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Gender disparities in care seeking and severity of sickness for children at a tertiary pediatric hospital in northern Vietnam

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Abstract

Vietnam has a recent history of son preference. Past research in other Asian countries with son preference has found that often parents are more likely to take sons to a health facility when they are sick, to do so more promptly, and invest more resources in care, than daughters. Little research has looked at gender differences in child health care seeking in Vietnam. Using data from a national pediatric hospital emergency care facility, we explore gender differences in the severity of child illness, referral patterns, and outcomes among children brought to the emergency room. We find that almost twice as many boys were brought into the facility as girls. Girls who were brought in were significantly more likely than boys to have entered care at a lower-level facility, controlling for severity of illness, past and current care seeking behaviors, and socio-demographic characteristics. This suggests that parents do provide preferential treatment to boys, potentially leading to worse outcomes for girls who become ill in Vietnam. However, there were no differences in delay of care seeking or reporting a barrier to care among boys and girls. We also find no evidence of provider bias, with no differences between boys and girls in their likelihood of transfers between facilities, admission to an ICU, or duration of care at the NHP. Future research should further explore these disparities and their social determinants, and policy makers should focus on ensuring that parents are motivated and enabled to provide equal care to their girls and boys.

Introduction

Where parents and societies place a greater value on boy children, they have been found to discriminate against girl children, including aborting girl fetuses and providing preferential care to boys compared to girls. Many of Vietnam's Asian neighbors have demonstrated son preference for decades, which has resulted in uneven child sex ratios and sex ratios at birth (Miller 2001, Das Gupta et al 2003, Guilmoto 2009). As recently as 2000, Vietnam showed no son preference in its sex ratio at birth (Guilmoto 2009). However, Vietnam's 2005 census showed a skewed sex ratio at birth (SRB) for the first time (Guilmoto et al 2009). This disparity has increased over the last decade, with 111.2 boys born per 100 girls[1] in 2010 (GSO 2011a). Recent increases in the SRB in Vietnam reflect the "ready-able-squeezed" conditions for sex-selective abortion described by Guilmoto (2009): where sons are preferred for cultural and/or economic reasons ("ready"), and technology allows for sex-selective abortion ("able"), falling fertility rates encourage sex-selection to ensure a son ("squeezed").

Son preference in Vietnam is thought to be related to cultural roles, the traditional division of labor, and declining fertility (Belanger and Hai Oanh 2009). The patrilineal kinship system is generally cited as the most important driver of son preference in Vietnam (Belanger 2002, Das Gupta et al 2003, Chung and Das Gupta 2007, Pham et al 2010, UNFPA 2011, Guilmoto 2012). In families, sons traditionally provide financial support to elder relatives, are responsible for family income generation, including agricultural production in rural areas, and they "maintain the family line" (UNFPA 2011). Culturally, there is a belief that the number of sons in a family reflects its karma or character (ibid.). Additionally, marriage in Vietnam is patrilocal and

[1] The natural sex ratio at birth in countries with no son preference is approximately 105 boys born per 100 girls (Dyson 2012).

exogamous (Belanger 2002, Guilmoto 2012). Thus, from a financial security standpoint, families rely on sons for support, while daughters support their husbands' relatives; investing in a girl is akin to "watering a neighbor's garden" (Attane & Guilmoto 2007). Daughters-in-laws face pressure to bear a son for their new families and many women feel they are not truly accepted by their husband's families until they provide a male heir (Belanger and Hai Oanh 2009). Those that cannot face discrimination and even threats of being expelled by the family (UNFPA 2011).

Vietnam implemented a two-child policy from the 1960s to 2003, limiting families to two children. Government campaigns to promote lower fertility were generally successful, as evidenced by quickly falling fertility rates and a now almost universal norm of two children per family. The total fertility rate (TFR) in Vietnam has decreased greatly since 1980, when it was 5.5 births per woman, to 3.85 in 1990, 2.18 in 2000, and 1.89 in 2010 (UNFPA 2012). The fertility decline has been in line with increased wealth, urbanization, and modernization, signs of a demographic transition. Though abortion has been legal in Vietnam since the 1960s, fetal sex diagnosis and sex-selective abortion were banned in Vietnam in 2006. However, these laws are rarely, if ever, enforced (UNFPA 2011). Facing the factors described above, some women and couples seek sex selective abortion in order to ensure the birth of at least one boy child. As women and couples have fewer children, their risk for having no boy children increases. Interestingly, two patterns for sex selection have emerged: some women or couples select for a boy for the first birth, while, more commonly, others select for a second or third birth if they have a daughter first (UNFPA 2011). This is consistent with patterns in India and China (Poston 2002, Chaudhuri 2012).

