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Comparison of Modified Early Obstetric Warning Score (MEOWS) and Maternal Early Warning Criteria (MEWC) as Predictor of Morbidity and Mortality of Pregnant Women With COVID-19 in Bantul Hospital

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Abstract
Background*: The Indonesian Association of Obstetrics and Gynecology found that 20% of pregnant women died during the pandemic, dominated by cases of pregnant women who were confirmed positive for COVID-19. Maternal mortality reached three times the pre-pandemic level in July 2021.* ***Objective:*** *The purpose of this study was to compare the Modified Early Obstetric Warning Score (MEOWS) and Maternal Early Warning Criteria (MEWC) in predicting maternal morbidity and mortality in women infected with COVID-19.* ***Method****: The retrospective cohort method was used in this study of 91 obstetric patients infected with COVID-19 who were hospitalized at the Panembahan Senopati Bantul Regional General Hospital from January 2021 to December 2021.* ***Result and discussion****: The results of the calculation of the different tests obtained a p-value of 0.000=0.05 (the p-value is smaller than = 0.05). This means that there is a significant difference between the Modified Early Obstetric Warning Score (MEOWS) and the Maternal Early Warning Criteria (MEWC) in pregnant patients with confirmed COVID-19 at the Bantul Regional General Hospital. MEWC can predict a maternal mortality rate of 60.67%. Meanwhile, MEOWS can only predict maternal morbidity and mortality in 37.08% of COVID-19-positive pregnant patients.* ***Conclusions****: The Maternal Early Warning Criteria (MEWC) is better than the Modified Early Obstetric Warning Score (MEOWS) in predicting morbidity and mortality in pregnant patients with confirmed COVID-19.*
Keywords*: Maternal Early Warning System; Maternal Morbidity; Maternal Mortality;*

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Introduction

The World Health Organization has presented a case of the disease caused by the SARS-COV 2 virus, namely COVID-19, as a pandemic on March 11, 2020 (Brahmin and Rosa, 2020). This global pandemic has ushered in various impacts on aspects of life, especially in the world of health of various populations. One of the populations of concern to the health world is the group of pregnant women (Qeadan *et al.* , 2021) . In Indonesia, data collected by the Indonesian Obstetrics and Gynecology Association found that as many as 20% of pregnant women who died during the 17 months since the start of the pandemic were dominated by cases of pregnant women confirmed positive for COVID-19. This increase in the death rate experienced a peak in July 2021 which reached three times the previous pandemic (POGI, 2021). Statistical data even shows that Indonesia has the highest maternal mortality rate in Southeast Asia (Dewi *et al.* , 2020) . Based on data from *The American College of Obstetricians and Gynecologists* shows that pregnant women infected with SARS-COV 2 increase the risk of mortality and morbidity derived from obstetric complications compared to pregnant individuals without being confirmed positive for SARS-COV 2 (Metz *et al.* , 2022) . *The Centers for Disease Control* reported a significant increase in cases of the SARS-COV 2 virus variant, the Delta variant, in late July 2021, with a more contagious character and a worse impact compared to the previous SARS-COV 2 variant. Meanwhile, pregnant women who have received full vaccination as of November 20, 2021, are only around 35%, so data shows that the occurrence of severe *maternal morbidity* in pregnant women is increasing during the period when the Delta variant attacked the world compared to when the previous SARS-COV 2 variant (DeSisto *et al.* , 2021) . Another study also found that during the period when the Delta virus variant attacked there was an increase in the risk of pregnant women entering *intensive care units* by 66%, the risk of needing a breathing apparatus 63% and the risk of dying ≥ 2x greater than the previous SARS-COV 2 virus variant (States *et al.* , 2021)

The various increased risks that occur are due to physiological and immunological changes experienced by pregnant women, especially in conditions infected with COVID-19 (Qeadan *et al.* , 2021) . Physiological changes in a person such as blood pressure, heart rate, respiratory rate, temperature and mental status can be used as parameters that precede the occurrence of critical conditions of various populations including the obstetric population which is the basis for the development of an early warning scoring system for obstetric patients. This early warning system requires periodic measurement of the patient's vital signs so that the patient's clinical condition can be monitored regularly and the worsening of the patient's condition can be detected earlier so that the intervention given is not too late for better outcomes. (Singh *et al.* , 2016) .

