

JOURNAL OF HEALTH & TRANSLATIONAL MEDICINE

JUMMEC

Volume 23 ■ Suppl 1 ■ August 2020



- EVALUATION OF SECONDARY SCHOOL STUDENT'S OUTDOOR THERMAL COMFORT DURING PEAK URBAN HEATING HOURS IN GREATER KUALA LUMPUR**
Fong CS, Aghamohammadi N, Ramakreshnan L, Sulaiman NM
- SELF-MANAGEMENT FACTORS RELATED TO HOTELS' AND NIGHTCLUBS' COMPLIANCE WITH LOCAL REGULATION (PERDA) ON SMOKE-FREE ENVIRONMENTS (SFE) IN BOGOR CITY**
Asyary A, Veruswati M
- PREVALENCE AND ASSOCIATED FACTORS OF DEPRESSION AMONG PARENTS WITH LOW SOCIO-ECONOMIC STATUS IN THE COMMUNITY IN KUALA LUMPUR, MALAYSIA**
Yakub NA, Abdul Kadir NB, Mohd Hoesni S
- INDONESIA TOWARDS UNIVERSAL HEALTH COVERAGE: LESSONS FROM ASEAN COUNTRIES**
Trisnawati AD, Wulandari RD
- ENDOTOXIN EXPOSURE AND LUNG FUNCTION AMONG RICE MILLERS IN MALAYSIA**
Md Shakri SF, Anua SM, Saftian S, Mohamad Asri AA
- VALIDATION OF THE COPSOQ AND EDJD-24 AS A JOB DEMAND SCALE FOR ASSESSING TAXI DRIVERS' SAFETY PERFORMANCE: SPECIFIC VS. GENERAL JOB DEMANDS**
Husain NA, Mohamad J
- HOSPITAL NURSES' PSYCHOLOGICAL CAPITAL AND WORK ENGAGEMENT – ARE THEY REALLY RELATED? THE CASE OF AN INDONESIAN HOSPITAL**
Percunda AD, Nuzulul KP
- EXPOSURE OF AFLATOXIN B₁ (AFB₁) IN INHALABLE DUST AND ITS RESPIRATORY EFFECTS AMONG RICE MILLERS**
Mohamad Asri AA, Anua SM, Saftian S, Md Shakri SF
- FEASIBILITY STUDY ON THE DEVELOPMENT OF THE HEMODIALYSIS SERVICES AT XYTEACHING HOSPITAL**
Rochmah TN, Rochiati, Mad Arabe ID
- SERVICE EXPERIENCE BY THE BUGIS ETHNIC ON HEALTH SERVICES PROVIDED IN PUBLIC HOSPITALS IN SOUTH SULAWESI**
Armin, Maidin A, Sidin I, Rivai F, Soedirham O, Rizki F
- CONSTRAINTS IN WAITING TIME OF HOSPITAL PHARMACY SERVICES**
Jannah IM, Seruni ENHP, Rochmah TN
- ASSESSING NURSES' SATISFACTION ON THEIR WORK-SCHEDULES: THE CASE OF A HOSPITAL IN JAKARTA**
Ruzany I, Sri Hariyati RI, Ahyanti E
- ROOT CAUSES OF MEDICATION ERRORS IN THE PHARMACY UNIT OF A MENTAL HOSPITAL IN INDONESIA**
Hasna R, Rochmah TN, Cahya MS
- THE COMPLIANCE OF CLINICAL PATHWAY ON CLINICAL SUPERVISION IN DECREASING THE LENGTH OF STAY FOR PATIENTS UNDERGOING MASTECTOMY AT AN ACADEMIC HEALTH CENTRE**
Ahmad AM, Dzulily C, Desak GAS, Erwin AT, Elly L, Ajeng IP
- CULTURAL-PSYCHOLOGICAL ELEMENTS AND ACHIEVEMENT OF MINIMUM SERVICE STANDARDS IN ISLAMIC HOSPITAL SURABAYA**
Indriani R, Nuzulul KP, Budhi S
- EVALUATION OF DIPHTHERIA SURVEILLANCE SYSTEM IN KEDIRI REGENCY, EAST JAVA PROVINCE**
Siti SNS, Kartika BW, Wahyuni CU, Istianah
