

## Research Paper

Water, sanitation, and hygiene conditions in schools in Antalya in Turkey: a descriptive survey<sup>†</sup>Ayse Meydanlioglu <sup>a</sup>, Arzu Akcan <sup>a,\*</sup> and Evrim Yalçın <sup>b</sup><sup>a</sup> Department of Public Health Nursing, Faculty of Nursing, Akdeniz University, Antalya, Turkey<sup>b</sup> Akdeniz University Rectorate, Antalya, Turkey

\*Corresponding author. E-mail: aarzu@akdeniz.edu.tr

<sup>†</sup>This study was presented as an oral presentation at the IV International Multidisciplinary Congress of Eurasia (IMCOFE) held from 23 to 25 August 2017. AM, 0000-0002-9799-937X; AA, 0000-0003-0503-2610; EY, 0000-0003-2032-4208

## ABSTRACT

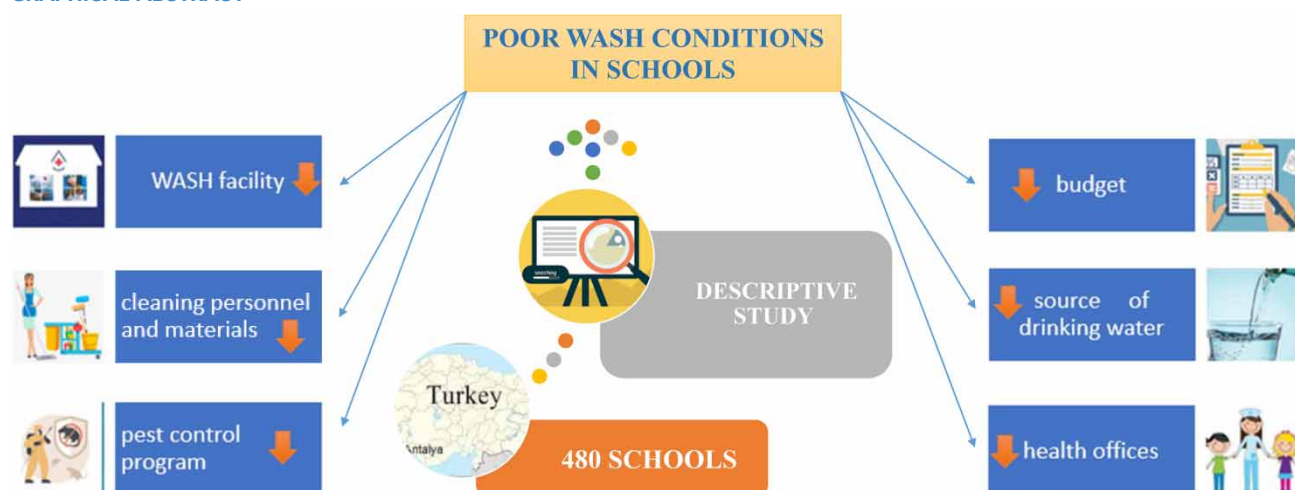
The aim of this study was to determine the water, sanitation, and hygiene conditions of schools in Antalya. This descriptive study was conducted with the administrators of 480 schools in 19 districts of Antalya. The data were collected with a questionnaire created by the researchers. In the study, number, percentage, and chi-square tests were used to evaluate the data. In 59% of the schools, a fountain in the garden or building was used as a source of drinking water, only 37.1% of the schools had a programmed pest control program, 32.1% of them had permanent cleaning personnel, and the cleaning materials were mostly (51.2%) obtained from their own budgets. While the number of sinks was sufficient according to the number of students in the schools, the number of toilets was not sufficient, especially for female students. It is of great importance that budget, material, and personnel deficits of schools, where the risk of infection transmission is high, are overcome by the authorities.

**Key words:** hygiene, sanitation, school, school nurse, water

## HIGHLIGHTS

- In this study, the water, sanitation, and hygiene conditions of the schools were evaluated.
- In this study, it was determined that schools had problems in providing the necessary materials, equipment, services, and personnel to provide hygiene and sanitation conditions.

