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(ICOPH 2018)



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Committee of the ICOPH - 2018

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Conference Proceedings of the 4th International Conference on Public Health (ICOPH 2018)

Edited by Prof. Dr. Hematram Yadav and Prof. Dr. Rusli Bin Nordin

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MESSAGE FROM THE HOSTING PARTNER ICOPH 2018



Thank you for allowing me to say a few words in this 4th International Conference on Public Health (ICOPH) 2018. Firstly, I must congratulate TIIKM and its collaborators for organising this conference and I understand that this conference is focusing on quality of health care. Quality is a real problem not only in health care but in all sectors of the industry including Universities. Quality as we know is the end-point of everything we do and it is setting standards at all level of the organization and making sure that the standards are met. Therefore many factors impact on quality. To improve quality of health care, it is not only the consumers and the providers who need to be addressed but also the availability of resources that affect quality of care in health care. Therefore in improving quality and safety of the health care we improve the practice, innovate new ideas, improve assess in health care, readjust our processes, and improve practice of health care. For us to improve quality we need to feel a sense of urgency, we need to be tireless and keep up the pressure. From what we implement not everything works so we need to learn what works, so that we can draw maps to help others.

I understand that the main purpose in this conference is to discuss and debate all the best ideas we can muster to improve quality and safety in health care in our work place, because it is simply not acceptable that millions of people globally are injured, and tens of thousands die every year, from medical errors that don't need to occur. Globally the public today knows much more about quality and safety in health care and their expectations are high. The public is looking for dramatic reductions in medical errors. They expect health information technologies to help in reducing errors. In many areas of the world mobile technology is

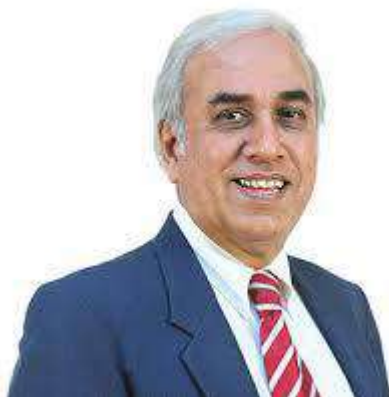
transforming health care. It can help a lone health worker in the most remote and isolated village to get up to date training and provide high quality care and it can also help connect health worker to obtain latest information that can save lives. For instance in Liberia during the Ebola outbreak the Ministry of Health sent critical information to health workers' through mobile phones to all parts of the country and similarly the health workers used to send time-sensitive information to ministry officials and to one another. In future this type technology will help other countries combating outbreaks and prepare them for future health threats as well.

I understand that there are over 30 countries being represented in the conference with about 700 abstracts and posters. I wish to congratulate the organizing committee making this conference happen and I am proud that MAHSA University is part of this endeavor. I understand that MAHSA University students and staff are actively involved in presenting papers in the conference. I wish all the participants and staff all the best and I am sure you all will deliberate and make the best use of the time in this conference

Thank you,

Prof. Tan Sri Datuk Dr. Hj. Mohamed Haniffa bin Hj. Abdullah,
Pro-Chancellor and Executive Chairman,
MAHSA University,
Kuala Lumpur,
Malaysia.

MESSAGE FROM THE CONFERENCE CO-CHAIR ICOPH 2018



It gives me great pleasure to welcome all of you to this 4th International Conference on Public Health (ICOPH 2018) in Bangkok, Thailand. As you all know the theme of this conference is ‘Promoting Quality and Safety in Health Care towards Health Communities’ and this is very timely as we are facing quality problems in health care globally. Although globally public health is no longer dominated by infectious diseases but dominated by non-communicable diseases such as chronic diseases (heart disease, diabetes, cancer, and mental-health condition), but infectious diseases do still play an important role and pose challenges to global health security. It is therefore imperative that quality of health care play an important role in the prevention of these diseases.

Quality healthcare is defined as providing effective and efficient healthcare services according to the current clinical guidelines and standards, which meets the patient's needs. It is important and urgent that we implement the principles of quality assurance in all areas of health care including Public Health. The health care provided must not only be efficient and effective but it must also be evidence based. Measurement and assessment of quality are equally important and the two most important methods to assess quality are cost effective and cost efficient. Although many of the basic tools of quality are available, we seldom apply these in our work place to assess programmes to see whether they are effective or not. I hope that this conference will provide you a platform for understanding the concept of quality and that you will be able to apply these concepts when you return.

