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Prevalence of Mortality Rate Based on Type of Disease in Primary Class ICU of PTPN II Bangkatan General Hospital in Year 2014

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Abstract : ICU is a part of hospital with special staffs and equipments for observation, care, and treatment for patients with acute diseases, injuries, or life threatening complications. ICU in Indonesia is divided into three types which are primary, secondary, and tertiary ICU. ICU in PTPN II Bangkatan General Hospital is a primary class ICU having limited facilities compared to secondary and tertiary ICU. Mortality rate in primary class ICU of PTPN II Bangkatan General Hospital in year 2013 is quite high which is about 31% (69 out of 221 patients).The aim of this research is to find out the prevalence of mortality rate based on type of disease among patients treated in primary class ICU of PTPN II Bangkatan General Hospital throughout 2014.This research is a descriptive study using cross-sectional method. The data used in this research is obtained from medical records which is a secondary data. The samples of this research are patients who have passed away in primary class ICU from 1st January 2014 until 31st December 2014. Throughout year 2014, 184 patients were treated in ICU. About 110 patients (59,8%) and 74 patients (40,2%) died. There are three main causses of death occurred in primary class ICU of PTPN II Bangkatan General Hospital which are circulation system related (23,4%), infectious disease (11,4%), and endocrine related (10,9%).In conclusion, the mortality rate of patients treated in primary class ICU of PTPN II Bangkatan General Hospital in year 2014 is higher compared to year 2013. Majority patients treated in primary class ICU of PTPN II Bangkatan General Hospital in year 2014 suffered circulation system related problem which is stroke.
Keyword : mortality rate, ICU, disease.

Introduction

Intensive Care Unit (ICU) is a part of the hospital which is independent, with a staff that is special, and equipment specifically intended for observation, care and treatment of patients suffering from acute illness, injury, or complications of life-threatening or potentially life-threatening disease with unknown prognosis.[1]

Treatment for patients in ICU conducted involving various professionals consisting of a multidisciplinary working together in a team with a single management. Therefore, support facilities, infrastructure and equipment is needed in order to improve ICU care. Given the need for specialized personnel, the expensive facilities and infrastructure, as well as the high cost of treatment, then for the sake of efficiency, the existence of the ICU in the hospital need to be concentrated in one place in an integrated unit installation.[2]

ICU services in Indonesia are classified into three primary (type C), secondary (type B), and tertiary (type A). The three types of ICU is determined based on energy, infrastructure, equipment, and capabilities of services.[1]

Rab splits ICU into three levels based on the completeness of the implementation. The first level is in the small hospital equipped with the treatment, observation room, monitors, resuscitation, and short-term ventilator that is not more than 24 hours. The second level contained in public hospitals greater where do the installation of ventilator longer and fitted by a doctor anyway, a more complete diagnostic tools, pathology laboratories, and physiotherapy. level three is contained in a referral hospital where there is a more complete tool among others hemofiltration, invasive monitors, including catheterization, intracranial danmonitor. ICU is also complemented by specialist doctors and nurses were trained and consultants with diverse backgrounds of expertise.[3]

Based on the results of research conducted by Adamski et al.it is ensured that mortality in ICU lowest in Australia and New Zealand (9%) and Scandinavia (9.1%), higher mortality was significantly reported in Italy (16.9%) and Saudi Arabia (20%). 4Di with about one in five patients who died occurred in the ICU, where more than 500,000 deaths occur each year.[5]

In Indonesia research discusses mortality in the ICU in hospitals type A is based on Decree of Minister of Health, Republic of Indonesia 2010 is a tertiary ICU namely Hospital Dr. Sardjito and Hospital Dr. Kariadi Semarang. Based on the medical record of RSUP Dr. Sadjito In 2010, the mortality rate in the ICU Hospital Dr. Sardjito in 2010 at around 31% (233 of 742 patients) and 8% died before being treated 48 hours while 23% died after being treated over 2 day.[6] Mortality in ICU Hospital Dr. Kariadi Semarang for a period of 4 months (January-April 2012) which is about 24.23% as many as 79 people, of which 75.9% died after being treated for more than 48 hours, and 8.8% were diagnosed die from respiratory failure.[7] Based on medical record ICU mortality in primary PTPN II Bangkatan General Hospital in 2013 at around 31% (69 of 221 patients).

