 and 2021 NHFS



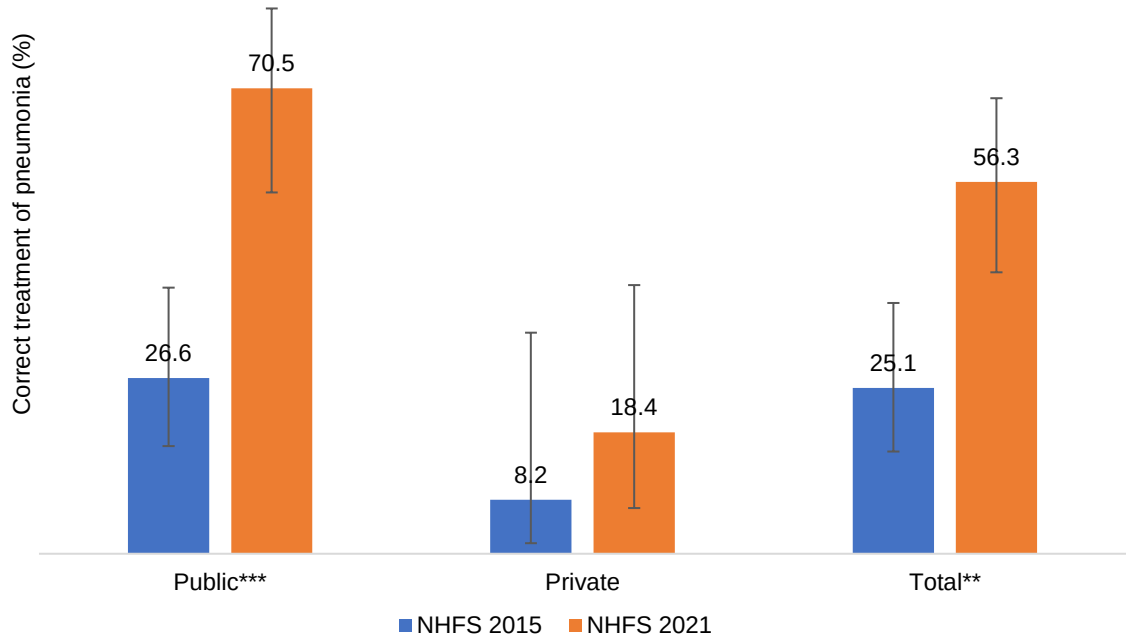
Note: Asterisks in figure indicate the *p* value of the difference between the surveys with * $p < .05$, ** $p < .01$, *** $p < .001$.

3.5 Diagnosis and Treatment for Pneumonia and Diarrhea

In this analysis, the correct treatment of pneumonia is defined as prescribing amoxicillin tablets/syrup to children with pneumonia. Similarly, the treatment of diarrhea is defined as prescribing zinc and ORS to children with diarrhea. In 2015, of all the observed consultations, 8% were diagnosed with pneumonia (9% in public facilities and 5% in private facilities) and 16% were diagnosed with diarrhea (17% in public facilities and 15% in private facilities) (data not shown).

Overall, only 25% of children with pneumonia received amoxicillin in 2015, but this increased significantly to 56% in 2021 (Figure 9). By managing authority, we observe higher percentages for correct treatment of pneumonia among public facilities compared to the private. There was also a significant increase in the treatment of pneumonia in public facilities from 27 to 71% between the surveys, but no significant change in the private facilities.

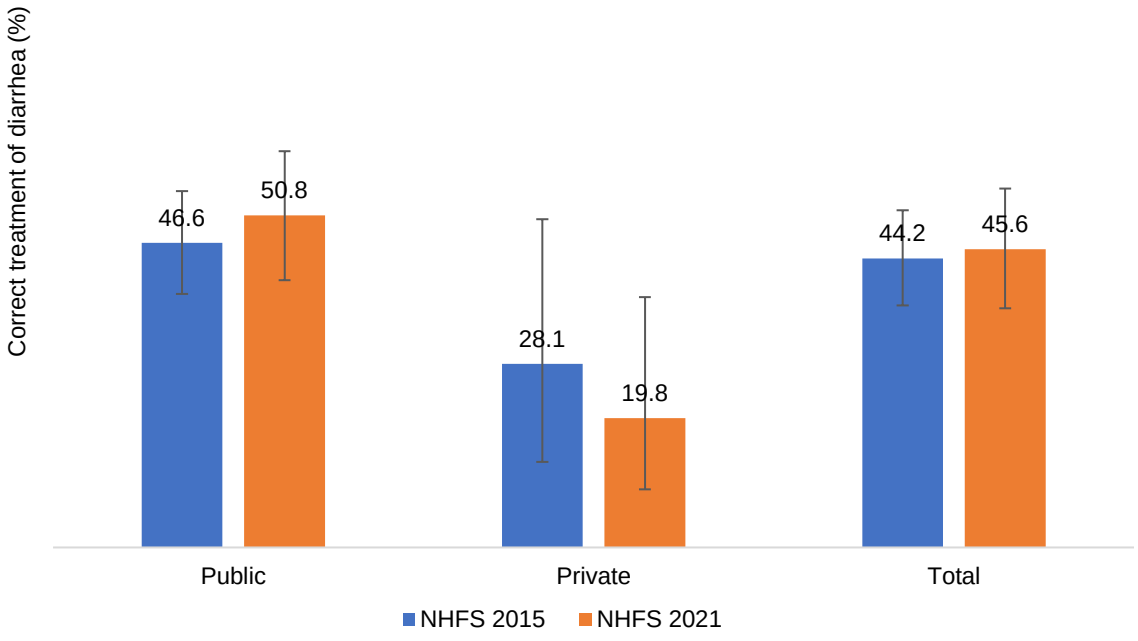
Figure 9 Change in the correct treatment of pneumonia (%)



Note: Asterisks in figure indicate the *p* value of the difference between the surveys with * $p < .05$, ** $p < .01$, *** $p < .001$.

In Figure 10, we see that the treatment of diarrhea was 44% in 2015 and 46% in 2021 with no significant difference. There was also no significant change by managing authority in the treatment of diarrhea.

Figure 10 Change in the correct treatment of diarrhea (%)