This year we have received more than 700 abstracts for the conference and we are happy of the tremendous response and support we have received. I am particularly happy that we have participants who have been regularly attending the last few conference and I would like to thank them for their support. I am sure that you all will deliberate and discuss some of the important issues in the next few days and will not only network and take home new ideas but will also implement some of these ideas when return. Finally let me take this opportunity to thank all the plenary speakers and members of the organising committee for the excellent preparations and arrangements for this conference and most importantly you the participants who have made this conference happen. I would like to thank all the academic partners, all universities and collaborators particular the Ministry of Health, Thailand for providing the support for this conference. Hope you will have good time the next few days but don't forget to enjoy the beauty of Thailand while you are here.

Thank you and regards,

Prof. Dr. Hematram Yadav,
Co-Chairman Organising Committee,
Department of Community Medicine,
MAHSA University,
Kuala Lumpur,
Malaysia.

MESSAGE FROM THE CONFERENCE CO-CHAIR ICOPH 2018



Welcome to the 4th International Conference on Public Health (ICOPH 2018) with the theme: **Promoting Quality and Safety in Health Care towards Healthy Communities**. On behalf of the Organizing Committee, Prof. Hematram Yadav and I would like to warmly welcome you to Bangkok, Thailand with the Thai's customary welcoming address of *Sawasdee!* We would like to thank everyone for making your time and effort to attend this international conference. In particular, to the event organizer, TIIKM (The International Institute of Knowledge Management), under the abled stewardship of Mr Isanka P. Gamage, co-founder and managing director, and his elite group of highly talented, motivated, and dedicated young entrepreneurs; scientific committee members who have voluntarily supported the arduous task of reviewing abstracts for the conference; hosting partner (MAHSA University); academic partners (Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka; University of Muhammadiyah Malang, Indonesia; Sikkim Manipal University, India; North South University, Bangladesh); strategic partners [The 16th World Congress of the European Association for Palliative Care (EAPC 2019); International Conference on Community Nursing and Public Health 2018]; Tour & Accommodation Partner (GLOBEENJOY); Event partner (Blue Arc); and ALL keynote and plenary speakers, sessions chairs, delegates and accompanying persons, including virtual presenters. Thank you all for supporting ICOPH 2018!

The **quality and safety of healthcare** is one of the most important factors in health and it has become one of the global health priorities to ensure healthy lives and promote well-being for

all. This global commitment is contained in the Third Sustainable Development Goal of the World Health Organization (SDG3: Ensure healthy lives and promote well-being for all at all ages). Quality improvement is meant for enhancing safety, effectiveness, and efficiency of health care which can be achieved through various quality methods. The quality of healthcare is applicable for all levels of health care including health education system and advanced technologies. ICOPH 2018 creates a great platform to discuss current landscape and next steps for improving quality of health care. The conference will bring together leading academicians, medical students, clinicians, public health professionals, health care specialists, health care workers, health economists, researchers, scientists, health workers, policy makers, social workers and other related professionals. ICOPH 2018 is a global gathering with renowned speakers, presentations, panel discussions, round table discussions, and valuable networking opportunities.

