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Original Article

Comparison of NEWS, SIRS, And qSOFA Score As a Predictor of Mortality And Length of Stay of Patients Pneumonia With Sepsis

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Abstract

Background: Pneumonia is a major health problem associated with high morbidity and mortality in all age groups worldwide. Sepsis is a life-threatening organ dysfunction resulting from a dysregulation of the body's response to infection. Sepsis is a global health problem with high mortality and morbidity. Sepsis develops rapidly to a critical stage and failure to identify and treat it will be fatal. Recommendations from the 2021 Surveillance Sepsis Campaign, several clinical scoring systems have been recommended to help predict patients who lead to septic conditions and to determine if the patient's condition falls into a worse condition. The Surveillance Sepsis Campaign 2021 explains that there is currently no gold standard for diagnosing sepsis. Several sepsis screening tools have been developed and evaluated for pre-hospital and in-hospital use. The most widely used diagnostic scoring systems include systemic inflammatory response syndrome, national early warning score (NEWS), quick sequential organ failure assessment (qSOFA) and sequential organ failure assessment (SOFA).

Methods: Descriptive analysis of subjects with a clinical score collective from pneumonia patients with sepsis who were treated at RSUD Dr. Moewardi Surakara during the period January 1 to December 31 2022 by collecting total sampling using medical record modalities. Samples that meet the inclusion criteria will be assessed for each clinical score, namely NEWS, SIRS, and qSOFA which will then be assessed for suitability with the SOFA score as the gold standard according to sepsis-3 in 2016, which then scores will be assessed for mortality and length of stay in pneumonia patients with sepsis. Each score will be compared which one is better used as a predictor of mortality and length of stay in pneumonia patients with sepsis.

Results: The analysis found that the suitability value between the NEWS score and the SOFA score had a Kappa value = 0.726 (p = <0.001) with a fairly high category suitability level compared to the SIRS score with Kappa = 0.320 (p = <0.001) with a low category suitability level and a score qSOFA with Kappa = 0.222 (p = <0.001) with a low category of suitability. It was found that the NEWS, SIRS, and qSOFA scores had a significant closeness value to mortality, with the highest NEWS score with r=0.482 (p=<0.001), compared to the SIRS score with r=0.216 (p=<0.001) and qSOFA r=0.175 (p=<0.001). While the analysis of the relationship between NEWS, SIRS, and qSOFA scores which had a significant relationship with length of stay was NEWS with r=0.129 (p=0.001) with a weak category of closeness (r=0.000-0.199), compared to the SIRS score with r=0.017 (p=0.672) and qSOFA with r=0.029 (p=0.479) which did not have a significant relationship with length of stay.

Conclusion: The NEWS score has the best suitability with the SOFA score and the NEWS score has the best value in predicting mortality and length of stay in pneumonia patients with sepsis, while the SIRS and qSOFA scores have less value in predicting mortality and length of stay in pneumonia patients with sepsis.

Keywords: Pneumonia, sepsis, NEWS, SIRS, qSOFA, SOFA, mortality, length of stay.

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BACKGROUND

Pneumonia is problem health main related with morbidity and mortality high on all group age all over the world.[1] Pneumonia divided in a manner wide to community acquired pneumonia or hospital acquired pneumonia.[1] Causes of pneumonia from various type microorganisms including bacteria, viruses, and fungi.[2] Sepsis is life-threatening organ dysfunction consequence dysregulation response body against infection.[3] Sepsis is global problem health with high mortality and morbidity.[3] Sepsis develops with fast to stage critical and failed for identify and treat it will fatal.[3] Global Burden of Diseases (GBD) in 2019 shows that lower airway infection case of 489 million people worldwide.[4] Age

>70 years and children <5 years is population the most got pneumonia.[4] Global Burden of Diseases in 2019 stated global incidence of lower airway infection is 155 cases per 1,000 in adults age >70 per year and 107 cases per 1,000 in children age >5 years.[4]

