Lampiran 1

INTERVENSI *VAP BUNDLE* DALAM PENCEGAHAN *VENTILATOR ASSOCIATED PNEUMONIA* (VAP) PADA PASIEN DENGAN VENTILASI MEKANIS

(The Incidence of VAP after VAP Bundle Intervention Among Patients with Mechanical Ventilation)

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ABSTRAK

Pendahuluan: *Ventilator Associated Pneumonia* (VAP) merupakan infeksi nosokomial yang terjadi pada pasien dengan pemakaian ventilator > 48 jam. Pasien kritis yang dirawat di ICU berisiko tinggi terjadi infeksi nosokomial pneumonia sehingga mengakibatkan peningkatan angka kesakitan, kematian dan biaya perawatan. Tujuan penelitian ini untuk mengetahui kejadian VAP setelah diberikan penerapan VAP *bundle*. **Metode:** Penelitian ini menggunakan metode *one shot case study post test only* dengan sampel sebanyak 6 orang mulai 31 Desember 2013 sampai dengan 31 Januari 2014. **Hasil** Hasil menunjukkan bahwa penerapan VAP *bundle* berpengaruh dalam mencegah terjadinya VAP. Hasil dari penilaian total CPIS didapatkan 4 dari 6 orang tidak terdiagnosa VAP dan 2 orang terdiagnosa VAP**. Diskusi:** Hasil penelitian yang ada perlu didukung dengan jumlah sampel yang lebih besar dan perlu penilaian CPIS secara berkelanjutan untuk mengidentifikasi VAP yang disebabkan oleh bakteri onset lambat khususnya pada pasien yang terpasang ventilasi mekanis dalam waku lama.

Kata kunci: *Ventilator Associated Pneumonia (VAP) Bundle*, kejadian *Ventilator Associated Pneumonia* (VAP)

ABSTRACT

Introduction: *Ventilator Associated Pneumonia (VAP) is a nosocomial infection in patients who use ventilator for more than 48 hours. The aimed of the study was to determine VAP incidence after VAP bundle application.* ***Methods:*** *This study used one-shot case study posttest only designed with*

samples of 6 individuals beginning on December 31, 2013 up to January 31, 2014. The totally score of CPIS assessment revealed that 4 of 6 patients was not diagnosed with VAP and 2 were diagnosed with VAP. ***Result:*** *The results showed that the application of VAP bundle has infl uence in preventing VAP incidence. The totally score of CPIS assessment revealed that 4 of 6 patients was not diagnosed with VAP and 2 were diagnosed with VAP.* ***Discussion:*** *This study need to be backed up furthermore with a larger sample size and continuous CPIS assessment is needed to identify VAP caused by bacteria, especially the late-onset bacteria, in patients using mechanical ventilation in longer a time.*

Keywords: *Ventilator Associated Pneumonia (VAP) Bundle, VAP incidence*

Lampiran 2

PENGARUH ORAL HYGIENE MENGGUNAKAN HEXADOL GARGLE DALAM MEMINIMALKAN KEJADIAN VENTILATOR ASSOCIATED PNEUMONIA (VAP) DI RUANG ICU RSUD TUGUREJO SEMARANG

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ABSTRAK

Oral Hygiene merupakan tindakan keperawatan yang dapat dilakukan untuk mencegah terjadinya *Ventilator Associate Pneumonia* (VAP) pada pasien, sedangkan tindakan oral hygiene di Ruang ICU RSUD Tugurejo belum maksimal. Berdasarkan data catatan kunjungan pasien di Ruang ICU RSUD Tugurejo Semarang dari bulan Januari sampai September 2015, terdapat beberapa pasien mengalami resiko VAP dengan skor CPIS 3 sampai 5. Tujuan penelitian ini untuk mengetahui pengaruh pelaksanaan *oral hygiene* menggunakan *antiseptic hexadol gargle* dalam meminimalkan kejadian *Ventilator Associated Pneumonia* (VAP) di R. ICU RSUD Tugurejo. Penelitian ini merupakan penelitian *Pre–Experimental*. Populasinya yaitu seluruh pasien yang terpasang Ventilator. Penentuan besar sampel menggunakan rumus Federer dan teknik pengambilan sampel *Consecutive Sampling* sehingga diperoleh jumlah sampel sebanyak 15 responden. Uji statistik yang digunakan uji wilcoxon. Berdasarkan hasil penelitian, didapatkan *p value* adalah 0,03 ($p < 0,05$), menunjukkan bahwa terdapat perbedaan yang bermakna antara kejadian *ventilator associated pneumonia* (VAP) sebelum dan sesudah *oral hygiene* menggunakan *hexadol gargle*. Kesimpulan hasil penelitian ini menunjukkan pelaksanaan oral hygiene menggunakan antiseptik *Hexadol Gargle* bisa menurunkan angka kejadian VAP. Oleh karena itu, diharapkan kepada perawat yang bertugas di Ruang ICU RSUD Tugurejo untuk dapat menerapkan penggunaan *hexadol gargle*

