ISBN 978-602-14215-8-1

ISPHE 2015

INTERNATIONAL SEMINAR ON PUBLIC HEALTH AND EDUCATION

The 2nd International Seminar on Public Health and Education

PROCEEDINGS

Semarang, April 23, 2015

BOOK 2

Public Health Department in collaboration with Sport Education Department, Postgraduate Program, Semarang State University

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Published by:
Postgraduate Program, Semarang State University
Bendan Ngisor, Semarang 50233
Email : isphe.unnes.2015@gmail.com
Telp. +6224 8440516, Fax. +6224 8449017

First published in April 2015
Editor : Oktia Woro K.H., Tandiyo Rahayu, Donald, Ross Sadler, Min Jeung Park, Budi Laksono, Arastio Soares, Keang Ratchy, Bashir Lakhal
Manuscript Team : Muhammad Azinar, Lukman Fauzi
Layout : Efa Nugroho, Thomas Sugeng H
Cover design : Muhammad Iqbal

Library cataloguing in Publication Data:
The Second International Seminar on Public Health and Education 2015 (The 2nd ISPHE 2015) Proceedings published by Postgraduate Program, Semarang State University – includes bibliographical references.
Series ISBN 978-602-14215-8-1

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PREFACE

Assalamu'alaikum warahmatullaahi wabarakaatuh,
Firstly, may we made our highest praise and thank to Allah The Almighty, for His bless so that we are able to continue a precious event; The Second International Seminar on Public Health and Education 2015 (The Second ISPHE 2015) in Semarang Indonesia, to share our knowledge and idea with so much warm and friendship from worldwide public health and education community.

The Second ISPHE 2015 is a continuation of The First ISPHE 2014 that had been held in Semarang, Indonesia on September 2, 2014. This second seminar is organized by Public Health Department in collaboration with Sport Education Department, Postgraduate Program, Semarang State University and supported by researcher team from Indonesia-Australia, Indonesian Health Education National Network (*Jejaring Nasional Pendidikan Kesehatan Indonesia* – JNPK), and Indonesian Public Health Association – Central Java (*Ikatan Ahli Kesehatan Masyarakat Indonesia Pengda Jawa Tengah* – IAKMI).

The Second ISPHE 2015 is aimed to gather all of experts, researchers, academicians, and practitioners in health education field in general as well as national and international level in one prestigious academic forum which to discuss the role of evidence based research in public health, health education, and health promotion decision making. This second seminar also proposed to contribute to the focus of health decision making; by considering the evidence based research, empirical data, and also local wisdom from each region, both national and regional levels as well as its relation to global health trends.

I would like to deliver our highest respect and appreciation to our honorable speakers, Prof. Donald, M.P.H, Ph.D. from Griffith University, Australia, Ross Sadler, B.Sc., Ph.D. from Griffith University, Australia, Min Jeung Park, Ners M.Sc., Ph.D. from University of Tokyo, Evaristo Soares from Department of Public Health Timor Leste, Ratha Phok from Institut de Technologie du Cambodge, Bashir Lakhal, M.Kes. from Department of Public Health, Lybia, and Dr. dr. Budi Laksono, M.HSc. from Health Department of Central Java, Indonesia. I really expect that this second seminar will be beneficial for all of us and to the development of the public health and education field.
Allow me to express my gratitude to all participants from Indonesia and other foreign countries who are enthusiastic in attending this seminar. I do hope that all participants will gain important values and collaborate it into our own fields and also able to make significant changes in the future. Besides, I also convey my appreciation to all organizing committee who have given their outstanding commitment for presenting this occasion.

Wassalamu'alaikum warahmatullaahi wabaraakatuh.

Sincerely yours,
Chairman of the Committee

Dr. dr. Oktia Woro Kasmini Handayani, M.Kes.

WELCOME MESSAGE

Assalamu'alaikum warahmatullaahi wabarakaatuh,

Dear Conference Participant,

I extend my most sincere welcome to all participants of The Second International Seminar on Public Health and Education 2015, held in Semarang, Indonesia on April 23rd, 2015. Semarang State University is proud of being important part to develop public health, especially in public health education, through hosting this important event.

