ACTA
AMAZONICA | http://dx.doi.org/10.1590/1809-4392201600263

ORIGINAL ARTICLE

Assessment of WASH scenarios in urban and rural schools of a small city in the Brazilian Amazon

João Paulo BORGES-PEDRO*, Patricia MÜLLER, Andreza Pinheiro NUNES, Maria Cecilia R. L. GOMES

Instituto de Desenvolvimento Sustentável Mamirauá - IDSM, Estrada do Bexiga 2584, Bairro Fonte Boa, CP 38, CEP 69553-225, Tefé, Amazonas, Brasil

* Corresponding author: joaopaulo.pedro@hotmail.com

ABSTRACT

This study analyzed environmental aspects of county and state managed public schools within Tefé county in the Brazilian Amazon, using the WASH concept (Water, Sanitation and Hygiene) developed by UNICEF and OMS. WASH is a strategy used since 1995, when child mortality rates were on the rise. Research was conducted using a questionnaire applied to employees of 19 primary and secondary schools, and based on WASH principles. After its application, we used an observation checklist to assess the state of the schools' physical structure. We also conducted water quality analyses. All schools presented water contamination with total coliforms and 26% did not conduct any type of water treatment. The number of toilets in all schools was insufficient, and 47% of schools presented bathroom irregularities. The presence of flies was observed in 52%, and the accumulation of rubbish in 31% of the schools. This study demonstrates an emerging need to improve issues of water, sanitation, and hygiene in Tefé schools in order to minimize the risk of illness, which influences school routines and individual learning processes. We suggest greater investments in and care of educational institutions, stemming from both public policies and the mobilization of the local population around these issues.

KEYWORDS: water, sanitation, hygiene, public schools, UNICEF

Avaliação do cenário WASH (água, saneamento e higiene) em escolas urbanas e rurais de uma pequena cidade na Amazônia brasileira

RESUMO

Este estudo avaliou alguns aspectos do ambiente das escolas públicas municipais e estaduais do município de Tefé, localizado na Amazônia brasileira, através do conceito WASH (água, saneamento e higiene) desenvolvido por UNICEF e a OMS. O WASH é uma estratégia utilizada desde 1995, quando os índices de mortalidade infantil estavam em crescimento. O estudo foi realizado a partir da aplicação de um questionário para os funcionários de 19 escolas de ensino primário ao médio, elaborado com base nos preceitos de WASH. Na sequência, foi utilizada uma lista de observação para verificação da estrutura física. Também foram realizadas analises da qualidade da água. Todas as escolas apresentaram contaminação da água por coliformes totais e 26% não aplicam nenhum tipo de tratamento à água. Em todas as escolas a quantidade de sanitários foi insuficiente, e em 47% as instalações sanitárias apresentarem irregularidades. A presença de moscas foi observada em 52% das escolas, além do acúmulo de entulho em 31% dessas instituições. Com este estudo, constatou-se a necessidade emergente de melhorias nas questões de água, saneamento e higiene nas escolas de Tefé, visando minimizar riscos de doenças que influenciam a vida escolar e o aprendizado dos alunos. Recomendamos maiores investimentos e cuidados nas instituições escolares, tanto a partir de políticas públicas, quanto partindo da mobilização da população.

PALAVRAS-CHAVE: água, saneamento, higiene, escola pública, UNICEF

CITE AS: Borges-Pedro, J.P.; Müller, P.; Nunes, A.P.; Gomes, M.C.R. L. 2018. Assessment of WASH scenarios in urban and rural schools of a small city in the Brazilian Amazon. *Acta Amazonica* 48: 75-82.

INTRODUCTION

Access to potable water, basic sanitation, and good hygiene habits are principal factors involved in reducing the incidence of illness among school-aged children. The 2030 Agenda (UN, 2015) established new goals for the international community: universal and equitable access to water and to end open defecation. WASH (Water, Sanitation and Hygiene) provides a healthy and comfortable environment that helps improve children's health and boosts educational attendance and achievement (UNICEF 2011). These concepts are excellent tools to help improve conditions in schools, independent of their location (urban or rural area) or local culture, and to integrate students with their communities. The WASH approach serves as a standardized assessment base of essential information related to sanitation, hygiene and health, which are aimed at subsidizing policies for the improvement of human development and life quality. The United Nations Organization, along with The United Nations Children's Fund - UNICEF, has been supporting the development of WASH in children's lives, primarily in school environments, investing in training and technical support. The example of School Led Total Sanitation (SLTS) conducted in Nepal with government collaboration is a commonly cited example of this strategy (UNICEF 2012a).