Society of Critical Care Medicine (SCCM) said the cause of death in the ICU are multiple organ failure (Multiple Organ Failure / MOF), cardiovascular disorders, and sepsis. Mutipel organ failure has a mortality rate of 11% - 18%. Sepsis is the second leading cause of death in the ICU with a mortality rate of 25% - 30%. In patients diagnosed with sepsis, more than 51% progress to acute renal failure, more than 18% progress to acute respiratory failure, and over 80% develop into myopathy or polyneuropathy.[8]

The study discusses the mortality in ICU still a little especially in the primary ICU is the reason researchers to conduct research ini. Beside the type of disease and services contained in the ICU also can affect mortality rates. To the researchers want to determine the prevalence of mortality rates based on the type of disease in ICU primary class 0f PTPN II Bangkatan General Hospital. The purpose of this study was to determine the prevalence of mortality rates based on the type of disease in patients admitted to the ICU primary of PTPN II Bangkatan General Hospital during the period from January to December, 2014.

Methods

This type of research is descriptive research with cross sectional approach (cross-sectional). This research was conducted in ICU primary class PTPN II Bangkatan General Hospital in July to December 2015. The study population was all patients in PTPN II Bangkatan General Hospital hospitalized in ICU primary classes and recorded in the medical record dari1 January 2014 - December 31, 2014 amounted to 184 person. Samples were patients who died in the ICU primary class on January 1, 2014 - 31 December 2014, with a sample size of 74 people. The data collection is done by using secondary data of medical records. Data analysis is univariate. Presentation of data in tables and narrative.

Results

A total of 184 patients admitted to the ICU with 110 patients (59.8%) of them were able to survive and the remaining 74 patients (40.2%) died in the ICU. Most patient is male in sex as many as 97 patients (52.7%) and 40 patients (41.2%) of them died. Meanwhile, patients with the female gender is treated in the ICU as many as 87 patients (47.3%) and 34 patients (39.1%) of them died (Table 1).

The age group of 50-59 years are the age group most stout in the ICU as many 71pasien (38.6%) and 31 patients (43.7%) of them died. The average age of patients admitted to the ICU is 55.64 years of age are most commonly treated are age 52 years (Table 1).

Patients in the ICU at most treated for <4 days as many as 121 patients (65.8%) and 53 patients (43.8%) of them died. The average length of treatment of patients admitted to the ICU was 3.53 days with the old frequency the most common treatment is for two days. The most rapid treatment of patients in the ICU are for one day and the longest is thirty days (Table 1).

Table 1. Distribution of patient medical record (death or alive) after admission into ICU primary class PTPN II Bangkatan General Hospital Period 01 Jan 2014 – 31 Dec 2014

Independent Variable	Record; n (%)		Total; n (%)
	Alive	Dead	
Gender			
Male	57 (58,8%)	57 (58,8%)	97 (52,7%)
Female	53 (60,9%)	34 (39,1%)	87 (47,3%)
Age (Year)			
< 19	6 (75%)	2 (25%)	8 (4,3%)
20 – 29	4 (66,7%)	2 (33,3%)	6 (3,3%)
30 – 39	2 (40%)	3 (60%)	5 (2,7%)
40 – 49	12 (60%)	8 (40%)	20 (10,9%)
50 – 59	40 (56,3%)	31 (43,7%)	71 (38,6%)
60 – 69	23 (59%)	16 (41%)	39 (21,2%)
70 – 79	21 (67,7%)	10 (32,3%)	31 (16,8%)
> 80	2 (50%)	2 (50%)	4 (2,2%)
Length of Stay			
< 4 days	68 (56,2%)	53 (43,8%)	121 (65,8%)
≥ 4 days	42 (66,7%)	21 (33,3%)	63 (34,2%)
Total	**110 (59,8%)**	**74 (40,2%)**	**184 (100%)**

