HEALTH CARE PREFERENCES FOR CHILDREN WITH TYPHOID FEVER IN TWO SLUM COMMUNITIES IN KARACHI, PAKISTAN

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Abstract. This study examined health care preferences and influences in response to initial and persistent symptoms of typhoid fever among children in two slum communities in Karachi, Pakistan. Typhoid fever in this area is endemic and has a high rate of multi-drug resistantce. The study involved a household survey of 502 respondents. Private practitioners, including qualified medical specialists, were the preferred providers for initial symptoms, with government and private hospitals preferred for continuing symptoms. A number of cases continued to select initial health care choices regardless of the severity of symptoms. The findings point to factors of cost, access to care, previous use of a provider and perceived quality of care as key influences regarding health care choices. These findings suggest that cases of typhoid fever in these communities are at risk for not receiving appropriate diagnoses and treatment for children who are at risk for severe cases of multi-drug resistant disease. Suggestions are made for improving the care of children with typhoid in this context.

INTRODUCTION

Typhoid fever is a major public health problem in the developing world. The disease occurs most commonly in children between ages 3 and 19 years old, especially where it is endemic or there is a large outbreak (Sinha, 1999; WHO, 2003). It is caused by the organism *Salmonella typhi* which spreads through fecal-oral transmission, typically in conditions of poor sanitation and contaminated water supplies. Initial symptoms include fever, diarrhea and malaise. Recent estimates suggest that there are about 21,650,000 cases of typhoid fever, with 216,510 deaths, per year due to the disease (Crump *et al*, 2004). Public health attention to the disease has greatly increased with the spread of multi-drug resistant (MDR) strains that are not susceptible to many previously-used antibiotics (Okeke *et al*, 2007). This situation has led to increased efforts to better understand its treatment and prevention.

In Pakistan, typhoid fever is endemic. Prospective disease surveillance conducted by the Diseases of the Most Impoverished (DOMI) Program in three slum areas of Karachi found an annual incidence rate of blood-culture confirmed typhoid fever of 452/100,000 among 2-15 year olds, while rates of >100/100,000 are considered high (Crump *et al*, 2004; Ochiai *et al*, 2008). Since blood cultures are found to be only about 50% sensitive, the actual rate in these communities in this age

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group is likely to be double (*ie*, 904/100,000). Poor sanitation and water supplies maintain endemic conditions in the city. There is also an increasing prevalence of multi-drug resistant (MDR) *S. typhi* in much of Pakistan (Rizvi and Arif, 1996; Bhutta, 2006). The DOMI study found that two-thirds of isolates tested were multi-drug resistant (resistant to all three first-line antibiotics) and 59% were resistant to nalidixic acid. A growing number of reports indicate that nalidixic acid resistance has led to poorer responses to treatment with ciprofloxacin – often the drug of choice where multi-drug resistance is common – and to serious complications from the disease, especially in children (Bhutta, 1996; Rathore and Hasan, 1996; Tariq *et al*, 1998; Bhutta *et al*, 2000; Shafiq-ur-Rehman, 2000).

MDR strains of *S. typhi* have been related to provider and patient reports of over-prescribing and indiscriminate use of antibiotics in Pakistan (Luby *et al*, 1998; Siddiqi *et al*, 2002). Drug resistance also implies problems with adherence to drug regimens. Nevertheless, with few public primary care clinics available, patients and families must decide among various sources of treatment in their search for relief from typhoid fever. This process often occurs over extended periods of time and at an increasing burden to families (Bhutta, 1996; Khan *et al*, 2006). This study explores choices and perceptions of health care for typhoid fever in an effort to identify the sources and patterns of treatment most frequently preferred for typhoid fever, and the influences leading to these patterns of use in an area where endemic and resistant disease is making treatment increasingly costly and complicated. With this information the adequacy of treatment available and appropriateness of its use may be assessed.

Determinants of health-seeking behavior in Pakistan

In Pakistan (Khan, 1993; Luby *et al*, 1998) as in other health care settings in much of the world (Sejfeskok *et al*, 2006; Tornheim *et al*, 2007) distance to health care providers and the cost of treatment are primary determinants in health seeking behavior. While these are critical considerations in public health planning, studies also show that perceived symptoms of an illness, its seriousness and the quality of the care available also affect health seeking behavior (Hunte and Sultana, 1992; D'Souza and Bryant, 1998; Noorali *et al*, 1999). If particular treatments do not prove effective, or a disease becomes more severe, patients, or those managing their care, often choose other, hopefully more effective, treatment alternatives (Nyamongo, 2002; D'Souza, 2003).

This study describes treatment preferences in the selection of care for children with symptoms of typhoid fever that vary by duration and severity. It describes reasons for preferences and the social context in which choices are made, which indicates motivating forces and constraints on the ability to seek care and manage cases of typhoid fever. While distance to providers and cost of services are typically seen as primary determinants of care, they are found to be variously related to particular forms of care and the seriousness of the disease. This information is crucial for assessing and planning health care resources in a context in which health care may not always be effective or available, especially for children who require rapid and appropriate diagnosis and treatment for typhoid fever (Bhutta, 2006).

