Nurse related factors influencing the application of Richmond Agitation Sedation Scale among Nurses at Aga Khan University Hospital, Nairobi, Kenya

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I. Introduction

The Richmond Agitation Sedation Scale (RASS) constitutes one of the most widely applied tools in many Critical care Units setups with the main aim of enabling titration of sedative medications through structured assessments in relation to sedation and agitation.[1] The tool comprises of a 10-steps scale ranging from +4 (combative nature of a patient's response) to -5 (unarousable patient).[1] The adoption of the 10 levels in assessing the patient enhances the effectiveness of efforts of sedation and substantial impact of poor sedation.[2] As a result, consequences such as self-extubation of intraluminal tubes and removal of catheters can be avoided.[2]

Globally, the RASS has been validated as one of the most suitable tool for monitoring patients in palliative sedation and has been recommended as a blueprint for assessing the degree of tranquility among patients in Intensive Care Unit (ICU).[3] If carefully applied, RASS could reduce tracheostomy chances among patients on mechanical ventilation.[3,4] Additional benefits of RASS application include minimal time of weaning patients from ventilators, reduced stay in critical care unit, fewer chances of extubation in addition to reduced hospitalization.[3] Therefore, RASS utilization helps in better control of agitation and improves recovery. Further, [4]noted that RASS adoption and appropriate use highly reduces the risk of giving an overdose and also minimizes the time spent in the ventilator. Scholars have noted that RASS are easy to use as compared to other scales such as Comfort Scale (CS),[5] increase the likelihood of patients being extubated prematurely or too often and at the onset of post-traumatic stress disorder.[5,6] The scale also reduces the need for sedatives with 42% of patients under RASS using sedatives as compared to 72% of patients not utilizing RASS using sedatives.[7]

In Kenya, RASS application is recommended in standard ICU settings. However, its utilization in Kenya remains poorly studied making any data availability on its applicability quite scanty. Studies that have focused on the RASS have not studied it as the primary tool of study but rather adopted it as a secondary tool of study, good example being a study on delirium where the scale was used to evaluate the status of agitation and sedation in an experiment assessing delirium determinants among patients in Critical care Units (CCUs).[7] As such, a study on RASS utilization is timely as it will provide an explanation on the extent of its adoption and some of the determinants on its utilization.

More so, this study will be guided by the fact that nurses are charged with the responsibility of making patients' assessments in the ICUs and CCUs who require specialized monitoring as their outcomes are heavily dependent on effective sedation control. Therefore, nurses stand the best chance of ensuring that adherence to and proper use of sedatives is effected. Based on this, the study seeks to establish nurse related factors that influence application of RASS among Nurses at Aga Kham University Hospital in Kenya.

II. Materials and Methods

Research Design: The study adopted descriptive cross-sectional study.
Study Location: The study was conducted at The Aga Khan University Hospital, Kenya.
Target Population: The target population for the study was 106 nurses working in the departments HDU, ICU, CTICU, and CCU which are charged with taking care of critically ill patients in Aga Khan University Hospital.
Sample Size: The study's sample size was 89 nurses.

Sample Size Calculation: The sample size was determined using[8] formula described as $n = \frac{N}{1+Ne^2}$. An additional 10% of the calculated sample was included to account for non-responses.

Sampling Method: The study adopted stratified proportionate random sampling.

Inclusion Criteria: All the nurses who were permanently employed for more than three months and working in ICU, HDU, CTICU and CCU at the Aga Khan University Hospital were included in the study.

Exclusion Criteria: Nurses who were not permanently employed and those who had worked for less than three months were not included in the study.

Data Collection Tools: A self-administered questionnaire and an observation checklist were used in data collection.

Statistical Analysis: Data was entered into SPSS version 25.0 for analysis. Analysis was through descriptive statistics such as frequencies and percentages and through inferential statistics which included Chi-Square. Results of the study were presented using tables. The significance level was set at 5% for the tests conducted in this study.

III.   Results

Profile of the Respondents

Table 1 shows that most of the respondents, 69.7% (62) were female. Slightly more than half of the respondents, 51.7% (46) were aged 31-40 years. The findings also revealed that 67.4% (60) of the respondents were married, 61.8% (55) had college level of education, 39.3% (35) worked in ICU and 43.8% (39) had worked in their current section for 3 to 5 years.

