Food Insecurity during COVID-19 in a Canadian Academic Pediatric Hospital; a cross-sectional survey

Meta van den Heuvel MD, PhD [1,2,3], Anne Fuller MD, MS[1,2,4], Nusrat Zaffar MS [2,3], Xuedi Li[1,3] MSc, Carolyn E. Beck MD MSc [1,2], Catherine S. Birken MD MSc [1,2,3]

[1] Department of Paediatrics, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada
[2] Division of Paediatric Medicine, Hospital for Sick Children, Toronto, Canada
[3] Child Health Evaluative Sciences, The Hospital for Sick Children, Toronto, Canada
[4] Department of Health Research Methods, Evidence and Impact, McMaster University, Hamilton, Ontario, Canada

Corresponding author:
Dr. Meta van den Heuvel, MD PhD
Hospital for Sick Children,
10215A, 555 University Ave, M5G 1X8, ON, Toronto.
Phone: 416-813-2814 X222814 Fax: 416-813-8345
mathilda.vandenheuvel@sickkids.ca

Funding Statement:
This research was supported by a Walmart Community Grant through the SickKids Foundation for a study on food insecurity in the inpatient hospital setting. These agencies had no role in the design, collection, analyses or interpretation of the results of this study or in the preparation, review, or approval of the manuscript.

Competing interests: None declared.

Contributors: Meta van den Heuvel and Catherine Birken designed the study and contributed to the acquisition, analysis and interpretation of the data and agreed to be accountable for all aspects of the work. Meta van den Heuvel drafted the manuscript. Nusrat Zaffar contributed to the acquisition of data. Carolyn Beck and Anne Fuller contributed to the study design and the interpretation of the data. Xuedi Li contributed to the data analysis. All of the authors revised the manuscript critically for important intellectual content.

Data-Sharing Statement:
All data presented in this manuscript are available to other investigators on request from the corresponding author.

Acknowledgements: The authors like to thank all families who participated in this research.

Abstract

Background: Hospital-based food insecurity is defined as the inability of caregivers to obtain adequate food during their child's hospitalization. We aimed to measure the prevalence of household and hospital-based food insecurity in an academic pediatric hospital setting. We explored the associations between food insecurity and parental distress and caregivers' experiences about their food situation.
Methods: A cross-sectional survey was conducted from April to October 2020. Household food insecurity was measured using the 18-item U.S. Household Food Security Survey Module. Three adapted questions about hospital-based food insecurity were included. Parental distress was measured with the Distress Thermometer for Parents. Descriptive statistics were used to assess the proportions of food insecurity. Linear regression models were used to explore the relationship between food insecurity and parental distress. Thematic analysis was used to explore caregivers' feedback.
Results: 851 families were reached by telephone and 775 (91%) provided consent to participate. 430 (51%) completed at least part of the survey. Caregivers described a high prevalence of household (34%) and hospital-based (38%) food insecurity. Both adult (B = 0.21 [95% CI 0.07-0.36]), child (B= 0.38 [95% CI 0.10-0.66]) and hospital-based (B = 0.56 [95% CI 0.30-0.83]) food insecurity were significantly associated with parental distress independent of covariates. Financial burden, emotional and practical barriers obtaining food were identified as important themes.
Interpretation: Both household and hospital-based food insecurity were highly prevalent in caregivers. Hospitals need to strongly consider reducing barriers for caregivers to obtain food for themselves during their child's admission in order to reduce parental distress.

Introduction

Household food insecurity, defined as unreliable access to sufficient quantities of affordable and nutritious food, affects 1 in 6 Canadian children under the age of 18.[1] It has been associated with multiple negative health outcomes in children including behavioural problems, developmental delay, and decreased academic performance and school engagement.[2–8] Children who experience food insecurity are likely to be sick more frequently and be hospitalized more often.[9] There are concerns of increased food insecurity rates during the COVID-19 pandemic [10,11] but there is no evidence to date specifically addressing families with children with acute or chronic illness.

Hospital-based food insecurity is defined as the inability of caregivers to obtain adequate healthy food, or enough to eat, during their child's hospital stay.[12,13] Food insecurity is also associated with poorer health among adults including parental distress.[1] Hospital-based food insecurity may interfere with the caregiver's ability to play an active role in family-centered care as parents may be hungry. Caregiver hospital-based food insecurity has not been well studied. In a recent study (pre-COVID) in the United States, about a third of the caregivers reported hospital-based food insecurity.[12,13] There is currently no literature about hospital-based food insecurity in the Canadian setting, nor in the context of the COVID-19 pandemic. Knowledge about hospital-based food insecurity is important in order to inform health system policies to optimally support parents during pediatric hospital admissions.

Given the high incidence of household food insecurity in Canada, potentially exacerbated during the COVID-19 pandemic, we aimed to determine the prevalence of household and hospital-based food insecurity in our hospital setting. We hypothesized a high prevalence of hospital-based food insecurity, based on the fact that parents need to buy their own food when their child is admitted to hospital, and parents of children with a chronic illness already experience high financial burdens.[14] Furthermore, we investigated the impact of food insecurity on parental distress during a hospital admission and overall caregivers' experiences about their food situation during their hospital stay.

Methods

Study population: We conducted a cross-sectional survey on the general pediatric inpatient unit of the Hospital for Sick Children in Ontario, Canada from April through October 2020. All families with a child admitted to the general pediatric ward were approached. Participating families had to be able to understand English and have internet access to participate. There was no minimum hospitalization length of stay needed to participate in our study.

Procedure: Families were given a recruitment letter upon hospital admission. Families were informed that the study explored food insecurity (Appendix 1). The research assistant (NZ) contacted families by phone 24-48 hours following admission and asked for consent to participate. One family member consented via a REDCap survey link. The caregiver was invited to complete the survey during admission or following discharge. Three reminders were sent to complete the survey. No incentives were offered.

Measures:

Exposure: Food Insecurity

Household food insecurity was measured with the 18-item U.S. Household Food Security Survey Module (HFSSM).[15] The HFSSM is included in the Canadian Community Health Survey (CCHS). This module includes 10 adult-specific and 8 child-specific questions. We used the scoring system of the CCHS (Table 2).[1] Caregivers were identified as household food secure if they did not have any affirmative items on neither the adult nor child questions.

There is currently no validated screening tool available to measure hospital-based food insecurity. Therefore, we adapted three questions from the HFSSM to identify hospital-based food insecurity. For example; if the HFSSM question was "I/we could not afford balanced meals in the last 12 months" we adapted the question to " I/ we could not afford balanced meals during my child's hospital admission". The specific three questions were chosen to elucidate the severity of the hospital-based food insecurity (Table 1). Scoring was similar to the scoring of HFSSM (Table 2).

Outcome: Parental Distress

Parental distress was measured with the overall distress score and the "Practical Problems" subscale of the Distress Thermometer for Parents (DT-P) developed by Haverman et al. in 2013.[16,17] The DT- P is a well validated questionnaire used in diverse populations of parents with chronically ill children.[16] The DT-P is strongly related to the Hospital Anxiety and Depression scale ($0.55 \leq r \leq 0.61$) and moderately-to-strongly related to the Parenting Stress Index ($0.38 \leq r \leq 0.43$).[16] Numerous studies to date have used the DT-P to measure parental distress in parents of children with different pediatric chronic health conditions.[18,19]

For the overall distress score parents were asked to indicate on a thermometer how much distress they have perceived in the past week; 0" indicates "no distress" and "10" indicates "extreme distress". Studies have identified a cut-off score of 4 to 5 to detect significant parental distress.[16,17] In our analysis, parental distress was measured as a continuous variable.

Co-variates: We asked parents general sociodemographic questions (n =25) about material needs such as poverty, income, housing, electricity bills and transport. Questions were based on the Canadian Community Health Survey.[20] Parents reported on the number of children in their household, their ethnicity, employment status, household income and their own health status ("In general, would you say your health is excellent/ very good/ good / fair / poor"). Details about the child's chronic condition, duration and month of admission were collected from the medical chart.

All covariates were identified *a-priori* from the literature. Potential confounders in the relationship between food insecurity and parental stress include: child age, child's chronic condition (Yes/No), duration of admission, parent's own health status, employment status, household income, single parent household and number of children.[21] The month of admission was relevant due to a one-caregiver policy implemented during the COVID-19 pandemic, affecting our study from April to June, 2020. This difference could have affected caregiver access to food.

Caregivers' experiences obtaining food

To explore caregivers' experiences obtaining food in more detail we included one open-ended question in our survey asking, "Do you have any other feedback regarding your food situation during your child's hospital admission?".

Analysis

Descriptive statistics were used to assess the sociodemographic characteristics and the proportions of household food insecurity and hospital-based food insecurity. Categorical variables were compared between household food secure and food insecure homes. To explore the relationship between household (adult and child) food insecurity, hospital-based food insecurity and parental distress during admission linear regression models were used. In the regression models, both household and hospital-based food insecurity were used as a continuous variable. We conducted an unadjusted analysis and a model adjusted for all covariates defined above. Variance inflation factors were used to assess multi-collinearity. Multiple imputation with 15 imputed datasets was performed using the *mice* package in R to overcome bias that may result from missing data. The estimates were combined across the 15 datasets using Rubin's rules. We tested for interactions between food insecurity and parental distress and the child's duration of admission or chronic condition. All p-values were two-tailed and statistical significance was set at α=0.05. R version 4.0.2 was used for all analyses (https://www.R-project.org/).[22]

We used a thematic approach to explore the answers to the one open question asking about caregivers' experiences obtaining food during hospital admission. The answers to the open question were independently reviewed by two of the authors (MH, NZ). Common themes related to hospital-based food insecurity were identified using NVivo software (version 12). Themes were independently categorized and reviewed with all other authors.

Ethics Approval

This study was approved by the Research Ethics Board from the Hospital for Sick Children, Toronto.

Results

Study population

From April to October 2020, 1340 children were admitted to our general pediatric ward. We successfully contacted 851 caregivers by telephone and 775 (91%) caregivers gave consent to participate, 430 (51%) completed at least parts of the survey and for 44 (10 %) the HFSSM was not fully completed (Figure 1).

Food Insecurity

One-hundred-and-thirty-two (34.2%) caregivers reported adult household food insecurity, and in 76 (19.7%) children household food insecurity was described. One-hundred-and-forty-seven (38.1%) caregivers reported hospital-based food insecurity. Table 2 describes the severity of household and hospital-based food insecurity. Both household- and hospital-based food insecurity was reported in 24.9% of caregivers. Table 3 describes the sociodemographic characteristics of the food insecure versus food secure caregivers.

Parental Distress

Both household and hospital-based food insecurity were significantly associated with parental distress independent of covariates. In the adjusted model, each affirmative answer on the 10 adult questions of the HFSSM was associated with an 0.21 (95% CI 0.07-0.36, p=0.004) increase in parental distress score; each affirmative answer on the 8 child questions of the HFSMM was associated with an 0.38 (95% CI 0.10-0.66, p=0.01) increase in parental distress score; each affirmative answer on the 3

hospital-based food insecurity questions was associated with an 0.56 (95% CI 0.30-0.83, p<0.001) increase in parental distress score (Table 4). The interaction term was significant for household food insecurity and the child's chronic condition. A stratified analysis showed that in children *without* a chronic condition the association between adult food insecurity and parental distress was stronger compared to children *with* a chronic condition (B= 0.42 95% [0.09;0.76], p=0.01 versus B = 0.11 [-0.06; 0.27], p=0.20; adjusted for all covariates). Other interactions were non-significant (data available upon request).

Caregivers' experiences obtaining food during hospital admission

Seventy-one (18.4%) parents answered the open question regarding their food situation in the hospital. Multiple themes were identified and are presented in Table 5.

1. Financial burden obtaining food

Many parents commented on the high expenses of food in the hospital. They often felt the need to sacrifice their own food intake and skip meals, or purchase inexpensive and unhealthy foods. Caregivers also described having to prioritize other hospital admission related expenses, such as parking costs, over food.

2. Emotional and practical barriers obtaining food

Many parents reported that they did not want to leave their child's room and did not want to take up the nurse's time to supervise their child. Themes emerged around COVID-19 caregiver restrictions in the hospital. Caregivers lacked assistance on how to access food for themselves during their child's admission.

3. Parental stress obtaining food

Caregivers also described the increase stress they experienced finding affordable food for themselves.

4. Advocacy for food for parents

Many parents advocated for food to be provided to parents during their child's hospital admission. They articulated that this would recognize caregivers are an important part of the child's care.

Interpretation

Our study examined the prevalence of household and hospital- based food insecurity and its relationship with parental distress in caregivers during their child's hospital admission. The results showed both a high prevalence of household (34%) and hospital-based (38%) food insecurity in caregivers and a quarter of the caregivers experienced both. Our study has several strengths. We included a large sample size of parents with diverse backgrounds and we collected data from a large Canadian pediatric children's hospital.

The prevalence of food insecurity identified in our study is similar to that reported in a 2018-19 study from a children's hospital in Texas, the United States, where caregivers reported 38% household food insecurity and 43% hospital-based food insecurity.[13] However, food insecurity was much more common among study participants than in the general Canadian population; in the latest annual report from Food Insecurity Policy Research (PROOF) Canada (2017-2018), household food insecurity among households with children was 16.2%.[1] The higher prevalence found in our study may be related to the timing of survey administration during

COVID-19 pandemic. However, our prevalence is still much higher than recent estimates of food insecurity during COVID-19; Statistics Canada reported that 19.2% of families living in households with children reported food insecurity during the same period.[11] Caregivers in our study may have experienced increased financial costs as has been previously reported in caregivers with a chronically ill child.[14,23] In contrast to medical costs, rent and utilities, food costs are variable and families cut down on their food as a way to afford paying additional costs such as transport, parking and out of pocket medical expenses. Hospital admission itself adds to the burden of expenses, as parents in our study endorsed additional hospital-related financial stressors such as transport, food, and parking.

Our study showed that parental distress increases as food insecurity increases. Interestingly, the association between adult food insecurity and parental distress was not significant in children with a chronic condition. This may be because these parents have access to social work and other funding opportunities. Alternatively, parents of children with chronic conditions experience already higher levels of parental stress and/ or have been used to being food insecure. High parental distress is associated with a child's maladjustment to illness and adherence with medical treatment.[16] High parental distress may also affect participation in family centered care. One previous study by Jones et al. reported that greater perceived fulfillment of parent needs during hospital admission is associated with greater participation in hospital care.[21] Consequently, patients of families with hospital-based food insecurity may experience a lower quality of family centered care and be at risk for poorer child health outcomes.

Many caregivers provided written feedback about their food situation in the hospital. Although there is no previous Canadian literature with which to compare our identified themes a previous study from Manchester, England identified similar themes; the expense of buying food and parents' ambiguity; despite the contribution that parents make to the work of caring for their children, they were not entitled to discounted meals.[24] A more recent study in the United States reported that parents agreed that the child's needs come first, but parents need to eat in order to help their children.[13] This parallels what caregivers in our study acknowledged, namely that parents need to eat to be able to take part in the care of their child during hospitalization.