Semarang State University (Unnes) is one of the biggest state universities in Indonesia which was established in 1965. It is the first university that declared itself as the Conservation University in Indonesia. The idea of conservation has become its vision to be an international conservation university which is healthy, outstanding, and prosperous. Regarding the vision, Unnes determine to consistently uphold the idea of protection, preservation, utilization, and sustainable development of natural and cultural resources of Indonesia. Unnes also put conservation as a manifestation of the main duties of university, namely education, research, and community service.

In line with Unnes vision of healthy, this seminar is projected to be an international event in the field of public health education and aims to become a benchmark for decision-making in health, especially in promotion and prevention sector through evidence based research. The seminar theme, "The Role of Evidence Based Research in Public Health, Health Education, and Health Promotion Decision Making" will highlight different initiatives and projects that will help direct collective vision towards securing better health status to our nations. At this seminar, we will be able to consider application of public health research as a basic of making decision in public health area.

I am convinced that the seminar will produce valuable result for improving public health education through different presentations and discussion by our distinguished speakers and participants. I hope you find the seminar sessions and program material in framing the direction of your work. I am confident that the efforts made by all organizing committee will make it a definite success and a valuable experience for participants.

Finally, I sincerely look forward to your participation and contribution to this event.

Wassalamu'alaikum warahmatullaahi wabaraakatuh.

Sincerely yours,
Rector of Semarang State University
Prof. Dr. Fathur Rokhman, M.Hum.

WELCOME MESSAGE

Assalamu'alaikum warahmatullaahi wabarakaatuh,

Dear Conference Participant,

On behalf of Postgraduate Program Semarang State University, we are pleased and honored to welcome you to The Second International Seminar on Public Health and Education 2015. It is a great privilege for us to be in Semarang, Indonesia on April 23rd, 2015. Postgraduate Program is proud to be working jointly with researcher team from Indonesia-Australia, Indonesian Health Education National Network (*Jejaring Nasional Pendidikan Kesehatan Indonesia* – JNPK), and Indonesian Public Health Association – Central Java (*Ikatan Ahli Kesehatan Masyarakat Indonesia Pengda Jawa Tengah* – IAKMI) at this important event.

Today is a time for change and we hope that the seminar will help us in confronting this change by bringing new opportunities for advancing public health education, nationally and globally. We are expecting the seminar to offer us with new material for improving our way of thinking and operation in confronting many public health problems. This seminar proposed to contribute to the focus of health decision making; by considering the evidence based research, empirical data, and also local wisdom from each region, both national and regional levels as well as its relation to global health trends.

Let's take advantage of this excellent opportunity and work together in strengthening our regional and national network and in sharing our interests and experience, particularly in public health education field. We are confident that the seminar will help us in building our network connections and in strengthening relationship.

We would like to thank each of you for participating in The 2nd ISPHE 2015 and bringing your knowledge and skills to this event. We expect you to be engaged in the sessions and to be proactive and inquisitive. Hopefully, all of you would enjoy your stay in Semarang, Indonesia. Finally, we would like to say thanks to all the organizing committee, who made this event possible be held.

Wassalamu'alaikum warahmatullaahi wabaraakatuh.

Sincerely yours,
Director of Postgraduate Program, Semarang State University
Prof. Dr. H. Achmad Slamet, M.Si.

Content

THE MAKING OF PUBLIC HEALTH DECISSION

POSTER PRESENTATION

THE MAKING OF PUBLIC HEALTH DECISSION PAPERS

SINGLE SERVER QUEUING MODEL FOR OUTPATIENTS AT THE RSUD TOTO BONE BOLANGO OF GORONTALO PROVINCE

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Abstract

Introduction: A queue is occurrence often found in daily life .Because left took a while is a valuable resources and the reduction of time waiting for the draw for analysis , so that this research to evaluate the system of the queue on outpatient services at the RSUD Toto Bone Bolango for 14 days of work .

Method: Non-reactive is a kind of this research , with the data as a secondary analysis .The data is outpatients at thehospital Bone Bbolango Toto district of Gorontalo Province.

Results: The results of research with a system of a queue m / m / 1 obtained ρ = 0.7 meaningful busy services officer of 70 percent from time programs as well as the proportion of 30 percent no patients in the system .L = 2.23 meaningful the number of outpatients in the system as many as three participants, two participants are in a queue, each participant was served. .Patients waiting for served lq = 1.54 or long his line two patients .Time spent a patient , w = 4.8 minutes plus the time during which served .Wq = 0.05 each hour or wq = 3,18 minutes meaningful patients be in a queue waiting for served during 0.05 hour or 3,18 minutes.