The incidence of sepsis is based on epidemiological data Global Burden of Sepsis show that 19.4 million cases of sepsis occur globally every year with potential of 5.3 million mortality every year.[4] The incidence in the United States in 2017 was obtained number sepsis incidence of 1.7 million case every year.[5] Mortality case in the United States before 2000 was recorded by 50% in patients with sepsis and septic shock.[5] Enhancement reported prevalence of sepsis make implementation a number step prioritize treatment and early identification of sepsis.[3] Pneumonia according to data from GBD in 2013 occupies order both in between reason main sepsis causing >2.5 million mortality globally.[4]

Sepsis appropriate called as syndrome than disease.[3] High prevalence of sepsis make focus mainly on detection early sepsis.[3] Sepsis-1 in 1991 defined that manifestation clinical infection accompanied with systemic inflammatory response syndrome was defined as sepsis.[6] Sepsis-3 explained that not all patients with SIRS is sepsis.[7] Recommendation from surveillance sepsis Campaign 2021 a number of clinical scoring system has recommend for help predict leading patient _ to septic conditions and determine patient fall to worse codition.[3] Systemic inflammatory response syndrome represent condition in a manner general but very sensitive although not too specific.[8]

Clinical scoring system is tool can used for recognize signs beginning bad clinical to start intervention and early management, like increase attention treatment, determine emergency status, determine maintenance status, and activate response fast emergency medical team.[9] Clinical scoring system can used as tool for determine the effective diagnosis of sepsis.[9] Clinical scoring system used for determine degrees severity and prognosis in patients.[9] A number of clinical scoring system use element laboratory in necessary a lot of time.[10] Manifestation organ failure is indicated with he made various type tool diagnose sepsis such as SIRS, qSOFA , SOFA, NEWS and modified early warning score (MEWS).[3] A number of tool sepsis screening has developed and evaluated for its use pre-hospital and at hospital. Clinical scoring system most used among SIRS, NEWS, qSOFA and SOFA.[11]

Sepsis-3 re-define sepsis as life-threatening organ dysfunction caused by dysregulation response hosts against infection.[3] Assessment of sepsis-associated organ failure was assessed by history and examination physical and usage SOFA score where ≥2 is higher risk of sepsis.[3] SOFA score is recommended based on physique examination and laboratory results because represent organ failure in patients with infection.[3] Avoid delay treatment of patient so make it tool more simple that is qSOFA score because use SOFA score in addition physique examination for evaluation need a number of component required laboratory result its need longer time.[3] Based on recommendation from SSC 2021 without change previous definition of sepsis, main focus is early care which makes SSC 2021 recommend for use clinical system scoring simple and fast for more optimal care.[3] *S*urveillance Sepsis Campaign 2021 recommend no use qSOFA for single screening tool for diagnosing sepsis and septic shock. [3] Ivana et all in 2022 explains that in accordance definition of sepsis-3 sepsis diagnosis approach using SOFA score that shows organ failure in patients with infection, however because use SOFA score need longer time, SSC 2021 recommend to use simple screening tool and more fast.[12] Surveillance Sepsis Campaign 2021 not yet determine recommendation the best screening tool for detect sepsis patients.[3] Surveillance Sepsis Campaign 2021 explain that moment there is no gold standard for diagnosing sepsis.[3]

Writer want to researching is NEWS, SIRS, and qSOFA scores own suitability to SOFA score for diagnosing sepsis and comparing as predictor mortality and length of stay hospitalization in pneumonia patients with sepsis. Research results

This expected get the best clinical scoring system for used in medical care.

METHODS

This research used retrospective study that collecting patients medical record that diagnosed pneumonia with sepsis during period 1 January 2022 to 31 December 2022 at Dr. Moewardi Surakarta Hospital. Population study is patients diagnosed with pneumonia with sepsis during period 1 January 2022 to 31 December 2022. Determination sample study with method consecutive sampling.

