Review Article

Preterm Birth and Renal Recurrent Infections: A Scoping Review

Alba Belanche Monterde* and Javier Flores Fraile

Department of Surgery, Faculty of Medicine and Dentistry, University of Salamanca, Spain

Abstract

UTI is related with other comorbidities and in the pregnant woman these issues are worse. Pregnant women have a high prevalence of UTI during pregnancy. The aim of the present review is evaluate if UTIs during pregnancy leads to preterm birth. Methods: Articles from PubMed Medline database were evaluated selecting only clinical trials with no time restriction. Initially 106 paper were found and only 6 trials were finally included. Results: The age of the mother is normally under 30% when UTIs during pregnancy and preterm birth occur. The socio-economic aspects and education of the parents also affects. UTIs during pregnancy increase the risk of preterm birth. Discussion: UTIs infection is produced by bacteria and during pregnancy the most current bacteria which was found is Escherichia coli. This inflammation cascade affects to the fetus which might lead with preterm birth. Conclusion: UTIs during pregnancy leads with an higher risk of suffering a preterm birth.

Introduction

The urinary tract infections (UTIs) are diseases caused by bacteria growing in the urinary tract, including kidneys, bladder, urethra or ureters that activate the inflammation biochemical cascade. This disease is continuous in the female tract and can be symptomatic or asymptomatic. Women are more risked than men to present UTIs due to the shorter urethra and it is the most common infection during pregnancy [1]. In the prenatal children UTI can also occur and they are named febrile urinary tract infections. This affection has 3-8% of prevalence and it seems to be congenital due to anomalies. Detecting it an early age is really important and it is normally diagnosed by ultrasonic images [2]. The severe UTIs are linked to immune deficient hosts. In addition to pregnancy, neurological disease, urine retention, renal transplantation and diabetes mellitus are risk factor for UTIs and complications [3]. Also sex, catheters and the sex are risk factors of diabetes so both diseases are linked. The UTIs are prevalent in some countries and might range from 9.8% to 26.6% in pregnant women [3]. The family monthly income and socio-demographical situation are factor which also increase the incidence of UTIs during pregnancy so education and economic changes are needed for prevention [4]. UTIs are normally shown in prevalence to Escherichia coli bacteria in pregnant women and a higher level is shown in the 34% of the cases [5]. Due to the resistance of antibiotics and the lack of symptoms UTI can have it is important to have knowledge about risk factors and diagnose correctly the mother and the fetus [6]. As this affection is related with the social aspect, the trials are normally differenced by the country and the most of them are carried out in low-income areas [4,7]. Premature neonatals are those infants who are born before 37 weeks of gestation. The prevalence is also higher in those countries, for example in Ethiopia the prevalence is 13.2% and it depends on the status of the mother, the family income and the family size between others [8]. UTIs are also related to sepsis in children in East Africa and this remains high prevalent that is why pregnant women with intranatal fever must be correctly screened of UTIs [9].

The aim of the present review is to know the current evidence about the preterm births related to urinary tract infections in pregnant women.

Methodology

Search strategy

The electronic search was conducted in PubMed Medline with the PICO question “Do UTIs produce premature birth?” and the following key words: premature birth, preterm birth, urinary tract infections, recurrent urinary infections and UTI. Initially a total of 106 paper were found, after applying the inclusion and exclusion criteria a total of 32 were selected for a full reading. Finally, a total of 6 papers were including in the review.

Inclusion and exclusion criteria

The exclusion criteria were papers talking about educational labors, papers about hospital incidences, bladder augmentation issues, clinical trial talking about urinary trypsin inhibitor and systematic reviews. Inclusion criteria were clinical trials that showed information about UTI mothers having a preterm birth and its consequences.

Analysis of results

The results of the review are shown in Table 1. In the descriptive table is shown the country where it was performed the study. Two trials were carried out in Romania, one in Nepal, one in Bangla-

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***Corresponding author**

Alba Belanche Monterde, Department of Surgery, Faculty of Medicine and Dentistry, University of Salamanca, Spain

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desh, one in India and one in Ethiopia. In all the studied recorded the concomitants issues of the mother including UTIs were analyzed. In the papers, the characteristics of the mother as educational level, age, habits and gestational problems are evaluated.

Author/Year	Study Type	Country	Sample (n)	Variables analyzed
Derebe M M [13]	nRCT	Ethiopia	604	Mother age, marital status, religion, education, occupation, household size, land ownership, drinking water source, toilet type used, paritary, gestational age at urine collection, undernutrition
Sirisha P [14]	nRCT	India	144	Mother age, bacteria isolation, blood test, and obstetric examination data.
Lee A [15]	nRCT	Bangladesh	9712	Mother age, gestational age, maternal education, paternal education, household, histoy of previous neonatal death, mil-upper-arm circumference, betel nut use, smoking and median interbirth interval.
Meca D [16]	nRCT	Romania	47	Mother age, body max Indec, number of urinary tract infections, genital tract infection, history of renal pathology, viral infection, mode of delivery, serum creatinine at admission, serum creatinine ar discharge, proteinuria, need of dialysis, maternal death, gestational age, birth weight, preterm birth, intrauterine growth restriction.
Poudyal P [17]	nRCT	Nepal	152	Hyperbilirrubinemia, neonatal sepsis, respiratory stress syndrome, morbid condition, history of premature rupture membranes and history of urinary tract infection.
Radu V D [18]	nRCT	Romania	183	Premature rupture of membranes, preterm birth, urological pathologies.