dalam pelaksanaan *oral hygiene* sehari dua kali pada pasien yang terpasang ventilator mekanik untuk mencegah VAP.

Kata Kunci : *Oral Hygiene, Antiseptik Hexadol Gargle*, VAP, Pasien ICU

ABSTRACT

Oral hygiene is a nursing actions that can be taken to prevent the Ventilator Associate Pneumonia (VAP) in patients. The practice of oral hygiene at the ICU of RSUD Tugurejo is not maximally implemented. Based on data of patients visit record in the ICU of RSUD Tugurejo Semarang during January-September 2015, there were some patients who at the risk of VAP with the score of CPIS is 3 to 5. The purpose of this study is to find the influence of oral hygiene implementation by using hexadol gargle antiseptic in minimizing the incidence of Ventilator Associated Pneumonia (VAP) at the ICU of RSUD Tugurejo. This was a pre-experimental study. The population in this study was all patients who mounted ventilator. The samples in this study taken by using the Federer formula and sampled by using Consecutive sampling technique so that obtained 15 respondents. The statistical analysis used the Wilcoxon test. Based on the result of this

Lampiran 3

Effect of Oral Care Program on Prevention of Ventilator-associated Pneumonia in Intensive Care Unit Patients: A Randomized Controlled Trial

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Abstract

Background: Ventilator-associated pneumonia (VAP) is one of the most common nosocomial infections that increase mortality rate and the length of hospitalization. Oral care can improve patient's oral health, however, the role of oral care in the reduction in incidence rate of VAP is indisputable. The aim of this study was to investigate the effect of oral care on the frequency of VAP of patients in intensive care unit. **Materials and Methods:** This clinical trial was conducted on 80 participants who were randomly assigned to a control group and an intervention group from 2016 to 2017. Data were collected at the first, third, and fifth days of the study using a demographic and clinical characteristics questionnaire and the Clinical Pulmonary Infection Score for detecting pneumonia. Data analysis was performed using descriptive and inferential statistics in SPSS software. **Results:** The results of this study showed that the frequency of pneumonia on the third and fifth days was 15.80% (6) and 23.70% (9) in the control group and 10.50% (4) and 7.90% (3) in the intervention group, respectively. Chi-square test did not show a significant difference (p = 0.059); however, the frequency of pneumonia in the intervention group reduced compared with the control group. **Conclusions:** According to the results of this study, the oral care program could not significantly decrease the incidence of VAP in critically ill patients compared with routine oral care practices. Similar studies with a larger sample size and longer duration should be conducted for better results.

Keywords: *Intensive care unit, oral hygiene, ventilator-associated pneumonia*

Lampiran 4

Impact of a VAP bundle in Belgian intensive care units

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Abstract

Background: In order to decrease the incidence of ventilator-associated pneumonia (VAP) in Belgium, a national campaign for implementing a VAP bundle involving assessment of sedation, cuff pressure control, oral care with chlorhexidine and semirecumbent position, was launched in 2011–2012. This report will document the impact of this campaign.

Methods: On 1 day, once a year from 2010 till 2016, except in 2012, Belgian ICUs were questioned about their ven-tilated patients. For each of these, data about the application of the bundle and the possible treatment for VAP were recorded.