The skewed sex ratio at birth, as well as the presence of cultural factors and norms that contribute to son preference, is not uniform across Vietnam. This phenomenon has been detected primarily in the northern part of the country, though it occurs in the south as well (Pham et al 2010). The sex ratio at birth is higher among wealthier and more educated parents, consistent with other Asian countries where son preference is often exhibited first among urban elites (Guilmoto 2009, Pham et al 2010, Guilmoto 2012). There is also a distinct ethnic aspect to son preference, with Kinh, ethnic Vietnamese, and Hoa, ethnic Chinese, having significantly higher SRBs compared to other minority groups, (Pham et al 2008). The marked disparities of son preference across Vietnam provide insight to the structural and cultural factors driving this change, and exploring trends in this phenomenon along urban/rural location, wealth, or geographic sub-groups is essential.

Gender disparities in child health

In other countries with high son preference across Asia and Africa, girl children often face discrimination in the household, in health outcomes, and are given fewer resources than their brothers. For example, in India, girls face excess risk of mortality in early childhood (Das Gupta & Bhat 1997, Agarwal & Unisa 2007) and are less likely to be vaccinated than boys (Borooah 2004). Examining within-household variation in immunization coverage, girls are disadvantaged compared to their brothers (Singh 2012). In India and elsewhere, girls have been shown to be taken to health facilities less frequently and in a less timely fashion than boys, to be breastfed for a shorter duration, and to have received less and poorer food and nutrition (Arnold et al 1998, Mishra et al 2004, Simanjuntak et al 2004, Barcellos et al 2014, Wilson et al 2012). Higher-order rural girl children with only female siblings were significantly disadvantaged in stunting and

immunization compared to lower-order girls, and boys in all birth orders, while higher-order boys with older female siblings experienced the most optimal health outcomes (Pande 2003). In a range of countries from China to Egypt to Chile, girls face discrimination in feeding, care seeking, and other outcomes (Khera et al 2014). In an analysis of children in rural China, first-born girls in two-child households were significantly more likely to have low height-for-age compared to boys in these households, although the authors found no significant differences between boys and girls in one-child households (Ren at al 2014). Past research in Vietnam has found that the gender composition of children in a household influences behaviors relating to fertility and family planning use (Belanger 2002). However, there has not yet been rigorous research into the impact of son preference on child health outcomes such as nutrition, growth and development, or immunization in Vietnam.

In care seeking for emergencies in countries with son preference, the differences between boys and girls are subtler, but may exist nonetheless. In India, examining hospitalization of boy versus girl children, boys were significantly more likely to be hospitalized than girl children (Asfaw et al 2010). Yet, there was not a significant difference between boys and girls in the use of household resources to finance care. However, families, especially poorer families, were significantly more likely to use tenuous financing strategies to cover the costs of care for boys than for girls.

There has been very little evidence in Vietnam about how son preference manifests itself beyond sex-selective abortion, especially relating to gender differences early childhood care seeking behaviors. Evidence from past nationally representative health surveys such as the 2011 Multiple

Indicator Cluster Survey (MICS) does not suggest that girls are systematically disadvantaged compared to boys, though some evidence highlights differences among children by gender. Consistent with other surveys in Vietnam, the 2011 MICS showed a trend of a skewed sex ratio at birth, and compared to boys, girls with diarrhea in the two weeks preceding the survey were significantly less likely to receive oral rehydration therapy (GSO 2011b). With lower overall fertility, increasing household income, and therefore fewer children to divide more resources between, many Vietnamese families may not face the challenges in allocating resources as in regions with higher total fertility. However, a meta-analysis of 185 Demographic and Health Surveys by Yount et al. (2014) suggests that women and families may invest more resources in boys following initial declines in the TFR and median age at first birth, especially in countries with son preference, though these investments seem to even out over time, to the benefit of all children.

Care seeking in the Vietnamese context

In Vietnam, the public health care system is hierarchical and includes commune health centers, district health centers and hospitals, provincial hospitals, and national referral centers. Referrals for higher levels of care typically occur sequentially to increasingly capable higher-level facilities. Though the public health system charges user fees, since 2005, a government insurance program has provided free public health care to all children under the age of six years (Teerawichitchainan and Phillips 2008, Tien et al 2011). With the Doi Moi economic reforms in the 1980s, increased privatization has led to a growing number of private clinics and hospitals that offer fee-for-service programs, utilized by Vietnamese across the socio-economic spectrum (Tuan et al 2005).

