SJIF Impact Factor: 3.458

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

ISSN: 2457-0400
Volume: 2.
Issue: 3.
Page N. 99-104
Year: 2018

Original Article www.wjahr.com

THE ANALYSIS OF FACTORS INFLUENCING NURSES IN CONDUCTING CARE BUNDLE MANAGEMENT OF HEAD INJURED PATIENTS IN THE EMERGENCY DEPARTMENT IN KUPANG EAST NUSA TENGGARA

Serly Sani Mahoklory*[1], Ahsan[2] and Mukhamad Fathoni [3]

[1]Master of Nursing Student, Faculty of Medicine, Brawijaya University, Indonesia.
[2,3]Lecturer of Medicine Faculty, Brawijaya University, Indonesia.

Received date: 02 April 2018 **Revised date:** 23 April 2018 **Accepted date:** 14 May 2018

Corresponding author: Serly Sani Mahoklory

Master of Nursing Student, Faculty of Medicine, Brawijaya University, Indonesia.

ABSTRACT

The increasing number of head injury in East Nusa Tenggara (NTT) is mostly caused by traffic accident and fall. That happens due to the fact that the livelihood of majority native NTT is Palmyra Palm Tree (Borassus flabellifer) slicer which demands them to climb 15 to 30 meters tree. Moreover, 58.4% of native NTT does not wear helmet in riding their bike which is dangerous and life threatening if traffic accident occurred. Nurses in emergency room have important role in taking care head injured patients. However, the first aid which is care bundle management does not conducted well. Automatically, it influenced the quality of care received by patients. Thus, the objective of this study is to analyze factors influencing nurses in conducting care bundle management of head injured patients in emergency department in Kupang. The method used in this study is quantitative with cross sectional approach which involved 114 respondents. The technique used in taking the sample is purposive sampling. The obtained data which were analyzed using simple linear regression analysis shows that p value of nurses' knowledge factor is $0.003 < \alpha = 0.05$, nurses' skill factor is $p = 0.017 < \alpha = 0.05$, nurses' resources factor $p = 0{,}006 < \alpha = 0{,}05$, and team work factor is $0.011 < \alpha = 0.05$. It can be concluded that H0 is rejected or there is influence among nurses' knowledge, skill, resources, and team work on conducting care bundle management. Nurses' knowledge is the most influential factor on conducting care bundle management in emergency department in Kupang with R value of 7.6%.

KEYWORDS: Emergency Nursing, Manajemen Care bundle, Head Injury.

INTRODUCTION

Head injury is the main cause of death and disability around the globe. The increasing number of injury in Indonesia is 7.5% case in 2007 and 8.2% case in 2013. The major cause of injury is fell (40.9%) found in East Nusa Tenggara Province (NTT) (1). Mostly, head injury case in NTT Province caused by traffic accident (34,2%) and fall (55,5%). That happens due to the fact that the livelihood of majority native NTT is Palmyra Palm Tree (*Borassus flabellifer*) slicer which demands them to climb 15 to 30 meters tree. Moreover, 58.4% of native NTT does not wear helmet in riding their bike which is dangerous and life threatening if traffic accident occurred.[1,2]

Nurses in emergency department (ER) have important role in initial treatment and independent decision making during emergency condition especially on head injured patients so that they will not get systemic head injury, disability, and death. Good and proper head injury management will affect the quality of care and patient outcome.[3,4] The same thing said by Damkliang, *et al* in 2013[4] that initial management on head injured patients has to be conducted optimally as evidence based practice (EBP) developments, in which one of it is care bundle management. However, until today there are fewer nurses who have conducted proper and precise care bundle management in Indonesia. This of course will influence the quality of initial treatment of head injured patients.

Care bundle can be defined as a set of specific nursing interventions performed on head injured patients by applying four components at the same time or at set for more effective outcome.[5] The initial component of care bundle management is assessments of level of

consciousness. Assessments of consciousness and systematical monitoring can identify initial clinical improvement or deterioration of head injured patients through *Glasgow Coma Scale* (GCS).[6]

The second component of care bundle is respiratory rate assessment. Changes on respiratory rate suffered by head injured patients caused by *intracerebral* bleeding which disturbs the function of respiratory tract inside brain. The third component of care bundle is pulse rate and blood pressure assessment. Pulse rate and blood pressure monitoring is conducted to detect the existence of hypotension as the secondary cause of head injury due to *hypoperfuson* and distracted oxygen supply to brain. The forth care bundle component is the arrangement on patients' head of bed at 30° angle. Head injured patients have to be treated in semi flower position to maximize vein drainage.[7]

Based on the result of interview with nurses and the data obtained from medical records at S.K. Lerik Regional Public Hospital in Kupang in 2016 it is obtained that the number of head injured patients is 210 patients who were mostly men in their 15-24 years old, 119 cases, with minimum success rate of treatment due to care bundle execution which has not yet been optimized.[8]

Therefore, the researcher is interested to study by analyzing the factors influencing nurses in conducting care bundle management of head injured patients in ER, Kupang.

