Availability and satisfactoriness of latrines and hand washing stations in health facilities, and role in health seeking behavior of women: evidence from rural Pune district, India

Peter Steinmann, Martin W. Bratschi, Pallavi Lele, Uddhavi Chavan, Neisha Sundaram, Mitchell G. Weiss, Sanjay Juvekar and Siddhivinayak Hirve

ABSTRACT

Water, sanitation and hygiene (WASH) installations are indispensable in health care facilities. Their quality might also influence the decision whether to visit a health facility. We investigated the WASH infrastructure in small health facilities in rural Pune, India, and surveyed expectations and satisfactoriness among women. The availability and quality of WASH installations was assessed in 12 facilities using a checklist. Dedicated questions in a household survey provided the community perspective, complemented by qualitative methods. A few public facilities had no latrine or hand washing station. On the contrary, all private facilities offered such installations. The bed/outpatient-to-installation ratio was also lower in private compared to public facilities. While most latrines were functional and well maintained, they often lacked garbage bins. Soap was often missing from hand washing stations. Dedicated latrines for women were rare. Women were generally satisfied with the WASH installations in the local health facility, but considered private facilities as better. WASH installations in health facilities are generally acceptable in private facilities while improvements are needed in some government facilities. Women expect WASH installations in health facilities, and view their quality in a broader framework of 'cleanliness,' which they consider when choosing facilities.

Key words | adequacy, health facility, health seeking behavior, India, sanitation facility, women

Peter Steinmann (corresponding author)
Martin W. Bratschi
Neisha Sundaram
Mitchell G. Weiss
Department of Epidemiology and Public Health,
Swiss Tropical and Public Health Institute,
Socinstrasse 57,
4051 Basel,
Switzerland
E-mail: *peter.steinmann@unibas.ch*

Peter Steinmann
Martin W. Bratschi
Neisha Sundaram
Mitchell G. Weiss
University of Basel,
Basel,
Switzerland

Pallavi Lele
Uddhavi Chavan
Sanjay Juvekar
Siddhivinayak Hirve
KEM Hospital Research Centre,
Pune,
India

INTRODUCTION

Water and sanitation facilities are a required feature of essential infrastructure for all public service institutions. Ensuring adequate water, sanitation and hygiene (WASH) is especially critical in health care facilities, which serve people who are sick or otherwise vulnerable, including pregnant women and infants whose immune systems may be immature or impaired. Health facilities lacking improved latrines (i.e., latrines that hygienically protect from contact with human excreta) or not providing a reliable supply of safe and uncontaminated, water expose patients and staff to inconveniences and health hazards (World Health Organization [WHO] 2008a; Bartram *et al.* 2015). Benova and colleagues have recently reported an association between WASH infrastructure at home and in facilities and maternal mortality (Benova *et al.* 2014). WASH installations in health facilities, as in all other places, must adhere to technical standards ensuring efficient protection of users and the community from exposure to fecal matter, separation of sewage from water bodies, and a sufficient supply of safe water. WASH installations that are kept clean and

doi: 10.2166/washdev.2015.101

odorless and meet the technical expectations of potential users are also more appealing, and hence are more likely to be used consistently, promoting sanitary conditions in and around a health facility. A locally acceptable design is another key factor promoting effective use. Furthermore, regular cleaning and maintenance are required to ensure hygiene and functionality (WHO 2008a, 2008b).

The medical condition of the patient, geographical access to a health facility, the reputation of the institution (often linked to its history and key staff), cost, previous experience, and the knowledge and advice of family and friends influence decisions of whether to visit a health facility and which one (Karkee & Kadariya 2013). Availability and satisfactoriness of basic infrastructure, including WASH installations, may also influence this decision but the impact of this factor on the decision process is not well described in the scientific literature. Similarly, little is known about expectations and demands in the community of potential patients with regard to WASH in health care facilities.