Past research has suggested that it is common for parents and caregivers to utilize multiple treatment strategies within the same care seeking episode, which delays entry into formal care as they engage in a process of trial and error. After recognition, parents and caregivers may first pursue home- or community-based treatment options, such as through informal drug sellers or traditional healers, and later access formal care in public or private facilities (Colvin et al 2013, Geldsetzer et al 2014, Kerry et al 2014). In general, care seeking moves from within the home to outside, especially as the severity of illness increases (Akin and Hutchinson 1999, Colvin et al 2013). Along this care seeking trajectory, parents or caregivers may consult with others for advice, wait to see if symptoms resolve on their own, or be required to negotiate access to care with others, especially due to gender or cultural norms (Geldsetzer et al 2014). When these additional steps delay entry to formal care, children may experience worse health outcomes.

Parents and caregivers use multiple metrics in deciding where to seek care. Patients are willing to bypass closer facilities in favor of more distant facilities in order to access higher quality care (Akin and Hutchinson 1999). While distance is an important determinant of access (Ettarh et al 2011), parents and caregivers also consider cost, cultural norms and beliefs, perceived severity of illness, perceived quality of services and providers, provider reputation, and their own and others' past experiences with care and the medical system (Leonard 2007, Rutherford et al 2010, Kahabuka et al 2011, Colvin et al 2013). Quality is an especially important driver, and parents will seek care differentially depending on the severity of symptoms, valuing quality when illness is severe and convenience when symptoms are mild (Leonard 2014). Patients across the socio-

economic spectrum value quality more than cost and location (De Sevigny et al 2004, Hanson et al 2004, Jacobsen et al 2012).

Children in Vietnam face multiple barriers to care. Globally, structural barriers, such as user fees for services, often limit access to formal care at clinics and hospitals (Colvin et al 2013). Despite the introduction of free care for children under age six, inequalities in child health outcomes, mortality rates, and access to services and interventions persist, disadvantaging poorer households (Axelson et al 2012). A majority of parents of newborns in Hanoi reported difficulties with paying the costs of in-patient hospital care, while half felt the hospital was too far from their home, and more than a third of parents do not know where to access infant hospital care near their home (Martinez et al 2012). In northern Vietnam, neonatal mortality rates increase with distance to the nearest health facility, especially among mothers with low education and households with low socio-economic status (Malqvist et al 2010). In rural areas, poorer families are more likely to self-treat illnesses and injuries, especially where distance and mountainous geography pose barriers to facilities (Hang and Byass 2009). Minority parents are less likely to seek care outside the home, while mother's literacy and education are positive predictors of care-seeking among Vietnamese families, regardless of ethnicity (Teerawichitchainan and Phillips 2008). In southern China, parents delayed care seeking and administered home treatment in order to avoid missed work and lost wages incurred by attending a health facility when their child was sick (Goodburn 2014). Little is known about sex differences in care seeking and associated barriers in the Vietnamese setting.

This paper explores gender disparities in care seeking for children brought into a pediatric emergency care facility in Hanoi, Vietnam. The primary aim is to characterize differences in care seeking patterns and outcomes between boy and girl children accessing tertiary pediatric emergency care, controlling for other household factors. We also examine whether provider bias exists within the public health system. It is important to understand how son preference in Vietnam impacts behaviors related to child care giving and care seeking, given the paucity of research on this topic and findings from other countries with son preference and skewed sex ratios at birth about disparities in care seeking by sex.

Data and Methods

Data

This study uses data from a cross-sectional prospective cohort of 585 neonates and children under 18 admitted through the National Hospital of Pediatrics (NHP) emergency department (ED), randomly sampled at admission from August to November 2013. The NHP is the main public tertiary pediatric hospital in northern Vietnam, and receives referrals from a catchment area of 31 million people. The hospital has 900 beds and an average daily census of 1100 patients. For overall admissions in 2013, 64.2% were boys and 36.2% girls; in the emergency department, 61.9% boys and 38.1% girls.

During the enrollment period, every fourth child admitted to the emergency department was approached for study enrollment. Children were eligible to participate in the study if they had an Emergency Severity Index (ESI) acuity score on admission of 1 through 3 on a scale of 1 through 5, where 1 is the most severe acuity and 5 is the least severe acuity. In order to be

eligible, patients had to be admitted to an NHP ward or intensive care unit (ICU) after receiving care in the emergency department. Children were excluded if they had an ESI score of 4 or 5, were age 18 or older, were discharged or referred to another facility without NHP admission, or died in the emergency department. Where the fourth patient was not eligible for participation, the following fourth patient was next approached.

