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Evaluation of parental perception of childhood urinary tract infection in Ondo, South-western Nigeria

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Abstract*:* *Background:* Urinary tract infection (UTI) is common in children with possible severe complications, deserving public health interventions.
Aims: To evaluate parental perception of symptoms, causes, complication and treatment of childhood UTI, and proposerelevant interventions.
Methods: This is an ethically-approved cross-sectional study using a structured questionnaire comprising a 35-item Likert-like scale on perception of UTI in children with a reliability rating of 0.93. Adequate perception of each variable was defined as mean score ≥ 3.0. Weighted mean scores were tested for significant difference using F-test. Multiple logistic regressions identified possible predictors of adequate perception among the participants. P -value <0.05 was considered significant.
Results: Altogether, 600 guardians/parents took part in the study. Their mean age was 29.8±6.5 years and almost two-thirds of them (62.3%) were females. Only 18.3% of the participants had adequate perception of UTI in children. Their grand mean score on perception of UTI was 2.68 ± 0.52. There was an upward trend in weighted mean scores of the various subscales (F-test = 21.63, p=0.000). Significant predictors of adequate perception of UTI in this survey include female gender (OR=16.72; 95% CI: 5.77-48.43), Hausa ethnicity (OR= 0.02; 95% CI: 0.00-0.17) and polygamous family structure (OR= 2.40; 95% CI: 1.16-4.96).
Conclusion: There was low parental perception of UTI in children in our study setting. Regular health education on childhood urinary tract disorders is recommended.

Key words: urinary tract infection, causes, treatment, outcome, parental perception

Introduction

Urinary tract infection (UTI) is common in children. It may account for up to 10% of febrile young children seen in the Emergency Room.[1] It can occur alone or alongside other paediatric disorders.[2,3]It can be classified into upper UTI (pyelonephritis) and lower UTI (cystitis).[4]It is usually caused by bowel flora especially Escherichia coli.[4] Most episodes of UTI in infancy are pyelonephritis, manifesting with fever and often without localizing signs.[4]Older children with UTI may present with abdominal pain, vomiting, fever, malodorous urine and urinary symptoms (dysuria, urgency, frequency).[4] This underscores the need for a high level of awareness of the disorder among parents.[5,6]UTI diagnosis requires urinalysis, urine microscopy and culture.[4]Also, blood culture, renal function tests and imaging studies may be indicated. Its treatment often comprises culture-guided parenteral antibiotics.[4,6]

Recurrent UTI can cause acute kidney injury (AKI) and bilateral renal scarring especially among children with co-morbidities.[7-10] In a two-hit hypothesis model, this acquired renal insults confer further risk of end-stage renal disease (ESRD) especially in persons of African descent with an underlying genetic predisposition like the Apolipoprotein 1 (APOL 1) gene polymorphism.[11,12] Therefore, adequate awareness of the disorder will enhance parental health-seeking behaviour.[13-15]This will prevent complicated childhood UTI that can worsen the rising burden of chronic kidney disease (CKD) and unmet needs of renal replacement therapy (RRT) in our resource-limited region.[16-18]
This article reports a multisite study that evaluated parental perception of symptoms, causes, complication and treatment of childhood UTI. Also, possible interventions at community level are proposed.

Methods

Study Setting and Participants

The study was carried out at the paediatric Out-Patient Departments (OPDs) of the Mother and Child Hospitals (MCHs) in Akure and Ondo town. These two MCHs are busy public facilities providing specialized free health care services to the state capital (Akure), Ondo town and suburbs as well as allied communities in south-western Nigeria.[19]Ondo state has a population of 4.3 million (estimated 47.1% are children) with a land area of 15,000 square kilometres and a long coastal line.[20]
This cross-sectional descriptive study was done from January to March2015. Ethical clearance was obtained from the Research and Ethical committee of the MCH Akure. Verbal informed consent was obtained from the respondents, having explained the purpose of the study and emphasized that participation was voluntary. The minimum sample size was determined by assuming a prevalence of 50% for adequate perception of UTI in children at the setting, a 95% confidence interval and a sample error of 5%.[21] This was adjusted for a 15% non-response rate. A total of 600 persons were recruited from the two institutions (*300 from each MCH*). The participants were all consecutive consenting guardians/ parents of children seen at the paediatric OPDs during the study period.