Table 1: Qualitative analysis of articles included in the systematic review.

Analysis of biases

All the trials are low level papers due to its lack of randomization and blinding. The analysis of biases was evaluated by a JADAD scale and showed in Table 2. Due to the characteristics of the issue the most of the recordings are retrospective trials so it was impossible to carry out a randomization process.

JADAD CRITERIA						
Author/Year	Is the Study Described as Randomized?	Is the Study Described as double-Blinded?	Was There a Description of Withdrawals and Dropouts?	Was the Method of Randomization Adequate?	Was the Method of Blinding Appropriate?	Score
Derebe M M [13]	0	0	1	NA	NA	1
Sirisha P [14]	0	0	1	NA	NA	1
Lee A [15]	0	0	1	NA	NA	1
Meca D [16]	0	0	1	NA	NA	1
Poudyal P [17]	o	o	1	NA	NA	1
Radu V D [18]	0	0	1	NA	NA	1

Table 2: Assessment of methodological quality according to the Jadad scale. NA: Not applicable.

Results

Mother age

The mother age is an important variable which is evaluated in almost the overall of the studies included. Derebe M.M. et al found that the 90.2% of the pregnant women without UTIs were over the twenties. The UTIs pregnant women overall of the studies included. Derebe M.M. et al found that the 90.2% of the pregnant women without UTIs were over the twenties. The UTIs pregnant women group was 28.6% younger than twenty years old [10]. In other study from India, the highest age group of pregnant women with UTIs was the 25-29 years range with 38% followed by 19-24 years with 32% [11].

Parents education and habits

The 38.1% of pregnant women with UTIs in Ethiopia were housewife and the 47.6% farmer. The partner were the 76.2% under secondary school formation. The drinking water is almost equal if comparing public to spring, surface u other type of watering [10].

Urinary tract infections (UTIs) during pregnancy

In Ethiopia between 2020 and 2022 the total of UTIs with a high bacterial growth observed were the 3.3%. Of these the 8% were symptomatic and the 12% asymptomatic. The symptoms were described as dysuria, urinary frequency, hematuria and/or abdominal pain [10]. The Escherichia coliwas shown in the 35%, Acinetobacter johnsonii20%, Streptococcus species 12%, Enterocuccusfeacalis 9%, Enterobacter species 9%, Klebsiella pneumonia 6%, Citobacterfreundii6% and Enterococcus avium 3% of the UTI pregnancy cases [11]. Hyperbilirrubinemia was observed in the 53.29%, neonatal sepsis in the 46.05% and respiratory distress syndrome 43.42% of the cases of UTIs during pregnancy. The most common risk factor of premature birth was a previous history of premature rupture of the membranes (28.29%), history of urinary tract infection (21.95%) and weight less than 45 kilogrames of weight (14.47%) [14]. Urosepsis in the pregnant woman showed statistically an increased risk of premature rupture of membranes so a preterm birth ($p<0.001$).

Discussion

In the present review scoping was observed that the socio-economic aspects play a very important role in preterm births. The low-income countries are the areas in where the highest incidences of UTIs are observed. The current trials are focused in those countries and the ones performed in developed countries are low. So, that might show a risk of publication biases due that the information reported in the literature is limited. In addition, the educational level of the parents and the overall income is an interesting variable for researches in this field. It seems that people who studied more than secondary school education are lower risked to present UTIs. In addition, the age of the mother is relevant. The women who presented a preterm birth and UTIs used to be under 30 years old in a high percentage. The water source may not be as important as other variables in UTI disease. The most common bacteria observed in the literature when studying pregnant woman with UTIs who had a preterm birth was Escherichia coli with almost a 30% of the records.

The risk of UTIs is higher in women due to its urinary tract anatomic characteristics. They present a shorter urethra so it is easier for pathogens to enter and develop an infection [1]. The pregnancy women with UTIs history are linked to urosepsis. They can need hospitalization and show another comorbidities as anemia, hydronephrosis or secondary reno-ureteral lithiasis. The second and third grade of hydronephrosis showed statistical significance ($p<0.001$) in these cases. These women also showed a severe inflammatory syndrome in which C-reactive protein and leukocyte count were significantly altered ($p<0.001$) [15]. In addition, urosepsis group presented a higher rate of obstetric transfers ($p<0.001$) and migration of catheters. Whereas, no fatality births were found even existing a sepsis [16]. In boys, UTIs are also present but in lower prevalence. In men, UTIs are normally caused by congenital issues and antenatal hydronephrosis is widely reported in literature. Circumcision showed to reduce the risk of this infection process in those cases [17]. The diagnosis of UTIs is an important part of the treatment as it can be asymptomatic. Normally when it is presented in the neonatal it is diagnosed by ultrasound but they normally use a bacteria recount for the mother (10, 11, 12, and 13). The criteria to establish a diagnosis is difficult to achieve. The complications are mainly shown in pregnant with renal failure which presented immu-

nodeficiency during pregnancy. They can need active treatment for the mother and an intensive care unit for the infant [18].

Within the limitations of this review, UTIs might be a considerable factor risk for preterm births when happening during pregnancy. However, this result should be taken carefully as the reports have low-quality and they seem to have risk of biases.

Conclusion

The results included in the review showed that UTIs during pregnancy are a risk factor of preterm birth. In addition, the educational level of the parents plays an important role in this affection.

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