Crucially, minimal demands of patients in terms of WASH installations are likely influenced by local hygiene perceptions, personal living conditions, previous experience and expectations that are in turn influenced by information obtained through the family, peers and the media. Hence, findings from a facility survey can best be understood in the light of quantitative and qualitative findings from community-based surveys and interviews. Mother and child health is a cornerstone of primary health care and a key reason to visit health care facilities for girls and women of reproductive age. Most of these visits take place at the most peripheral and accessible health care facilities as such visits are relatively frequent and typical conditions do not require sophisticated infrastructure or equipment. In such facilities, WASH conditions tend to be most precarious as facilities are usually small, have a low profile and resources are limited.

In India, open defecation remains a common practice for some segments of society, and access to basic sanitation infrastructure is not universal: according to the WHO/United Nations Children's Fund [UNICEF] Joint Monitoring Programme for Water Supply and Sanitation, the prevalence of open defecation in India was 48% in 2012, and 36% of the population had access to improved sanitation (Malik 2013; WHO/UNICEF Joint Monitoring Programme 2014). Indian Public Health Standards require sub-centers to be equipped with one toilet facility in the waiting area, one in the labor room (if available), and one in the ward room (if available). Safe water in adequate quantity is also to be provided (Directorate General of Health Services 2012). Research has not adequately examined the WASH infrastructure in Indian health facilities generally and those providing maternal and child health services in particular (Benova *et al.* 2014).

According to WHO, 66.6% of all births in India were in institutions in 2011, and maternal mortality was 190 per 100,000 live births in 2013 (WHO 2014). A high proportion of the institutional births are in private facilities (Thind *et al.* 2008), reflecting the general disposition to use private health care providers in India (Yip & Mahal 2008). To stay in business, private health care providers, which in India operate in parallel with the governmental or public system, need to attract customers, i.e., patients, with a product that is superior compared to that available in the public system (Yip & Mahal 2008). One way to distinguish their services from public health facilities is by ensuring their infrastructure has more amenities, including attention to WASH facilities. Nevertheless, lax supervision, failure to enforce regulations and limited alternatives may also result in substandard facilities of private health care providers (Yip & Mahal 2008).

The aims of this study were three-fold: (i) to objectively describe the availability and functionality of WASH installations in a sample of lowest-tier government and private health facilities that provide prenatal and obstetric care in the Vadu area of the Pune district of Maharashtra state, India; (ii) to survey expectations and the satisfactoriness of WASH installations in government and private health facilities in the community of (potential) patients and among local government officials, teachers and health professionals; and (iii) to gauge how public consideration of WASH installations affects community regard and prospects for use of health facilities.

METHODS

Study location and data collection

This study was an integral part of the research project, 'Women, WASH and Health in Rural Pune District – identifying stress and unmet needs,' implemented at the site of the

Vadu Health and Demographic Surveillance System (Vadu HDSS) in Pune, India in 2013–2014. The study setting and data collection approach have been described in detail elsewhere (Hirve *et al.* 2015). In brief, the Vadu HDSS covers over 100,000 people living in 22 villages. The study focused on the communities covered by the Vadu HDSS, a semi-rural area about 30 km north-east of Pune city in Maharashtra state, western India. In addition to two rural hospitals, a total of eight smaller government clinics with together less than 100 beds and 10 private health facilities serve the local population; they offer inpatient and outpatient services, with a focus on emergency, general, maternal and child health care services.

Instruments and data collection

A checklist (available as Support Material 1 (S1)) was used for the health facility survey. Additional efforts to understand the community's perception were implemented in a household survey, focus group discussions (FGDs) and key informant interviews (KIIs) (Table 1) (Hirve *et al.* 2015). The selection of survey respondents was not stratified according to facility catchment areas.

The facility survey covered six public and six private health care facilities providing antenatal care and obstetric services in the study area. Facilities were selected based on location (along the main highway as relatively easy access would offer patients the possibility to choose among facilities), current provision of relevant services and willingness of the head doctor to be included in the study. The checklist assessed the quality of available WASH installations with respect to the following considerations: number, type and location of toilets; gender-distinct facilities; functionality and maintenance (cleanliness and hygiene); provision for privacy of users; and accessibility. Similarly, hand washing facilities were tallied with reference to number of taps, location and water supply, functionality and condition, cleanliness, hygiene (availability of soap) and accessibility.

