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EFFECT OF INSTRUCTIONS ABOUT THE METHOD OF URINE COLLECTION AND STORAGE ON THE ISOLATION RATE OF URINARY BACTERIA IN CHILDREN

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ABSTRACT

A study of 65 children (29males and 36females) and aged between four weeks and 15years with significant bacteriuria was undertaken over a six month period to determine the effects of instruction received about the methods of urine collection and storage on the prevalence of urinary tract infection. The commonest clinical presentation was fever (64.6%). Only 22(35.4%) of the patients had specific symptoms suggestive of urinary tract infections. The instructions about urine collection were given to 48(73.8%) care givers. This instruction was given by the attending doctors (84%). Despite the explanation, 15(23.1%) of the patients collected the urine samples wrongly and 44(67.7%) stored the samples for longer than one hour. Significant bacteriuria was more prevalent in 74.2% of patients who submitted their urine samples more than one hour after collection. Communication skill is important and should be emphasized in the trainings of health workers in procedure on the patients.

INTRODUCTION

Urinary tract infection is a preventable cause of morbidity and mortality in the paediatric age group (1-4). The infection is often asymptomatic or the symptoms may be mild that insufficient attention is paid to the illness (3). The prevalence rate in Saudi Arabia (5) is 5.3%, in Sweden⁶ is between 1 and 3% from neonatal period to school age. In Nigeria, Akinkugbe et. al. (7) reported a prevalence of 24% and 6% among rural and urban children respectively, Okafor et al (8) found the prevalence rate of 2.1% in Enugu. Morton and Lawande (9) in Zaria reported a prevalence rate of 0.4% of symptomatic

bacteriuria while Adeleke et al(10) in Kano, reported a prevalence of 3.2%.

Omer and El-Haj (5) reported a rate of 26.7% in Saudi Arabia. Female sex preponderance for symptomatic and asymptomatic bacteriuria after the age of two years has been reported from within and outside Nigeria (3,5,7,10,11).

Diagnosis of UTI is based on the finding of significant bacteriuria, which is influenced by the methods of urine collection (1-5). Accurate diagnosis requires careful collection of urine samples in sterile bottles with good storage and transportation to the laboratory within

30minutes to one hour after collection(3,8,10,11). Urinary tract infections can be over diagnosed due to contamination of urine samples during urine collection and prolonged storage without refrigeration. This study was undertaken to find out the level of instruction received by patients and their caregivers and their effect on the method of collection and storage of urine specimen in children with significant bacteriuria.

PATIENTS AND METHODS

The study was carried out at Aminu Kano Teaching Hospital, Kano (AKTH) between January - June, 2008. The Patients were consecutive children aged between 1month and 14years that attended the Paediatric out-patients department of AKTH, who had significant bacteriuria and whose parents gave consent for the study. All the urine samples were analyzed in the microbiology laboratory of AKTH, Kano.

A structured questionnaire was used to collect the data. The information obtained from the care-givers included age, sex, presenting complaints, methods of urine collection, duration and places of urine storage, any instruction about cleaning external genitalia, method of collection of urine, storage of urine, source of

instructions, and the organism cultured from the urine.

The data were analyzed using the chi-square test where appropriate and a probability level of $p \leq 0.05$ was taken as significant.

RESULTS

There were 65 patients; (29males and 36females) aged four weeks to 15 years who attended AKTH during the study period with significant bacteriuria of a single organism. Female predominance was observed in all age groups but this was only statistically significant after five years of age.

The symptoms on presentation included fever (64.6%) abdominal pain (43%) dysuria (23.1%), urinary incontinence (10.8%) and failure to thrive (9.2%).