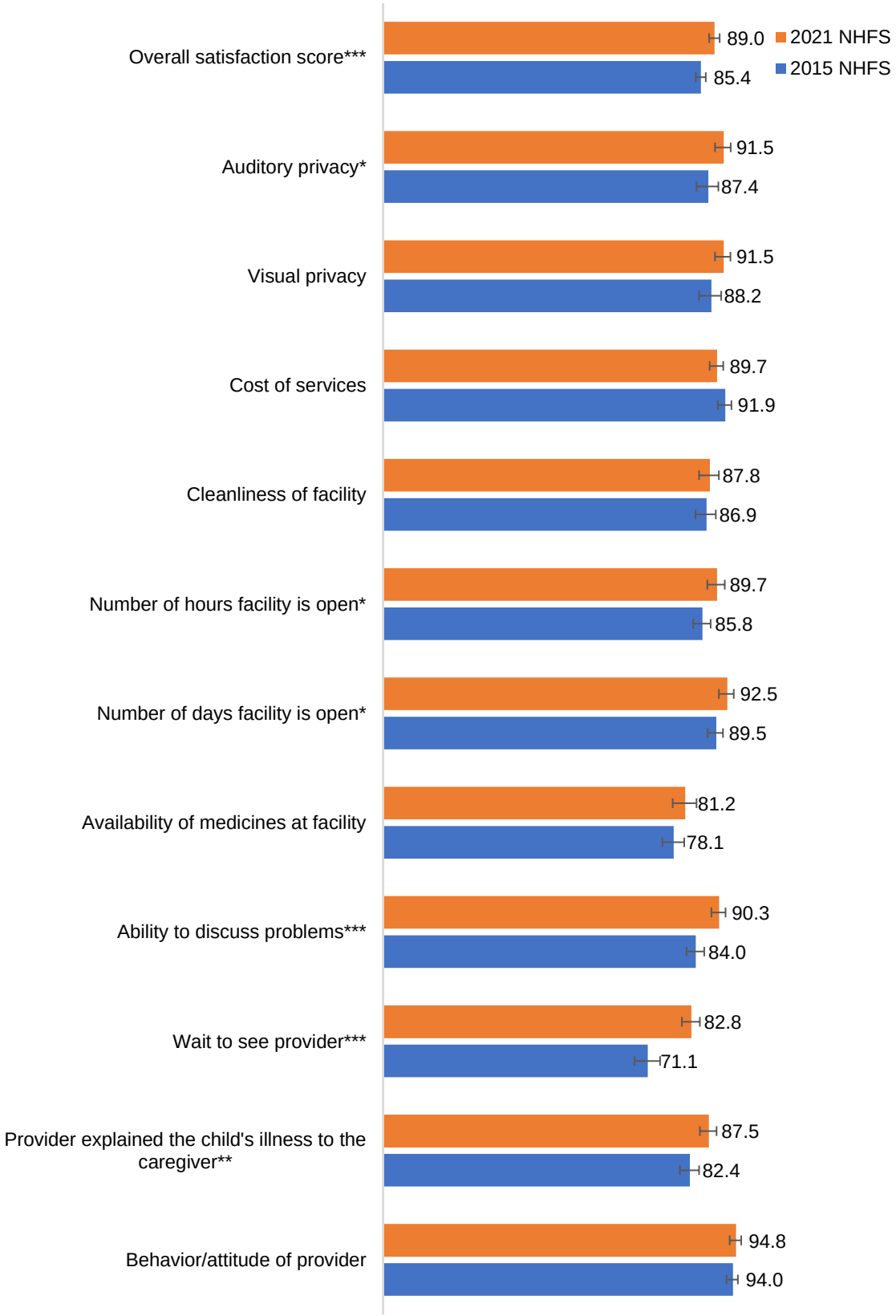


3.6 Caregiver Satisfaction Score for Child Curative Services

Another aspect of the quality of care is caregiver satisfaction, which was assessed before the caregiver left the facility. Interviewers asked caregivers of sick children for their opinions about the consultation process and the quality of services received. Specifically, interviewers read a list of common reasons for caregiver dissatisfaction and asked caregivers to rate if each issue posed a major issue, minor issue, or was not an issue during their child's consultation. Caregiver satisfaction was measured using the responses obtained in these caregivers exit interviews after receiving sick child services.

Figure 11 displays the change in the 11 indicators identified by caregivers. A response of "no problem" registered as the caregiver showing satisfaction with the quality of the visit. Significant increases were observed in 6 of the 11 indicators, including the provider explaining about the child's illness (increased by 5 percentage points), the waiting time to see a provider (increased by 12 percentage points), the ability to discuss problems (increased by 6 percentage points), the number of days and hours the facility is open (increased by 3 and 4 percentage points, respectively), and auditory privacy (which increased by 4 percentage points). The overall caregiver satisfaction score increased by 4 percentage points from 2015 to 2021.

Figure 11 Change in 11 indicators encountered by caregivers and recorded as "no problem" in the services received during the sick child care consultation (%)



Note: Asterisks in figure indicate the *p* value of the difference between the surveys with *p < .05, ** p < .01, *** p< .001.

Table 6 shows the change in caregiver satisfaction score by background characteristics. The caregiver satisfaction score increased significantly across all background characteristics—facility, provider characteristics, and client characteristics.

The caregiver satisfaction score in health facilities managed by public authorities increased significantly by 5 percentage points in 2021 and in public hospitals and BHCCs by 6 and 5 percentage points, respectively. There was also a significant improvement in the caregiver satisfaction score in the mountains (8 percentage points) and in the hills (4 percentage points). Except for the Madhesh, Bagmati, and Gandaki provinces, other provinces saw a significant increase in the caregiver satisfaction score. Karnali Province had the highest increase (13 percentage points). This was followed by increases in the Lumbini (5 percentage points), Koshi, and Sudurpaschim provinces (both by 4 percentage points, $p <$ .05) (Table 6).

Table 6 shows that the caregiver satisfaction score increased significantly in facilities that performed quality assurance activities (increasing by 5 percentage points), had staff management meetings (increasing by 4 percentage points), and management committee meetings (increasing by 5 percentage points). There were also significant increases seen in facilities with a system to determine caregiver opinions (increasing by 3 percentage points) and facilities where external supervision had been conducted in the previous 4 months (increasing by 5 percentage points).

Table 6 also shows significant differences in provider characteristics. A significant difference in the caregiver satisfaction score was observed for providers with a nursing and paramedic background (increasing by 5 percentage points).

Table 6 illustrates the significant differences in caregiver satisfaction based on the characteristics of both the child and the caregiver. Notably, a significant variation in caregiver satisfaction was observed among children age 2–59 months, with a notable increase of 4 percentage points in satisfaction among male children. Similarly, there was a significant difference in satisfaction among caregivers age 20–29 (increasing by 3 percentage points) and those age 30–39 (increasing by 4 percentage points).

In addition, caregiver satisfaction increased by 4 percentage points among those belonging to the Brahmin/Chettri caste and by 3 percentage points among those of the Janajati caste. Caregivers with basic and secondary education levels also had a 4-percentage-point increase in satisfaction. Furthermore, caregivers who had their first visit and lived close to health facilities had a 4-percentage-point increase in satisfaction (Table 6).

Table 6 Change in caregiver satisfaction score (%), by background characteristics, 2015 and 2021 NHFS

	2015 NHFS (N = 2,186)		2021 NHFS (N = 2,383)		Difference (percentage points)	*p* value
	%	95% CI	%	95% CI		
Caregiver satisfaction score	**85.4**	**[84.0, 86.7]**	**89.0**	**[87.6, 90.4]**	**3.6**	***
Facility types						
Public hospitals	78.5	[75.5, 81.6]	84.3	[81.6, 87.0]	5.8	**
PHCCs	85.2	[83.3, 87.2]	87.7	[85.6, 89.9]	2.5	NS
BHCCs	86.1	[84.2, 87.9]	90.6	[88.6, 92.6]	4.5	**
Private hospital	91.3	[89.1, 93.6]	88.6	[86.0, 91.3]	-2.7	NS
Managing authority						
Public	84.4	[82.9, 86.0]	89.1	[87.6, 90.7]	4.7	***
Private	91.3	[89.1, 93.6]	88.6	[86.0, 91.3]	-2.7	NS
Ecoregion						
Mountain	84.3	[81.1, 87.4]	91.8	[89.4, 94.1]	7.5	***
Hill	86.6	[84.7, 88.5]	90.3	[89.0, 91.7]	3.7	**
Terai	84.4	[82.2, 86.7]	87.5	[85.0, 89.9]	3.1	NS
Province						
Koshi	82.4	[79.4, 85.3]	86.3	[84.0, 88.7]	3.9	*
Madhesh	86.1	[82.7, 89.5]	88.5	[84.3, 92.8]	2.4	NS
Bagmati	87.3	[84.5, 90.1]	88.8	[85.9, 91.8]	1.5	NS
Gandaki	88.3	[84.3, 92.3]	89.9	[87.4, 92.3]	1.6	NS
Lumbini	86.4	[83.4, 89.4]	91.1	[88.8, 93.5]	4.7	*
Karnali	78.6	[73.3, 84.0]	91.8	[88.9, 94.6]	13.2	***
Sudurpashchim	84.0	[80.8, 87.2]	88.1	[85.8, 90.4]	4.1	*
Performed regular quality assurance activities						
Yes	84.5	[81.7, 87.4]	89.1	[86.3, 91.9]	4.6	*
Conducted staff management meeting at least once every 6 months						
Yes	84.6	[82.4, 86.8]	88.1	[86.2, 90.1]	3.5	*
Conducted meeting with management committee member at least once every 6 months						
Yes	84.8	[82.4, 87.2]	88.5	[86.4, 90.5]	3.7	*
System to determine client opinions						
Yes	85.8	[84.1, 87.4]	89.0	[87.7, 90.3]	3.2	**
External supervision in the last 4 months						
Occurred	84.7	[83.2, 86.2]	89.3	[87.6, 90.9]	4.6	***
Providers characteristics						
Provider type[1]						
Pediatrician	86.6	[82.5, 90.6]	86.8	[84.2, 89.4]	0.2	NS
Medical officer	83.1	[79.5, 86.7]	86.0	[83.2, 88.7]	2.9	NS
Nurse/paramedic	85.7	[84.0, 87.4]	90.7	[88.8, 92.6]	5.0	***
Other specialist	87.5	[83.6, 91.4]	81.8	[75.7, 87.9]	-5.7	NS
Received in-service training on IMNCI in last 24 months						
Received	84.9	[81.2, 88.7]	86.9	[83.7, 90.0]	2.0	NS
Child characteristics						
Age of child in months						
Under 2 months	82.1	[76.2, 88.1]	90.0	[85.8, 94.2]	7.9	NS
2–59 months	85.5	[84.2, 86.9]	89.0	[87.6, 90.4]	3.5	***
Sex of child						
Female	86.2	[84.6, 87.8]	89.0	[86.8, 91.3]	2.8	NS
Male	84.7	[83.0, 86.4]	89.0	[87.5, 90.6]	4.3	***
Caregiver characteristics						
Age of caregivers						
Less than 20	85.0	[80.4, 89.7]	91.1	[87.1, 95.1]	6.1	NS
20–29	86.2	[84.7, 87.7]	89.3	[88.1, 90.6]	3.1	**
30–39	83.1	[80.7, 85.6]	87.4	[84.7, 90.1]	4.3	*
40 and above	86.2	[82.5, 90.0]	89.0	[84.6, 93.5]	2.8	NS
Caste/ethnicity						
Brahmin/Chettri	84.8	[82.9, 86.8]	88.4	[86.8, 90.1]	3.6	**
Terai and other Madhesh	84.5	[81.1, 87.9]	89.7	[86.0, 93.4]	5.2	NS
Dalits	85.0	[82.2, 87.7]	87.9	[84.9, 91.0]	2.9	NS
Newar	88.6	[84.3, 92.9]	89.7	[86.1, 93.3]	1.1	NS
Janajati	87.0	[84.8, 89.2]	90.4	[88.5, 92.3]	3.4	*
Muslim	84.6	[79.0, 90.1]	86.0	[80.1, 91.9]	1.4	NS
Others	80.3	[66.4, 94.3]	96.9	[94.4, 99.5]	16.6	NS

Continued...