The community survey questionnaire used to assess broader project interests included two questions about WASH in health care facilities while the FGDs were informed by three relevant issues. The focus of the community survey questions and the FGD topics considered the satisfactoriness of WASH installations in health care institutions and whether their quality influenced decisions about use of particular health services. Depending on the respondent group, the guides for KIIs contained up to six questions related to WASH installations in health care facilities. Health personnel were asked about the adequacy of WASH installations and the observed link between WASH installations and health outcomes. They were also interviewed about their impression of whether the availability and conditions of WASH installations were a factor influencing decisions of where patients seek care, as well as plans to improve WASH installations at their institution. KII questions for community leaders were the same as those for health care personnel, except that community leaders were not asked whether they believed that the quality of WASH installations affected the patients' decisions about which health facility to use. Teachers were not interviewed about WASH in health care facilities.

Table 1 | Data collection methods and number of participants

Data collection method	Number of participants	Comment
Health facility checklist	6 public facilities, 6 private facilities	Along main highway
Household survey	165 adolescent girls (13–17 years old), 143 adult women (18–45 years old)	Randomly selected
FGDs	7	Adolescent girls, women
KIIs	21	Community leaders, school and health care personnel

Data analysis

Data from the facility checklist were double-entered and checked for internal consistency. Data analysis was descriptive, with results stratified by facility status (government or private). Variables summarizing the quality of available WASH infrastructure in a certain domain were generated. The following domains were investigated for sanitation and hand washing facilities: adequacy (type and ratio of facilities to patients), functionality (all necessary infrastructure and equipment present and in good working

condition; 10 items for latrines and 7 items for hand washing stations), order and maintenance (cleanliness; 6 items for latrines and 3 items for hand washing stations), accessibility (safe and easy access; 1–2 items for latrines and 2 items for hand washing stations) and privacy (only latrines; necessary infrastructure; 3–4 items). For each domain, a score was calculated by summing the status of all its components (1 = present/no problem; 0 = absent/insufficient), and the domains classified as sufficient if at least half (for 2 items per domain) or 2/3 (for >2 items per domain) of the maximum possible score was achieved, i.e., for a domain with 3 or more items: adequate/good (67–100% of the characteristics contributing to the domain are classified as present/no problem), partially adequate (34–66%) and inadequate (0–33%). These indicators summarizing the quality of the available WASH infrastructure by domain were formulated with reference to a tool developed for a WHO pilot survey of sanitation facilities in schools in Albania and Croatia (unpublished material).

The narratives from the FGDs and KIIs were transcribed and then translated from Marathi to English, with quality control procedures to ensure the faithfulness of the transcription and translation. Specifically, all translations were reviewed by a social scientist, and a random sample of 10% of all interviews were translated a second time and compared to the initial translation. The community survey questionnaire responses were directly entered into a MySQL relational database, with consistency and range checks as well as appropriate skips built into the data entry package. Data were analyzed using STATA v13. For details on data capture and entry for the community survey, FGDs and KIIS see Hirve *et al.* (2015).

Ethics statement

The study was approved by the Ethics Committee of the King Edward Memorial Hospital Research Center, Pune, India (KEMHRC/VSP/DirOff/EC/1899) and the Ethikkommission beider Basel, now Ethikkommission Nordwest- und Zentralschweiz (ethics committee Northwest and Central Switzerland), the body granting ethical clearance for studies conducted by institutions in the Canton of Basel-Stadt where the Swiss Tropical and Public Health Institute is located (Reference 174/13). Health facility managers granted permission to assess their facilities. Adult respondents to questionnaires and participants in FGDs and KIIs provided written informed consent before enrollment into the study. Adolescent girls (under 18 years-of-age) assented to participate while written informed consent was obtained from the legal guardian.