The organizers have prepared an impressive list of 16 conference tracks, publication and conference chair workshop, round table discussion, students' session and gathering, and exhibition, as well as opportunities to publish selected full papers in high quality international, peer-reviewed journals. Four award categories have been created to honour the best presentations: best presentation award, best student presentation award, sessions' best award, and best poster presentation award. Two eminent keynote speakers will deliver state-of-the art lecture on the following: Dengue infections and Childhood Obesity: Battling Epidemics that know no Boundaries (**Prof. John P. Elder**, Distinguished Professor and Division Head, Division of Health Promotion and Behavioral Science, San Diego State University, United States), and Reducing the Global Burden of Cardiovascular Disease: A Model for Sustainable Cardiac Care Development in Developing Countries (**Prof. Ernest Madu**, Founder of the Heart Institute of the Caribbean), and a special guest speaker from Thailand, **Dr. Chaiporn Promsingh**, Medical Officer on Health Promotion, Advisory Level, Office of Senior Advisor Committee, Department of Health, Ministry of Public Health, Thailand. Eight plenary speakers have agreed to share their experiences in this conference: **Prof. Dr. Forhad Akhtar Zaman** (Global Burden of Tuberculosis & Drug Resistant TB), **Dr. Nasrin Banu Laskar** (Clean India Mission), **Dr. Raghieb Ali** (Cardiovascular Disease), **Dr. Keith Buckley** (Evaluating the Right to Affordable Healthcare), **Prof. Dr. Pei Lin Lua** (Community Health Education Empowerment Via e-Health Innovations), **Prof. Steven L. West** (Routine Dental Exams of Persons with Disabilities in the U.S.), **Assoc. Prof. M. Nasir**

Uddin (Molecular pathogenesis of preeclampsia and its potential therapeutics) and **Dr. J. Paulo Moreira** (Financing Health and Wellness Tourism Projects: Success Factors).

The conference will be an excellent opportunity to network and discuss current issues in public health across the globe, with the scope aligned towards the understanding and realization of the World Health Organization's Third Sustainable Development Goal (SDG3). Following from ICOPH 2017 in Kuala Lumpur, we will need to discuss the following issues and practical solutions: What will be the barriers each country would face when achieving these targets in 2030's? How to overcome those barriers? What are the measures that can be taken? The role of Governments and Industries, and how scientific research can support the achievement of the targets in 2030's.

Finally, as agreed during the round table discussions in ICOPH 2017, we need to re-appraise the following Health Targets for SDG3:

- By 2030, reduce the global maternal mortality ratio to less than 70 per 100 000 live births.
- By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1000 live births and under-5 mortality to at least as low as 25 per 1000 live births.
- By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.
- By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.
- Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol.
- By 2030 halve the number of global deaths and injuries from road traffic accidents.
- By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes
- Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.
- By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

- Strengthen the implementation of the WHO Framework Convention on Tobacco Control in all countries, as appropriate.
- Support the research and development of vaccines and medicines for the communicable and noncommunicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all.
- Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and Small Island developing States.
- Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

The road to success is not easy. But together and inclusively, we can be part of this global effort to address many of the health targets for the SDG3. This international conference is, therefore, an earnest effort to realize our dream of promoting quality and safety in healthcare towards healthy communities.

Finally, please enjoy our networking dinner and cultural show and the many exciting and fascinating tourist destinations in and around Bangkok and Thailand in general.

Thank you very much (*Khob Khun Mark*)!



Prof. Dr. Rusli Bin Nordin
Co-Chair,
Monash University,
Malaysia.

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PREDICTORS OF AND BARRIERS ASSOCIATED WITH HEALTH SERVICES UTILIZATION AMONG PERSONS WITH DISABILITY

Billy Jay N. Pedron

De La Salle Medical and Health Sciences Institute, The Philippines

Abstract: In the Philippines, despite numerous initiatives and programs that aims to increase awareness of persons with disability about the different health care benefits intended for them, majority of them still experiences obstacles particularly in accessing health care services. The purpose of the study was to identify predictors and barriers associated to health services utilization among persons with disability. The study used descriptive design, with 77 persons with disability from 3 hospitals in the province of Cavite as respondents. Regression was used to identify the predictors for both health services utilization and barriers. The researcher found out that gender and type of disability has significant differences in terms of health care services utilization, and in terms of experienced barriers, only educational background has significant difference. Further, the study also revealed that age, location and monthly income were significant predictor in utilization of health care services. While, education became significant predictor in predicting barriers in accessing health care services. Different barriers were identified in low level health care services utilization among persons with disability. In this context, strong implementation of policy to increase awareness and knowledge about disability and its prevention in the community level are essential to address the barriers.