- DETERMINANTS ON THE UTILIZATION OF INSTITUTIONAL DELIVERY IN RURAL AREAS OF MYAING TOWNSHIP, MAGWAY REGION, MYANMAR**
Aung T, Kyaw-Oo A, Geater AF, Liabsuetrakul T, Ko MK
- THE INFLUENCE OF SEAMLESS AND COMPLETENESS DISCHARGE SUMMARY FILLING TO SUITABILITY OF SEVERITY LEVEL IN TERTIARY REFERRAL HOSPITAL**
Hapsari DF, Chalidyanto D, Wahyuhadi J
- PATIENT PERCEPTIONS ABOUT CUSTOMER-CENTRIC IN THE EXECUTIVE AMBULATORY POLYCLINICS IN HERMINA DEPOK HOSPITAL, INDONESIA**
Agustiani NK, Sulistiadi W, Asyary A, Purwadi AG
- THE EFFECT OF HOSPITAL SERVICE QUALITY ON INPATIENT SATISFACTION IN PIRU HOSPITAL**
Ernawaty, Supriyanto S, Krisbianto, Visanti
- HEALTHY CITY AWARDS IN SOUTH SULAWESI, INDONESIA: EXPECTATIONS AND CHALLENGES**
Fakulturi S, Asnawi A
- THE IMPACT OF DOCTORS-NURSES COLLABORATION ON CLINICAL PATHWAY COMPLIANCE IN INPATIENT DEPARTMENT AT AN INDONESIAN PRIVATE HOSPITAL**
Siswanto M, Dhananti I
- AN EVALUATION OF THE IMPLEMENTATION OF THE ELDERLY HEALTH PROGRAM IN INDONESIA: A CASE STUDY**
Reviani, Wulandari RD
- EPIDEMIOLOGY OPOST-EARTHQUAKE DISEASES IN GANGGA SUBDISTRICT, NORTH LOMBOK, INDONESIA**
Almira F, Hidayah AC
- CONTRIBUTING FACTORS OF STUNTED GROWTH AMONG TODDLERS IN MAKASSAR CITY: A QUALITATIVE STUDY**
Tahangnaca M, Amiruddin R, Ansariadi, Syam A
- INDONESIAN HEALTHY AGING: SEEING OUR READINESS TO REALIZE HEALTHY AGING IN TERMS OF THE EXISTING POLICIES**
Rahmawati IT, Romadaniyati R, Chizbiyah W, Herlyawati A, Reviani, Wulandari RD
- THE PREVALENCE OF CYBERBULLYING AND ITS ASSOCIATED FACTORS AMONG YOUNG ADOLESCENTS IN PENANG, MALAYSIA**
Sivabalan TV, Ahmad Zaki R, Choo WY
- IMPROVING HAND HYGIENE COMPLIANCE THROUGH WHO'S MULTIMODAL HAND HYGIENE IMPROVEMENT STRATEGY**
Bernadetta M, Dzulily Ch, Niken S
- IDENTIFYING THE FACTORS ASSOCIATED WITH EMERGENCY BOARDING TIME**
Armiyani AS, Yustawan I, Prabawati E
- PREDICTION OF STAGE-BASED HUMAN IMMUNODEFICIENCY VIRUS (HIV) AND ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS) CASES IN SURABAYA FROM 2018 UNTIL 2022**
Lutfi FN, Fariani S
- COST EFFECTIVENESS ANALYSIS BETWEEN SMALL INCISION CATARACT SURGERY AND PHACOEMULSIFICATION**
Wulandari A, Dahli M, Ernawaty, Wulandari RD, Rochmah TN
- HEALTH LITERACY AMONG ADULT TYPE 2 DIABETES MELLITUS (T2DM) PATIENTS IN KLANG HEALTH DISTRICT MALAYSIA**
Tan WY, Ismail M
- SYSTEMATIC REVIEW OF LIFE COURSE SOCIAL DETERMINANTS OF HEALTH AND THEIR ASSOCIATION WITH ADULTHOOD METABOLIC SYNDROME**
Merzuki MF, Kew Y, A, Mahmud AB, Moy FM