RESULTS

Quantitative health facility survey

All 12 health facilities (6 private; 6 public) where WASH installations were surveyed were small third-tier facilities offering maternal and child care services, complemented by basic services in other areas including non-communicable diseases and emergency care. The mean number of beds in the public facilities was 4.5 (median 3; range 1–12), and the mean was 14 (median: 15; range: 8–20) in the private facilities (Table 2). An approximation of the number of outpatient contacts per day was 44 in the public facilities (median: 53, range: 8–113) and 23 (median: 23; range: 13–33) in the private facilities, indicating a predominance of ambulatory care in public facilities while private facilities are focusing on inpatient services.

Table 2 | Availability of WASH infrastructure within surveyed health facilities in Pune district

	Facility	Number of toilets in the facility	Number of hand washing stations in the facility (taps)	Number of beds in the facility	Number of outpatients using the facility (approx. per day)
Public	1	0	0	1	5–10
	2	1	1	5	50–55
	3	2	0	3	50–55
	4	2	1	12	100–125
	5	1	1	3	25–30
	6	2	2	3	10–15
	Mean	1.3	0.8	4.5	44.2
Private	1	2	2	15	15–20
	2	3	3	12	20–25
	3	1	1	8	10–15
	4	8	8	16	30–35
	5	4	5	20	30–35
	6	3	3	15	20–25
	Mean	3.5	3.7	14.3	23.3

The mean number of latrines per health care facility was 2.4 (median 2; range 0–8), but there were fewer in public (mean 1.3; median 1.5; range 0–2) than in private (mean 3.5; median 3; range 1–8) facilities. One public health care facility did not have any latrines. Latrines generally were classified as improved (flush toilets) and were located inside the health facility in 7 instances. One public facility had an unimproved (pit without cement slab) latrine. Generally, one hand washing station (tap) was available per latrine but two public facilities did not have any hand washing stations. The mean number of hand washing stations was 0.8 (median: 1; range 0–2) in public facilities, 3.7 (median: 3; range: 1–8) in private facilities and 2.3 (median: 1.5; range: 0–8) across all health care facilities surveyed. In all facilities with latrines and hand washing stations, the latter were located close to the latrines and were supplied with water from a tap connected to the main water source of the health center (typically a large cistern).

On average, one latrine was available for about 4 beds (Table 3). While this relationship was relatively steady across the private health care facilities, it varied more in public ones (1.5–6 beds per latrine in facilities with latrines). In terms of outpatients, on average one latrine was available for every 7 of them in private facilities (range: 4–8) while in

Table 3 | Status of WASH infrastructure in surveyed health facilities in Pune district (for definitions, refer to section 'Data analysis'; for the list of variables and possible outcomes refer to Supporting material S1, (available online at http://www.iwaponline.com/washdev/005/001.pdf))

	Number			
	Public ($n = 6$)	Private ($n = 6$)	Total ($n = 12$)	Comments
Adequacy (latrines): good				
Type of latrine	4[a]	6	10	Flush toilets inside ($n = 7$) or outside ($n = 3$)
Bed/latrine ratio	3.5	4.1	3.9	One public facility without toilets
Outpatient/latrine ratio	34.0	6.7	14.0	One public facility without toilets
Adequacy (hand washing stations): good				
Type of hand washing station	4[b]	6	10	Distance <10 m from latrine
Bed/hand washing station ratio	5.6	3.9	4.2	Two public facilities without HWSs
Outpatient/hand washing station ratio	55.3	6.3	15.0	Two public facilities without HWSs
Functionality: good				
Latrines	4[a]	6[d]	10	Garbage bins in only 2 facilities
Hand washing stations	2[h]	6	8	Hand drying materials in 0 facilities
Order and maintenance: good				
Latrines	3[c]	6[d]	9	Toilet paper in 0 facilities
Hand washing stations	2[i]	5[j]	7	No soap in 6 facilities
Accessibility: good				
Latrines	4[e]	6	10	Indoor or convenient path
Hand washing stations	3[k]	6	9	Indoor or convenient path
Privacy ensured (latrines)	5[f]	5[g]	10	Reserved latrine(s) for women in 2 facilities