This study use inclusion and exclusion criteria. Inclusion criteria study is patient age >18 years, patients diagnosed with pneumonia with sepsis based on history and examination physical, laboratory result, chest x-ray, and SOFA score ≥2 which has diagnosed by a doctor. Exclusion criteria is data from medical record no complete.

Assessment of NEWS, SIRS, and qSOFA scores based on physique examination and laboratory results from record medical at the time patient diagnosed with pneumonia with sepsis. NEWS, SIRS, and qSOFA scores will rated suitability with SOFA scores and as predictor mortality and length of stay of pneumonia patients with sepsis. This research has approved by the committee ethics study Faculty March Eleventh University of Medicine on March 10, 2023 (112/UN.27.06.7.5/PP/2023). Data analysis was performed with Statistical Product and Service Solution (SPSS) 21 for Windows. This study for analyze is NEWS, SIRS, and qSOFA scores suitability to SOFA score for diagnosing sepsis and comparing as predictor mortality and length of stay in pneumonia patients with sepsis.

RESULTS

This study involved 762 patients using secondary data that is medical record at dr. Moewardi Surakarta who was treated in the period January 1 2022 to December 31 2022. Samples that meet criteria inclusion and exclusion taken in a manner successively until amount sample fulfilled and found amount sample 615 records medical pneumonia patients with sepsis. This study showing pneumonia patients with sepsis mean age of 57.51 years with standard deviation 11.41 years . Patient with type sex male 312 patients (50.6%) and female 304 patients (49.4%). Room care patient were 252 patients (40.9%) in HCU, 200 patients (32.5%) in ICU, and non- intensive care 164 patients (26.6%).

Pneumonia patients with sepsis who have comorbid DM in 138 patients (22.4%), stroke in 77 patients (12.5%), CKD in 88 patients (14.3%), and malignancy in 192 patients (31.2%). Patient based on Pneumonia acquired pneumonia (CAP) total of 477 patients (77.4%), Hospital acquired pneumonia (HAP) 126 patients (20.5%), ventilator acquired pneumonia (VAP) 8 patients (1.3%), and confirmed Covid 28 patients (4.5%). Patient with septic shock in 171 patients (27.8%) and septic conditions in 445 patients (72.2%). Patient with length of stay <7 days 313 patients (50.8 %) and >7 days as many as 303 patients (49.2%). Patient with *outcome* life 365 patients (59.3%) and 251 patients (40.7%) died. Characteristics overview subject study can seen in table 1.

Table 1. Characteristics subject study

Variable	Mean/ F	%
Age	57.51	11.41
Sex		
Man	312	50.6%
Woman	304	49.4%
Room care		
Non- intensive	164	26.6%
HCU	252	40.9%
ICU	200	32.5%
Comorbidity		
DM	138	22.4%
Strokes	77	12.5%
Heart disease	88	14.3%
Malignancy	192	31.2%
Pneumonia		
CAP	477	77.4%
HAP	126	20.5%
VAP	8	1.3%
Confirmed Covid		
Yes	28	4.5%
No	588	95.5%
Sepsis/ septic shock		
Septic Shock	171	27.8%
Sepsis	445	72.2%
Length of Treatment		
> 7 days	303	49.2%
≤ 7 days	313	50.8%
Outcomes		
Life	251	40.7%
Died	365	59.3%

Analysis used for analyze suitability of NEWS, SIRS, and qSOFA scores with SOFA score using the *Kappa Coefficient* test. Based on *Kappa Coefficient* test analysis suitability between NEWS score with SOFA score was obtained mark *Kappa* = 0.726 with value p=<0.001 (p<0.05) which means that there is suitability between NEWS score with SOFA score with level suitability category high enough. Analysis suitability between SIRS score with SOFA score was obtained *Kappa* = 0.320 with value p=<0.001 (p<0.05) which means that there is suitability evaluation between SIRS score with SOFA score with level suitability category low. Analysis suitability between score qSOFA with SOFA score was obtained *Kappa* = 0.222 with value p=<0.001 (p<0.05) which means that there is suitability evaluation between score qSOFA to SOFA score with level suitability category low. Analysis suitability of the parameter scores NEWS, SIRS, and qSOFA with SOFA score can seen in table 2.