UNIVERSITY OF MALAYA
Faculty of Medicine

Home (<https://jummec.um.edu.my/index.php/jummec/index>)

/ Archives (<https://jummec.um.edu.my/index.php/jummec/issue/archive>) / Vol 23 Suppl 1 (2020)



(<https://jummec.um.edu.my/index.php/jummec/issue/view/1772>)

The University of Malaya, Kuala Lumpur, Malaysia hosted the APACPH-KL Early Career Global Public Health Conference: Implementation Science for Improving Population Health on the 11th and 12th of April, 2019. The two-day conference was officiated by APACPH-KL President, Yang Berbahagia Datuk Professor Awang Bulgiba Awang Mahmud. The conference gathered experts and researchers in public health for an exchange and expansion of knowledge and to share experiences on how to tackle public health issues, which are sometimes borderless.

Organized by Asia-Pacific Academic Consortium for Public Health Kuala Lumpur (APACPH-KL), in collaboration with the Centre for Population Health (CePH), the Department of Social and Preventive Medicine (SPM), Faculty of Medicine, University of Malaya, and the University of Airlangga; the conference aimed to leverage on the global public health education and research of Asia-Pacific universities to address global public health issues through interaction with public policy and media. It also hoped to develop and enhance the network amongst international fellow students and early career public health researchers.

The conference offered an excellent platform for early-career public health professionals and students to exchange ideas and network with regional public health thought leaders and researchers. The organizers succeeded in bringing people from the industry, academia, NGOs, and international organizations to make presentations and have interactive discussions. Participants made oral presentations on Health Systems and Policy, Epidemiology, Occupational and Environmental Health as well as Behavioural and Reproductive Health.

This conference hopes to build up the confidence of early-career public health professionals and postgraduate students in presenting and publishing articles in well-regarded peer-reviewed journals. It was also the perfect opportunity for them to network and interact with one another. APACPH-KL and the University of Malaya look forward to more of such activities being conducted in the near future.

Published: 2020-08-28

Articles

GUEST EDITORIAL: CORONAVIRUS (COVID-19) IS HERE TO STAY!

(<https://jummec.um.edu.my/index.php/jummec/article/view/25764>)

Wah Yun Low, Maznah Dahlui, Nur Asyikin Yakub, Fatin Diyana Abdul Aziz, Tri Martiana
1 - 2

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25764/12082>)

EVALUATION OF SECONDARY SCHOOL STUDENT'S OUTDOOR THERMAL COMFORT DURING PEAK URBAN HEATING HOURS IN GREATER KUALA LUMPUR
(<https://jummec.um.edu.my/index.php/jummec/article/view/25806>)

Chng Saun Fong, Nasrin Aghamohammadi, Logaraj Ramakreshnan, Nik Meriam Sulaiman
3 - 11

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25806/12103>)

SELF-MANAGEMENT FACTORS RELATED TO HOTELS' AND NIGHTCLUBS' COMPLIANCE WITH LOCAL REGULATION (PERDA) ON SMOKE-FREE ENVIRONMENTS (SFE) IN BOGOR CITY
(<https://jummec.um.edu.my/index.php/jummec/article/view/25808>)

Al Asyary, Meita Veruswati
12 - 18

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25808/12106>)

PREVALENCE AND ASSOCIATED FACTORS OF DEPRESSION AMONG PARENTS WITH LOW SOCIO-ECONOMIC STATUS IN THE COMMUNITY IN KUALA LUMPUR, MALAYSIA
(<https://jummec.um.edu.my/index.php/jummec/article/view/25861>)

Nur Asyikin Yakub, Nor Baâ€™yah Abdul Kadir, Suzana Mohd Hoesni
19 - 25

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25861/12137>)

INDONESIA TOWARDS UNIVERSAL HEALTH COVERAGE: LESSONS FROM ASEAN COUNTRIES
(<https://jummec.um.edu.my/index.php/jummec/article/view/25810>)

Annis Dwi Trishawati, Ratna Dwi Wulandari
26 - 30

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25810/12108>)

ENDOTOXIN EXPOSURE AND LUNG FUNCTION AMONG RICE MILLERS IN MALAYSIA
(<https://jummec.um.edu.my/index.php/jummec/article/view/25811>)

Siti Farhanah Md Shakri, Siti Marwanis Anua, Sabreena Safuan, Amiratul Aifa Mohamad Asri
31 - 40

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25811/12109>)

VALIDATION OF THE COPSOQ AND BJD-24 AS A JOB DEMAND SCALE FOR ASSESSING TAXI DRIVERS' SAFETY PERFORMANCE: SPECIFIC VS. GENERAL JOB DEMANDS
(<https://jummec.um.edu.my/index.php/jummec/article/view/25813>)

Nor Azmawati Husain, Jamilah Mohamad
41 - 51

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25813/12110>)

HOSPITAL NURSES' PSYCHOLOGICAL CAPITAL AND WORK ENGAGEMENT – ARE THEY REALLY RELATED? THE CASE OF AN INDONESIAN HOSPITAL
(<https://jummec.um.edu.my/index.php/jummec/article/view/25814>)

Alita Dewi Percunda, Nuzulul Kusuma Putri
52 - 59

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25814/12111>)

EXPOSURE OF AFLATOXIN B1 (AFB1) IN INHALABLE DUST AND ITS RESPIRATORY EFFECTS AMONG RICE MILLERS
(<https://jummec.um.edu.my/index.php/jummec/article/view/25815>)