## GRAPHICAL ABSTRACT



This is an Open Access article distributed under the terms of the Creative Commons Attribution Licence (CC BY-NC-ND 4.0), which permits copying and redistribution for non-commercial purposes with no derivatives, provided the original work is properly cited (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## INTRODUCTION

Water, sanitation, and hygiene (WASH) services are critical to health, and schools must focus on improving WASH to ensure that their students stay healthy (WHO 2022). Children have a better environment for learning and fulfilling their full potential when they have facilities such as clean water, toilets, and soap for washing hands at school (UNICEF 2018). However, UNICEF and WHO reported that inequalities persist between and within countries, despite the continued decline in the proportion of schools without basic WASH services (WHO 2022).

Schools with adequate WASH facilities should have a safe and adequate water system for handwashing and drinking, sufficient private, safe, clean, culturally and gender-appropriate toilets for students and teachers, and adequate and clean handwashing facilities (McMichael 2019). Unfortunately, it has been reported that there are no suitable WASH conditions in schools on all continents in the world, and that even when the infrastructure is available, the amount is not sufficient, and it is not suitable for maintaining and improving the health of the school community (Poague *et al.* 2022; WHO 2022). Globally, 600 million children lack basic drinking water and sanitation, and 900 million children are deprived of basic hygiene services in their schools (UNICEF 2018). However, it is known that improving water, hygiene, and sanitation conditions in schools improves children's health and reduces absenteeism (Sharma & Adhikari 2022).

In Turkey, a 'White Flag' certificate with a validity period of 2 years is given to schools that meet the criteria determined in cooperation with the Ministry of Health and the Ministry of National Education to encourage schools about cleanliness and hygiene and to improve school health (Ministry of National Education 2010). However, most of the schools cannot obtain this certificate due to inadequate physical infrastructure and resources, and approximately one-third of them have this certificate (Çetinkaya *et al.* 2020). In our country, resources are provided to schools by the state. However, public resources are not sufficient to solve the economic problems that schools experience, so schools have to receive support from different institutions and organizations (Ministry of National Education 2010; Özdoğan Özbal 2017). In addition to the resources provided by the state, schools receive services from local administrations and meet the needs of students' parents (school–parent association) specified as private financial resources by using the payments made or private donations made (Gürel & Sarışık 2022). As a result of the study carried out by the Ministry of National Education in 21 provinces belonging to seven geographical regions, it was determined that most of the cleaning material needs of schools (89.9%) were met by the school–parent association (Ministry of National Education 2010). In addition, many schools in our country do not have health offices, and no health workers, especially school health nurses, are employed (Töre 2019; Çetinkaya *et al.* 2020).

It is known from the studies conducted in Turkey that schools are crowded, the cleaning services are not sufficient, schools have difficulty in meeting the need for tools and equipment used in cleaning, and the number of cleaning personnel is insufficient. In addition, it has been reported that the number of toilet cubicles per student is not sufficient, there is a shortage of sanitation and cleaning materials in the toilets, and the students meet their drinking water needs from the sinks in the toilets (Ministry of National Education 2010; Arslan 2018; Çetinkaya *et al.* 2020; Sezer Balcı *et al.* 2020). Schools in Antalya, which is the province with the third highest number of immigrants in our country due to its geographical location, are also faced with personnel problems, in addition to the inadequacy of physical infrastructure and materials, due to the increasing number of students. Therefore, this study aims to determine the cleaning, hygiene, and sanitation conditions of schools in Antalya. It is thought that the results of this study will provide important data in terms of revealing regional problems and discussing solution proposals for maintaining a healthy and reliable education environment in schools in this province.

## METHODS

### Design of the study

This study, which was conducted to determine the cleaning, hygiene, and sanitation conditions of schools in Antalya, was designed as a descriptive study.

### Sample of the study

The population of the study consists of principals of 1,244 public and private schools in 19 districts of Antalya. Principals of all schools in Antalya were included in the sampling and students were not included. 480 school principals filled out the questionnaire and the participation rate was determined as 38.6%. Looking at the studies conducted by distributing questionnaires, it is known that the average online questionnaire response rate is around 30% recently (Cleave 2020). The number of participants reached in this study was found to be compatible with the literature in this context.