The majority of food insecure families reported both household- and hospital-based food insecurity. Clinicians need to be aware of this overlap and when identifying families with social needs, clinicians should also inquire about immediate hospital-based food insecurity. When available resources (like e.g. meal vouchers) should be offered to families to alleviate hospital-based food insecurity.

Limitations

Limitations of our study include non-response bias. Families were informed about the study topic food insecurity before giving consent and families without food insecurity might have been less inclined to participate. However, our results may also have underestimated the incidence of food insecurity as we excluded non-English speaking families and families who did not have internet access. Also, we did not collect any information on social work referrals, who might have been able to provide meal vouchers. In addition, the surveys were filled in per household, and no details were collected about the individual caregiver who answered the survey. Finally, our results are reflective of food insecurity during the COVID-19 pandemic, about which

there is no previous local data with which to compare rates of food insecurity. Due to the cross-sectional nature of our study, no causal relationship can be determined.

Conclusion

In conclusion, both household and hospital-based food insecurity were highly prevalent in caregivers with a child admitted to our academic pediatric hospital. Future research should further explore the relationship between food insecurity, family centered care and child health outcomes. Hospitals need to strongly consider reducing barriers for parents to obtain food for themselves during their child's admission, offering nutritious food at a low cost and reducing other costs such as parking in order to reduce parental distress during their child's hospital stay.

Table 1: Hospital-based food insecurity questions

1.	I/we could not afford to eat balanced meals during my child's hospital admission
2.	Did you or other adults in your household ever cut the size of your meals or skip meals during the hospital admission, because there wasn't enough money for food?
3.	During the hospital admission, were you ever hungry but didn't eat because there wasn't enough money for food?

Table 2: Household and hospital-based food insecurity reported by caregivers

Household Food Insecurity			**Hospital-based Food Insecurity**	
	Adult Food Status 10-item n = 386	**Child Food Status 8-item** n = 386		**Caregiver Food Status 3-item** n = 386
Household Food Secure	254 (65.8%)	310 (80.3%)	**Hospital-based Food Secure**	239 (61.9%)
Household Food Insecure	132 (34.2%)	76 (19.7%)	**Hospital-based Food Insecure**	147 (38.1%)
Marginal Food Insecurity *(1 positive response)*	51 (13.2%)	38 (9.8%)	Marginal Food Insecurity *(1 positive response)*	67 (17.4%)
Moderate Food Insecurity *(2-5 positive responses)*[1]	57 (14.8%)	34 (8.8%)	Moderate Food Insecurity *(2 positive responses)*	36 (9.3%)
Severe Food Insecurity *(6 or more positive responses)*[1]	24 (6.2%)	4 (1.0%)	Severe Food Insecurity *(3 positive responses)*	44 (11.4%)

[1]For child food status: moderate food insecurity 2-4 positive responses; severe food insecurity; more than 5 positive responses. Based on scoring method PROOF.[1]

Table 4: The association between household and hospital-based food insecurity and parental distress using linear regression

n=386	Parental distress score (0-10)			
	Unadjusted		Adjusted*	
	Beta (95%CI)	p-value	Beta (95%CI)	p-value
Adult household food insecurity score (0-10)	0.19 (0.07; 0.32)	**0.002**	0.21 (0.07; 0.36)	**0.004**
Child household food insecurity score (0-8)	0.33 (0.09; 0.58)	**0.01**	0.38 (0.10; 0.66)	**0.01**
Hospital-based food insecurity score (0-3)	0.57 (0.33; 0.81)	**<0.001**	0.56 (0.30; 0.83)	**<0.001**

*Adjusted for parent's own health, employment status, household income, single parent household, number of children, month of admission, child age, child's chronic condition and duration of admission.

References

1. Tarasuk V, Mitchell A. Household food insecurity in Canada, 2017-2018. PROOF. Toronto, 2020. Available: https://proof.utoronto.ca/resources/proof-annual-reports/household-food-insecurity-in-canada-2017-2018/ (accessed 2020 Nov. 19).
2. Alaimo K, Olson CM, Frongillo EA. Food insufficiency and American school-aged children's cognitive, academic, and psychosocial development. *Pediatrics* 2001;108(1):44-53.
3. Shankar P, Chung R, Frank DA. Association of food Insecurity with children's behavioral, emotional, and academic outcomes: a systematic review. *J Dev Behav Pediatr* 2017;38(2):135–50.
4. Jyoti DF, Frongillo EA, Jones SJ. Food insecurity affects school children's academic performance, weight gain, and social Skills. *J Nutr* 2018;135(12):2831–9.
5. Franklin B, Jones A, Love D, et al. Exploring mediators of food insecurity and obesity : a review of recent literature. *J Community Health* 2012;37(1):253–64.
6. Kaur J, Lamb MM, Ogden CL. The association between food insecurity and obesity in children - the National Health and Nutrition Examination Survey. *J Acad Nutr Diet* 2015;115(5):751-8.
7. Cook JT, Frank DA, Berkowitz C, et al. Food insecurity is associated with adverse health outcomes among human infants and toddlers. *J Nutr* 2004;134(6):1432–8.
8. Melchior M, Chastang JF, Falissard B, et al. Food insecurity and children's mental health: a prospective birth cohort study. *PLoS One* 2012;7(12):1–7.
9. Council on Community Pediatrics. Promoting food security for all children. *Pediatrics* 2015;136(5):e1431-8.
10. Who 's Hungry - beyond COVID-19: Building a future without poverty Available: https://www.dailybread.ca/wp-content/uploads/2020/11/Whos-Hungry-Report-2020.pdf (accessed 2020 Nov.19).
11. Statistics Canada. Canadians experiencing food insecurity during the COVID-90 pandemic. Available: https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2020042-eng.html (accessed 2020 Nov.19).
12. Makelarski JA, Thorngren D, Lindau ST. Feed first, ask questions later: Alleviating and understanding caregiver food insecurity in an urban children's hospital. *Am J Public Health* 2015;105(8):e98–104.
13. Lee AM, Lopez MA, Haq H, et al. Inpatient food insecurity in caregivers of

hospitalized pediatric patients: A mixed methods study. *Acad Pediatr* 2021 24; S1876-2859(21)00239-4.

14. Fuller AE, Brown NM, Grado L, et al. Material hardships and health care utilization among low-income children with special health care needs. *Acad Pediatr* 2019;19(7):733-9.

15. Bickel G, Nord M, Price C. Guide to measure household food insecurity. 2000. Available: https://naldc.nal.usda.gov/download/38369/PDF (accessed 2020 Nov.19).

16. Haverman L, Van Oers HA, et al. Development and validation of the distress thermometer for parents of a chronically ill child. *J Pediatr* 2013;163(4):1140-6 e2.

17. van Oers HA, Schepers SA, Grootenhuis MA, et al. Dutch normative data and psychometric properties for the Distress Thermometer for Parents. *Qual Life Res* 2017;26(1):177–82.

18. Schepers SA, Sint Nicolaas SM, Maurice-Stam H, et al. Parental distress 6 months after a pediatric cancer diagnosis in relation to family psychosocial risk at diagnosis. *Cancer* 2018;124(2):381–90.

19. Diederen K, Haverman L, Grootenhuis MA, et al. Parental Distress and quality of life in pediatric inflammatory bowel disease. *J Pediatr Gastroenterol Nutr* 2017;66(4):630–6.

20. Canadian Community Healthy Survey. Available: https://www.statcan.gc.ca/eng/survey/household/3226 (accessed 2020 Nov.19)

21. Jones J, Nowacki AS, Greene A, et al. Investigating parent needs, participation, and psychological distress in the children's hospital. *Hosp Pediatr* 2017;7(7):385–94.

22. R Core Team. R: a language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing; 2018.

23. Lindley L, Mark B. Children with special health care needs; Impact of health care expenditures on family financial burden. *J Child Fam Stud* 2010;19(1):79–89.

24. Callery P. Paying to participate: Financial, social and personal costs to parents of involvement in their children's care in hospital. *J Adv Nurs* 1997;25(4):746–52.

Food Insecurity during COVID-19 in a Canadian Academic Pediatric Hospital; a cross-sectional survey ~~study~~

Meta van den Heuvel MD, PhD [1,2,3], Anne Fuller MD, MS[1,2,4], Nusrat Zaffar MS [2,3], Xuedi Li[1,3] MSc, Carolyn E. Beck MD MSc ~~FRCPC~~[1,2], Catherine S. Birken MD MSc ~~FRCPC~~[1,2,3]

[1] Department of Paediatrics, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada
[2] Division of Paediatric Medicine, Hospital for Sick Children, Toronto, Canada
[3] Child Health Evaluative Sciences, The Hospital for Sick Children, Toronto, Canada
[4] Department of Health Research Methods, Evidence and Impact, McMaster University, Hamilton, Ontario, Canada

Corresponding author:
Dr. Meta van den Heuvel, MD PhD
Hospital for Sick Children,
10215A, 555 University Ave, M5G 1X8, ON, Toronto.
Phone: 416-813-2814 X222814 Fax: 416-813-8345
mathilda.vandenheuvel@sickkids.ca

Funding Statement:
This research was supported by a Wallmart Community Grant through the SickKids Foundation for a study on food insecurity in the inpatient hospital setting. These agencies had no role in the design, collection, analyses or interpretation of the results of this study or in the preparation, review, or approval of the manuscript.

Competing interests: None declared.

Contributors: Meta van den Heuvel and Catherine Birken designed the study and contributed to the acquisition, analysis and interpretation of the data and agreed to be accountable for all aspects of the work. Meta van den Heuvel drafted the manuscript. Nusrat Zaffar contributed to the acquisition of data. Carolyn Beck and Anne Fuller contributed to the study design and the interpretation of the data. Xuedi Li contributed to the data analysis. All of the authors revised the manuscript critically for important intellectual content.

Abstract

Background: Hospital-based food insecurity is defined as the inability of caregivers to obtain adequate food during their child's hospitalization. We aimed to measure the prevalence of household and hospital-based food insecurity in an academic pediatric hospital setting during the COVD-19 pandemic. We ~~also~~ explored the associations between ~~effects of~~ food insecurity and~~on~~ parental distress and overall caregivers' experiences about their food situation ~~during their hospital stay~~.

Methods: ~~This was A~~a cross-sectional survey was conducted~~study~~ from April to October 2020. Household food insecurity was measured using the 18-item U.S. Household Food Security Survey Module. Three adapted questions about hospital-based food insecurity were included~~added~~. Parental distress was measured with the Distress Thermometer for Parents. Descriptive statistics were used to assess the proportions of food insecurity. Linear regression models were used to explore the relationship between food insecurity and parental distress. Recurrent themes in caregiver's answers ~~experiences~~ were identified using thematic ~~qualitative~~ analysis.

Results: 851 families were reached by telephone and 775 (91~~.0~~%) provided consent to participate. 43~~05~~ (5~~6.~~1%) completed at least one survey ~~questionnaire~~. Caregivers described a high prevalence of household (34~~.2~~%) and hospital-based (38~~.0~~%) food insecurity. Both adult (B = 0.21 [95% CI 0.07-0.36]), child (B= 0.38 [95% CI 0.10-0.66]) and hospital-based (B = 0.56 [95% CI 0.30-0.83]) food insecurity were significantly associated with parental distress independent of covariates. ~~In the qualitative analysis, T~~the ~~f~~ financial burden and emotional and practical barriers obtaining food were identified as important themes.

Interpretation: Both household and hospital-based food insecurity were highly prevalent in caregivers. Hospitals need to strongly consider reducing barriers for caregivers to obtain food for themselves during their child's admission in order to reduce parental distress.

Commented [MVDH1]: 250 words

Introduction

Household food insecurity, defined as unreliable access to sufficient quantities of affordable and nutritious food, affects 1 in 6 Canadian children under the age of 18.[1] It has been associated with multiple negative health outcomes in children including behavioural problems, developmental delay, and decreased academic performance and school engagement.[2–8] Children who experience food insecurity are likely to be sick more frequently and be hospitalized more often.[9] There are concerns of increased food insecurity rates during the COVID-19 pandemic [10,11] but there is no evidence to date specifically addressing families with children with acute or chronic illness.

~~Previous evidence demonstrated that parents of children with a chronic health condition face increased financial burdens for multiple reasons, including higher out-of-pocket expenses and effects of caregiving on employment.[12,13] Parents of children with chronic health conditions may experience hospital-based food insecurity.~~ Hospital-based food insecurity is ~~can be~~ defined as the inability of caregivers to obtain adequate healthy food, or enough to eat, during their child's hospital stay, ~~where they are unable to obtain adequate food during their child's hospitalization~~.[14] Food insecurity is also associated with poorer health among adults including parental distress. Hospital-based food insecurity may interfere with the caregiver's ability to play an active role in family-centered care as parents may be hungry. ~~are occupied with their basic needs.~~

Caregiver hospital-based food insecurity has not been well studied. In ~~one~~ recents study (pre-COVID) in the United States, about a third ~~31%~~ of the caregivers reported hospital-based food insecurity.[14] ~~In this population, there was a significant overlap between household and hospital-based food insecurity, with 21.6% reporting both.14 A 2011 study, in a pediatric urban hospital setting in the United States, reported the same incidence with over a third of caregivers meeting the criteria for hospital-based food insecuri,ty.~~[15] There is currently no literature about hospital-based food insecurity in the Canadian setting, nor in the context of the COVID-19 pandemic. ~~.~~ Knowledge about hospital-based food insecurity is important in order to inform health system policies to optimally support parents during pediatric hospital admissions.

Given the high incidence of household food insecurity in Canada, potentially exacerbated during the COVID-19 pandemic, we aimed to determine the prevalence of household and hospital-based food insecurity in our hospital setting. We hypothesized a high prevalence of hospital-based food insecurity, based on the fact that ~~because~~ parents need to buy their own food when their child is admitted to hospital, and parents of children with a ~~-~~chronic illness already experience high financial burdens. Furthermore, we investigated the impact of food insecurity on parental distress during a hospital admission and overall caregivers' experiences about their food situation during their hospital stay.

Methods

Study population: We conducted a cross-sectional survey ~~study~~ on the general pediatric inpatient unit of the Hospital for Sick Children in Ontario, Canada from April through October 2020. All families with a child admitted to the general pediatric ward were approached. Participating families had to be able to understand English and have internet access to participate. There was no minimum hospitalization length of stay needed to participate in our study. ~~.~~

Procedure: Families were given a recruitment letter upon ~~During~~ hospital admission. Families were informed that the study explored food insecurity (Appendix 1

Commented [MVDH2]: Max words 2500

Commented [MVDH3]: Ref 14

Commented [MVDH4]: Reference

Commented [MVDH5]: Change to ref 15

Commented [MVDH6]: Reference

Recruitment Letter). , Tthe research assistant (NZ) contacted families by phone after 24-48 hours following admission by and asked for consent to participate. One family member consented via a REDCap survey link. needed to give consent and was Interested families were emailed a survey link. Theis caregiver was invited had time to complete answer the survey questionnaire during admission or following dischargeafter admission. Three reminders were sentd to complete the surveyquestionnaire. No incentives were offered.