Amiratul Aifa Mohamad Asri, Siti Marwanis Anua, Sabreena Safuan, Siti Farhanah Md Shakri
60 - 71

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25815/12112>)

FEASIBILITY STUDY ON THE DEVELOPMENT OF THE HEMODIALYSIS SERVICES AT XY TEACHING HOSPITAL (<https://jummec.um.edu.my/index.php/jummec/article/view/25816>)

Thinni Nurul Rochmah, Rochiati ., Iriana Depung Mad Arabe
72 - 77

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25816/12113>)

SERVICE EXPERIENCE BY THE BUGIS ETHNIC ON HEALTH SERVICES PROVIDED IN PUBLIC HOSPITALS IN SOUTH SULAWESI
(<https://jummec.um.edu.my/index.php/jummec/article/view/25817>)

Armin ., Alimin Maidin, Indahwaty Sidin, Fridawaty Rivai, Oedojo Soedirham, Fadila Rizki
78 - 83

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25817/12114>)

CONSTRAINTS IN WAITING TIME OF HOSPITAL PHARMACY SERVICES
(<https://jummec.um.edu.my/index.php/jummec/article/view/25818>)

Linda Miftahul Jannah, Eka Nurul Hidayah Puspa Seruni, Thinni Nurul Rochmah
84 - 90

PDF (<https://jummec.um.edu.my/index.php/jummec/article/view/25818/12115>)

ASSESSING NURSES' SATISFACTION ON THEIR WORK-SCHEDULES: THE CASE OF A HOSPITAL IN JAKARTA (<https://jummec.um.edu.my/index.php/jummec/article/view/25819>)

Ichsan Rizany, Rr Tutik Sri Hariyati, Efi Afifah
91 - 98

Editor-in-Chief

Lau Yee Ling, BSc, MMedSc, PhD

Founding Editor

Khairul Anuar Abdullah, MPH, PhD

Senior Editor

Tunku Kamarul Zaman, MD, MS Ortho, PhD

Assistant Editors

Amirah Binti Amir, MBBS, PhD

Cheong Fei Wen, BBMedSc, PhD

Editors (University of Malaya)

Ivy Chung, BEng, PhD

Debra Sim Si Mui, BSc, PhD

Azlina Amir Abbas, MD, AdvDipMed Sci, MS Ortho

Kiew Lik Voon, BBioMedSc, MSc (Pharm), PhD

Wong Pooi Fong, BBioMedSc, DipTropMed, MMedSc, PhD

Anwar Norazit, BBMedSc, MMedSc, PhD

Suzita Mohd Noor, BBMedSc, MMedSc, PhD

Thamil Selvee A/P Ramasamy, BSc, PhD

Victor Hoe Chee Wai Bin Abdullah, MBBS, MPH, MPH(OH), MEng(SHE), PhD

Noor Azlin Yahya, MDenSci, BDS, DipTra

Tan Choo Hock, MBBS, PhD

Wong Li Ping, BSc, MMedSc, PhD

Tan Ai Huey, MD, MRCP

Retnagowri A/P Rajandram, BSc, PhD

Kamariah Binti Ibrahim, BSc, MMedSc, PhD

Muhammad Fazril Bin Mohamad Razif, BSc, PhD

Tengku Ain Fathlun Binti Tengku Kamalden, MBBS, MRCSEd, MRCOphth, MMed (Ophth), PhD