Even with the establishment of universal rights for access to quality drinking water in adequate quantities, and to adequate sanitation (COHRE *et al.* 2008; UN Office of the High Commissioner for Human Rights 2010) thousands of schools in Brazil do not offer these conditions. In the Amazonas state, in the Brazilian Amazon region, health problems associated with the lack of sanitation, water treatment, and hygiene in urban schools are common (Araújo and Grava 2012), and the same scenario is replicated in rural areas. Schools have inadequate or precarious infrastructure to supply drinking water and to support sewage disposal. Schools are places of intense contact between people, where poor sanitation and water quality foster high-risk environments for the health of school staff and students (Adams *et al.* 2009). A study conducted in Colombia showed that 40% of all cases of diarrhea in children originated from school contact (Koopman 1978).

Tefé County is located in Amazonas state, extending from the margins of the Solimões/Amazonas River into a region of low population density and extensive primary rainforest cover. In the urban area of Tefé there are 16 state-run schools (managed by the state government) and 16 county-run schools (managed by the municipality). In the rural area there are 70 county-run schools, according to the school census of 2015, most of them in remote and hardly accessible areas.

We surveyed sanitation infrastructure and hygiene procedures in urban and rural schools in Tefé with the objective to evaluate their compliance with the WASH scenario of the UNICEF guidelines.

MATERIAL AND METHODS

This study was conducted in the county of Tefé, located in the central Brazilian Amazon and about 500 kilometers from Manaus (Figure 1). The city has more than 62 thousand inhabitants, with an area of more than 23 thousand km²

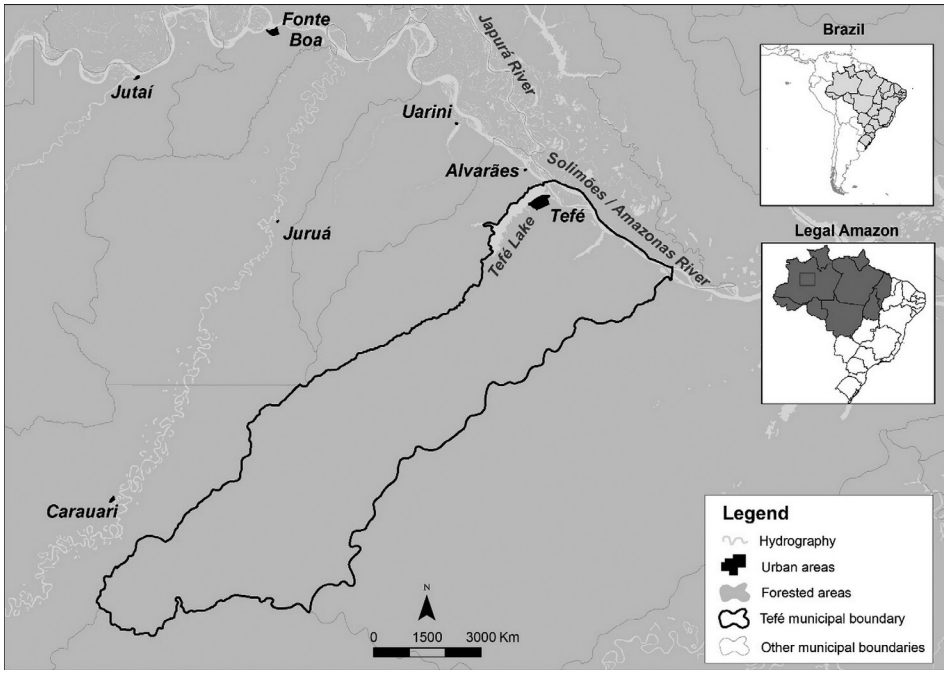

Figure 1. Location of Tefé in the Brazilian Amazon.

(IBGE 2016). The main economic activities of the city are fishing, agriculture and local trade. In general, the population is descended from natives of the region and, in recent decades, has received an influx of people from other parts of Brazil, mainly its Northeastern region.