The methods of urine collection are shown in Table I. No urine specimen was obtained by urethral catheterization or suprapubic tap. Twenty (30.8%) patients collected the urine specimens wrongly from early stream or chamber pot specimens. 25(38.5%) submitted the urine samples within one hour of collection. None of the urine specimen was refrigerated. Forty-eight (73.8%) patients admitted being instructed on the proper method of urine collection, storage

and transportation to the laboratory within one hour. Doctors (84%), laboratory Scientists (14.8%) and Nurses (2.2%) gave such instructions. Some of the care-givers had multiple instructions given by both the Doctors and laboratory Scientists. Seventeen (26.2%) of patients or care-givers did not

receive previous instructions. Although there was no significant relationship between instructions given and the method of urine collection as well as the duration of storage, bacteriuria was higher in patients who stored urine samples longer than one hour (Table II).

TABLE I: METHODS OF URINE COLLECTION ACCORDING TO THE AGE GROUPS

Method	1 - 12months	>1 - 5 years	>5- 15years	Total
Midstream	-	14	14	28
Clean catch	15	2	-	17
Chamber pot	10	4	-	14
Early stream	2	3	1	6
Total	27	23	15	65

TABLE II: RELATIONSHIP BETWEEN INSTRUCTIONS AND METHODS OF URINE COLLECTION AND DURATION OF STORAGE.

Method of Urine collection	Received instruction		Total	X ²	p - value
	Yes n-48	No n-17			
Correct	39	11	50(76.9)	1.78	> 0.1
Wrong	9	6	15(73.1)		
Duration of Urine storage					
≤ 1 hour	14	7	21(32.3)	0.39	> 0.1
≥ 1 hour	34	10	44(67.7)		

TABLE III: RELATIONSHIP BETWEEN DURATION OF URINE STORAGE AND TYPES OF ORGANISM ON CULTURE

Duration of home storage	E. Coli	Klebsiella	Staph aureus	Pseudomonas	Proteus	Total
≤ 1 hour	8	5	2	4	5	24
≥ 1 hour	19	8	9	5	-	41
Total	27	13	11	89	5	65

The commonest organism isolated was **Escherichia coli** (41.5%). There were no multiple bacterial isolates. The other organisms isolated were **Klebsiella spp** (20%), **Staphylococcus aureus** (16.9%), **Pseudomonas aeruginosa** (13.8%) and **Proteus mirabilis** (7.8%). Table III shows the relationship between instructions and methods of urine storage and types of organism cultured.

DISCUSSION

The study has shown a female preponderance for asymptomatic bacteriuria. This was significant after the age of five years. This is similar to studies reported from elsewhere(2,4,5). The reason for this may be due to the short female urethra, which makes it easier for organisms from the vulva to get into the bladder. Morton and Lawande⁹ noted that

up to the age of three years, male were more affected than females. However, Okoro and Okafor(8) in Enugu (South east Nigeria) did not observe any sex difference in patients with symptomatic urinary tract infections.

The commonest clinical presentation was fever (64.6%) of the cases. Twenty three percent of the children had dysuria while 10.8% had urinary incontinence; these two symptoms are specific for urinary infections. This finding is similar to the study by Anochie et al (12) but contrast with report by Okoro and Okafor⁸ who observed dysuria and pyuria in 43% and 71% of their cases, respectively. Morton and Lawande⁹ in Zaria (North-west Nigeria), reported 10% of children with fever had UTI, 22% of with diarrhoea and 43% of those with dysuria. It is therefore

recommended that UTI should be suspected and investigated accordingly, in any child that presents with a history of non-specific fever, even in the absence of symptoms referable to the renal system. Twenty-seven percent of care-givers did not receive adequate instructions in respect of proper urine collection, storage (refrigeration) and rapid transportation of samples within one hour to the laboratory. This has contributed to the wrong collection of urine from unsterile containers (Chamber-pot) or from early rather than mid-stream clean catch of urine flow. The chance of growing contaminants cultures of such collections is high. There was delay in the transportation of urine samples to the laboratory in 67% of patients; these samples were submitted later than one hour after collection. This may increase the multiplication of the organisms in the urine, resulting in false diagnosis of urinary tract infection. This over diagnosis of UTI may account for the high prevalence rates reported from Port-Harcourt, (13) Ibadan (7) and Zaria (9).