Measures:

Exposure: *Food Insecurity*

Household food insecurity was measured with the 18-item U.S. Household Food Security Survey Module (HFSSM).[16] The HFSSM is included in the Canadian Community Health Survey (CCHS). This module includes 10 adult-specific and 8 child-specific questions. We used the the scoring system of the CCHS. Households are classified as either food secure (no items affirmed) or marginally (no more than 1 positive response on either scale), moderately (2-5 positive responsesive on adult scale; 2-4 positive responses on child scale) or severely food insecure (6 or more positive responses (5 or more on child scale).[1] (Table 2) Caregivers were identified as household food secure if they did not have any affirmative items on neither the adult nor child questions.

There is currently no validated screening tool available to measure hospital-based food insecurity. Therefore, we adapted three questions from the HFSSM survey to identify hospital-based food insecurity. For example; if the HFSSM question was "I/we could not afford balanced meals in the last 12 months" we adapted the question to " I/ we could not afford balanced meals during my child's hospital admission". The specific three questions were chosen to elucidate give an impression about the severity of the hospital-based food insecurity. We added three adapted questions about hospital-based food insecurity to this survey (Table 1). Scoring was similar to the scoring of HFSSM. (Table 2) Caregivers were classified as either hospital-based food secure (no items affirmed) or marginally (1 positive response), moderately (2 positive responses) or severely food insecure (3 positive responses) similar to that of the HFSSM.

Outcome: *Parental Distress*

Parental distress was measured with the overall distress score and the "Practical Problems" subscale of the Distress Thermometer for Parents (DT-P) developed by Haverman et al. in 2013.[17,18] Numerous studies to date have used the DT-P to measure parental distress in parents of children with different pediatric chronic health conditions.[19,20] The DT- PIt is is a well validated questionnaire used in diverse populations of parents with chronically ill children. The DT-P is strongly related to the Hospital Anxiety and Depression scale (0.55 ≤ r ≤ 0.61) and moderately-to-strongly related to the Parenting Stress Index (0.38 ≤ r ≤ 0.43). Numerous studies to date have used the DT-P to measure parental distress in parents of children with different pediatric chronic health conditions.[19,20]

For the overall distress score parents were asked to indicate on a thermometer how much distress they have perceived in the past week; 0" indicates "no distress" and "10" indicates "extreme distress". For the practical problem score, they had to indicate if they had any problems with housing, work/study, finances/insurance, housekeeping, transport, childcare/ child supervision/ leisure activities/relaxing in the past week. Studies have identified a cut-off score of 4 to 5 to

Commented [MVDH7]: (Grootenhuis et al J Peds 2013).

Commented [MVDH8]: (Grootenhuis et al J Peds 2013).

detect significant parental distress.[17,18] In our analysis, parental distress was measured ~~used~~ as a continuous variable~~score~~.

Co-variates: We asked parents general sociodemographic questions (n =25) about material needs such as poverty, income, housing, electricity bills and transport. Questions were based on the Canadian Community Health Survey.[21] Parents reported on the number of children in their household, their ethnicity, employment status, household income and their own health status ("In general, would you say your health is excellent/ very good/ good / fair / poor"). Details about the child's chronic condition, duration and month of admission were collected from the medical chart.

All covariates were identified *a-priori* from the literature. Potential confounders in the relationship between food insecurity and parental stress include: child age, child's chronic condition (Yes/No), duration of admission, parent's own health status, employment status, household income, single parent household and number of children.[22] The month of admission was relevant due to a one-caregiver policy implemented during the COVID-19 pandemic, affecting our study from April to June, 2020. This difference could have affected caregiver access to food.

~~We also included the month of admission because during COVID-19 our hospital had implemented different rules and from April through June, only one caregiver was allowed to stay with their child during the admission.~~

Caregivers' experiences obtaining food

To explore caregivers' experiences obtaining food in more detail we included one open-ended question in our survey asking, "Do you have any other feedback regarding your food situation during your child's hospital admission?".

Analysis

Descriptive statistics were used to assess the sociodemographic characteristics and the proportions of household food insecurity and hospital-based food insecurity. Categorical variables were compared between household food secure and food insecure homes. To explore the relationship between household (adult and child) food insecurity, hospital-based food insecurity and parental distress during admission linear regression models were used. In the regression models, both household and hospital-based food insecurity were used as a continuous variable. We conducted an unadjusted analysis and a model adjusted for all covariates defined above~~potential confounders~~. ~~To assess test for multi-collinearity, variance inflation factors were examined. Missingness for each covariate was under 15%. Multiple imputation (n=15) was performed using the *mice* package in R to overcome bias that may result from missing data.~~[23]Variance inflation factors were used to assess multi-collinearity. Multiple imputation with 15 imputed datasets was performed using the *mice* package in R to overcome bias that may result from missing data. The estimates were combined across the 15 datasets using Rubin's rules. We tested for interactions between food insecurity and parental distress and the child's duration of admission or chronic condition. All p-values were two-tailed and statistical significance was set at α=0.05. R version 4.0.2 was used for all analyses (https://www.R-project.org/).[24]

We used a ~~qualitative~~ thematic approach ~~analysis~~ to explore the answers to the one open question asking about caregivers' experiences obtaining food during hospital admission. The answers to the open question~~s~~ were independently reviewed

by two of the authors (MH, NZ). Common themes related to hospital-based food insecurity were identified using NVivo software (version 12). Themes were independently categorized and reviewed with all other authors.

~~Recurrent themes in the answers to the open question were identified (by MH) using NVivo software (version 12).~~ **Ethics Approval**

This study was approved by the Research Ethics Board from the Hospital for Sick Children, Toronto.

Results

Study population

From April to October 2020, 1340 children were admitted to our general pediatric ward.~~;~~ ~~132 (9.9%) children were readmitted and not approached for our study.~~ We successfully contacted ~~were able to reach~~ 851~~775~~ caregivers by telephone and ~~they were asked to participate in our study.~~ 775 (91.~~0~~%) caregivers gave consent to participate, 430~~.~~ (51%) completed at least parts of the survey and for 44 (10 %) the HFSSM was not fully completed. ~~(91.0%) provided consent to participate. 386 (49.8%) families~~ filled in ~~completed both the HFSSM and the general sociodemographic survey questions~~ completely. ~~Figure~~(Figure 1) ~~1 shows the flow diagram of the study.~~

Food Insecurity

One-hundred-and-thirty-two (34.2%) caregivers reported adult household food insecurity, and in 76 (19.7%) children household food insecurity was described. ~~Compared with food secure families, families who reported to be food insecure were more often from single parent households (25.2% vs 7.4%), less often from European background (23.1% vs 42.8%), more often unemployed (16.1% vs 2.5%), more often reported to have a lower income (49.2% vs 15.2%), less often owned a house (37.6% vs 75.3%) and rated their own health more often as fair/ poor (27.3% vs 7.1%) (Table 3).~~ One-hundred-and-forty-seven (38.1%) caregivers reported hospital-based food insecurity. Table 2 describes the severity of household and hospital-based food insecurity. Both household- and hospital-based food insecurity was reported in 24.9% of caregivers. Table 3 describes the sociodemographic characteristics of the food insecure versus food secure caregivers.

~~n=386~~	~~**Food Insecure** mean (SD) or n (%) (n=143)~~	~~**Food Secure**[1] mean (SD) or n (%) (n=243)~~
~~Child age in month (n=384)~~	~~83.7 (73.8)~~	~~75.0 (70.0)~~
~~Child with a chronic health condition (n=385)~~	~~91 (63.6%)~~	~~138 (57.0%)~~
~~Single parent household (n=386)~~	~~36 (25.2%)~~	~~18 (7.4%)~~
~~Maternal ethnicity (n=386)~~	~~-~~	~~-~~
~~- European~~	~~33 (23.1%)~~	~~104 (42.8%)~~
~~- East Asian~~	~~6 (4.2%)~~	~~34 (14.0%)~~
~~- South and Southeast Asian~~	~~36 (25.2%)~~	~~46 (18.9%)~~
~~- Black~~	~~18 (12.6%)~~	~~8 (3.3%)~~
~~- Arabic~~	~~12 (8.4%)~~	~~15 (6.2%)~~
~~- Latin American~~	~~11 (7.7%)~~	~~10 (4.1%)~~
~~- Indigenous~~	~~4 (2.8%)~~	~~6 (2.5%)~~

- Other	23 (16.1%)	20 (8.2%)
Employment (n=386)		
- Both parents full time employed	8 (5.6%)	76 (31.3%)
- One parent full time employed	70 (49.0%)	124 (51.0%)
- Both parents part-time employed	4 (2.8%)	3 (1.2%)
- Both parents not employed	23 (16.1%)	6 (2.5%)
- Other (eg. parental leave)	38 (26.6%)	34 (14.0%)
Number of children (n=380)	2.5 (1.4)	2.0 (1.0)
Family income before tax (n=327)		
- $0 to $39, 999	64 (49.2%)	30 (15.2%)
- $40, 000 to $79,999	39 (30.0%)	38 (19.3%)
- $80, 000 to $149,999	22 (16.9%)	67 (34.0%)
- $150, 000+	5 (3.8%)	62 (31.5%)
Trouble making ends meet (n=380)	96 (68.6%)	42 (17.5%)
Trouble paying electricity/ heat/ telephone bill (n=383)		
- Never true	47 (33.1%)	201 (83.4%)
- Sometimes true	77 (54.2%)	36 (14.9%)
- Often true	18 (12.7%)	4 (1.7%)
Housing (n=384)		
- Owned	53 (37.6%)	183 (75.3%)
- Paying rent	87 (61.7%)	57 (23.5%)
- Other	1 (0.7%)	3 (1.2%)
Parent's own health (n=384)	-	-
- Fair/Poor	39 (27.3%)	17 (7.1%)
- Good/Very good/Excellent	104 (72.7%)	224 (92.9%)
Month of admission (n=385)		
- April	19 (13.3%)	30 (12.4%)
- May	35 (24.5%)	46 (19.0%)
- June	30 (21.0%)	38 (15.7%)
- July	15 (10.5 %)	40 (16.5%)
- August	18 (12.6%)	36 (14.9%)
- September	14 (9.8%)	36 (14.9%)
- October	12 (8.4%)	16 (6.6%)
Duration of admission in days (n=382)	5.5 (5.6)	5.4 (6.0)

[1] Caregivers were identified as household food secure if they did not have any affirmative items on both the adult and child questions of the HFSS*Parental Distress*

Parents who reported household or hospital-based food insecurity also reported higher levels of parental distress than food secure families (mean score respectively 7.3 [SD 2.4], 7.4 [SD 2.2] vs 6.2 [SD 2.6]). Caregivers who reported hospital-based food insecurity also described more practical problems with childcare (51.0 % vs 28.6 %), housing (21.2% vs 8.4%), work / study (49.7% vs 34.2%), finances / insurance (58.7% vs 23.6%) and transport (28.3% vs 10.9%) than food secure families.

Both household and hospital-based food insecurity were significantly associated with parental distress independent of covariates. In the adjusted model, each affirmative

answer on the 10 adult questions of the HFSSM was associated with an 0.21 (95% CI 0.07-0.36, p=0.004) increase in parental distress score; each affirmative answer on the 8 child questions of the HFSMM was associated with an 0.38 (95% CI 0.10-0.66, p=0.01) increase in parental distress score; each affirmative answer on the 3 hospital-based food insecurity questions was associated with an 0.56 (95% CI 0.30-0.83, p<0.001) increase in parental distress score (Table 4). The interaction term was significant for household food insecurity and the child's chronic condition. A stratified analysis showed that children *without* a chronic condition the association between adult food insecurity and parental distress was stronger compared to children *with* a chronic condition (B= 0.42 95% [0.09;0.76] p = 0.01 versus B = 0.11 [-0.06; 0.27] p = 0.20; adjusted for all covariates). Other interactions were non-significant (data available upon request).

Caregivers' experiences obtaining food during hospital admission

Seventy-one (18.4%) parents answered the open question regarding their food situation in the hospital. Multiple themes were identified and are presented in Table 5.

1. Financial burden obtaining food

Many parents commented on the high expenses of food in the hospital. ~~"*The food in the hospital is too expensive. To eat even two meals a day will cost about $30. If you are here for a week that's over $200. It makes it hard*".~~ They often felt the need to sacrifice their own food intake and skip meals, or purchase inexpensive and unhealthy foods. ~~"*We skip at least one meal or more to afford a long stay*"~~ and ~~Mmany caregivers described that they only bought inexpensive foods.~~ ~~"*I am eating chips and small things during my child's hospital admission*".~~ Caregivers also described having to prioritize other hospital admission related expenses, such as parking costs, over food. ~~"*I went without food during the hospital admission because I otherwise wouldn't have had the money to get my car out of the parking lot when my son would be discharged*".~~

2. Emotional and practical barriers obtaining food

Many parents reported that they did not want to leave their child's room ~~"*I felt awful to leave my child in the room by herself in order to be able to run downstairs and get some food for me*"~~ and did not want to take up the nurse's time to supervise their child. ~~d "*Getting food has been challenging because I have to call a nurse to stay with my child while I get something to eat, and do understand they are extremely busy*".~~ Themes emerged around COVID-19 caregiver restrictions in the hospital. ~~"*Swap policy makes it hard for adults to acquire food and most food places around the hospital are closed due to COVID – so not much food for adults available*".~~ Caregivers lacked assistance on how to access food for themselves during their child's admission., ~~including child-minding during the purchase of food.d; "*When my child was admitted there was no guidance given to help me get food for myself*".~~

3. Parental stress obtaining food

Caregivers also described the increase stress they experienced finding affordable food for themselves.

4. Advocacy for food for parents

~~At last~~ ~~Mm~~any parents advocated for food to be provided to ~~for~~ parents during their child's hospital admission. ~~"*The hospital should provide food for parents or at least*~~

low-cost food" and They articulated that this would ralso have the possibility to deliver food to their child's room. They recognized caregivers are ain important part of the child's care "*It doesn't make sense not to offer or feed the parent that is staying in the hospital with the child. If the parent isn't strong or has energy — how can they help their child recover or be of assistance to doctors or nurses?*".