Wong Kah Hui, BSc, MSc, PhD

Farhana Binti Fadzli, MBChB, MRad

Anand A/L Sanmugam, MD, MSurger

Nadia Binti Atiya, MB, BCh, BAO, BMedSci, MPath

Vinod Pallath, BSc, MSc, PhD

Mazlina Mazlan, MBBS, MRehabMed

Nur Musfirah Mahmud, Bsc, PhD

Fong Si Lei, MBBS, MRCP

International Editors

Ilyas Khan, Swansea University, United Kingdom

John Fairclough, Cardiff Metropolitan University, United Kingdom

Simon Frostick, University of Liverpool, United Kingdom

Mohammed Mahdy, Sana'a University, Yemen

David Tai Wei Leong, National University of Singapore, Singapore

Bruce Russell, University of Otago, New Zealand

Hesham M. Al-Mekhlafi, Jazan University, Kingdom of Saudi Arabia

Kai Ling Liang, Ghent University, Belgium

Chia-Ching (Josh) Wu, National Cheng Kung University, Taiwan

Advisory Board

David Chiu-Yin Kwan, China Medical University, Taiwan

Wilfred Peh, Singapore Medical Association, Singapore

Aw Tar-Ching, United Arab Emirates University, United Arab Emirates

Omar Kasule, King Fahad Medical City, Saudi Arabia

Parveen June Kumar, Queen Mary University of London, United Kingdom

Jeong-Wook Seo, Seoul National University Hospital, Korea

Looi Lai Meng, University of Malaya, Malaysia

Language Editors

Gracie Ong @ Gracie Ong Siok Yan

Geh Sooi Lin

Rohela Mahmud

Zahurin Mohamme

M.S. Kanthimathi

Hamimah Hj. Hassan

Yong Hoi Sen

Ruby binti Husain

FEASIBILITY STUDY ON THE DEVELOPMENT OF THE HEMODIALYSIS SERVICES AT XY TEACHING HOSPITAL

Rochmah TN¹, Rochiati², Mad Arabe ID¹

¹Department of Health Policy and Administration, Faculty of Public Health, Universitas Airlangga, Indonesia

²General Hospital Darmo of Surabaya, Indonesia

Correspondence:

Iriana Depung Mad Arabe

*Department of Health Policy and Administration,
Faculty of Public Health, Universitas Airlangga, Indonesia*

Email: Iriana.dm-2018@fkm.unair.ac.id

Abstract

Background: Despite new advancements, renal failure patients continue to require hemodialysis services or treatments in hospitals in Indonesia. Due to this, it is essential that hospitals consider offering this kind of services. Therefore, a thorough and accurate calculation is needed to examine the commercial feasibility of this treatment.

Objective: This study aims to conduct a feasibility study of the hemodialysis services for a teaching hospital.

Method: The feasibility study for the hemodialysis services has to be identified from a number of aspects such as lands for constructing the buildings, the infrastructure, human resources, equipment, and finance.

Results: Based on the forecasted calculation, it is estimated that the number of patients requiring regular hemodialysis in the said teaching hospital by the year 2027 would have risen to 59,727 and to cater to this need, an estimated number of 103 beds would be needed for such hemodialysis services. The feasibility analysis also indicated that the projected construction would require various kinds of investments such as land, infrastructure, and equipment for the hospital management's information system, diverse communication system for internal and external services as well as training for service quality improvement. The calculation indicated that the investment would require US\$2,790,567.51 to develop the XY Teaching Hospital.

Conclusion: Nevertheless, the feasibility study of the hemodialysis services also showed that there is a considerable potential for developing the hemodialysis services in XY Teaching Hospital.

Keywords: *Feasibility study, Hemodialysis service, Teaching Hospital*

Introduction

Renal disease is a degenerative disease but it can be managed in various ways, ranging from blood pressure control, diet regulation, pharmacological therapy, fluid and electrolyte restriction, to renal replacement therapy (*Renal Replacement Therapy*). This may include hemodialysis, peritoneal dialysis, or renal transplantations. Patients who experience stage 5 of the CKD/ESRD (*End Stage Renal Disease*)/end-stage renal disease/terminal renal failure (GGT) require renal replacement therapy (*Renal Replacement Therapy*), one of which is hemodialysis (HD) (1,2) and this would serve very well for a teaching hospital.

A Teaching Hospital is a hospital that has an integrated function as a place for education, research, and health services in the field of medical and / or dentistry education, continuing education, and other health education; it encompasses teaching and learning in a multi-professional manner (3). The XY Teaching Hospital has more than 400 patients suffering from chronic renal disease and undergoing hemodialysis treatments. During such treatments, patients had to queue for the hemodialysis services. Based on the number of patients currently seeking medical treatment at the XY Teaching Hospital, it is forecasted that the hospital may need to address as many as 38,400 actions/year, with each patient requiring at least several actions of the hemodialysis. To date, the XY Teaching Hospital is able to treat 70 dialysis patients per day on average. In order to meet this need, the hemodialysis treatments had to be scheduled for up to three shifts of action. The *morning shift* action is from 6:30am to 11:00am; the *afternoon shift* action is from 12.00pm to 4.00 pm while the *night shift* action is from 5:00pm to 8:00pm. This tight schedule suggests that the hemodialysis services provided by the teaching hospital needs to be enhanced for improved services. For this reason, a comprehensive analysis of the logistics is needed hence, this study developed the *Feasibility Study* so as to assess if it is possible for the teaching hospital to develop the hemodialysis treatment services. This will be

an important part of the hospital's quality improvement effort since it allows for a change to be incrementally accepted by staff and patients (4).

The general aim of this study is to perform a feasibility study on the development of the hemodialysis services in the XY Teaching Hospital, thus the objectives are to:

1. Conduct an analysis of the hemodialysis service requirements in the XY teaching General Hospital,
2. Conduct an analysis of the feasibility of the land for construction, the infrastructure, human resources, and the equipment needed, in accordance with the hemodialysis service regulatory standards, and
3. Conduct an analysis of the financial aspects for developing the hemodialysis services.