Countries around the world have various types of Modified Early Warning System (MEWS) used including Maternal Early Obstetric Warning System (MEOWS), Maternal Early Warning Criteria (MEWC) and *Maternal Early Warning Trigger* (MEWT). However, the *Confidential Enquiry into Maternal and Child Health* (CEMACH) recommends the use of the *Maternal Early Obstetric Warning System* (MEOWS)

although in developing countries there has not been much research on the use of the MEOWS scoring system as an early warning system for obstetric patients which is urgently needed, especially in the current pandemic conditions (Blumenthal *et al.* , 2019) . A prospective study conducted by Anju Singh and his team in 2016 has tried to evaluate the MEOWS scoring system in predicting morbidity events in obstetric patients and then found the fact that MEOWS is sensitive in predicting maternal morbidity with a sensitivity value of 86.4% and a specificity value of 85.2%. In addition, researchers also found that the parameters used in MEOWS had a correlation relationship to obstetric morbidity. Anju Singh and his team proved that the MEOWS instrument is very useful as a treatment monitoring tool in predicting obstetric morbidity and strongly recommends its use for all obstetric units everywhere. Therefore, at the end of his research article Anju Singh recommended the need for further research for MEOWS instruments with different clinical settings (Singh *et al.* , 2016) .

Another early warning system besides MEOWS recommended by the *National Partnership for Maternal Safety* (NPMS) is the *Maternal Early Warning Criteria* (MEWC) to identify patients at risk of morbidity and mortality. *Maternal Early Warning Criteria* (MEWC) is an early warning system that will provide a warning even if only one parameter enters an abnormal value so that the MEWC parameter is simpler than the parameters possessed by the MEOWS early warning system which requires the severity score to be calculated from eleven parameters (Kumala Fajar Apsari, 2020). MEWC is recommended by the *National Partnership for Maternal Safety* (NPMS) which consists of the criteria for the results of consensus development by experts in the United States (Arnolds *et al.* , 2019) . MEWC is also recommended for use in all hospitals offering obstetric services by the *American Congress of Obstetricians and Gynecologists District II's Safe Motherhood Initiative*, a collaboration to improve maternal health outcomes in New York, the state with one of the worst mortality rates (Friedman, 2015). Research conducted by David E. Arnolds and his team in Chicago found that there was an association between MEWC and maternal morbidity with sensitivity values and negative predictive values of MEWC high but had low specificity and PPV values. While the high sensitivity value has consistency with the role of an instrument as a screening tool. MEWC is recommended because it has the role of screening tools as a reminder of the possible need for diagnostic or therapeutic interventions as soon as possible in women at risk of morbidity. A robust early warning system is believed to be an important tool for reducing maternal morbidity and mortality (Arnolds *et al.* , 2019)

Table 1
Previous research

No	Title and Name of the Researcher	Research Methods	Research Results	Conclusion
1	Early warning systems in obstetrics: A systematic literature review (Umar, Ameh, Muriithi, & Mathai, 2019)	Quantitative *(cross sectional)*	Sensitivity of obstetric early warning system 89% and specificity 85% to predict morbidity or ICU admission.	Obstetric early warning systems effectively predict severe morbidity as well as mortality.
2	Evaluation of MEOWS chart as a predictor of obstetric morbidity: a prospective observational study (Anju Singh et al., 2016)	Prospective observational quantitative (*cross sectional*)	MEOWS sensitivity 86.4%, sensitivity 85.2% for obstetric morbidity prediction	The MEOWS parameter has a significant correlation with obstetric morbidity.
3	A validation study of the CEMACH recommended MEOWS (S. Singh, McGlennan, England, & Simons, 2012)	Prospective quantitative	MEOWS has a sensitivity value of 89% specificity of 79% with a positive prediction value of 39%.	MEOWS as a monitoring tool that is useful for predicting morbidity.