MATERIALS AND METHODS

This study is part of the International Vaccine Institute's Diseases of the Most Impoverished Program (DOMI). This program aims to prevent *Shigella*, cholera and typhoid fever through the introduction of new vaccines for populations with high rates of these diseases (Clemens and Jodar, 2004). The typhoid fever project has endeavored to assist five Asian

countries, including Pakistan, in the introduction of the Vi polysaccharide vaccine against typhoid fever in public health programs. Yet, in order to target and implement a vaccination program against typhoid fever, it is necessary to have scientific information regrading disease burden, and the economic and socio-behavioral context of typhoid fever in these settings. This study, consisting of a household survey conducted prior to a demonstration trial of Vi vaccine in the same slum areas of Karachi, is one of a number of socio-behavioral investigations of responses to typhoid fever (Chen *et al*, 2005; Kaljee *et al*, 2007).

Research communities

Two adjacent metropolitan slum communities, Sultanabad and Hijrat Colonies in Karachi, Pakistan, were selected as study sites to conduct the typhoid fever socio-behavioral study. Karachi is the largest city in Pakistan and is a thriving seaport. In the 1960s many people migrated to Karachi seeking job opportunities. Subsequently, Sultanabad and Hijrat Colony emerged as squatter settlements.

Sultanabad is situated in the West District of Karachi and covers an area of 2.4 km^2. It has a population of 16,904 people. The squatter settlement is mainly inhabited by Pushto and Hindko ethnic groups. Hijrat Colony is located in the South District, and is adjacent to the most elite district of Karachi. This location provides greater access to employment in government and private sectors. Hijrat Colony covers an area of 2 km^2 and has a population of 19,457 people, and has mainly Punjabi, Pushto, Hindko and Urdu speaking people. The religion of both areas is Muslim.

Community health care facilities

Sultanabad and Hijrat Colony have an array of provider options, similar to many communities in Pakistan (Hunte and Sultana, 1992). However, local public sector facilities (clinics) are nearly non-existant in these sites (Khan *et al*, 2006). Private practitioners are more common and range from board certified physicians to hakims who practice *Unani*, or traditional, Arabic humoral, medicine, although use of traditional medicine has diminished greatly in favor of allopathic medicine (Foster, 1984). Residents consult pharmacists when purchasing medicines, as well as to obtain advice about symptoms of illnesses. Families engage in self-treatment for mild or initial symptoms of illnesses (Zaidi *et al*, 2006). There are also a number of government and private hospitals at varying distances from the communities which are frequented by community members.

The most popular practitioners in these communities are “physicians” of which there are several in each community (27 physicians in Sultanabad, 25 physicians in Hijrat). However, half these providers lack full medical qualification (Khan *et al,* 2006). Many of these physicians utilize “compoders” *(ie*, compounders) or non-qualified auxiliary staff who provide injections or explain the use of medications to patients. After 4-5 years working with a physician, many compoders set up their own medical dispensaries where they provide an array of medical services. Community residents also call them “doctors”.

There are various popular health care facilities in these communities. Aga Khan University (AKU) has established community health centers, which provide free consultation and treatment for mild disorders. Because of AKU’s involvement with the DOMI typhoid fever project, laboratory tests and treatments are provided free of charge at these centers, with cases of severe fever referred to the AKU tertiary hospital. There are also a few specialized maternal child health and EPI centers in these communities.

There are two tertiary government hospitals and various private hospitals at a reasonable distance from these communities (*ie*,

within 5-6 kms). Medical and surgical specialists staff government hospitals. Treatment, consultations and laboratory tests at these facilities are often free of charge, depending on the availability of medications and equipment. Medical specialists also staff private hospitals, although patients must pay for services and medications at these facilities.

Sampling

A randomized, controlled Vi vaccine demonstration project took place in August 2003 in the communities of Sultanabad, Hijrat Colony and Bilal Colony for 2-15 year olds. It was preceded by one year of prospective typhoid surveillance in these areas. At the start of the surveillance study, a census was conducted in the communities from October-December 2001 to identify the socio-demographic characteristics of the population. The socio-behavioral survey was conducted on 502 individuals selected from the census. Data collection was conducted in September 2002.

Men and women 15 years or older living in households which had at least one child under 15 years old were eligible to participate in the survey. Respondents were chosen by a random sample proportional to the size of each community and were equally distributed between men and women.

A rapid assessment consisting of interviews with community residents, health care providers and community leaders was conducted in the study areas prior to the household survey to assist with quantitative instrument development and data interpretation. The 38 individuals who participated in the rapid assessment were excluded from participation in the household survey.