[a]Others: latrine absent ($n = 1$), latrine unimproved ($n = 1$).
[b]Others: hand washing station absent ($n = 2$). One of two latrines in an additional health facility without HWS.
[c]Others: latrine absent ($n = 1$), latrine dirty and smelly ($n = 2$).
[d]Other: health facility with both well and badly maintained latrines ($n = 1$).
[e]Others: latrine absent ($n = 1$), outside improved latrine with poor accessibility ($n = 1$).
[f]Other: latrine absent ($n = 1$).
[g]Other: no gender separation, no partitioning ($n = 1$). Also, two facilities have both mixed and gender-separated toilets.
[h]Others: hand washing station absent ($n = 2$), hand washing station not fully functional ($n = 2$).
[i]Others: hand washing station absent ($n = 2$) or not well maintained ($n = 2$).
[j]One additional facility has both well and not well maintained hand washing stations.
[k]Others: hand washing station absent ($n = 2$), hand washing station poorly accessible ($n = 1$).

public ones, a mean of 34 outpatients shared one latrine (range: 7–66).

The functionality of the available latrines was generally good but most of them were not equipped with garbage bins to dispose of sanitary napkins (Table 3). All hand washing stations in private facilities and two out of six in public facilities were classified as functional. However, hand drying materials were typically unavailable in any health care facilities. The maintenance of at least one latrine per health care facility was rated good in all private and half of the public facilities. In the remaining two public health care facilities with latrines, these were classified as insufficient as they were dirty and smelly. Toilet paper was not available in most facilities, reflecting customary practices where anal cleansing with water is the preferred method. Hand washing stations were less well maintained, with only two in public and five in private health care facilities classified as being in good working order. No hand washing soap was provided in six health facilities where hand washing stations were present. Accessibility of existing WASH installations was generally good as both latrines and hand washing stations were usually located inside the health facilities. Poor accessibility of the latrines was noted in one public facility, and a similar issue was found for the hand washing station in another public facility. Physical barriers to protect the privacy of latrine users were generally available but only two health facilities had reserved at least one latrine for women.

Almost all (97%) questionnaire respondents perceived WASH installations at the local health care facilities as generally satisfactory. Most household survey participants had benefited from primary (55%) or secondary or even higher education (40%). The mean household size among survey participants was 5.6 individuals and the main occupation of the household head was farming (51%) or services/worker (38%).

Views and expectations regarding WASH in health facilities

According to the FGDs and KIIs, clean WASH installations are expected to be present in all health care facilities as they are regarded as an essential component of basic infrastructure ('Since it is a hospital, there should be toilet facilities available.' KII with community leader). However, respondents were well aware that some public health care facilities had no WASH installations, and that latrines in private health care facilities were generally cleaner and better maintained ('Cleanliness is ensured in private facilities because it has control.' KII with community leaders). Respondents attributed the difference in availability to business considerations: 'Each private hospital has a toilet facility … they need it because they have to run the business' (KII with community leader) and better cleanliness resulting from more diligent supervision ('[in public facilities] if officers leave, the staff stop cleaning.' KII with community leader).

WASH installations in private health care facilities appear more likely to be reserved for inpatients, but in public health care facilities even passers-by may use the latrines, which makes it more difficult to keep them clean ('People will visit your clinic to use the toilet … they pretend that they have come for check-up, and once the caretaker goes inside they will go to the toilet.' KII with health worker). Respondents also acknowledged a perceived improvement in government facilities in recent years, which they attributed to local staff becoming more responsible and to more investment in construction of health care facilities. FGD participants expressed a clear preference for gender-separated toilets, and they expected accessory infrastructure such as rubbish bins to be available.