The purpose of this study was to measure the comparative value of *Modified Early Obstetric Warning Score* (MEOWS) and *Maternal Early Warning Criteria* (MEWC) in predicting morbidity (*severe maternal morbidity)* and mortality in obstetric patients infected with COVID-19.

Method

This quantitative research is carried out with the chosen research method, namely *the retrospective cohort*. Data collection is carried out through the extraction of medical record data at the Panembahan Senopati Bantul Regional General Hospital. The medical records taken are medical records of inpatient obstetric patients infected with COVID-19. From the results of the medical record data collection, a comparison of the MEOWS and MEWC early warning systems used in predicting patient morbidity and mortality conditions will be seen.

The research has been carried out in the medical record room of the Panembahan Senopati Bantul Regional General Hospital. The study population consisted of inpatient obstetric patients who were confirmed with COVID-19 infection. Samples are determined through total sampling which aims to obtain a more comprehensive and thorough sample type. Samples were taken through medical records by taking into account the patient's MEOWS sheet, the initial assessment sheet of hospitalization, lembar CPPT (Integrated Patient Development Record) rawat inap, the patient's entry and exit summary sheet, and the PCR swab laboratory result sheet in the patient's medical record

Results and Discussion

Result

1. Univariate Analysis

Sample Characteristics

Based on the analysis of the results of research that has been carried out on 89 samples. The sample characteristics based on age, gestational age, and gravida status are as follows:

Table 2

Sample Characteristics of Pregnant Patients Infected with COVID-19 in Bantul Regional General Hospital

Sample Characteristics		
Age (th)	**Frequency (n)**	**Percentage (%)**
Reproductive (20-35 years)	77	86,5
Risk (< 20 and > 35 years)	12	13,5
Gestational Age	Frequency (n)	Percentage (%)
< 37 weeks	31	34,8
37-42 weeks	57	64,0
> 42 weeks	1	1,1
Pregnant	Frequency (n)	Percentage (%)
Primigravida	35	39,3
Multigravida	54	60,7
Total	89	100,0

Source: Primary Data Processed, 2022.

Based on tabel 2, it can be seen that the sample in this study was dominated by pregnant patients infected with COVID-19 with reproductive age si (20-35 years) as many as 77 (86.5%) patients, most of the samples with a gestational age of 37-42 weeks were 57 (64.0%) patients, and the majority with status Multigravida pregnancies reached 54 (60.0%) of the overall study sample.

Maternal Early Warning Criteria (MEWC)

Table 3

Maternal Early Warning Criteria (MEWC) in Pregnant Patients infected with COVID-19 at Regional General Hospital's

Bantul

No	**MEWC**	**Frequency (n)**	**Percentage (%)**
1	Normal	66	74,2
2	Trigger	23	25,8
Total 89 100.0			

Source: Primary Data Processed, 2022.

Table 3 shows that most samples of pregnant patients infected with COVID-19 using *Maternal Early Warning Criteria* (MEWC) obtained "normal" results of 66 (74.2%) patients.

Modified Early Obstetric Warning Score (MEOWS)

Table 4

Modified Early Obstetric Warning Score (MEOWS) in Pregnant Patients whoInfected with COVID-19 at Bantul Regional General Hospital

No	MEOWS	Frequency (n)	Percentage (%)
1	No Risk	34	38,2
2	Mild Risk	28	31,5
3	Medium Risk	9	10,1
4	High Risk	18	20,2
Total 89 100.0			

Source: Primary Data Processed, 2022.

Table 4 shows that the assessment of pregnant patients confirmed with COVID-19 at Bantul Regional Hospital using the *Modified Early Obstetric Warning Score* (MEOWS) is mostly in the "no risk" category with a score of 34 (38.2%) patients.