Results: Between 36.6 and 54.8% of the 120 Belgian ICUs participated in the successive surveys. While the character-istics of ventilated patients remained similar throughout the years, the percentage of ventilated patients and especially the duration of ventilation significantly decreased before and after the national VAP bundle campaign. Ventilator care also profoundly changed: Controlling cuff pressure, head positioning above 30° were obtained in more than 90% of cases. Oral care was more frequently performed within a day, using more concentrated solutions of chlorhexidine. Subglottic suctioning also was used but in only 24.7% of the cases in the last years. Regarding the prevalence of VAP, it significantly decreased from 28% of ventilated patients in 2010 to 10.1% in 2016 ($p \leq 0.0001$).

Conclusion: Although a causal relationship cannot be inferred from these data, the successive surveys revealed a potential impact of the VAP bundle campaign on both the respiratory care of ventilated patients and the prevalence of VAP in Belgian ICUs encouraging them to follow the guidelines.

Keywords: VAP, VAP bundle, Belgian ICUs, VAP survey

Lampiran 5

Reducing incidence rate of ventilator-associated pneumonia (VAP) using prevention bundle in the ICU

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Abstract

Ventilator-Associated Pneumonia (VAP) is the most prevalent healthcare-associated infections in Intensive Care Units (ICU). In decreasing its incidence, a VAP prevention bundle as one of infection control methods

had been applied to the ventilated patients. This study aimed to determine the correlation between the use of the VAP prevention bundle and the incidence rate of VAP in the ICU at a regional general hospital. A cross-sectional study was done using surveillance data of the VAP prevention bundle implementation checklist from the infection control committee. The samples were chosen using a stratified random sampling method. They were selected from two ICU wards according to the inclusion and exclusion criteria from January to June 2019 (n: 189). Furthermore, every seven bundles and the incidence rate of VAP were scored and observed. The result showed that there were ten incidences of VAP with a mean of 3.7‰. The highest rate was found in May as 9.8‰ while the standard was less than 5.8‰. Descriptive results showed that 6 of 7 bundles were the highest total scores in 34.9% samples with oral hygiene as a bundle item at most frequently listed in 98.4% patients. Logistic regression also pointed out a significant correlation ($p<0.05$) between the use of the VAP prevention bundle and the incidence rate of VAP. Therefore, there was a significant correlation between the use of VAP prevention bundles and the incidence rate of VAP for ventilated patients in the ICU room. Thus, each VAP prevention bundle must be carried out entirely to affect the incidence rate of VAP.

Keywords: healthcare-associated infections, intensive care units, infection control, VAP, prevention bundle

Lampiran 6

Efficacy of a bundle approach in preventing the incidence of ventilator associated pneumonia (VAP)

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ABSTRACT

Ventilator-associated pneumonia (VAP) is a potentially preventable iatrogenic illness that may develop following mechanical ventilation. A

bundle for the prevention of VAP consists of different measures which may vary between institutions, and may include: elevation of the head of the bed, oral care with chlorhexidine, subglottic suctioning, daily assessment for extubation and the need for proton-pump inhibitors, use of closed suction systems, and maintaining endotracheal cuff pressure at 25 cmHO. Our aim was to determine the efficacy of a VAP prevention bundle, consisting of the above-mentioned measures, by evaluating the incidence of VAP before (no-VAP-B group) and after (VAP-B group) the introduction of the bundle. We retrospectively evaluated the data for patients who were mechanically ventilated with an endotracheal tube, in the period between 1 September and 31 December 2014 (no-VAP-B group, n = 55, 54.5% males, mean age 67.8 ± 14.5 years) and between 1 January to 30 April 2015 (VAP-B group, n = 74, 62.1% males, mean age 64.8 ± 13.7 years). There were no statistically significant differences between no-VAP-B and VAP-B groups in demographic data, intensive care unit (ICU) mortality, hospital mortality, duration of ICU treatment, and duration of mechanical ventilation. No significant differences in the rates of VAP and early VAP (onset ≤7 days after intubation) were found between no-VAP-B and VAP-B groups (41.8% versus 25.7%, $p = 0.06$ and 10.9% versus 12.2%, $p > 0.99$, respectively). However, a signifi-cant decrease in the late VAP (onset >8 days after intubation) was found in VAP-B group compared to no-VAP-B group (13.5% versus 30.9%, $p = 0.027$). Overall, our results support the use of VAP prevention bundle in clinical practice.