## Data collection

The data of the study were collected with the 'Water, Cleaning and Hygiene Questionnaire for Schools' created by the researchers, using the research and literature information on the subject. The questionnaire consisted of three parts: (1) introductory information for schools (location, type of education, number of students and employees, supply of cleaning personnel and materials, drinking water supply, and pest control program); (2) cleaning and hygiene practices for various areas (the frequency of cleaning the garden, corridors, classrooms, teachers' room, library, lab, gym, and toilets and the methods used), and (3) cleaning and hygiene conditions of toilets (number, cleanliness, availability of hygienic materials, etc.). The questionnaire consisted of multiple-choice questions and open-ended questions, and the school principals were asked to answer the questions. In cases where more than one option was ticked in some questions, such as the toilet cleaning method, evaluations were made by considering the total number of answers. The data of the research were obtained based on the self-reports of school principals between June and July 2017. The form could be filled in 15–20 min.

## Statistical analysis

Statistical Package for the Social Sciences software was used in analyzing the data. Number, percentage, mean, and standard deviation were used. According to the rules set by the Ministry of National Education in Turkey, schools must have a cubicle for every 20 female students, a cubicle and two urinals for every 40 male students, and a washbasin for every 60 students. According to the number of cubicles and washbasins available, the school is defined as 'Sufficient' if it meets this criterion, and 'Insufficient' if it does not.

## Ethical considerations

Prior to conducting this study, the researchers signed the Declaration of Helsinki developed by the World Medical Association and obtained institutional permission from Akdeniz University Clinical Research Ethics Committee (Decision: 14.06.2017, No:382) and the Antalya Provincial Directorate of National Education. In addition, a written informed consent was obtained from the principals included in the study.

## Limitations of the study

In this study, the water, cleaning, and hygiene conditions of the schools were evaluated according to the written statements of the school administrators, i.e., the answers they gave to the questionnaires, and no observations and examinations were made in the schools. This situation was considered an obstacle to the elimination of the bias in the answers given by the school principals.

## RESULTS

In this study, it was found that 82.5% of the schools included in the sample provided full-time education, 91.7% were public schools, 53.8% were in districts outside the central districts, and the rates of primary and secondary schools were higher (25.9 and 25.3%, respectively). The number of students and teachers in the schools in the central districts was nearly twice that of the schools in the rural districts. Therefore, the number of students per school in the city center is higher. The ratios of male and female students in schools in the central and rural districts were close to each other. The ratio of female teachers in schools in the central districts was higher than both male teachers and those in the rural districts (Table 1). It was determined that in 59% of the schools, the students used the fountain in the garden or the building as a source of drinking water. However, in 34 schools (4%), students met their drinking water needs from the taps in the toilets. In addition, it was determined that only 37.1% of the schools had a programmed pest control program, 32.1% had permanent cleaning personnel, and the cleaning materials were mostly (51.2%) obtained from the school council budget. It was determined that only 16.0% of the schools had health offices and 36.8% of them had no staff (Table 2).

In 63.7% of the schools, there were toilets on each floor for students, 63.3% of these toilets had toilet paper, most of them had waste bins (89%) and liquid/foam soap (98.5%), but the numbers of handheld paper towels (47.7%) and hand dryers (2.1%) were found to be low (Table 3). Table 4 shows whether the schools had a recommended number of sinks and toilets according to the Turkish standards. According to this, only 42.3% of the schools had enough toilets for female students, while 72.8% had enough toilets for male students. According to the total number of students, the ratio of toilets in schools was lower for both female and male students in the central district schools. The ratio of sinks in schools according to the number of students was better than the ratio of toilets (87.7% for girls and 85.7% for boys), and these rates were also lower in the central