Table 6—*Continued*

	2015 NHFS (N=2,186)		2021 NHFS (N=2,383)		Difference (percentage points)	*p* value
	%	(95% CI)	%	(95% CI)		
Education of caregivers						
No education	85.7	[83.5, 87.9]	88.8	[85.5, 92.1]	3.1	NS
Basic education	85.3	[83.3, 87.3]	88.9	[87.1, 90.8]	3.6	**
Secondary	85.2	[83.5, 86.9]	89.2	[87.7, 90.6]	4.0	***
More than secondary	83.9	[75.8, 92.1]	91.3	[87.2, 95.3]	7.4	NS
Time of visit						
First visit	85.4	[84.0, 86.8]	89.1	[87.7, 90.5]	3.7	***
Follow-up visit	85.3	[82.2, 88.5]	88.2	[85.0, 91.3]	2.9	NS
Health facility close to home						
Yes	85.4	[84.0, 86.8]	89.6	[88.2, 91.0]	4.2	***

PHCCs = primary health care centers; BHCCs = basic health care centers
[1] Due to low number, the figures of Others are not shown in the table.
* p < .05, ** p < .01, *** p < .001, NS = not significant

4 SUMMARY

The study aims to assess the changes in curative services for sick children between 2015 and 2021. The specific objectives involve assessing the changes in the availability of curative services, infection prevention and control measures, service readiness, healthcare providers' adherence to the process of care, and caregiver satisfaction.

Service availability and readiness: Although the availability of all three services (child curative, child growth monitoring, and child vaccination) remained unchanged in all provinces except for a significant decrease in Karnali Province, we found that the readiness of children's curative services improved in all provinces between the two surveys. This includes the availability of items such as child and infant scales, measuring tapes, and diagnostic tests such as hemoglobin, stool parasite tests, and malaria diagnostic tests. In addition, the availability of medicines such as amoxicillin and ORS has also improved. The only areas that did not improve significantly were IMNCI-trained staff and the presence of IMNCI guidelines.

The significant increase in the service readiness score could be attributed to the 37 percentage point increase in the availability of amoxicillin in 2021. The availability of amoxicillin has increased since it replaced cotrimoxazole as the treatment of choice for pneumonia, as recommended by both the WHO and the Nepal government and included in the IMNCI protocol.[12] However, significant declines were observed in the availability of vitamin A capsules and zinc sulphate tablets or syrup for children in curative care services in 2021.

Public facilities showed an increase in overall service readiness from 2015 to 2021, while no significant improvement was seen in the private sector. Sudurpaschim Province showed the largest improvement in child curative care service readiness.

Infection prevention and control: Despite variations in the observed indicators based on characteristics such as facility type, ecological zone, and province, each infection prevention indicator has shown a significant increase from 2015 to 2021. This trend was true regardless of whether or not the facility conducted quality assurance, client opinion surveys, or meetings.

Adherence to the process of care and the treatment of pneumonia and diarrhea: The overall adherence to the process of care for sick children under age 5 increased significantly from 28% in 2015 to 34% in 2021. This revealed a significant gap in the management of sick children in Nepal's healthcare facilities. It is not common for providers to conduct a proper history, assess general danger signs, or perform a physical examination, although these aspects of care have improved since 2015.

Treatment for pneumonia significantly increased in 2021 compared to 2015, especially in public facilities. There was no change in treatment for diarrhea between 2015 to 2021. For both diarrhea and pneumonia, treatment with ORS and zinc and amoxicillin, respectively, was much lower, although non-significant, in private hospitals than in public hospitals.

In both years, providers or caregivers asking about or sharing symptoms of the child (age 0–5) was higher compared to other indicators, with a marked increase observed in 2021. Overall adherence to the process of care in health facilities managed by public authorities increased significantly, mostly in public hospitals and PHCCs, followed by BHCCs. Except for the Koshi, Bagmati, and Lumbini provinces, other provinces saw a significant increase in their overall adherence to the process of care.

Sudurpaschim Province had the highest increase. The adherence to the process of care has improved significantly. However, although significant improvements were seen, Madhesh Province (compared to others) had low overall adherence to care in both years.

The overall adherence to the process of child curative care significantly increased in facilities that had a system to collect client feedback. In addition, notable differences were observed in facilities that conducted staff management meetings and management committee meetings and employed external supervision in the last 4 months.

The overall process of child curative care showed significant differences for providers such as medical officers and paramedics/nurses. Moreover, the overall adherence to the process of care for children age 2–59 months increased significantly from 29% in 2015 to 34% in 2021. Significant differences were observed for both male and female caregivers in both years. Likewise, there was a significant increase in the overall adherence to the process of care among caregivers of the Terai/Madhesh, Brahmin/Chettri, and Janajati castes in 2021. There were significant differences in education levels among caregivers. Although individuals with more than secondary education provided a higher level of care in both surveys, there were no significant differences between 2015 and 2021. However, caregivers with no education, basic education, and secondary education showed a significant improvement in the overall process of care. Furthermore, the process of care increased by 5 percentage points in 2021 for children visiting a health facility for the first time. The significant differences between 2015 and 2021 were also high among caregivers who lived near a health facility.

Caregiver satisfaction: The overall caregiver satisfaction increased significantly in 2021 compared to 2015. Overall caregiver satisfaction in health facilities managed by public authorities increased significantly, primarily in public hospitals and BHCCs.

In both surveys, caregiver satisfaction was found to be higher in lower-level facilities. However, except for the Madhesh, Bagmati, and Gandaki provinces, all other provinces experienced a significant increase in their overall caregiver satisfaction, with Karnali Province showing the highest increase, followed by the Lumbini, Koshi, and Sudurpaschim provinces. Of the 11 aspects used to measure caregiver satisfaction, explanations about a child's illness and waiting to see a provider had low scores in both surveys.

The overall caregiver satisfaction increased significantly in facilities that conducted quality assurance, staff management meetings, and management committee meetings. Furthermore, significant differences were observed in the facilities that had systems to determine caregiver opinions and had external supervision conducted in the past 4 months. Notably, there was an improvement in overall caregiver satisfaction when the providers had nursing or paramedic backgrounds.

5 POLICY IMPLICATIONS

The results have several policy implications for the government of Nepal to improve healthcare delivery and outcomes.

First, providing trained staff and guidelines is crucial to ensuring the provision of high-quality care. The government should prioritize healthcare worker education and training and provide incentives to health workers who adhere to guidelines. Monitoring and evaluation of the adherence to guidelines should also be conducted.

Second, the decentralization of healthcare is necessary to improve management issues and service delivery. Clear guidelines for the roles and responsibilities of each level of government should be developed. Investment in infrastructure and human resources should be increased, and coordination between different levels of government need to be strengthened.

Third, targeted services should be provided to improve service readiness. The government's vision to provide targeted child health services to 90% of the estimated population by 2030 must continue. Clear guidelines for service delivery should be developed, and coordination between different levels of government should be strengthened.

Fourth, private sector involvement should be enforced to improve service readiness and provide comprehensive treatment for children in a single visit. Developing clear guidelines for private sector involvement and monitoring the private sector's compliance with those guidelines are essential.

Fifth, procurement and supply chain management should be strengthened to ensure the availability of essential medicines and commodities at the provincial and local levels. Clear guidelines for procurement and supply chain management should be developed, and investment in the procurement and supply chain management infrastructure needs to be increased.

Sixth, provincial and local governments should be responsible for improving service readiness. The federal government should continue to support provinces and local governments to improve service readiness. Monitoring and evaluation of service readiness and strengthening coordination between different levels of government should be implemented.

Finally, improving overall client (caregiver) satisfaction requires a multi-faceted approach that addresses the process of care, quality assurance, monitoring and evaluation, and health worker training and resources. Clear guidelines for service delivery should be developed, and incentives for health facilities that demonstrate improvements in client satisfaction should be provided. In addition, focusing on health worker education and training, quality assurance, and monitoring and evaluation systems can enhance client satisfaction.