KEY WORDS: Ventilator-associated pneumonia; VAP; primary prevention; epidemiology; medical devices; intratracheal intubation; bundle

Lampiran 7

The incidence of ventilator-associated pneumonia (VAP) in a tertiary-care center: Comparison between pre- and post-VAP prevention bundle

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ABSTRACT

Introduction: Ventilator-associated pneumonia (VAP) is a nosocomial infection that develops 48 h after the initiation of mechanical ventilatory support. Current evidence-based guidelines demonstrate that VAP prevention is feasible through the implementation of certain VAP prevention bundle of interven-tions simultaneously. We aimed in this study to investigate the effect of VAP prevention pre- and post-implementation.

Methods: This is a single-center, cohort study that took place at the Pediatric Intensive Care Unit (PICU) of King Abdulaziz Medical City (KAMC), Jeddah, Saudi Arabia from January 2015 to March 2018 and assessed the rate of VAP before and after implementation of the bundle.

Results: The study included 141 children, 95 were included from the pre-bundle group and 36 from the bundle group. VAP developed in 35% of the

pre-bundle group compared to 31% of the bundle group (p = 0.651) with incidence rates equaled to 18 and 12 per 1000 ventilator days, respectively.

Conclusion: This study found that VAP bundle did not significantly reduce VAP rate in the PICU. Further large prospective multi-center studies with longer intervention duration are indicated to investigate the benefits of using VAP prevention bundle.

Lampiran 8

The effect of daily sedation interruption protocol on early incidence of ventilator-associated pneumonia among patients hospitalized in critical care units receiving mechanical ventilation

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Abstract

Background: Ventilator-associated pneumonia (VAP) is a common side effect in patients who receive intravenous sedation infusion. In routine care, after starting sedation infusion for patients who receive mechanical ventilation, interruption of sedation starts without protocol. This study aimed to evaluate the effect of daily sedation vacation protocol on the incidence of VAP in mechanically ventilated patients.

Materials and Methods: In this clinical trial study, 80 patients with intravenous sedation infusion were selected and randomly allocated to intervention and control groups. In the intervention group, daily sedation vacation protocol and in the control group, routine sedation vacation was followed. Modified clinical pulmonary infection score questionnaire was completed before intervention and on the third, fourth, and fifth days after intervention. Data were analyzed by using repeated measures analysis of variance (ANOVA), Chi-square, and independent *t*-test.

Results: The results of this study showed that the incidence rate of VAP in the intervention and control groups was 0% versus 15% on the third day of intervention, 12.5% versus 50% on the fourth day, and 27.5% versus 55.3% on the fifth day of intervention in the intervention and control groups, respectively. The incidence of VAP in the intervention group was significantly lower than in the control group ($P < 0.05$).

Conclusions: The results of this study showed that in patients with intravenous sedation, infusion of a daily sedation vacation protocol may reduce the incidence of VAP. Therefore, in order to prevent VAP, nurses are recommended to use this daily sedation vacation protocol.

Key words: Iran, ventilator-associated pneumonia, sedation, sedation vacation

Lampiran 9

The effectiveness of a bundle in the prevention of ventilator-associated pneumonia

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Abstract

Objectives: The aim of this study was to evaluate the impact of a bundle called FAST HUG in ventilator-associated pneumonia, weigh the healthcare costs of ventilator-associated pneu-monia patients in the intensive care unit, and hospital mortality due to ventilator-associated pneumonia.

Material and methods: The study was performed in a private hospital that has an 8-bed inten-sive care unit. It was divided into two phases: before implementing FAST HUG, from August 2011 to August 2012 and after the implementation of FAST HUG, from September 2012 to December 2013. An individual form for each patient in the study was filled out by using information taken electronically from the hospital medical records. The

following data was obtained from each patient: age, gender, reason for hospitalization, use of three or more antibiotics, length of stay, intubation time, and outcome.

Results: After the implementation of FAST HUG, there was an observable decrease in the occurrence of ventilator-associated pneumonia ($p < 0.01$), as well as a reduction in mortality rates ($p < 0.01$). In addition, the intervention resulted in a significant reduction in intensive care unit hospital costs ($p < 0.05$).

