Seminars in Medical Writing and Education. 2024; 3:558
doi: 10.56294/mw2024558

REVIEW

The MEOWS Score - "Modified Early Obstetric Warning Score" as a Tool for Evaluating Gestational Morbiditiese

El índice MEOWS (Modified Early Obstetric Warning Score) como herramienta para evaluar las morbilidades gestacionales

Gabriela Vacheli Rodrigues[1], Isabella Cristini Amaral de Almeida[1], Patricia Facina Soares Caracol[1], Wanessa Roberta Araújo[1], Karina Thalita da Silva Higa[1], William Alves dos Santos[1]

[1]Faculdade Anhanguera de Jacareí, Enfermagem. Jacareí, Brasil.

Cite as: Vacheli Rodrigues G, Amaral de Almeida IC, Facina Soares Caracol P, Araújo WR, da Silva Higa KT, Alves dos Santos W. The MEOWS Score - "Modified Early Obstetric Warning Score" as a Tool for Evaluating Gestational Morbidities. Seminars in Medical Writing and Education. 2024; 3:558. https://doi.org/10.56294/mw2024558

Submitted: 07-11-2023 **Revised:** 12-03-2024 **Accepted:** 02-07-2024 **Published:** 03-07-2024

Editor: PhD. Prof. Estela Morales Peralta

Corresponding Author: Gabriela Vacheli Rodrigues

ABSTRACT

Introduction: this research is justified based on the current scenario described by the World Health Organization (WHO) of the increase in obstetric complications worldwide, which has gained great repercussions in the academic sphere. To identify the relationship between gestational morbidities in the MEOWS assessment.
Method: this is a literature review in which books, dissertations and scientific articles selected from the Latin American and Caribbean Health Sciences Information System (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE) and Virtual Health Library (VHL) databases were searched. Articles available in full, published in the last 5 years, in Portuguese and English were included. Incomplete articles and articles older than 5 years were excluded.
Results: reduction in obstetric complications and mortality, with a view to quality care and preventive action, with the Score MEOWS, in the assistance with the women.
Conclusion: it was possible to verify that the MEOWS scale has a very positive effect when it comes to recognizing and avoiding clinical problems in patients, and that it brings autonomy to the nursing team, covering everyone in the recognition of complications. All the articles included in the research highlighted assertive points in various areas of hospital practice.

Keywords: Obstetrics; Gestational Diabetes; Gestational Hypertension; Early Warning Score; Vital Signs.

RESUMEN

Introducción: esta investigación se justifica a partir del escenario actual descrito por la Organización Mundial de la Salud (OMS) del incremento de las complicaciones obstétricas a nivel mundial, lo cual ha adquirido gran repercusión en el ámbito académico. Identificar la relación entre las morbilidades gestacionales en la evaluación MEOWS.
Método: se trata de una revisión bibliográfica en la que se buscaron libros, tesis y artículos científicos seleccionados de las bases de datos Latin American and Caribbean Health Sciences Information System (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE) y Virtual Health Library (BVS). Se incluyeron artículos disponibles en su totalidad, publicados en los últimos 5 años, en portugués e inglés. Se excluyeron los artículos incompletos y con más de 5 años de antigüedad.
Resultados: reducción de las complicaciones obstétricas y de la mortalidad, con vistas a una atención de calidad y una acción preventiva, con el Score MEOWS, en la asistencia con las mujeres.

Conclusion: se pudo comprobar que la escala MEOWS tiene un efecto muy positivo a la hora de reconocer y evitar problemas clínicos en las pacientes, y que aporta autonomía al equipo de enfermería, abarcando a todos en el reconocimiento de complicaciones. Todos los artículos incluidos en la investigación destacaron puntos asertivos en diversas áreas de la práctica hospitalaria.

Palabras clave: Obstetricia; Diabetes Gestacional; Hipertensión Gestacional; Puntuación de Alerta Precoz; Constantes Vitales.