Keywords: Persons with Disability, Health utilization, Health barriers, Health Systems

Introduction

Disability is a complex occurrence, which includes a wide array of interaction between features of a person's body and features of the society. Further, it covers a spectrum of various levels of functioning at body level, person level and societal level. (WHO, 2016)

Disability affects hundreds of millions of families in developing countries. Worldwide, it estimated that around 10% of the total world's population, or roughly 650 million people, live with a disability (WHO, 2010), and about 80% of the world's population of people with disabilities lives in low-income countries, and most of them experience social and economic disadvantages and denial of rights. Rates of disability are increasing due to population aging and increase in chronic health conditions, among other causes. (WHO, 2010)

Philippines is not spared from this. According to the Asia-Pacific Development Center on Disability the population of persons with disability is estimated at around 942,000 or 1.23 % as to proportion of persons with disabilities to total population. Half of the PWD in the Philippines are old people (60 years and over). The other half are below 49 years old. This could only mean that one in 20 households in the Philippines has at least one member with disability.

In spite of numerous laws and bills passed in the Philippines, people with disability experience different types of barriers when they attempt to access health care. Health systems frequently fail to respond adequately to both the general and specific health care needs of people with disability. Comparing persons with disabilities from the general population, they have both same health care needs. However, they experience unequal access and greater unmet health care needs and experience poorer levels of health compared with the general population. This is mainly due to poverty and social exclusion. People with disabilities in developing countries are over

represented among the poorest people. Poverty causes disabilities and can further lead to secondary disabilities and complications as a result of the poor living conditions, health endangering employment, malnutrition, poor access to health care and education opportunities, etc. Together, poverty and disability create a vicious circle (World Bank, 2010).

Persons with disability are likely to have limited opportunities to earn income and often have increased medical expenses. Disabilities among children and adults may affect the socioeconomic standing of entire families (American Psychological Association). Poverty, as a contextual factor, may also increase the likelihood, that a health condition may result in impairment, activity limitation, or participation restriction. This could be the case if there is lack of health care and rehabilitation services or lack of resources to access those that are available; acquire prosthetic, orthotic and mobility devices; get personal assistance at the community level, etc. In poor communities where such services are not provided or are of low quality, health conditions may be more likely to lead to disability. Even if such services are available, they may not be affordable (Horner et al. 2003).

Full inclusion of disabled people in society is the solution. To achieve this, we need to remove the barriers that exclude people with disability from participating in society. Health and education should be the primary focus in solving the problem. Health is a prerequisite for it increases in productivity while education relies on adequate health. Both health and education can also be seen as vital components of growth and development. Given their role as both inputs and outputs gives health and education their central importance in economic development (Todaro, 2010).

The purpose of the study was to identify predictors and barriers associated to health services utilization among persons with disability.

Methods

Study Design and Population

This study used the quantitative descriptive type of research. This is non-intrusive and deals with naturally occurring phenomena. In this study, the phenomena were the experienced barrier and utilization of health care services of Persons with disability. The participants of the study were the 77 persons with disability who underwent Inclusion criteria and are currently undergoing rehabilitation care under the Level 3 hospitals in Cavite.

Research Instrument

The research instruments used were self-made questionnaire. Questionnaire were divided into 2 parts: demographics and the barriers and utilization of health care services of PWD. Questions were based on RA 10754 An Act Expanding The Benefits And Privileges Of Persons With Disability (PWD) from RA 7277, as amended, otherwise known as the "Magna Carta for Persons with Disability" and adapted questions from different journals, related literature and studies that discussed barriers and utilization pattern of persons with disability as to health services.

The questionnaire is composed of two parts: the first part sought to obtain the demographic data of the respondents, while the second part includes questions that would determine health care service utilization and barriers.

In determining the barriers that could affect the utilization of health services, the following elements/factors were the bases in formulating questions: a. financial barriers, b. cognitive barrier and c. structural barrier. This part was answered using Likert scale. 5 - very great extent, 4 - great Extent, 3- some extent, 2 - little extent, 1 - very little extent.

Correspondingly, in determining the utilization of respondents, the following health care services were taken into consideration: a. General Health Services b. Dental Services c. Rehabilitative Services d. Psychological Services. his part was answered by a Likert scale. 5 - always, 4 - very often, 3- sometimes, 2 - rarely, 1 - never.