Narrative data from FGDs and KIIs further specified the key features of WASH installations that are important to them: the number of latrines, their cleanliness and availability of water and accessories (such as dustbins). Other factors, however – such as a good reputation of the facility, well-respected doctors and the ability to competently deal with complications – were generally seen as being more important than the status of WASH installations when choosing which health facility to use. 'We consider factors such as who will conduct the normal delivery, which doctor provides good treatment etc. and do not think about toilets' (FGD with adult women). For ambulatory visits, including child birth, the status of WASH installations was seen as less critical than for prolonged hospitalization. 'We do not think about toilets if we soon go back. If we have to get admitted, then we give it more thought' (FGD with adolescent women). The household survey results showed that 73% of the respondents considered the

availability and condition of latrines when deciding which health care facility to use for antenatal care and delivery.

The decision about which facility to use was often taken by a family member and not the woman herself. 'People will see that she does not face any threat. Her husband or brother will take care of these things and only take her to that [safe] hospital' (KII with community leader). If financial means permit, private health care facilities were preferred. 'We had hired a private room and felt very nice. We had the opposite experience at the public [*name removed*] hospital' (FGD with older women). Cost was often a deciding factor. 'We go where it is cheapest. Most ladies go to the government hospital, and if it is a private one then we go to the cheapest' (FGD with migrant women).

The importance of hygiene during childbirth was acknowledged. A health worker in a KII explained,

> Under the Sharda Gram Arogya scheme [*program for the provision of antenatal care*] delivery is free of cost, and they also get a subsidy to cover the cost of travel. They receive a delivery kit including a baby dress, soap etc. At that time we urge them to adhere to five hygiene rules: washing hands after cleaning the baby, keeping drinking water on a shelf and covered with a lid, using clean utensils for fetching water, washing hands with soap after using the toilet, and washing hands before cooking and before eating meals.

Health care personnel and village leaders also noted recent investments in health care facilities, including WASH installations. 'Two more toilets are needed. Now the construction work is going on …' (KII with health worker).

DISCUSSION

Our study documented the availability and status of latrines and hand washing stations in public and private health care facilities offering prenatal and obstetric care in the Vadu area, India. We found that some government facilities had no latrines or hand washing stations. In private facilities, latrines and hand washing stations tended to be cleaner and better maintained, and the patient-to-installation ratios were lower. Patients expect clean and functioning WASH installations in health care facilities as a part of the basic infrastructure. However, other considerations such as qualified doctors and good medical equipment are more prominent determinants in deciding which facility to use.

The prevalence of open defecation in the study area is low and most people have access to WASH installations in or close to their living quarters (Hirve *et al.* 2015). In health facilities that were surveyed, the available WASH infrastructure could mostly be classified as 'improved,' but only relatively so and with notable needs for improvement. For example, rubbish bins are necessary for women to safely and discreetly dispose of sanitary napkins but they were often unavailable. Furthermore, hand washing stations often lacked soap. The number of latrines and taps appeared reasonable considering the number of beds and average number of outpatients with the exception of one facility that received over 100 outpatients per day but had only two latrines and one tap, and one public facility that had no latrine. According to the District Level Household and Facility Survey 2007–2008, the proportion of sub-centers in Maharashtra state that had a latrine was 78.4% (International Institute for Population Sciences 2010), close to that observed in our study (83.3%). A particular challenge to maintain hygiene and cleanliness seemed to be the use of WASH facilities by passers-by. However, both national and international basic requirements for sanitation infrastructure in small health centers were still not met in every facility; for example, few facilities had three latrines as suggested by the Indian Public Health Standards for facilities offering obstetric care and ward beds (Directorate General of Health Services 2012), and gender-separated latrines were rare. World Health Organization (WHO) guidelines suggest a minimum of four latrines per health facility, one each for men, women and children, and one for staff (WHO 2008a, 2008b). Study participants said they were generally satisfied with the WASH situation in the health facilities they had used, but they were sensitive to perceived differences between private and public facilities. People in the study area are acutely aware of the difference between public and private facilities, the former are run by the government (local term 'sarkari') and offer some free services while the latter are privately owned and considered expensive. The general satisfaction with the quality of sanitary installations in health facilities, despite their

documented shortcomings, indicates a need to raise more awareness for the importance of proper sanitation infrastructure. It might also suggest people remember a more precarious situation, and compare the conditions with those in other public places that offer even more basic amenities.

