

Original Article

Identifying areas for improvement in paediatric inpatient care using the Child HCAHPS survey

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Abstract

The Child-Hospital Consumer Assessment of Healthcare Providers and Systems (Child-HCAHPS) survey is a validated measure of paediatric inpatient experience. The study objective was to determine which survey questions were most correlated with respondents' overall rating of care. Knowing which questions are most important may provide valuable insights for developing targeted quality improvement initiatives.

Methods: Within 6 weeks of discharge, 3,389 telephone surveys were completed by parents/guardians of children who were hospitalized for at least 24 hours. The survey was comprised of 66 questions, with responses based on Likert-scales. One survey question asked respondents to rate the overall care that their child received on a scale from 0 (worst care) to 10 (best care). The correlation between the overall rating of care and each survey measure and question was then examined using Spearman correlation coefficients. All survey questions were normalized to a 100-point score (0=worst, 100=best).

Results: Questions on provider coordination and nursing care were most correlated with overall experience. Quietness of hospital room ($r=0.19$, $P<0.001$), and keeping families informed in the emergency room ($r=0.12$, $P<0.001$) showed poor correlation. Correlation with overall experience was strongest for the 'communication with nurses' domain ($r=0.46$, $P<0.001$).

Conclusions: To our knowledge, this is the first study which examines the correlation of individual questions of the Child-HCAHPS to overall rating of care within a Canadian context. Our results suggest that our large health care organization may attain initial inpatient experience improvements by focusing upon personnel-based initiatives, rather than physical attributes of our hospitals.

Keywords: *Paediatric hospitals; Patient-centred care; Physician–patient relations; Surveys and questionnaires.*

The provision of patient and family-centered care ensures the inclusion of what matters to patients and families in the planning, development, and assessment of their health care (1). The measurement of patient experience acts as a driver toward achieving high-quality health care. To ensure care is patient-centered, the patient's voice must be incorporated. The use of validated

measures such as the Consumer Assessment of Healthcare Providers and Systems (CAHPS) complement of surveys, allows for adult patients to rate their experience of care, and provide feedback on aspects of their care (2). Additionally, the public reporting of survey results allows for improved accountability of hospitals and greater incentives to improve the quality of care.

The HCAHPS survey is considered the gold standard for measuring adult inpatient experience in the USA (2). Until recently, however, there has been no gold standard measure for measuring paediatric inpatient experience. The Child HCAHPS survey was introduced in 2014 to address this gap, and was developed after a rigorous process, including a literature review, expert interviews, stakeholder input, and focus group with parents (3). Thus far, the Child HCAHPS survey has been validated in the USA, Belgium, and Canada. As a validated measure, the Child HCAHPS survey has the potential for standardized measurement of paediatric inpatient experience that can be monitored over time. With widespread use, the Child HCAHPS survey can allow for potential benchmarking of paediatric services in health care facilities nationally and internationally (4). In Canada, Alberta and two other provinces (parts of Ontario and Quebec) have implemented the survey to capture paediatric inpatient experience.

The Child HCAHPS survey builds on the core domains addressed by the adult HCAHPS (communication, hospital environment, and discharge process), by adding new domains relevant to paediatric care, such as privacy, patient safety, and age-appropriateness of care (5,6). The survey is comprised of 18 measures, categorized by overarching domains. As noted by the Agency for Healthcare Research and Quality (AHRQ), public reporting of all 18 measures may be overwhelming for consumers (7). Similarly, the Child HCAHPS can be daunting from a quality improvement perspective, as it may be difficult to determine which specific aspects of care should be allocated time and resources. A focus on specific measures and individual questions may help to facilitate targeted initiatives to improve the delivery of care in paediatric settings.

One method to facilitate targeted initiatives is to examine the correlations between individual aspects of care and one's overall rating of care (8). In doing so, challenges of implementing change at the organizational level may be overcome by focusing on improving core measures. This may also allow for the development of strategic quality improvement initiatives that are feasible and scalable. Thus, the objective of this study was to assess which individual questions and Child HCAHPS measures most strongly correlate with overall paediatric inpatient hospital experience in Alberta.

METHODS

Ethical approval for the present study was granted by the University of Calgary Conjoint Health Research Ethics Board (CHREB; file number REB17-0769).