6 STRENGTH AND LIMITATIONS

In this study, we utilized data from the 2015 and 2021 NHFS datasets, which are nationally representative. We used a simple additive procedure to define the scores for both surveys, which made them comparable for further analysis. With a weighted additive model or principal component analysis, the scores may differ. By analyzing data from two consecutive surveys, we can estimate the quantities and uncertainty of current or past events at different points in time. Our analysis can be useful for policymakers to allocate resources and prioritize issues by comparing the two surveys.

A comparison of the survey results before and after federalization can provide insights into the process of federalization. However, it is important to note that the survey is cross-sectional and that the findings should not be interpreted as causal. Further, since the study focused on the significant differences between the two survey points, the variables analyzed in the study should not be taken as predictors. Furthermore, qualitative study will be required to better understand how different factors interact to affect the adherence to the process of care and overall caregiver satisfaction. However, the findings from this study can be used by governments and program planners as they work toward addressing the child health related SDGs.

Finally, data collection for the survey was on hold for about 3 months after completing 75% of the data collection due to the COVID-19 lockdown. Facilities which were visited after this delay may be significantly different than those visited prior to the delay.

7 CONCLUSION

In both 2015 and 2021 surveys, almost all Nepalese facilities provided child curative care, with the majority offering child growth and vaccination services. Child curative services were universally available when measured as being offered for 5 days or more each week in both survey periods. The overall child curative service readiness for both types of services increased significantly in all provinces, with public hospitals, PHCCs, and BHCCs showing the most improvement. Facilities that conducted quality assurance, held staff management meetings, held management committee meetings, and had a system to determine client opinions and external supervision showed higher service readiness. Infection prevention readiness also increased significantly for both types of services in all provinces. The overall adherence to the process of care increased significantly with public hospitals and PHCCs showing significant improvement, and providers such as medical officers and paramedics/nurses showing significant improvements in the overall adherence to the process of care. Overall caregiver satisfaction in health facilities managed by public authorities increased significantly in 2021, with the highest rate of satisfaction reported in Karnali Province. Madhesh Province had lower overall adherence to the process of care and caregiver satisfaction than other provinces.

To improve healthcare services and achieve SDG 3.2 to end preventable deaths of newborns and children under 5 years of age, the following recommendations are proposed:

- Strengthen quality assurance and staff management systems
- Sustain and improve infection prevention and control measures
- Ensure adherence to the IMNCI protocol for common childhood illnesses

Enhancing the availability of trained staff, guidelines, equipment, diagnostics, and medicines, and addressing provincial disparities, especially in Madhesh Province, is crucial for universal access to quality healthcare services. To achieve this, the local government should take the lead in ensuring accountability and transparency. In the federalized system, local plans and better allocation of resources can address provincial disparities. The IMNCI protocol should be emphasized to increase trained staff and the adherence to the process of care.

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APPENDICES

Appendix Table 1 Indicators of each area of child curative care service readiness

Indicator	Guidelines and trained staff (2 items)	Equipment (5 items)	Diagnostics (3 items)	Medicines and commodities (7 items)
Child curative care service readiness	1. Guidelines on child curative care (IMNCI) 2. Staff trained in child curative care in last 24 months before the survey (IMNCI)	1. Child and infant scale 2. Length/height 3. Measuring equipment 4. Thermometer 5. Stethoscope 6. Growth chart	1. Hemoglobin (Hb) 2. Test parasite in stool (general microscopy) 3. Malaria diagnostic capacity	1. Oral rehydration solution (ORS) 2. Amoxicillin (dispersible tablet 250 or 500 mg OR syrup/ suspension) 3. Injectable Gentamicin 4. Paracetamol syrup or suspension 5. Vitamin A capsules 6. Albendazole capsules/ tablets 7. Zinc sulphate tablets, dispersible tablets or syrup

Note: The WHO SARA manual and the IMNCI protocol were used as a reference to define the indicators for each area.

Appendix Table 2 Tracer items and procedures of adherence to the process of care score

Tracer items
Taking client history
Fever
Cough or difficult breathing (fast breathing or chest in-drawing)
Diarrhea
General danger signs asked by provider or mentioned by caregiver
Child is unable to drink or breastfeed
Child vomits everything
Child has had convulsions with this illness
Information asked to caregiver
Asked about normal feeding or breastfeeding habits or practices when the child is not ill
Asked about feeding or breastfeeding habits or practices for child during this illness
Mentioned the child's weight or growth to the caregiver, or discussed growth chart
Asked if child received Vitamin A/deworming within past 6 months or asked vaccination status
Provider performed physical examination on the sick child
Took child's temperature by thermometer or felt the child for fever or body hotness
Counted respiration (breaths) for 60 seconds
Auscultated child (listen to chest with stethoscope) or count pulse
Checked skin turgor for dehydration (pinch abdominal skin)
Checked for pallor by looking at palms or conjunctiva
Looked into child's mouth
Looked in child's ear or felt behind child's ear
Weighed the child
Provider recorded on child health card
Counseling given to the caregiver
Provided general information about feeding or breastfeeding the child even when not sick
Told the caregiver to give extra fluids to the child during this illness
Told the caregiver to continue feeding the child during this illness
Told the caregiver what illness(es) the child has
Described signs and/or symptoms in the child for which to immediately bring child back
Provider discussed follow-up visit with caregiver

Note: The adherence to the process of care under different indicators was based on the Government of Nepal/MoHP's IMNCI protocol and the GoN/MoHP's health facility quality improvement module for health services strengthening.

Appendix Table 3 Variables used to construct the caregiver satisfaction score

1.	Time waited to see provider (No problem vs major/minor problem/Don't know)
2.	Ability to discuss problems or concerns about child's health with the provider (No problem vs major/minor problem/Don't know)
3.	Amount of explanation caregiver received about the problem or treatment (No problem vs major/minor problem/Don't know)
4.	Privacy from having others hear from consultation discussion (No problem vs major/minor problem/Don't know)
5.	Privacy from having others see from consultation discussion (No problem vs major/minor problem/Don't know)
6.	Availability of medicines/methods at this facility (No problem vs major/minor problem/Don't know)
7.	The hours of services at this facility i.e., when they open and close (No problem vs major/minor problem/Don't know)
8.	The number of day's services is available (No problem vs major/minor problem/Don't know)
9.	The cleanliness of the facility (No problem vs major/minor problem/Don't know)
10.	Staff treated to care giver (No problem vs major/minor problem/Don't know)
11.	Cost for services or treatments (No problem vs major/minor problem/Don't know)

Note: The questions listed here were about the common problems caregivers encountered at health facilities. For example, if any of these problems occurred on the day of the visit, and if so, whether they were major or minor issues for the caregivers. These questions were used to construct the caregiver satisfaction scale in order to determine if the aforementioned issues posed no problem (1 = Yes, 0 = No).

Appendix Table 4 List of background characteristics or variables and their operational definitions

Variable	Definition/Categories
Facility types	▪ Categorized as public hospitals, private hospitals, PHCCs, and BHCCs. BHCC includes HPs, urban health centers, and CHUs. Public hospitals, PHCCs, and BHCCs fall under the category of public facilities, while private hospitals included in the study represent private facilities. Stand-alone HTCs (private facilities) and a few federal-level public hospitals were excluded from the analysis as they do not provide child curative services.
Managing authority	▪ Categorized as public and private. In this study, the term "private facilities" refers exclusively to private hospitals.
Ecoregion	▪ Nepal's three ecological zones are categorized as the mountain, hill, and Terai regions.
Province	▪ The seven provinces of Nepal are categorized as Koshi, Madhesh, Bagmati, Gandaki, Lumbini, Karnali, and Sudurpaschim.
Performed regular quality assurance activities and observed documentation of such activities	▪ Categorized as No and Yes. Facility reports that it routinely carries out quality assurance activities and had documentation of a recent quality assurance activity. This could be a report or minutes of a quality assurance meeting, a supervisory checklist, a mortality review, or an audit of records or registers.
Conducted staff management meeting	▪ Categorized as No and Yes. It is defined as the conduct of staff management meetings at least once every 6 months, as well as the observation of documented evidence of a recent meeting.
Conducted management meeting with management committee members	▪ Categorized as No and Yes. It is defined as the conduct of management meetings with management committee members at least once every 6 months, along with the documentation of a recent meeting.
System to determine client opinions	▪ Categorized as No and Yes. It is defined as having a facility with a system for determining client opinions and a procedure for reviewing client opinions.
External supervision in the last 4 months	▪ Categorized as not occurred and occurred. It is defined as the facility reporting that it received an external supervisory visit from the higher authority like district, provincial, or federal office during the 4-month period before the survey.
Provider type	▪ Categorized as pediatrician, medical officers, nurse/paramedic, other specialist, and others
Provider received in-service training on IMNCI in last 24 months	▪ Categorized as No and Yes. It is defined as receiving IMNCI training in last 24 months before the survey.
Age of child in months[1]	▪ Categorized as under 2 months (0–2 months), and 2–59 months. Categorized based on the treatment protocol of IMNCI.
Sex of child	▪ Categorized as female and male.
Age of caregivers[2]	▪ Categorized as less than age 20, 20–29, 30–39, and 40 and above.
Caste/ethnicity	▪ Categorized as Brahmin/Chettri, Terai and other Madhesh caste, Dalits, Newar, Janajati, Muslim, and Others.
Education of caregivers	▪ Categorized as no education, basic education, secondary, and more than secondary
Time of visit	▪ Categorized as first visit and follow-up visit.
HF close to home	▪ Categorized as No and Yes. This is based on the question "Is this the closest health facility to your home?"