Interpretation

Our study is the first to examined the prevalence of household and hospital- based food insecurity and its relationship with parental distress in caregivers during their child's hospital admission. The results showed both a high prevalence of household (34.1%) and hospital-based (38.0%) food insecurity in caregivers and a quarter of the caregivers experienced both. Our study has several strengths. We included a large sample size of parents with diverse backgrounds and -and we collected data from a large Canadian pediatric children's hospital. In addition, we used validated instruments to measure food insecurity and parental distress

The This prevalence of food insecurity identified in our study is is quite similar to that reported in a 2018-19 study as found in a recent study from a children's hospital in Texas, the United States, in 2018-2019 where caregivers reported 38% household food insecurity and 43% hospital-based food insecurity. However, food insecurity was much more common among study participants than in the general Canadian population; i In the latest annual report from Food Insecurity Policy Research (PROOF) Canada (2017-2018), household food insecurity prevalence in adults in Ontario was 13.3% and household food insecurity among households with children was 16.2%.[1] The higher prevalence found in our study may be related to the timing of survey administration during COVID-19 pandemic. However, oOur prevalence is still much higher than recent estimates of food insecurity during COVID-19; Statistics Canada reported that 19.2% of families living in households with children reported food insecurity during the same period.[11] Caregivers in our study may have experienced increased financial costs as has been previously reported in caregivers with a chronically ill child.[12,13] In contrast to medical costs, rent and utilities, food costs are variable and families cut down on their food as a way to afford paying additional costs such as transport, parking and out of pocket medical expenses. Hospital admission itself adds to the burden of expenses, as parents in our study endorsed additional hospital-related financial stressors such as transport, food, and parking.

Our study showed that Sociodemographic factors were different between household food insecure and food secure caregivers. A higher proportion of single parent households, black maternal ethnicity, lower household income, worse parental health and unemployment were seen in caregivers who experienced household food insecurity. These sociodemographic factors are consistent with previously reported literature in Canada.[1]

Parental distress was higher in caregivers who endorsed household (adult and child) or hospital-based food insecurity. Previous studies have identified a cut-off score of 4 - 5 to detect significant clinical parental distress[17], indicating that in our study population parental distress was overall is high. Household and hospital-based food insecurity were significantly associated with parental distress independent of covariates, indicating that parental distress increases as food insecurity increases. Interestingly, the association between adult food insecurity and parental distress was not significant in children with a chronic condition. This may be because these parents have access to social work and other funding opportunities. Alternatively,

Commented [MVDH9]: Refernce Lee

parents of children with chronic conditions experience already higher levels of parental stress and/ or have been used to being food insecure. ~~.~~ High parental distress is associated with a child's maladjustment to illness and adherence with medical treatment.[17] High parental distress may also affect participation in family centered care. One previous study by Jones et al. reported that greater perceived fulfillment of parent needs during hospital admission is associated with greater participation in hospital care.[22] Consequently, patients of families with hospital-based food insecurity may experience a lower quality of family centered care and be at risk for poorer child health outcomes.

Many caregivers provided written feedback about their food situation in the hospital. Although there is no previous Canadian literature with which to compare our identified themes a previous study ~~, one study~~ from Manchester, England identified similar themes; the expense of buying food and parents' ambiguity; despite the contribution that parents make to the work of caring for their children, they were not entitled to discounted meals ~~interviewed parents in the week following their child's hospital discharge~~.[25] ~~Difficulty obtaining food and the expense of buying food was identified as an important theme. The author also described parents' ambiguity; despite the contribution that parents made to the work of caring for their children, they were not entitled to free meals or the discount offered to hospital workers.~~ A more recent study ~~that interviewed parents during hospital admission~~ in the United States reported that parents agreed that the child's needs come first, but parents need to eat in order to help their children.[14] This parallels what caregivers in our study acknowledged, namely that parents need to eat to be able to take part in the care of their child during hospitalization. ~~An unexpected theme identified was the "stress of leaving their child alone" in order to obtain food for themselves. This could be explained in part by COVID-19 related caregiver restrictions. However, even preceding the pandemic, it was often difficult for both caregivers to stay with their child during hospital admission due to work obligations and the need to care for siblings.~~

The majority of food insecure families reported ~~suffered from~~ both household- and hospital-based food insecurity. Clinicians need to be aware of this overlap and when identifying families with social needs, clinicians should ~~questions should~~ also inquire about immediate hospital-based food insecurity. When available resources (like e.g. meal vouchers) should be offered to families to alleviate hospital-based food insecurity. ~~y.~~

Limitations

~~Our study has several strengths. We included a large sample size of parents with diverse backgrounds and we collected data from a large Canadian pediatric children's hospital. In addition, we used validated instruments to measure food insecurity and parental distress.~~ Limitations of our study include non-response bias ~~and the inability to include families who could not speak English or did not have internet access~~. Families were informed about the study topic food insecurity before giving consent and families without food insecurity might have been less inclined to participate. However, our results may also have underestimated the incidence of food insecurity as we excluded ~~the is exclusion of~~ non-English speaking families and ~~or~~ families who did not have internet access ~~to internet latter limitation may in fact have biased our result in the direction of underestimating the incidence of food insecurity~~. Also, we did not collect any information on social work referrals, who might have been able to provide meal vouchers. In addition, the surveys were filled

in per household, and no details were collected about the individual caregiver who answered the survey. Finally, our results are reflective of food insecurity during the COVID-19 pandemic, about which there ~~and there~~ is no previous local data with which to compare rates of food insecurity. Due to the cross-sectional nature of our study, no causal relationship can be determined.

Conclusion

In conclusion, both household and hospital-based food insecurity were highly prevalent in caregivers with a child admitted to our academic pediatric hospital. Future research should further explore the relationship between food insecurity, family centered care and child health outcomes. Hospitals need to strongly consider reducing barriers for parents to obtain food for themselves during their child's admission, offering nutritious food at a low cost and ~~including reduced meal pricing, opportunities to provide food to caregivers without leaving their child's bedside, and~~ reducing other costs such as parking in order to reduce parental distress during their child's hospital stay~~admission~~.

Data-Sharing Statement

All data presented in this manuscript are available to other investigators on request from the corresponding author.

Table 1: Hospital-based food insecurity questions

1.	I/we could not afford to eat balanced meals during my child's hospital admission
2.	Did you or other adults in your household ever cut the size of your meals or skip meals during the hospital admission, because there wasn't enough money for food?
3.	During the hospital admission, were you ever hungry but didn't eat because there wasn't enough money for food?

Table 2: Household and hospital-based food insecurity reported by caregivers

Household Food Insecurity			**Hospital-based Food Insecurity**	
	Adult Food Status 10-item n = 386	**Child Food Status 8-item** n = 386		**Caregiver Food Status 3-item** n = 386
Household Food Secure	254 (65.8%)	310 (80.3%)	**Hospital-based Food Secure**	239 (61.9%)
Household Food Insecure	132 (34.2%)	76 (19.7%)	**Hospital-based Food Insecure**	147 (38.1%)
Marginal Food Insecurity *(1 positive response)*	51 (13.2%)	38 (9.8%)	Marginal Food Insecurity *(1 positive response)*	67 (17.4%)
Moderate Food Insecurity *(2-5 positive responses)*[1]	57 (14.8%)	34 (8.8%)	Moderate Food Insecurity *(2 positive responses)*	36 (9.3%)
Severe Food Insecurity *(6 or more positive responses)*[1]	24 (6.2%)	4 (1.0%)	Severe Food Insecurity *(3 positive responses)*	44 (11.4%)

[1]For child food status: moderate food insecurity 2-4 positive responses; severe food insecurity; more than 5 positive responses. Based on scoring method PROOF.

Commented [MVDH10]: Reference

Table 4: The association between household and hospital-based food insecurity and parental distress using linear regression

n=386	Parental distress score (0-10)			
	Unadjusted		Adjusted*	
	Beta (95%CI)	p-value	Beta (95%CI)	p-value
Adult household food insecurity score (0-10)	0.19 (0.07; 0.32)	**0.002**	0.21 (0.07; 0.36)	**0.004**
Child household food insecurity score (0-8)	0.33 (0.09; 0.58)	**0.01**	0.38 (0.10; 0.66)	**0.01**
Hospital-based food insecurity score (0-3)	0.57 (0.33; 0.81)	**<0.001**	0.56 (0.30; 0.83)	**<0.001**

*Adjusted for parent's own health, employment status, household income, single parent household, number of children, month of admission, child age, child's chronic condition and duration of admission.

References

1. Tarasuk V, Mitchell A. (2020) Household food insecurity in Canada, 2017-18. Toronto: Research to identify policy options to reduce food insecurity (PROOF). Available: https://proof.utoronto.ca/ (accessed 2020 Nov.19).

2. Alaimo K, Olson CM, Frongillo EA, Jr. Food insufficiency and American school-aged children's cognitive, academic, and psychosocial development. *Pediatrics* 2001;108(1):44-53.

3. Shankar P, Chung R, Frank DA. Association of food Insecurity with children's behavioral, emotional, and academic outcomes: a systematic review. *J Dev Behav Pediatr* 2017;38(2):135-50.

4. Jyoti DF, Frongillo EA, Jones SJ. Food insecurity affects school children's academic performance, weight gain, and social skills. *J Nutr* 2005; 135(12):2831-9.

5. Franklin B, Jones A, Love D, et al. Exploring mediators of food insecurity and obesity: a review of recent literature. *J Community Health* 2012;37(1):253-64.

6. Kaur J, Lamb MM, Ogden CL. The association between food insecurity and obesity in children-The National Health and Nutrition Examination Survey. *J Acad Nutr Diet* 2015;115(5):751-8.

7. Cook JT, Frank DA, Berkowitz C, et al. Food insecurity is associated with adverse health outcomes among human infants and toddlers. *J Nutr*. 2004;134(6):1432-8.

8. Melchior M, Chastang JF, Falissard B, et al. Food insecurity and children's mental health: a prospective birth cohort study. *PLoS One* 2012;7(12):e52615.

9. Council on Community Pediatrics. Promoting food security for all children. *Pediatrics* 2015;136(5):e1431-8.

10. Who 's Hungry- beyond COVID-19: Building a future without poverty. Available: https://www.dailybread.ca/wp-content/uploads/2020/11/Whos-Hungry-Report-2020.pdf (accessed 2020 Nov.19).

11. Statistics Canada. Canadians experiencing food insecurity during the COVID-19 pandemic. Available : https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2020042-eng.html (accessed 2020 Nov.19).

12. Fuller AE, Brown NM, Grado L, et al. Material hardships and health care utilization among low-income children with special health care needs. *Acad Pediatr* 2019;19(7):733-9.

13. Lindley LC, Mark BA. Children with special health care needs: Impact of health care expenditures on family financial burden. *J Child Fam Stud* 2010;19(1):79-89.

14. Lee, A; Lopez M, Clegg, K et al. Inpatient food insecurity in the caregivers of hospitalized pediatric patients. Abstract. Pediatric Academic Societies Meeting, Baltimore, 2019.

15. Makelarski JA, Thorngren D, Lindau ST. Feed first, ask questions later: alleviating and understanding caregiver food insecurity in an urban children's gospital. *Am J Public Health* 2015;105(8):e98-e104.

16. Bickel G, Nord M, Price C et al. Guide to measure household food insecurity. Revised March, 2000. Available: https://fnsprod.azureedge.net/sites/default/files/FSGuide.pdf (accessed 2020 Nov.19).

17. Haverman L, van Oers HA, Limperg PF et al. Development and validation of the distress thermometer for parents of a chronically ill child. *J Pediatr* 2013;163(4):1140-6 e2.

18. van Oers HA, Schepers SA, Grootenhuis MA, et al. Dutch normative data and psychometric properties for the Distress Thermometer for Parents. *Qual Life Res* 2017;26(1):177-82.

19. Schepers SA, Sint Nicolaas SM, Maurice-Stam H, et al. Parental distress 6 months after a pediatric cancer diagnosis in relation to family psychosocial risk at diagnosis. *Cancer* 2018;124(2):381-90.

20. Diederen K, Haverman L, Grootenhuis MA, et al. Parental distress and quality of life in pediatric inflammatory bowel disease: Implications for the outpatient clinic. *J Pediatr Gastroenterol Nutr* 2018;66(4):630-6.

21. Brcic V, Eberdt C, Kaczorowski J. Development of a tool to identify poverty in a family practice setting: A pilot study. *Int J Family Med* 2011;2011:1–7.

22. Jones J, Nowacki AS, Greene A, et al. Investigating parent needs, participation, and psychological distress in the children's hospital. *Hosp Pediatr* 2017;7(7):385–94.

23. Van Buuren S, Groothuis-Oudshoorn K. mice : Multivariate imputation by chained equations in R. *J Stat Softw* 2011;45(3):1–67.

24. R Core Team. R: a language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing; 2018.

25. Callery P. Paying to participate: Financial, social and personal costs to parents of involvement in their children's care in hospital. *J Adv Nurs* 1997;25(4):746-752.

CMAJ REVIEWER FEEDBACK
EDITORS' COMMENTS

OVERALL

1. How were families asked about participation? Were the families told that it was related to food insecurity? If so, those without the issue may have been less likely to participate.

All families with a child admitted to the general paediatric inpatient unit at the hospital were given a flyer about the study upon admission. Then after 24-48 hours our research assistant (NZ) called the families to ask them from consent (see Appendix Verbal recruitment script). The families were informed that this study was conducted to investigate food insecurity experienced by caregivers.

We have made this explicit in the Procedure section (page 3, line 33) and also addressed this in the Limitation section page 7, line 41).

2. We think your study is best described as a cross-sectional survey, and suggest to review the CHERRIES checklist as well as the SRQR checklist (for the qualitative component).

We have added both checklists as Appendices.

3. Please review the CMAJ Open author guidelines for paper formatting.

We have reviewed the CMAJ Open author guidelines for paper formatting and edited our paper.

INTRODUCTION

4. You discuss hospital-based food insecurity, but is there an actual definition?

Both terms inpatient food insecurity and hospital-based food insecurity have been used in the literature. These terms have been defined as the caregiver's ability to obtain adequate food during hospitalization (reference 12, 13). We have made this definition more explicit in our introduction (page 3, line 11).

METHODS

5. More details are needed about recruitment. Who in the family was targeted to be approached? Was there a minimum hospitalization length of stay? Was consent given only by the adult?

The parent who accompanied the child during admission was given the recruitment letter. The research assistant contacted families by phone after 24- 48 hours. Consent was only given by the adult, since the main objective of our study was to explore caregiver food insecurity. There was no minimum hospitalization length of stay needed to be included in our study.
We have made the recruitment process more clear; page 3 line 40,

6. A copy of the survey is needed in an appendix.

We have added a copy of the survey in the Appendix.

7. "Household food insecurity was measured with the 18-item U.S. Household Food Security Survey Module (HFSSM)." Why is this survey chosen? How do the questions differ from CCHS? CCHS is used for SES components. "We added three adapted questions…" What are the three additional questions from and how were they adapted?

The HFSSM survey has been included in the CCHS to measure food insecurity; in other words the CCHS has included the HFSSM survey to monitor food insecurity. It is an accepted tool and has been used internationally to describe food insecurity.
There is currently no validated screening tool available to measure hospital-based food insecurity. Therefore, we adapted three questions from the HFSSM survey to identify hospital-based food insecurity. For example if the HFSSM question was "I/we could not afford balanced meals in the last 12 months" we adapted the question to " I/ we could not afford balanced meals during my child's hospital admission".
These details were added to the Method section, page 4, line 2.