Nineteen schools were assessed during the study, nine state schools, eight urban county schools and two rural county schools. State schools provide primary and secondary grade education for students aged six to 17 years, while county schools are dedicated to preschool and kindergarten for children aged two to five years. From this point forward schools are referred to as state and county schools. The schools surveyed were selected according to logistical criteria based on the ease of access.

The data were collected during visits to the schools. We conducted semi-structured interviews with school staff based on questionnaires (24 questions). In addition, we used an observation checklist (11 items) for the state of the physical infrastructure of the schools. It took us about one hour at each school to conduct the interviews and checklist. We addressed the following topics in accordance with the guidelines of Adams *et al.* (2009): water quality and quantity, number of toilets, number of sinks, school cleaning routine, vector and illness control, number of students and employees. School administrators were also questioned on whether or not the school dealt with issues of water, sanitation and hygiene with students and how this is carried out. This research was approved by the Municipal Secretary of Education of Tefé.

Water sampling was conducted at bathroom sinks, kitchen sinks, and when possible, water fountains. In total, we collected 125 samples, with an average of six samples per school. All samples were stored in a cooler ice box for a maximum of 60 minutes before processing. The water samples were analyzed for turbidity and quantification of total coliform bacteria and *Escherichia coli*, following Eaton *et al.* (2005). The analysis was conducted at the Environmental and Water Quality Laboratory of the Mamirauá Institute (IDSM), in Tefé.

Table 1. Information on water and sanitation in urban and rural state-run and county-run schools surveyed in Tefé county, in the central Brazilian Amazon. N students = number of students; N staff members = number of staff members; N students/water points = number of students per drinking water points; N toilets students = number of flush toilets available for students; N toilets staff = number of flush toilets available for school staff; N students/toilet = number of students per flush toilet. EJA indicates that this school offers adult and youth education.

School Code	Grades offered	N students	N staff members	N drinking water points	N students/water points	N toilets students	N toilets staff	N students/toilet
County A	Preschool	200	56	8	25	7	2	29
County B	Preschool	238	25	4	59	4	1	60
County C	Preschool and first grade of primary school	462	39	4	115	4	1	116
County D	Preschool	245	27	4	61	4	0	61
County E	Primary school	-	-	8		4	1	-
County F	Preschool	224	33	4	56	6	1	37
County G	Primary and EJA	1260	-	8	157	16	1	79
County rural H	Preschool, primary school and EJA	326	49	3	108	4	1	82
County rural I	Primary school and EJA	120	15	2	60	1	0	120
County J	Preschool	409	-	4	102	4	1	102
State A	Primary school	800	45	8	100	7	1	114
State B	Primary school	790	44	8	98	3	1	263
State C	Primary school	387	36	8	48	4	1	97
State D	Primary school	500	28	3	166	6	1	83
State E	Secondary school	1200	78	8	150	12	1	100
State F	Secondary school	-	-	8	-	6	1	-
State G	Primary school	544	12	4	136	8	1	68
State H	Preschool*, primary school and EJA	1176	-	8	147	4	1	294
State I	Primary school, EJA, Technical school and Secondary school	725	45	8	90	4	2	181

* This preschool is an exception to the standard pattern of preschools being run by the municipality

RESULTS

Education and hygiene

Overall 42% of the surveyed schools addressed WASH concepts in an interdisciplinary manner, even if indirectly, and 36% had specific projects on this topic. In addition to programs regarding hygiene, eight county schools (42%) and seven state schools (37%), including the two rural schools, promoted activities on awareness regarding oral hygiene and hand washing. In our sample, 79% of schools did not have budget nor staff to develop activities related to hygiene. Only one school (State B, Table 1) received educational material on hygiene from the federal government. In three county schools (16%) students had to bring toothbrush and toothpaste from home for oral hygiene. Only one school made oral hygiene materials available to students.

During visits we observed that 31% of schools accumulated discarded material on site, including appliances, water fountains, desks, and white boards. Regarding disease vectors and other insects, we observed the occurrence of flies in 52% of the school kitchens, and in one school we found ants in food items stored in the pantry. In one school, a vulture entered the food preparation facilities during our interview. Regarding fumigation, state school staff members informed that a private company is responsible for fumigation for vector control.