Instrument development and interviewer training

The socio-behavioral quantitative instrument was initially developed by IVI social scientists and members of the typhoid fever study sites at a meeting in Bangkok in February, 2002. It was further refined, based on the results of the qualitative rapid assessment mentioned above. The instrument was translated into the local *Urdu* language, a national language of Pakistan. *Urdu* is spoken and understood by all ethnic groups irrespective of their gender or educational status. The instrument was back-translated by an independent social scientist to examine its correspondence to the English version, pilot-tested and then revised. The survey instrument consisted of four parts: 1) socio-demographic information of respondents, 2) health seeking preferences, 3) perceptions and attitudes regarding typhoid fever, and 4) perceptions and attitudes regarding vaccines.

Interviewers for the study were selected from individuals who had recently completed their masters degrees in social sciences from Pakistani universities. They participated in a week-long training workshop conducted by the IVI and the Pakistani project social scientists. The training sessions included a close review of the questions and their translations, mock interviews, and information about field procedures and data collection.

Data collection and analysis

The interviews took place at the respondents' homes with interviews scheduled by community recruiters. Informed consent was obtained from the respondents prior to the interview. Interviewers read the questions to the respondents to make the data collection consistent across the sites regardless of literacy levels. Each interview took approximately 45 minutes to complete.

Questionnaires were reviewed for completion by the interviewers at the end of each interview. For quality control, field managers reviewed approximately 150 completed surveys to ensure that responses were recorded completely and accurately. Data were entered immediately to identify problems with data collection. Both SAS (SAS Institute, Cary,

NC) and STATA (Stata Corporation, College Station, Texas) software were used for data analysis.

Chi-square tests of significance were utilized to examine socio-demograhic differences in perceptions of typhoid fever, preferences in health care providers and transportation to health care settings. Bivariate logistic regression was used to test for differences in social factors related to the selection of health care providers. Multivariate logistic regression was used to corroborate and further test for independent relations between choice of health care provider, reasons for their selection and social factors.

Ethics

This study received ethical clearance from the institutional review board of the Aga Khan Hospital Ethical Committee and by the Secretariat Committee for Research Involving Human Subjects of the World Health Organization, in Geneva, Switzerland.

Consent forms were read to participants and written consent was obtained. For participants unable to sign the form, an impartial witness signed after the respondent provided verbal consent. All interviews were conducted confidentially and all completed interviews were kept in a locked and secure storage location.

RESULTS

Social characteristics of the sample

Of the 502 household participants in the study, 51% were male. In general, there was a low level of education in this population, particularly among women. While a major proportion of respondents were illiterate (257, 51.2%), 2.5 times more females were illiterate (187, 72.8%) compared to males (70, 28.6%). A few of the respondents (42, 8.37%) had only a primary school education, though nearly a third of participants (157, 31.27%) had completed secondary school.

The average mean monthly income was 5,437 Rps (USD 97), with 80% of the respondents (396/502, 78.9%) having a monthly household income less than 6,000 Rps (USD 107). Twenty-six percent (132/502) of the respondents had a household income less than 3,000 Rps per month (USD 53). These income levels indicate that the communities were impoverished.

The following sections describe experiences, perceptions and responses to typhoid fever among the community residents of Sultanabad and Hijrat Colony.

Community experience and perceptions of typhoid fever

The common Urdu term for typhoid fever is, *maeeyade bukhar*, meaning "fever for a long period of time". When asked about symptoms, they mentioned weakness (45%), continuous fever (41%), intermittent fever (34%), headache (28%) and abdominal pain (21%). These symptoms resemble those identified by researchers as the initial clinical features of typhoid fever (Parry ***et al***, 2002). Close to a third of those surveyed (156/502, 31%) indicated that someone in his or her household had experienced typhoid fever in the past.

Perceptions of typhoid fever

Respondents were surveyed regarding the likelihood that someone in their household would contract typhoid fever in the future, whether particular ages were more susceptible to the disease and if it was perceived as a serious disease.

Nearly 58% of respondents thought it "very likely" (259/502, 52%) or "likely" (30/502, 6%) that someone in the household would get typhoid fever, indicating that a majority of households thought that a family member would contract the disease ($p<0.0001$).

Ninety-two percent of those surveyed thought children 2-6 years of age were vulnerable to typhoid fever, followed by infants

Table 1
Social factors and healthcare choices: initial symptoms.