Study Methods

This study is qualitative in approach as data were collected based on interviews, observations, and document reviews. Following the approval of the Health Research Ethics Committee, Faculty of Public Health Airlangga University, approval no. 15-KEPK, the problem was explored. Various information was obtained from the relevant units i.e department of population and civil registration, district health office, finance, facilities, infrastructure and human resources both inside and outside the hospital.

This study is divided into two stages. In the first stage, a needs analysis of the hemodialysis services covering the geographical, demographic, socio-economic and environmental aspects, was conducted. In the second stage, the feasibility analysis of the land, the construction and buildings, infrastructure, human resources, and the hemodialysis equipment was performed,

In analyzing the service requirements, for the teaching hospital, we performed the calculation *forecast* so as to get an overview of the hemodialysis services and other needs. Based on the prevalence and calculations

forecast, we were able to acquire the normative values. To analyse the feasibility of the land for construction and building, the facilities and infrastructure as well as human resources and equipment, a comparison between the standard hemodialysis services and the real conditions in the Hemodialysis Installation was made (5).

Following the above, a feasibility analysis of the financial aspects was then performed. Among others, this included an estimation of the investment fund, the funding sources, income projection for the estimated number of hemodialysis actions, fixed cost projections and variable costs, cash flow projections for the next 10 years, profit projections and losses for the next 10 years, and finally, we performed the ratio analysis.

Service Standards

The Indonesian Nephrology Association (INA) in 2003, had clearly mentioned that standard services for hemodialysis should include adequate workforce, suitable services, correct equipment, right medicines, fitting buildings and supportive infrastructure, sufficient financing, correct waste disposal systems, occupational health and safety measures as well as a system for evaluating, recording and reporting the activities.

Hemodialysis (HD) is a renal replacement therapy that uses a special device that is aimed at helping patients to overcome the symptoms and signs of the renal failure disease due to a low glomerular filtration rate (6). This practice is expected to extend life and to improve the quality of life for patients. A standard hemodialysis service center should consist of at least four dialysis machines, supported by units of *water treatment*, and other supportive equipment. There should also be medical personnel consisting of at least two nurses who are HD nurses, and a HD certified doctor who is supervised by a HD certified internist. The structure of the center is monitored by an internist who is a specialist in Internal Medicine, Renal Consultant and Hypertension. For treatment purposes, the standard for hemodialysis services must be adhered to, i.e,

the concept of hemodialysis services, the procedure for hemodialysis services, the flow of patients for hemodialysis service, minimum requirements for medicine, and medical devices needed (7). Various medical devices in the hemodialysis service also need to be in the hospital's control system at all times. The use of the medical devices must also follow the principles of patient safety and standard precautions.

Results and Discussion

This study is divided into two stages. In the first stage, a needs analysis of the hemodialysis services covering the geographical, demographic, socio-economic and environmental aspects, was conducted. In the second stage, the feasibility analysis of the land, the construction and buildings, infrastructure, human resources, and the hemodialysis equipment was performed

1. Needs Analysis of the Hemodialysis Services in XY Teaching Hospital

The results from first stage obtained for this study were based on interview, observation, and review the geographical and demographic data generated from the XY Teaching Hospital which was located in the middle of the district, and surrounded by regency cities. The population of the XY teaching General Hospital in 2015 was 2,117,278 and the district had a projection of a 2-year population increase of 4.7%.

Based on the calculations, the *forecasting* data obtained were stretched to until 2027, and it was then estimated that the number of patients with regular hemodialysis would encompass around 574 patients per year. On that normative assumptions, we predicted in 10 years that the highest estimation by 2027 for hemodialysis actions would be as many as 59,727 actions. Thus, by 2027 the highest estimation for the need of the hemodialysis machine and patient beds would be about 103. This takes into consideration that there would be at least three infectious patients.

Based on the current hourly arrangement of the hemodialysis services that had been

divided into three sessions the need appears to be very high. In accordance with the consensus of the renal failure disease, it had been emphasized that maximum or adequate results are better gained from treatment that is given within five hours. Thus, this would require more hemodialysis machines to be added if the XY teaching hospital is aiming to provide hemodialysis services.

From the needs analysis conducted of the internal aspects, it can be deduced that the XY teaching Hospital needs to develop a hemodialysis service that can offer 103 machines and beds.