If a child under age 18 was eligible for participation by meeting ESI score inclusion criteria, a trained resident physician approached his or her parent or accompanying relative for informed consent (98.4% response). Parents or accompanying relatives (76.8% mother, 15.9% father, 4.8% grandparent, 2.6% other relative) completed a 42-item self-administered questionnaire on socio-demographic characteristics, care seeking for the current and past illness episodes, and barriers to care. The majority of respondents self-administered the questionnaire (94.7%), while a trained resident physician administered the questionnaire to the accompanying parent or caregiver in the remainder of cases.

In addition to the questionnaire, hospital records were reviewed for acuity on arrival, referral information, diagnosis via the standardized International Classification of Disease, 10th Revision (ICD-10) code, and staffing and equipment for ambulance transfers. Patient outcomes were recorded, including admitting ward, intra-hospital transfers, duration of care, and status at discharge. Data were entered into Excel and analyzed in STATA Version 13.1.

Measures:

Independent variables: Our primary outcome of interest in this analysis is whether or not the parents or caregivers of the child first sought care at a lower-level facility, versus seeking care directly at the NHP. Whether the parents or caregivers of a child first sought care elsewhere, and the level and staffing type of the facility, are based on parent or caregiver report. If the parent or caregiver did not report care seeking at a lower-level facility, but the NHP received a formal referral for the child, we consider the child to have sought care at a lower-level facility first.

As secondary outcomes, we examine acuity on arrival at the NHP, delay of care seeking after recognition of illness, admission to an intensive care unit (ICU) at the NHP, duration of care at the NHP, and mortality. Acuity on arrival is measured using the Emergency Severity Index (ESI), a standardized, validated acuity assessment instrument (Tanabe et al 2004). Admitting nurses were trained in use of the ESI, then assigned all admitted patients an ESI score upon admission to the ED during the study period. Children who were admitted to the neonatal intensive care unit (NICU), pediatric intensive care unit (PICU), or surgical intensive care unit (SICU) are considered as admitted to an intensive care unit (ICU), versus admission to a general hospital ward. Delay of care seeking is measured as the time from recognition of illness to the time of seeking care outside the home, based on parent or caregiver self-report. Duration of care is measured as the time from admission at the NHP emergency department to discharge from the hospital, based on hospital records. Status at discharge is recorded for all patients from hospital records; patients who died or had support withdrawn are classified as dying, versus patients who were discharged home.

Covariates: The main independent variable is child's sex (female or male). We examine a number of potentially confounding factors, including acuity on arrival and child's age measured in years, based on hospital records. At the patient and household levels, we examine child's ethnicity, household wealth, and location type. Kinh ethnicity versus other is reported by parents and caregivers, as is whether the child resides in an urban or rural location. Household wealth index quintiles were constructed using standard principal components analysis of household asset indicators as reported by parents and caregivers (Filmer & Pritchett 2001). Parent characteristics include age, educational attainment, and employment status. Parents and caregivers self-reported the mother's and father's age in years. Parents' education attainment is measured categorically: any attendance at primary school, secondary school, university, or technical or vocational school. Parents self-reported occupation type and work status; parents are dichotomized as working full time versus any other work arrangement.

We examine several covariates related to past and current care seeking. Parents and caregivers self reported whether the child received medical care at any type of facility, public or private, in the preceding year, as well as if the child had ever received care at the NHP. Parents and caregivers also self reported whether they faced a barrier in accessing services at the NHP for this visit. Potential barriers include costs associated with medical care, cost of transportation to access care, availability of transportation, severity of the child's condition, time required to access services, needing to care for other children, and other barriers. If a parent or caregiver reported any of the above barriers, the child is considered to have faced a barrier in accessing the NHP versus not facing a barrier.

Data analysis

In bivariate analysis, we assess differences by sex in acuity on arrival (ESI score), whether the patient first attended a lower-level facility, and other care seeking factors (delay of care seeking outside the home after recognition of illness, and a dichotomous measure of whether this delay was more than 24 hours). We also assess bivariate associations between sex and ICU admission to the NICU, PICU, or SICU, duration of care at the NHP, and whether the child died or had support withdrawn at the NHP, versus discharge home. Among children who first sought care at another facility, we examine bivariate associations between sex and whether the child was formally transferred to the NHP, and transferred in an ambulance.

We use binary logistic regression to examine predictors of entering care at a lower level prior to admission at the NHP, controlling for child's sex, acuity on arrival, past and current care seeking factors, and socio-demographic characteristics. Covariates for care seeking outcomes were selected based on a priori hypotheses of determinants of care seeking behaviors. The first model includes sex and acuity on arrival. In the second model, we add care seeking factors, which include the number of days care seeking outside the home was delayed after recognition of illness, whether the child utilized any medical care in the previous year, whether the child ever previously attended the NHP, and whether the child faced a barrier in accessing the NHP. In the third model, child and household-level characteristics are added, which include the child's age, his or her household wealth quintile, and whether he or she resides in a rural area. The final model adds parent-level characteristics, including mother and father's age, whether the mother and father have a secondary or post-secondary education versus primary, and whether the mother and father work full time.