By community	Total number	Sultanabad		Hijrat		Adjusted OR (Sultanabad)
		No.	%	No.	%	
Private doctor	311	133	56	178	67	0.64 (0.44-0.93)
AKU health center	74	32	14	42	16	0.82 (0.50-1.36)
Government hospital	66	49	21	17	7	3.57 (2.04-6.62)
Private hospital	29	11	5	18	7	0.64 (0.30-1.40)
By age of respondent	**Total number**	**≤ 32 year**		**> 32 years**		**Adjusted OR (young) (95% CI)**
		No.	%	No.	%	
Private doctor	311	170	67	141	57	1.49 (1.02, 2.17)
AKU health center	74	33	13	41	16	0.77 (0.46, 1.28)
Government hospital	66	23	9	43	17	0.53 (0.30, 0.93)
Private hospital	29	13	5	16	6	0.77 (0.36, 1.68)

(≤1 yr, 88.2%) and adolescents 7-16 years old (87.2%). While perceived risk for the disease was not significantly different between these age groups, compared to these younger ages, perceived vulnerability to the disease was considerably lower for persons age17-50 (66%) and >50 (64%) ($p<0.0001$).

Most respondents felt that typhoid fever was a serious disease for all age groups. The majority of respondents described it as "serious" or "very serious" for children less than 7 years old (96%). Typhoid fever was believed to be the most severe in children less than 2 years old compared to other age groups, with 67% of the respondents describing it as "very serious" for this age group ($p<0.0001$). Conversely, perceived severity was the lowest for adults age 17-50, in which only 23% of respondents identified typhoid fever as "very serious" for this age group ($p<0.0001$).

Usual health care preferences

Community members were familiar with the various treatment options in Sultanabad and Hijrat Colony. The majority of respondents (449/502, 89%) indicated that they or a member of their household had visited a healthcare facility for treatment within the past 6 months.

Sixty-eight percent ($p<0.0001$) of those surveyed cited private doctors as their usual source of healthcare, although, as mentioned, those locally known as "doctors" do not necessarily have formal medical education or qualifications. As shown in Fig 1, the next most common response was to seek health care for children at the Aga Khan Health Center, chosen by 15% of respondents. Seeking care at a government hospital was chosen by 11% of respondents, while seeking care at private hospitals, pharmacies, hakims (traditional healers) or through self-treatment were not commonly cited.

Health care preferences for initial symptoms of typhoid fever

Respondents were asked what they would do in response to the initial symptoms of typhoid fever in children, with symptoms defined as having a high fever (39-40^{0}C) for three days accompanied by a headache and abdominal pain (Levine, 1994; Parry ***et al***, 2002). As shown in Fig 1, 62%, indicated that their first response would be to seek care with

a private doctor. The next most common preference was to seek care at the Aga Khan Health Center, which was chosen by 14% of respondents, with seeking care at a government hospital chosen by 13% of respondents. Use of a private hospital, pharmacy and self-treatment were not commonly cited. The healthcare-seeking pattern for initial symptoms of typhoid fever was found to correlate closely with their usual source of providers (Kappa: 0.61, 95% CI 0.55,0.67) (Fig 1).

Health care preferences for continuing symptoms of typhoid fever

Several respondents shifted in their choice of health care provider when considering continuing symptoms of typhoid fever, with hospitals becoming the most important source of care, as one would expect. In these circumstances, a majority of respondents (56%) would take their child to either a government (36%) or private hospital (29%) ($p<0.01$), with government hospitals more often selected for children with persistent symptoms of typhoid fever ($p<0.0001$). These findings indicate a shift in preference for health care from initial symptoms in which government and private hospitals were infrequently selected as sources of health care (13% and 6%, respectively).

Consistency in health care preferences for continuing symptoms. While the selection of government hospitals greatly increased and were preferred more frequently (36 %) than private doctors (32%) for persistent symptoms of typhoid fever, they were not selected at significantly different rates ($p=0.127$). Thus, while there was a general shift to seek care at hospitals for persistent symptoms of the disease, 40% of those who chose a private doctor for initial symptoms would continue to use this option if symptoms persisted, although the overall proportion with this choice decreased by half, (311 or 62% to 159 or 32%) (Fig 2).

Similarly, nearly two-thirds of those who chose government hospitals as a source of care for initial symptoms would continue to select these facilities if symptoms persisted (Fig 3).

These patterns of health care preferences suggest that health care decisions are influenced by perceptions of the disease and the availability of health alternatives, as well as by social factors that influence choice of providers. Social and community factors associated with preferences for health care are examined below, followed by the reasons for choices of providers.

Social factors in health seeking behavior for typhoid fever

Social factors in health seeking preferences for initial symptoms of typhoid fever. Variations in health care preferences were examined for children with initial typhoid fever symptoms, in relation to differences in gender, age, education, income and the community of the respondents. Patterns of healthcare choices did not vary significantly by level of education or monthly household income, no doubt related to the economic homogeneity of these communities.

However, respondents from Sultanabad reported seeking care from a government hospital more frequently than respondents from Hijrat Colony. Those from Sultanabad sought care from a private doctor less frequently than those in Hijrat Colony. There were no government clinics in Hijrat Colony, while there was a government dispensary in Sultanabad. These patterns remained significant after adjusting for age, gender and education.

In terms of age, younger respondents (≤32 years of age) more often reported seeking care from a private doctor than older respondents (>32 years), with a less frequent preference for care from a government hospital than older respondents. These patterns remained significant after adjusting for community of residence, gender and education.