In India, the private sector is preferred for its assumedly higher standards in terms of care and its flexibility in meeting patients' demands, but access is restricted by the fees that are much higher than in public institutions (Ergler *et al.* 2011). As a result, the better-off and well educated are more likely to use private services than the poor (Thind *et al.* 2008; Roy *et al.* 2013); patients who can afford it hope to find not only better doctors but also better infrastructure. The Government of India in recent years has made efforts to improve health care services at public facilities. This has brought about increased investment in facilities and improved quality of services (Yip & Mahal 2008), which was acknowledged by participants in our study. The rate of institutional deliveries has also increased significantly (Pardeshi *et al.* 2011). Meanwhile, private facilities have also developed strategies, such as stratified pricing, to attract poorer segments of the population (Dilip 2010).

Our results suggest that the most important factors considered in the decision of which health facility to use for delivery were the presence of qualified staff, infrastructure, cost and accessible location. The general cleanliness of the facility, rather than the more specific measures of cleanliness of WASH installations, was also considered when selecting a health facility for delivery, confirming the findings of other studies focusing on the perception of good care (Bhattacharyya *et al.* 2013) and justifying the ongoing investments to upgrade the quality of health facilities. It must also be considered that the choice of which facility to use for child birth was often made by a family member rather than the pregnant woman herself. This suggests that the choice of a facility may better represent family satisfaction than patient satisfaction, and the two may be different. This must be kept in mind when designing studies of the perceived quality of care and health service expectations – i.e., whose expectations are actually considered.

Certain limitations of this study must be acknowledged. The selection of the health facilities was not random, inasmuch as only facilities along the main highway were studied, and managers had to agree to the survey. More remote facilities are likely to have poorer infrastructure and WASH conditions. No instance of refusal to participate in the survey was recorded, and the survey included a sizable fraction of the eligible facilities, limiting the scope for bias in that respect. Demand generation services and outright promotion were not investigated, creating scope for confounding. Study participants were also aware of the general interest of the investigators, namely the quality of WASH in health facilities, which might have influenced the prominence assigned to WASH installations when stating priority considerations when choosing health facilities. It is particularly important to note that geographical access and financial incentives and means have not been investigated in depth, factors that are known to heavily influence health seeking behavior. Our findings nevertheless document the relative priority of WASH considerations in health care facilities offering antenatal and obstetric services. The study also did not include interviews with facility managers regarding resources, capacity and mechanisms for maintaining and improving WASH facilities, limiting the ability to comment on their awareness of shortcomings, and plans for improvement. This perspective should be considered in future research.

The need for improved sanitation in India is widely acknowledged. Although investments in sanitation for public health facilities have been notable, the focus of attention was more on other domains, which deserve no less attention. In his Independence Day speech on 15 August 2014, Prime Minister Modi made a political commitment to provide toilets in all Government schools by next year, calling upon corporate social responsibility to help finance the effort. Our findings highlight related needs for improved WASH installations in public health facilities for women.

CONCLUSION

The status of WASH installations in health facilities in the Vadu area of the Pune district of India is generally acceptable in private facilities, but investment to build or upgrade installations are needed in some government facilities: no latrine existed in one government health facility while another one only had a simple pit latrine. Also, no hand washing stations

existed in two government health facilities. It appears important to assess needs in other regions using similar approaches, to commit government resources to address identified shortcomings, and to monitor policy and investment responses to those needs. Because women patients do not necessarily decide which health care facilities they use, popular use of a facility may not necessarily indicate patient satisfaction. Women consider latrines and water supply as essential features of the basic infrastructure. They view the quality of WASH installations in a broader framework of 'cleanliness,' which they consider when choosing a facility, but other considerations of family decision-makers, such as the availability of qualified staff, other essential healthcare infrastructure and cost may predominate.