We tested interaction effects to determine if girl children with specific socio-demographic characteristics are particularly at risk for adverse outcomes or differential care seeking. These included whether a child was a girl living in a rural area, and whether a child was a girl in a household with the poorest wealth status. We found all interactions not to be significant; thus, no interaction effects are presented in the final models shown below.

Ethical considerations

Ethical approval was obtained from the institutional review boards of the University of California, San Francisco, and the National Hospital of Pediatrics in Hanoi, Vietnam. All respondents provided written informed consent.

Results

Sample characteristics

The sample included 67.1% boys and 32.9% girls, with a mean age of 1.82 years (SD 2.74 years), as shown in Table 1. In the sample 95.7% of children are of Kinh descent, or ethnic Vietnamese. The overall distribution of children's household wealth quintile did not differ significantly between boys and girls, though girls tended to be from poorer households, while boys tended to be from richer households. Overall, 51.9% percent of boys reside in a non-urban area, while 53.7% of girls come from non-urban areas.

There are no significant differences in parents' socio-demographic characteristics between boy and girl children. Among all children, the mean age of mothers is 29.3 years (SD 5.46), and the mean age of fathers is 32.8 years (SD 6.37). Overall, 51.6% of mothers and 55.6% of fathers work full time outside the home. A majority of mothers have continued education past primary

school, with 47.9% of mothers having a secondary education, and 39.8% attending college, university, or a technical or vocation post-secondary school. Among fathers, 52.5% have attended secondary school, and 35.9% attended college, university, or a technical or vocational school.

The distribution of diagnoses is not significantly different between boy and girl children. Overall, pneumonia is the most commonly diagnosed illness; 23.7% of the sample received a pneumonia diagnosis. Other types of respiratory infections and illnesses are also common in our sample, with 9.6% of children receiving this diagnosis. Additional frequent diagnoses include 15.3% digestive and gastrointestinal illnesses, 14.2% parasitic infections including rotaviral enteritis, and 9.6% unclassified symptoms.

Overall, 46.9% of girls and 43.8% of boys had previously received care at the NHP, and 59.9% received care at any facility within the previous year, with no significant difference between boys and girls. The parents or caregivers of girls (21.58%) were more likely than parents or caregivers of boys (17.8%) to report facing a barrier in reaching the NHP, though this difference was not statistically significant. Girls were not significantly more likely than boys to report experiencing specific barriers. Among all children who reported facing a barrier, cost of treatment was the most commonly reported barrier (22.5%). Other reported barriers include the cost of transportation (15.3%), other barriers (14.4%), and competing demands of caring for other children (5.4%). Less than 5% of those reporting a barrier cited the severity of symptoms or availability of transport.

Bivariate associations of sex and outcomes

More than one third of children first accessed care at another facility prior to the NHP, including 35.0% of boys and 41.7% of girls (Table 2). Examining delay of care seeking outside the home from recognition of illness, the mean delay for all children is 3.94 days (SD 5.21), with no significant difference between boys and girls. Girls were not significantly more likely to be delayed more than 24 hours than boys; 59.9% of girls were delayed more than 24 hours, versus 58.0% of boys. There was no significant difference in the distribution of acuity scores between boys and girls; 11.7% of boys and 7.9% of girls were assigned an ESI score of 1, the highest acuity, and 28.5% of boys and 31.4% of girls were assigned an ESI score of two. ESI 3 was the most common score, with 59.8% of boys and 60.7% of girls assigned this score. Girls were more likely to be admitted to an ICU, though not statistically significantly so; 9.4% of girls were admitted to the neonatal ICU, surgical ICU, or pediatric ICU, compared to 8.1% of boys. There are no significant differences in the duration of care between boys and girls. The mean duration of stay at the NHP for all children is 0.90 days (SD 3.24). There are also no significant differences by sex in mortality: 3.5% of boys and 2.3% of girls died in care or had support withdrawn.

We find no evidence of provider or system bias against girls. Among those seeking care first at another facility, girls were not significantly less likely to receive a transfer, including ambulance transfers, and were not less likely to have specific types of equipment or staff present during the transfer than boy children. Within the NHP, girls do not significantly differ from boys in their likelihood of ICU admission, duration of stay, or mortality.