A system of a queue of M/M/1 is still an effective system and if considered a queue too long needs to be add second servant or worker or change in the characteristics of the arrival of the queue as efforts to improve services to outpatients in RSUD Toto Bone Bolango

Keywords : Queue, M/M/1,Poisson

Introduction

Queuing process is a process associated with the arrival of patients at a care facilities then wait in a queue (if all servers are busy) and eventually left the facilities. The interesting thing is whether the arrival of patients, whether that person comes one by one or in groups, and whether the balking or reneging allowed. Balking occurs when a patient has been in a queue, leaves the queue and designated care facilities because that person waited too long (Bustoni: 2005). If not mentioned specifically, the standard assumption is all of the patients arrive one by one and there is no balking and reneging.

The time of arrival fulfilling the Poisson distribution which equivalent to the fact that between times of arrival is exponential occur randomly and independent from one another. The exponential distribution is widely used in the field of statistics, especially in the theory of reliability and the waiting time or queuing theory (Walpole: 1986). The exponential distribution is very important because it is often assumed that the time of a server in the queue's system is exponential. It is difficult to explain about why the server time should be in exponential form, but in fact server time is very close to the exponential form (Stallings, 2003). Poisson distribution is also

important for queue's analysis because we have to assume the patterns of Poisson arrival to build queue's equations, because generally assuming Poisson arrivals is valid (Stallings, 2003).

Queue's discipline is a rule when the customers serve. This rule is based on the first-in first-out (FIFO) which is serving in the order of arrival, and the last-in first-out (LIFO) which is customer who came last would get the next services or based on priorities.

To assess the problem above, the purpose of this study is to analyze the effectiveness of the queue's system that occur during the care of outpatients, also to analyze whether the queue's single server (M/M/1 system) as a single server server is still an effective model for the care of outpatients in Gorontalo's Toto Bone Bolango Hospital.

Review of Literature

Queue's Characteristics

Queues are characterized by the five components (Bustanul, 2010, Mulyono, 2007):

1. The Arrival Pattern

   Arrival pattern is usually characterized by inter-arrival time which is the time between the arrivals of two sequential patients at a care facility. This pattern can be deterministic (known with certainty) or in the form of a random variable whose probability distribution is considered to have been known. This pattern may depend on the number of patients who are in the system or not.

2. The Server Pattern

   Server pattern characterized by server time (server time) is the time it takes a server to serve a patient. Server time can be deterministic or random variable probability distribution considered to have been known. This quantity can depend on the number of patients who have been in care facilities or not depends on the circumstances. The interesting thing is whether the only serviced by one server or customer requires a single server. If not mentioned specifically, then the basic assumption is that only one ministry has been able to serve the affairs of a patient completely.

3. Total Servers

   Total servers in a server system is very important, in this case is closely related to the existing queue's system.

4. System Capacity

   System capacity is the number of patients, including those being served and who are in the queue so that it can be accommodated by the care facilities at the same time. When a patient comes to a care facility that is full then the patient is balked to enter and also not allowed to wait outside (because it will increase the capacity) and

forced to leave the facility without getting care, a system that does not limit the number of patients in its care facility has infinite capacity while a system that limits the number of patients has a finite capacity. Generally, assumption that exists is assumption about an infinite queue's size, so the queue's wait can expand without limit. In the infinite queue, an item (the patient) can be lost from the system. In practice, the queue is finite (Stallings, 2003).

5. Queue's discipline

   Queue's discipline is the rule where patients are served based on the first in, the first out (FIFO) and serve based on the order of arrival which is the last in, the first out (LIFO), for example, patients who came last would get the next server by randomly or based on priorities.

The main task of queue is a queuing system for analyzing the effectiveness of the case, which is involves four outputs, those are waiting patients, waiting times, patients in queue and queue's time, so I want to know about the average value of the output earlier.

Queuing System

A queuing system is a set of patient server and a rule that govern customer arrival and processing of the problem (Bronson, 1988). A queue is a birth-death process with a population consisting of patients who are waiting to get the service or being serviced. A birth occurs when a patient came to a care facility, while if patients leave any such facilities then there is a death. Queues have multiple systems (Heizer, 2005)

1. M/D/2/5/TMPK System

   Is a system that the arrival time has an exponential distribution form, deterministic server time, has two servers can accommodate five people at the same time with the provision that final customer is a customer came next the entry to be serviced (last in first out).

