

Identifying The Difficulties in Collecting Urine Samples from Children by Using a Urine Bag



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Abstract

Aim: The study aimed to identify the difficulties in collecting urine samples from children by using a urine bag.

Material and Methods: Data for this descriptive study were collected in 2019. The study population consists of parents who had previous experience in collecting urine samples from their children using a urine bag. Data was collected using the Sociodemographic Characteristics of the Parents Form and the Difficulties Experienced in Collecting a Urine Sample by Using a Urine Bag Form. The latter consists of 18 questions in total. Parents were asked to answer each question either "Yes" or "No". The sample of the research consists of 1915 parents. Data were evaluated in percentages.

Results and Discussion: It was found that 77.9% of the parents had difficulty in collecting urine samples from their daughters. Parents stated that they faced several issues such as feeling stressed (95.7%), not being able to easily place the urine bag (86.3%), the bag's slipping from its position (94.7%), the bag's adhesive tapes' coming off (71.2%), the child being uneasy (89.6%), frequently checking whether the bag is full (94.7%), stool contamination in the urine bag (51.9%), irritation in the child's vulva (61%), difficulty in pouring the collected urine into the urine container (70.5%), urine collection taking a long time (98.6%), and inability to collect urine in the bag (95.1%). It was found that 95.7% of the parents used more than one bag, 62% used more than one diaper, and 23.6% gave antibiotics to their children without collecting a urine sample due to these difficulties. Regular follow-up is also required to evaluate the effectiveness of support provided to parents who have difficulty in collecting urine samples. Identifying these difficulties can also contribute to eliminating such problems that may be experienced by parents later.

Conclusions: The parents had great difficulty in collecting urine samples from their children using a urine bag. Due to these difficulties, it is recommended to develop a new product that will eliminate such problems.

Keywords: Urine bag; Difficulty in collecting a urine sample; Urine drainage bag

Introduction

Urinary tract infection (UTI) is the most common serious bacterial infection in infants and children. Early diagnosis and treatment of this disease reduce the risk of long-term problems [1]. On the other hand, inadequate or inaccurate diagnosis may lead to overtreatment and unnecessary use of antibiotics [2]. Moreover, inadequate diagnosis and treatment may also lead to renal scar formation, hypertension, and end-stage renal failure. The diagnosis of UTI can only be confirmed after a high-quality urinalysis [3]. The least invasive, safest, fastest, and cheapest method should be preferred for urine collection [1].

The American Academy of Pediatrics (AAP) recommends the suprapubic aspiration method with 1-9% bacterial contamination and the urinary catheterization method with 8-14% bacterial contamination for urine collection [4,5]. However, these methods are invasive and cause pain. Moreover, medical expertise is required to use these methods [5]. Using a sterile urine bag,

which is among the non-invasive methods, shows a bacterial contamination rate between 26-62%. The clean-catch method, on the other hand, shows a bacterial contamination rate between 13-27%, offering an acceptable urine sample collection practice for diagnosing UTI [5-7]. However, these methods cannot be used in infants and children since they have not developed sphincter control yet [4].

Since catheterization and suprapubic aspiration are invasive procedures, the risk of urinary tract infections may increase, and they may cause pain and stress [8]. Furthermore, parents are very reluctant to allow the use of painful invasive methods. Due to the disadvantages of invasive methods, urine collection bags are widely used [9]. In a study conducted by Hadjipanayis et al. with 1129 pediatricians, 53% of the pediatricians stated that they used the urine collection bag method in collecting urine samples from babies up to 3 months old as the first option while 59% stated that

they used this method in collecting urine samples from children between 4-36 months [10]. Late tests may cause an increase in resource use, and poor-quality urine specimens may lead to incomplete diagnosis, unnecessary follow-up, and examinations [11]. Moreover, urine sample collection methods may result in the contamination of the bladder bacteria. This may lead to a wrong diagnosis and cause unnecessary antibiotic use due to a false-positive result. Therefore, the efficient collection of urine samples is a critical issue [12]. To the best of our knowledge, in the literature, there is no study on the difficulties in collecting a urine sample by using a urine bag. The present study aimed to identify the difficulties experienced by parents during urine collection from children by using a urine bag.

Design and Methods

The research was designed as a quantitative and quasi-experimental study. Data were collected using an online survey system between 07-10 June 2019.

Population and Sample of the Study

The study population consists of parents who had previous experience of collecting urine samples from their children using a urine bag. During data collection, the exact number of people to be included in the sample could not be determined. Therefore, the sample size was calculated using the equation ($n=t^2pq/d2$) as the number of individuals in the target population was unknown [13]. The inclusion criteria for parents were as follows:

- a) Parents who had previous experience in collecting a urine sample from their children using a urine bag,
- b) Parents who are literate,
- c) Parents who can use the Google Docs system.