The instructions given by the doctors and laboratory scientist did not positively influence the method of urine collection and

storage. Only 48(73%) agree to be instructions by both the doctors and laboratory scientists. The instructions may be too detailed in that the care-givers could not comprehend the instructions. About 67% who claimed to understand the instructions collected the urine samples wrongly and stored the samples wrongly and stored the samples for more than one hour. There were no significant difference in the storage and method of collection of urine in growing a positive culture from the study.

The commonest organism cultured in the study was **Escherichia Coli** was (41.5%). This is similar to reports from within and outside Nigeria have reported that **Escherichia Coli** was the commonest cause of UTI in symptomatic patients (3,8,10, 11,12). In Port-Harcourt¹² and Ibadan (7), **Klebsiela spp** was the commonest and also in Arabian Gulf in the paediatric age group(5). However, in rural Nigerian children, Akinkugbe et al(7) found **Staphylococcus aureus** as the commonest organism in urine specimen of asymptomatic patients.

There is uncertainty of electricity power supply in Nigeria and the low socio-economic status of most

people, refrigeration is not always possible. There is the need to communicate and educate care-givers in accurate methods of collecting urine specimens to be examined for bacteria and also how to transport it to the laboratory within one hour of collection.

REFERENCES

1. Aikhionbare HA. Epidemiology of childhood renal diseases in Africa. *Nig J Med* 1998; 7: 97 - 100.
2. Campbell AGM, McIntosh N. Forfar and Arneil's Text book of Paediatrics. Churchill Livingstone 1994;1031 - 10346.
3. Owa JA. Urinary tract infections. In: Azuibuke JC, Nkanginieme KEO. eds. Paediatrics and Child health in a Tropical Region. Owerri. African Educational Services.
4. Mitchel K. Urinary tract infection in catheterized patients. *Post grad Doc (Africa)* 1993; 15: 29 - 31.
5. Ommer EE, El-Haj AI. Urinary tract infections in school children in Saudi Arabia. *Med Digest* 1992; 18: 3 - 7.
6. Rudolph AM, Hoffman JIE, Rudolph CD. Rudolph's Paediatrics; Prentice Hall International 1996: 1388 - 1392.
7. Akinkugbe FM, Fanulusi JB, Akinkugbe OO. Urinary tract infection in infancy and early childhood. *East Afr Med J* 1973; 50: 514 - 520.
8. Okafor HU, Okoro BA. Urinary tract infection in Children. The Enugu experience. *Nig Med Pract* 1993; 25: 71 - 75.
9. Morton RE, Lawande R. Frequency and clinical features of urinary tract infection in paediatric out-patients in Nigeria. *Ann Trop Paediatr* 1982; 2:113 - 117.
10. Adeleke SI, Asani MO, Belonwu RO, Ihesiulor G. Bacterial isolates from childhood urinary tract infection in Kano. *Ann Nig Med* 2005; 2:1 : 4 - 7.
11. Okofor HU, Okoro BA, Ibe BC, Njoku-Obi NU. Prevalence of asymptomatic bacteriuria among nursery school children. *Nig J Paediatr* 1993; 20: 84 - 88.
12. Anochie IC, Nkanginieme KEO, Eke FU. The influence of instruction about the method of urine collection and storage on the prevalence of urinary tract infection. *Nig J Paediatr* 2001; 28: 39 - 42.
13. Eke FU, Eke NN. Renal disorders in children. A Nigerian study. *Paediatr Nephrol* 1994;8:383 - 386.
14. Beeker C, Guenther Gray C, Raj A. Community empowerment paradigm and the primary prevention of HIV/AIDS. *Soc Sci Med.* 1998;46:831-842