METHODS

This study is a quantitative study with cross sectional approach which purposes are to analyze the influence between independent variable (nurses knowledge, skill, resources, and team work factors) and dependent variable (care bundle management). Data collection was done once in January up to February 2018. Univariate was used to visualize each variable. Spearman test was used to know the relationship among variables while linear regression test was used to know the most dominant factor influencing nurses in conducting care bundle management.

RESULTS

Overall 114 nurses were included in the study. Based on table, it can be seen that most respondents are females with 67 respondents (58.8%) from the total of 114 respondents. Almost half of them, 55 respondents (48,2%), are 26-30 years old, most respondents have Associate Degree Nursing (ADN) with 72 respondents (63.2%), almost half of respondents, 53 respondents (46.5%), have long service of less than 3 years and almost half of respondents have BT & CLS clinical skills, 53 respondents (46,5%).

Table 1: Demographic distribution of participants.

Characteristics		**n**	**%**
Sex	Female	67	58.8
	Male	47	41.2
Age	≤ 25	18	15.8
	26 - 30	55	48.2
	31 - 35	24	21.1
	36 - 40	8	7
	≥ 40	9	7.9
Educational Background	Nursing School	4	3.5
	Associate Degree Nursing	72	63.2
	Bachelor of Nursing/Ners (Professional Degree)	38	33.3
	Master of Nursing	0	0
Long Service	≤ 3 years	53	46.5
	4 – 6 years	26	22.8
	7 – 9 years	12	10.5
	≥ 10 years	23	20.2
Clinical Skills	None	18	15.8
	BLS	43	37.7
	BT & CLS	53	46.5
	ACLS	0	0

Table 2: Result of Univariate Analysis.

Variable		n	%
Nurses' knowledge	Less	9	7.9
	Fair	44	38.6
	Good	61	53.5
Nurses' skills	Less	0	0
	Fair	80	70.2
	Good	34	29.8
Nurses' resources	Less	23	20.2
	Fair	29	25.4
	Good	62	54.4
Team work	Less	76	66.7
	Good	38	33.3
Care bundle management implementation	Less	68	59.6
	Fair	18	15.8
	Good	28	24.6

Source: Primary Data, 2018

Based on table above, it is seen that from 114 respondents, most of them, 61 nurses (53.5%), have appropriate knowledge of care bundle management; most of respondents, 80 nurses (70.2%), have fair skills; most nurses' resources, 62 respondents (54.4%), are categorized good; and nurses' team work is categorized as bad from 76 respondents (66.7%) with as bad care bundle management implementation from 68 respondents (59.6%).

Table 3: Results of Bivariate Analysis.

Independent Variable	Dependent Variable	p *value*	r
Nurses' knowledge	Care bundle management implementation	0.003	0.278
Nurses skill	Care bundle management implementation	0.028	0.206
Nurses' resource	Care bundle management implementation	0.009	0.244
Team work	Care bundle management implementation	0.012	0.236

Source: Primary Data, 2018

Based on table above, it can be seen that p *value* of nurses' knowledge is $0.003 < \alpha = 0.05$, p *value* of nurses skill is $0.028 < \alpha = 0.05$, p *value* of nurses resources is $0.009 < \alpha = 0.05$ and p *value* of nurses' team work is $0.012 < \alpha = 0.05$. It can be concluded that correlation coefficient among nurses' knowledge, skill, resources, and team work factors is around 0.20 – 0.399.

Table 4: Results of Multivariate Analysis.