INTRODUCTION

This research is justified based on the current scenario described by the World Health Organization (WHO) of the increase in obstetric complications worldwide, which has gained great repercussions in the academic sphere. In this sense, the proposal is to bring a reflection on the possibility of reducing these maternal mortality rates through a tool "MODIFIED EARLY OBSTETRIC WARNING SCORE" (MEOWS) that guides the following of safety protocols and action at the time of the complication, thus helping in a homogeneous care for the whole team and bringing safety to the patient.[1]

The implementation of MEOWS in hospitals by nurses is of great importance to society, as it can make a significant contribution to improving the quality of obstetric care and reducing maternal and neonatal morbidity and mortality. Obstetric complications, such as gestational diabetes, gestational hypertension, hemorrhages and infections, can develop rapidly and pose serious risks to the health of mother and baby.[1]

Early identification of these complications helps to intervene quickly and appropriately, thereby reducing damage to health and mortality rates. By using this standardized assessment tool, health professionals can more effectively monitor the clinical condition of pregnant women, identifying early signs of deterioration and enabling intervention before the situation worsens. This not only directly benefits pregnant women and their newborns by ensuring safer and more efficient care, but also contributes to reducing the costs associated with treating serious complications.[1]

There are several risk factors for developing hypertension during pregnancy, including: previous history of pre-eclampsia, pre-existing systemic arterial hypertension (SAH) and/or diabetes mellitus (DM), chronic kidney disease, advanced maternal age, high body mass index (BMI), multiple pregnancies and antiphospholipid antibody syndrome. Early diagnosis and appropriate treatment are essential for reducing maternal, fetal and neonatal complications.[1]

During a healthy pregnancy, the maternal body undergoes various physiological changes such as alterations to the cardiovascular, renal, hematological, respiratory and metabolic systems. With regard to the metabolic system, it is important to highlight the increased sensitivity to insulin, which ends up promoting the uptake of glucose from fat reserves to meet the energy demands of pregnancy. However, local and placental hormones such as estrogen, progesterone, leptin, cortisol, placental lactogen and placental growth hormone together promote a state of insulin resistance. As a result, there is a slight increase in blood glucose levels, but this maternal hyperglycemia is easily transported across the placenta to feed the growing fetus. As the maternal body is slightly resistant to insulin, it ends up breaking down fat stores, resulting in a further increase in glucose and free fatty acid concentrations. Therefore, when the normal metabolic adaptations to pregnancy do not occur properly, some pregnancies can have the outcome of gestational diabetes mellitus (GDM).[3]

Initially, it is recommended that fasting blood glucose be requested for certain groups of pregnant women at the first prenatal visit. These groups are made up of pregnant women who have any risk factors such as obesity, a previous history of gestational diabetes or a baby weighing more than 4 kg, glycated hemoglobin ≥ 5,7 %, first-degree relatives with DM, a history of polycystic ovary syndrome, pre-existing cardiovascular disease, among others. Early screening helps detect hyperglycemia in pregnancy, which can be differentiated into two categories: pre-gestational DM II and GDM. The reference values used in these cases for diagnosis are 92-125 mg/dL for GDM and > 126 mg/dL for DM II diagnosed during pregnancy.[4]

It is important for pregnant women to be assessed for the risk of gestational diabetes, especially if they have predisposing factors such as advanced maternal age or high-risk ethnicity. Early diagnosis and appropriate treatment can reduce the damage to both the mother and the newborn, including complications during pregnancy and childbirth, as well as an increased risk of developing type 2 diabetes later on.[5]

In academic circles, it is justified by the need for integrative reviews that assess the effectiveness and applicability of MEOWS in different hospital contexts, since there are few articles in Portuguese - Brazil that work on the subject, making it important for the national scope. By reviewing the existing literature, it was possible to analyze the available evidence, identifying knowledge and providing subsidies for future research in this area. In addition, by proposing recommendations for the implementation of MEOWS and assisting in the development of health policies aimed at improving the quality of obstetric care and reducing maternal and

https://doi.org/10.56294/mw2024558

neonatal morbidity and mortality rates. The objective was to identify the relationship between gestational morbidities in the MEOWS assessment.