Regression analyses

In Model 1, controlling for child's sex and acuity on arrival, we find that girls have 1.489 times the odds of entering care at a lower-level facility than boys, as shown in Table 3 (95% CI 1.028-2.156). The sickest children are most likely to enter care at a lower level. Children with ESI 1 have 4.593 times the odds of entering care at a lower level compared to children with ESI 3 (95% CI 2.590-8.145). Similarly, children with ESI 2 are also more likely to enter care a lower level, and have 3.209 times the odds compared to children with ESI 3 (95% CI 2.188-4.706).

Controlling for past and current care seeking in Model 2, girls have significantly higher odds of having entered care at a lower level compared to boys, (OR=1.568, 95% CI 1.049-2.343). Higher severity of illness is again significantly associated with higher odds of attending a lower level first (ES1 OR=5.873, 95% CI 3.113-11.081; ESI 2 OR=3.018, 95% CI 1.990-4.578). Children who delayed more than 24 hours in seeking care outside the home have 1.815 times the odds of entering care at a lower-level facility (95% CI 1.227-2.685). Experiencing a barrier to care at the NHP is also significantly associated with a higher likelihood of entering care at a lower-level facility (OR=1.916, 95% CI 1.224-3.000). Having accessed any care in the last year and any prior care at the NHP were significantly associated with having entered care directly at the NHP (OR=0.561, 95% CI 0.371-0.847, OR=0.450, 95% CI 0.295-0.685, respectively).

Model 3 adds child- and household-level covariates. Controlling for acuity, care seeking behaviors, and child- and household characteristics, girls remain significantly more likely to seek care at a lower level than boys (OR=1.780, 95% CI 1.116-2.839). Acuity on arrival, delaying care seeking outside the home more than 24 hours, and facing a barrier to the NHP remain

significantly associated with higher odds of seeking care at a lower-level facility. As in the previous model, prior utilization of any facility in the preceding year and ever at the NHP are associated with lower odds of first seeking care at a lower-level facility. Children in rural areas are significantly more likely to go to a lower-level facility first (OR=1.670, 95% CI 1.027-2.812). Poorer households are more likely to seek care at a lower-level facility first, while richer households are more likely to go directly to the NHP (OR=0.703, 95% CI 0.585-0.845). Age is not significantly associated with facility type for care seeking.

In the final model, adding in parent level socio-demographic factors does not significantly affect girls' likelihood of first attending a lower-level facility compared to boys. Girls are significantly more likely to enter care at a lower-level facility, and this association holds controlling for acuity of illness, past and current care seeking, and child-, parent-, and household-level socio-demographic characteristics (OR=1.865, 95% CI 1.159-3.001). Increased severity of illness was significantly associated with increased odds of having entered care at a lower level in the final model; children with scores of ESI 1 and ESI 2 are significantly more likely to enter care at a lower level than children with a score of ESI 3 (OR=5.059, 95% CI 2.337-10.951 and OR=2.640, 95% CI 1.604-4.348, respectively). In the full model, waiting more than 24 hours to seek care outside the home and facing a barrier to care at the NHP remain significantly associated with higher odds of entering care at a lower level (OR=1.774, 95% CI 1.114-2.825, OR=1.917, 95% CI 1.097-3.347, respectively). Households in higher wealth quintiles had significantly lower odds of having entered care at a lower level (OR=0.743, 95% CI 0.607-0.910), as did those who had accessed any care in the preceding year (OR=0.504, 95% CI 0.308-0.826) or received previous care at the NHP (OR=0.588, 95% CI 0.349-0.989). The addition of parental covariates

weakens the strength of the association of rural residence with likelihood of going to a lower-level facility. No parent-level covariates are significantly associated with care seeking, although having a mother with secondary education versus primary is marginally associated with higher odds of seeking care directly at the NHP.

Discussion

This study examines differences in care seeking behaviors and health outcomes for emergently ill children in northern Vietnam. We assess social determinants that drive where families seek care, and whether there is any provider bias in the public health system. We find significantly different care seeking patterns for ill boys and girls in northern Vietnam, where parents are less likely to seek care for girls at higher-level facilities first, compared to boys. Despite no statistically significant differences in acuity on arrival or distribution of diagnoses among boys and girls, girls are still more likely to enter care at a lower level, controlling for care seeking behaviors and socio-demographic characteristics. Furthermore, the fact that so many fewer girls were brought into the higher-level facility at all suggests that families do not even seek high-level care for girls, and perhaps that due to lack of early care seeking, girls are more likely to die at home before reaching a facility. These findings support previous work in other countries with son preference of a gender bias in care seeking behaviors among children (Arnold et al 1998, Mishra et al 2004, Barcellos et al 2012), especially disparities in emergency care seeking (Asfaw et al 2010). For example, in Nepal, despite no significant socio-demographic or geographic differences between boy and girl children, girl children were discriminated against at multiple steps throughout the care-seeking trajectory (Pokhrel et al 2005). This is the first known analysis finding evidence of this in Vietnam.