Disease with disorders of the circulatory system is a kind of most disease in the ICU is a total of 109 patients (59.2%), it also shows that diseases of the circulatory system is a disease with a death in the ICU as many as 43 patients (39.4 %) and the remaining 66 patients (60.6%) were able to survive. The second most prevalent diseases in the ICU is a disease with endocrine disruption in that attack, 46 patients (25%) and 26 patients (56.5%) of them were able to survive, while 20 patients (43.5%), the other died. Disease caused by infectious and parasitic diseases are the third largest in the ICU that as many as 44 patients (23.9%) with almost half of them with 21 patients (47.7%) died and the remaining 23 patients (52.3%) survived (Table 2).

Table 2. Distribution of patient medical record (death or alive) after admission into ICU primary class PTPN II Bangkatan General Hospital Period 01 Jan 2014 – 31 Dec 2014 based on ICD 10 2015

Disease Type	Record; n (%)		Total; n (%)
	Alive	Dead	
Circulation system	66 (60,6%)	43 (39,4%)	109 (59,2%)
Endocrine	26 (56,5%)	20 (43,5%)	46 (25%)
Infection and Paraites	23 (52,3%)	21 (47,7%)	44 (23,9%)
Genitourinary System	20 (50%)	20 (50%)	40 (21,7%)
Digestive System	10 (50%)	10 (50%)	20 (10,9%)
Respiratory System	9 (47,4%)	10 (52,6%)	19 (10,3%)
Post operative	14 (100%)	0 (0%)	14 (7,6%)
Poisoning, trauma, etc	4 (66,7%)	2 (33,3)	6 (3,3%)
Neoplasm	4 (57,1%)	3 (42,9%)	7 (3,8%)
Nervous system	4 (50%)	4 (50%)	8 (4,3%)
Blood and mixtures	3 (75%)	1 (25%)	4 (2,2%)
Musculoskeletal & connective tissue	2 (66,7%)	1 (33,3%)	3 (1,6%)
Skin & subcutaneous	1 (50%)	1 (50%)	2 (1,1%)
Congenital Malformation	0 (0%)	1 (100%)	1 (0,5%)

Stroke generating from circulatory disorder is the most prevalent diseases in the ICU as many as 58 patients (31.5%) and caused 26 patients (44.8%) of them died. Meanwhile, diabetes mellitus belonging to the disease with disturbances in endocrine and metabolic causes 41 patients (22.3%) admitted to the ICU with 18 patients (43.9%) died. Sepsis is the third most diseases are treated in the ICU as many as 32 patients (17.4%) and 15 patients (46.9%) of them died (Table 3).

Table 3. Distribution of patient medical record (death or alive) after admission into ICU primary class PTPN II Bangkatan General Hospital Period 01 Jan 2014 – 31 Dec 2014 based on most type of disease

Disease Type	Record; n (%)		Total; n (%)
	Alive	Dead	
Circulation System			
Stroke	32 (55,2%)	26 (44,8%)	58 (31,5%)
Myocardiac Infarction	21 (80,8%)	5 (19,2%)	26 (14,1%)
Intracranial Hemorrhage	6 (54,5%)	5 (45,5%)	11 (6%)
CHF	9 (56,2%)	7 (43,8%)	16 (8,7%)
Hypertension	19 (67,9%)	9 (32,1%)	28 (15,2%)
Endocrine & MEtabolic			
Diabetes Mellitus	23 (56,1%)	18 (43,9%)	41 (22,3%)
Hypoglicemia	1 (33,3%)	2 (66,7%)	3 (1,6%)
Hyperglicemia	0 (0%)	1 (100%)	1 (0,5%)
Infection and Parasites			
Sepsis	17 (53,1%)	15 (46,9%)	32 (17,4%)
DHF	2 (33,3%)	4 (66,7%)	6 (3,2%)
Malaria	1 (100%)	0 (0%)	1 (0,5%)