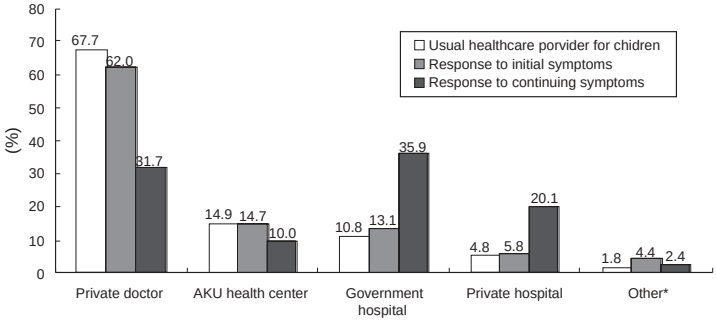
Social factors in health seeking preferences for continuing symptoms of typhoid fever. In considering children with symptoms of typhoid fever that persist for more than three days, respondents from Sultanabad, more frequently reported they would seek care from a private doctor than those from Hijrat Colony, but less frequently from a private hospital. After adjusting for community, age, education and socioeconomic status these differences remained significant.

Table 2 below also shows that female respondents would more frequently seek care from a private hospital than male respondents after adjusting for community, age, education and socioeconomic status.

Reasons for choosing particular providers for typhoid fever exhibited variations in response to different levels of disease severity similar to variations in respondents' choices of provider. The reasons for preferences for particular providers indicate the influence of health provider characteristics and disease severity.

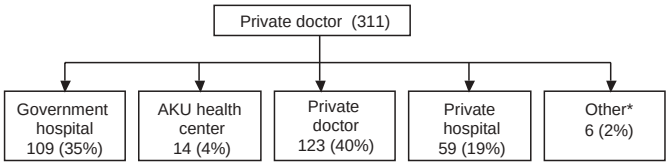
Reasons for choices of health care for typhoid fever

Reasons for choice of provider for initial symptoms of typhoid fever. For a child with initial symptoms of typhoid fever, distance was most frequently mentioned as the key determinant in choosing a provider (55%, 225) ($p<0.0001$), followed by quality of consultation (44.2%, 212) and cost (41.3%, 198) (Table 3). Distance was also the key reason for the use of a private doctor (65%, 202), which was the most preferred source of care for initial symptoms of typhoid fever.



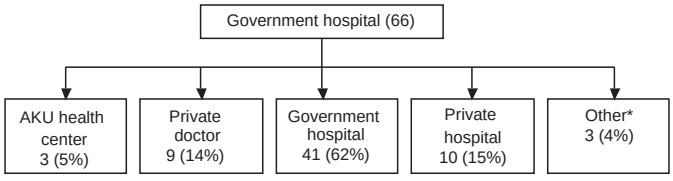
*Other includes self-treatment, pharmacy, traditional healer, etc.

Fig 1–Percent initial and continuing responses to typhoid fever symptoms for children ($p<0.0001$).



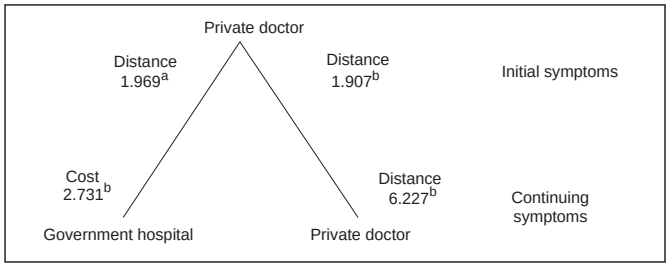
*Other includes self-treatment, pharmacy, religious elder, etc.

Fig 2–Flow from private doctor as choice for initial symptoms of typhoid fever to choice for persistent symptoms.



*Other includes self-treatment, pharmacy, religious elder, etc.

Fig 3–Flow from government hospital as choice for initial symptoms of typhoid fever to choice for persistent symptoms.



[a]$p<0.001$, $p<0.0001$

Fig 4–Flow from private doctor for initial symptoms to government hospital and private doctor for continuing symptoms with reasons for choices.

Table 2
Social factors and healthcare choices: continuing symptoms.

By gender of respondent	Total number	Male		Female		Adjusted OR (Female respondent (95% CI)
		No.	%	No.	%	
Private doctor	159	82	33	77	30	0.84 (0.55-1.30)
AKU health center	50	18	7	32	12	1.69 (0.83-3.42)
Government hospital	180	98	40	82	32	0.70 (0.46-1.06)
Private hospital	101	41	17	60	23	1.75 (1.04-2.94)
By area	Total number	Sultanabad		Hijrat		Adjusted OR (Sultanabad)(95% CI)
		No.	%	No.	%	
Private doctor	159	87	37	72	27	1.56 (1.06, 2.28)
AKU health center	50	34	14	16	6	2.66 (1.42, 4.98)
Government hospital	180	75	32	105	40	0.70 (0.48, 1.02)
Private hospital	101	35	15	66	25	0.51 (0.32, 0.80)

Tables 3
Reasons for choice of healthcare provider for initial symptoms, *N*(%) multiple responses permitted.