Data Collection

A researcher-designed questionnaire (*comprising bio-data, symptoms, causes, treatment and outcome of UTI*) was administered to every participant. The questionnaire contained 35 variables on UTI perception based on 'basic patient information on UTI in children' by Shaikh et al.[22] Parental perception of each variable was accessed on a five-point Likert scale ranging from 'strongly agree' to 'strongly disagree'. We computed the reliability rating of the questionnaire from 60 respondents and obtained a Cronbach Alpha (CA) of 0.93:*the symptoms subscale consists of 13 items with CA of 0.84;causes subscale, 6 items (CA = 0.83), treatment subscale, 10 items (CA=0.87) and outcome subscale, 6 items (CA=0.85).*The researchers and two trained assistants conducted the interviews in English or Yoruba languages to ensure good comprehension.

Data Analysis

The data were analyzed using SPSS version 20.0 statistical software for Windows (IBM, Armonk, N.Y., United States). Fisher's Exact test or Chi-square was used to compare categorized data such as gender, religion and socioeconomic class. Weighted mean score was computed for variables on each Likert sub-scale. Adequate perception was defined with a cut-off point of 3.0. The Student t-test and F-test were used to determine any significant difference between weighted mean scores, while Scheffé post hoc test identified the significantly different weighted means on F-test. Multiple binary logistic regression analysis was done to identify factors predicting adequate parental perception of childhood UTI. The level of significance of each test was set at $p<0.05$.

Results

Altogether, six hundred parents/ guardians took part in the study. Their mean age was 29.8±6.5 years and almost two-thirds of them (62.3%) were females. Their ethnic groups were as follows: Yoruba (69.2%), Hausa (21.8%), Ibo (8.0%) and others (1.0%). They were mainly Christians (67.5%) and Muslims (31.8%). About a quarter of the participants (23.3%) had tertiary level of education, 62.3% secondary while 14.4% had primary level of education. A majority (92.7%) of them was married; their types of family were as follows: monogamous (65.0%), polygamous (34.3%) and others (0.7%).

Perception of UTI symptoms

Less than one-fifth (18.3%) of the participants had adequate perception of all the listed symptoms of UTI in children but76.3% of them perceived that UTI can occur in children and 51.7% agreed that it can cause fever like malaria. Table 1 shows the participants' mean scores on perception of possible UTI symptoms, with alow weighted mean score (2.56±0.60). However, their perception of specific symptoms of UTI was significantly higher than the non-specific symptoms (2.70±0.80 vs. 2.52±0.78; t= 3.946, *p*=0.000).

Table 1: Participant's perception of symptoms of UTI in Children

Symptoms	Mean score	SD
UTI can occur in children	2.23	0.80
UTI can involve both kidneys	2.48	0.81
It can be present in a newborn baby	2.66	0.80
It can cause frequent urination	2.54	0.82
It can cause cloudy and smelling urine	2.45	0.80
It can cause burning or painful urination	2.60	0.83
It can cause blood in urine	2.70	0.83
It can cause flank or back pain	2.67	0.80
It can cause bedwetting in a dry child	2.48	0.83
It can cause fever like malaria	2.52	0.78
It can cause vomiting and abdominal pain	2.58	0.81
It can reoccur or persist in a child	2.72	0.82
It can occur more in children below 4yrs	2.66	0.80
Weight Mean score (*symptoms*)	2.56	0.60

SD = standard deviation

Perception of causes of UTI

Only about one-tenth (11.2%) of the participants adequately perceived the causes of UTI but one-third (32.1%) agreed that UTI can result from faecal contamination of the urinary tract in children. The weighted mean score for perceived causes of UTI in children was 2.77±0.66. The details of participants' mean scores on the items on UTI causes sub-scale are shown on Table 2 below.

Table 2: Participant's perception of causes of UTI in children

Causes	Mean score	SD
UTI can be due to germs from the anus	2.67	0.84
UTI can be due to germs from the blood	2.73	0.79
It can occur in abnormal urinary tract	2.78	0.81
It can occur more in uncircumcised boys	2.85	0.78
It can occur without sexual activity	2.80	0.80
It can occur in frequent sex or new partner	2.80	0.84
Weighted Mean score (*causes*)	2.77	0.66

SD = standard deviation

Perceived treatment of UTI in children

The perception of treatment measures of UTI in children was low (31.5%) among the participants. A majority of them considered inappropriate therapies for UTI: 65.0% would treat with antimalarial, 59.5% with paracetamol only and 51.0% would treat with native concoction. About31.3% did not perceive the need for urine tests in caring for a child with UTI. Also, over two-thirds (68.5%)of them disagreed with possible preventive measures of UTI. The mean scores of each item on the treatment subscale and their weighted mean score (2.59±0.60) are shown on Table 3.