Survey instrument

Alberta Health Services (AHS) administers a modified version of the Child HCAHPS via telephone to parents and/or

guardians of patients aged 17 years or younger who have stayed in Alberta hospitals for at least 24 hours. The survey is conducted within 6 weeks of discharge from the hospital, using computer-assisted telephone interview (CATI) software (Voxco [Voxco version 1.10], Montreal, Canada). The survey is comprised of 65 questions, 39 of which are experience questions and 10 are screening questions from the original Child HCAHPS survey. The Alberta modified version also includes nine additional experience questions following focus groups and pilot-testing with parents in Alberta, and six additional demographic questions. Responses to these questions are Likert-type scales. One survey question asked respondents to rate the overall care that their child received on a scale from 0 (worst care) to 10 (best care). Other survey items use categorical responses (e.g., excellent, very good, good, fair, poor). There is an additional open-ended question at the very end of the survey, asking respondents if there are any additional comments they would like to share about their experience at the hospital. Information is obtained from parents and/or guardians, who act as a proxy for their child in answering questions. More information about the Child HCAHPS survey is publicly available at the Agency for Healthcare Research and Quality website: https://www.ahrq.gov/cahps/surveys-guidance/hospital/about/child_hp_survey.html.

Sample derivation and dialing protocol

Clinical databases at AHS collect all inpatient information (acute care admission, discharge, and transfer information). A standard script extracts eligible cases on a biweekly basis, and filters all inpatient records based on the study exclusions. These include patients who are 18 years old and older, inpatient stay of less than 24 hours, no-publicity patients (parents who do not want to be contacted), healthy newborns, obstetric patients, death during hospital stay, any day surgery or ambulatory procedures, and any psychiatric unit or psychiatric physician service on record.

The complete list of eligible inpatient discharges is imported into the CATI software program and stratified at the hospital level. The survey is conducted in English only and no incentives are offered to prospective respondents. Random dialing is performed on the sample, until a quota of 10% of eligible discharges is met at each of the 14 hospitals captured. To maximize the potential for survey completion, each eligible number is dialed up to nine times on varying days and times (from 09:00 to 19:00 Monday to Friday, 10:00 to 15:00 on Saturdays).

Analysis

Due to the different response scales for individual questions from the Child HCAHPS, responses were scored on a normalized scale from 0 (worst) to 100 (best) (9). For instance, response options of always, usually, sometimes, and never were

converted to scores of 100, 66.66, 33.33, and 0, respectively. For questions with response options of 'yes, definitely', 'yes, somewhat', and 'no', these were converted to 100, 50, and 0. The question pertaining to overall rating of hospital was converted to a normalized score as well. For this, a response of 10 was converted to 1, a response of 20 to 2, etcetera.

To obtain a mean score for measures from the Child HCAHPS, such as 'communication between you and your child's nurses', and 'preparing you and your child to leave the hospital', mean score was calculated using the formula: *sum of normalized question scores in the measure/number of questions in the measure* (7). For instance, the mean score for the measure 'Keeping you informed' is comprised of two questions, which would be calculated by dividing the sum of the normalized score of the two questions (providers keeping you informed, given as much information as you wanted) by two. The questions on the standard Child HCAHPS instrument with the normalized scores can be found in the appendix (Supplementary Table 1).

Selected demographic and clinical characteristics of children and respondents were reported using descriptive statistics. Demographic features included sex, age, and global health status of the child, age, and educational level of the respondent, respondent relationship to the child, and the amount of time the respondent spent with the child in hospital. Clinical variables included the hospital type (paediatric, adult), and length of hospital stay (less than 3 days, 3 to 7 days, longer than 7 days). To assess the relationship between measures and overall rating of care, as well as individual questions with overall rating of care, Spearman correlation statistics were calculated. We utilized the software SAS Network version 9.3 for Windows (Cary, NC) for all analyses. In all cases, a P-value of less than 0.05 was considered statistically significant.

RESULTS

From October 2015 to March 2017, 3,389 inpatient surveys were completed. Table 1 presents the characteristics of the patients and respondents. The majority of patients were male (55.1%), and were 4 years old and under (66.7%). Most respondents were mothers (84.6%), who spent all or nearly all of the time at the hospital with their child (70.7%), and were between 25 and 34 years old (47.7%). Most patients stayed in a paediatric hospital (55.7%), for less than 3 days (42.1%).