Independent Variable	Dependent Variable	p *value*	R^2
Nurses' Knowledge	Care bundle management implementation	0,003	0,076
Nurses' Skill	Care bundle management implementation	0,017	0,050
Nurses' Resources	Care bundle management implementation	0,006	0,066
Team Work	Care bundle management implementation	0.011	0.056

Source: Primary Data, 2018

Based on table above, it is known that p *value* of nurses' knowledge is $0.003 < \alpha = 0.05$ with $R^2 = 0.076$ which means CBM implementation is 7.6%; p *value* of nurses' skill is 0.017 with $R^2 = 0.050$ which means CBM implementation is 5%; p *value* of nurses' resources is 0.006 with $R^2 = 0{,}066$ which means CBM implementation is 6.6%; and p *value* of nurses' team work is 0.011 $R^2 = 0.056$ which means CBM implementation is 5.6%.

Simple linear regression test was used to understand the most influencing factor in care bundle management implementation.

Table 5: Results of Simple Linear Regression.

Variable	R	R^2	p *value*
Nurses' knowledge	0.276	0.076	0.003
Nurses' skill	0.223	0.050	0.017
Nurses' resources	0.258	0.066	0.006
Nurses' team work	0.237	0.056	0.011

Source: Primary Data, 2018

Based on table above it is known that the strongest R is in nurses' knowledge variable which is 0.276 with R^2 0,076. It shows that the most influencing variable is nurses' knowledge with 7.6%.

Here in after, multiple linear regression tests which had fulfilled the requirement of classical assumption test such as *heteroscedasticity*, autocorrelation, *multicollinearity*, and normality was used to know direction of regression coefficient and the influence of independent variable on dependent variable at the same time.

Table 6: Results of Multiple Linear Regression.

Model	Sum of Squares	Df	Mean Square	F	F table	P value
Regression	10.238	4	2.559	3.262	2.455	.014
Residual	85.527	109	.785			
Total	95.765	113				

Source: Primary Data, 2018

Based on table above, it is known that F > F Table (3.262 > 2.455). Thus, Ho is rejected. It means that there is significant influence of nurses' knowledge, skill, resources and team work on the implementation of care bundle management in emergency department at Kupang.

Tabel 7: Results of Multiple Linear Regression.

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig
	B	Std.e	Beta		
constant	.019	.716		.027	.979
Nurses' Knowledge	.072	.102	.170	.711	.479
Nurses' Skill	.010	.012	.089	.832	.407
Team Work	.012	.010	.128	1.202	.232
Nurses' Resources	.009	.054	0.38	.164	.870

Source: Primary Data, 2018

Based on the above table nurses' knowledge regression coefficient positive p value of 0.072 means that if the nurses' knowledge increased 1 unit then the implementation of care bundle management will experience an increase of 0.072, nurses' skill is a positive value of 0.010 means if the nurses' skill increased 1 unit then the implementation of care bundle management will increase by 0.010, team work is positive 0.012 means that if team work has increased 1 unit then the implementation of care bundle management will experience an increase of 0.012, and nurses' resources is positive value of 0.009 means that if nurses' resources increased 1 unit then the implementation of care bundle management will increase by 0.009.

DISCUSSION

1. Influence of Nurses' Knowledge on Care Bundle Implementation

Knowledge is one of important domain in nursing care. Treatment based on proper knowledge will give positive impact on the quality of patients' care.[9] Results of simple linear regression show that there is significance of nurses' knowledge on care bundle management for 0.003 ≤ 0.05 with t value 3.041 > t table 2.3610 and positive regression coefficient for 0.118 which states that for every 1 nurses' knowledge improvement, there will be 0.118 care bundle management improvement. The result shows that the higher nurses' knowledge means the higher care bundle management implementation in ER.

In accordance with the study conducted by Damkliang, *et al* 2015[10] which shows that there was significant improvement on knowledge score after the implementation of care bundle management intervention (p <0.001). Therefore, proper knowledge regarding care bundle management can be one of strategies to improve the quality of care with optimum result in crowded ER with limited nurses' resources.

2. Influence of Nurses' Skill on Care Bundle Implementation

This study shows that most respondents (61 respondents (53.5%)) have adequate or fair nursing skill while the rest of them have proper or good nursing skill. Results of statistical test show that there is significant regression for 0.011 ≤ 0.05 with t value 2.579 ≥ t table 2.3610. It means that H0 is rejected or there is influence of nurses' skill on care bundle management implementation in Kupang ER. Positive regression coefficient for 0.025 shows that every 1 improvement of nurses' skill there will be significant improvement of care bundle management for 0.025.

Care bundle management is one of methods to give consistent nursing care to head injured patients to lessen the variation in giving nursing care so that the care will be more optimized (11). Based on the study conducted by Damkliang, *et al* 2015b (12) on 22 participants in ER, it is known that nurses' skill has big role in implementing care bundle management where nurses' skill is very helpful in improving the quality of nursing

care, knowledge, and confidence during the treatment of head injured patients in ER.