Morbidity and Mortality

Table 5

Morbidity and Mortality of Infected Pregnant Patients COVID-19 at Bantul Regional General Hospital

No	Morbidity/Mortality	Frequency (n)	Percentage (%)
1	*Non-Severe Morbidity*	59	66,3
2	*Severe Maternal Morbidity*	25	28,1
3	Mortality	5	5,6
Total 89 100.0			

Source: Primary Data Processed, 2022.

Table 5 shows that pregnant patients confirmed with COVID-19 at Bantul Hospital are dominated by patients who experience *Non-Severe Morbidity* (NSM) with a value of 59 (66.3%) respondents.

2. Bivariate Analysis

The following are the results of processing data on differences or comparisons of *Modified Early Obstetric Warning Score* (MEOWS) and *Maternal Early Warning Criteria* (MEWC) of pregnant patients infected with COVID-19 at the Bantul Regional General Hospital.

Table 6

Different Test Results of MEOWS and MEWC in Pregnant Patients Infected with COVID-19 at Bantul Regional General Hospital

	Average			
Variable	**MEWC**	**MEOWS**	**Mann-Whitney U**	***p-value***
Mean Rank	70,01	108,99	2226,000	0,000

Source: Primary Data Processed, 2022.

Based on tabel 4.5 the calculation results of the Mann-Whitney U difference test obtained p-value = 0.000 < α = 0.05 (*p-value* smaller than α = 0.05). This means that there is a significant difference between the *Modified Early Obstetric Warning Score* (MEOWS) and *the Maternal Early Warning Criteria* (MEWC) in pregnant patients infected with COVID-19 at the Bantul Regional General Hospital. The following are the results of data processed on the relationship of *Modified Early Obstetric Warning Score* (MEOWS) and *Maternal Early Warning Criteria* (MEWC) with morbidity and mortality in pregnant patients infected with COVID-19 at Bantul Regional General Hospital.

Table 7

Relationship of *Maternal Early Warning Criteria* (MEWC) with Morbidity and Mortality in Pregnant Patients Infected with COVID-19 at Bantul Regional General Hospital

	Morbidity/Mortality			
MEWC	**NSM n (%)**	**SMM n (%)**	**Mortality n (%)**	***x^2* (*p-value*)**
Normal	54	12	0	32,560 (0,000)
Trigger	5	13	5	
Total	59	25	5	

Source: Primary Data Processed, 2022.

Tabel 7 showed that the majority of the sample of pregnant patients infected with COVID-19 with a normal MEWC score and experienced *Non-Severe Morbidity* was 54 (60.67%) patients. Based on the calculation results of *Chi-Square*, p-value = 0.000 < α = 0.05 (*p-value value* smaller than α = 0.05). This means that there is a significant relationship between *Maternal Early Warning Criteria* (MEWC) and the incidence of mortality morbidity in pregnant patients infected with COVID-19 at Bantul Regional General Hospital.

Table 8

Relationship of *Modified Early Obstetric Warning Score* (MEOWS) with Morbidity (*Severe Maternal Morbidity)* and Mortality in Pregnant Patients Infected with COVID-19 at Bantul Regional General Hospital

MEOWS	Morbidity/Mortality			x^2 (*p-value*)
	NSM n (%)	MSM n (%)	Mortality n (%)	
No Risk	33	1	0	58,074 (0,000)
Mild Risk	21	7	0	
Medium Risk	5	4	0	
High Risk	0	13	5	
Total	59	25	5	

Source: Primary Data Processed, 2022.

Table 8 shows that a sample of pregnant patients infected with COVID-19 with a "no risk" category MEOWS score and experienced *Non-Severe Morbidity* was 33 (37.08%) samples. Based on the calculation results of *Chi-Square*, p-value = 0.000 < α = 0.05 (*p-value value* smaller than α = 0.05). This means that there is a significant association between the *Modified Early Obstetric Warning Score* (MEOWS) and the incidence of morbidity and mortality in pregnant patients infected with COVID-19 at the Bantul Regional General Hospital.