Discussions

Based on research conducted by Niaki and Abtahi which involving 274 patients of which 96 patients (35%) of them died after being treated at ICU.[9] Another study done by Ala, Pakravan, and Ahmadi to 391 patients admitted to the ICU found that mortality rate reached 111 patients (28.4%). [10] another study conducted by Lior et al.terhadap 7265 patients over the age of 65 years who were treated in the ICU and in the study obtained deaths by 1898 patients (26%). 11 in the meantime, the results different obtained in this study is based on table 5.[1] obtained as many as 184 patients admitted to the ICU with 74 patients (40.2%) of them died.

In this study, obtained ICU mortality in primary class PTPN II Bangkatan General Hospital quite high. This can occur for several reasons, namely the availability of the facility is still minimal, the number of nurses in the ICU and the number of nurses being trained are lacking. Facilities available in the ICU primary class PTPN II Bangkatan General Hospital still quite minimal or limited and not in accordance with the criteria established by Kepmenkes. Based on interviews conducted in ICU ventilator was obtained that the unavailability of the things that become obstacles in the ICU at the moment while based on criteria established by Kepmenkes, each ICU should have a ventilator with an amount corresponding to the number of beds. This resulted in patients requiring ventilator should be referred to the hospital with more adequate equipment, the referral process this will only increase the death rate because it takes time to process referrals to hospitals lain. Based in table 1bahwa patients admitted to the ICU due to interference on the respiratory system are many and half of them died, this is likely due to unavailability as supporting respiratory ventilator for patients with disorders of the respiratory system. In terms of the number of nurses, ICU primary class PTPN II Bangkatan General Hospital shifts with each consisting of three nurses in the morning and two nurses on day and night. This amount is in accordance with the criteria established by the RI Department of Health (2006). However, this number was still less because if the referral process or in the process of medical examination at another hospital, it would require an additional nurse is one nurse per patient. If seen from the number of ICU nurses are training, it is already regulated by the health department RI (2006) that 25% of nurses in ICU primary classes have training certificates intensive care, at least one person per shift. In interviews conducted showed that only two nurses who attended training with a certificate and should have the primary class ICU PTPN II Bangkatan General Hospital there are three nurses who have training certificates.

The mortality rate in ICU patients with male sex with 40 patients (21.7%) more than women, the 34 patients (18.5%). The same results were obtained in studies conducted by Ala, Pakravan, and Ahmadiyaitu mortality in ICU in male patients (15.3%) slightly more than women (13.04) .10 In fact, research Mahmood, Eldeirawi, and Wahidi research involving more patients is 261 255 patients also give the same result, namely mortality in male patients (55.2%) more than women (44.8%). In the study also found that there are significant differences between the patients who died in the ICU by gender.[12] Based on the three studies showed that the death rate of male patients more than in women. However, there are many differences in the number of patients who died in the ICU by sex between men and women.

Differences in mortality by sex is based on the theory of hormonal. Some research suggests that the influence of the effects of estrogen. Estrogen protects cardiovascular function and immunology, as well as durability against severe hypoxia, while 5 α-dihydrotestoterone (DHT) suppress these functions. The immune response in women better than men, it is evident where after immunization, female will produce more antibodies. In the experimental study which was given Escherichia coli lipopolysaccharide, on the research showed that in experimental animals females provide pro-inflammatory response and sensitivity of norepinephrine better. Provision of male hormones in animals lowered death caused by sepsis. Ovariectomy conducted on mice eliminate these effects, but the effect is back after being given 17 β estradiol. Estrogen reduces neutrophil chemotaxis and activation. Giving 17 β estradiol in experimental animals male reduces production of interleukin 6 by cardiomyocyte and improve heart function. Although it has been many studies showing the beneficial effects of estrogen and also interfere with the effect of testosterone, but the results of this new form of the results of experiments on animals try while convincing results in clinical not yet found.[12]

Lior et al. mentions in his research that advanced age alone does not preclude good results in patients in the ICU. However, the research found that at the age above 75 years, age becomes a risk factor for mortality in ICU patients is not yet clear reason why the relationship between age and mortality in the ICU could be even stronger after the age of 75 tahun.[11] Meanwhile, research conducted by Mahmood, Eldeirawi, and Wahidi result that mortality in female patients with age <50 years less than in males while the female patients ≥50 years of age have a higher mortality rate than male patients, according to research.[12] On table 1 shows that the age most ICU admission is aged 50-59 years to 71 patients (38.6%), at this age also the majority of patients died in the ICU as many as 31 patients (43.7%).

