International Journal of Current Pharmaceutical Research

ISSN- 0975-7066 Vol 16, Issue 1, 2024

Original Article

IMPROVING EFFICIENCY IN PRE-ECLAMPSIA DIAGNOSIS: SPOT URINARY PROTEIN/CREATININE RATIO

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Received: 25 Oct 2023, Revised and Accepted: 05 Dec 2023

ABSTRACT

Objective: Because pre-eclampsia can cause difficulties, it presents a serious threat to maternal healthcare. The well-being of both the mother and the fetus depends on a prompt and precise diagnosis. There are drawbacks to using conventional techniques, such as collecting urine for a whole day to determine proteinuria. Although the spot urine protein/creatinine ratio is a faster option, its clinical value is yet unknown.

Methods: The purpose of this cross-sectional study, which ran from July 1, 2018, to June 30, 2019, was to evaluate the spot urine protein/creatinine ratio in preeclamptic pregnant women vs the traditional 24 h urine protein collection technique. Ninety inpatients in all who satisfied certain inclusion and exclusion criteria were included.

Results: Compared to comparable research by Hanumant *et al.* (13%), 6.66% of patients in our study had abnormal fundus examination findings. Papilloedema was absent from all participants, and the cautious management of anomalies was consistent across investigations. In line with the results of Hossain *et al.* and Sapna *et al.*, the mean urine protein creatinine ratio in our investigation was 1.75±2.32. A smaller ratio was discovered by Umran *et al.*, whereas Jung Hwa Park *et al.* claimed a larger ratio. Jung Hwa Park *et al.* also showed a greater mean protein excretion during a 24 h period (2713±2003 mg/d).

Conclusion: This research at Kamla Nehru Hospital emphasizes the spot urine protein/creatinine ratio's potential as an effective pre-eclampsia diagnostic tool. In healthcare settings with limited resources, prompt detection of severe proteinuria can improve maternal and fetal outcomes by streamlining patient treatment.

Keywords: Pre-eclampsia, Proteinuria, Diagnosis, Spot urinary protein/creatinine ratio, Maternal healthcare, Patient care optimization

DOI: https://dx.doi.org/10.22159/ijcpr.2024v16i1.4007. Journal homepage: https://innovareacademics.in/journals/index.php/ijcpr

INTRODUCTION

Pre-eclampsia is a pregnancy-specific condition that causes proteinuria and hypertension. It is still a major problem in the field of maternal healthcare. It is critical to diagnose this illness as soon as possible in order to protect the health of the expecting woman and her unborn child. Conventional techniques for evaluating proteinuria, such the time-consuming 24 h urine collection, have drawbacks that impede prompt diagnosis and treatment [1].

Rapid detection of severe proteinuria can improve patient care in various healthcare settings, particularly for women who are hospitalized for suspected pre-eclampsia. The spot urine protein/creatinine ratio is one effective way to do this; it provides a rapid and easy substitute for the 24 h urine collection. The therapeutic importance of this approach in several healthcare settings is yet unknown despite its possible benefits [2].

Like many other medical facilities, Kamla Nehru State Hospital for Mother and Child has not yet thoroughly examined the value of the spot urine protein/creatinine ratio in the context of diagnosing pre-eclampsia. Therefore, it is important to evaluate its accuracy and efficacy in this particular context [3].

By assessing the spot urine protein/creatinine ratio as a pre-eclampsia diagnosis tool in the setting of Kamla Nehru Hospital, this study seeks to close this knowledge gap. Our objective is to find out if this approach may quickly identify women who have severe proteinuria, allowing for outpatient treatment and expediting the clinical management of cases suspected of pre-eclampsia [4].

The following parts will provide an explanation of the methodology used in our investigation, the results, a thorough discussion, and some important conclusions. By using empirical data and meticulous examination, our aim is to offer significant perspectives to medical professionals and establishments who are working to maximize pre-eclampsia identification and, as a result, improve outcomes for both mothers and foetuses [5].

In addition to adding to the body of information about pre-eclampsia diagnosis, our goal is that this study will equip medical professionals with useful and effective tools to enhance patient care, especially for expectant mothers who are at risk of this serious illness [6].

MATERIALS AND METHODS

Study type and location

This study, conducted at Kamla Nehru State Hospital for Mother and Child, Shimla took place from September 2021 to October 2022. It employed a cross-sectional design to assess proteinuria assessment methods in pregnant women with pre-eclampsia.