Chosen provider	Reasons for choice of healthcare provider for initial symptoms (p<0.001)					
	Distance	Quality of consultation	Cost	Drug availability	Treatment options	Total
Private doctor	202 (65.0)	125 (40.2)	98 (31.5)	66 (21.2)	66 (21.2)	311
AKU health center	44 (59.5)	28 (37.8)	49 (66.2)	16 (21.6)	19 (25.7)	74
Government hospital	10 (15.2)	40 (60.6)	43 (65.2)	33 (50.0)	26 (39.4)	66
Private hospital	9 (31.0)	19 (65.5)	8 (27.6)	7 (24.1)	8 (27.6)	29
Total	265 (55.2)	212 (44.2)	198 (41.3)	122 (25.4)	119 (24.8)	480

On multivariate regression analysis of reasons for choosing providers (Table 4) distance was also most often significantly associated with use of private providers (p<0.01), with cost of treatment not related to choosing this form of care. Distance was also associated with a preference for the use of AKU health clinics (p<0.001) for children with typhoid fever with the cost of care important in the use of this provider (p<0.01). For those that selected government hospitals, cost (p<0.001), the availability of medications (p<0.001) and quality of consultation (p<0.05) were significant reasons for the use of these facilities with distance and quality of consultation not related to this choice of provider. However, only a minority of respondents (13%) chose this provider.

The general identification of distance as a reason for choosing a provider in these communities may be related to the fact that walking was the most common form of transportation to health facilities (79.7%, p<0.0001). It was the most common means of transportation to private doctors (87.5%, p<0.0001). In traveling to government health facilities,

Table 4
Reasons for choice of provider for initial symptoms of typhoid fever (Summary of multiple logistic regression, ORs).

	Distance	Cost	Quality of consultation	Treatment option	Drug availability
Private doctor	3.163[b]	0.329[b]	0.803	0.747	0.745
AKU health center	1.412	3.609[b]	1.01	1.315	0.696
Government hospital	0.143[b]	3.537[b]	1.982[a]	1.706	2.999[b]
Private hospital	0.402[a]	0.565	2.16	1.007	0.898

[a]p<0.05 , [b]p<0.01

Table 5
Factors influencing the choice of private doctors for initial symptoms of typhoid fever.

Private doctor	OR	95% CI	p-value
Age <32 years	1.430	0.944 2.167	0.0913
Sultanabad	0.600	0.397 0.906	0.0152
Distance	2.940	1.932 4.473	<0.0001
Treatment options	0.765	0.471 1.242	0.2784
Cost	0.350	0.231 0.531	<0.0001
Quality of consultation	0.900	0.585 1.387	0.6341
Drug availability	0.774	0.484 1.238	0.2850
Women (gender)	1.275	0.834 1.951	0.2625
Walking time	2.340	1.549 3.534	<0.0001

walking was less frequently mentioned than for private providers (33.3%), and taking buses was the most common (53%). Distance or physical access in the selection of private doctors was further indicated in the mean time to reach these providers which was half the time (14.9 minutes) for private providers compared to the time to reach government health facilities (28 minutes).

In an assessment of the effects of social factors and provider characteristics related to the choice of private doctors for initial symptoms of typhoid (Table 5), distance and walking time were independently related to the choice of these private providers. Controlling for other factors (*eg*, education, income, gender), residents of Sultanabad were less likely than those of Hijrat Colony to select private clinics for their child's care. Cost, as noted earlier, was not associated with the decision to use these providers.

Reasons for choice of provider for continuing symptoms of typhoid fever. There was a nearly three-fold increase (66:180 respondents) in the preference for government hospitals as a primary source of care for continuing symptoms of typhoid fever (p<0.01) (Table 6). The factors most often mentioned as influencing the choice of these providers were cost (p<.0.01) and drug availability (p<0.01), with distance and quality of consultation unrelated to the selection of government hospitals for care (p<0.01) (Table 7).

Private doctors were the second most common preference for care for continuing symptoms of typhoid fever. These choices

Table 6
Reasons for choice of healthcare provider for persistent symptoms (multiple responses permitted).

Chosen provider	Reasons for choice of healthcare provider for persistent symptoms (*N*/%)					
	Distance	Quality of consultation	Cost	Drug availability	Treatment options	Total
Private doctor	65 (41)	73 (46)	34 (21)	26 (16)	86 (54)	159
AKU health center	21 (42)	23 (46)	20 (40)	14 (28)	26 (52)	50
Government hospital	11 (6)	55 (31)	104 (58)	67 (37)	101 (56)	180
Private hospital	6 (6)	57 (56)	15 (15)	22 (22)	59 (58)	101
Total	103 (21.0)	208 (42.4)	173 (35.3)	129 (26.3)	272 (55.5)	490

Table 7
Reasons for choice of healthcare provider for persistent symptoms: summary of multiple logistic regression (ORs).