8. "Caregivers were classified as either hospital-based food secure (no items affirmed) or marginally (1 positive response), moderately (2 positive responses) or severely food insecure (3 positive responses)." What is the justification for this classification?

The scoring system was based on the household food security classification used by the Canadian Community Health Survey and used in all national reports of PROOF (Food Insecurity Policy Research). See the report "Household Food Insecurity in Canada" 2017-2019; scoring system is explained in Table 2 and we referenced PROOF (reference 1).

9. Parental distress: how was the tool used chosen? Is it a validated tool?

The Distress Thermometer for Parents (DT-P) was chosen because it is well validated questionnaire used in diverse populations of parents with chronically ill children (Haverman et al J Peds 2013, reference 16). The DT-P is strongly related to the Hospital Anxiety and Depression scale ($0.55 \leq r \leq 0.61$) and moderately-to-strongly related to the Parenting Stress Index ($0.38 \leq r \leq 0.43$). We have added this information to the method section (page 4, line 17)

10. Detailed information about the qualitative analysis is needed and additional study tool (such as an interview guide).

There was only one open question in the survey – so no additional study method such as an interview guide was used. A thematic approach was used for the analysis of this one open question. The answers to the open questions were independently reviewed by two of the authors (MH, NZ). Common themes related to hospital-based food insecurity were identified. Themes were independently categorized and reviewed with all other authors.

We have made this more clear in our method, analysis section (page 5, line 17).

RESULTS

11. A table of study participants is needed to tell us "who" provided responses to the survey.

We did not collect any specific information about the person who provided responses to the surveys. One survey per household was distributed - no details were collected about the individual caregiver who answered the survey.
We have acknowledged this limitation in our limitation section (page 7, line 47).

12. N-values are needed throughout.
We have updated Table 3 and provided n values for each variable.

13. It is not clear how you arrived at the themes based on the methods. Any quotes used require a unique identifier to link them to participants. All quotes should be moved to tables.

Please see also our answer to nr 10. We have removed all quotes from the text and added them in the table. Unique identifiers were added. We have updated our method section for the qualitative analysis of the one open ended survey item.

INTERPRETATION

14. The first sentence is a statement of precedence. CMAJ Open does not allow statements of precedence, even if true.

We have revised the first sentence.

STATISTICIAN'S COMMENTS

15. Please clarify who answered the questionnaires and when.

Please see also our answer to question 1 and 11 – we have updated the "Procedure" section to make this more clear.

16. If possible, compare respondents to non-respondents who consented.

Unfortunately, we were not allowed by REB to collect data from non-respondents.

17. All the covariate effects are hidden

We have added all covariates effects in an Appendix.

18. What does this paper have to say about this issue specifically in parents of a child who was hospitalized? That seems to be missing, except for the fact that this is how the study sample was defined.

Hospital-based food insecurity has previously been described the literature, however mainly in the United States (references 12, 13). Our study is, to the best of our knowledge, the first study that has explored this topic in caregivers in the Canadian setting.

METHODS

19. The three questions in Table 1, as worded, does not seem to distinguish food insecurity that was present prior to the admission from food insecurity that was a result of the admission, or of the chronic illness that a child may be experiencing.

The three questions in Table 1 are designed to inquire about food insecurity experienced by caregivers during their child's hospital admission; in other words the caregiver's inability to obtain adequate food during their child's hospitalization (defined as hospital-based food insecurity). The household food insecurity questions (HFSSM survey) asked about the situation at home in the last 12 months, prior to hospital admission. See also attached the survey.

20. Multi-collinearity is not something to test for. It is certain to be present (except in experimental studies with certain types of designs). It is quantified or assessed.

We have adapted our wording "Variance inflation factors were used to assess multi-collinearity" (page5, line 10).

21. Having 15% missing data for each covariate can mean that a much larger number of observations are omitted from the multiple regression. What percentage of participants had no missing data for all the predictor variables in the model? The results say that 386 completed both surveys – is that complete in the sense of "filled in completely" or in the sense of "gave answers to at least some questions?"

430 families filled in only parts of the survey and for 44 (10%) the HFSSM was not fully completed and food insecurity status could not be assessed. We have tried to make this more clear in the Study Population section (page 5, line 31). Also, we have added the n-values for all the predictor variables in Table 3. The n-value for the multiple regression is also presented in Table 4.

22. It is good to see multiple imputation used here. Be clear that n=15 means that 15 imputed datasets were generated. Also, state how the estimates were combined across the 15 datasets. Using the mice package, that would be through the use of Rubin's rules, I believe.

We agree with the reviewer and have updated our analysis section: Multiple imputation with 15 imputed datasets was performed using the mice package in R to overcome bias that may result from missing data. The estimates were combined across the 15 datasets using Rubin's rules. (page 5, line 11).

23. Table 4 makes it clear, but it should probably be stated outright in the methods that parental stress was the outcome in the regression models.

We have added "exposure" to Food Insecurity and "outcome" to Parental Distress in our method section to make this more clear (page 4).

24. The duration of the admission was asked and used as a covariate. Does this mean that the questionnaire was filled out only after the child was discharged?
No, the research assistant obtained this data from the medical record when the child was discharged. We have added this clarification in the method section; page 4, line 36.

25. From the results (i.e., employment question), it looks like there was one survey per family. The methods mention that parents were asked questions. Did just one parent per child fill out the survey? Can you report which parent? As distress is reported for the parent, not the family, please report what you know about the parents who responded.

Please see our answer to question 11

26. Even though it is only a small part of this study, the qualitative analysis is insufficiently described – there are guidelines on reporting that could be consulted to determine additional details that should be added.

We have added the SRQR checklist as an Appendix and updated our method section.

RESULTS
27. How is 775/13400 91%? The relevant number for the response rate is the 386 respondents out of the 1340 eligible (29%). CMAJ Open considers survey's with response rates above 50%.

We have clarified this response rate and changed our Figure. From April to October, 1340 children were admitted to our general pediatric ward. We could reach 851 caregivers by phone to ask for consent to participate. From the caregivers we could reach 775 (91%) gave consent and 430 (51%) completed at least parts of the survey.

INTERPRETATION
28. It is understandable that parents whose children have chronic health conditions may need to work less or incur additional financial burdens related to the child's illness. But not every child that is hospitalized has a chronic condition. Two examples are the family of a child with a short illness, or the family of a child first diagnosed with a chronic illness. These families would be eligible for this study, but would likely not be susceptible (yet)specifically to hospital-based food insecurity. They could experience generic food insecurity. This issue should be added to the discussion (or explored with the available data).

Please see our answer to question 29.

29. As all the participants in the study had a hospitalized child, it is not clear from the results how much hospitalization has to do with the food insecurity- distress relationship. The adjusted and unadjusted estimates in table 4 are very similar, suggesting there was little confounding. Was there any effect modification? Is the relationship of food insecurity and distress different according to the child's duration of admission or the child's chronic condition?

We tested for interactions between food insecurity and parental distress and the child's duration of admission or chronic condition. The interaction term was significant for household food insecurity and the child's chronic condition. A stratified analysis showed that children without a chronic condition the association between adult food insecurity and parental distress was stronger compared to children with a chronic condition (B= 0.42 95% [0.09;0.76] p = 0.01 versus B = 0.11 [-0.06; 0.27] p = 0.20; adjusted for all covariates). Other interactions were non-significant (data available upon request). In the discussion we described explanations for this finding; parents of children with a chronic condition might have access to social work and other funding opportunities. Alternatively, parents of children with chronic conditions experience already higher levels of parental stress and/ or have been used to being food insecure.

We have added this information in the method section (page 5, line 13) and result section page 6, line 2) and updated the interpretation (page 7, line 12).

30. Response bias is mentioned - is there any way to compare any of the characteristics of those who did and did not respond to the survey amongst those that consented to be sent a link? The consequences of the response bias could be explored – as the response rate is so low.

Unfortunately, we were not allowed by REB to collect data from non-respondents. We have described the response bias in the limitation section in more detail.

TABLES

31. In Table 2, I suggest also including the scores (out of 10, or out of 8) that define the categories marginal, moderate, and severe. That will save the reader from having to go back to the methods to see these definitions.

We have included the scores in Table 2.

32. Table 3: for binary items (yes/no), it is customary to include only one level in a table as the other level can be inferred.

We have updated Table 3.

33. Did the participation drop off as the study progressed? There are 2-3 times more admissions in the first three months as compared to October.

We finished our study on the 20th of October. We have provided this detail in Table 3. The participation was quite consistent throughout the months of July, August and September.

PEER REVIEW COMMENTS

Reviewer: 1
Dr. Emilie Beaulieu, University of British Columbia
Hospital-based food insecurity is a very intriguing and rarely explored topic! This is a great opportunity to provide evidence and inform practical changes in pediatric hospitals. The objectives of this study are well stated. However, I feel like there were some missed opportunities in terms of analysis that could have provided additional evidence and stronger conclusions. I also wish the discussion section could be developed to discuss practical implications to the findings, including how the researchers expect to improve hospital-based food insecurity (involve social workers with families from low socioeconomic status to provide economic support like food coupons, prepaid parking coupons, etc.?)

We thank the reviewer for the interest in our topic and acknowledging the novelty of exploring hospital-based food insecurity. We also would like to thank her for the thoughtful feedback to our manuscript.

Here are some of my suggestions to improve the manuscript.

Introduction:
2) p.3 Line 18-21: Can you provide a few examples of hospital-based food insecurity to provide a better idea to the reader of what is meant by this quite new concept. Also, you may want to change the word 'adequate food' for healthy, it might help to understand what hospital-based food insecurity is. Also, Makelarski et al described caregiver hospital-based food insecurity as ' defined as not getting enough to eat during a child's hospitalization which seemed easier to understand from my point of view…

Thank you have also have added the wording "not getting enough to eat" used by used by Makelarski et al to clarify the concept of hospital-based food insecurity (page 3, Line 12).

Methods
3) p.3 Line 48-50: Can you provide the province and country of the hospital?

We have added province and country in the study population section (page 3, Line 34).

4) p.3 Line 50: Was there a minimal hospitalization length of stay to contact families? Would a patient hospitalized for one night only be less likely to have been recruited? Parental distress

and the financial burden of an overnight stay vs two weeks long hospitalization may lead to very different results. I know you used this variable as a potential confounder, but in table 3, you present the duration of admission with a mean and SD as if this variable follows a normal distribution, but I would think that there are more 1-2 nights hospitalization than more than 2 night? Would it be worth presenting the median, 25th, and 75th percentile? Or min and max? did you delete some outliers? Etc. Would there be a difference in your model if you used it as a categorical variable?

The mean admission duration was very similar among food secure and food non-secure families. See details below. We did not exclude outliers from our analysis.

		Complete Study population N=430	**Food Insecure** n=143	**Food Secure** n=243
Duration of admission in days	Mean (SD)	5.4 (5.7)	5.5 (5.6)	5.4 (6.0)
	Min, Max	0, 40	0, 39	0, 40
	25th percentile	2	2	2
	75th percentile	6	7	6

We have updated Table 3 with these details.
We also added testing for interaction between food insecurity and parental distress and the child's duration of admission. Please see our answer to editor nr 29.

5) p.3 Line 56: I think the second 'by' should be deleted.

We removed the second "by".

6) P.4 line 7: Regarding the HFSSM, I understand that there are child and adult-specific questions. However, I was a bit confused by Table 2. If the parent answer 1 affirmative answer that is a child item and 1 positive answer for the adult items then they would be considered household food insecure but would they be considered as 'marginal' (e.g.1 each) or 'moderate' (e.g. because they have 2 items in total)? I reviewed quickly ref 16 that was provided for this questionnaire but did not see that they would divide the results like that. On p.34 of this reference, my understanding is that if it is a household with children (which is always the case for this study) you would report the results on 18? Table 2 doesn't provide the overall answers (on 18) and the way I understand it, I cannot sum the adult item column and child item columns…If it is ok to present results on 10 for adults and 8 for children-related items, could you consider modifying the way you describe this variable on p.4 because I was expecting a result out of 18 points. Also, I think it is interesting to see in Table 2 that overall there is a bigger proportion of caregiver-related food insecurity than child-related insecurity, but I wonder what is the added value of presenting the adult and child separate values in a table. There are no child-specific items for the hospital-based food items, so I feel like it looks a bit weird to have all these NA in the table…I would strongly suggest redesigning the way you present this data.

Our food security classification was based on the scoring system of the Canadian Community Health Survey and used in all national reports of PROOF (Food Insecurity Policy Research, reference). See the report "Household Food Insecurity in Canada" 2017-2019; reference 1. We have changed Table 2 in order to make the scoring of the HFSSM more clear.
We have also added the scoring as a footnote to this Table.
According to this scoring method; If a parent has 1 affirmative item on parent questions and 1 affirmative item on the child questions they would considered to be "marginal" food insecure in both the Adult and Child category.

7) p.4 line 14: Would it be possible to add a reference to justify your choice of the three questions for the hospital-based food insecurity items? Were there similar questions to what was used by ref 14 and 15 mentioned in the introduction?

There is currently no validated screening tool available to measure hospital-based food insecurity. Therefore, we adapted three questions from the HFSSM survey to identify hospital-based food insecurity. For example if the HFSSM question was "I/we could not afford balanced meals in the last 12 months" we adapted the question to " I/ we could not afford balanced meals during my child's hospital admission". The specific three questions were chosen to give an impression about the severity of the hospital-based food insecurity. Previous research by Lee et al also adapted the HFSSM to inquire about hospital-based food insecurity. We have updated our method section with these details page 4, line 7.

Analysis
8) p.5 line 12: Did you consider using statistical analysis to compare secure and insecure household related answers?

We have provided the specific covariate effects between the food secure and insecure households in an Appendix.

9) p. 5 line 15: Can you specify how the parental distress variable is used (continuous)
It is written in your table results but would be helpful to write it in the analysis section. Because you wrote in the parental distress paragraph' Studies have identified a cut-off score of 4 to 5 to detect significant parental distress.', as was wondering if you would decide to use the parental distress as a categorical variable.

Parental distress was used as a continuous score because we have used it in parents of hospitalized children; in this population the parental distress score is generally high. Also, we have no previous data in our population about parental distress to decide on "cut-off" points. We have clarified in our method section that parental distress was used a continuous score; page 5 Line 28.

10) Also, it is interesting to know if there is a relationship between the 'level' of food insecurity (on score form 0-10 or 0-8) and parental distress (using a linear regression model). But I would

have liked to know if there was a statistically significant difference in parental distress between secure and insecure household and hospital-based…you compare the result 'descriptively', but why not use a logistic regression to compare and adjust for confounders?