School meals and food storage

In the majority of schools (95%), an annual training for school cafeteria workers takes place. Nutritionists planned menus in a little more than half (58%) of the schools. We identified that 77% of schools had a pantry (room for food storage) with proper ventilation and lighting. The rest of schools had a specific space for food item storage, however, these areas were inadequate, with food stored in wooden cabinets and/or in plastic or cardboard boxes. In one school we found expired food items, and in another situation, the school did not allow access to the pantry.

Water and sanitation

In all the state schools, students had their own bathrooms that were not shared with teachers. In 11% of the county schools bathrooms were shared by students and teachers and in three schools (16%), bathrooms were located inside a classroom. The schools did not inform the number of students per gender.

In relation to sewage treatment, only one of the ten county schools lacked wastewater treatment, and the wastewater was discharged into the open. All other state and county schools sent wastewater to septic tanks (95% of total), however, only 27% did annual maintenance on tanks, 11% serviced tanks when there was some problem, and 47% did no maintenance whatsoever.

According to school staffs, the frequency of bathroom cleaning depended on the number of class periods and class schedules. In about half of all schools, toilets were observed to be inadequate for use. Typical problems were the lack of water for flushing, defect flush handles or buttons, toilets in disuse due to defects, and lack of hygienic conditions (44% of the schools had dirty toilets at the time we visited).

The average number of sinks per school was relatively low considering the number of students in attendance (Figure 2). In addition, in 32% of the schools, sink faucets were not working properly and in some cases, leaks were causing flooding of bathroom floors, and in 84% of the schools we visited, soap was absent from sinks.

The most common form of disinfection treatment used by the schools was chlorination (8 schools), but we were not able to assess whether the procedure is done properly.

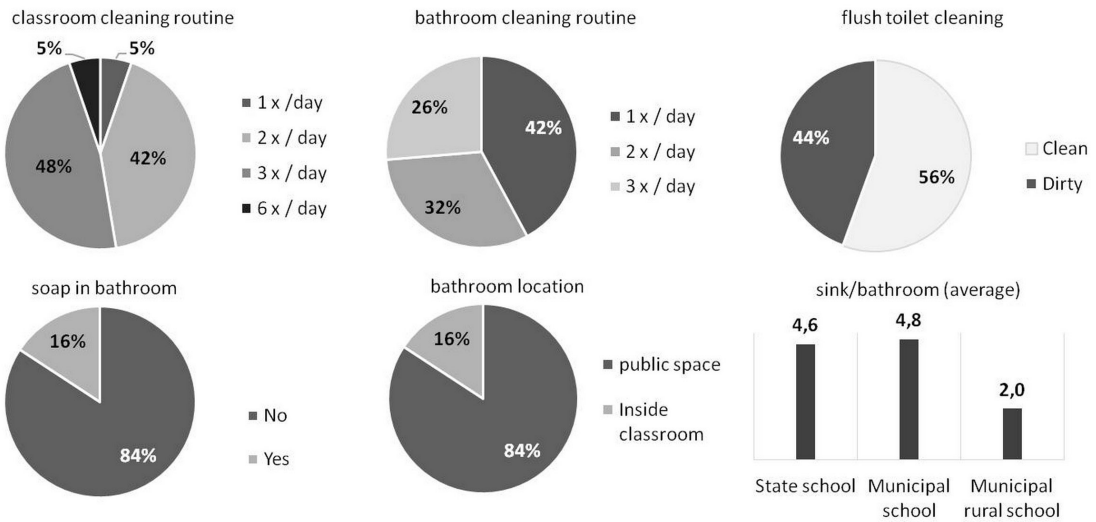

Figure 2. Aspects of classroom and bathroom cleaning and bathroom structure in 19 schools surveyed in Tefé county, in the central Brazilian Amazon.

Five schools (26% of total) did not treat water, not even for drinking. In these cases, the water source was a well on the school grounds. Rural schools did not have their own wells and depended on private wells in the neighborhood for water provision. All state schools had their own wells and three of the county schools were supplied by public water services (Figure 3). Most schools had their own water storage tanks with informed capacities of 2000 to 5000 liters. However, 57% of school administrators could not inform the capacity of their water tanks and 95% did not know how much water their school consumes monthly.

Cups were not available to students at drinking fountains in 21% of schools. One of the county schools recommended that students bring cups from home. Cups made available by schools were plastic and non-disposable. Cups were not made available in sufficient quantities and thus were shared by all students. The location of drinking fountains varied in accordance with the structure of each school, but it was possible to identify that in 42% of cases they were near school kitchens.