Willingness to recommend hospital was the measure most strongly correlated with overall rating of care ($r=0.52$, $P<0.001$). Eight of the measures showed similar correlations with overall rating of care: parent–nurse communication ($r=0.46$, $P<0.001$), child–nurse communication ($r=0.45$, $P<0.001$), child–doctor communication ($r=0.45$, $P<0.001$), parent–doctor communication ($r=0.42$, $P<0.001$), keeping you informed ($r=0.43$, $P<0.001$), involving teens in their care ($r=0.43$, $P<0.001$), helping child feel comfortable ($r=0.42$, $P<0.001$), and preparing to

leave hospital ($r=0.40$, $P<0.001$). The measures that showed the weakest correlation with overall rating of care were quietness of hospital room ($r=0.19$, $P<0.001$) and keeping you informed in emergency room ($r=0.12$, $P<0.001$).

Table 2 shows the correlation between overall rating of care and individual questions from the Child HCAHPS. Recommendation of hospital to others was most strongly correlated with overall rating of care ($r=0.52$, $P<0.001$). Survey items relating to interactions with health care providers also had stronger correlations with overall rating of care such as: nurses listening to parents ($r=0.42$, $P<0.001$), doctors encouraging patients to ask questions ($r=0.40$, $P<0.001$), providers asking patients about any concerns ($r=0.40$, $P<0.001$), providers keeping parents informed ($r=0.40$, $P<0.001$), nurses listening carefully to child ($r=0.40$, $P<0.001$), doctors giving easy to understand explanations ($r=0.39$, $P<0.001$), nurses giving easy to understand explanations ($r=0.38$, $P<0.001$), being treated respectfully by nurses ($r=0.37$, $P<0.001$), nurses encouraging patients to ask questions ($r=0.37$, $P<0.001$), and providers involving patients in their care ($r=0.37$, $P<0.001$). Having toys, books, mobiles, and games for children appropriate for their age in the hospital also was correlated with overall rating of care ($r=0.34$, $P<0.001$). The survey items that showed the weakest correlation with overall rating of care were: asking parent to list all the prescription medicines their child was taking at home ($r=0.09$, $P<0.001$) and parents being informed about their child in the emergency room ($r=0.12$, $P<0.001$).

DISCUSSION

The Child HCAHPS survey is a standard measurement tool that can assess the paediatric patient experience nationally and internationally. Knowing which questions are most important for patient experience may provide valuable insights for developing targeted quality improvement initiatives. Thus, this study determined which survey questions were most correlated with respondents' overall rating of care. This is the first Canadian study to explore key areas for quality improvement in acute paediatric care.

The transferability of the Child HCAHPS in different countries has been validated in the USA (5) and Belgium (4). Our main findings pertaining to patient–provider interactions are similar to those reported for the adult HCAHPS survey by our group (8). In the USA, patient-level correlations for adult HCAHPS domains, reported by the Centers for Medicare and Medicaid Services (CMS) were found to be similar to our study (10). Domains such as communication with nurses and doctors demonstrated the strongest correlation with overall hospital rating than other domains (10).

Interactions with health care providers are key to the provision of patient-centered care. Communication, information sharing, and involving patients in their care are all concepts

Table 1. Sample characteristics (n=3,389 unless otherwise stated)

Variable	% of sample
Sex of child	
Male	55.1
Female	44.9
Age of child	
0 years	44.8
1–4	21.9
5–8	11.4
9–12	8.1
13–17	13.8
Global health status of child (n=3,341)	
Excellent	36.1
Very Good	31.6
Good	19.1
Fair	8.6
Poor	4.6
Age of respondent (n=3,385)	
Less than 25	6.1
25–34	47.7
35–44	34.2
45 or older	11.0
Education level of respondent (n=3,355)	
Eighth grade or less	1.3
Some high school	5.8
High school graduate or equivalent	16.5
College, CEGEP or other nonuniversity certificate/diploma	36.0
Undergraduate level (some or complete)	23.5
Postgraduate degree or professional designation	16.9
Respondent relationship to child (n=3,386)	
Mother	84.6
Father	11.9
Other	3.5
Respondent time spent at hospital with child (n=3,385)	
All or nearly all of the time	70.7
Most of the time	23.3
Some of the time	4.8
A little of the time	0.8
None of the time	0.4
Hospital type	
Paediatric hospital	55.7
Adult hospital	44.3
Length of child's hospital stay	
Less than 3 days	42.1
3–7 days	31.9
Longer than 7 days	26.0

of patient-centered care (8,11). Therefore, in order to provide high-quality care, it is imperative to look at health care provider interaction as a key priority for quality improvement. As doctor–patient communication, doctor–parent communication, nurse–patient communication, and nurse–parent communication had a stronger correlation with overall rating of care, strategies to improve health care provider communication with patients and families should be considered. Interventions to improve communication include communication skills training, which has been linked to better patient satisfaction, greater empathy and less burnout in physicians (12). Other strategies include building healthy relationships with patients through listening attentively to the needs of patients and families, and following-up with patients (13).