METHOD

The type of research is an Integrative Literature Review, with an exploratory and descriptive approach to data, in which books, dissertations and scientific articles selected through a search in the following databases (books, database sites, etc.) were researched in the databases of the Latin American and Caribbean Health Sciences Information System (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE) and the Virtual Health Library (VHL).

The Health Sciences Descriptors (DeCS) to be used in the search included: "Obstetrics", "Gestational Diabetes", "Gestational Hypertension", "Early Warning Score", "Vital Signs". The strategy for combining the terms used the Boolean operators "AND" to correlate the subject descriptors. Therefore, the search strategy for definitions based on the DeCS mentioned were combined with Boolean operators (AND and OR) according to the objective of the review.

The period of the articles searched were those published in the last five years. The keywords used in the search were: Obstetrics, Gestational diabetes, Gestational hypertension, Early warning score, Vital signs.

In order to define the guiding question, the PCC strategy was adopted (table 1) where P (Population): pregnant women, C (Concept): vulnerabilities in gestational morbidities, C (Context): relationship between gestational morbidity and the effectiveness of the MEOWS scale evaluation in reducing complications. The guiding question was: "Is there a relationship between the effectiveness of Score by MEOWS in identifying gestational morbidities?".

The selection of studies was carried out by two researchers with the help of the Microsoft Excel program in an independent and standardized manner, to identify discrepancies were defined by a second author. First, the titles and abstracts were read and, in a second phase, the full articles. A reviewer was also used in the selection to increase the fidelity of the articles selected, while avoiding disagreements

The inclusion criteria were: (i) studies that evaluated MEOWS as an early identification tool, (ii) studies whose outcome was the effectiveness of early detection using the scale, and (iii) studies with a case-control, cohort or retrospective cross- sectional design. The exclusion criteria were: (i) studies with exposures or outcomes other than those determined in the inclusion criteria, (ii) review studies, clinical protocols, case reports, and (iii) studies published as book chapters, conference abstracts, letters to the editor or editorials.

To check the quality of the article, risk of bias tools such as the *Cochrane Risk of Bias Tool or the Newcastle-Ottawa Scale* were not used, as this was an integrative review and not a systematic literature review. However, they were reviewed by another reviewer who took part in the work so that any disagreements could be resolved.

Data was extracted and collected using the free Rayyan platform for screening and categorizing articles in systematic reviews, but it can also be useful in integrative reviews.

The authors declare that they have no conflicts of interest that could influence the results of this study.

Table 1. PCC research design strategy for the research design

P: (Population)	pregnant women
C: (Concept)	vulnerabilities in gestational morbidities
C: (Context)	gestational morbidity and the effectiveness of the MEOWS scale evaluation

RESULTS AND DISCUSSION

Table 2 describes the database of articles found that meet the objective of this study. It was possible to identify studies related to gestational morbidities, especially those most commonly found, such as Gestational Hypertension and Gestational Diabetes Mellitus in the evaluation of the effectiveness of the MEOWS scale.

Table 3 includes an analysis of the effectiveness of the implementation of MEOWS, which is related to the main objective of this work.

The results show that the effective implementation of the MEOWS scale has a high rate of detecting gestational morbidities and contributes to reducing maternal mortality, especially in cases of miscarriage, postpartum and high-risk pregnancies.

Pregnancy is a natural condition in a woman's life that lasts approximately 280 days. During this period, her body undergoes various biological, bodily and psychological changes in order to accommodate the fetus. As a result, it is common for signs and symptoms to appear as the body's response to the new reality. These changes must be understood by pregnant women and health teams as a natural process of life.[10]

Table 2. Studies evaluating MEOWS in reducing gestational morbidity.