We find no evidence of system or provider bias by sex. Once a child is in care, there are no significant differences in any outcome measures, such as ICU admission, transfers, staff/equipment on transfers, or duration of stay. This is reassuring, especially in light of past research from other settings, which found that physicians have higher than average levels of son preference (Yount 2003, Patel 2013).

In line with previous work, we find past care seeking influences future care seeking. These parents might have higher self-efficacy or health knowledge, resulting in their higher likelihood of going directly to the NHP and bypassing lower-level facilities. It is also possible that education received in other facilities or in the community about available services might improve emergency outcomes by reducing delay (Bruce et al 2013). Parents who had previous positive experiences at the NHP may return if they have established trust in these providers (Kahabuka et al 2011). In Sri Lanka, parents and patients weighed the need for quality against time costs and financial constraints when seeking care (Akin and Hutchinson 1999). As expected, there are disadvantages in access based on socio-economic status; however, parent level characteristics, education, age, and occupation, are not significant. This suggests that either these disparities are an issue across different levels of education and age, and potentially in both urban and rural areas, or that the effects of education and occupation are mostly reflected through household wealth.

Children who had more severe illnesses were more likely to have gone to a lower-level facility before the higher-level facility. This finding suggests that going to lower level may lead to delays in children getting adequate care, and therefore becoming sicker. We do not have ESI data from the first facility visited, but future research could explore this finding in more detail, namely,

decision-making around when and what type of facility to first visit when a child is ill. Better education to parents about what types of illnesses or symptoms require higher-level care immediately, complemented by more resources or training at lower-level facilities could address this phenomenon.

This study faces several limitations. First, this is a secondary analysis of a dataset not intended to explore these findings. While the dataset is representative of the pediatric population admitted to the NHP, the number of girls included in this dataset is limited, and a better understanding of care seeking patterns for girl children might emerge from a study that over-samples girl children. We also did not collect information on gender norms, attitudes, and preferences from parents or caregivers, which would further contextualize our findings. Data on sibling order, child composition, and fertility preferences within the household might help identify which girl children are most at risk. The information collected on care seeking did not include home treatment, and our survey instrument may not capture multiple facilities visited before the NHP. Additionally, due to the cross sectional nature of the survey, potential biases could arise due to recall bias and self-report. Some of the respondents were grandparents or other family members accompanying the child, who might not have know all relevant information (i.e., past care seeking in preceding year and ever seeking care at the NHP). The questionnaire was translated from English to Vietnamese, and back-translated to ensure accuracy, though it is possible that errors in translation remained in the survey.

While there were limitations in the data, there were also strengths. Because some of the data was collected from hospital records at a high-level facility, we are able to incorporate the ICD-10 diagnosis and use a validated measure of acuity on arrival with the survey data. Many similar studies rely on parents self-report of illnesses or severity of illness, which has limitations.

Few studies have explored disparities in childcare seeking and outcomes by sex in Vietnam, a country with increasingly skewed sex ratios at birth and known son preference. This topic merits further examination to better understand care seeking patterns and potential discrimination against girl children in Vietnam currently, and in the future. It is essential to explore other child health behaviors, investments, and outcomes for evidence of differential care by sex, such as breastfeeding, vaccination, child feeding patterns and nutrition status, and others, as have been identified in other countries. For example, in Nepal, disparities in care seeking for boy and girl children were the result of differences in parents' perceptions of illness by gender (Pokhrel and Sauerborn (2004). Further research should also explore whether disparities exist for different sibling compositions and birth order.

That so many fewer girls were brought into the facility than boys warrants more examination. Larger studies should explore if this disparity is specific to the NHP, as this this admission ratio is found across the hospital's services, or a consistent trend throughout the Vietnamese health system. If more evidence for the phenomenon is identified, further qualitative and quantitative research should explore what is happening to the girls who do not make it to the facility and parents' motivations for and behaviors that lead to these differences in care provision.

The findings of this study hold important policy and programmatic implications, as there has been very little focus thus far in Vietnam on the impact of son preference on child health. If this is indeed a larger problem, policies and programs should focus on finding ways to motivate families to provide equal care for boys and girls.

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Table 1. Selected socio-demographic characteristics of NHP ED patients by sex (N=585).