2. Feasibility Analysis of Land Requirements needed for Construction and Buildings, Infrastructure, Human Resources, and Equipment in accordance with the Service Regulatory Standards

Based on the feasibility analysis of the land requirements for construction and building, it can be concluded that the XY Teaching Hospital is able to meet its hemodialysis services fulfilment because it has already prepared an area of 1700m² according to the management planning scheme and based on its current normative needs. From the feasibility analysis of the infrastructure, there are still some areas that do not meet the standards. This can be traced to several quality indicators including: integrated hospital information system, communication system for external telephone used for the Hemodialysis installation.

With regards to the feasibility analysis of the human resources required, it appears that this aspect was also in accordance with national standards, hence the XY Teaching Hospital has the eligibility to develop the hemodialysis services for as many as 103 machines.

Based on the feasibility analysis of the equipment and drugs required, it appears that the XY Teaching hospital is currently appropriate. Nonetheless, the addition of other equipment is still needed so as to be able to address the treatment and drug *emergency* cases. In this regard, the XY Teaching Hospital is able to meet the equipment and drugs

requirement, according to its current normative needs.

Based on the above analyses, it can be concluded that it is worthwhile for the XY Teaching Hospital to develop its own hemodialysis services consisting of 103 machines and bed

3. Feasibility Analysis of the Financial Ability of the XY Teaching Hospital for Hemodialysis Services

Much funding is needed for developing the hemodialysis services in the XY Teaching Hospital. This includes the lands for construction, the facilities tied to the services offered, the human resources to run the operations, and the equipment and drugs to sustain the services provided. An estimated calculation showed that the amount totaled to US\$2,790,567.51 The hospital has to find ways of raising this amount because the government will be unable to support this project, based on the INA CBG's tariff (8). Majority of the patients who are using the hemodialysis services are under the Social Insurance organization which contributions are a number of fees that are paid regularly by participants, employers and / or governments (9,10)

The amount of investment costs, and the amount of direct and indirect costs for operating the hemodialysis services can be extremely heavy, starting from the lands needed for construction to the direct and indirect costs incurred such as the cost of distributing medical services, purchasing equipment, and so on. In this regard, a discussion is needed so as to obtain efficient solutions.

Among the calculations made for the alternative financing is the possibility of reducing the HD medical services to 10% of the current HD rate, and also to reduce costs of consumption by 10%. From the calculation, it was noted that the NPV is (-) US\$1,160,233.61. This result suggests that the assessment of developing the Hemodialysis Installation was financially not feasible.

The calculation derived from other alternative financing scenarios can be used as the consideration to evaluate whether the current HD tariff is too low, or the *unit costs*, investment costs, and the determination of the rates of medical services are not proportional.

Conclusion

Based on the description of the feasibility analysis stated above, it seems clear that the XY Teaching Hospital needs a number of support, such as adequate lands for construction, facilities, human resources, and equipment. Based on the analysis of data, it can be concluded that XY Teaching Hospital can fulfill those needs, but the cost would be high.

The benefits of the hemodialysis services are divided into two categories:

1. *Benefit of Tangibles*
 - a. Reduced treatment costs for patients with chronic renal failure.
 - b. Reduced transfusion costs for patients with chronic renal failure.
 - c. Reduced financial burden for in-hospital patients with chronic renal failure.
2. *Intangible Benefits*
 - a. Increased *Quality Adjusted Life Years* for hemodialysis patients.
 - b. Increased *Brand Image* for XY Teaching hospital with superior services such as HD.
 - c. Doctors and medical personnel at XY Teaching Hospital are trained in the hemodialysis services.
 - d. XY Teaching Hospital can be a pilot hospital with superior HD services, there by serve as a model teaching school for research and development.

The development of the Hemodialysis services, based on the analysis of the financial aspects, is not feasible. Nonetheless, the Hemodialysis services have *tangible* and *intangible benefits* which may be further examined for better validation. Therefore, it cannot be denied that the development of the Hemodialysis services is still essential.

From the discussion provided, it can thus be concluded that the important points are as follows:

1. Based on the needs and feasibility analysis of the hemodialysis services, there is considerable potential for the developing the hemodialysis services.
2. The number of hemodialysis machines that would be required to serve this by the year 2027 is 103 machines only, thus there is still time to raise the funds.
3. There are additional requirements needed such as infrastructure, human resources, medical and non-medical equipment as well as drugs needed so as to complete this project.
4. The funding needed for the development of the hemodialysis services appears to be high, a total of US\$2,790,567.51. It may not be possible for the government to sponsor all the costs because majority of the patients using the hemodialysis services are covered by the Social Insurance organization.
5. From the analysis of the financial aspects, it appears that it may not be worth the effort for the XY Teaching Hospital to proceed with the project. Nonetheless, this may be off-set by the *tangible* and *intangible* benefits as explained above. Future studies may need to examine these two categories of benefits in detail.
6. The financial aspect of the analysis implied that developing the Hemodialysis services may not be feasible. Nonetheless, this disadvantage may be off-set by the *tangible* and *intangible benefits*. The reason is because it is still imperative for XY Teaching Hospital to develop this project for the sake of the renal failure patients.