Table 1: Profile of the Respondents

		Frequency	Percent (%)
gender of the respondents	Male	27	30.3
	Female	62	69.7
Age	20-30 years	37	41.6
	31-40 years	46	51.7
	41-50 years	4	4.5
	>50 years	2	2.2
Marital Status	Married	60	67.4
	Single	27	30.3
	Separated/Divorced	2	2.2
Highest Level of Education	College	55	61.8
	Undergraduate	26	29.2
	Postgraduate	8	9.0
Section Worked	Intensive Care Unit (ICU)	35	39.3
	Cardiothoracic Care Unit (CTICU)	8	9.0
	Coronary Care Unit (CCU)	18	20.2
	High Dependency Unit	28	31.5
Years Worked in the Section	<1 year	9	10.1
	1 to 2 years	15	16.9
	3 to 5 years	39	43.8
	6 to 10 years	20	22.5
	>10 years	6	6.7

RASS Application Level

The level of RASS application was assessed using self-reporting by the respondents and through observation using the checklist. On the self-reported scale, Table 2 shows that respondents generally scored highly in the application of RASS, with a mean application score of 85.6% and a standard deviation of 1.6.

Table 2: Self-reported Scale on RASS Application

		Frequency	Percent (%)
RASS utilization	Yes	77	86.5
	No	12	13.5
RASS utilization frequency	Always	37	41.6
	Not Always	52	58.4
Observing if patient was alert, agitated or restless	Done	89	100.0
	Not Done	0	0.0
Calling out the patient by name if not alert	Done	89	100.0
	Not Done	0	0.0
Observing if patient opened eyes to voice	Done	75	84.3
	Not Done	14	15.7
Stimulation of the patient by shaking shoulder	Done	88	98.9
	Not Done	1	1.1

Observing for movement to physical stimulation	Done	78	87.6
	Not Done	11	12.4
			Overall Mean=85.6 ±16

The level of RASS application was assessed through the observation checklist based on the seven items as adopted in the self-evaluation. Those who practiced more than six items were deemed to have high RASS application level while those who practiced less than 6 items were deemed to have low RASS application level. Figure 1 confirms that RASS application was high at ao overall application rate of 71.9%.
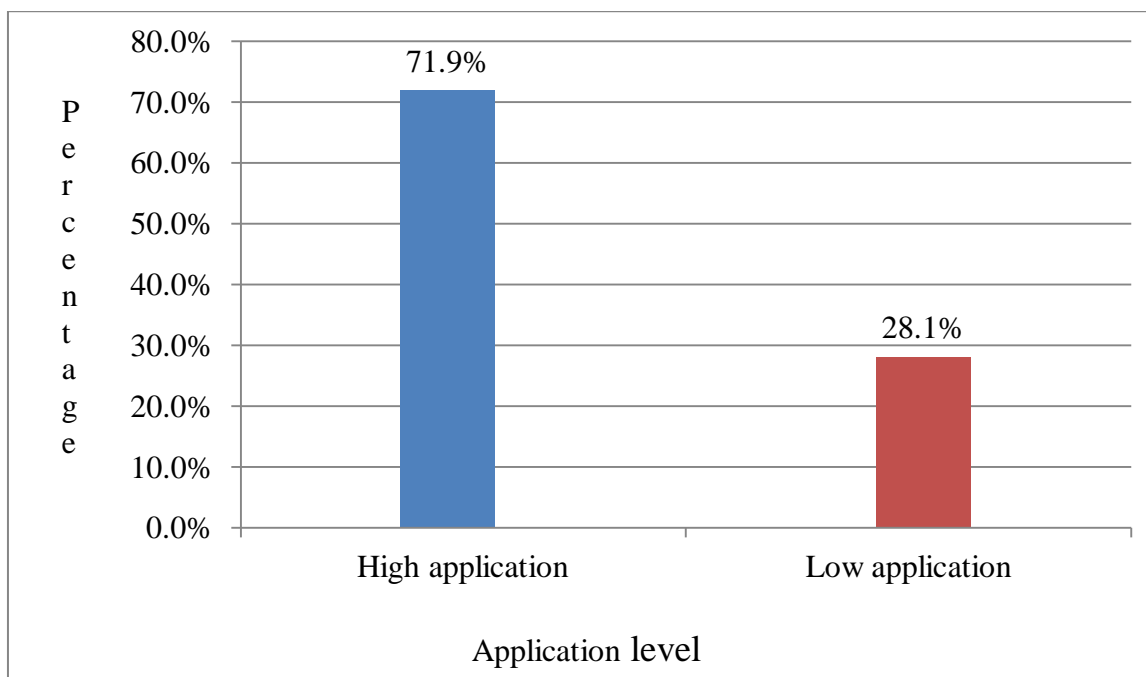