2. D/D/1 System

   Has the arrival time and server time are both deterministic with only one server. Because the capacity of the system and discipline are not characterized, then it considered similar to FIFO (first in first out).

3. M/M/s System

   A queuing process that has a Poisson arrival pattern with a number of servers S that are not interdependent but the server time of each is identical to follow an exponential distribution form that is not dependent on the state of the system, its capacity is finite and queue discipline FIFO.

4. M/ M/1/K System

Accommodate most patients K in the care facilities at the same time. If a care facility is full then the patients who come in will be balked and not allowed to wait outside.

5. M/M/s/K System

   Is a system characterized by the amount of server as much as S and each has times identical servers but are not interdependent, which is distributed exponentially. The capacity of the system must be $s \leq K$.

6. M/M/1 System

   Is an inter-arrival time queue has exponential probability distribution with parameter μ, a server, an unlimited system capacity and the queue discipline is first come first served. With τ is the rate of arrival of the average patients and μ is the average server rate. Among the expected time of arrival and the time servers are expected to serve a patient is a row $1/\tau$ and $1/\mu$. System M/M/1, referred to a single server queuing system servers with an infinite capacity to have a Poisson distribution for the output and the exponential distribution for time ministry. This server system called single server system which is the simplest form of the system queues (Kotler, 2002)

Because outpatients care systems in Gorontalo's Toto Bone Bolango hospital are using the system M/M/1 queuing system in the form of a single service then there is some measure of the effectiveness of the characteristics:

1. Population customers unlimited
2. First in, first out
3. Poisson arrival rate
4. Exponential service time

   Above characteristics assuming $\tau < \mu$

   Where $\tau = \mu$ = the arrival rate and service level.

Method

Research design

This research is a non-reactive research (*unobtusif*) "a measurement whereby people who researched did not realize that they are part of a research for measuring individual and does not interfere with individuals do not feel bothered, because what is involved is the information obtained from him in the past which are currently recorded in the data secondary (Kuntoro, 2010) using secondary data as a secondary analysis (data analysis) with the main emphasis is to analyse the effectiveness of the queue by using queue theory single service system (single server system).

Source Of Data

Source of data in this research is a secondary data of outpatients at the hospital Toto Bone Bolango of Gorontalo province for 14 days of work infebruary 2015 .

Technique Analysis Data

The main task of the queue analysis is aware of information the time of arrival and services as input item. while items waiting for , waiting time , item-item and wait time of the queue as output .Who wanted to know about specifically about the outputs is the value of the average of the output .

Methods of Data Analysis

- To calculate the average number in the system
- The average time of service $\mu = \frac{\sum rata-rata\ pelayanan}{n}$

1. Determine the intensity of traffic queues .The probability that a servant was busy (that is the probability of a patients being waited) $\rho = \frac{\bar{r}}{\mu} =$
2. Determine the average number of patients in the system. $L = \frac{\bar{r}}{\mu - \bar{r}}$
3. Determine the average number of patients is waiting to be served $L_q = \frac{\bar{r}^2}{\mu(\mu-\bar{r})}$
4. Determine the average time that spent by a patient in the system. in this case is the time of the queue in minutes .The time of the queue (W) $= \frac{1}{\mu - \bar{r}}$
5. Determine the average time that spent by a patient in the queue. In this case waiting time .Waiting time $W_s = \frac{\bar{r}}{\mu(\mu-\bar{r})}$

Results and Discussion

The average number of outpatients in RSUD Toto Kabupaten Bone Bolango Province Gorontalo each day is X = 104,38 person each day or 104 each day for 21 days of work infebruary 2015 .

The average time of effective service (t) outpatients at the RSUD Toto Kabupaten, Bone Bolango for five days of work which is 3.6 hours a day

The average rate of arrival (T) outpatients at RSUD Toto Kabupaten, Bone Bolango is 28.99 person per hour or rounded 29 people

The average time services to anyone person of outpatients at RSUD TotoKabupaten Bone Bolango(μ) = 1,43 minutes . Meaningful one of participant served by officers with 1,43 minutes each time

The average length of time services to any one person outpatients at

RSUDTotoKabupaten.BoneBolango (μ) = 42 people each hour. Meaningfull in an hourservices officer may serve outpatients at RSUD Toto kabupaten, Bone Bolango Province Gorontalo atotal of 42 people.