Table 3: Participant's perception of treatment of UTI in Children

Treatment	Mean score	SD
UTI can be treated with antimalarial	2.40	0.87
UTI can be treated with PCM only	2.51	0.90
Antibiotics are necessary to treat UTI	2.32	0.82
UTI can be treated by self-medication	2.62	0.98
UTI can be treated by native concussion	2.63	0.92
Urine tests are necessary to treat UTI	2.32	082
Ultrasound scan or x-ray can be necessary to treat UTI	2.71	0.81
Treatment of constipation can prevent future UTI	2.76	0.78
Low daily dose of antibiotics can prevent frequent UTI	2.86	0.79
Drinking more fluid may prevent UTI	2.77	0.81
Weighted mean score (*treatment*)	2.59	0.60

SD = standard deviation

Perception of possible outcome of complicated UTI

The participants had a low perception of possible morbidities that can occur later in life due to complicated childhood UTI: kidney damage, poor growth and hypertension were identified as such by 29.8%, 30.3% and 25.8% respectively. Table 4 shows the mean scores on the UTI outcome subscale.

Altogether, only 18.3% of our participants had adequate perception of the practical aspects of UTI in children included in this study. The participants' grand mean score on perception of UTI in this survey was 2.68 ± 0.52. The upward trend in weighted mean scores on the various subscales attained statistical significance, with a relatively higher perception of UTI causes/outcome than UTI symptoms/treatment among the participants (F-test = 21.63, *p*=0.000; Table 5).

Table 4: Participant's perception of possible outcome of complicated UTI in children

Outcome	Mean score	SD
UTI can cause kidney damage or failure	2.72	0.77
It can cause poor growth of a child	2.75	0.80
It can cause high blood pressure	2.81	0.75
It can cause low blood level	2.82	0.78
It can cause low bone growth	2.84	0.74
It can cause the death of a child	2.80	0.80
Weighted mean score (*outcome*)	2.79	0.65

SD = standard deviation

Table 5: Summary of participant's perception UTI in children

Childhood UTI	Weighted mean score*	SD	Interpretation
Symptoms	2.56[a]	0.60	Low perception
Causes	2.77[b]	0.66	Low perception
Treatment	2.59[a]	0.60	Low perception
Outcome	2.79[b]	0.65	Low perception
Grand mean score	2.68	0.52	Low perception

[a,b]Significantly different means identified by Scheffé post hoc test (*F-test = 21.63; p=0.000)

Predictors of adequate perception of UTI

On bivariate analysis, some participants' characteristics such as gender, ethnicity, religion and educational level were significantly associated with adequate perception of UTI in children ($p < 0.05$; Table 6). On multiple logistic regression model, significant predictors of perception of UTI in this survey includes gender (OR=16.72; 95% CI: 5.77-48.43), Hausa ethnicity (OR= 0.02; 95% CI: 0.00-0.17) and polygamous family structure (OR= 2.40; 95% CI: 1.16-4.96), Table 7.

Table 6: Comparison of some characteristics of participants with and without adequate perception of childhood UTI

Characteristics	Perception of childhood UTI: Low perception: *mean score <3 (n, %)*	Adequate perception: *mean score ≥3 (n, %)*	*Test (χ^2)*	*df*	p-value
Gender					
Male	215(44.3)	9(8.3)	49.303[a]	1	0.000*
Female	270(55.7)	100(91.7)			
Age					
< 40	243(93.8)	77(90.6)	1.031[a]	1	0.310
≥40	16(6.2)	8(9.4)			
Ethnic group					
Yoruba	326(66.5)	89(80.9)	49.040[b]	3	0.000*
Hausa	129(26.3)	2(1.8)			
Ibo	32(6.5)	16(14.5)			
others	3(0.6)	3(2.7)			
Religion					
Christianity	317(64.7)	88(80.0)	14.368[b]	2	0.000*
Muslim	171(34.9)	20(18.2)			
others	2(0.4)	2(1.8)			
Educational level					
Primary	49(12.3)	19(25.7)	14.630[a]	2	0.001*
Secondary	262(65.8)	32(43.2)			
Tertiary	87(21.9)	23(31.1)			
Marital status					
Married	457(93.3)	99(90.0)	1.409[a]	1	0.235
Single	33(6.7)	11(10.0)			
Type of family					
Monogamous	305(62.2)	85(77.3)	8.926[b]	2	0.009*
Polygamous	181(36.9)	25(22.7)			
others	4(0.8)	0(0.0)			

[a]Pearson chi-square; [b]Fishers exact test; df : degree of freedom;*significant at $p< 0.05$.