Table 2. Analysis suitability NEWS, SIRS, and qSOFA scores with SOFA score

	SOFA					
	Score >2		Score =2		Kappa	P
	F	%	F	%		
NEWS					0.726	<0.001
≥5	244	89.4%	55	16.0%		
<5	29	10.6%	288	84.0%		
SIRS					0.320	<0.001
≥2	154	56.4%	85	24.8%		
<2	119	43.6%	258	75.2%		
qSOFA					0.222	<0.001
≥2	168	61.5%	134	39.1%		
<2	105	38.5%	209	60.9%		

Analysis of NEWS, SIRS, and qSOFA scores with length of stay and mortality pneumonia patients with sepsis study using the correlation *Coefficient Contingency* test ecause the data uses nominal category with nominal.

Analysis on this research obtained results that score NEWS, SIRS, and qSOFA has significant relationship with mortality with p value <0.05, where the NEWS score is r=0.482 with p=<0.001 having category moderate (r=0.400 – 0.599), the SIRS score is r=0.216 with p=<0.001 having category weak (r=0.000-0.199), and qSOFA r=0.175 with p=<0.001 having very weak category (r=0.000-0.199). Analysis patient with results score positive inclined with *outcome* died on NEWS, SIRS, and qSOFA scores. Analysis of NEWS, SIRS, and qSOFA scores showing that score who have significant with length of stay is NEWS namely r=0.129 with value p=0.001 (p<0.05) and level category weak (r=0.000-0.199), where NEWS scores that are ≥5 tend to be with length of stay <7 days, this caused lots patient died at length of stay <7 days, then the SIRS score is r=0.017 with value of p=0.672 and qSOFA r=0.029 with value p=0.479 no own significant relationship with length of stay. Analysis results of NEWS, SIRS, and qSOFA scores with length of stay and mortality pneumonia patients with sepsis can seen in table 3.

Table 3. Analysis NEWS, SIRS, and qSOFA scores with mortality and length of stay

	Length of Treatment					
	>7 days (n=303)		≤7 days (n=313)		r	p
	F	%	F	%		
NEWS					0.129	0.001
≥5	127	41.9%	172	55.0%		
<5	176	58.1%	141	45.0%		
SIRS					0.017	0.672
≥2	115	38.0%	124	39.6%		
<2	188	62.0%	189	60.4%		
qSOFA					0.029	0.473
≥2	153	50.5%	149	47.6%		
<2	150	49.5%	164	52.4%		
	Outcomes					
	Survivor (n=251)		Non survivor (n=365)		r	p
	F	%	F	%		
NEWS					0.482	<0.001
≥5	205	81.7%	94	25.8%		
<5	46	18.3%	271	74.2%		
SIRS					0.216	<0.001
≥2	130	51.8%	109	29.9%		
<2	121	48.2%	256	70.1%		
qSOFA					0.175	<0.001
≥2	150	59.8%	152	41.6%		
<2	101	40.2%	213	58.4%		

Analysis characteristics sepsis patients with length of stay and *outcome* in this study using the

correlation *Eta* test for numeric, meanwhile for nominal categorical data using a correlation *Coefficient Contingency* test.

Analysis characteristics showing that variable that has significant relationship with length of stay were sepsis and septic shock, namely r=0.137 with p value = 0.001 (p <0.05) which is significant that there is closeness with level category weak (r=0.000-0.199), where patient with predisposed septic shock with longer length of stay fast, because lots patient with septic shock who died. Analysis characteristics subject other like age r=0.002 with value p=0.961, type sex r=0.016 with value p=0.683, room r=0.086 with value p=0.099), diabetes mellitus namely r=0.038 with p=0.346, stroke is r=0.077 with value p=0.055, disease heart coroner r=0.077 with p=0.056 , malignancy r=0.039 with value p=0.333, community acquired pneumonia r=0.036 with value p=0.372, hospital acquired pneumonia r=0.032 with value of p=0.422, ventilator acquired pneumonia r=0.002 with value of p=1000, and confirmed covid r=0.050 with value p=0.212, no own significant relationship with long care septic patients with p-value >0.05.