**Table 1** | General introductory characteristics of schools according to location

	Central districts		Rural districts		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Level ( <i>n</i> =363)						
Kindergarten	13	8.8	27	12.5	40	11.0
Primary school	41	27.9	53	24.5	94	25.9
Secondary school	37	25.2	55	25.5	92	25.3
High school	21	14.3	41	19.0	62	17.1
Mixed	35	23.8	40	18.5	75	20.7
Status ( <i>n</i> =480)						
State school	190	85.6	250	96.9	440	91.7
Private school	32	14.4	8	3.1	40	8.3
Type of teaching ( <i>n</i> =480) <sup>a</sup>						
Full time	171	77.0	225	87.2	396	82.5
Dual education	51	23.0	33	12.8	84	17.5
Schools by the total number of students ( <i>n</i> =480)						
<500	126	56.8	208	80.6	334	69.6
500–1,000	61	27.5	42	16.3	103	21.5
>1,000	35	15.8	8	3.1	43	9.0
Total number of students in schools by gender ( <i>n</i> =172,715)						
Female	52,316	48.3	30,895	48.0	83,211	48.2
Male	56,087	51.7	33,417	52.0	89,504	51.8
Total number of teachers in schools by gender ( <i>n</i> =3,697)						
Female	1,378	57.6	667	51.0	2,045	55.3
Male	1,013	42.4	639	49.0	1,652	44.7

<sup>a</sup>In Turkey, in schools with many students, half of the students come to school in the morning and half in the afternoon. That is, a dual education system is applied in these schools. In schools with a low number of students, the same students receive full-time education.

district schools. On the other hand, it was seen that 92.5% of the schools did not have the recommended number of toilets for female teachers, while 82.8% had the recommended number for male teachers, and therefore, female teachers were more disadvantaged (Table 4).

## DISCUSSION

When children have access to clean water, toilets, and soap at their school, they have a better environment to learn and realize their full potential (UNICEF 2018). In this study, in which the hygienic conditions of schools in Antalya were investigated, it was determined that the schools' clean drinking water supply, regular pest control program, permanent cleaning personnel, supply of cleaning materials, and number of toilets were not adequate.

A basic drinking water service in schools means having water from an efficient reliable source. However, according to UNICEF's 'Drinking Water, Sanitation and Hygiene in Schools: 2018 Global Status Report', only 69% of schools have a basic drinking water service on a global scale (UNICEF 2018). In our country, 93.8% of the water sources used in schools is 'tap water' (Ministry of National Education 2010). In this study, it was determined that 59% of the schools used tap water as a drinking water source, but that some schools (33%) also had a water dispenser. This difference in the rates of drinking water sources is thought to be related to the status of the school. Since private schools in our country have more resources than public schools, they can offer their students opportunities such as water dispensers as a source of drinking water. In addition, the fact that students in 34 schools (4%) met their drinking water needs from the taps in the toilets is a very important finding in terms of infection risk. Because of these points of use, it is possible for the water to be polluted (Shrestha *et al.*

**Table 2** | Some hygiene and sanitation facilities of schools according to location

	Central districts		Rural districts		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Drinking water source ( <i>n</i> =758) <sup>a</sup>						
Fountain in the garden (mains water)	127	36.5	201	48.4	328	43.0
Fountain in the building independent of the toilets	49	14.1	73	17.6	122	16.0
Water dispenser	139	39.9	113	27.2	252	33.0
Fountain in the toilets	22	6.3	12	2.9	34	4.5
Other	11	3.2	16	3.9	27	3.5
Pest control method ( <i>n</i> =480)						
Programmed prevention/elimination program	100	45.0	78	30.2	178	37.1
Not programmed, if needed	114	51.4	159	61.6	273	56.9
No prevention/elimination program	8	3.6	21	8.1	29	6.0
Supply of cleaning staff ( <i>n</i> =697) <sup>a</sup>						
Service purchasing	126	37.0	108	30.3	234	33.6
Permanent staff	119	34.9	105	29.5	224	32.1
Contractual staff	27	7.9	25	7.0	52	7.5
Other	69	20.2	118	33.1	187	26.8
Cleaning material supply ( <i>n</i> =670) <sup>a</sup>						
School council budget	190	55.6	153	46.6	343	51.2
General budget of the school	99	28.9	140	42.7	239	35.7
From official institutions	53	15.5	35	10.7	88	13.1
Health office ( <i>n</i> =480)						
Available	27	21.6	12	10.1	39	16.0
Not available	98	78.4	107	89.9	205	84.0
Staff in the health office ( <i>n</i> =39)						
None	9	34.6	5	41.7	14	36.8
Doctor	3	7.7	0	0.0	3	5.3
Nurse	9	30.8	4	33.3	13	31.6
Teacher	6	19.2	3	16.7	9	18.4

<sup>a</sup>Since more than one method was used, 'n' indicates the total number of answers.