References

1. Gede AN. Terapi hemodialisis sustained low efficiency daily dialysis pada pasien gagal ginjal kronik di ruang terapi intensif. EJ Med Udayana. 2013;2(5):766-782. Available from: <https://ojs.unud.ac.id/index.php/eum/article/view/5341>.

2. Price SA & Wilson LM. Patofisiologi: konsep klinis proses-proses penyakit. 6th Ed. (Huriawati Hartanto Ed). Jakarta: Penerbit Buku Kedokteran EGC; 2005.
3. Indonesia R. Peraturan pemerintah RI No.93 tahun 2015 tentang rumah sakit pendidikan. Lembaran Negara Republik Indonesia tahun 2015 nomor 295. 2015;1(30):77-87.
4. Ogrinc GS, et al. Fundamentals of health care improvement: a guide to improving your patients' care. Qual Saf Health Care. DOI: 10.1136/qshc.2009.033365.
5. Weller J, Cumin D, Torrie J, et al. Multidisciplinary operating room simulation-based team training to reduce treatment errors: a feasibility study in New Zealand hospitals. N Z Med J. 2015;128(1418):40-51. Available from: <https://researchspace.auckland.ac.nz/docs/uoa-docs/rights.htm>.
6. Kementerian Kesehatan RI. Peraturan Menteri Kesehatan RI nomor: 812/MENKES/PER/VII/2010 tentang penyelenggaraan pelayanan dialisis pada fasilitas pelayanan kesehatan. 2010.
7. World Health Organization. Workload indicators of staffing need: user's manual. Bull World Health Organ. 2010;1-56. Available from: https://www.who.int/hrh/resources/WISN_Eng_UsersManual.pdf?ua=1
8. Kementerian Kesehatan RI. Peraturan Menteri Kesehatan Republik Indonesia nomor 27 tahun 2014 tentang Petunjuk Teknis Sistem Indonesian Case Base Groups (INA-CBGs). 2014:50.
9. Indonesia R. Peraturan Presiden Republik Indonesia no 12 tahun 2013 tentang jaminan kesehatan. 2013. Available from: <http://ir.obihiro.ac.jp/dspace/handle/10322/3933>.
10. Kementerian Kesehatan RI. Peraturan Menteri Kesehatan RI no 59 tentang standard tarif pelayanan kesehatan dalam penyelenggaraan program jaminan kesehatan. 2014. DOI: 10.1016/j.gaitpost.2018.03.005.
11. Menkes RI. Peraturan Menteri Kesehatan Republik Indonesia nomor 56 tahun 2014 tentang klasifikasi dan perizinan rumah sakit. Indonesia: Kementrian Kesehatan RI; 2014.
12. Menkes RI. Pedoman penyelenggaraan Pelayanan Rumah Sakit. Indonesia: Kementrian Kesehatan RI; 2012.
13. Pernefri. Pedoman pelayanan hemodialisis di sarana pelayanan kesehatan. Indonesia: Pengurus Besar Perhimpunan Nefrologi Indonesia; 2003.
14. Robin C & Kaplan RS. The design of cost management system: text, cases and reading. University of Michigan: Prentice Hall; 1993.
15. Donald EK, Weygandt JJ & Warfield DT. Accounting Principles. Unites States of America: John Wiley & Sons. 2007:7.
16. Emsalifalak H, et al. A comparative study on the activity based costing systems: traditional, fuzzy and Monte Carlo approaches. United States of America: ScienceDirect. 2014;4:58-67.
17. French KE, et al. Value based care and bundled payments: anesthesia care costs for outpatient oncology surgery using time-driven activity based costing, healthcare. Harv Bus Rev. 2015;4:173-180.
18. Hansen & Mowen. Management accounting. Jakarta: Salemba Empat; 2005.
19. Kaplan AL, et al. measuring the cost of care in benign prostic hyperplasia using Time-Driven Activity Based Costing (TDABC). Harv Bus Rev. 2014;3:43-48.
20. Lee J, Park M, Kwun SH & Chang DS. Feasibility study on establishing human resource development infrastructure for developing countries: the case for Ghana's power company. Paper presented at: 2018 Portland International Conference on Management of Engineering and Technology (PICMET), Honolulu. 2018:1-13. DOI: 10.23919/PICMET.2018.8481950.