We thank the reviewer for this suggestion. However, as described above – parental stress in hospitalized children is generally high. We did not think it was appropriate to use it as a dichotomous outcome variable ("stress" vs "no-stress") in our population and we were more interested to see if the level of stress would increase if families reported food insecurity.

11) p.5 line 17: Can you specify if the model was adjusted for all potential confounders.

We have made it more clear that the model was adjusted for all potential confounders (page 5, line 9).

Results

12) p.6 line 36-37: The way the numbers and percentages are presented here is confusing. 775 is not 91% of 1340. Please refer to your abstract where it is presented appropriately.

We have changed Figure 1 and the way the numbers and percentage are presented.
1340 children were admitted to our general pediatric ward; 132 (9.9%) children were readmitted and not approached for our study. We were able to reach 851 caregivers by telephone and they were asked to participate in our study. 775 (91%) caregivers gave consent to participate and 430 (51%) completed at least one survey.

13) p.7 line 40-42: I was not convinced that a parental distress score of 7.3 vs 6.2 was significantly different…also, the clinical difference of these results should be discussed in the discussion section…

We agree with the reviewer; we did not compare the parental distress score between the different food insecurity groups statistically and we have removed this statement from this section.

14) p.8 qualitative results section
I really enjoyed reading the quotes. Very rich data. I am not sure however that putting these quotes in a table 5 is helpful…

Thank you for this feedback. As per editor suggestion; all quotes were placed in the Table.

15) p.9 line 8: delete the 'in' before important

We have edited this sentence.

Interpretation

16) First paragraph: There was one reference from the US (ref 14) discussed in the introduction that studied hospital-based and household food insecurity and found very similar results to this study. This was not mentioned in the discussion?

We thank the reviewer for this suggestion and we have added the comparison to the data from this study in the United States to our Interpretation section (page 6, line 43).

17) Third paragraph: It is not clear to me that parental distress was clinically higher among the food insecure group, compared to secure group based on the data presented. Parental distress increases as food insecurity increases, and I think this should be discussed more.

We agree with the reviewer (similar as discussed above) and we have removed this statement from the third paragraph and made the continuous association more clear (page 7, line 11).

18) I am used to thinking of food insecurity as 'yes-no' and not as a continuous variable. What is the clinical implication of using this variable as continuous? Would it allow you to prioritize families with higher food insecurity scores in terms of economic support while hospitalized, etc.? Also, my understanding of the data is that some families report hospital-based food insecurity but not household food insecurity? Can you highlight and discuss this? Would identifying and supporting at least all the families with household food insecurity allow preventing most of the hospital-based food insecurity and associated parental distress?

We thank the reviewer for these important ideas and encouraging us to include clinical implications in this manuscript. In the future we plan to use the data from this study to inform interventions to address food insecurity in the hospital setting. We have highlighted the fact that most families suffered from both household- and hospital-based food insecurity. Clinicians and hospital administrators should be aware of this overlap and when identifying families with social needs. Clinicians should also inquire about immediate hospital-based food insecurity and when available resources (like meal vouchers) should be given to families to alleviate hospital-based food insecurity. However, not all families who suffered from hospital-based food insecurity also suffered from household food insecurity as pointed out. This may be explained by the high food costs in hospital. Hospital management should make it a priority to offer nutritious food at no or low cost to caregivers to alleviate hospital-based food insecurity. We have added this information to the Interpretation Section Page 7, line 34 and in our Conclusion section page 8 , line 8.

19) Perhaps I missed it, but it would be interesting to discuss what is normally done in your hospital to help parents with financial difficulties during hospitalizations. Is a social worker included when it is a prolonged hospitalization and parents with low socioeconomic status for example? If so, do you identify any risk of bias? If not, would it be an avenue to apply to your results?

In our hospital, there is no standardized screening for food insecurity and/or financial difficulties. If families are identified with social needs a social worker may be consulted, who might be able to provide meal vouchers. This does not depend on the duration of hospital admission. We did not collect any data about referral to social work during our research study. We have added this to our limitation section, page 7, line 45.

Reference
19) p. Ref 16: the link did not work for me

Thank you for notifying, we have updated the link.

Reviewer: 2
Dr. hasanain Ghazi, Management and science University

1. the 3 added questions on hospital based secuirty adopted from where? put reference and also any validation done ?

See the answer to question 7, reviewer 1.

2. what is the sampling Methods user?

We have updated our Figure of the population sample.

3. any inclusion and exclusion criteria?

All families with a child admitted to the general pediatric ward were approached. Participating families had to be able to understand English and have internet access to participate.

4. How the child food status measured ?

With the HFSSM survey as stated in our Method section.

5. why month of admission wan included? any importance

We also included the month of admission because during COVID-19 our hospital had implemented different rules and from April through June, only one caregiver was allowed to stay with their child during the admission which could have led to difference in food access. We have added this to the Method section, Page 4, line43.

Table 3: Sociodemographic characteristics by food security status.

		Mean (SD) or N (%)		
	N[1]	**Study population**	**Food Insecure[2]**	**Food Secure[2]**
		n = 430	n=143	n=243
Child age in month	428 (0.5)	78.2 (71.3)	83.7 (73.8)	75.0 (70.0)
Child with a chronic health condition	429 (0.2)	257 (59.9)	91 (63.6)	138 (57.0)
Single parent household	430 (0.0)	62 (14.4)	36 (25.2)	18 (7.4)
Maternal ethnicity	430 (0.0)			
- European		147 (34.2)	33 (23.1)	104 (42.8)
- East Asian		43 (10.)	6 (4.2)	34 (14.0)
- South and Southeast Asian		94 (21.9)	36 (25.2)	46 (18.9)
- Black		32 (7.4)	18 (12.6)	8 (3.3)
- Arabic		32 (7.4)	12 (8.4)	15 (6.2)
- Latin American		21 (4.9)	11 (7.7)	10 (4.1)
- Indigenous		10 (2.3)	4 (2.8)	6 (2.5)
- Other		51 (11.9)	23 (16.1)	20 (8.2)
Employment	430 (0.0)			
- Both parents full time employed		89 (20.7)	8 (5.6)	76 (31.3)
- One parent full time employed		212 (49.3)	0 (49.0)	124 (51.0)
- Both parents part-time employed		8 (1.9)	4 (2.8)	3 (1.2)
- Both parents not employed		31 (7.2)	23 (16.1)	6 (2.5)
- Other (eg. parental leave)		90 (20.9)	38 (26.6)	34 (14.0)
Number of children	421 (2.1)	2.2 (1.2)	2.5 (1.4)	2.0 (1.0)
Family income before tax	359 (16.5)			
- $0 to $39, 999		104 (29.0)	64 (49.2)	30 (15.2)
- $40, 000 to $79,999		86 (24.0)	39 (30.0)	38 (19.3)
- $80, 000 to $149,999		101 (28.1)	22 (16.9)	67 (34.0)
- $150, 000+		69 (18.9)	5 (3.8)	62 (31.5)
Trouble making ends meet	420 (2.3)	157 (37.4)	96 (68.6)	42 (17.5)
Trouble paying electricity/ heat/ telephone bill	423 (1.6)			
- Never true		270 (63.8)	47 (33.1)	201 (83.4)
- Sometimes true		127 (30.0)	77 (54.2)	36 (14.9)
- Often true		26 (6.1)	18 (12.7)	4 (1.7)
Housing	426 (0.9)			
- Owned		251 (58.9)	53 (37.6)	183 (75.3)
- Paying rent		170 (39.9)	87 (61.7)	57 (23.5)
- Other		5 (1.2)	1 (0.7)	3 (1.2)
Parent's own health	426 (0.9)			
- Fair/Poor		64 (15.0)	39 (27.3)	17 (7.1)
- Good/Very good/Excellent		362 (85.0)	104 (72.7)	224 (92.9)
Month of admission	429 (0.2)			

- April		50 (11.7)	19 (13.3)	30 (12.4)
- May		90 (21.0)	35 (24.5)	46 (19.0)
- June		75 (17.5)	30 (21.0)	38 (15.7)
- July		61 (14.2)	15 (10.5)	40 (16.5)
- August		63 (14.7)	18 (12.6)	36 (14.9)
- September		60 (14.0)	14 (9.8)	36 (14.9)
- October[3]		30 (7.0)	12 (8.4)	16 (6.6)
Duration of admission in days	425 (1.2)	5.4 (5.7)	5.5 (5.6)	5.4 (6.0)
- Min, Max		0, 40	0, 39	0, 40
- 25th percentile		2	2	2
- 75th percentile		6	7	6

[1] Missing % out of 430

[2] Caregivers were identified as household food secure if they did not have any affirmative items on both the adult and child questions of the HFSSM. 44 (10%) caregivers did not complete the HFSSM and food security status was not calculated.

[3] Study finished on the 20th of October.

Table 5: Caregivers' experiences obtaining food during their child's hospital admission.

	Themes			
1.	***Financial Burden***			
	Food is too expensive	The food in the hospital is too expensive. To eat even two meals a day will cost about $30. If you're here for a week that's over $200. It makes it hard.(SN 37)	I think I cut back on what I choose to eat while in hospital just because we don't eat out much and the price to eat out 3 meals a day gets expensive and I don't want to go broke eating out.(SN 155)	Food at the hospital is very expensive I 've only been here 2 weeks now and spent over $200 so far I can only imagine how much more money it would cost me without support it is possible to run quickly into financial issues.(SN 385)
	Caregivers sacrifice their own food	I didn't eat for the first day, second day only one sandwich and so expensive to buy.(SN 94)	We skip at least one meal or more to afford a long stay. (SN 274)	I am just eating eggs and chocolate bars as my food in the hospital.(SN 122)
	Financial stress	Hospital food options are expensive and unaffordable during long hospital stays. Between parking and food, it puts a financial strain when your child's medical expenses exceed your household income.(SN 133)	Over the years I definitely went without food during hospital admission because I otherwise wouldn't have had the money to get my car out of the parking lot when my son would be discharged.(SN 147)	My children have complex medical needs however because of my income I do not qualify for any financial support. I have 5 children, 3 with medical needs. I sometimes avoid taking them to hospital because financially I cannot afford it.(SN 28)
2.	***Emotional and Practical Barriers***			
	Difficulty leaving the child	At times it is very hard to get downstairs during the times it is open (my son has high needs and can't just stay with a volunteer). (SN 400)	I do not feel comfortable leaving my child without parent's eyes on him and the nurse so as a result I packed food as best I could for 4 days.(SN 30)	It has been a bit challenging because I have to call a nurse to stay with my child while I get something to eat, and do understand they are extremely busy.(SN 131)

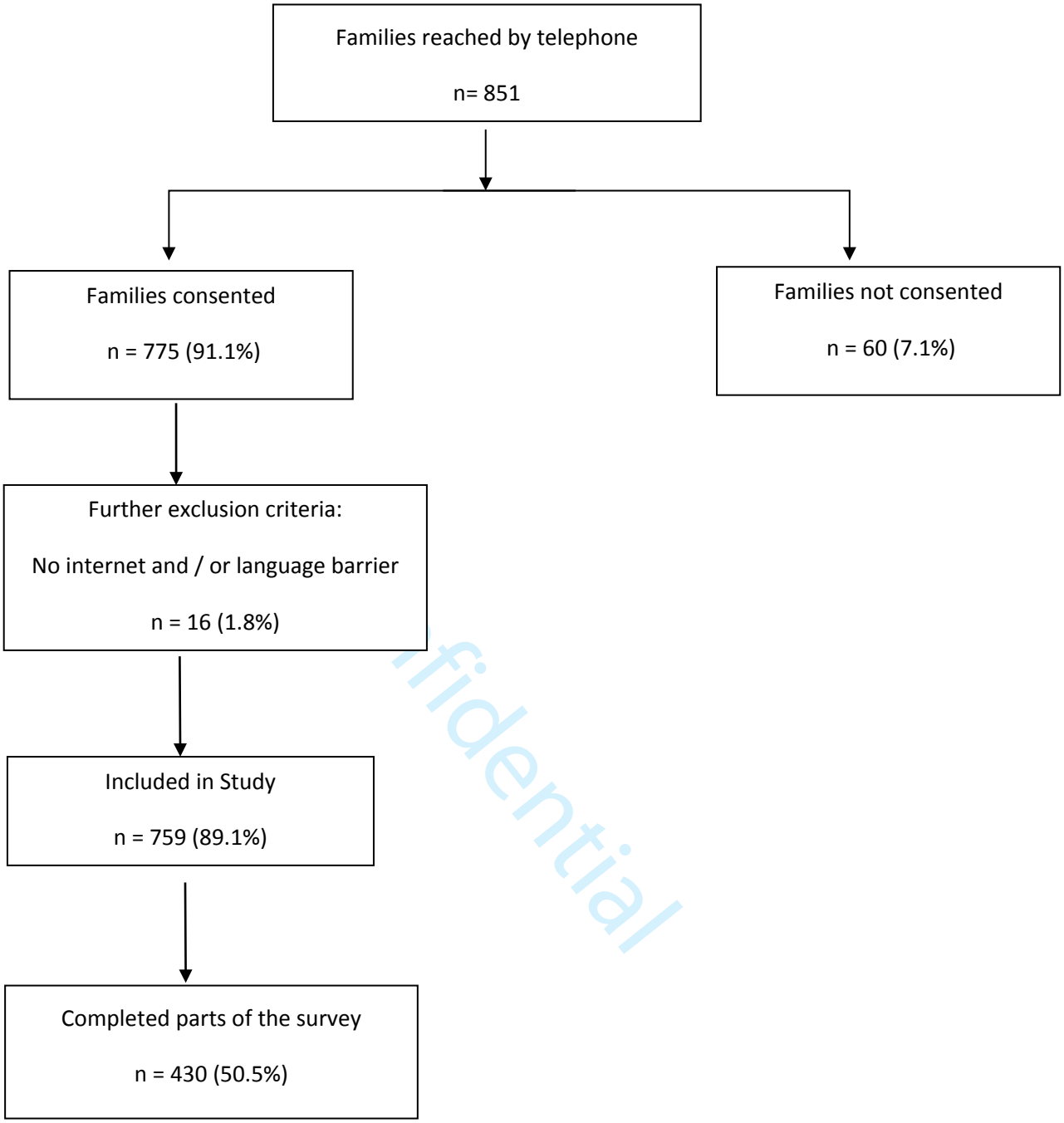
	COVID-19 restrictions	We had an odd situation due to COVID due to lack of available options, inability to leave the hospital and getting care four our daughter to go downstairs and get food. We both skipped meals as they were not as accessible. (SN 24)	Especially with COVID, security measures are high and parents can't freely walk around. A meal program would be great for all families and their physical and mental health.(SN 253)	I couldn't go and get a gift card to order food because we couldn't leave the room. No offers to help with that we're made. I went 2 days without eating.(SN 126)
	Lack of information	There is unclear information about having meals sent to the room for the parents, and there are no prices attached to the menus, so ordering from the meal train is impossible.(SN 380)	When my child was admitted there was no guidance given to help me get food for myself. (SN 126)	Only today was she told that an exception is made and as my daughter is under 6 months and can't actually eat the Food Train food, it was offered to my Mrs.. She had one meal all of today as she wasn't allowed to go out of the room.(SN 201)
3.	***Parents' stress***	The stress of having a child admitted in the hospital is enough on top of worrying about getting yourself meals throughout the day while trying to care for your child. Especially being one parent for the child, during a pandemic.(SN 53)	In high stress situations, such as having a child in a hospital, the last thing parents think about is feeding themselves. (SN 253)	It doesn't make sense not to offer or feed the parent that is staying in hospital with the child. If the parent isn't strong or has the energy how can they help their child recover or be of assistance to the doctors and nurses?(SN 347)
4.	***Advocacy for food for parents***	I hope this will help other families with regards to obtaining food from the hospital who have been staying there for a longer period of time. Never have I imagined in my life that I will get a food voucher from a stranger. I know how it is to be	It doesn't make sense not to offer or feed the parent that is staying in the hospital with the child. If the parent isn't strong or has energy – how can they help their child recover or be of assistance to doctors or nurses?~~Food should be~~	A meal program/discount for overnight/extended stay would be so beneficial for families and we are shocked that it is not already in place.(SN 253)

		in need, especially as essential as food. So, if you can help them with this - that will be awesome! (SN 782)	~~provided in the room with the child. Quality food for both child and parent~~ (SN 347)	

Table 5: Caregivers' experiences obtaining food during their child's hospital admission.