ACKNOWLEDGEMENTS

This research was made possible with funding from the UK Department for International Development (DFID) through the SHARE Research Consortium (www.SHAREresearch.org), and the Water Supply & Sanitation Collaborative Council (WSSCC). However, the views expressed are those of the authors and do not necessarily represent UK government or WSSCC policy. Vadu HDSS, a member of the INDEPTH Network, provided its longitudinally collected data (household census list with information on gender and age of household members) as a sampling frame. The authors thank the Vadu HDSS field staff for their commitment when collecting data. Finally we are grateful to all members of the Vadu community who participated in the study for allowing us the opportunity to learn from them.

REFERENCES

Bartram, J., Cronk, R., Montgomery, M. A., Gordon, B., Neira, M., Kelley, E. & Velleman, Y. 2015 Lack of toilets and safe water in health-care facilities. *Bull. World Health Organ.* **93**, 210.

Benova, L., Cumming, O. & Campbell, O. M. R. 2014 Systematic review and meta-analysis: association between water and sanitation environment and maternal mortality. *Trop. Med. Int. Health* **19**, 368–387.

Bhattacharyya, S., Srivastava, A. & Avan, B. I. 2013 Delivery should happen soon and my pain will be reduced: understanding women's perception of good delivery care in India. *Glob. Health Action* **6**, 22635.

Dilip, T. R. 2010 Utilization of inpatient care from private hospitals: trends emerging from Kerala, India. *Health Pol. Plan.* **25**, 437–446.

Directorate General of Health Services, Ministry of Health, Family Welfare, Government of India 2012 Indian Public Health Standards (IPHS): Guidelines for Sub-Centres. Revised 2012. New Delhi.

Ergler, C. R., Sakdapolrak, P., Bohle, H. G. & Kearns, R. A. 2011 Entitlements to health care: why is there a preference for private facilities among poorer residents of Chennai, India? *Soc. Sci. Med.* **72**, 327–337.

Hirve, S., Lele, P., Sundaram, N., Chavan, U., Weiss, M. G., Steinmann, P. & Juvekar, S. 2015 Psychosocial stress associated with sanitation practices: experiences of women in a rural community in India. *J. Water Sanit. Hyg. Dev.* **5**, 115–126.

International Institute for Population Sciences 2010 *District Level Household and Facility Survey (DLHS-3), 2007–08: India*. International Institute for Population Sciences, Mumbai.

Karkee, R. & Kadariya, J. 2013 Choice of health-care facility after introduction of free essential health services in Nepal. *WHO South-East Asia J. Pub. Health* **2**, 96–100.

Malik, A. 2013 More temples than toilets? *BMJ* 346.

Pardeshi, G. S., Dalvi, S. S., Pergulwar, C. R., Gite, R. N. & Wanje, S. D. 2011 Trends in choosing place of delivery and assistance during delivery in Nanded district, Maharashtra, India. *J. Health Popul. Nurt.* **29**, 71–76.

Roy, M. P., Mohan, U., Singh, S. K., Singh, V. K. & Srivastava, A. K. 2013 Factors associated with the preference for delivery at the government hospitals in rural areas of Lucknow district in Uttar Pradesh. *Indian J. Public Health* **57**, 268–271.

Thind, A., Mohani, A., Banerjee, K. & Hagigi, F. 2008 Where to deliver? Analysis of choice of delivery location from a national survey in India. *BMC Public Health* **8**, 29.

WHO 2008a *Essential environmental health standards in health care*. World Health Organization, Geneva.

WHO 2008b *Operations manual for delivery of HIV prevention, care and treatment at primary health centres in high-prevalence, resource-constrained settings*. World Health Organization, Geneva.

WHO 2014 MDG 5: Maternal and reproductive health: Women Data by country. Retrieved 14.08.2014, from http://apps.who.int/gho/data/node.main.REPWOMEN39?lang=en.

WHO/UNICEF Joint Monitoring Programme 2014 *Progress on Drinking-Water and Sanitation*. WHO and UNICEF, Geneva and New York.

Yip, W. & Mahal, A. 2008 The health care systems of China and India: performance and future challenges. *Health Affairs (Millwood)* **27**, 921–932.

First received 3 January 2015; accepted in revised form 20 April 2015. Available online 11 June 2015