Table 7: Multivariate binary logistic regression of predictors of adequate perception of UTI

Variables	p-value	OR	95% C.I.
Gender			
Male		1.00	
Female	0.000*	16.72	5.77-48.43
Ethnicity			
Yoruba		1.00	
Hausa	0.000*	0.02	0.00-0.17
Igbo	0.862	1.09	0.43-2.75
Others	0.512	2.42	0.17-34.14
Religion			
Christianity		1.00	
Muslim	0.792	1.11	0.51-2.43
Others	0.297	3.54	0.33-38.10
Level of Education			
Primary		1.00	
Secondary	0.095	0.54	0.26-1.11
Tertiary	0.559	0.79	0.36-1.73
Type of family			
Monogamous		1.00	
Polygamous	0.018*	2.40	1.16-4.96

*Significant at $p< 0.05$;

Discussion

This survey confirms a low perception of childhood urinary tract infection (UTI) in the setting, similar to a recent report that 48.3%of respondents had no knowledge of UTI in Rantya-Gyel Community in Jos.[23]Also, a majority of our participants were not aware that UTI can occur in neonatal infants similar to prior reports.[24,25] Perception of the genito-urinary symptoms of UTI was higher than its non-specific features among our participants, comparable to the Jos study in which 51% of their participants perceived symptoms suggestive of UTI.[23] Non-specific symptoms like fever in children are often attributed to malaria in endemic regions.[3,26] There is a need to enlighten the public on the possibility of UTI in febrile young children with extra-renal complaints, especially when they are not responsive to standard antimalarial therapy. Also, there was a misconception among our study participants that UTI occurs only in adults. This may be partly due to the proven association between sexual activity and UTI especially among pregnant women.[27,28] Kimbi et al[29] found that access to health information is higher among urban dwellers than those living in the rural areas but our participants in this urban setting knew little about childhood UTI. This reiterates the need for improved public enlightenment on kidney diseases in children consistent with the World Kidney Day's theme in 2016.[30]

Although perception of UTI causes and outcome was relatively higher among our participants, its weighted mean score was still inadequate in this survey. Faecal contamination was not perceived as a possible source of uropathogens by about two-thirds of the respondents. This can undermine their practice of anal hygiene, predisposing the female child to recurrent UTI and possible renal scarring.[9,27] In addition, there was inadequate perception of appropriate UTI therapies in children in this study. This could result from their ignorance of the disease entity and widespread self-medication practices in the setting.[31] Likewise, Gebretsadik et al[15] reported that less than one-third of caregivers sought formal health care facilities for common childhood illnesses in Ethiopia. Over 60% of our participants considered native concoctions as appropriate therapy for UTI, consistent with the widespread promotion of traditional herbal mixtures for treatment of multiple febrile illnesses in children in the environ.[32] Sadly, some of these herbal concoctions contain nephrotoxic substances.[33] Again, possible future outcome of complicated childhood UTI were unknown to most of our participants. This could cause poor health -seeking behavior, non-adherence to prescribed therapy and late presentation in health facilities with severe morbidities.[16]

Significant determinants of adequate perception of childhood UTI among our participants include both biological variables and modifiable social factors. Female participants were 16 times more likely than males to have adequate perception of UTI. This could be related to home keeping role of women including interest in health issues affecting children, while menare preoccupied with economic activities. Also, the Hausas had higher perception of childhood UTI than the other tribes perhaps their cultural view takes cognizance of prevention of urine contamination by anal-genital hygiene.

Again, participants from polygamous family settings were at least twice more likely to be aware of childhood UTI. Parents in polygamous setting might have suffered more episodes of genitourinary infections than those in monogamous setting, increasing their awareness of the disorder.[28] Moreover, perception of UTI was associated with participants' educational level and religion in this study; this might be due to prior exposure to relevant health information during academic or religious teachings. Therefore, an intervention based on Health Belief Model described by Hashemiparast et al[34] could be useful in preventing UTI in our setting.

The low perception of UTI found among our participants was not due to their lack of understanding of the study tool. Medical jargons were totally avoided and each item on the subscales was explained using' day-today' expressions and interpreted in their local language when needed. The strength of this study includes its multisite nature and the high reliability ratings of the scales.

Conclusions

Conclusions and recommendations: There was low parental perception of symptoms, causes, treatment, prevention and possible complications of childhood UTI in the setting. Some modifiable variables influence their views of the disorder in children. Health education packages adapted to the environs could improve their knowledge of occurrence and appropriate care of childhood genitourinary infections ensuring healthy kidneys later in life. This can be done using health education shows on existing mass media. Likewise, waiting areas of public facilities can be equipped with audio-visuals presenting health information on common childhood illnesses including UTI. Also, relevant audio-messages on common childhood urinary tract disorders in Nigerian languages should be available to subscribers on the mobile networks. These could enhance parental knowledge and health seeking behaviours.

Authors' Contribution
This work was carried out in collaboration between both authors. Author MTA designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author ROO managed the literature searches and participated in data collection. Both authors read and approved the final manuscript.
Conflict of interest: None

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