Author/ Year	Database	Types of study	Objectives
Schuler, L. et al. 2019.[6]	MEDLINE	Descriptive study	To evaluate MEOWS in womena after pregnancy in a tertiary hospital in Brazil.
Yadav, P. et al. 2023.[7]	MEDLINE	Observational study	To evaluate and validate the performance of the modified obstetric early warning system (MEOWS) as a screening tool for early prediction of severe obstetric morbidity.
Kaur, J. et al 2023.[8]	MEDLINE	Retrospective	To determine whether MEOWS could accurately identify patients at risk of severe maternal morbidity and mortality in the emergency room environment.
Xu, Yonghui. 2024.[9]	LILACS	Retrospective Study	To validate the accuracy of four early warning scores for the early identification of women at risk.

Table 3. Effectiveness of implementing MEOWS in reducing gestational morbidity

Author/Year	Country	Sample	Service Sector	Morbidities	MEOWS effectiveness	Predicting maternal mortality
Schuler, L. et al. 2019.[6]	Brazil	705	Hospital	Abortion	99,20 %	0 %
Yadav, P. et al. 2023.[7]	India	1800	The Childbirth	After childbirth	91,87 %	0,79 %
Kaur, J. et al 2023.[8]	Canada	267	Academic Center	After childbirth	67,90 %	0 %
Xu, Yonghui. 2024.[9]	China	352	ICU	High-risk pregnant women	98,4 %	0,91 %

Most of the time, the pregnant woman manages to recover from the adversities encountered during this period and goes home without any changes. However, there is a portion of the maternal population that has peculiar characteristics, prone to developing certain diseases or even those who did not have pre-existing pathologies, may develop complications during labor, requiring specialized attention.[11]

However, in terms of prevalence, it is estimated that around 85 % of pregnancies are low-risk or have intermediate risk factors, and that only 15 % of pregnant women are high-risk. The main pathologies responsible for high-risk classification are gestational arterial hypertension (GAH), which accounts for between 5 % and 10 % of cases, and gestational diabetes mellitus (GDM), with a prevalence of 17,8 %.[10]

Bonomi defines a high-risk pregnancy as one in which the life or health of the mother and/or the fetus and/or the newborn is more likely to be affected than that of the average population.

Every two minutes, a woman dies during pregnancy or childbirth, according to the latest estimates released in the United Nations agencies' Trends in Maternal Mortality 2000 to 2020 report. There are an estimated 287,000 maternal deaths worldwide in 2020. In total numbers, deaths maternal remain largely concentrated in the poorest parts of the world and in countries affected by conflict.[13]

According to information released in 2022 by the Brazilian Obstetric Observatory (OOBr), Brazil is at an abysmal distance from meeting the United Nations (UN) Sustainable Development Goals (SDGs). The preliminary quantification of the Maternal Death Ratio (MMR) for 2021 shows 107,53 deaths per 100 000 live births, and the country's commitment is to reduce this to 30 deaths/100 000 by 2030. During the pandemic, maternal mortality in Brazil increased by 94,4 %. At the beginning of the pandemic, we already knew that there would be a significant impact of COVID-19 on sexual and reproductive health and the guarantee of reproductive rights. Now, the situation is even more serious. Recent data shows that significant investment is needed in the obstetric and neonatal care network. Efforts must be stepped up to ensure adequate care for pregnant and postpartum women, especially those in situations of greater vulnerability," says the representative of the UN Population Fund in Brazil.[14]

Despite the progress made in maternal childbirth care, there are still difficulties in achieving a satisfactory obstetric outcome, as there are still a significant number of records of the incidence of diseases and complications that could be avoided through quality prenatal care. In addition, obstetric care, especially in public units, often takes place in inappropriate environments, lacking the structure and support to meet the needs of parturient women.