	Distance	Cost	Quality of consultation	Treatment option	Drug availability
Private doctor	6.711[b]	0.368[b]	1.329	1.173	0.497[b]
AKU health center	3.297[b]	1.254	1.324	1.066	1.064
Government hospital	0.094[b]	5.077[b]	0.424[b]	1.013	2.322[b]
Private hospital	0.192[b]	0.284[b]	1.863[b]	0.983	0.817

[a]$p<0.05$, [b]$p<0.01$

represent a continuity in preferences related to their earlier selection for initial symptoms. Those that continued to choose these providers similarly indicated that distance was a key reason for their selection ($p<0.01$) with cost and drug availability ($p<0.01$) again not associated with this health care choice (Table 7).

Private hospitals, like government hospitals, also received a three-fold increase in their selection for continuing symptoms of typhoid fever (29:101 respondents). Unlike government hospitals, however, quality of consultation ($p<0.01$) was the key factor in this choice of care rather than cost.

In an analysis of the independent effects of social factors and provider characteristics on the choice of government hospitals for care for continuing symptoms of typhoid fever, cost and the availability of medications, as well as travel time in taking buses to these providers were significantly associated with the selection of these health facilities (Table 8). As in earlier analyses, distance and quality of consultation, were not related to the choice of provider.

Continuity and change in selections and influences on choices of health care providers

As these results show, shifts and continuity in reasons for the choice of provider indicate respondent perceptions of providers and the need for care. Fig 4 illustrates how the choice of private doctors for initial and continuing symptoms for children's episodes of typhoid fever, also identified distance as the primary reason for choosing this provider. Those that selected private doctors initially but

Table 8
Factors related to choice of government hospitals for continuing symptoms of typhoid fever.

Government hospital	OR	95% CI		p-value
Hijrat	1.303	0.814	2.087	0.2703
Distance	0.096	0.045	0.206	<0.0001
Treatment options	0.948	0.600	1.496	0.8178
Cost	4.955	3.113	7.889	<0.0001
Quality of consultation	0.367	0.225	0.597	<0.0001
Drug availability	2.245	1.371	3.676	0.0013
Women (gender)	0.735	0.471	1.144	0.1726
Travel by bus time	4.335	2.237	8.400	<0.0001

then switched to government hospitals for prolonged symptoms consistently mentioned cost as the primary consideration influencing the selection of these providers, as seen in earlier assessments (Tables 4 and 7). These consistencies and transitions show the predominance of cost and distance in the choice of provider, which suggests that factors related to more acute, initial episodes of the disease, contrast with the demands of more prolonged symptoms and the need for care beyond an initial three days of illness.

DISCUSSION

In the communities of Sultanabad and Hijrat Colony respondents were aware that typhoid fever was a prevalent and serious disease, especially in children and infants, who were seen as those most vulnerable to attacks of the disease. Studies of multi-drug resistant strains of *S. typhi* commonly found in Pakistan and elsewhere in South Asia show that children, and especially infants, are the most susceptible to severe and complicated cases of typhoid (Bhutta *et al*, 1991; Verma *et al*, 1996; Bhutta, 2006). Respondent attitudes about the seriousness of typhoid fever reflect the high incidence and resistant strains of the disease found in these communities (Ochai *et al,* 2008). These conditions have made treatment of children with the disease increasingly complex and costly. Assessment of local preferences for health care for children is critical for assessing and improving the management of the disease and access to needed services (Bahl *et al*, 2004).

In this setting, which lacks government primary health care facilities to treat typhoid fever, government hospitals, the main available public provider, were not the first choice of care for most households (Khan *et al*, 2006). Thus, for initial symptoms a majority of respondents selected private doctors for their child's care. This finding corresponds to the use of the private sector, which is common throughout Pakistan and in other parts of South Asia, where local private providers give the bulk of care, even in impoverished communities (Nizami *et al*, 1996; Thaver *et al*, 1998; Batia *et al*, 2001) In the close-knit, slum communities of this study, the predominant influence on the selection of private providers was the distance or the physical access to these providers. In addition, the significant correlation between preferences for these providers for typhoid fever and their use as regular sources of care for general family ailments, indicate that previous household experience was important in their selection by community residents.

Respondents perceived local, qualified and unqualified private doctors as providing immediate care, with cost being not as im-

portant in this choice of provider, implying expectations of a quick recovery. Respondents also stated that their main transportation to private doctors involved walking for a short period of time to reach them, thus involving little out-of pocket financial or temporal travel expense. This situation indicates that a series of factors influenced household decisions in selecting a private doctor for typhoid fever, including household proximity and previous experience with providers, and responsive care that was likely provided by familiar staff, which is typical in these small, community-based clinics (Noorali *et al*, 1999; Pongsupap and van Lerberghe, 2006).