Water analyses showed that in all schools (with the exception of one sample) there was contamination by total coliforms. Drinking fountains were the most critical places, where 80% of samples showed values higher than the method count limit (> 400 UFC/100 mL). In 64% of the samples, the presence of *Escherichia coli* was identified. Only 36% of the samples did not indicate the presence of this bacteria; in the case of a single school (State F), all samples were negative. The turbidity values varied from 0 to 6.7 NTU. In 2% of the samples the registered values surpassed 5 NTU, both collected at bathroom sinks. For drinking water collected at drinking fountains, the values ranged from 0 to 4.1 NTU.

DISCUSSION

Education and hygiene

According to WASH, school curricula should address topics of sanitation, water and hygiene (UNICEF 2012b) and schools must offer students adequate infrastructure to attend to their basic needs. Schools should also provide comfort and security (World Health Organization 2004) so that the students' attention is focused on learning, and adverse situations, such as the use of distant bathrooms or the consumption of water from a dubious source, do not cause them insecurity or fear.

In the 19 schools surveyed in Tefé, we documented that only a little more than a third had covered WASH content with students in some form, and that the majority did not receive any type of financial support to this end. We believe that the absence of this content reveals the institutions' unfamiliarity with the topic. If there was engagement with this topic, schools would overcome scarce financial resources to address these issues. Various examples on the successful improvement of hygiene and sanitation in schools can be cited in over 94 countries, such as Ethiopia, Nepal, Kyrgyzstan and Ghana, where activities directed at schools and the community turned students, parents, and teachers into principal actors of local change (UNICEF 2012c). In Malawi, the Mother Groups Program (based on WASH principles) was created with government and NGO incentive to help students with education and information regarding the menstrual period (UNICEF 2011).

Furthermore, schools must be attractive to students and the environment in which activities are developed should be clean and free of inappropriate objects, offering comfort so that

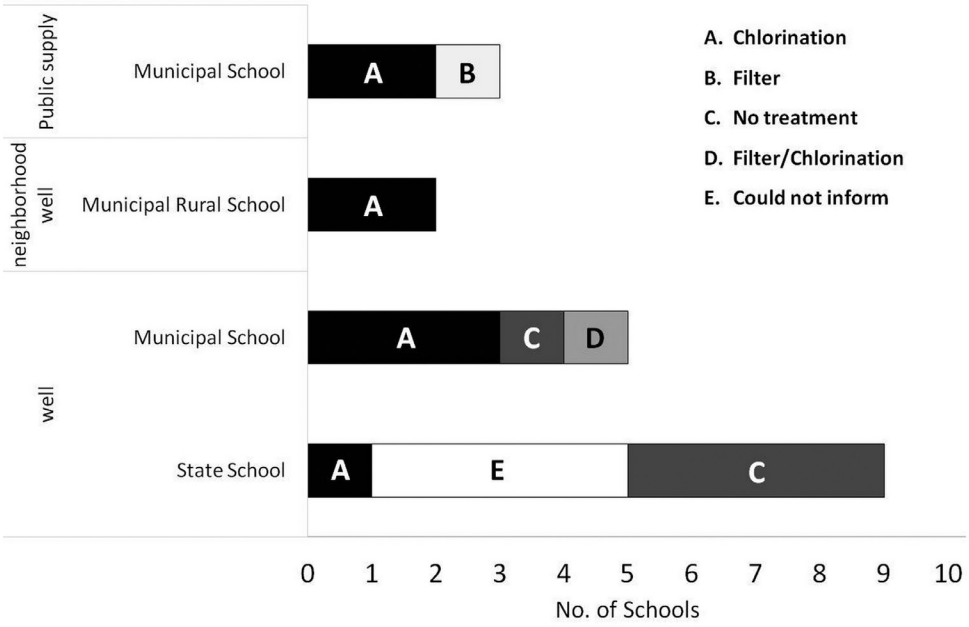

Figure 3. Water origin and treatment in schools surveyed in Tefé county, in the central Brazilian Amazon.

students can concentrate on learning. As we found trash piles in one third of the schools, these places become potentially host sites for disease vectors. As stated by Correa and Pinheiro (2017), the precarious situation of sanitation and garbage collection in the Amazon allows the proliferation of mechanical vectors, notably insects, which can carry eggs of different parasites such as Ascaridae, nematode larvae and Oxyuridae.