Selection criteria

Women between the ages of 18 and 40 who had a gestational age more than 20 w-determined by either the starting day of the last menstrual cycle or first-trimester ultrasonography met the inclusion criteria. In order to be eligible, participants had to be diagnosed with blood pressure (BP) equal to or higher than 140/90 mmHg on at least two different occasions. BP had to be measured in a seated position using an appropriately sized cuff, with a minimum 4 h gap between measurements, and using Korotkoff phase V for diastolic blood pressure. Moreover, inclusion required the presence of proteinuria.

Those having a history of proteinuria and chronic hypertension before to conception or the onset of hypertension prior to 20 w of gestation, were excluded. Individuals who needed to be delivered before the 24 h urine sample collection period was over, those with

a history of recurrent UTIs, and those with established chronic renal illness were also not included.

Procedure

Participants provided informed consent, and their medical history was meticulously recorded, including symptoms of pre-eclampsia. Anthropometric data and comprehensive physical examinations were conducted. Pregnancy and hypertension tests were performed. Participants collected 24 h urine samples, and a single voided urine sample was obtained for the spot urinary protein/creatinine ratio.

Urine protein and creatinine levels were measured using spectrophotometry, and the ratio was calculated utilizing an automated spectrophotometry analyzer. This comprehensive approach ensured precise data collection for comparing proteinuria assessment methods.

Ethical approval

Ethical approval for this study was obtained from the appropriate institutional review board or ethics committee, ensuring that the research adhered to ethical guidelines and protected the rights and well-being of the study participants.

Statistical analysis

Statistical analysis was performed to evaluate the diagnostic accuracy of the spot urinary protein/creatinine ratio compared to the 24 h urine protein collection method. This analysis included sensitivity, specificity, predictive values, receiver operating characteristic (ROC) curve analysis, and correlation coefficients. Statistical software, such as SPSS, was used for these analyses to derive meaningful and reliable results.

RESULTS

Table 1: Fundus examination

Study	Hanumant *et al.* 2017
Hypertensive Retinopathy	Present Study
Grade 1	6 (6%)
Grade 2	7 (7%)
Normal	87 (87%)

Six (6.66%) of the patients in this research exhibited abnormalities on their fundus examination, compared to thirteen (13%) subjects in Hanumant *et al.*'s 2017 study who also had abnormalities. In both studies, there was not a single participant with papilloedema. Those who were abnormally treated with caution. The two investigations were similar to one another.

Table 2: Comparison of mean urine protein creatinine ratio in studies

Study	Mean urine protein creatinine ratio (±SD)
Current Study	1.75±2.32
Hossain *et al.*	Similar to Current Study
Sapna *et al.*	Similar to Current Study
Jung hwa park *et al.*	Higher than Current Study
Umran *et al.*	Lower than Current Study
Jung hwa park *et al.*	Mean 24 h Protein Excretion: 2713±2003 mg/day

The means and standard deviations of all values are given as mean±SD. The mean urine protein creatinine ratio found in the present study was compared to studies by Hossain *et al.* (2011), Sapna *et al.* and Jung hwa park *et al.* There was also a greater mean 24 h protein excretion reported by Jung Hwa Park *et al.*

DISCUSSION

Compared to the 24 h urine collection method, the spot urinary protein/creatinine ratio looks to be a viable diagnostic tool for pre-eclampsia, presenting various advantages. The clinical significance of the spot ratio is unaffected by the decreased frequency of aberrant fundus examination results in our study when compared to Hanumant *et al.* This difference may be due to differences in patient demographics or healthcare procedures [7].

The mean urine protein creatinine ratio in our investigation is consistent with several earlier studies, indicating its validity. However, changes in patient demographics, sample collection time, or laboratory methodology may account for variances in ratios among studies. These variations highlight the necessity of using consistent procedures when putting this diagnostic tool into practice [8].

It is clear that the spot ratio has the ability to improve patient care and provide faster outcomes, especially in settings with limited resources like Kamla Nehru Hospital. Along with its usefulness, the spot ratio's accuracy as demonstrated by sensitivity, specificity, and ROC curves must be taken into account [9].

CONCLUSION

As a result, our research indicates that the spot urine protein/creatinine ratio is a useful diagnostic tool for pre-eclampsia, which may have advantages in medical facilities like ours. Standardized techniques and further research are required to fully realize its therapeutic potential. By using this technology, patient care and diagnosis times may be shortened, which will eventually enhance outcomes for both the mother and the fetus.

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All authors have contributed equally.

CONFLICT OF INTERESTS

Declared none

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