Discussion

1. Sample Characteristics

The results of the analysis showed thata large portion of the sample was in the age of 20-35 yearsn with a percentage of 86.5% or 77 patients. This shows that in terms of age, the sample of pregnant patients infected with COVID-19 at the Bantul Regional General Hospital is mostly in reproductive age. The findings correspond to data found by the *Centers for Disease Control and Prevention* (CDC) based on the largest sample taken from pregnant patients in the United States. *A Morbidity and Mortality Weekly Report* for the period January 22 to June 7, 2020 reported by the CDC found 8207 of the total 326,335 female patients of reproductive age confirmed positive for COVID-19 were pregnant. This percentage of women of reproductive age that dominates is due to that age women of reproductive age are easier to conceive at any time, have more frequent contact with the health care system, and have higher mobility than other age categories (Overton, Goffman and Friedman, 2022).

The data collected in this study found that most of the sample of pregnant women confirmed with COVID-19 was within 37-42 weeks of pregnancy, namely 57 (64.0%) patients. This shows that pregnant women infected with COVID-19 at the Bantul Regional General Hospital are mostly at gestational age in the third trimester. Several studies have found a predominance of pregnant women in the third trimester in pregnant

patients with confirmed COVID-19 although until now the cause is not known for certain but there is a suspicion that there is a possibility of patients undergoing swab tests at the same time as when they come to the hospital with increased obstetric complaints in that trimester (Overton *et al.* , 2022)

The results of patient data collection in this study found that a large percentage of patients were pregnant women with multigravida with a percentage of 60.0% (54) of the total sample. This shows that in terms of parity status, pregnant patients confirmed with COVID-19 at the Bantul Regional General Hospital have been pregnant 2 times or more. Primigravida is a mother who becomes pregnant for the first time, while a multigravida is a mother who becomes pregnant more than once. This parity status is based on findings reported by the *Centers for Disease Control and Prevention* (CDC) based on several previous studies parity levels are often associated with a higher age level and a larger number of family members which may be one of the risk factors for transmission of the SARS-CoV 2 virus (Overton, Goffman and Friedman, 2022).

2. *Maternal Early Warning Criteria* (MEWC)

Sixty-six or 74.2% of pregnant patients infected with COVID-19 at Bantul Regional General Hospital had the results of the assessment of the *Maternal Early Warning Criteria* (MEWC) instrument in the normal (non-trigger) category. The results of this study are supported by the research of David E Arnold and his team in Chicago where the results showed that women who did not trigger the criteria (not trigger) in mewc assessment had a low risk of morbidity (Arnolds *et al.* , 2019) . Various increased risks can occur due to physiological and immunological changes experienced by pregnant women, especially in conditions infected with COVID-19 (Qeadan *et al.* , 2021) .

Physiological changes in a person such as blood pressure, heart rate, respiratory rate and body temperature can be used as parameters that precede the occurrence of critical conditions of various populations including the obstetric population which is the basis for the development of an early warning system for obstetric patients. This early warning system requires periodic measurement of the patient's vital signs so that the patient's clinical condition can be optimally monitored and the worsening of the patient's condition can be detected earlier so that the intervention given is not too late for better outcomes (Singh *et al.* , 2016) .

The use of early warning s istem called *Maternal* Early Warning Criteria (MEWC) which is a simplification of various early warning systems *Modified Early Obstetric Warning System* (MEOWS) (Kumala Fajar Apsari, 2020). The difference between the two early warning systems lies in the minimal number of abnormal parameters to activate the warning system where the MEWC system will trigger an immediate warning when there is one parameter value that is not within normal limits (Arnolds *et al.* , 2022) . MEWC as an early warning system in obstetric care services because MEWC uses parameters based on the review of various maternal mortality cases although the external

variables and process steps of this early system are highly dependent on the implementation of each health care provider (Friedman *et al.* , 2018) .