Food storage

In Tefé school employees seem to have undergone enough training related to food preparation, but showed little care about food storage, which should help to prevent the proliferation of harmful microorganisms and the emergence of vectors. Food management in schools directly influences the health of students. In a region in the United States, 604 disease outbreaks were related to school meals from 1973 to 1997, an average of 25 cases annually (Daniels et al 2002). To avoid disease outbreaks in the school environment and the consequent strain on student's health and learning, the latter authors state that staff training, in good practices related to food storage, handling and preparation is of fundamental importance. The immunity of children is relatively lower than that of adults (Marzano and Balzaretti 2013), so that protective measures against pathogenic agents potentially contaminating food in schools is specially relevant.

Sanitation and water

WASH guidelines stress the importance of decent and safe bathrooms. There ought to be separate toilet booths for girls and boys, and students and teachers should use separate bathrooms, but in this study we recorded that in two of 19 visited schools, teachers share bathrooms with students. In particular, having the bathroom accessed directly from within a classroom, as was the case in three of the surveyed schools, means that students and teachers are distracted each time the bathroom is used, besides compromising the students' privacy.

The location of bathrooms and the number of toilets per student are important factors to be considered in the school environment. The Brazilian Ministry of Education recommends that there be one toilet for every 20 children (Brasil 2006) in primary schools. The general recommendation for schools based on a national standard (Creder 2006), is one toilet for every 75 boys and one for every 35 girls, while UNICEF (2012) recommends one toilet for every 25 girls or female staff members, and one toilet plus urinal for every 50 boys or male staff members. No school in our survey met the minimal recommendation of UNICEF regarding toilet availability (Figure 4). In one particular case, the school only had four toilets for 1176 students, all found dirty and in precarious conditions. These sanitary conditions were similar in 44% of schools and thus make it difficult to uphold the standard of access to decent bathrooms, as emphasized by WASH guidelines.

Environments that provide a sense of privacy and safety can help prevent school absence. Specially for teenage girls that must deal with menstrual hygiene, exclusive female toilets in good hygienic conditions are very important (UNICEF 2012b). In Nepal, a teacher observed certain difficulties among female students and became preoccupied with their absence from school. In response, she raised funds to purchase sanitary pads and to make adaptations to toilets to ease pad disposal.

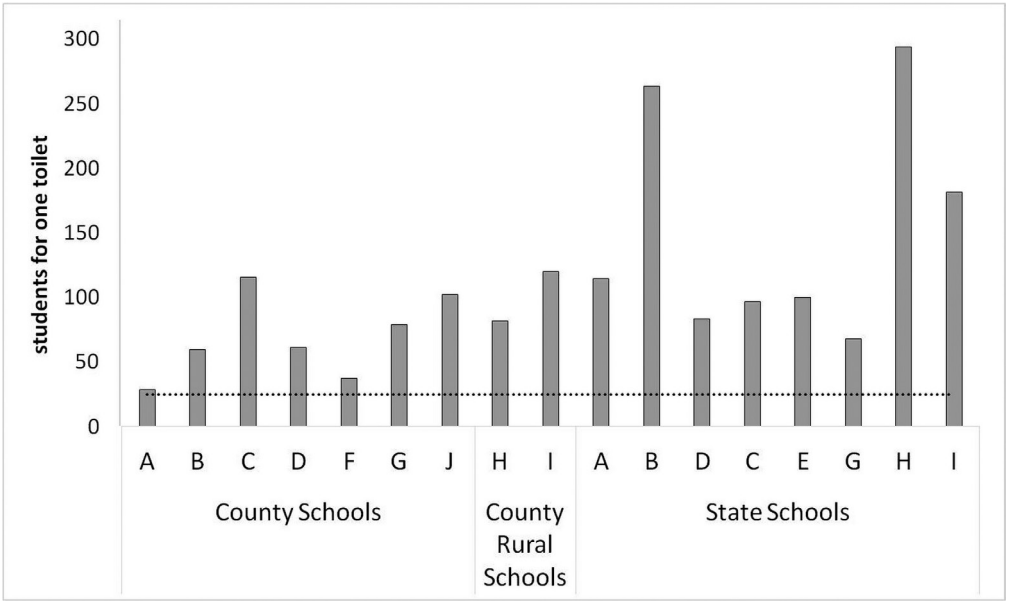

Figure 4. Students per toilet at schools surveyed in Tefé county, in the central Brazilian Amazon. The dotted line indicates the recommendation of UNICEF.