The results were summarized based on the respondents answers on the questionnaire. The mean of the results was obtained for each factor as to the experienced barrier and health care services utilization, and were interpreted using the range below:

Table 1: Arbitrary scale in interpreting Barriers in Healthcare Services

Barriers in Healthcare Services Scale	
Range	Interpretation
5.0 -4.50	Very Great extent
4.49 -3.50	Great extent
3.49 - 2.50	Some extent
2.49- 1.50	Little extent
1.49 -1.00	Very little extent

Table 2: Arbitrary scale in interpreting Utilization of Healthcare Services

Utilization of Healthcare Services Scale	
Range	Interpretation
5.0 -4.50	Always
4.49 -3.50	Very Often
3.49 - 2.50	Sometimes
2.49- 1.50	Rarely
1.49 -1.00	Never

Data Analysis

Frequency and percentage were used to describe the profile of the respondents in terms of age, gender, type of disability, location, monthly income and education. Weighted mean was employed to determined the experienced barriers and extent of utilization of health care services. Regression Analysis was used to predict the variables that would affect the barriers and utilization of health services.

Result

Profile of the Respondents

The profiles of the respondents revealed that out of 77 respondents, majority of which are female (53%) and belonged to the age bracket of 21 - 40 y/o (30%), who are college level (51%), from Tagaytay City (30%), had an average of Php 9,000 per month (49%), and have orthopedic or mobility disability (70%).

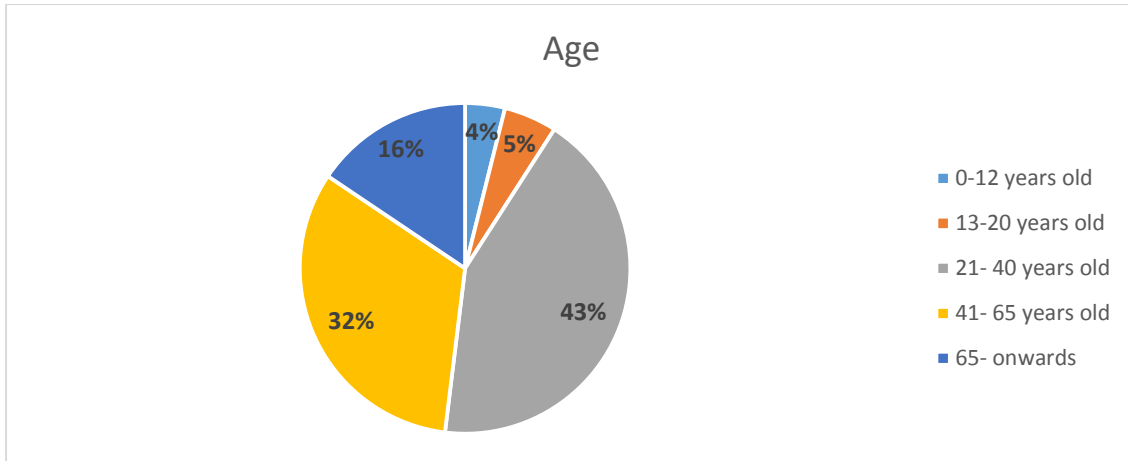


Figure 1: Profile of The Respondents According to Age

Figure 1 shows the profile of the respondents according to age. It revealed that out of 77 respondents, 43% of the respondents belonged to the age bracket of 21 - 40 y/o; 32 % were from 41- 65 y/o; 16% from the age bracket of 65 y/o- on wards; 5% from 13 - 20 y/o and 4% from 0 - 12 y/o bracket.

