

Bibliometric Evaluation of the Published Theses Related to Preeclampsia

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ABSTRACT

Aim: Maternal mortality rates represent an important indicator of global health. An essential factor impacting maternal health during pregnancy is preeclampsia. The theses written on preeclampsia in gynecology and obstetrics were evaluated within the scope of the study. This study aimed to reveal the thematic development and knowledge structure of the theses published on preeclampsia. It aimed to reveal the thematic development and knowledge structure of the theses published in this field.

Methods: Within the scope of this study, social network analysis was carried out based on the keywords obtained from the theses prepared with the target of preeclampsia. Theses included in the study were accessed via <https://tez.yok.gov.tr/UlusalTezMerkezi/>. The studies that include the phrase "preeclampsia" in the title were selected for examination, and the keywords obtained from these studies were listed.

Results: The concept with the highest degree of centrality and betweenness centrality is "preeclampsia," as expected. Following the keyword "severe preeclampsia," the keywords "pregnancy." It is observed that the betweenness centrality values of the "severe preeclampsia," "pregnancy," and "endocan" keywords are high compared to the degree centrality values.

Conclusions: Through this study, researchers can design innovative topics and questions and concentrate on subjects not often emphasized to develop more valuable research on preeclampsia.

Keywords: Preeclampsia, obstetrics, social network analysis, degree centrality, betweenness centrality.

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Introduction

Maternal mortality rates represent an important indicator of global health. An essential factor impacting maternal health during pregnancy is preeclampsia. Preeclampsia is a multi-systemic disease that occurs after the 20th week of pregnancy and can last six weeks after birth; it is seen in 5- 10% of all pregnancies and is still one of the leading causes of maternal and fetal morbidity and mortality worldwide (1, 2).

An essential topic here is the early diagnosis of maternal preeclampsia because delivery is the only-absolute treatment regime for preeclamptic pregnancies. Observational treatment may be appropriate in pregnancies with extremely premature infants (pregnancy under 28 weeks) when the mother's condition is stable. However, as the mother's condition (uncontrolled maternal hypertension, renal failure, thrombocytopenia, epigastric pain, liver dysfunction, HELLP syndrome, visual disturbance, headache, and seizures) worsens; the obstetricians prefer not to lose time and terminate pregnancies as soon as possible. On the other hand, an important issue is the preparation of fetal lung maturation for the extrauterine lifetime, with intramuscular injection of corticosteroids to the mother before anticipated preterm birth, which needs at least 48 hours.

Clinical signs appear in the second half of pregnancy, but the first pathogenetic mechanisms begin in the early weeks. The unwanted complication of preeclamptic pregnancies, such as maternal and neonatal morbidity and mortality, could be prevented by early recognition and appropriate management of this disease. When the national and international indexed journals in the field of obstetrics and gynecology are examined, it is seen that studies on preeclampsia and its related

subheadings continue with interest. Besides the scientific journals, preeclampsia continues to be presented as a thesis topic with genuine interest without losing value. When the theses within the framework of the education given in the obstetrics and gynecology departments of the medical faculties in our country are examined, it is understood that these studies primarily focus on early detection (laboratory and radiological) of disease and alternative treatment regimens for preeclampsia.

The theses published on preeclampsia in Turkey were evaluated within the scope of the study. This study aimed to reveal the thematic development and knowledge structure of the theses published on preeclampsia.

Methods

Within the scope of this study, social network analysis was carried out based on the keywords obtained from the theses focused on preeclampsia. Theses included in the present study were accessed via <https://tez.yok.gov.tr/UlusalTezMerkezi/>. The studies that include the phrase "preeclampsia" in the title were considered, and the keywords obtained from these were listed. As a result of the examination, 119 theses were determined suitable for the study's inclusion criteria, but the number of theses whose keywords could be accessed was determined as 85. Out of the 85 theses that were considered for the study, 342 keywords were found. After more precisely expressing repeating or similar terms as a single keyword, the final keyword count was calculated to be 144.

Bibliometric analysis is a well-liked and exacting technique for investigating and analyzing vast amounts of scientific data. It helps to explore the subtleties of a particular field's thematic and

evolutionary history (3). A quantitative approach which includes mathematical and statistical methods, is used by bibliometric approaches to describe, rate, and track published research(4, 5). The relationships between the documents can be statistically analyzed by looking at the articles and scientific papers in the literature using the bibliometric approach. So this allows one to draw general conclusions about the relevant literature and determine how the articles have changed over time or the trend toward specific topics. Even before the reading begins, bibliometric approaches are helpful in literature reviews since they direct the researcher to the most important publications and map the research field objectively (4).

With contributions from sociology, social psychology, anthropology, physics, mathematics, and computer science, social network analysis (SNA) is an interdisciplinary methodology research area to analyze bibliometric studies(6). It is a rich scientific field that has greatly benefited from the cooperative efforts of researchers from various scientific fields. Social network analysis studies using bibliometric data examine variables such as articles, citations, co-citation networks, collaborating authors, or institutions, and some concepts are widely used (7). SNA enables the examination and analysis of social networks, which show the relations and ties between the units or actors interacting (8). In the context of this study, the units are the keywords collected in the thesis on preeclampsia. In social network analysis, different numerical quantities are used to visualize the relations between the units and the interpretation of these relations (9). Betweenness centrality and degree centrality are one of these quantities. More information about these measurements can be reached from a study published by Ocaokoglu (9).