In this way, girls began to feel more secure when attending school during their menstrual periods (UNICEF 2012c).

The lack of soap in most schools disfavors hygienic practices and puts students in a situation of risk for infection and diarrhea, which is aggravated by the precarious state of bathrooms. Up to one third of all cases of diarrhea in low- and middle-income countries can be prevented by the simple act of hand washing (Ejemot-Nwadiaro 2015). In Pakistan, hand washing with soap was the most effective way to remove bacteria, halving the incidence of diarrhea in children younger than 15 years, and acute respiratory infections in children younger than 5 years (Luby *et al.* 2005).

All schools presented water contamination by total coliforms, with highest concentrations in drinking fountains. The ingestion of contaminated water puts students at risk of diarrhea outbreaks, which in turn leads to school absence and compromises learning, since regular attendance is essential to the learning process (UNICEF 2011). Only one school in our survey showed no *E. coli* in the water samples, which can be related to a set of positive factors, such as the quality of the well, maintenance of a water reserve and the use of chlorine.

The Brazilian Ministry of Health (Brasil 2011) recommends the absence of *E. coli* in 100-mL samples of publicly distributed water, and a maximum turbidity of 5 NTU for drinking water. Although the water in most surveyed schools was within the permitted turbidity levels, our results for the presence of bacteria show that improving the quality of drinking water in Tefé schools should be given priority by county health and education administrators. Good water quality in schools is fundamental for student performance since it can influence their cognitive functions (Popkin *et al.* 2010).

The major point of concern in our survey was the perceived lack of knowledge and commitment to the improvement of sanitary standards by staff members in many schools, even regarding simple and highly effective measures such as regular hand washing. Although state and county oversight and regulation are important to control water contamination and to secure minimally functional school infrastructure, experiences elsewhere have shown that the involvement of the community at grassroots level may be equally important to improve the sanitary safety in local schools.

Limitations of the survey

Due to logistical difficulties, we were able to access only a small proportion of rural schools in Tefé county. Many schools are located at great distances from the city and are accessible only by river. It would have been important to include these schools in the WASH survey, since they are likely to have equally low or lower sanitation standards, but it was not feasible within the logistical capabilities of our study. For the same reason, we were not able to analyze important water quality parameters, such as iron, chlorine, ammonia and protozoan counts. Some school administrators were not open or available to answer all questions in our survey and/or to provide free access to all school facilities. This demonstrates either a lack of interest in participating in our study or hesitation with regard to how results could be damaging to themselves or their schools.

CONCLUSIONS

This study demonstrated that schools in Tefé do not conform to WASH guidelines. Our survey showed that schools do not offer adequate sanitary conditions for their students, and do not conduct periodic maintenance of their facilities. Documented irregularities include the lack of soap for hand washing in 84% of the schools, the presence of disease vectors and other insects, insufficient and poorly maintained drinking fountains and toilets, flooding and clogging of toilets, drinking water contaminated with *E. coli*, and a lack of regular maintenance of septic tanks. Based on our results it can be estimated that more than 9,000 students in Tefé county are exposed to risks resulting from the poor sanitary conditions in their schools. As the structural and organizational state of schools is the responsibility of county and state governments, the present situation highlighted in our study reflects administrators' unpreparedness and lack of commitment to fundamental health issues in the school environment. We believe that more participation of families and the community in general in improving the sanitation conditions in schools is needed to start changing the current scenario. Our results show the necessity for the promotion of campaigns aimed at hygiene and sanitary baselines, such as keeping clean toilets, washing hands and simple water treatment.

ACKNOWLEDGEMENTS

We thank the Instituto de Desenvolvimento Sustentável Mamirauá (IDSM) and the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for supporting this research.

REFERENCES

Adams, J., Bartram, J., Chartier, Y., Sims, J. 2009. Water, sanitation and hygiene standards for schools in low-cost settings. WHO, Geneva, 51p.