Since 10 parents left the form incomplete, the research was completed with 1915 parents.

Data Collection Tools

Sociodemographic characteristics of the parents form

The form, which was prepared by the researchers, includes questions regarding the sociodemographic characteristics of the parents, such as age, gender, education level, number of children, of the parents who had difficulty in collecting urine samples from their children using a urine bag and consists of five items. Since the study aimed to determine the difficulties in collecting urine samples from children by using a urine bag, parents who experienced difficulties in taking urine samples were included in the study. Parents who had not experienced any problem with urination before and who could easily take urine samples by using a urine bag did not fill out the form.

Difficulties experienced in collecting a urine sample using a urine bag form:

This form, which was prepared by the researchers in light of the literature [8,14,15], includes questions about the difficulties in

collecting urine samples and those experienced by the participants. The form includes several questions about using the urine bag such as “whether they were able to place the urine bag properly, whether the bag slipped from its place, whether the adhesive tapes of the bag came off, whether there was fecal contamination, and whether the baby was irritated in the vulva area”. Moreover, the form also includes questions about consequences of the failure to collect urine sample such as “whether they gave antibiotics without taking a urine sample, and whether they used extra bags and diapers”. The form consists of 18 questions in total. Parents were asked to answer these questions as “Yes” or “No”.

Expert opinion: Expert opinions of 2 pediatric nursing faculty members were obtained before and during the research. Also, expert opinions were obtained from 2 neonatologists and 2 neonatal nurses before and after preparing the survey form. Finally, 5 parents who had experienced problems while collecting urine samples were consulted for their opinions.

Application of Data Forms

The research data were collected through online surveys prepared using the Google Docs application to reach a larger sample and to generalize the results to a larger population. The survey took about 3-5 minutes to complete. Parents also provided feedback via the Google Docs application.

Data Evaluation

The obtained data were analyzed using the SPSS 20 software package, and they were evaluated in percentages.

Ethical Principles

Ethics Committee approval (No. 2019-4/8) was obtained before the research. Only the voluntary parents participated in the study.

Results

According to the results of the survey, which was completed by 1915 parents, 61.9% of the parents were between the ages of 26-33, 98.7% were women, 53.5% had a bachelor's degree, and 50.1% had one child. It was found that 77.9% of the parents had difficulty in collecting urine samples from their daughters (Table 1). Parents stated that they experience the biggest challenge when it took more than 15 minutes to take the urine sample. Likewise, feeling stressed because they could not get the urine sample from their children, urine not flowing properly and not accumulating in the bag, and the bag slipping from its place were among the other difficulties that more than 90% of the parents had. But they stated that stool contamination in the bag was the least faced difficulty (Table 2). It was found that the biggest side effect of the difficulties was that the parents used more than one bag. Furthermore, it was found that the parents who could not collect the urine sample at the health care facility collected the urine sample at home and then took it to the hospital for analysis. Similarly, it was found that the parents used more than one diaper due to the difficulties they experienced (Table 3).

Table 1: Distribution of sociodemographic characteristics of the parents.

Sociodemographic Characteristics	n	%
Age		
18-25	83	4.3
26-33	1186	61.9
34 and above	646	33.7
Gender		
Female	1890	98.7
Male	25	1.3
Education Level		
Primary Education	46	2.4
High School	338	17.7
Associate Degree	286	14.9
Bachelor's Degree	1024	53.5
Master's Degree and above	221	11.5
Number of Children		
1	960	50.1
2	842	44
3 and above	113	5.9
Gender of the child when difficulty is experienced while collecting a urine sample using a urine bag		
Female	1491	77.9
Male	253	13.2
Both	171	8.9

Table 2: Difficulties experienced by parents while collecting urine sample by using a urine bag.

Difficulties Experienced	Yes		No	
	n	%	n	%
Frequently checking whether the bag was full made me feel stressed.	1832	95.7	83	4.3
I could not place the bag easily.	1652	86.3	263	13.7
The bag slipped after placing it.	1814	94.7	101	5.3
The adhesive tapes on the urine bag came off.	1364	71.2	551	28.8
Covering the urine bag with a diaper made my child uneasy.	1716	89.6	199	10.4
It was difficult to check whether the baby urinated or not.	1814	94.7	101	5.3
The bag came into contact with stool.	993	51.9	922	48.1
My child's vulva area was irritated because I covered the urine bag with the diaper.	1168	61	747	39
I had difficulty in pouring the urine sample into the urine container.	1351	70.5	564	29.5
It took me over 15 minutes to take a urine sample by using the bag.	1888	98.6	27	1.4
Since I covered the urine bag with a diaper after placing it, the bag got folded inside the diaper and the urine could not be easily collected in the bag.	1821	95.1	94	4.9

Table 3: Consequences of the difficulties experienced by parents while taking urine sample using a urine bag.