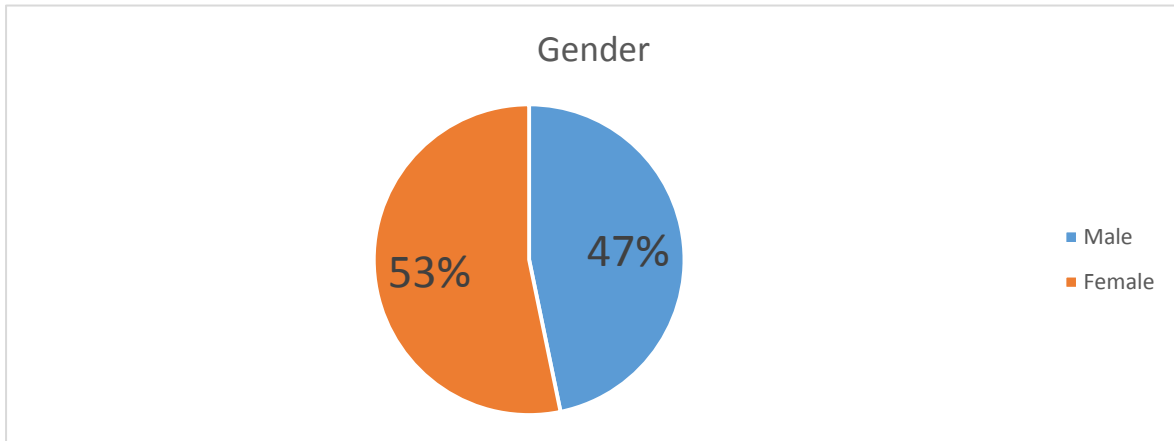


Figure 2: Profile of The Respondents According to Gender

Figure 2 illustrates the profile of the respondents according to gender. The results revealed that out of 77 respondents, 53% were female and 47% were male.

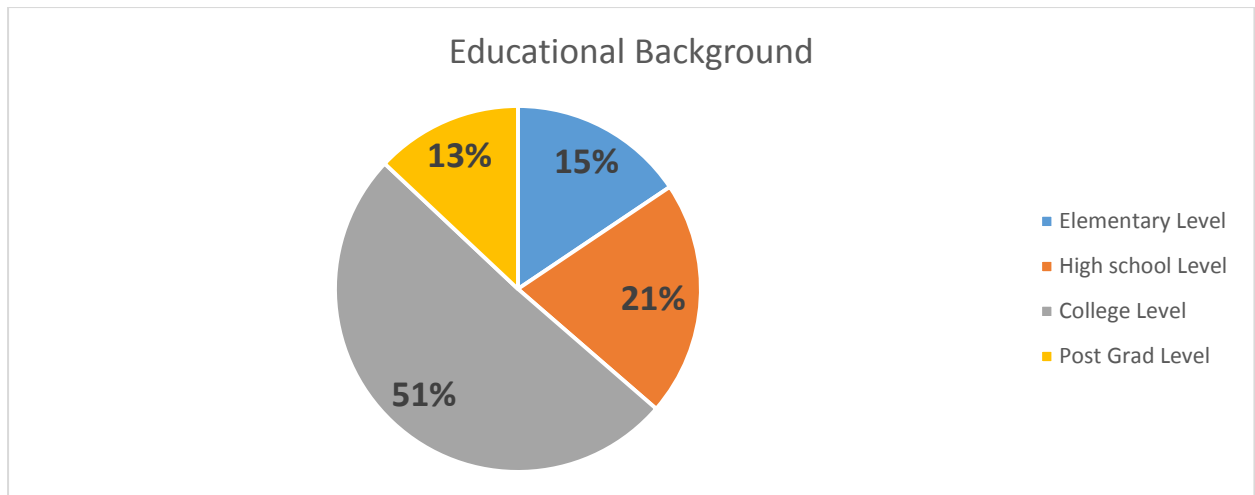


Figure 3: Profile of The Respondents According to Educational Background

Figure 3 revealed that most of the respondents were at the college level (51%) followed by those at high school level (21%), then from the elementary level (13%) and lastly those from the post graduate level (13%).