Analysis characteristics showing that variable that has significant relationship with mortality is room care r=0.126 with value p=0.007 and confirmed covid r=0.085 with value p=0.033, with p value <0.05 and level second variable the in category weak (r=0.000-0.199), where patient with room care in the HCU or ICU is likely more many died compared to with non-intensive room care. Analysis characteristics other subject like age r=0.019 with value p=0.643, type sex r=0.006 with p=0.887, diabetes mellitus namely r=0.038 with value p=0.348, stroke is r=0.066 with value p=0.100, heart coroner disease r=0.066 with p=0.100, malignancy r=0.044 with p=0.270, community acquired pneumonia r=0.011 with value p=0.789, hospital acquired pneumonia r=0.014 with value p=0.736, ventilator acquired pneumonia r=0.008 with p=0.851, and sepsis/ septic shock namely r=0.061 with value p=0.128, no significant relationship with mortality pneumonia patients with sepsis p- value >0.05. Analysis results characteristics variable with length of stay and mortality pneumonia patients with sepsis can seen in table 4.

Analysis characteristics multivariate subjects and scores of NEWS, SIRS, and qSOFA with length of stay and mortality pneumonia patients with sepsis using logistic regression test. Analysis multivariate NEWS, SIRS, and qSOFA scores as predictor of length of stay obtained that the NEWS score is OR=0.58 with value p=0.001 can as predictor of length of stay with value OR<1 stated that NEWS score ≥5 as predictor of length of stay <7 days, this caused lots patients who died at length of stay <7 days.

Analysis multivariate NEWS, SIRS, and qSOFA scores as predictor mortality obtained that the NEWS score is OR=12.73 with p=<0.001 as predictor mortality pneumonia patients with sepsis with value OR>1 stated that NEWS score ≥5 has risk mortality. Analysis results multivariate can seen in table 5.

Table 3. Analysis multivariate

	Lama Rawat		
	OR	95%CI	p
NEWS	0.58	0.42-0.80	0.001*
SIRS	-	-	n/s
qSOFA	-	-	n/s

	Outcome		
	OR	95%CI	p
NEWS	12.73	8.24-19.86	<0.001
SIRS	1.30	0.86-1.19	0.219
qSOFA	0.88	0.57-1.36	0.566