	Boys (N=394)	Girls (N=191)
Child sex	67.3%	32.7%
Child age (N=577)		
Less than one year	44.6%	45.5%
One	22.7%	24.3%
Two through five	21.7%	18.0%
Six through nine	7.2%	10.6%
Ten through seventeen	3.9%	1.6%
% Kinh ethnicity	95.7%	95.8%
Mother's characteristics		
Mean age (years) (N=583)	29.3 years	29.3 years
Percent working full time outside the home	53.1%	48.7%
Completed education (N=581)		
Primary	13.3%	10.5%
Junior secondary	22.2%	26.3%
Secondary	23.3%	26.3%
Technical school	9.2%	7.4%
College/university	32.0%	29.5%
Father's characteristics		
Mean age (years) (N=580)	32.8 years	32.7 years
Percent working full time outside the home	56.1%	54.5%
Education (N=583)		
Primary	12.8%	10.0%
Junior secondary	24.7%	25.7%
Upper secondary	26.3%	29.8%
Technical school	3.3%	5.2%
College/university	32.9%	29.3%
Wealth quintile (N=490)		
Poorest	20.4%	21.6%
Poorer	18.6%	20.4%
Middle	19.5%	21.6%
Richer	20.1%	19.1%
Richest	21.3%	17.3%
Resides in a non-urban area	51.9%	53.2%
Ever attended NHP previously	43.7%	47.1%
Attended care at any facility in previous year	62.4%	60.5%
Reported barrier to care at NHP	21.8%	25.7%

Table 2. Bivariate associations of patient outcomes by sex (N=585).

	Boys (N=393)	Girls (N=191)
Sought care at NHP after attending lower-level facility	36.4%	44.5%
Mean time from recognition of illness to seeking care outside the home (days)	3.93 days	3.96 days
Delayed care more than 24 hours	58.0%	59.9%
ESI acuity score on arrival		
1	11.7%	7.9%
2	28.5%	31.4%
3	59.8%	60.7%
Admitted to an ICU	8.1%	9.4%
NICU	3.1%	4.7%
PICU	2.0%	2.6%
SICU	3.1%	2.1%
Mean duration of care at NHP (days)	0.93 days	0.88 days
Died in NHP care or support withdrawn	2.3%	3.5%
Among children who first sought care at another facility	Boys (N=138)	Girls (N=79)
Child formally transferred to NHP	90.9%	92.9%
Transferred in ambulance	62.2%	52.9%

***p<.001, **p<.01,*p<.05, $^{+}$p<.10

Table 3. Logistic regression for odds of entering care at a lower level (vs. accessing NHP directly).

	Model 1 (N=583)		Model 2 (N=554)		Model 3 (N=457)		Model 4 (N=457)	
	OR	[95% CI]	OR	[95% CI]	OR	[95% CI]	OR	[95% CI]
Child is female	1.489*	[1.028-2.156]	1.568*	[1.049-2.343]	1.780*	[1.116-2.839]	1.865*	[1.159-3.001]
ESI 1 acuity on arrival[a]	4.593***	[2.589-8.144]	5.873***	[3.113-11.081]	4.838***	[2.272-10.302]	5.059***	[2.337-10.951]
ESI 2 score on arrival[a]	3.209***	[2.188-4.706]	3.018***	[1.990-4.578]	2.658***	[1.623-4.353]	2.640***	[1.604-4.348]
Delayed care seeking > 24 hours			1.815**	[1.227-2.685]	1.762*	[1.117-2.701]	1.774*	[1.114-2.825]
Accessed any care in preceding year			0.561**	[0.371-0.847]	0.518**	[0.320-0.840]	0.504**	[0.308-0.826]
Ever received care at the NHP			0.450***	[0.295-0.685]	0.556*	[0.334-0.928]	0.588*	[0.349-0.989]
Reported barrier to care at NHP			1.916**	[1.224-3.000]	1.954*	[1.128-3.384]	1.917*	[1.097-3.347]
Age of child (years)					0.948	[0.864-1.040]	0.934	[0.847-1.031]
Household wealth quintile					0.703***	[0.585-0.845]	0.743**	[0.607-0.910]
Resides in a rural area					1.670*	[1.027-2.812]	1.601^{+}	[0.933-2.746]
Mother has secondary education[b]							0.358^{+}	[0.109-1.173]
Mother has post-secondary education[b]							0.445	[0.123-1.616]
Father has secondary education[b]							0.802	[0.256-2.508]
Father has post-secondary education[b]							0.543	[0.148-1.999]
Mother works full time							1.028	[0.561-1.886]
Father works full time							0.798	[0.431-1.477]
Constant	0.328		0.363		0.780		2.688	
Log likelihood	-362.61		-316.09		-237.78		-234.27	

***p<.001, **p<.01,*p<.05, $^{+}$p<.10

[a] Compared to ESI 3

[b] Compared to primary education only