The shift in health care preferences for persistent symptoms of typhoid fever to more frequently select government and private hospitals involved considerations of cost and drug availability most commonly cited for the selection of government hospitals, compared to quality of care mentioned as the key reason for selecting private hospitals. The use of government hospitals for extended care of a family member is typically associated with free health care, including free medications, if available. For those that selected private hospitals as their preference for treatment, these for-profit institutions were thought to provide superior, if expensive care.

It is important to note that 40% of respondents who selected private providers for initial symptoms of typhoid fever would continue to use these providers for their children with persistent symptoms of the disease, with distance again given as the chief reason for their selection. As demands on families are perceived to increase with a member facing a prolonged case of typhoid fever, there are perceived benefits in immediate access to care and in having confidence with familiar providers.

However, social context was also a factor in variations in preferences for health care related in part to the presence of a government medical dispensary in Sultanabad, which provided free consultations and medications, if available. Whereas other government hospitals more typically frequented by these community residents, such as those of the Karachi Development Authority (KDA), involved more distant locations.

Responding to continuing symptoms, residents of Hijrat Colony more often selected private hospitals than those of Sultanabad. This trend was related to residents of Hijrat Colony being more often employed in government offices and private companies than residents of Sultanabad. Such employers provide additional support for health care allowing employees to more easily afford the expensive and superior care of private hospitals.

It was also noted that women were more likely to choose private hospitals for the care of their children for continuing symptoms of typhoid fever than men, selecting what they perceived to be the best care available for their children. This finding reflects a common finding that women have an important perspective on their children's illnesses and the quality of their children's care (Buor, 2001; Bhutta *et al*, 2004; Halvorson, 2004).

The effects of social factors related to health care preferences show that a range of influences affect health care decision-making at the household level which are also often specific to particular communities. These considerations are crucial in assessing health care conditions and in planning for improvements in the health care resources of communities (Noorali *et al*, 1999).

Inadequate and inappropriate care by households and practitioners have been major contributors to unacceptable levels of morbidity and complications from typhoid fever, and has led to the emergence of drug-resistant strains of the disease (Khan and Khan, 2000). A recent study (Siddiqi *et al*, 2002) comparing prescribing practices for 12 countries showed that, even among qualified prac-

titioners, providers in Pakistan were found to prescribe more antibiotics inappropriately than in any of the other country.

With children in impoverished communities suffering a disproportionate burden of the disease (Bhutta, 1996; Sinha *et al*, 1999; WHO, 2003), interventions should involve health education and social support to assist household care givers in recognizing potentially-life threatening conditions, in identifying adequate sources of care and in improving their use of medications (Trostle *et al*, 1983; D'Souza and Bryant, 1998; Siddiqi *et al*, 2002). In addition, given the variable nature of qualified and unqualified private "doctors" in this setting (approximately 50% of each; Kahn *et al*, 2006), it is crucial that the quality of the care is assessed and interventions instituted to improve provider practices and strengthen the public health infrastructure (Marsh *et al*, 1999). Thus, there is a need for information, training and supervision in the management of typhoid fever for private and public practitioners in these communities, and no doubt elsewhere in Pakistan and South Asia. As Siddiqi and colleagues (2002) recommend, along with efforts to educate communities in the appropriate use of medical care and in changing provider prescribing habits, intervention strategies need to be planned and evaluated for their appropriateness in specific health care settings, as this study indicates. The place to start seems most importantly to build, staff and equip public health clinics in these communities.

This study of health-seeking behavior was based on responses to hypothetical symptoms of typhoid fever. In the initial onset of an actual case of the disease there may be home care that could include special dietary regimens and the use of traditional and pharmaceutical treatments (Zaidi *et al*, 2006). In the responses examined here expert care was identified for what was perceived as a serious disease, rather than for its more initial and generalized symptoms. While the decisions of patients cannot be predicted conclusively, this data reflects typical health care seeking behavior and likely sequences and strategies in the management of household episodes of the disease.

In summary, the considerations of health care options in these slum communities were influenced by multiple factors including the severity of the disease, physical access to health care, experience with previous providers, the cost of care and the quality and range of health care options. Important contextual influences were the availability of health care options in the community, geographic setting and socio-demographic factors. As these findings suggest, there is a need for further studies of providers' diagnostic and prescribing practices in order to improve professional and household management of the disease. Long-term goals need to involve the development of public primary health care clinics to ensure adequate diagnosis, treatment and referral of cases of typhoid fever. Improvements in the treatment of typhoid may reduce the production of drug resistant strains of *S. typhi*, along with severe cases of the disease and its complication. This study is a first step in assessing and planning for appropriate public health interventions to manage the problem of typhoid fever in children.

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