Table 4. Characteristics sepsis patients with length of stay and mortality

	Length of Treatment						*Outcomes*					
	>7 days (n=303)		≤7 days (n=313)		r	p.s	Died (n=251)		Go home (n=365)		r	p.s
	Mean/ F	SD/%	Mean/ F	SD/%			Mean /F	SD/%	Mean/ F	SD/%		
Age	57.49	11.80	57.53	11.04	0.002	0.961	57.25	10.90	57.68	11.76	0.019	0.643
Gender					0.016	0.683					0.006	0887
Man	155	51.3%	156	49.8%			128	51.0%	183	50.3%		
Woman	147	48.7%	157	50.2%			123	49.0%	181	49.7%		
Room care					0.086	0.099					0.126	0.007*
Non- intensive	84	27.7%	80	25.6%			52	20.7%	112	30.7%		
HCU	133	43.9%	119	38.0%			103	41.0%	149	40.8%		
ICU	86	28.4%	114	36.4%			96	38.2%	104	28.5%		
DM					0.038	0.346					0.038	0.348
Yes	63	20.8%	75	24.0%			61	24.3%	77	21.1%		
No	240	79.2%	238	76.0%			190	75.7%	288	78.9%		
Strokes					0.077	0.055					0.066	0.100
Yes	30	9.9%	47	15.0%			38	15.1%	39	10.7%		
No	273	90.1%	266	85.0%			213	84.9%	326	89.3%		
Coroner disease					0.077	0.056					0.066	0.100
Yes	35	11.6%	53	16.9%			35	13.9%	53	14.5%		
Nope	268	88.4%	260	83.1%			216	86.1%	312	85.5%		
Violence					0.039	0.333					0.044	0.270
Yes	100	33.0%	92	29.4%			72	28.7%	120	32.9%		
No	203	67.0%	221	70.6%			179	71.3%	245	67.1%		
CAP					0.036	0.372					0.011	0.789
Yes	230	75.9%	247	78.9%			193	76.9%	284	77.8%		
No	73	24.1%	66	21.1%			58	23.1%	81	22.2%		
HAP					0.032	0.422					0.014	0.736
Ya	66	21.8%	60	19.2%			53	21.1%	73	20.0%		
Tidak	237	78.2%	253	80.8%			198	78.9%	292	80.0%		
VAP					0.002	1.000					0.008	0.851
Ya	4	1.3%	4	1.3%			3	1.2%	5	1.4%		
No	299	98.7%	309	98.7%			248	98.8%	360	98.6%		
Confirmed Covid					0.050	0.212					0.085	0.033*
Yes	17	5.6%	11	3.5%			6	2.4%	22	6.0%		
No	286	94.4%	302	96.5%			245	97.6%	343	94.0%		
Shock / septic shock					0.137	0.001*					0.061	0.128
Septic Shock	65	21.5%	106	33.9%			78	31.1%	93	25.5%		
Sepsis	38	78.5%	207	66.1%			173	68.9%	272	74.5%		

DISCUSSION

Pneumonia patients with sepsis in the study more a lot in men compared woman. Study by Nosheen et al 2018 in Pakistan found same thing.[17] Organ dysfunction is caused by a reaction inflammation caused by the resulting infection from systemic cytokine release. The study by Nosheen et al 2018 explains that pro-inflammatory reaction mediated by TNF-α, IL-1 and IL-6. TNF-α expression during the inflammatory process higher in men compared to women.[17] Enhancement IL-6 expression is associated with higher risk inflammation.[17]

Mean age of pneumonia patients with sepsis was 57.51 years. Study by Loeches et al in 2019 shows that age on patient with age more than 65 years have higher risk for sepsis occurs in infectious conditions.[18] Patient with age more than 65 years cause downturn and interruption function system immune adaptive with B cells and T cells.[19] The study by Martin et al showed that age is mortality independent predictor in treated patients with sepsis.[18]

The patients have comorbid especially malignancy, diabetes mellitus, stroke, and other comorbidities. The study by Dimitrios et al 2018 comorbidity increase septic condition.[20] The study by Dimitrios et al describes how various type of infection varied in the rate that causes sepsis and the amount disease enhancing accompaniment risk of sepsis and death varies depending on the underlying infection.[20] Patient with type 2 diabetes mellitus has higher risk of sepsis, presumably relate with immunosuppression condition.[20] Influence from individual comorbidity, several comorbidity like type 2 diabetes mellitus, chronic kidney disease related with risk of sepsis in nearly all type of infection.[20] Comorbid like chronic heart disease and malignant cause risk of sepsis in pneumonia.[17]

Most pneumonia patients with sepsis were found with community acquired pneumonia that is compared to with hospital acquired pneumonia and ventilator acquired pneumonia. The study by Guimaraes et al in 2017 shows that hospital care acquired associated with worse condition with higher mortality and longer length of stay comparison with community acquired pneumonia.[21] Study by Kim et al 2022 explains that hospital acquired pneumonia incidents are associated with various factor sociodemographic, clinical, and environmental, the incidence only limited in hospital, so incidence more a little compared with community acquired pneumonia in due demographics larger compared to hospital acquired pneumonia.[22]