	Themes			
1.	***Financial Burden***			
	Food is too expensive	The food in the hospital is too expensive. To eat even two meals a day will cost about $30. If you're here for a week that's over $200. It makes it hard. (SN 37)	I think I cut back on what I choose to eat while in hospital just because we don't eat out much and the price to eat out 3 meals a day gets expensive and I don't want to go broke eating out. (SN 155)	Food at the hospital is very expensive I 've only been here 2 weeks now and spent over $200 so far I can only imagine how much more money it would cost me without support it is possible to run quickly into financial issues. (SN 385)
	Caregivers sacrifice their own food	I didn't eat for the first day, second day only one sandwich and so expensive to buy. (SN 94)	We skip at least one meal or more to afford a long stay. (SN 274)	I am just eating eggs and chocolate bars as my food in the hospital. (SN 122)
	Financial stress	Hospital food options are expensive and unaffordable during long hospital stays. Between parking and food, it puts a financial strain when your child's medical expenses exceed your household income. (SN 133)	Over the years I definitely went without food during hospital admission because I otherwise wouldn't have had the money to get my car out of the parking lot when my son would be discharged. (SN 147)	My children have complex medical needs however because of my income I do not qualify for any financial support. I have 5 children, 3 with medical needs. I sometimes avoid taking them to hospital because financially I cannot afford it. (SN 28)
2.	***Emotional and Practical Barriers***			
	Difficulty leaving the child	At times it is very hard to get downstairs during the times it is open (my son has high needs and can't just stay with a volunteer). (SN 400)	I do not feel comfortable leaving my child without parent's eyes on him and the nurse so as a result I packed food as best I could for 4 days. (SN 30)	It has been a bit challenging because I have to call a nurse to stay with my child while I get something to eat, and do understand they are extremely busy. (SN 131)
	COVID-19 restrictions	We had an odd situation due to COVID due to lack of available options, inability to leave the hospital and getting care four our	Especially with COVID, security measures are high and parents can't freely walk around. A meal program would be great for all	I couldn't go and get a gift card to order food because we couldn't leave the room. No offers to help

		daughter to go downstairs and get food. We both skipped meals as they were not as accessible. (SN 24)	families and their physical and mental health. (SN 253)	with that we're made. I went 2 days without eating. (SN 126)
	Lack of information	There is unclear information about having meals sent to the room for the parents, and there are no prices attached to the menus, so ordering from the meal train is impossible. (SN 380)	When my child was admitted there was no guidance given to help me get food for myself. (SN 126)	Only today was she told that an exception is made and as my daughter is under 6 months and can't actually eat the Food Train food, it was offered to my Mrs.. She had one meal all of today as she wasn't allowed to go out of the room. (SN 201)
3.	***Parents' stress***	The stress of having a child admitted in the hospital is enough on top of worrying about getting yourself meals throughout the day while trying to care for your child. Especially being one parent for the child, during a pandemic. (SN 53)	In high stress situations, such as having a child in a hospital, the last thing parents think about is feeding themselves. (SN 253)	It doesn't make sense not to offer or feed the parent that is staying in hospital with the child. If the parent isn't strong or has the energy how can they help their child recover or be of assistance to the doctors and nurses? (SN 347)
4.	***Advocacy for food for parents***	I hope this will help other families with regards to obtaining food from the hospital who have been staying there for a longer period of time. Never have I imagined in my life that I will get a food voucher from a stranger. I know how it is to be in need, especially as essential as food. So, if you can help them with this - that will be awesome! (SN 782)	It doesn't make sense not to offer or feed the parent that is staying in the hospital with the child. If the parent isn't strong or has energy – how can they help their child recover or be of assistance to doctors or nurses? (SN 347)	A meal program/discount for overnight/extended stay would be so beneficial for families and we are shocked that it is not already in place.(SN 253)



Food Insecurity Questionnaire

The following questions ask about the food eaten in your household and during the hospital admission and whether you were able to afford the food you need.

1. Which of these statements best describes the food eaten in your household in the last 12 months

◯ 1. Enough of the kinds of food we want to eat
◯ 2. Enough but not always the kinds of food we want
◯ 3. Sometimes not enough to eat
◯ 4. Often not enough to eat
◯ 5. Decline or refuse to answer

Below are several statements that people have made about their food situation. For these statements, please tell me whether the statement was often true, sometimes true, or never true for (you/your household) in the last 12 months.

2. I worried whether our food would run out before I/we got money to buy more in the last 12 months.

◯ 1. Often true
◯ 2. Sometimes true
◯ 3. Never true
◯ 4. Decline or refuse to answer

3. The food that I/we bought just didn't last, and I/we didn't have money to get more in the last 12 months.

◯ 1. Often true
◯ 2. Sometimes true
◯ 3. Never true
◯ 4. Decline or refuse to answer

4. I /we couldn't afford to eat balanced meals in the last 12 months.

◯ 1. Often true
◯ 2. Sometimes true
◯ 3. Never true
◯ 4. Decline or refuse to answer

5. In the last 12 months, did you (or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?

◯ Yes
◯ No
◯ Decline or refuse to answer

5a. How often did this happen?

◯ Almost every month
◯ Some months but not every month
◯ Only 1 or 2 months
◯ Decline or refuse to answer

6. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?

◯ Yes
◯ No
◯ Not sure

7. In the last 12 months, were you every hungry but didn't eat because there wasn't enough money for food?

◯ Yes
◯ No
◯ Decline or refuse to answer

8. In the last 12 months, did you lose weight because there wasn't enough money for food?

◯ Yes
◯ No
◯ Decline or refuse to answer

9. In the last 12 months, did you (or other adults in your household) ever not eat for a whole day because there wasn't enough money for food?

◯ Yes
◯ No
◯ Decline or refuse to answer

9a. How often did this happen?

◯ 1. Almost every month
◯ 2. Some months but not every month
◯ 3. Only 1 or 2 months
◯ 4. Decline or refuse to answer

The following questions are statements people have made about the food situation of their children. For these statements please tell us whether the statement was OFTEN true, SOMETIMES true or NEVER true in the last 12 months for all children living in your household.

10. I relied on only a few kinds of low-cost food to feed my child (children) because I was /we were running out of money to buy food.

◯ Often true
◯ Sometimes true
◯ Never true
◯ Decline or refuse to answer

11. I couldn't feed my child(ren) a balanced meal, because I couldn't afford that.

◯ 1. Often true
◯ 2. Sometimes true
◯ 3. Never true
◯ 4. Decline or refuse to answer

12. Your child / children were not eating enough because you just couldn't afford enough food.

◯ 1. Often true
◯ 2. Sometimes true
◯ 3. Never true
◯ 4. Decline or refuse to answer

13. In the last 12 months, did you ever cut the size of (your child's / any of the children's) meals because there wasn't enough money for food?

◯ Yes
◯ No
◯ Decline or refuse to answer

14. In the last 12 months, did your child/any of your children ever skip meals because there wasn't enough money for food?

◯ Yes
◯ No
◯ Decline or refuse to answer

14a. How often did this happen?

◯ Almost every month
◯ Some months but not every month
◯ Only 1 or 2 months
◯ Decline or refuse to answer

15. In the last 12 months, was your child / were your children ever hungry but you just couldn't afford more food?

◯ Yes
◯ No
◯ Decline or refuse to answer

16. In the last 12 months, did your child / any of your children ever not eat for a whole day because there wasn't enough money for food?

◯ Yes
◯ No
◯ Decline or refuse to answer

The following questions are statements people made about their food situation while their child was admitted in the hospital. For these statements please tell us whether the statement was OFTEN true, SOMETIMES true or NEVER true.

17. I/we could not afford to eat balanced meals during my child's hospital admission.

◯ 1. Often true
◯ 2. Sometimes true
◯ 3. Never true
◯ 4. Decline or refuse to answer

18. Did you or other adults in your household ever cut the size of your meals or skip meals during the hospital admission, because there wasn't enough money for food?

◯ Yes
◯ No
◯ Decline or refuse to answer

18a. How often did this happen?

◯ 1. Almost every day during the admission
◯ 2. Some days but not every day
◯ 3. Decline or refuse to answer

19. During the hospital admission, were you ever hungry but didn't eat because there wasn't enough money for food?

◯ Yes
◯ No
◯ Decline or refuse to answer

Do you have any other feedback regarding your food situation during your child's hospital admission?

_____

Household Resource Questionnaire

Social factors can have a big impact on children's health and development. During the COVID19 pandemic many families may experience financial stress. The following questions ask about your food, housing and financial situation and parental distress regarding practical problems. You are free not to answer or skip questions.

Social factors can have a big impact on children's health and development. The following questions ask about access to food, secure housing and other social factors.

1. In the last 12 months, did you or your household run out of money to pay for the following:

a. Food

◯ Yes
◯ No

b. Housing

◯ Yes
◯ No

c. Utilities

◯ Yes
◯ No

2. Taking everything about COVID-19 into account, what would you say have been the consequences of the novel coronavirus (COVID-19) on you and your household?

◯ Very negative
◯ Negative
◯ No effect
◯ Positive
◯ Very positive

3. How would you describe your household? (choose ONE)

◯ Mother, father, child(ren)
◯ Same sex couple with child(ren)
◯ Single parent family (mother head)
◯ Single parent family (father head)
◯ Grandparent(s) with grandchild(ren)
◯ Extended family with child(ren)

4. How many children do you have?

_____

5. (a) What were the ethnic or cultural origins of your child's ancestors? (Mother's family)
An ancestor is usually more distant than a grandparent. You can provide more than one answer.

- ☐ Eastern European (e.g., Polish, Russian, Croatian)
- ☐ Western European (e.g., English, French, Portuguese)
- ☐ East Asian (e.g., Chinese, Korean, Japanese)
- ☐ South Asian (e.g., East Indian, Pakistani, Sri Lankan)
- ☐ Southeast Asian (e.g., Vietnamese, Malaysian, Filipino)
- ☐ Middle Eastern (e.g., Iranian, Afghan, Palestinian)
- ☐ East African (e.g., Ethiopian, Kenyan, Somali)
- ☐ Middle African (e.g., Cameroonian, Chadian, Congolese)
- ☐ Northern African (e.g., Moroccan, Algerian, Egyptian, Sudanese)
- ☐ Southern African (e.g., Botswana, South African)
- ☐ Western African (e.g., Ghanaian, Nigerian, Guinean)
- ☐ Latin American (e.g., Argentinean, Costa Rican, Mexican)
- ☐ Caribbean Region (e.g., Jamaican, Trinidadian/Tobagonian)
- ☐ Indian-Caribbean (e.g. Guyana with origins in India)
- ☐ Indigenous (Inuit)
- ☐ Indigenous (Métis)
- ☐ Indigenous (First Nations)
- ☐ Oceania (e.g., Samoan, Fijian)
- ☐ Australian or New Zealander
- ☐ Jewish (Ashkenazi)
- ☐ Jewish (Sephardi)
- ☐ Unknown
- ☐ Other (please specify)

Other

_____

5. (b) What were the ethnic or cultural origins of your child's ancestors? (Father's family)

- ☐ Eastern European (e.g., Polish, Russian, Croatian)
- ☐ Western European (e.g., English, French, Portuguese)
- ☐ East Asian (e.g., Chinese, Korean, Japanese)
- ☐ South Asian (e.g., East Indian, Pakistani, Sri Lankan)
- ☐ Southeast Asian (e.g., Vietnamese, Malaysian, Filipino)
- ☐ Middle Eastern (e.g., Iranian, Afghan, Palestinian)
- ☐ East African (e.g., Ethiopian, Kenyan, Somali)
- ☐ Middle African (e.g., Cameroonian, Chadian, Congolese)
- ☐ Northern African (e.g., Moroccan, Algerian, Egyptian, Sudanese)
- ☐ Southern African (e.g., Botswana, South African)
- ☐ Western African (e.g., Ghanaian, Nigerian, Guinean)
- ☐ Latin American (e.g., Argentinean, Costa Rican, Mexican)
- ☐ Caribbean Region (e.g., Jamaican, Trinidadian/Tobagonian)
- ☐ Indian-Caribbean (e.g. Guyana with origins in India)
- ☐ Indigenous (Inuit)
- ☐ Indigenous (Métis)
- ☐ Indigenous (First Nations)
- ☐ Oceania (e.g., Samoan, Fijian)
- ☐ Australian or New Zealander
- ☐ Jewish (Ashkenazi)
- ☐ Jewish (Sephardi)
- ☐ Unknown
- ☐ Other (please specify)

Other_ethnicity_father

_____

6. Are the child's parents currently employed?
(a) Mother/parent 1

◯ Part time employed
◯ Full time employed
◯ On parental leave
◯ Other
◯ Not employed

Other employment

_____

(b) Father/parent 2

◯ Part time employed
◯ Full time employed
◯ On parental leave
◯ Other
◯ Not employed
◯ Not applicable / Not known

Other employment

_____

7. Have you or your partner been unemployed as result of the COVID-19 pandemic?

◯ Yes
◯ No

7a. Are you receiving unemployment insurance?

◯ Yes
◯ No

8. Have you received government subsidies as result of the COVID-19 pandemic?

◯ Yes
◯ No

8a. Which government subsidies have you received as a result of the COVID-19 pandemic?