Within the scope of the study, the keywords obtained from 85 accessible theses on

preeclampsia were examined by SNA. Moreover, the network map created by these keywords was tried to be revealed. Analyzes were performed in the UCINET (10) program. A 144 x 144 data matrix was prepared in the UCINET, with 144 keywords obtained from the theses. It was noted that some theses used different expressions for the specific concept. These expressions were entered into the data matrix as a single keyword so that these expressions with the same meaning would not be included separately in the matrix.

Results

The cumulative distribution of theses published on preeclampsia in obstetrics and gynecology between 2007 and 2022 is given in figure-1. To reveal the network structure of the keywords obtained from 85 theses using SNA, 144 keywords of 85 theses related to preeclampsia were processed into a 144 x 144 data matrix and subjected to social network analysis.

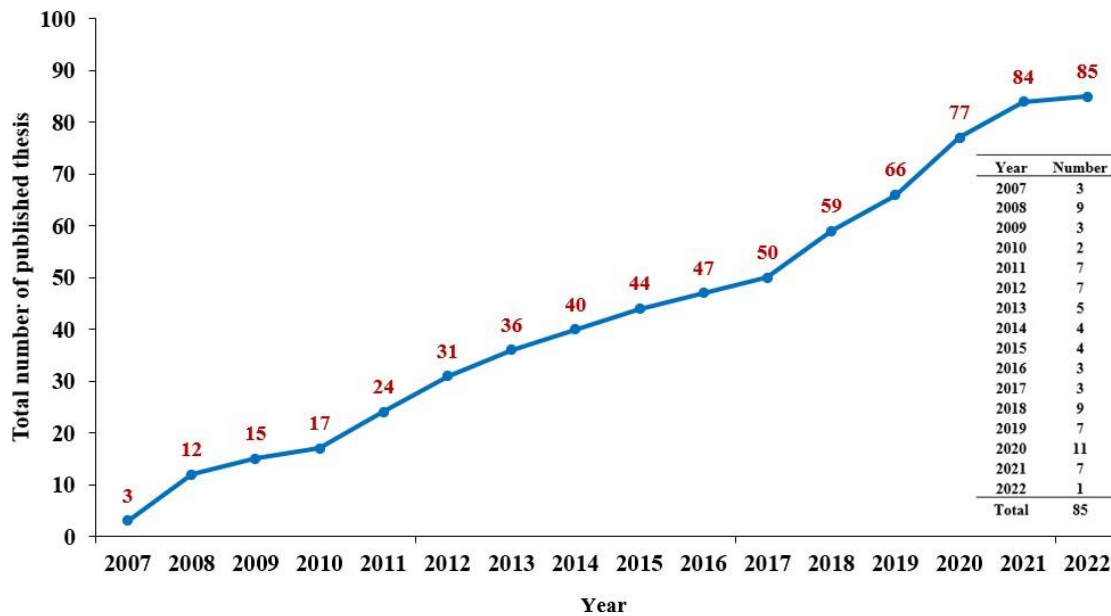


Figure-1. Distribution of the accessed thesis during the 2007 – 2022 time period

The degree and betweenness centrality findings regarding the keywords are given in table-1. To

avoid making the table-1 too long, keywords with a degree of centrality of less than six were not considered.

Table 1: Top keywords with degree centrality and betweenness value for preeclampsia

Degree Centrality		Betweenness Centrality	
Keyword	Value	Keyword	Value
• Preeclampsia	133	• Preeclampsia	17443.75
• Severe preeclampsia	36	• Severe preeclampsia	1153.90
• Pregnancy	32	• Pregnancy	545.77
• Proteinuria	14	• Endocan	538.23
• Mild preeclampsia	12	• Doppler Ultrasonography	361.37
• HELLP syndrome	11	• Placenta-specific protein 1	295.77
• Gestational hypertension	8	• Mild preeclampsia	221.68
• 8-hydroxy-2-deoxyguanosine	7	• VEGF	181.13
• Angiotensin-1	6	• PLGF	127.98
• Angiotensin-2	6	• IUGR	114.08
• Adiponectin	6	• Endoglin	100.24

Discussion

It is known that Hippocrates first observed the sudden and unexpected occurrence of grand mal seizures in mothers, which occur when preeclampsia progresses to eclampsia(11). Arterial hypertension is the essential symptom of preeclampsia and is often, but not always, accompanied by proteinuria. In patients with onset of 20 weeks of gestation, ≥ 300 mg proteinuria calculated in 24- hour urine or, if this is not possible, protein from at least two random urine samples, at least 4-6 hours apart (second value less than seven days old) concentration should be ≥ 300 mg (at least +1 positive with a dipstick). If the systolic blood pressure is ≥ 140 mm/Hg or the diastolic blood pressure is ≥ 90 mm/Hg in two measurements taken at least 4-6 hours apart using the appropriate cuff, and if all of these abnormalities cease after six weeks postpartum, the patient is diagnosed with preeclampsia (12).