Consequences of the Difficulties Experienced	Yes		No	
	n	%	n	%
I gave my child antibiotics without taking a urine sample.	451	23.6	1464	76.4
I refused to give my child medicine without taking a urine sample.	1051	54.9	864	45.1
I could not take a urine sample in any way.	942	49.2	973	50.8
I gave up taking a urine sample because I had difficulty in taking a urine sample using a urine bag.	1125	58.7	790	41.3
I had to use more than one bag.	1833	95.7	82	4.3
I had to use more than one diaper.	1186	61.9	729	38.1
Since I could not take the urine sample at the healthcare facility, I had to collect the urine sample at home and take it there later.	1578	82.4	337	17.6

Discussion

It was found that 77.9% of the parents had difficulty in collecting urine samples from their daughters. The anatomical structure of the baby girls may be associated with the difficulty in taking the urine sample from them. It was found that 95.7% of the parents felt stressed because they could not take the urine sample. On the other hand, invasive attempts may cause pain and stress [8]. Parents are highly reluctant to allow the use of painful and stressful invasive methods [9].

Urine collection from children using a urine bag may cause the bag to fold or wrinkle [16]. It was found that 86.3% of the parents could not place the bag easily. Among the parents who have a daughter, 77.9% had difficulty in collecting the urine sample using a urine collection bag. They may experience difficulty in placing the urine bag due to the anatomical structure of the baby girls.

While 94.7% of the parents stated that the bag slipped from its place, 71.2% stated that they could not take the urine sample because the adhesive tapes of the urine bag came off. Likewise, the study conducted by Oerlemans et al. [17]. reported that the urine bag may get detached from the skin and cause leakage. Thus, the findings of the present study are similar to literature. Of the parents, 89.6% stated that their child was uneasy while taking the urine sample. Children who experience pain in the vulva due to adhesion of the bag may feel discomfort while taking urine samples. The study conducted by Lamy et al. [14]. Revealed that the adhesion of the bag to the sensitive skin caused moderate to severe pain according to visual pain scales . Concerns about the cleanliness of the vulva area, placing the bag, adhesive tapes of the bag, keeping the bag inside the diaper, and frequent checks to control whether the babies urinated may have disturbed the baby. It was found that 94.7% of the parents frequently checked whether the bag was full. Even if a sufficient amount of urine is accumulated in the bag, it cannot be seen from the outside since the urine bag remains covered inside the diaper [18]. Thus, parents have to check the urine bag frequently since they cannot see whether it is

full or not because the diaper covers the bag, and the non-invasive methods take a longer time. The bacterial contamination rate of the sterile bag is high (26-62%) [5,6]. In the present study, 51.9% of the parents stated that stool contamination was a problem in using the sterile bag. This finding is also compatible with literature.

Parents have to follow up on whether the adhesive tapes on urine bags cause skin irritation in their babies. The study conducted by Liaw et al. [19]. reported that the bag leaked frequently, especially during removal, and caused rashes. Likewise, the study conducted by Oerlemans et al. [17]. reported that the adhesive tapes caused skin irritation [17]. Similarly, in the present study, 61% of the parents stated that their child’s vulva area was irritated due to the urine bag. The research conducted by May [15]. Revealed that removing the urine bag from the skin when it was full and heavy caused loss of urine . In the study conducted by Liaw et al. [19], it was found that some parents had difficulty in emptying the urine bag into the sample container. Likewise, in the present study, 70.5% of the parents stated that they had difficulty in pouring the urine sample into the sample container.

Using a urine bag, as one of the non-invasive urine collection methods, is a useful method but it is time-consuming [5]. In the present study, 98.6% of the parents stated that it took more than 15 minutes to take a urine sample. Placing the bag inside the diaper and checking whether the urine is accumulated in the bag or not may increase the duration of urine sample collection. It was found that 95.1% of the parents had difficulty because the urine poured over and did not accumulate in the bag. According to the literature review, it was reported that 19.7% of the medical faculty students in Kukul’a’s [20] study, 10% of the participants in Özceylan & Toprak’s [21] study, and 48.6% of the participants in Koçyiğit et al. [22] study used antibiotics without prescription. The study conducted by Karaman Kenesarı & Özçakar [23] found that 8.1% of the mothers who participated in the study gave their children antibiotics without a prescription. Similarly, in the present study, it was found that 23.6% of the parents gave antibiotics to their