PHCCs = primary health care centers; BHCCs = basic health care centers; HP = Health Post; CHU = Community Health Unit; HTCs = HIV testing and counseling centers; IMNCI = Integrated Management of Neonatal and Childhood Illness; HF = Health Facility

[1] Don't know cases were dropped during the analysis (3 cases in 2015 and 5 cases in 2021).

[2] Don't know cases were dropped during the analysis (51 unweighted cases in 2015 and 14 cases in 2021).

Appendix Table 5 Distribution of facilities that offer child curative care services, by background characteristics, 2015 and 2021

Background characteristic	2015 NHFS n (%)	2021 NHFS n (%)
Facility types		
Public		
Public hospitals	21 (2.3)	44 (2.8)
PHCCs	42 (4.5)	51 (3.3)
BHCCs	806 (86.3)	1,350 (86.9)
Private		
Private hospitals	65 (6.9)	108 (7.0)
Managing authority		
Public	869 (93.1)	1,445 (93.0)
Private	65 (6.9)	108 (7.0)
Ecoregion		
Mountain	118 (12.6)	210 (13.5)
Hill	480 (51.4)	816 (52.5)
Terai	336 (35.9)	528 (34.0)
Province		
Koshi	161 (17.2)	260 (16.7)
Madhesh	171 (18.3)	244 (15.7)
Bagmati	184 (19.7)	319 (20.6)
Gandaki	119 (12.8)	198 (12.7)
Lumbini	137 (14.7)	236 (15.2)
Karnali	74 (7.9)	128 (8.2)
Sudurpaschim	89 (9.5)	169 (10.9)
Quality assurance		
Not performed	747 (79.9)	1,190 (76.6)
Performed	188 (20.1)	363 (23.4)
Staff management meeting		
No	582 (62.3)	761 (49.0)
Yes	352 (37.7)	793 (51.1)
Management meeting with management committee member		
No	602 (64.4)	781 (50.3)
Yes	332 (35.6)	773 (49.7)
System to determine client opinions		
No	419 (44.8)	841 (54.2)
Yes	515 (55.2)	712 (45.8)
External supervision in the last 4 months		
Not occurred	345 (37.0)	522 (33.6)
Occurred	589 (63.0)	1,032 (66.4)
Total	**934**	**1,554**

PHCCs = primary health care centers; BHCCs = basic health care centers

Appendix Table 6 Proportion of child health service providers, by background characteristics, 2015 and 2021

Background characteristic	2015 NHFS n (%)	2021 NHFS n (%)
Facility type		
Public		
Public hospitals	209 (6.3)	481 (9.7)
PHCCs	257 (7.8)	276 (5.6)
BHCCs	2,433 (73.8)	3,424 (69.0)
Private		
Private hospitals	396 (12.0)	784 (15.8)
Managing authority		
Public	2,900 (88.0)	4,180 (84.2)
Private	396 (12.0)	784 (15.8)
Ecological region		
Mountain	335 (10.2)	590 (11.9)
Hill	1,654 (50.2)	2,478 (49.9)
Terai	1,307 (39.7)	1,897 (38.2)
Province		
Koshi	542 (16.4)	757 (15.2)
Madhesh	594 (18.0)	867 (17.5)
Bagmati	707 (21.5)	1,149 (23.1)
Gandaki	406 (12.3)	546 (11.0)
Lumbini	503 (15.3)	769 (15.5)
Karnali	204 (6.2)	367 (7.4)
Sudurpashchim	341 (10.3)	510 (10.3)
Provider type		
Pediatrician	60 (1.8)	118 (2.4)
Medical officers	176 (5.3)	345 (7.0)
Nurse/paramedic	3,005 (91.2)	4,396 (88.5)
Others specialist	36 (1.1)	58 (1.2)
Others	19 (0.6)	48 (1.0)
Received in-service training on IMNCI in last 24 months	2929 (88.9)	4543 (91.5)
Not received	367 (11.1)	421 (8.5)
Received		
Total	**3,296**	**4,964**

PHCCs = primary health care centers; BHCCs = basic health care centers; IMNCI = Integrated Management of Neonatal and Childhood Illness

Appendix Table 7 Proportion of caregivers (or child), by background characteristics, 2015 and 2021

Background characteristic	2015 NHFS n (%)	2021 NHFS n (%)
Facility type		
Public		
Public hospitals	399 (18.3)	389 (16.3)
PHCCs	146 (6.7)	148 (6.2)
BHCCs	1332 (61.0)	1418 (59.5)
Private		
Private hospitals	308 (14.1)	429 (18.0)
Managing authority		
Public	1878 (85.9)	1954 (82.0)
Private	308 (14.1)	429 (18.0)
Ecological region		
Mountain	189 (8.7)	201 (8.4)
Hill	977 (44.7)	998 (41.9)
Terai	1019 (46.6)	1184 (49.7)
Province		
Koshi	302 (13.8)	341 (14.3)
Madhesh	530 (24.2)	593 (24.9)
Bagmati	559 (25.6)	416 (17.5)
Gandaki	160 (7.3)	171 (7.2)
Lumbini	289 (13.2)	470 (19.7)
Karnali	150 (6.9)	143 (6.0)
Sudurpashchim	197 (9.0)	248 (10.4)
Age of child in months		
Under 2 months	106 (4.9)	90 (3.8)
2–59 months	2077 (95.1)	2289 (96.2)
Sex of child		
Female	976 (44.6)	1070 (44.9)
Male	1,210 (55.4)	1313 (55.1)
Caregiver characteristics		
Age of caregivers		
less than 20	173 (8.2)	102 (4.3)
20–29	1351 (63.9)	1418 (60.2)
30–39	381 (18.0)	560 (23.8)
40 and above	209 (9.9)	277 (11.7)
Caste/ethnicity		
Brahmin/Chettri	668 (30.6)	682 (28.6)
Terai and other Madhesh caste	469 (21.5)	438 (18.4)
Dalits	307 (14.0)	465 (19.5)
Newar	76 (3.5)	81 (3.4)
Janajati	525 (24.0)	565 (23.7)
Muslim	126 (5.8)	127 (5.3)
Others	14 (0.7)	24 (1.0)
Education of caregivers		
No education	817 (37.4)	723 (30.3)
Basic education	581 (26.6)	591 (24.8)
Secondary	759 (34.7)	1040 (43.7)
More than secondary	30 (1.4)	29 (1.2)
Time of visit		
First visit	1947 (89.1)	2195 (92.2)
Follow-up visit	239 (10.9)	187 (7.8)
Total	**2,186**	**2,383**

PHCCs = primary health care centers; BHCCs = basic health care centers

Appendix Table 8 Change in availability of trace indicators of guidelines and trained staff, equipment, diagnostics, and medicines and commodities for child curative care services, 2015 and 2021 NHFS