3. Influence of Nurses' Resources on Care Bundle Implementation

This study shows that most nurses' resources (62 respondents (54.4%)) are categorized well while few of them (23 respondents (20.2%)) are not good enough. Results of statistical test show significant regression for $0.006 \leq 0.05$ and t value $2.824 \geq$ t table 2,610. It means that H0 is rejected or there is influence from nurses' resources on the implementation of care bundle management in Kupang ER. Positive regression coefficient for 0.060 shows that for every 1 improvement of nurses' resources variable, there will be 0.060 improvement of care bundle management implementation with significant number.

Based on the study conducted by Harris & McDonald, 2014 (13) on 384 patients in ER, it is known that senior nurses have more competence to conduct streaming on patients in ER for further assessment compared to junior nurses. It reflects that senior nurses have more quality so that they can work professionally based on the existed procedure. Thus, educational background, training, and experience in ER need to be considered in improving the quality of nurses' resources in hospital. The same thing was stated by Bosch, *et al* 2016[14] that to make a change in management of head injured patients, resources and unpredictable ER condition need to be considered. Through evaluation in every intervention given during the treatment, it is expected that optimum quality of service can be given.

4. Influence of Team Work on Care Bundle Implementation

This study shows that most nurses' team work (76 respondents (66.7%)) can be categorized as bad and only few of them (38 respondents (33.3%)) can be categorized as good. It happens due to lack of coordination between team leader and its members in giving nursing care in crowded situation so that care bundle management can be optimally conducted.

Results of statistical test shows significant regression for $0.011 \leq 0.05$ and t value for $2.579 \geq$ t table 2.3610 which means H0 is rejected. There is influence from team work on care bundle implementation in Kupang ER. Positive regression coefficient for 0.022 shows that in every 1 improvement on nurses' resources variable there will be significant improvement for 0.022 on care bundle management.

Team work is a need in working performance and good achievement where the feeling of being together occurs to cope with differences so that nurses will be in unity of team work. It can be seen in the work of nurses in charge who work under professional nurses' supervision as part of team work in giving nursing care optimally.[15] Based on the result of study conducted by Ajeigbe, *et al* 2014[16] on team work in ER by using *Revised Nurse Work Index* instrument with likert scale, it is known that staffs who work in ER with team work shows higher working satisfaction on team work for $p<0.0001$ compared to colleagues in ER without team work. It happened because nurses who work in team and take part as partner in taking care patients improved their intrapersonal relationship and emphasized on their profession. Thus the practice of active team work is expected to be able to improve working satisfaction in ER.

5. The Dominant Factor In The Implementation Of Care Bundle Management In Emergency Departement In Kupang

This study shows that the dominant variable that is most influential with the implementation of care bundle management by the nurses is the knowledge factor of the nurse with the coefficient of determination (R Square) of 0.076 or 7.6% which means the knowledge of the nurses has an effect on the implementation of care bundle management of 7.6% the remaining 92.4% is influenced by other variables beyond this regression model.

Several factors influencing knowledge have been found in this research that most of respondents have nursing education (63,2%) and almost half (33,3%) have nursing S1, almost half of respondents have BT & CLS clinical skill that is 53 respondent (46.5%) and a small percentage of respondents have a working period of ≥ 10 years ie 23 respondents (20.2%). This is in accordance with Damkliang et al (2015) study on nurses at IGD Thailand showing a statistically significant increase in knowledge scores after care bundle management intervention ($p <0.001$).

NURSING IMPLICATION

The results of this study can be used as reference for nurses in ER in giving nursing care of head injured patients by improving the implementation of care bundle management, boarding their knowledge in emergency nursing through nurses' competency development in conducting care bundle management and. The results of this study can also be used as reference for future study which focuses on other aspect which is presumed to have influences on the implementation of care bundle management in ER such as nurses' experiences, quality of nursing care, wrought up patients, and health facilities factors.

CONCLUCTION

There is positive influence from nurses' knowledge, skill, resources, and team work on care bundle management where nurses' knowledge has the most influence on it.

ETHICAL ISSUES

The study was approved by the ethical committee at East Nusa Tenggara, Medicine Faculty, Nusa Cendana Kupang University.

AUTHOR'S CONTRIBUTION

All authors contributed to the study concept, design, data analysis and manuscript preparation.

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