Mortality in pneumonia patients with sepsis

Analysis NEWS, SIRS, and qSOFA scores with length of stay and mortality pneumonia patients with sepsis, this study using the correlation test *Coefficient Contingency*. Analysis on this research obtained results that score NEWS, SIRS, and qSOFA has significant relationship with mortality with value $p<0.05$, where the NEWS score $r=0.482$ with $p=<0.001$ having closeness highest relationship compared to SIRS and qSOFA with moderate category ($r=0.400–0.599$), while the SIRS $r=0.216$ with $p=<0.001$ with weak category ($r=0.000$-0.199), and qSOFA $r=0.175$ with $p=<0.001$ very weak category ($r=0.000$-0.199). Analysis with results positive score inclined with outcome died on the NEWS, SIRS, and qSOFA scores with any different level.

The analysis showing NEWS score has significant suitability to mortality pneumonia patients with sepsis resulting NEWS score can used as mortality predictor in pneumonia patients with sepsis. This research supported various studies that show Zhou et al 2020 in Beijing explains that NEWS can used as predictors in community acquired pneumonia patients with sepsis in the emergency department.[23] qSOFA ≥2 and NEWS ≥7 scores are highly correlated with mortality in 28 days, risk ICU care, and risk to use mechanical ventilation in community acquired pneumonia patients with sepsis at emergency department.[23]

Manita et al 2021 shows that the NEWS score is related with increase in mortality.[24] Increased of NEWS score in pneumonia patients

three times or more has high risk of severe sepsis or increasing septic shock mortality risk.[24] NEWS hypothesized compared to with qSOFA and SIRS as tool sepsis screening, however study furthermore show that NEWS is most accurate screening tool for sepsis.[24] NEWS score used in triage because no immediate availability of data among laboratory results, determination addition oxygen addition, and urine output record as found in the SOFA and SIRS scores. because of that some variable deleted for simplify scores.[24]

Studies by Zhou et al 2021 show based on *cut-off* score qSOFA ≥2 and NEWS ≥7 are highly related with bad *outcomes*.[23] As comparison, another study by Abbott et al reported that NEWS score of 5 or more associated with mortality in two day time after enter treatment.[16] Khwannimit et al in 2019 explored the differences score clinical that is component from all score including CURB-65, PSI, SOFA, and MEDS consists from element laboratory, which makes difficult get complete data in short time in emergency department.[16]

Length of stay in pneumonia patients with sepsis

Analysis NEWS, SIRS, and qSOFA scores showing that score that have significant with length of stay is NEWS r=0.129 with value p=0.001 (p<0.05) and level in weak category (r=0.000-0.199), where NEWS scores that are ≥5 tend to be with length of stay <7 days, on analysis caused many patients who died at length of stay <7 days that caused length of stay calculation become more quickly, then the SIRS score is r=0.017 with value of p=0.672 and qSOFA r=0.029 with value p=0.479 no own significant relationship with length of stay.

Study by Thodphetch et al 2021 shows that using NEWS is sufficient good in the emergency unit emergency, room care, and health services community, with a secondary analysis of use in the emergency department showing that a higher NEWS score on examination at triage improves the patient to be treated, have a longer hospital stay, and a higher mortality rate than lower NEWS score.[25]

The study by Zhou et al 2020 shows that the increasing NEWS score have long lenght of stay and high mortality rate compared to with lower NEWS score.[23] Study by Zhou et al 2020 calculating the length of stay in patients with outcome live after treatment.[23] Different with this study, shows that higher NEWS scores relate with length of stay <7 days, in this study sample counted from whole sample with outcome die or live, where many sample patient died <7 days.

CONCLUSION

There is highest suitability NEWS score with SOFA score as predictor mortality and length of stay stay pneumonia patients with sepsis, whereas SIRS and qSOFA score has no suitability with length of stay. NEWS score can used as predictor mortality and length of stay stay if no support facilities for use SOFA score on daily service health.

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