Trace Indicators	NHFS 2015 (N = 934) %	95% CI	NHFS 2021 (N = 1,554) %	95% CI	Difference (percentage points)	*p* value
Guidelines and trained staff						
IMNCI guidelines observed	61.0	[56.6, 65.3]	54.1	[50.5, 57.6]	-6.9	*
Staff trained in IMNCI in last 24 months	21.9	[18.5, 25.8]	23.4	[20.4, 26.8]	1.5	NS
Equipment						
Child and infant scale	26.6	[22.8, 30.7]	53.4	[49.8, 57.0]	26.8	***
Length/height measuring equipment	24.2	[20.8, 28.0]	32.4	[29.1, 35.9]	8.2	**
Thermometer[1]	95.0	[92.4, 96.7]	95.9	[94.1, 97.2]	0.9	NS
Stethoscope	98.4	[96.3, 99.3]	98.3	[96.9, 99.1]	-0.1	NS
Growth chart	76.1	[72.2, 79.7]	77.4	[74.8, 79.9]	1.3	NS
Diagnostics						
Hemoglobin (Hb)	15.1	[13.5, 16.8]	25.4	[22.7, 28.2]	10.3	***
Test parasite in stool (general microscopy)	10.5	[9.1, 12.2]	16.1	[13.9, 18.7]	5.6	***
Malaria diagnostic capacity	21.8	[19.2, 24.7]	35.6	[32.3, 39.1]	13.8	***
Medicines and commodities						
Oral rehydration solution packet	92.4	[89.8, 94.3]	96.4	[94.9, 97.4]	4.0	**
Amoxicillin (dispersible tablet 250 or 500 mg OR syrup/suspension)	24.1	[20.6, 28.1]	60.8	[57.2, 64.2]	36.7	***
Injectable gentamycin	63.6	[59.1, 67.9]	67.2	[63.7, 70.4]	3.6	NS
Paracetamol syrup/suspension	85.3	[81.8, 88.3]	89.0	[86.4, 91.1]	3.7	NS
Vitamin A capsules	89.7	[87.2, 91.7]	82.3	[80.3, 84.2]	-7.4	***
Albendazole capsule/tablet	96.7	[95.2, 97.8]	96.8	[95.6, 97.7]	0.1	NS
Zinc sulphate tablets, dispersible tablets or syrup	95.6	[94.3, 96.7]	91.0	[88.9, 92.6]	-4.6	***

IMNCI = Integrated Management of Neonatal and Childhood Illness

[1] In the 2015 survey, respondents were asked about the availability of mercury or digital thermometers. However, in the 2021 survey, only the availability of digital thermometers was assessed.

* $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant

Appendix Table 9 Change in indicators for adhering to the process of care among children age under 5, 2015 and 2021 NHFS

Indicators	NHFS 2015 (N = 2,186) %	95% CI	NHFS 2021 (N = 2,383) %	95% CI	Difference (percentage points)	*p* value
Taking client history						
Fever	77.2	[74.0, 80.0]	82.1	[79.3, 84.5]	4.9	*
Cough or difficult breathing (fast breathing or chest in-drawing)	56.0	[52.6, 59.4]	73.2	[69.9, 76.2]	17.2	***
Diarrhea	40.8	[37.6, 44.1]	40.0	[36.4, 43.8]	-0.8	NS
General danger signs asked by provider or mentioned by caregiver						
Child is unable to drink or breastfeed	21.6	[18.9, 24.5]	22.0	[19.4, 24.8]	0.4	NS
Child vomits everything	20.5	[17.8, 23.5]	31.2	[27.2, 35.5]	10.7	***
Child has had convulsions with this illness	4.7	[3.4, 6.4]	5.6	[4.3, 7.2]	0.9	NS
Information asked to caregiver						
Asked about normal feeding or breastfeeding habits or practices when the child is not ill	17.7	[15.1, 20.6]	27	[24.0, 30.3]	9.3	***
Asked about feeding or breastfeeding habits or practices for child during this illness	16.3	[13.9, 19.1]	18.6	[16.0, 21.5]	2.3	NS
Mentioned the child's weight or growth to the caregiver or discussed growth chart	4.1	[3.0, 5.6]	5.3	[4.1, 6.8]	1.2	NS
Asked if child received Vitamin A/deworming within past 6 months or asked vaccination status	9.8	[8.2, 11.7]	14.2	[12.0, 16.7]	4.4	**
Provider performed physical examination on the sick child						
Took child's temperature by thermometer or felt the child for fever or body hotness	67.7	[63.5, 71.6]	80.4	[76.7, 83.7]	12.7	***
Counted respiration (breaths) for 60 seconds	39.9	[36.6, 43.3]	56.6	[53.2, 60.1]	16.7	**
Auscultated child (listen to chest with stethoscope) or count pulse	49.5	[45.8, 53.3]	54.0	[49.6, 58.3]	4.5	NS
Checked skin turgor for dehydration (pinch abdominal skin)	20.7	[18.5, 23.1]	21.4	[18.3, 24.9]	0.7	NS
Checked for pallor by looking at palms or conjunctiva	14.4	[12.2, 16.8]	12.4	[10.1, 15.2]	-2.0	NS
Looked into child's mouth	11.4	[9.6, 13.4]	14.1	[10.8, 18.1]	2.7	NS
Looked in child's ear or felt behind child's ear	12.8	[10.6, 15.4]	8.4	[6.5, 10.8]	-4.4	**
Weighed the child	62.3	[57.1, 67.2]	75.5	[70.7, 79.7]	13.2	***
Provider recorded on child health card	68.8	[63.8, 73.4]	53.7	[48.5, 58.7]	-15.1	***
Counseling given to the caregiver						
Provided general information about feeding or breastfeeding the child even when not sick	11.1	[9.2, 13.2]	18.3	[15.8, 21.2]	7.2	***
Told the caregiver to give extra fluids to the child during this illness	17.5	[15.0, 20.3]	23.7	[20.9, 26.7]	6.2	**
Told the caregiver to continue feeding the child during this illness	16.8	[14.5, 19.3]	20.8	[18.0, 23.9]	4.0	*
Told the caregiver what illness(es) the child has	34.5	[30.7, 38.6]	49.7	[45.2, 54.1]	15.2	***
Described signs and/or symptoms in the child for which to immediately bring child back	7.0	[5.7, 8.7]	15.6	[13.2, 18.3]	8.6	***
Provider discussed follow-up visit with caregiver	25.8	[22.7, 29.1]	30.4	[26.9, 34.1]	4.6	NS

IMNCI = Integrated Management of Neonatal and Childhood Illness; GoN/MoHP = Government of Nepal/Ministry of Health and Population

Note: The adherence to the process of care, based on the IMNCI protocol of the GoN/MoHP, is defined by five indicators: (i) Taking client history, (ii) General danger signs asked by the provider or mentioned by the caregiver, (iii) Information given to the caregiver, (iv) Physical examination of the child by the provider, and (v) Counseling given to the caregiver.

* $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant

Appendix Table 10 Change in indicators of adherence to the process of care for children age 0–2 months by background characteristics, 2015 and 2021 NHFS

Indicators	NHFS 2015 (N=106) % (95% CI)	NHFS 2021 (N=90) % (95% CI)	Difference (percentage points)	*p* value
Taking client history				
Fever	76.1 [63.8, 85.2]	69.6 [56.2, 80.3]	-6.5	NS
Cough or difficult breathing (fast breathing or chest in-drawing)	43.4 [30.5, 57.2]	71.7 [59.5, 81.4]	28.3	**
Diarrhea	28.5 [16.4, 44.8]	35.2 [23.1, 49.6]	6.7	NS
General danger signs asked by provider or mentioned by caregiver				
Child is unable to drink or breastfeed	60.5 [45.7, 73.6]	62.4 [48.4, 74.7]	1.9	NS
Child vomits everything	21.9 [11.7, 37.2]	45.9 [33.1, 59.2]	24.0	*
Child has had convulsions with this illness	12.9 [6.0, 25.4]	10.3 [4.1, 23.7]	-2.6	NS
Information asked to caregiver				
Asked about normal feeding or breastfeeding habits or practices when the child is not ill	33.2 [21.9, 46.9]	43.6 [31.1, 56.9]	10.4	NS
Asked about feeding or breastfeeding habits or practices for child during this illness	22.2 [13.3, 34.7]	39.9 [27.6, 53.7]	17.7	NS
Mentioned the child's weight or growth to the caregiver or discussed growth chart	4.9 [1.1, 18.8]	3.1 [1.3, 7.0]	-1.8	NS
Asked if child received vitamin A/deworming within past 6 months or asked vaccination status	11.7 [6.2, 21.2]	18.0 [10.2, 29.7]	6.3	NS
Provider performed physical examination on the sick child				
Took child's temperature by thermometer or felt the child for fever or body hotness	80.3 [69.9, 87.8]	79.7 [66.5, 88.6]	-0.6	NS
Counted respiration (breaths) for 60 seconds	43.5 [29.9, 58.3]	65.4 [52.8, 76.1]	21.9	*
Auscultated child (listen to chest with stethoscope) or count pulse	57.7 [42.6, 71.6]	64.1 [50.2, 75.9]	6.4	NS
Checked skin turgor for dehydration (pinch abdominal skin)	14.4 [7.8, 25.1]	22.7 [13.3, 35.9]	8.3	NS
Checked for pallor by looking at palms or conjunctiva	33.6 [23.8, 45.2]	29.6 [19.6, 42.1]	-4	NS
Looked into child's mouth	7.1 [3.3, 14.6]	17.5 [8.6, 32.4]	10.4	NS
Looked in child's ear or felt behind child's ear	4.3 [1.6, 10.7]	8.2 [3.2, 19.4]	3.9	NS
Weighed the child	70.2 [55.5, 81.7]	78.4 [64.6, 87.9]	8.2	NS
Provider recorded on child health card	67 [52.8, 78.7]	57.4 [43.7, 70.1]	-9.6	NS
Counseling given to the caregiver				
Provided general information about feeding or breastfeeding the child even when not sick	17.3 [8.4, 32.2]	27.2 [17.7, 39.3]	9.9	NS
Told the caregiver to give extra fluids to the child during this illness	8.3 [2.5, 24.8]	3.4 [1.4, 8.1]	-4.9	NS
Told the caregiver to continue feeding the child during this illness	40.2 [26.4, 55.8]	35.4 [24.0, 48.6]	-4.8	NS
Told the caregiver what illness(es) the child has	34.3 [23.4, 47.2]	57.7 [43.8, 70.4]	23.4	*
Described signs and/or symptoms in the child for which to immediately bring child back	15.5 [8.0, 28.0]	31.4 [20.9, 44.1]	15.9	**
Provider discussed follow-up visit with caregiver	30.9 [20.3, 44.0]	24.7 [16.0, 36.0]	-6.2	NS