Conclusion: The implementation of FAST HUG reduced the number of ventilator-associated pneumonia cases. Thus, decreasing costs, reducing mortality rates and length of stay, which therefore resulted in an improvement to the overall quality of care.

Lampiran 10

Implementing a care bundle approach reduces ventilator-associated pneumonia and delays ventilator-associated tracheobronchitis in children: differences according to endotracheal or tracheostomy devices

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Abstract

Objective: To reduce ventilator-associated infections (VARI) and improve outcomes for children.

Methods: This prospective interventional cohort study was conducted in a paediatric intensive care unit (PICU) over three periods: pre-intervention, early post-intervention, and late post-intervention. These children were on mechanical ventilation (MV) for 48 h.

Results: Overall, 312 children (11.9% of whom underwent tracheostomy) and 6187 ventilator-days were assessed. There was a significant reduction in ventilator-associated pneumonia (VAP) among tracheostomized patients (8.16, 3.27, and 0.65 per 1000 tracheostomy ventilation-days before the intervention, after the general bundle implementation, and after the tracheostomy intervention, respectively). The median time from onset of MV to diagnosis of ventilator-associated tracheobronchitis (VAT) increased from 5.5 to 48 days in the late post-intervention period ($p = 0.004$), and was associated with a significant increase in median 28-day ventilator-free days and PICU-free days. Tracheostomy (odds ratio 7.44) and prolonged MV (odds ratio 2.75) were independent variables significantly associated with VARI. A trend towards a reduction in PICU mortality was observed, from 28.4% to 16.6% (relative risk 0.58).

Conclusions: The implementation of a care bundle to prevent VARI in children had a different impact on VAP and VAT, diminishing VAP rates and delaying VAT onset, resulting in reduced healthcare resource use. Tracheostomized children were at increased risk of VARI, but preventive measures had a greater impact on them

POLTEKKES KEMENKES YOGYAKARTA	**VAP (VENTILATOR ASSOCIATED PNEUMONIA)** **BUNDLE CARE**		
	NO. DOKUMEN	**NO. REVISI**	**HALAMAN**
STANDAR PROSEDUR OPERASIONAL	**TANGGAL TERBIT**	**DITETAPKAN,** **DIREKTUR**	

PENGERTIAN	Suatu rangkaian perawatan rutin pada pasien yang terpasang alat bantu napas ventilator mekanik baik melalui pipa endotracheal/tracheostomi.	
TUJUAN	Penerapan rangkaian perawatan tersebut sebagai upaya untuk mencegah : 1. Masuknya bakteri ke saluran pernapasan bawah 2. Kolonisasi mikroorganisme	
PROSEDUR PELAKSANAAN	1. Lakukan hand hygiene dengan cara cuci tangan 6 langkah 2. Posisikan pasien semi recumbent (30-45 derajat) 3. Manajemen suction a. Gunakan APD yang sesuai dan diperlukan (masker, face shield/googles, hanscun) b. Gunakan alat-alat yang sudah disterilkan c. Suctioning apabila diperlukan d. Gunakan cairan steriluntuk membersihkan selang kateter suction jika dimasukkan ke ETT tube e. Gunakan Teknik close suction 4. Lakukan manajemen sirkuit ventilator a. Sirkuit harus diganti setiap hari b. Ganti sirkuit apabila kotor c. Tidak membuka sirkuit ventilator secara rutin d. Buang konsendat ke dalam tempat penampungan e. Lakukan heat and humidity exchangers (ganti jika kotor, PEEP >5 cm H2O) f. Konversi ke heated humidification jika menggunakan	

	ventilator >96 jam, terdapat banyak sekresi/darah, asidosis respiratorik, terdapat kebocoran udara melalui chest tube dan VT <300 cc atau >750 cc 5. Oral hygiene a. sikat gigi setiap 12 jam menggunakan kasa yang dibasahi dengan larutan chorhexidin/hexadol gargle. 6. Berikan GI ulcer prophylaxis 7. Lakukan pemberian sedasi sesuai protocol weaning sedation
UNIT TERKAIT	1. Ruang ICU/ICCU 2. Ruang HCU