The nurse, together with the multidisciplinary team, must provide holistic care in urgent and emergency obstetric situations, with the aim of promoting and minimizing maternal-fetal suffering, as well as providing guidance, examining and assessing possible alterations. The care provided during obstetric urgencies and

emergencies includes maternal and fetal monitoring, sonar auscultation of the fetal heartbeat, frequency of contractions, psychological support, keeping the pregnant woman informed about all the procedures, the baby's progress and, if necessary, preparing the pregnant woman for an emergency delivery.[15]

Schuler, L (2019), the article published in Brazil aims to evaluate the MEOWS in women after pregnancy, including 705 patients, and concluded that the use of the MEOWS, retrospectively, showed a significant number of patients presenting trigger events, which were not recognized by the nursing team in 99.2 % of cases. This finding can be attributed to the fact that the MEOWS has not yet been adopted as part of routine nursing care. Applying this tool would result in better care, as critical situations would be recognized and corrected earlier, avoiding unfavourable outcomes.[6]

Yadav, P (2023), comes with the concept of validating the accuracy of four early warning scores for early identification of women at risk and 352 pregnant women were enrolled and 290 were identified with severe maternal morbidity and it is noted that the MEOWS is more accurate than other tools for predicting the deterioration of women.[7]

In India the purpose is to evaluate and validate the performance of the MEOWS system as a screening tool for early prediction of severe obstetric morbidity, with a total of 1800 pregnant women, where it was pointed out as a resolution that MEOWS helps in the early recognition of obstetric morbidity, even before the signs and symptoms become clinically evident and that it is a useful tool for predicting adverse maternal outcomes in pregnant women.[8]

In Canada, the aim was to determine whether the MEOWS could accurately identify patients at risk of severe maternal morbidity and mortality in the emergency department setting, where 267 medical records were used, with the outcome that the MEOWS can be a valuable tool for identifying postpartum patients who are at risk of severe outcomes early in an emergency department visit.[9]

Therefore, there were no articles that could counter the benefits of using the tool in the care of women during pregnancy and after childbirth, showing the real need for the tool to be applied in all areas of care in order to reduce female mortality.

The use of these tools in the hospital environment benefits both the user and the professional, always aiming to improve the service provided. From this perspective, the work process becomes inherent to patient care and the organization of the health service, together with the practice of the professional nurse, as they are able to apply quality tools, since during their academic training they have developed the skills and competencies to identify the points that need management intervention. Nurses act by planning care actions, forecasting and providing the necessary resources to organize care.[16]

CONCLUSION

After developing this review, which sought to: Identify the relationship between gestational morbidities in the evaluation of the MEOWS, it was possible to see that the application of the scale was concrete and advantageous. This review also concludes that the MEOWS scale can be classified as a good predictor of health problems, albeit previously, given the limited evidence produced in Brazilian services. It was possible to verify that the MEOWS scale has a very positive effect when it comes to recognizing and avoiding clinical problems in patients, brings autonomy to the nursing team, covering everyone in the recognition of intercurrences and a better management and administration of the team in the sectors.

All the articles included in the research highlighted assertive points in various areas of hospital activity. Implementing the tool is not easy, as it requires good training and adaptation on the part of nursing and multidisciplinary teams, with effective, authentic records and, above all, records that prompt effective action according to each patient's score. However, institutions must have the physical and functional structure to promote good records and mobilize professionals, with protocol models that help with agile decision-making and have an impact on preventing adverse situations.

It is proposed that further studies be carried out to validate this scale, bearing in mind that Brazil is the driving force behind major experiments in prevention, and the use of the MEOWS scale is a real opportunity to improve health care.

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FINANCING

The authors did not receive financing for the development of this research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Gabriela Vacheli Rodrigues, William Alves dos Santos.
Data curation: Isabella Cristini Amaral de Almeida, William Alves dos Santos.
Formal analysis: William Alves dos Santos, Karina Thalita da Silva Higa.
Research: Karina Thalita da Silva Higa, Wanessa Roberta Araújo.
Methodology: William Alves dos Santos.

Project management: Gabriela Vacheli Rodrigues, William Alves dos Santos.
Resources: Gabriela Vacheli Rodrigues.
Software: William Alves dos Santos.
Supervision: Patricia Facina Soares Caracol, William Alves dos Santos.
Validation: William Alves dos Santos.
Display: Isabella Cristini Amaral de Almeida, Patricia Facina Soares Caracol.
Drafting - original draft: Wanessa Roberta Araújo.
Writing - proofreading and editing: William Alves dos Santos.

https://doi.org/10.56294/mw2024558