* $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant

Appendix Table 11 Change in the adherence to the process of care score (%) for child curative care services among children age 0–2 months by background characteristics, 2015 and 2021 NHFS

Variable	2015 NHFS (N = 106) %	95% CI	2021 NHFS (N = 90) %	95% CI	Difference (percentage points)	*p* value
Adherence to the process of care score	**33.6**	**[29.2, 38.0]**	**40.1**	**[34.9, 45.3]**	**6.5**	**NS**
Facility characteristics						
Facility types						
Public						
Public hospitals	27.1	[20.4, 33.8]	38.9	[34.5, 43.4]	11.8	**
PHCCs	36.1	[30.5, 41.7]	36.1	[30.6, 41.6]	0.0	NS
BHCCs	31.6	[23.6, 39.5]	40.5	[26.3, 54.8]	8.9	NS
Private						
Private hospitals	40.2	[34.7, 45.7]	41.7	[37.2, 46.1]	1.5	NS
Managing authority						
Public	30.9	[25.4, 36.3]	39.4	[32.3, 46.5]	8.5	NS
Private	40.2	[34.7, 45.7]	41.7	[37.2, 46.1]	1.5	NS
Ecoregion						
Mountain	30.5	[10.3, 50.6]	53.0	[49.3, 56.7]	22.5	NS
Hill	33.9	[26.9, 41.0]	43.1	[37.3, 48.8]	9.2	NS
Terai	33.8	[28.5, 39.1]	31.4	[23.0, 39.9]	-2.4	NS
Province						
Koshi	34.2	[22.7, 45.7]	31.6	[19.3, 44.0]	-2.6	NS
Madhesh	33.7	[22.3, 45.2]	32.4	[27.9, 37.0]	-1.3	NS
Bagmati	31.1	[23.4, 38.9]	41.2	[35.0, 47.4]	10.1	NS
Gandaki	42.9	[21.7, 64.0]	40.2	[29.5, 50.9]	-2.7	NS
Lumbini	33.5	[27.5, 39.6]	44.1	[33.4, 54.9]	10.6	NS
Karnali	30.5	[18.5, 42.5]	44.8	[37.5, 52.1]	14.3	NS
Sudurpaschim	34.5	[29.4, 39.6]	52.3	[47.1, 57.5]	17.8	***
Performed regular quality assurance activities						
Yes	37.6	[28.7, 46.6]	41.4	[34.8, 48.1]	3.8	NS
Conducted staff management meeting at least once every 6 months						
Yes	34.7	[27.4, 42.1]	41.8	[34.3, 49.3]	7.1	NS
Conducted meeting with management committee member at least once every 6 months						
Yes	32.0	[27.0, 37.1]	44.8	[39.3, 50.4]	12.8	**
System to determine client opinions						
Yes	33.6	[29.1, 38.2]	42.7	[37.7, 47.8]	9.1	**
External supervision in the last 4 months						
Occurred	33.6	[29.0, 38.3]	38.2	[32.0, 44.4]	4.6	NS
Providers characteristics						
Provider type[1]						
Pediatrician	37.0	[31.1, 43.0]	37.1	[33.7, 40.5]	0.1	NS
Medical officer	28.4	[20.3, 36.6]	42.7	[37.5, 47.8]	14.3	**
Nurse/paramedic	31.9	[25.2, 38.6]	41.1	[28.4, 53.7]	9.2	NS
Specialist other than pediatrician	48.7	[45.3, 52.1]	36.1	[32.6, 39.6]	-12.6	NS
Child characteristics						
Sex of child						
Female	36.4	[28.9, 43.9]	31.2	[22.1, 40.4]	-5.2	NS
Male	31.5	[26.4, 36.7]	44.1	[38.5, 49.6]	12.6	**
Caregiver characteristics						
Age of caregivers						
less than 20	42.2	[25.8, 58.5]	46.5	[35.7, 57.3]	4.3	NS
20–29	32.1	[26.9, 37.3]	38.5	[31.7, 45.3]	6.4	NS
30–39	38.0	[30.5, 45.5]	42.2	[33.4, 51.1]	4.2	NS
40 and above	24.5	[18.7, 30.3]	45.4	[34.2, 56.5]	20.9	***
Caste/ethnicity						
Brahmin/Chettri	32.8	[27.2, 38.5]	45.1	[39.1, 51.0]	12.3	*
Terai and other Madhesh	33.7	[25.0, 42.4]	39.2	[33.6, 44.7]	5.5	NS
Dalits	50.4	[35.1, 65.8]	32.0	[14.2, 49.8]	-18.4	NS
Newar	29.1	[21.6, 36.7]	42.2	[33.0, 51.3]	13.1	NS
Janajati	31.4	[23.9, 38.8]	43.0	[31.8, 54.2]	11.6	NS
Muslim	18.5	[0.1, 36.9]	20.8	[14.3, 27.4]	2.3	NS

Continued...

Appendix Table 11—*Continued*

Variable	2015 NHFS (N = 106) %	2015 NHFS (N = 106) 95% CI	2021 NHFS (N = 90) %	2021 NHFS (N = 90) 95% CI	Difference (percentage points)	*p* value
Education of caregivers						
No education	30.1	[22.7, 37.5]	32.3	[20.5, 44.2]	2.2	NS
Basic education	38.5	[30.0, 47.1]	38.8	[22.2, 55.4]	0.3	NS
Secondary	32.4	[26.8, 38.1]	40.6	[36.4, 44.8]	8.2	*
More than secondary	0.0		57.0	[47.4, 66.6]	-	NS
Time of visit						
First visit	34.6	[30.0, 39.2]	40.6	[35.1, 46.1]	6.0	NS
Follow-up visit	24.0	[18.4, 29.7]	32.3	[26.2, 38.4]	8.3	NS
HF close to home						
No	39.0	[32.2, 45.8]	35.8	[32.0, 39.5]	-3.2	NS
Yes	32.2	[27.2, 37.2]	41.1	[34.8, 47.4]	8.9	*

PHCCs = primary health care centers; BHCCs = basic health care centers; HF = health facility
[1] Due to low number, the figures of Others are not shown in the table.
* $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant, dash (-) = data not available at one time point

Appendix Table 12 Change in adherence to the process of care for children age 2–59 months, by background characteristics, 2015 and 2021 NHFS