2017). Similarly, in the study conducted throughout the country, it was determined that 10.3% of students met their drinking water needs from the fountains in the toilets (Ministry of National Education 2010).

Schools are vulnerable to pests since their buildings are large and may be neglected, serve large numbers of people, and store, prepare and consume food in them (US Environmental Protection Agency 2022). Therefore, planned pest management practices are needed in schools both to reduce the risks to students and staff from pesticide exposure and to minimize pest damage to structures and personal belongings (Maryland Department of Agriculture 2020). However, it is known that even in developed countries, there is no clear school-specific model in this regard, and planned and regular practices in schools are limited (Jones & Glick 2018). As a result of the nationwide study conducted by the Ministry of National Education in Turkey in 2010, it was stated that only 34.2% of schools had a programmed prevention/destruction program and that pests were sometimes seen in 35.4% of schools (Ministry of National Education 2010). Similarly, in this study, it was determined that only 37.1% of the schools had a programmed pest control program, while more than half had schools sprayed if needed. Since schools do not have sufficient budgets for programmed pest control, school administrators provide pesticides in schools, mostly by getting support from the local governments (municipalities) for pests in schools (Özdoğan Özbal 2017).

**Table 3** | Hygienic conditions of student toilets in schools according to location ( $n=480$ )

	Central districts		Rural districts		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Toilet on each floor						
Available	150	67.6	156	60.5	306	63.7
Not available	72	32.4	102	39.5	174	36.3
Toilet paper in cubicles						
Available	144	64.9	160	62.0	304	63.3
Not available	78	35.1	98	38.0	176	36.7
Waste bins in cubicles						
Available	205	92.3	222	86.0	427	89.0
Not available	17	7.7	36	14.0	53	11.0
Liquid/foam soap						
Available	219	98.6	254	98.4	473	98.5
Not available	3	1.4	4	1.6	7	1.5
Paper towel for drying hands						
Available	118	53.2	111	43.0	229	47.7
Not available	104	46.8	147	57.0	251	52.3
Hand dryer						
Available	8	3.6	2	0.8	10	2.1
Not available	214	96.4	256	99.2	470	97.9
Cleaning frequency						
After each recess	114	51.4	105	40.7	219	45.6
2–3 times a day	87	39.2	110	42.6	197	41.1
One time a day	21	9.4	43	16.7	64	13.3

It was determined that only 16.0% of the schools had health offices, and most of them had no health workers or teachers assigned. In our country, there is usually a health office in private schools, but the number is very low in public schools. Only 8.9% of primary schools have a health office in Turkey (Ministry of National Education 2010). However, it is very important to employ health workers, especially school nurses, in schools, because school nurses are in a unique position to collaboratively assess needs in the school, collect data for solutions, advocate for better health, and evaluate outcomes. School nurses can expand their sphere of influence by working across sectors, professions, and disciplines to create a culture of health at school and improve health outcomes, thus contributing to the solution of schools' resource constraints (Bergren 2017; NASN 2018).

Cleaning staff in schools are important employees in terms of providing a clean, hygienic, and safe environment for students and staff. It is known that 57.6% of the cleaning personnel in schools in our country are permanent and that in schools without cleaning personnel, an attempt is made to fill this gap by allocating contracted personnel or by purchasing services. Similarly, it is known that 89.9% of the cleaning material needs of schools in our country are met from their own budgets obtained by the school council (Ministry of National Education 2010). In this study, it was determined that only 32.1% of the schools had permanent cleaning personnel and that the cleaning material needs were mostly (51.2%) met from the school council budget. This situation may cause difficulties in meeting the cleaning materials and cleaning personnel needs of the schools and disrupt the services.