Figure 1: RASS Application Level

Nurse Related Factors and Application of RASS
The study evaluated two nurse related factors, whether respondent had attended any core course and knowledge on RASS, and how they influenced RASS application. Table 3 shows that 27.0% (24) of the respondents reporting that they had attended a course on ACLS; other courses had minimal attendance based on self-reporting by the respondents

Table 3: Self-reporting on Critical Course Attended

Course attended	Frequency(n)	Percent (%)
ACLS	24	27.0
Sedation	2	2.2
Renal replacement & ACLS	1	1.1
Africa Critical Care Chapter 2018	1	1.1
ACLS & BLS	1	1.1
Basic	3	3.4
Intubation	1	1.1
Critical care nursing inhouse	2	2.2
Pediatric advanced life support	1	1.1
Pain management in critically ill	1	1.1
Critical care orientation	2	2.2
Infection control in ICU	2	2.2

Respondents' knowledge on RASS was assessed by 3 items where the respondents were evaluated on whether they would correctly respond on RASS usability. Overall, 69.7% of the respondents responded correctly to the usability of RASS.

Table 4: RASS Usability

Knowledge item	Frequency (n)	Percent (%)
What is the criterion for using RASS?		
Correct response	72	80.9
Incorrect response	17	19.1
The 10-point scale in Richmond agitation-sedation scale represents?		
Correct response	57	64.0
Incorrect response	32	36.0
How often should the RASS be used?		
Correct response	57	64.0
Incorrect response	32	36.0

RASS knowledge level was categorized into two whereby, those who responded correctly to all the three items were considered as having high knowledge level, while those who responded correctly to two items and below, were considered as having low knowledge level. Figure 1 shows that 59.6% of the respondents had low knowledge on RASS application.
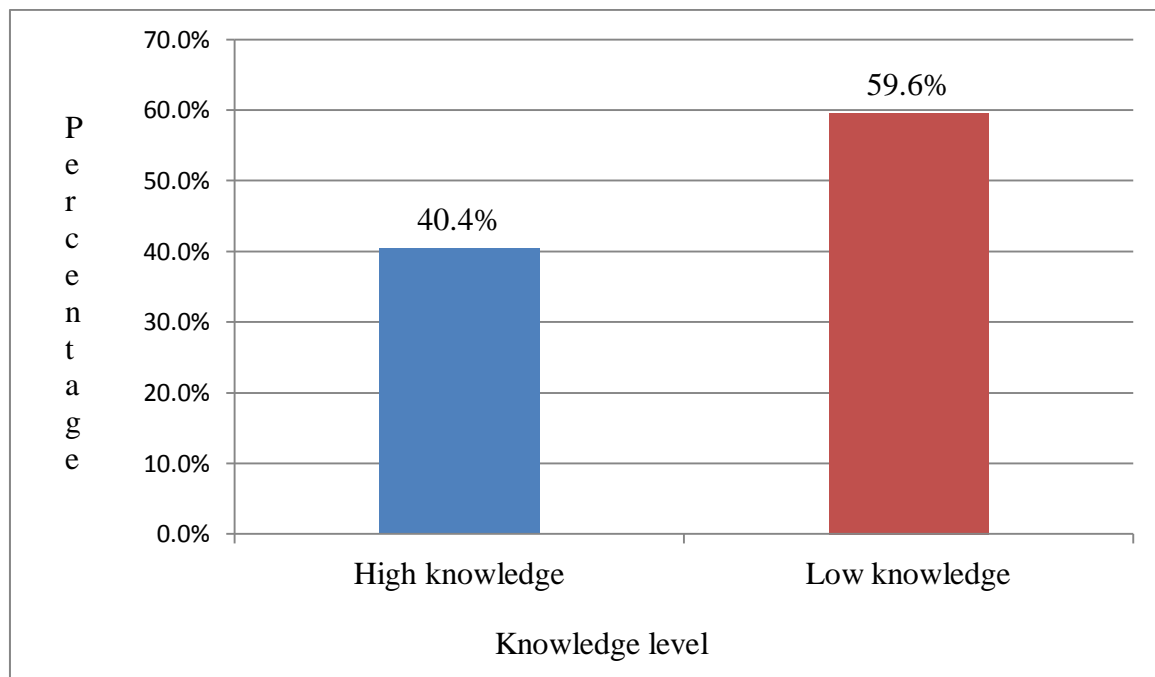
Figure 2: Level of Knowledge on RASS Usability

