Griffith UNIVERSITY

Please complete section below:

Course Code: 2820MED

Course Name: Trauma and Environmental Conditions

Due Date: 16/09/19   **Assessment Item #:**

Course Tutor: Sandy MacQuarrie

Course Convenor: Sandy MacQuarrie

Study Period or Session   1   2   3   4

DATE RECEIVED:

Postmark:

Please provide your STUDENT NUMBER here:

5137815

Student Name: Steffan Paton

Address: 13 Taurus Circuit

I have retained a copy of this assessment item for my own records.

Acknowledged by: Steffan Paton_____   Date: 16/09/19_____

(insert name here)

Where the item is submitted electronically Clicking "I Agree" constitutes an electronic signature for the purpose of assignment declaration compliance.

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Extension Requests:

Assessment Item Number: ____   Due Date: _____

Extension Granted: Y   N   Amended Due Date: _____

Extension Approval Number: _____

Extension Approved by: _____   Approval Date: _____

Examiner's Use Only: **Tick Where Appropriate:**

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Examiner's Comments:

Course Code: 2820MED

Course: Trauma and Environmental Conditions in Paramedic Practice

Course Convenor: Sandy MacQuarrie

Assessment: Critically Appraised Topic

Assessment Weight: 25%

Due Date: 16/09/2019 11:00PM

Date Submitted: 16/09/2019 9:30PM

Student Name: Steffan Paton

Student ID: 5137815

Word Count: 1231

Title: What was the Respiratory Rate? The significance of respiratory rate assessment and reassessment in trauma patients.

Report By: Steffan Paton

2nd Party Appraiser: Sandy MacQuarrie

Clinical Scenario: You arrive at the scene of a conscious 52 year-old patient who has experienced a fall from height of 4 metres resulting in multiple traumatic injuries. During your treatment you conduct multiple sets of vital signs surveys, repeating the observations you deem most important to track the trends of your patients condition while in your care. It is likely the initial and subsequent assessments of their respiratory rate are not accurate or do not end up assessed at all.

PICO (Population, Intervention, Comparison, Outcome) Question: For the prehospital trauma patient, does accurately assessing and reassessing the respiratory rate (and the change in respiratory rate) act as a better predictor of morbidity and mortality?

Keywords and Strategy: (Respiratory rate or change in respiratory rate) AND (trauma or traumatic) AND (prehospital or pre-hospital) AND (morbidity or mortality) AND/OR (assessment or outcome or outcomes).