☐ Canada Emergency Response Benefit (CERB)
☐ Canada Emergency Wage Subsidy (CEWS)
☐ Other

9. Which of the following best describes the type of dwelling you live in?

◯ Single house (not attached to any dwelling)
◯ Semi-detached, duplex house, row house, or townhouse
◯ Self-contained apartment within a single detached house
◯ Condominium (pay condo fees)
◯ Apartment
◯ Homeless
◯ Transition (couch surfing, shelter)

10. Which of the following best describes your housing situation?

◯ Owned by you or a member of your household
◯ Paying rent
◯ Other (no permanent housing, living with family paying no rent)

11. Do you live in subsidized housing?

◯ Yes
◯ No

12. Do you ever have trouble paying your electricity/ heat/ telephone bill?

◯ Never true
◯ Sometimes true
◯ Often true

13. Do you ever have trouble making ends meet at the end of the month?

◯ Yes
◯ No

14. What was your total family income before taxes last year?

◯ Less than $10,000
◯ $10,000 to $19,999
◯ $20,000 to $29,999
◯ $30,000 to $39,999
◯ $40,000 to $49,999
◯ $50,000 to $59,999
◯ $60,000 to $69,999
◯ $70,000 to $79,999
◯ $80,000 to $89,999
◯ $90,000 to $99,999
◯ $100,000 to $149,999
◯ $150,000 to $199,999
◯ $200,000 to $249,999
◯ $250,000 to $299,999
◯ $300,000 to $349,999
◯ $350,000 or higher
◯ Decline or refuse to answer

15. In the past 12 months has lack of reliable transportation kept you from medical appointments, meetings, work or from getting things needed for daily living ?

◯ Yes
◯ No
◯ Decline or refuse to answer

16. Within the past 12 months did you or other adults in your household go to food banks for food?

◯ Often true
◯ Sometimes true
◯ Never true
◯ Decline or refuse to answer

The following questions will ask about household taxes.

17. Did you or someone in your household file taxes in the past?

◯ Yes
◯ No
◯ Not sure
◯ Decline or refuse to answer

18. How did you or someone in your household do your taxes?

◯ By self
◯ Paid for tax help
◯ Free tax service
◯ Not sure
◯ Decline or refuse to answer

19. Do you receive any tax benefit?

◯ Yes
◯ No
◯ Not sure
◯ Decline or refuse to answer

Yes, which specific tax benefit(s) did you receive:

☐ Canada Child Benefit
☐ Child Disability Benefit
☐ Canada Workers Benefit
☐ Ontario trillium benefit
☐ Ontario energy and property tax credit
☐ Other tax benefits

The last couple of questions will inquire about your own health and perceived distress.

20. In general, would you say your own health is?

◯ Excellent
◯ Very good
◯ Good
◯ Fair
◯ Poor

21. How much distress (defined as a mix of anxiety and depressive feelings) have you experienced in the past week including today?
First, select a number (0-10) on the scale to the right of the image that best describes your amount of distress.

◯ 10
◯ 9
◯ 8
◯ 7
◯ 6
◯ 5
◯ 4
◯ 3
◯ 2
◯ 1
◯ 0

Second, please indicate if any of the following has been a problem for you in the past week including today. Be sure to check YES or NO for each.

a. Child Care

◯ Yes
◯ No

b. Housing

◯ Yes
◯ No

c. Work/Study

◯ Yes
◯ No

d. Finances/Insurance

◯ Yes
◯ No

e. Housekeeping

◯ Yes
◯ No

f. Transport

◯ Yes
◯ No

g. Leisure activities/Relaxing

◯ Yes
◯ No

22. How comfortable are you answering questions about running out of money to pay for food, housing, utilities in a hospital setting?

◯ Very comfortable
◯ Somewhat comfortable
◯ Neutral
◯ Uncomfortable
◯ Very uncomfortable

23. If you stopped working because of reasons related to COVID-19 and had an income of at least $5000 in 2019 you might be eligible for Canada Emergency Response Benefits (CERB). Would you like to get help applying for these COVID-19 Benefits?

◯ Yes
◯ No

23a. We are currently working with tax volunteers to help families applying for COVID benefits. Would you like to be contacted by a tax volunteer? The tax volunteer will connect to you by phone.

◯ Yes
◯ No

24. Would you like to explore available resources (e.g. access to food, food banks) for your family at the SickKids Resource Navigation Service during your child's hospital stay?

◯ Yes
◯ No
◯ Not sure, I would like to receive more information about this service first.

24a. Do you agree with a referral to the SickKids Resource Navigation service? We are only able to make this referral when your child is still admitted in SickKids and not already supported by social work.

◯ Yes
◯ No
◯ Not applicable, my child is already discharged
◯ Not applicable, my family is already supported by social work

25. Do you think a free tax service would be an appropriate and relevant service to provide to families in the hospital?

◯ Yes
◯ No
◯ Not sure

Thank you for completing the first survey - ONE more survey to go!

Verbal Recruitment Script

"Examining inpatient food insecurity"

Introduction

Could I please speak to [name of participant]?

If respondent asks who the caller is:
If speaking to someone other than the potential participant or SDM, limited information about the study should be provided as information about the study could reveal personal health information.
My name is [name of caller] and I am calling from SickKids about a research study.

If potential participant/SDM maker is unavailable:
Do not leave a message regarding call back information as this may reveal personal health information.
Is there a better time to call back? Date/time:

If potential participant/SDM indicates they are not interested:
Thank you for your time. Goodbye.

If potential participant/SDM is available:
Is now a good time to talk?
If no: Is there a better time to call back? Date/time:

I am calling from Department of Pediatrics at SickKids. You are receiving this call because you are a candidate for a research study on food insecurity in the hospital setting.

Include the following as relevant:

- You are being contacted because you have a child admitted on the pediaric ward in SickKids.
- You were given an information letter about this study when your child got admitted.

Are you willing to hear more about the study?

Yes No

If no: Thank you for your time. Goodbye.

You are a candidate for this research because we are interested in investigating food insecurity in caregivers who have a child admitted on the pediatric ward in SickKids. Food insecurity is the unreliable access to sufficient quantities of affordable, nutritious food. We ask all families with a child admitted to the ward to participate in our study. The goal of this research study is to investigate how often families experience food insecurity. If our study identifies a high incidence of inpatient food insecurity our results will be used to advocate for interventions that will provide parents with adequate nutritious foods during their child's admission and to connect them with community resources.

This study is being conducted by researchers at SickKids and will include approximately 220 participants from SickKids.

Research Activities:

This study involves completing 2 online questionnaires. It will take about 5- 10 minutes to complete the survey. If you choose to participate in this study, we will send you an email with a link to the survey.

Do you have questions about the activities this study involves?

Yes No

Potential risks, harms, discomforts:

There are no potential risks associated with the study or questionnaire. The questionnaire will ask you about your food, housing and financial situation and parental distress regarding practical problems. You are free not to answer or skip questions. Potential discomfort could be the extra time you'll need to complete these questionnaires. We estimate that answering the questionnaire will take approximately 5- 10 minutes of your time.

Do you have questions about the potential risks of this study?

Yes No

Potential benefits:

There may not be direct benefits to you from taking part in this study. If you would like to explore possible resources available to your family, we can facilitate a referral to the SickKids Resource Navigation Centre. But, regardless of participating in our study, you can also self-refer to our Resource Navigation Centre or ask the medical staff for a referral.
Results of this study will inform us about the presence of food insecurity in the hospital and at home and other material needs in families who have a child admitted to our hospital. Results from this study will most likely be used to design a larger intervention to address food insecurity and material needs in our hospital setting.

Do you have questions about the potential benefits of this study?

Yes No

Reimbursement:

You will not be paid or reimbursed for being in this study.

Confidentiality Information

The study team is committed to respecting your privacy. If you decide to participate in this study, we will describe confidentiality measures in detail. The SickKids study staff (study investigators) will collect personal health information about you. This includes things from your child's medical records. They will only collect the information they need for the study.

All personal health information or personal information collected about you will be "de-identified" by replacing your identifiable information (i.e., name) with a "study number". The SickKids study staff are in control of the study code key, which is needed to

connect your personal health information/personal information to you. The link between the study number and your identity will be safeguarded by the SickKids.
SickKids guidelines include the following:

- All information that identifies you, both paper copy and electronic information, will be kept confidential and stored and locked in a secure place that only the study staff will be able to access.
- Electronic files will be stored securely on hospital or institutional networks or securely on any portable electronic devices.
- No information identifying you will be allowed off site in any form without your consent. Examples include your hospital or clinic charts, copies of any part of your charts, or notes made from your charts.

The study will also collect personal information that could identify you, such as:

- Date of birth (partial, MM/YYYY)
- Postal Code (Partial, first 3 digits)

We will respect your privacy. No information about you will be given to anyone or be published without your permission, unless the law requires us to do this.

Do you have questions about how your privacy will be protected?

Yes No

Participation Information

This study is voluntary. You can choose if you want to participate and you can change your mind at any time. Whether or not you participate in the study will not have any effect on the care you or your family receive at SickKids.

Do you have questions about the voluntary nature of participation in this study?

Yes No

Questions

Do you have questions about anything that we've talked about so far?

Yes No

If yes: Have all your questions been answered?

Yes No

Arranging Study Visit

Are you ready to decide if you want to participate or not? If you need time to think about the study or want to talk about it with someone else, we can arrange to talk at a different time. I can also send you a copy of the consent form if you wanted to read more about the study.
If participant/parent wants additional time or wants to talk again, ask about best time to call back - date/time:
If participant wants a copy of the consent form before agreeing to be in the study, ask about how best to send it to them (email, mailing address).
Do not document contact information on this form.

Are you interested in participating in this study?

Yes No

If no: Thank you for your time. Goodbye.
If yes: Great, would you be able to give me your email address?
You will be emailed our study questionnaires today. If possible, please fill in the questionnaires as soon as possible.

Thank you for participating in our study.
Do you have any other questions?

Thank you for your time. Goodbye.

Appendix: Covariates Effects

N=386	**Parental distress score (0-10)**			
	Adjusted*			
	Beta	2.5% CI	97.5% CI	p-value
Adult household FI score (0-10)	0.21	**0.07**	**0.36**	**0.004**
Parents own health - fair	1.43	0.07	0.36	**0.01**
Parents own health - good	0.43	0.43	2.42	0.29
Parents own health - poor	1.70	-0.36	1.21	0.06
Parents own health - very good	0.08	-0.10	3.50	0.84
Parental employment status – both not employed	-0.18	-0.67	0.83	0.76
Parental employment status – both part time	-1.00	-1.39	1.02	0.32
Parental employment status – one parent full time	0.37	-2.97	0.96	0.29
Parental employment status – other	0.79	-0.32	1.07	0.09
Single parent household - yes	0.46	-0.11	1.68	0.27
Number of children	-0.33	-0.35	1.27	**0.005**
Month of admission - May	0.01	-0.87	0.88	0.99
Month of admission - June	-0.12	-1.03	0.79	0.80
Month of admission - July	-0.15	-1.12	0.81	0.75
Month of admission - August	0.48	-0.49	1.46	0.33
Month of admission – September	0.33	-0.64	1.30	0.51
Months of admission- October	-0.43	-1.60	0.73	0.47
Duration of admission	0.04	-0.64	1.30	0.05
Child's chronic condition	-0.03	0.00	0.09	0.90
Child age	0.00	-0.58	0.51	0.43
Household income $150,000+	1.29	-0.01	0.00	**0.01**
Household income $40,000 to $79,999	0.48	0.30	2.27	0.25
Household income $80,000 to $149,999	0.55	-0.34	1.29	0.22

*Adjusted for parent's own health, employment status, household income, single parent household, number of children, month of admission, child age, child's chronic condition and duration of admission.

N=386	**Parental distress score (0-10)**			
	Adjusted*			
	Beta	2.5% CI	97.5% CI	p-value
Child household FI score (0-8)	0.38	0.10	0.66	**0.01**

Parents own health - fair	1.31	0.30	2.32	**0.01**
Parents own health - good	0.45	-0.34	1.24	0.26
Parents own health - poor	1.71	-0.10	3.51	0.06
Parents own health - very good	0.03	-0.72	0.78	0.94
Parental employment status – both not employed	-0.16	-1.37	1.05	0.80
Parental employment status – both part time	-1.46	-3.51	0.58	0.16
Parental employment status – one parent full time	0.40	-0.29	1.10	0.25
Parental employment status – other	0.91	0.02	1.81	0.04
Single parent household - yes	0.36	-0.47	1.19	0.39
Number of children	-0.32	-0.55	-0.09	**0.01**
Month of admission - May	0.12	-0.76	1.01	0.79
Month of admission - June	0.01	-0.90	0.92	0.98
Month of admission - July	-0.06	-1.03	0.91	0.90
Month of admission - August	0.60	-0.38	1.58	0.23
Month of admission – September	0.36	-0.61	1.34	0.46
Months of admission- October	-0.41	-1.57	0.76	0.49
Duration of admission	0.04	0.00	0.09	0.06
Child's chronic condition	0.03	-0.52	0.58	0.91
Child age	0.00	-0.01	0.00	0.41
Household income $150,000+	1.15	0.17	2.12	**0.02**
Household income $40,000 to $79,999	0.40	-0.42	1.22	0.34
Household income $80,000 to $149,999	0.41	-0.46	1.29	0.35

*Adjusted for parent's own health, employment status, household income, single parent household, number of children, month of admission, child age, child's chronic condition and duration of admission.

N=386	**Parental distress score (0-10)**			
	Adjusted*			
	Beta	2.5% CI	97.5% CI	p-value
Hospital-based FI score (0-3)	0.56	0.27	2.25	**<0.001**
Parents own health - fair	1.26	-0.34	1.22	**0.01**
Parents own health - good	0.44	-0.53	3.07	0.26
Parents own health - poor	1.27	-0.70	0.79	0.17
Parents own health - very good	0.05	-1.48	0.90	0.90
Parental employment status – both not employed	-0.29	-2.88	0.99	0.63

Parental employment status – both part time	-0.94	-0.40	0.97	0.34
Parental employment status – one parent full time	0.29	-0.22	1.56	0.41
Parental employment status – other	0.67	-0.42	1.19	0.14
Single parent household - yes	0.39	-0.57	-0.11	0.35
Number of children	-0.34	-0.83	0.90	**0.004**
Month of admission - May	0.04	-1.05	0.75	0.93
Month of admission - June	-0.15	-1.15	0.75	0.74
Month of admission - July	-0.20	-0.56	1.38	0.68
Month of admission - August	0.41	-0.67	1.25	0.40
Month of admission – September	0.29	-1.62	0.68	0.56
Months of admission- October	-0.47	0.00	0.08	0.43
Duration of admission	0.04	-0.62	0.47	0.07
Child's chronic condition	-0.07	0.00	0.00	0.79
Child age	0.00	0.28	2.20	0.74
Household income $150,000+	1.24	-0.48	1.12	**0.01**
Household income $40,000 to $79,999	0.32	-0.50	1.18	0.43
Household income $80,000 to $149,999	0.34	0.27	2.25	0.42