Through Chi-Square test statistics, the relationship between attendance to critical courses and knowledge with RASS application was tested. Table 5 shows that there is a significant association between whether nurse has attended any critical care training while working at the hospital with RASS application, $\chi^2_{1, 89}$=4.568, p-value=0.033. The odds ratio (OR) shows that those who had attended training were 2.9 times more likely to have RASS application. Therefore, having attended any training has a significant influence on RASS application. Also evident from Table 5 is that knowledge level had a significant relationship with RASS application, $\chi^2_{1,89}$=6.036, p-value=0.014. The odds ratio (OR) shows that nurses who had high knowledge were 3.8 times more likely to have RASS application. Therefore, knowledge of nurses has a significant influence on RASS application.

Table 5: Chi-Square Test Results on Nurse Related Factors RASS Application

Variable	Category	Application of RASS		Chi-Square	OR
		High	Low		
Have you attended any critical care training while working at the hospital?	Yes	34	7	χ^2=4.568,	2.904
	No	30	18	p-value=0.033	
RASS knowledge level of the participants	High	31	5	χ^2=6.036,	3.758
	Low	33	20	p=0.014	

IV. Discussion

From the findings, RASS application level was high. These findings agreed with [9] who noted that RASS is relevant in most hospitals due to the rising numbers of admissions in ICUs that require frequent monitoring. The ease of use among other benefits implies that RASS is widely used in Kenyan hospitals in determining agitation levels and alertness present in patients.[9,10] Additionally, RASS finds wide application in hospitals compared to other scales such as COMFORT scale due to its higher reliability and validity, user friendliness, logicalness, and alignment with the assessment needs of sedated patients.

Training of nurses had a significant association with RASS application with nurses who had attended specialized being more likely to utilize RASS as compared to those who had not attended specialized training. Special training is required for a health practitioner to have the capacity to utilize RASS.[11] Further, training ensures that nurses acquire the necessary skills to effectively manage sedation patients using RASS tool.[11] the findings also revealed a significant relationship between nurses' knowledge on RASS use with RASS utilization level. Nurses with high knowledge had a higher likelihood of utilizing RASS. The capacity to apply and integrate RASS in caring for the critically ill requires that nurses understand how the tool works and rationales for every intervention that should be made to correct any deviation from expected standard outcomes.[12] nurses' knowledge is necessary due to their role in determining sedation levels that are sufficient for the comfort of the patient. Additionally, high degree of competence and knowledge are required so as to maintain alertness, professionalism and patience in dealing with critically ill patients in hospitals.[12,13]

V. Conclusion

From the results of the study, it can be concluded that the level of RASS application is high. On attendance of specialized training, it can be concluded that nurses possess moderate knowledge on RASS application and have moderately attended specialized training on critical care such as sedation. However, a significant association was found between specialized training and knowledge with RASS application. Nurses who had attended specialized training and those with higher levels of knowledge on RASS were more likely to utilize RASS as compared to those who had not attended training and those with lower knowledge levels on RASS.

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