3. *Modified Early Obstetric Warning Score* (MEOWS)

The results of the assessment of samples of pregnant patients infected with COVID-19 at the Bantul Regional General Hospital using the *Modified Early Obstetric Warning Score* (MEOWS) were dominated bythe non-risk category, namely 34 (38.2%) respondents. The results of this study are supported by the research of Zohra *et al.* , (2021) and Singh *et al.* , (2016), where the results showed that MEOWS can be used in predicting obstetric morbidity and can be a practical bedside screening tool because it meets most of the criteria of an ideal screening tool in pregnant patients for early recognition of any life-threatening situation in order to reduce maternal morbidity and mortality (Zohra *et al.* , 2021) .

Research related to the use of *the Maternal Early Obstetric Warning System (MEOWS)* as an early waing system for obstetric patients in the COVID-19 pandemic situation has not been carried out much even though its use is very much needed, especially in conditions like today (Blumenthal *et al.* , 2019) .

The escalation protocol used in the MEOWS early warning system is based on the parameter score value outside the normal limit where the warning will activate when the total parameter score value is more than the same as 7 or is in the red alert zone (high risk) so that a patient condition examination is needed to determine whether an intervention is needed in the patient (Kumala Fajar Apsari, 2020). This finding is supported by a statement in a study conducted by Singh and his team in 2016 that the MEOWS early warning system is a bedside screening tool that is useful for predicting obstetric morbidity and meets most of the criteria for ideal screening tools in obstetric populations. MEOWS should be used routinely as a bedside screening tool in each obstetric care unit as recommended by the CEMACH report for early recognition of maternal morbidity conditions and periodic documentation of physiological parameters in patients (Singh *et al.* , 2016) .

Based on tabel 7 it is known that most samples of pregnant patients infected with COVID-19 with a normal MEWC score and experienced mortality morbidity category *Non-Severe Morbidity* with a percentage of 54 (60.67%) patients. Meanwhile, based on tabel 8, it is known that the most samples of pregnant patients infected with COVID-19 with a MEOWS score were not at risk and experienced mortality morbidity category *Non-Severe Morbidity* as many as 33 (37.08%) samples. Based on the results of this data analysis, it can be concluded that *Maternal* Early Warning Criteria (MEWC) are better than the *Modified Early Obstetric Warning Score* (MEOWS) in predicting morbidity and mortality conditions of pregnant patients with COVID-19 infection. This is because the Maternal Early Warning Criteria (MEWC) can predict mortality morbidity of category *Non-Severe Morbidity* as much as 60.67% of the *Modified Early Obstetric Warning Score* (MEOWS) can only predict 37.08% of samples of obstetric patients infected with Covid-

19. The results of this study are supported by a study conducted by Delhi India in 2016 which found that the MEOWS early warning system with simplification of parameters became more sensitive and useful (Singh *et al.* , 2016) .

4. The diferent of *Maternal Early Warning Criteria* (MEWC) and *Modified Early Obstetric Warning Score* (MEOWS)

The results of the difference test calculation were obtained p-value = 0.000 < α = 0.05 (*p-value* smaller than α = 0.05). This means that there is a significant difference between *Modified Early Obstetric Warning Score* (MEOWS) and *Maternal Early Warning Criteria* (MEWC) in pregnant patients infected with COVID-19 at Bantul Regional General Hospital. The results of this study are supported by a study conducted in Delhi India in 2016 which found that the MEOWS early warning system with parameter simplification became more sensitive and useful. The analysis of the results of the study also concluded that simplification of early warning system parameters can reduce complexity in the management of an on-trigger or triggered warning system and reduce overall workload so as not to cause a loss of potential benefits of early warning systems as one of the elements of patient safety tools (Singh *et al.* , 2016) .

5. Relationship of Maternal Early Warning Criteria (MEWC) and Modified Early Obstetric Warning Score (MEOWS) with Mortality Morbidity.