The hospital environment is also a key aspect to patient-centered care, and an important determinant in making patients comfortable. The hospital environment is especially important for children, as they experience the hospital as a social place (14,15). From the Child HCAHPS survey, the question pertaining to the inclusion of toys, books, and games that were appropriate for the child's age was also correlated with overall rating of care. Lambert et al. interviewed children on their views of a child-friendly hospital environment, with main findings being the availability and accessibility of diverse activities and leisure spaces for children (14). Strategies to improve the care experience for paediatric inpatients such as resources for children in the hospital should be explored.

Public reporting of the Child HCAHPS survey is not currently government mandated. The Patient Protection and Affordable Care Act of 2010 includes HCAHPS among the measures to be used to calculate value-based incentive payments in the Hospital Value-Based Purchasing program (2). Studies have found public reporting to be linked to improved quality of care (16–18). In the USA, progress over time on HCAHPS scores have been correlated with public reporting of results (19,20). Public reporting increases transparency and accountability in the delivery of high-quality health care (16). To facilitate improvements in quality of care for paediatric patients, Child HCAHPS results should be publicly reported. The inclusion of the correlational results from individual questions and domain-based questions as part of public reports may also assist hospitals and the public to be informed about which aspects of care are deemed most important by patients and their families.

A strength of this study lies in our transparent methodology—one that can be adopted by health care organizations and researchers in other countries who have utilized the Child HCAHPS survey to conduct similar correlational analyses on their own. This study also has some limitations. The study was conducted by telephone, which may affect the responses received. Studies from the adult HCAHPS survey have found respondents are more likely to respond positively on telephone

Table 2. Correlation between overall rating of care and individual questions from the Child HCAHPS survey

Question wording	Spearman correlation
Willingness to Recommend Hospital	
Would you recommend this hospital to your friends and family?	0.52
Communication between You and Your Child's Nurses	
During this hospital stay, how often did your child's nurses listen carefully to you?	0.42
During this hospital stay, how often did your child's nurses explain things to you in a way that was easy to understand?	0.38
During this hospital stay, how often did your child's nurses treat you with courtesy and respect?	0.37
Communication Between You and Your Child's Doctors	
During this hospital stay, how often did your child's doctors listen carefully to you?	0.38
During this hospital stay, how often did your child's doctors explain things to you in a way that was easy to understand?	0.36
During this hospital stay, how often did your child's doctors treat you with courtesy and respect?	0.30
Communication About Your Child's Medicines	
During the first day of this hospital stay, were you asked to list or review all of the prescription medicines your child was taking at home?	0.09
During the first day of this hospital stay, were you asked to list or review all of the vitamins, herbal medicines, and over-the-counter medicines your child was taking at home?	0.14
Before your child left the hospital, did a provider or hospital pharmacist explain in a way that was easy to understand how your child should take these new medicines after leaving the hospital?	0.25
Before your child left the hospital, did a provider or hospital pharmacist explain in a way that was easy to understand about possible side effects of these new medicines?	0.29
Keeping You Informed About Your Child's Care	
During this hospital stay, how often did providers keep you informed about what was being done for your child?	0.40
How often did providers give you as much information as you wanted about the results of these tests?	0.35
Privacy When Talking With Doctors, Nurses, and Other Providers	
During this hospital stay, how often were you given as much privacy as you wanted when discussing your child's care with providers?	0.27
Preparing You and Your Child to Leave the Hospital	
Before your child left the hospital, did a provider ask you if you had any concerns about whether your child was ready to leave?	0.26
Before your child left the hospital, did a provider talk with you as much as you wanted about how to care for your child's health after leaving the hospital?	0.31
Before your child left the hospital, did a provider explain in a way that was easy to understand when your child could return to his or her regular activities?	0.32
Before your child left the hospital, did a provider explain in a way that was easy to understand what symptoms or health problems to look out for after your child left the hospital?	0.31
Before your child left the hospital, did you get information in writing about what symptoms or health problems to look out for after your child left the hospital?	0.27
Keeping You Informed About Your Child's Care in the Emergency Room	
While your child was in this hospital's Emergency Room, were you kept informed about what was being done for your child?	0.12
How Well Nurses Communicate With Your Child	
During this hospital stay, how often did your child's nurses listen carefully to your child?	0.40
During this hospital stay, how often did your child's nurses explain things in a way that was easy for your child to understand?	0.36
During this hospital stay, how often did your child's nurses encourage your child to ask questions?	0.37