A basic sanitation service in schools can be realized if schools have available and gender-specific advanced sanitation facilities. Globally, however, only 66% of schools provided single-sex sanitation in 2016 (UNICEF 2018). In this study, there were enough toilets for female students in only 42.3% of the schools and for male students in 72.8% of the schools, and the rates were significantly lower in schools in the central districts. This situation is thought to be due to the old school buildings, the

**Table 4** | Availability of sufficient number of toilets and sinks for students and teachers according to the localization of the schools

	Central districts		Rural districts		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Number of female student toilets ( <i>n</i> =468)						
Sufficient	77	35.8	121	47.8	198	42.3
Insufficient	138	64.2	132	52.2	270	57.7
Number of male student toilets ( <i>n</i> =467)						
Sufficient	134	63.2	206	80.8	340	72.8
Insufficient	78	36.8	49	19.2	127	27.2
Number of female student sinks ( <i>n</i> =471)						
Sufficient	178	82.4	235	92.2	413	87.7
Insufficient	38	17.6	20	7.8	58	12.3
Number of male student sinks ( <i>n</i> =467)						
Sufficient	170	79.4	230	90.9	400	85.7
Insufficient	44	20.6	23	9.1	67	14.3
Number of female teacher toilets ( <i>n</i> =479)						
Sufficient	12	5.4	24	9.3	36	7.5
Insufficient	209	94.6	234	90.7	443	92.5
Number of male teacher toilets ( <i>n</i> =472)						
Sufficient	40	18.1	41	16.3	81	17.2
Insufficient	181	81.9	210	83.7	391	82.8

lack of capacity to serve the increasing number of students, and the lack of new arrangements according to the student profile as gender in Turkey (Göksoy 2017). In this study, although the ratios of male and female students in schools in central and rural areas are close to each other, the number of cabins for both genders, especially for girls, was insufficient due to the high number of students in schools in the city center. According to the regulations in our country, a cabin should be provided for every 20 female students, but a cubicle and two urinals for every 40 male students in schools. In addition to the differences in these rates, the use of a wall-mounted urinal together with the cabin for male students may have made them more advantageous in this regard, as it provides space savings. In addition, in this study, it was determined that teachers were more disadvantaged than students in terms of adequate cabin supply. It was determined that there was not enough cabin for teachers of both genders, especially female teachers in schools in the central districts. Since the rate of female teachers in schools in central districts is higher than both male teachers and schools in rural districts, it is expected that they will be more disadvantaged. This situation may cause significant problems, especially for female students and teachers who are at high risk of genitourinary infections. In order to prevent the entire school population, especially these vulnerable groups, from being adversely affected by inadequate sanitation conditions, urgent steps should be taken to accept students according to their capacities and improve sanitation conditions according to the student profile. At least, ensuring the continuity of hygienic materials and cleanliness, as well as raising awareness about hygiene should be the first steps to be taken. Although there are practices such as giving the 'White Flag' certificate as a reward to encourage and supervise schools in terms of cleanliness and hygiene in Turkey, most of the schools cannot receive this certificate due to insufficient physical infrastructure and resources (Ministry of National Education 2010; Çetinkaya *et al.* 2020). However, it is expected that the guides on 'Improving Hygiene Conditions in Educational Institutions and Infection Prevention Control Guide' and 'Precautions to be Taken in Schools During the Epidemic' published by the Ministry of National Education are expected to guide the prevention of infection and ensuring hygiene in schools (Ministry of National Education 2020, 2021). At the same time, taking water samples from the mains water and water tanks used in schools in our country once a month by the Ministry of Health facilitates the rapid taking of measures for unsafe drinking water sources (TC Resmi Gazete 2005).

Basic hygiene services in schools can be provided if the schools have a handwashing facility with soap and water (UNICEF 2018). In this study, while the number/quantity of sinks, liquid/foam soap, toilet paper, and waste bins in the toilets of the schools were sufficient, the rates of paper towels and hand dryers for drying hands were found to be low. Similarly, in the study conducted across the country, it was stated that 92.8% of schools' student toilets always had waste bins, 66.8% of them had liquid/foam soap, and 17.2% of them had toilet paper (Ministry of National Education 2010). However, since dirty and smelly toilets and the lack of hygienic materials are factors that affect the use of school toilets by students, it is important to eliminate hygiene and material deficiencies to prevent urinary system problems in children (Sezer Balcı *et al.* 2020).