Preeclampsia and associated hypertension disorders of pregnancy (HDP) are significant causes of obstetric pathologies and mortality in mothers and newborns worldwide. However, the etiology of preeclampsia is not clear yet. The clinical manifestation of the disease comes from extensive intravascular-endothelial damage.

Vascular damage in multiple organ systems, vasospasm, increased platelet activation and consumption, and subsequent activation of the intravascular coagulation system cause severe symptoms of preeclampsia in pregnant women (13). Another essential effect of preeclampsia is the effect on fetal health, such as IUGR and stillbirth (14, 15).

Social network analysis showed that the concept with the highest centrality is the phenomenon of preeclampsia. Since our study aims to analyze the

Abnormal trophoblastic invasion is the trigger of preeclamptic symptoms. Abnormal implantation due to impaired trophoblast invasion and incomplete spiral artery remodeling causes inadequate placentation(16). As a result of ischemia of the placenta, increased angiogenesis markers such as soluble fms-like tyrosine kinase-1(sFlt-1), soluble endoglin, and vascular endothelial growth factor (VEGF) (17).

According to the severity of the disease, preeclampsia is divided into three groups: mild, severe preeclampsia, and eclampsia. Especially severe preeclampsia and eclampsia are essential for clinicians. Both conditions require urgent hospitalization, close follow-up, and often immediate intervention. Current studies mainly aim to identify severe forms of preeclampsia in the early stages of the disease. This may allow early detection of severe preeclampsia before the disease progresses further and without serious maternal and fetal complications.

It is possible to reach the information that the number of studies produced in the field of obstetrics and gynecology with the expression preeclampsia in the title increased significantly after 1985 and that there are about 6000 articles listed in the PubMed directory. More research must focus on early detection and treatment that reduce maternal and neonatal morbidity and mortality. Our study aims to examine the Turkish-origin theses written on preeclampsia in obstetrics bibliometrically. To guide future researchers to design new studies less explored on preeclampsia issue.

theses on preeclampsia, every thesis study includes the phrase preeclampsia in the title; it is expected that this result will be obtained in the analysis. As a result

of degree centrality analysis, it was seen that the expressions "severe preeclampsia" and "pregnancy" had the highest value after preeclampsia. As expected, disease severity is an essential issue for clinicians.

Clinical categorization and perinatal and maternal issues are closely related in preeclampsia patients, and these issues worsen as the clinical image worsens (18). According to several studies, severe preeclampsia has greater maternal and perinatal morbidity and death rates than mild preeclampsia (19-21). It is also reported that severe preeclampsia cases had considerably lower mean birth weights than mild preeclampsia cases (20). In the same research, severe preeclampsia patients had considerably higher IUGR rates and fetal and maternal morbidity rates than mild preeclampsia. It is already known that decreased liver and renal function used in the follow-up of patients with mild preeclampsia is an early sign of severe preeclampsia (18). Severe preeclampsia is a life-threatening condition. This is an obstetric emergency, and a pregnant woman diagnosed with severe preeclampsia needs hospitalization and close monitoring. Even if delivery is the only effective treatment, delivery does not always improve the general condition of the preeclamptic patient. All these essential complications of severe preeclampsia made severe preeclampsia the second most focused concept in the theses.

Delivery is the only proven remedy for severe preeclampsia. Regardless of the gestational week, the standard strategy is to terminate the pregnancy with a maternal indication since it is a pathological condition that treats maternal and fetal health outcomes. The fact that the third concept most frequently emphasized in the theses evaluated within the scope of our study is pregnancy shows that these were mainly prepared within the framework of preeclampsia, severe preeclampsia, and pregnancy.

After the "preeclampsia," the degree centrality of the "severe preeclampsia" and "pregnancy" was observed to be high. Apart from these concepts, it was determined that the most popular concepts on which the theses included in the study focused on secondary were proteinuria, mild preeclampsia, and HELLP syndrome.

Other findings obtained by SNA relate to betweenness centrality. Within the scope of the study, the case with the highest centrality is "preeclampsia." In other words, it acts as a bridge between concepts that are not related to each other. Since preeclampsia occurs in every thesis reviewed, it is not surprising that betweenness centrality is the highest. It is observed that the concepts of "severe preeclampsia" and "pregnancy" have a high centrality in between, following the phenomenon of preeclampsia. Based on this finding, these cases were handled with cases unrelated to each other in different theses. The researchers determined that endocan and doppler ultrasonography are the other concepts preferred by the researchers to establish a connection between the unrelated concepts.

Conclusion

This study might guide researchers who want to study preeclampsia issues in obstetrics to demonstrate the concepts with which preeclampsia is heavily related. Researchers can design innovative research questions, concentrate on topics not often highlighted, and add to the body of literature through this study. Additionally, it could be crucial to demonstrate through this study which notions are linked to the concept of preeclampsia.

Conflict of Interest: The authors declare that there is no conflict of interest.

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