Disease in the elderly is often different with young adults because of illness in the elderly is a combination of disorders that arise as a result of the disease and the aging process, the process of disappearance of the network's ability to repair itself and maintain the structure and function normally, so it cannot withstand diseases (including infection) and repair damage diderita.[13] Decrease of this function possible reasons for hospitalized patients and also died in the ICU are at an advanced age. Meanwhile, Said the study stated that age

also has a strong relationship to the severity of penyakit.[14] Thus, another reason elderly patients admitted to the ICU may also be influenced by the severity of the patient's illness.

In research Andersen et al.didapatkan that patients are able to survive in the ICU hospitalized longer than patients who did not survive. The majority of treated patients died after two days in the ICU, and most of them earn a limited intervention. This is because based on data obtained indicated that medical workers limit the intensity of the action given to octogenarian patients (patients aged 80 years or more) if there is no improvement in the condition in the first two days of treatment in ICU.15 In the study conducted in ICU primary class PTPN II Bangkatan General Hospital, based on table 1 found that patients who died in the ICU most died after being treated <4 days while the majority of patients who survived was treated for ≥ 4 days with an average length of patient care in the ICU for 3.53 day.

Patient care in the ICU longer it can cause other complications that may worsen the patient's disease, one of which could occur nosokomialsekunder infection. One study suggested that high mortality rates in ICU, 60% of which are caused due to nosocomial infections. In the study also mentioned bring patients admitted to the ICU for more than four days to have a significant relationship to the incidence of nosocomial infections. The use of tools that are invasive ICU is also a risk of infection nosokomial.[16] However, the research conducted in ICU primary class PTPN II Bangkatan General Hospital, the mortality rate of patients treated in the ICU were higher after being treated <4 days. This suggests that the mortality in the ICU is high not due to nosocomial infections, but is likely due to other causes, due to the severity of the patient when entering the ICU. Vice versa, the severity of the patient's disease can also affect the length of patients admitted to the ICU.

The type of disease patients admitted to the ICU also be one of the factors that affect mortality in ICU. Based on the results of research conducted by Niaki and Abtahi, the majority of patients admitted to the ICU due to intracranial hemorrhage (extradural hemorrhage, subdural hemorrhage, intraventricular hemorrhage, and intracerebral hemorrhage) as many as 100 patients (36.5%) of 274 patients. However, in these studies it was found that the highest death rate is not due to interference on intracranial.[9] Meanwhile, the results of research conducted by Sawe et al., Stated that the intracranial injury was the reason most often used as an indication of a patient to enter ICU.[17] Results different obtained in this study, where in table 1 shows that the disease with disorders of the circulatory system into the most diseases are treated in the ICU is a total of 109 patients (59.2%). According to the table 1 that the disturbance in the circulatory system that is intended in this study including stroke is a disease with diagnosis most as many as 58 patients (31.4%).

In Indonesia there is a shift in diet, which leads to fast food and preserves which we know contains a high salt, saturated fat, and low in fiber began mushrooming, especially in big cities in Indonesia. In addition to a shift in diet, lifestyle shift and also a lack of activity also occurs where things that can increase the risk of hypertension.[18] Hypertension is a chronic disease that is often called the silent killer because in general patients do not know that they suffer from hypertension before pressure checked blood. In addition, people with hypertension do not generally have a signs and symptoms before complication occur.[19] Hypertension is a major risk factor for stroke. Possible this is the reason why stroke is most prevalent diseases in the ICU.

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