## CONCLUSION

Schools are a major source of infection as crowded places where students and staff spend most of their time during the day. Especially in cases where water, hygiene, and sanitation conditions are inadequate, the risk of person-to-person transmission will increase, making schools high-risk environments for students and staff. For this reason, it is important to provide clean drinking water, hygiene, and sanitation services to protect students and staff from diseases in schools. In this way, students can study in a healthy and safe environment. However, it was seen that the schools in Antalya had problems in supplying the necessary materials, tools, services, and personnel to provide hygiene and sanitation conditions and that they tried to find temporary solutions to meet these needs. To encourage and facilitate effective WASH coverage and implementation in schools, it is important to support schools with supplies, equipment, and cleaning staff.

## ACKNOWLEDGEMENT

We are grateful for the contribution of all school administrators.

## ETHICAL CONSIDERATIONS

All procedures performed in studies involving human participants were in accordance with the ethical standards of the Akdeniz University Ethics Committee (14.06.2017 dated, Approval No: 382).

## FUNDING SOURCE

The authors declare that they have received no financial support.

## DATA AVAILABILITY STATEMENT

Data cannot be made publicly available; readers should contact the corresponding author for details.

## CONFLICT OF INTEREST

The authors declare there is no conflict.

## REFERENCES

- Arslan, M. M. 2018 Sınıf öğretmeni adaylarının ilkokullardaki okul güvenliğine ilişkin gözlemleri (Observations of classroom teacher candidates on school safety in primary schools). *Kırıkkale Üniversitesi Sosyal Bilimler Dergisi (Kırıkkale University Journal of Social Sciences)* 8 (2), 607–620.
- Bergren, M. D. 2017 School nursing and population health: past, present, and future. *Online Journal of Issues in Nursing* 22 (3), 1.
- Çetinkaya, A., Uyar, F., Özmen, D., Şahin, D. & Sezen Köksal, S. 2020 Manisa il merkezinde bulunan devlet ilkokul ve ortaokullarının fiziki ve çevresel koşullarının değerlendirilmesi (Evaluation of physical and environmental conditions of state primary and secondary schools in Manisa city center). *Celal Bayar Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi (Celal Bayar University-Health Sciences Institute Journal)* 7 (3), 335–340.
- Cleave, P. 2020 *What Is A Good Survey Response Rate? – SmartSurvey*. Available from: <https://www.smartsurvey.co.uk/blog/what-is-a-good-survey-response-rate> (accessed 16 December 2021).
- Göksoy, S. 2017 Okulların altyapı yeterliliği (Infrastructural competency of schools). *Uluslararası Liderlik Eğitimi Dergisi (International Journal of Leadership Training)* 1 (1), 9–15.
- Gürel, M. & Sarışık, S. 2022 Ortaokullarda maddi ihtiyaçlar ve bu ihtiyaçların giderilme yollarının okul yöneticilerinin görüşlerine göre incelenmesi (Analysis of the financial needs and the ways of meeting these needs in secondary schools through the opinions of school managers). *Eğitim Yönetimi ve Politikaları Dergisi (Journal of Educational Administration and Policy)* 3 (1), 12–21.