children without taking a urine sample while 54.9% refused to give them drugs before a urinalysis. It is important for parents to take a urine sample quickly since underdiagnosis or misdiagnosis may also lead to overtreatment and unnecessary antibiotics use [2]. The use of antibiotics without taking a urine sample may be due to the lack of information. Moreover, the presence of UTI symptoms may influence the decision of the parents, leading them to use antibiotics without taking a urine sample. It was found that 49.2% of the parents could not take a urine sample in any way. This may be associated with the stress experienced by the individuals, poor bag placement, stool contamination in the bag, folding of the bag in the diaper, and covering the bag with the diaper.

It was found that 58.7% of the parents gave up collecting the urine sample. In the study conducted by Liaw et al. [19], 20.4% of the parents/caregivers gave up taking the urine sample because they could not do it using a urine collection bag after long trials [18]. According to the study conducted by Newman et al. [24], 25% of urine samples from 3066 babies in the US were collected using a urine bag while 70% by catheter, 3% by suprapubic aspiration, and 2% by clean catch method. In the study of Coutinho et al. [25], 18% of the parents preferred using a urine bag to using a urinary catheter for collecting the urine sample. The results of another study revealed that parents/caregivers preferred using the urine pad as the first option, using a urine bag as the second, and the clean catch method as the third option for taking the urine sample [19].

In 2020, the cost of taking a urine sample was calculated as £49.39 for catheterization, £51.84 for suprapubic aspiration, £64.82 for clean capture, and £112.28 for the urine bag method [26]. In another study, Downs [27]. Reported that using urine bags cost an additional US\$429 compared to urinary catheterization. It was stated that the reason for this cost difference was the false positives and contaminated samples rather than the cost of the urine bags used in urine collection. Therefore, using a urine bag is the most expensive urine collection method for all stages. Also, the urine samples are often imprecise due to the highest contamination rate compared to other urine collection methods [26]. In the present study, it was found that 95.7% of the parents used more than one urine bag, and 61.9% used more than one diaper. The use of more than one urine bag and diaper increases the cost of collecting the urine sample by using a urine bag. The reason for using multiple urine bags and diapers may be due to adhesive tapes' slipping from their place, stool contamination in the bag, taking a urine sample taking longer than 30 minutes, and urine flowing into the diaper.

It was found that 82.4% of the parents collected the urine sample at home and took it to the hospital later. The patient and parents may feel stressed due to failure in taking a urine sample in the hospital for a long time. Furthermore, families may prefer to collect the urine sample at home and take it to the hospital, as

the individuals may feel more comfortable for urinary excretion in their family environment.

Practice Implications

Urine samples need to be collected from children who are admitted to the hospital with symptoms of urinary tract infection to make an early diagnosis and to initiate the treatment without losing time. The least invasive, safest, fastest, and least expensive method should be preferred for urine collection [1]. Urine collection bags are non-invasive kits and can be simply applied by parents without requiring a medical specialization; moreover, health care providers frequently request urinalysis for the diagnosis of urinary tract infections [10]. Although it is frequently preferred by health care providers, the results of the present study reveal that there are several difficulties in collecting urine samples from children by using urine bags. Therefore, identifying and addressing these difficulties effectively is very important. On the other hand, nurses should be prepared to provide forward-looking guidance and interventions considering the difficulties encountered. Regular follow-up is also critical to evaluate the effectiveness of the support provided to parents who have difficulty in collecting urine samples. Identifying these difficulties experienced by parents can also contribute to the elimination of such problems later. To the best of our knowledge, no study has been made on the difficulties experienced in collecting a urine sample from children by using a urine bag. Further qualitative and quantitative studies are required on the parents' experiences focusing on these challenges.

Strengths and Limitations

This is the first study that directly identifies the difficulties in collecting urine samples from children by using a urine bag. The fact that the sample of the study consists of parents who can use the Google Docs system, data of the research were collected between certain dates, and those who are illiterate and cannot use the system were excluded from the study may be stated as the limitations of this study.

Conclusion

Nurses play a key role in identifying the difficulties experienced by parents while collecting urine samples from their children. This study has shed light on several experiences of parents who have difficulty. The findings of the study may help healthcare team members to explore parents' experiences. According to the results of this study, nurses should consider the difficulties experienced by parents to help them take urine samples more easily from their children. To conclude, it was found that parents had great difficulty in collecting urine samples from their children by using a urine bag. It is recommended to develop a novel product, which is more useful, to eliminate such difficulties. As a secondary output, a new product idea has emerged to eliminate these difficulties in taking urine from children.

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