PRISMA:
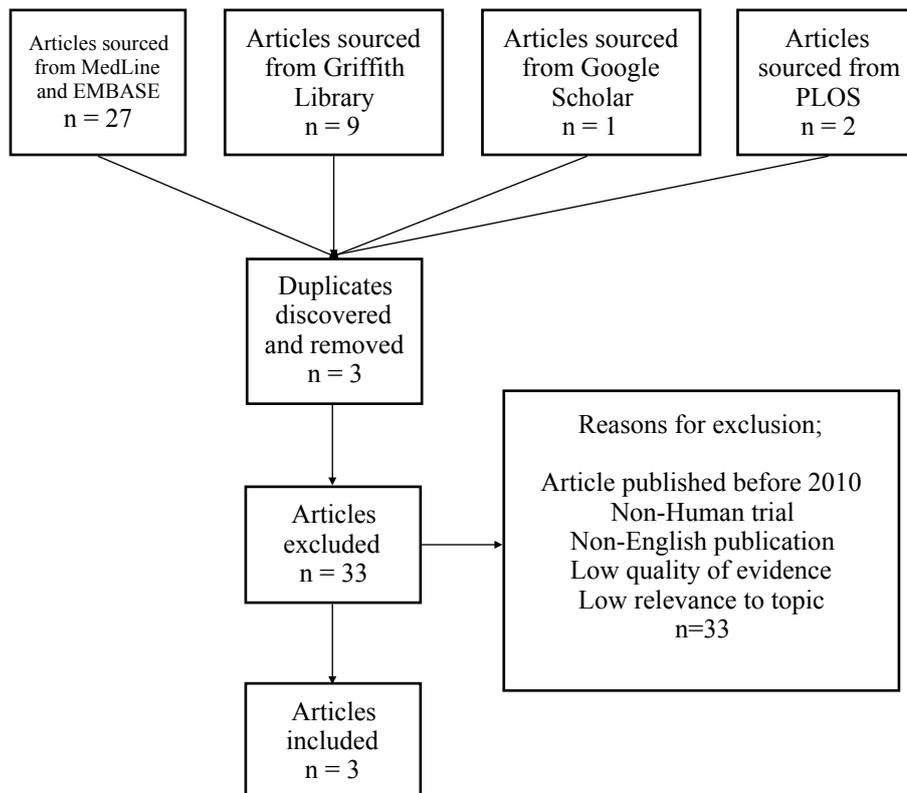
Search Results: 3

Author	Sample and Design	Results	Outcome	Limitations	Strengths	IF
Bruijns et al, 2013	28273 patients. Retrospective cohort study	Full sample results see a 99.6% survival rate vs 0.4% mortality rate. Mortality rate with moderate ISS vs severe ISS = 0.3% vs 3.0%. 3.4 times higher mortality rate in 48hours if there is a rise in RR by 8 breaths/min or more.	- Reinforcement of the use of prehospital vital signs as a part of in hospital assessment and treatment plans. - This is in collaboration with primary assessment by the emergency department examination.	- A comparison between in hospital and prehospital data involving a broad range of data parameters - Not directly focused on RR - Limited to only 48 hour mortality with no information for longer time frames included - 20% sensitivity only - Self confessing focus on in hospital outcomes with no specific prehospital performance data points	- First study to look at prehospital and in hospital vital sign relationships - Moderate impact journal - Very large sample size of 28273 - Main focus was patient outcome focused - Bias management by removal of outliers in samples - Highlights the importance of utilisation of using prehospital data to maintain awareness of patient trends - 96% specificity of data	2.04
Yang et al, 2016	1191 patients. Prognostic study	1191 received electrocardiogram (ECG) derived RR monitoring, 358 acoustic monitoring and 14 end-tidal CO_2 RR monitoring.	- No statistical difference between acoustic or end-tidal CO_2 monitoring. However, changes were noted when comparing against ECG monitoring. - Measurement of the RR can provide clinically useful data for non-intubated patients and assist accuracy of trauma scoring systems.	- Single-centre study only - Based on secondary sub-analysis of data from instruments used in another primary trial. - The primary trial bared little relevance and had a near nil focus on respiratory rate in trauma	- Level of evidence stated as level III - Large cohort of 1191 patients - Even distribution of demographic, age, and social parameters, therefore a diverse cohort. - Large sample size - Moderate impact journal - Acknowledgement of difficulties that currently exist in measurement of prehospital RR assessment in trauma specifically - Offered future practise reform by using pulse-oximeters to also measure RR if accuracy between oxygen saturation and heart rate could be elevated	2.18
Yonge et al, 2017	12332 activations. Retrospective review	466 patients notably under triaged = 5.9% OR 1.7	- Tachypnea in the presence of suspected thoracic injury should see more upgrading of level two triage categories be reinstated to the realm of level 3.	- Single-centre retrospective study, therefore limited scope for projection - Focusing on under-triage rather than morbidity and mortality - Never directly addresses trends in RR and patient outcomes	- Very large patient cohort - Moderate impact journal - Very focused on the parameter of RR and the impact that this has on patient care pathways - Reiterated the need for a higher regard to be shown to the RR in patient assessment and patient handover to adopt and react to trends that may eventuate. - Forms the basis of future prospective trials to fill a void in the literature and evidence base of both in-hospital and pre-hospital settings	2.64
	Abbreviations; CO_2, carbon dioxide; IF, impact factor; ISS, injury severe score; RR, respiratory rate.					

Comments:
- It is clear a large gap in clinical assessment currently exists. This gap requires appropriately constructed studies that focus on the parameter of RR to better inform current best-practice.
- Minor findings have been uncovered leading to knowledge that a change in respiratory rate is significant in trauma patients. This finding has not been subsequently researched.
- The prioritisation of RR assessment has been decreased due to perceptions of unimportance
- There is data to suggest that RR can have a part in assisting the early warning of a patients deterioration, however, the quality of this data can vary greatly.
- An increase of 8 breaths per minute is synonymous with an increase in morbidity by a factor of 3.4 times.
- Acoustically measured RR is useful for non-intubated patients in the prehospital environment.
- Patients are under-triaged as a result of incorrect RR measurements.

Consider: Considerations must be made if a change in the RR of a patient is assessed while in the clinicians care in order to aid prediction of deterioration with support from other vital signs. At this point in time, it would not be supported by evidence to base predictions solely off of RR alone, but following future research this may become a more heavily weighted vital sign.

Clinical bottom line: Respiratory rate (and a change in respiratory rate) does exhibit some importance in the prediction of morbidity and mortality in prehospital patients. The current data, however, does not specifically mention the ability for the respiratory rate as a better or worse predicting factor for morbidity and mortality in trauma patients in comparison to other vital signs. The data instead involves respiratory rate as a part of a set of data that then predicts a larger trend for the prognosis of each patient. More research is desperately needed to answer this question and it can be noted that there is both a significant lack of research on this topic and neglect towards the measurement of a respiratory rate in both in-hospital and pre-hospital settings.

References

Bruijns, S. R., Guly, H. R., Bouamra, O., Lecky, F., & Wallis, L. A. (2014). The value of the difference between ED and prehospital vital signs in predicting outcome in trauma. *Emerg Med J*, *31*(7), 579-582. doi; 10.1136/emermed-2012-202271

Yang, S., Menne, A., Hu, P., Stansbury, L., Gao, C., Dorsey, N., . . . Mackenzie, C. (2017). Acoustic sensor versus electrocardiographically derived respiratory rate in unstable trauma patients. *Journal of Clinical Monitoring and Computing, 31*(4), 765-772. doi:10.1007/s10877-016-9895-8

Yonge, J. D., Bohan, P. K., Watson, J. J., Connelly, C. R., Eastes, L., & Schreiber, M. A. (2018). The Respiratory Rate: A Neglected Triage Tool for Pre-hospital Identification of Trauma Patients. *World Journal of Surgery, 42*(5), 1321-1326. doi:10.1007/s00268-017-4353-4