- Jones, S. E. & Glick, S. 2018 School factors associated with the implementation of integrated pest management-related policies and practices. *Journal of School Health* **88** (9), 669–675.
- Maryland Department of Agriculture. 2020 *Integrated Pest Management (IPM) in Schools*. Available from: [https://mda.maryland.gov/plants-pests/Pages/Integrated-Pest-Management-\(IPM\)-in-Schools.aspx](https://mda.maryland.gov/plants-pests/Pages/Integrated-Pest-Management-(IPM)-in-Schools.aspx) (accessed 21 December 2021).
- McMichael, C. 2019 Water, sanitation and hygiene (WASH) in schools in low-income countries: a review of evidence of impact. *International Journal of Environmental Research and Public Health* **16** (3), 359.
- Milli Eğitim Bakanlığı (Ministry of National Education) 2010 *İlköğretim Okullarında Temizlik ve Hijyen (Cleaning and Hygiene in Primary Schools)*. Available from: [www.meb.gov.tr](http://www.meb.gov.tr) (accessed 16 December 2021).
- Milli Eğitim Bakanlığı (Ministry of National Education) 2020 *Eğitim Kurumlarında Hijyen Şartlarının Geliştirilmesi ve Enfeksiyon Önleme Kontrol Kılavuzu (Improving Hygiene Conditions in Educational Institutions and Infection Prevention Control Guide)*. Available from: <http://merkezisgb.meb.gov.tr/www/egitim-kurumlarinda-hijyen-sartlarinin-gelistirilmesi-ve-enfeksiyon-onleme-kontrol-kilavuzu/icerik/244> (accessed 31 August 2022).
- Milli Eğitim Bakanlığı (Ministry of National Education) 2021 *Salgın Döneminde Okullarda Alınması Gereken Önlemler (Precautions to be Taken in Schools During the Epidemic)*. Available from: <https://www.meb.gov.tr/salgin-doneminde-okullarda-alinmasi-gereken-onlemler/haber/23905/tr> (accessed 31 August 2022).
- National Association of School Nurses 2018 *Healthy Communities – The Role of the School Nurse (Position Statement)*. National Association of School Nurses, Silver Spring, MD.
- Özdoğan Özbal, E. 2017 Cooperation with local administrations of primary school principals in solving economic problems of school. *Journal of Human Sciences* **14** (4), 4135–4148.
- Poague, K. I. H. M., Blanford, J. I. & Anthonj, C. 2022 Water, sanitation and hygiene in schools in low- and middle-income countries: a systematic review and implications for the COVID-19 pandemic. *International Journal of Environmental Research and Public Health* **19** (5), 3124.
- Sezer Balcı, A., Kolac, N., Keskin, E. & Poyraz, R. 2020 İlköğretim öğrencilerinin okul tuvaletlerini kullanma durumu ve etkileyen faktörler (Primary school students use of school toilets and affecting factors). *International Anatolia Academic Online Journal Health Sciences* **6** (1), 65–77.
- Sharma, M. K. & Adhikari, R. 2022 Effects of water, sanitation, and hygiene on the school absenteeism of basic level students in the government school of Nepal. *Frontiers in Education* **7**, 869933.
- Shrestha, A., Sharma, S., Gerold, J., Erismann, S., Sagar, S., Koju, R., Schindler, C., Odermatt, P., Utzinger, J. & Cissé, G. 2017 Water quality, sanitation, and hygiene conditions in schools and households in Dolakha and Ramechhap Districts, Nepal: results from a cross-sectional survey. *IJERPH* **14** (1), 89.
- TC Resmi Gazete (Turkish Official Newspaper) 2005 *İnsani Tüketim Amaçlı Sular Hakkında Yönetmelik (Regulation on Water Intended for Human Consumption)*. Available from: <https://www.resmigazete.gov.tr/eskiler/2005/02/20050217-3.htm> (accessed 31 August 2022).
- Töre, E., 2019 İlkokullarda okul sağlığı uygulamaları: Öğretmen ve idari çalışan görüşleri üzerine nitel bir çalışma (School health practices in primary schools: A qualitative study on the views of teachers and administrative staff.). In: *Bütünsel Açıdan Çocuk: İlköğretim Çalışmaları (The Child From A Holistic Perspective: Primary Education Studies)* (Olkun, S., Deniz, M. E., Toran, M., Sarı, M. H. & Kanişli, H. eds.). Pegem Akademi, Ankara.
- UNICEF 2018 Drinking-water, Sanitation and Hygiene in Schools: Global Baseline Report 2018. Available from: <https://www.who.int/publications/m/item/drinking-water-sanitation-and-hygiene-in-schools-global-baseline-report-2018> (accessed 16 December 2021).
- US Environmental Protection Agency 2022 *Information on Pests in Schools and Their Control | US EPA*. Available from: <https://www.epa.gov/ipm/information-pests-schools-and-their-control> (accessed 30 August 2022).
- World Health Organization (WHO) 2022 *Schools Ill-Equipped to Provide Healthy and Inclusive Learning Environments for all Children – UNICEF, WHO*. Available from: <https://www.who.int/news/item/23-06-2022-schools-ill-equipped-to-provide-healthy-and-inclusive-learning-environments-for-all-children-unicef-who> (accessed 28.07.2022).

First received 1 March 2022; accepted in revised form 1 September 2022. Available online 8 September 2022