Indicators	NHFS 2015 (N=2,077) % (95% CI)	NHFS 2021 (N=2,289) % (95% CI)	Difference (percentage points)	*p* value
Taking client history				
Fever	77.2 [74.0, 80.1]	82.5 [79.8, 84.9]	5.3	**
Cough or difficult breathing (fast breathing or chest in-drawing)	56.7 [53.2, 60.1]	73.2 [69.9, 76.2]	16.5	***
Diarrhea	41.4 [38.2, 44.7]	40.2 [36.6, 44.0]	-1.2	NS
General danger signs asked by provider or mentioned by caregiver				
Child is unable to drink or breastfeed	19.5 [17.0, 22.3]	20.4 [17.9, 23.3]	0.9	NS
Child vomits everything	20.4 [17.7, 23.5]	30.7 [26.8, 34.9]	10.3	***
Child has had convulsions with this illness	4.2 [3.0, 5.9]	5.4 [4.1, 7.1]	1.2	NS
Information asked to caregiver				
Asked about normal feeding or breastfeeding habits or practices when the child is not ill	16.8 [14.3, 19.8]	26.4 [23.3, 29.8]	9.6	***
Asked about feeding or breastfeeding habits or practices for child during this illness	16.1 [13.6, 18.8]	17.8 [15.2, 20.7]	1.7	NS
Mentioned the child's weight or growth to the caregiver or discussed growth chart	4.1 [2.9, 5.6]	5.3 [4.1, 6.9]	1.2	NS
Asked if child received vitamin A/deworming within past 6 months or asked vaccination status	9.7 [8.1, 11.7]	14.1 [11.9, 16.6]	4.4	**
Provider performed physical examination on the sick child				
Took child's temperature by thermometer or felt the child for fever or body hotness	67.0 [62.8, 71.0]	80.4 [76.6, 83.7]	13.4	***
Counted respiration (breaths) for 60 seconds	39.7 [36.3, 43.1]	56.2 [52.8, 59.7]	16.5	**
Auscultated child (listen to chest with stethoscope) or count pulse	49.2 [45.5, 52.9]	53.5 [48.9, 58.0]	4.3	NS
Checked skin turgor for dehydration (pinch abdominal skin)	21.1 [18.9, 23.4]	21.4 [18.3, 24.9]	0.3	NS
Checked for pallor by looking at palms or conjunctiva	13.4 [11.2, 15.9]	11.8 [9.6, 14.4]	-1.6	NS
Looked into child's mouth	11.6 [9.8, 13.7]	14 [10.8, 17.9]	2.4	NS
Looked in child's ear or felt behind child's ear	13.2 [10.9, 15.9]	8.4 [6.5, 10.9]	-4.8	**
Weighed the child	61.9 [56.8, 66.9]	75.4 [70.5, 79.6]	13.5	***
Provider recorded on child health card	68.9 [63.9, 73.5]	53.4 [48.2, 58.5]	-15.5	***
Counseling given to the caregiver				
Provided general information about feeding or breastfeeding the child even when not sick	10.8 [9.0, 12.8]	18 [15.5, 20.9]	7.2	***
Told the caregiver to give extra fluids to the child during this illness	18 [15.5, 20.8]	24.5 [21.6, 27.6]	6.5	**
Told the caregiver to continue feeding the child during this illness	15.6 [13.3, 18.2]	20.3 [17.5, 23.4]	4.7	*
Told the caregiver what illness(es) the child has	34.5 [30.6, 38.7]	49.5 [45.0, 54.0]	15	***
Described signs and/or symptoms in the child for which to immediately bring child back	6.5 [5.3, 8.1]	15 [12.6, 17.8]	8.5	***
Provider discussed follow-up visit with caregiver	25.5 [22.4, 28.9]	30.6 [27.2, 34.4]	5.1	*

* $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant

Appendix Table 13 Change in the adherence to the process of care score (%) for child curative care services for children age 2–59 months by background characteristics, 2015 and 2021 NHFS

Variable	2015 NHFS (N = 2,077) %	95% CI	2021 NHFS N=2,289 %	95% CI	Difference (percentage points)	*p* value
Adherence to the process of care score	**28.9**	**[27.6, 30.2]**	**33.9**	**[27.6, 30.2]**	**5.0**	*******
Facility characteristics						
Facility types						
Public						
Public hospitals	30.6	[28.2, 33.1]	36.4	[34.4, 38.3]	5.8	***
PHCCs	28.9	[27.0, 30.9]	34.8	[33.1, 36.5]	5.9	***
BHCCs	26.8	[25.0, 28.7]	31.6	[29.7, 33.5]	4.8	***
Private						
Private hospitals	36.2	[33.6, 38.8]	39.5	[35.6, 43.4]	3.3	NS
Managing authority						
Public	27.8	[26.4, 29.2]	32.8	[31.3, 34.2]	5.0	***
Private	36.2	[33.6, 38.8]	39.5	[35.6, 43.4]	3.3	NS
Ecoregion						
Mountain	31.9	[29.0, 34.8]	37.8	[34.8, 40.9]	5.9	**
Hill	32.5	[30.8, 34.1]	38.7	[36.6, 40.8]	6.2	***
Terai	25.0	[22.9, 27.1]	29.3	[27.4, 31.3]	4.3	**
Province						
Koshi	33.2	[29.8, 36.6]	34.6	[31.7, 37.5]	1.4	NS
Madhesh	18.9	[16.0, 21.8]	25.6	[22.6, 28.5]	6.7	**
Bagmati	32.9	[30.8, 35.0]	37.6	[33.1, 42.0]	4.7	NS
Gandaki	33.2	[29.4, 37.1]	40.1	[37.3, 42.9]	6.9	**
Lumbini	30.9	[27.8, 34.1]	34.5	[31.7, 37.3]	3.6	NS
Karnali	29.1	[24.7, 33.5]	35.4	[31.6, 39.2]	6.3	*
Sudurpaschim	32.0	[29.3, 34.7]	41.7	[38.2, 45.1]	9.7	***
Performed regular quality assurance activities						
Yes	33.6	[31.3, 35.9]	34.8	[31.4, 38.3]	1.2	NS
Conducted staff management meeting at least once every 6 months						
Yes	29.4	[27.2, 31.5]	34.5	[32.3, 36.7]	5.1	**
Conducted meeting with management committee member at least once every 6 months						
Yes	28.9	[26.5, 31.4]	34.0	[31.6, 36.5]	5.1	**
System to determine client opinions						
Yes	31.3	[29.6, 33.0]	35.7	[33.8, 37.5]	4.4	***
External supervision in the last 4 months						
Occurred	29.7	[28.2, 31.2]	33.7	[31.8, 35.7]	4.0	**
Providers characteristics						
Provider type[1]						
Pediatrician	35.0	[32.7, 37.3]	38.0	[35.9, 40.2]	3.0	NS
Medical officer	30.9	[28.6, 33.3]	38.0	[33.9, 42.1]	7.1	**
Nurse/paramedic	27.1	[25.4, 28.8]	31.7	[30.0, 33.5]	4.6	***
Specialist other than pediatrician	36.9	[29.8, 43.9]	34.7	[29.7, 39.8]	-2.2	NS
Received in-service training on IMNCI in last 24 months						
Received	29.8	[26.7, 32.8]	35.6	[32.2, 38.9]	5.8	*
Child Characteristics						
Sex of child						
Female	28.2	[26.3, 30.1]	34.3	[32.4, 36.2]	6.1	***
Male	29.5	[28.1, 30.9]	33.6	[31.9, 35.3]	4.1	***
Caregiver characteristics						
Age of caregivers						
Less than 20	26.9	[22.7, 31.0]	31.6	[27.0, 36.2]	4.7	NS
20–29	29.7	[28.2, 31.1]	35.5	[33.7, 37.3]	5.8	***
30–39	30.1	[28.0, 32.2]	33.6	[31.3, 35.8]	3.5	*
40 and above	24.2	[20.8, 27.6]	27.9	[24.2, 31.6]	3.7	NS

Continued...

Appendix Table 13—*Continued*

Variable	2015 NHFS N=2,077 %	2015 NHFS N=2,077 95% CI	2021 NHFS N=2,289 %	2021 NHFS N=2,289 95% CI	Difference (percentage points)	*p* value
Caste/ethnicity						
Brahmin/Chettri	31.7	[30.1, 33.4]	37.3	[35.5, 39.1]	5.6	***
Terai and other Madhesh	21.3	[18.7, 23.8]	29.5	[26.1, 32.9]	8.2	***
Dalits	28.2	[25.4, 30.9]	31.0	[28.3, 33.6]	2.8	NS
Newar	34.3	[30.7, 38.0]	35.5	[30.6, 40.5]	1.2	NS
Janajati	33.5	[31.1, 35.9]	36.9	[34.2, 39.5]	3.4	NS
Muslim	23.0	[17.3, 28.7]	28.0	[23.8, 32.3]	5.0	NS
Others	27.1	[22.5, 31.7]	35.7	[28.6, 42.8]	8.6	NS
Education of caregivers						
No education	24.8	[22.6, 27.0]	29.2	[26.8, 31.6]	4.4	**
Basic education	30.4	[28.6, 32.2]	35.7	[33.5, 38.0]	5.3	***
Secondary	32.1	[30.6, 33.7]	36.2	[34.3, 38.0]	4.1	**
More than secondary	33.6	[28.7, 38.5]	38.4	[32.6, 44.2]	4.8	
Time of visit						
First visit	28.8	[27.4, 30.2]	34.0	[32.5, 35.5]	5.2	***
Follow-up visit	29.8	[27.2, 32.5]	33.2	[30.0, 36.4]	3.4	NS
HF close to home						
No	34.1	[31.6, 36.6]	35.3	[32.4, 38.1]	1.2	NS
Yes	28.2	[26.8, 29.6]	33.8	[32.1, 35.4]	5.6	***

PHCCs = primary health care centers; BHCCs = basic health care centers; HF = health facility
[1] Due to low number, the figures of Others are not shown in the table.
* $p < .05$, ** $p < .01$, *** $p < .001$, NS = not significant