Araújo, L.F., Grava, A.F. 2012. Avaliação da Qualidade Microbiológica e Físico-Química das Águas Consumidas nas Escolas Públicas da Cidade de Manaus, Amazonas. In: Medeiros, M.S. (Org.), *Saúde Ambiental na Amazônia: desafios e perspectivas*, vol.19. EDUA, Manaus, p.29-45.

Brasil. 2011. Ministério da Saúde. Portaria nº 2.914, de 12 de dezembro de 2011. (http://bvsms.saude.gov.br/bvs/saudelegis/gm/2011/prt2914_12_12_2011.html). Accessed on 09/05/2016.

Brasil. 2006. *Ministério da Educação. Secretaria de Educação Básica. Parâmetros básicos de infra-estrutura para instituições de educação infantil*. MEC/SEB, Brasília, 45p.

COHRE; WaterAid; SDC; UN-HABITAT. 2008. *Sanitation: A human rights imperative*. 1 ed. COHRE, Geneva, 50p.

Correa, L.L.; Pinheiro, A.S.F. 2017. Dynamics of parasitic diseases and the environmental and sanitation context in cities of the Brazilian Amazon. *Journal of Parasitic Diseases: Diagnosis and Therapy*, 2:1-2.

Creder, H. 2006. *Instalações hidráulicas e sanitárias*. 6 ed. Livros Técnicos e Científicos, [S.l.], 450p.

Daniels, N.A.; Mackinnon, L.; Rowe, S.M.; Bean, N.H.; Griffin, P.M.; Mead, P.S. 2002. Foodborne disease outbreaks in United States schools. *The Pediatric Infectious Disease Journal*, 21: 623-628.

Eaton, A.D.; Clesceri, L.S.; Rice, E.W.; Greenberg, A.E. (Ed.). 2005. *Standard Methods for the Examination of Water & Wastewater*. 21. ed. APHA. Maryland, Irregular pagination.

Ejemot-Nwadiaro, R.I.; Ehiri, J.E.; Arikpo, D.; Meremikwu, M.M.; Critchley, J.A. 2015. Hand washing promotion for preventing diarrhoea. *Cochrane Database Of Systematic Reviews*, 9: 1-4.

IBGE. 2016. Cidades: Amazonas, Tefé. (http://cidades.ibge.gov.br/xtras/perfil.php?codmun=130420). Accessed on 13/05/2016.

Koopman, J.S. 1978. Diarrhea and School Toilet Hygiene in Cali, Colómbia. *American Journal of Epidemiology*, 107: 412-420.

Luby, S.P.; Aqboatwalla, M.; Feijin, D.R.; Painter, J.; Billhimer, W.; Altaf, A.; Hoekstra, R.M. 2005. Effect of handwashing on child health: a randomised controlled trial. *The Lancet*, 366: 225-233.

Marzano, M.; Balzaretti, C. 2013. Protecting child health by preventing school-related foodborne illnesses: Microbiological risk assessment of hygiene practices, drinking water and ready-to-eat foods in Italian kindergartens and schools. *Food Control*, 34: 560-567.

Popkin, B.; D'Anci, K.; Rosenberg, I. 2010. Water, hydration, and health. *Nutrition Reviews*, 68: 439-458.

UN, General Assembly. 2015. Transforming our world: The 2030 agenda for sustainable development. A/RES/70/1, 21 October, 2015.

UN Office of the High Commissioner for Human Rights (OHCHR). 2010. *The Right to Water, Fact Sheet No. 35*. UNO/OHCHR, Geneva, 61p.

UNICEF. 2011. *Equity of Access to WASH in Schools*: *A Comparative Study of Policy and Service Delivery in Kyrgyzstan, Malawi, the Philippines, Timor-Leste, Uganda and Uzbekista*n. UNICEF, New York, 104p.

UNICEF. 2012a. *WASH for School Children: State-of-the-art in Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka*. UNICEF ROSA. South Asia, 62p.

UNICEF. 2012b. *Water, Sanitation and Hygiene (WASH) in Schools*. UNICEF, New York, 56p.

UNICEF. 2012c. *Soap Stories and Toilet Tales from Schools*. UNICEF, New York, 36p.

World Health Organization (WHO).2004. Information series on school health. Document 2, The physical school environmentt: An essential Component of a Health-Promoting School. WHO, Geneva, 57p.

RECEIVED: 03/03/2017
ACCEPTED: 15/10/2017
ASSOCIATE EDITOR: Carlos José Sousa Passos