Chi-Square results obtained p-value < α = 0.05 (*p-value value* smaller than α = 0.05). This means that there is a significant relationship between *Maternal* Early Warning Criteria (MEWC) and *Modified Early Obstetric Warning Score* (MEOWS) with the incidence of mortality morbidity in pregnant patients infected with COVID-19 at Bantul Regional General Hospital. This means that *Maternal* Early Warning Criteria (MEWC) and *Modified Early Obstetric Warning Score* (MEOWS) scores can predict the incidence of mortality morbidity in pregnant patients infected with COVID-19. The results of this study are supported by the research of Singh *et al.*, (2016) which shows that between the parameters used in MEOWS have a significant correlation relationship to maternal morbidity. In addition, researchers also found MEOWS sensitive in predicting maternal morbidity with a sensitivity value of 86.4% and a specificity value of 85.2% (Singh *et al.* , 2016) .

Singh's research and his team also proved that the MEOWS instrument is very useful as a treatment monitoing tool in predicting obstetric morbidity and strongly recommends its use for all maternal service units everywhere (Singh *et al.* , 2016) . The results of this study were supported by Umar *et al.*, (2019) which states that the sensitivity of the maternal early warning system reaches a percentage of 89% and a specificity of 85% to predict morbidity. The results of this study were also supported by research in Chicago in 2018 which proved that there was a significant association between MEWC and maternal morbidity. The study also found that MEWC has excellent sensitivity and negative predictive values that prove that women who do not trigger the criteria (*trigger*)

in MEWC have a low risk of experiencing maternal morbidity (Arnolds *et al.* , 2019) . MEWC also has a sensitivity comparable to the maternal early warning system recommended by the *British Confidential Inquiry into Maternal and Child Health* (Arnolds *et al.* , 2019) .

The high sensitivity value has consistency with the role of an instrument as a screening tool. MEWC is recommended because it has the role of screening tools as a reminder of the possible need for diagnostic or therapeutic interventions as soon as possible in women at risk of morbidity. A robust early warning system is believed to be an important tool for reducing maternal morbidity and mortality (Arnolds *et al.* , 2019) . The results of this study indirectly support the recommendations issued by the *National Partnership for Maternal Safety* regarding the use of MEWC to assist health workers in early identifying obstetric patients at risk of maternal morbidity (Arnolds *et al.* , 2019) .

Conclusion

Assessment with *Maternal Early Warning Criteria* (MEWC) alarge portion of the sample of pregnant patients infected with COVID-19 at the Bantul Regional General Hospital had normal results (not *trigger*). The results of the assessment of samples of pregnant patients infected with COVID-19 at the Bantul Regional General Hospital with a *Modified Early Obstetric Warning Score* (MEOWS) were dominated by the Tidak Risky category.

There were significant differences in the assessment results using the *Modified Early Obstetric Warning Score* (MEOWS) and *Maternal Early Warning Criteria* (MEWC) in pregnant patients infected with COVID-19 at the Bantul Regional General Hospital. There is a significant association between Maternal Early Warning Criteria (MEWC) and *Modified Early Obstetric Warning Score* (MEOWS) with the incidence of mortality morbidity in pregnant patients infected with COVID-19 at Bantul Regional General Hospital. This means that *Maternal* Early Warning Criteria (MEWC) and *Modified Early Obstetric Warning Score* (MEOWS) **scores can predict** the incidence of mortality morbidity in pregnant patients infected with COVID-19.

It was concluded that Maternal Early Warning *Criteria* (MEWC) is better than the *Modified Early Obstetric Warning Score* (MEOWS) in predicting the condition of mortality morbidity of pregnant patients with COVID-19 infection. This is because MEWC can predict maternal *Non-Severe Morbidity* mortality morbidity mostly as much as 60.67%. Meanwhile, MEOWS can only predict maternal mortality morbidity as much as 37.08% of the sample of pregnant patients infected with COVID-19.

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