1. Determine the intensity of traffic queues

   where :$\bar{\tau}$ = 29 participants and μ = 42 participants each hours, so obtained $\rho = 0.69 \sim 0.7$. meaningfulρ = 0.7 Where the service will be busy as much as 70 percent of the working time or there are 30 percent The proportion of no customers patients in the system. ρ = 0.8 which$\rho < 1$ So there a circumstance that tunak as a condition that must be fulfilled then fourth the size of effective may be analyzed
2. Determine the number of avarage patients in a system (L),

   L = 2.23.,

   Meaningful the number of outpatients at the RSUD Toto kabupaten .Bone bolango the average in the system is as many as 3 (three) participants or 2 (two) participants who are in the ranks of the queue with 1 one of participants was serve.
3. Determine the average number of patients waiting to be served (Iq).

   L_q = 1,54 or 2 people

   Meaningful the number of outpatients at the RSUD Toto Kabupaten .Bone Bolango the average waiting to be served is 2 (two) participants or long a queue is 2participants.
4. Determine the average time spent a patients in the system in this time where timethe queue a queue (w) = 4.8 minutes.

   So the average time spent by outpatients at RSUD Toto Kabupaten .Bone Bolango in a system of 4.8 minutes .It is meaningful that during 4.8 minutes patients are in the system during their stay namely in a line of a queue coupled with the time duringwhich served .
5. Determine the average time spent by a patients in a queue

   Waiting Time :W_q = 0.05 each hour or W_q = 3,18 minutes

   So the average time spent by a patient in a queue of 3.18 minutes .Meaningful that a customer be in a queue to wait served is as long as 0.05 hour or 3,18 minutes .

Queue theory basically can be used to analyze the effectiveness of queue and apply it to a place.One of the essential assumption of the theory was at the queue of the exponential and the steady state probability tunak(a). Arrival time between distributed in ekspnensial shows that the arrival time sufficiently rapidly than average occurring concurrently with the very old. The result is that some patients that come within a short time, thus producing a queue.After a while it lasted a long in which nonew patients that come to allow reduction of the line.

The intensity of traffic queues (ρ) to be sought more time before analyze , where in the queue of traffic intensity $\rho = 0.7$ meaningful that has occurred because a state of being tunak because $\rho < 1$ (as a requirement to be analyzed) so fourth the size of effective can be analyzed . By using the theory of the queue and effectiveness of the queue system can be analyzed what happened, where the number of outpatients at the hospital Toto Kabupaten Bone Bolango the average in the system as much as 3 (three) people and the number of patients waiting to be served a total of 2 peoplewhile 1 (one) man was being served .The average time spent by an outpatients in the queue is for 4.8 minutes while the average time spent by a outpatients in RSUD Toto Kabupaten .Bone Bolango in the system is as long as 3,18 minutes .

The results of a system where the queue can be evaluated which manager or the leader of the RSUD Bone Bolango have to consider the time of busy waiter of 70 percent and 30 percent of leisure , waiting time of outpatients 0.05 hours with long queues formed is 3 participants .This can be inferred from the results of the queue which means that does not happen so do no harm at the hospital outpatients KabupatenToto Bone Bolango the queue and also the prevailing system in RSUD Toto Bone Bolango at the time registration outpatients with outpatients most of the queue system is effective with only the use of a servant , could serve with either the whole outpatients on each day by the time short enough. So the system of M/M/1 still an effective system of the queue is used at the time the registration of outpatients at the RSUD Toto kabupatenBolango Province Gorontalo.

Conclusion

A queue system at the time the registration outpatients in RSUD Toto Kabupaten Bone Bolango Province Gorontalois still a system that effective with only use a servant namely systemm / m / 1 because it can serve with either the whole outpatients on each day withenough time brief.

If this result could yet accepted or still considered a queue too long needs to be added or second servant done other changes in characteristics the arrival of the queue as efforts to increase services to outpatients in Toto KabupatenRSUD.BoneBolango Province Gorontalo.

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ISBN 978-602-14215-8-1

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Has participated in:

The 2nd International Seminar on Public Health and Education

Organized by:
Public Health Department in collaboration with Sport Education Department, Postgraduate Program, Semarang State University

As ORAL PRESENTER

Semarang, April 23 2015

Rector,

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NIP. 196612101991031003

Chairman of the Committee,

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As a : PARTICIPANT

Semarang, April 23 2015

Rector,

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