(Continued)

Table 2. Continued

Question wording	Spearman correlation
How Well Doctors Communicate With Your Child	
During this hospital stay, how often did your child's doctors listen carefully to your child?	0.36
During this hospital stay, how often did your child's doctors explain things in a way that was easy for your child to understand?	0.39
During this hospital stay, how often did your child's doctors encourage your child to ask questions?	0.40
Involving Teens in Their Care	
During this hospital stay, how often did providers involve your child in discussions about his or her health care?	0.37
Before your child left the hospital, did a provider ask your child if he or she had any concerns about whether he or she was ready to leave?	0.40
Before your child left the hospital, did a provider talk with your child about how to take care of his or her health after leaving the hospital?	0.31
Preventing Mistakes and Helping You Report Concerns	
Before giving your child any medicine, how often did providers or other hospital staff check your child's wristband or confirm his or her identity in some other way?	0.27
During this hospital stay, did providers or other hospital staff tell you how to report if you had any concerns about mistakes in your child's health care?	0.19
Helping Your Child Feel Comfortable	
Things that a family might know best about a child include how the child usually acts, what makes the child comfortable, and how to calm the child's fears. During this hospital stay, did providers ask you about these types of things?	0.36
During this hospital stay, how often did providers talk with and act toward your child in a way that was right for your child's age?	0.24
Hospitals can have things like toys, books, mobiles, and games for children from newborns to teenagers. During this hospital stay, did the hospital have things available for your child that were right for your child's age?	0.34
Responsiveness to the Call Button	
After pressing the call button, how often was help given as soon as you or your child wanted it?	0.32
Paying Attention to Your Child's Pain	
During this hospital stay, did providers or other hospital staff ask about your child's pain as often as your child needed?	0.30
Cleanliness of Hospital Room	
During this hospital stay, how often were your child's room and bathroom kept clean?	0.30
Quietness of Hospital Room	
During this hospital stay, how often was the area around your child's room quiet at night?	0.19

surveys, than they are on paper-based questions (21). However, before public reporting of HCAHPS results, the CMS performs mode adjustments, to ensure there is no bias in the reporting (22). A second limitation is that we did not collect information on race/ethnicity in the survey. Differences in the experience of care perceived by patients of different ethno-cultural backgrounds would be useful to know for quality improvement, especially in the delivery of culturally competent health services to patients in paediatric settings. Another limitation lies in the interpretation of our results. While hospital cleanliness did not have a strong correlation with overall rating of care, hospital cleanliness is a marker of quality and has been associated

with hospital acquired infections (23). Additionally, questions related to medication reconciliation was also poorly correlated with overall rating of care, but is recognized as a top patient safety priority (24). It is unclear why these patient safety questions were poorly correlated with overall rating of care. To complement these responses, qualitative reports with stakeholders (including patients and families) on important aspects of care would improve understanding.

Respondents of the Child HCAHPS survey are the parents and guardians of patients. Future studies, should also consider the collection of experiences from children in addition to parents/guardians. To date, most quality improvement initiatives

in paediatric hospitals have been driven from the perspectives of adults. In order for paediatric hospitals to be truly 'patient-centered', the paediatric patient voice should be incorporated.

In conclusion, this study aims to add to the body of literature on the Child HCAHPS survey, and how different analyses may provide valuable information to improve the care experience for paediatric patients and their families. Aspects of care that were highlighted in our study were deemed as important to patients and families. However, in order to improve paediatric care, different stakeholders (health care providers, patients and families, and health quality improvement leaders) should aim to work together to address these challenging domains of care. Health care organizations should aim to adopt the use of the Child HCAHPS, especially in different countries to allow for international comparisons in the quality of paediatric care. Our study results may inform the design of targeted initiatives to improve the quality of care.

SUPPLEMENTARY DATA

Supplementary data are available at *Paediatrics & Child Health* Online.

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