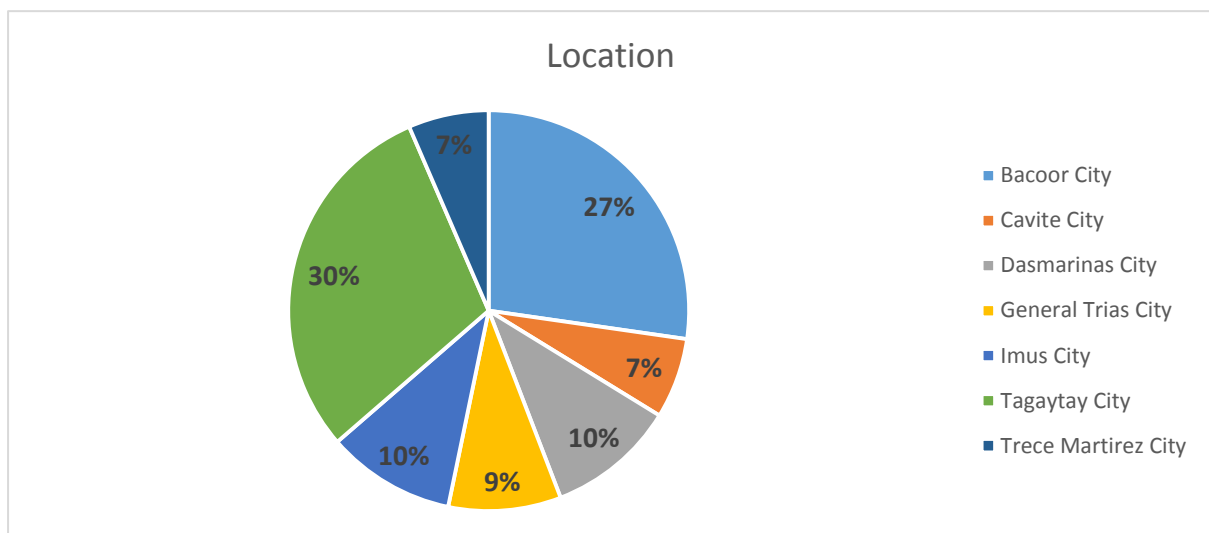


Figure 4: The Profile of the Respondents According to Location

Figure 4 illustrates the profile of the respondents according to location. The results revealed that out of 77 respondents, 30% were from Tagaytay; 27% were from Bacoar City; 10% were from both Dasmariñas City and Imus; 9% from General Trias and 6% from both Trece Martirez and Cavite City.

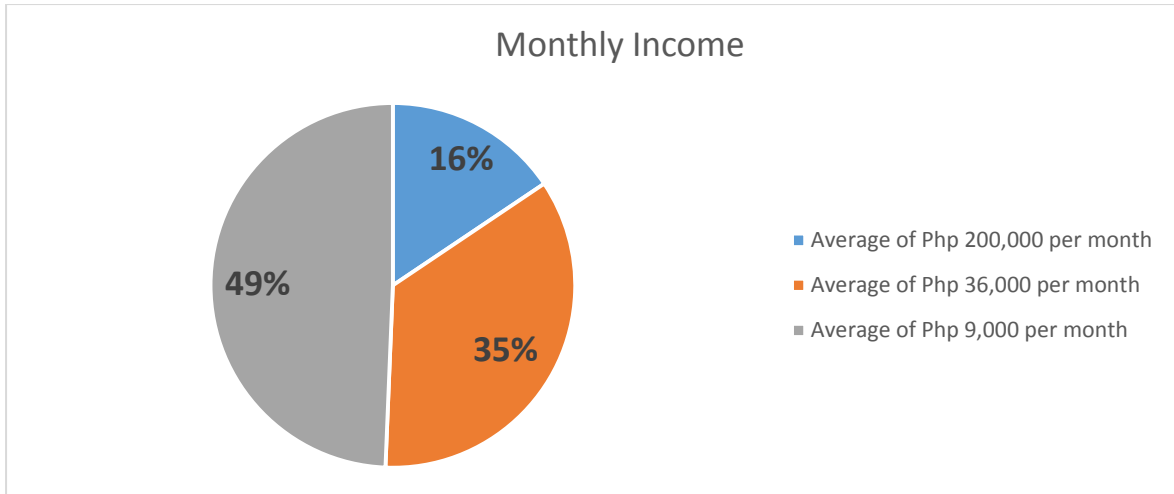


Figure 5: Profile of The Respondents According to Monthly Income

Figure 5 illustrates the profile of the respondents according to monthly income. The results revealed that out of 77 respondents, 49% has an average of Php 9,000 per month; 35% has an average of Php 36,000 per month and 16% has an average of Php 200,000 per month.

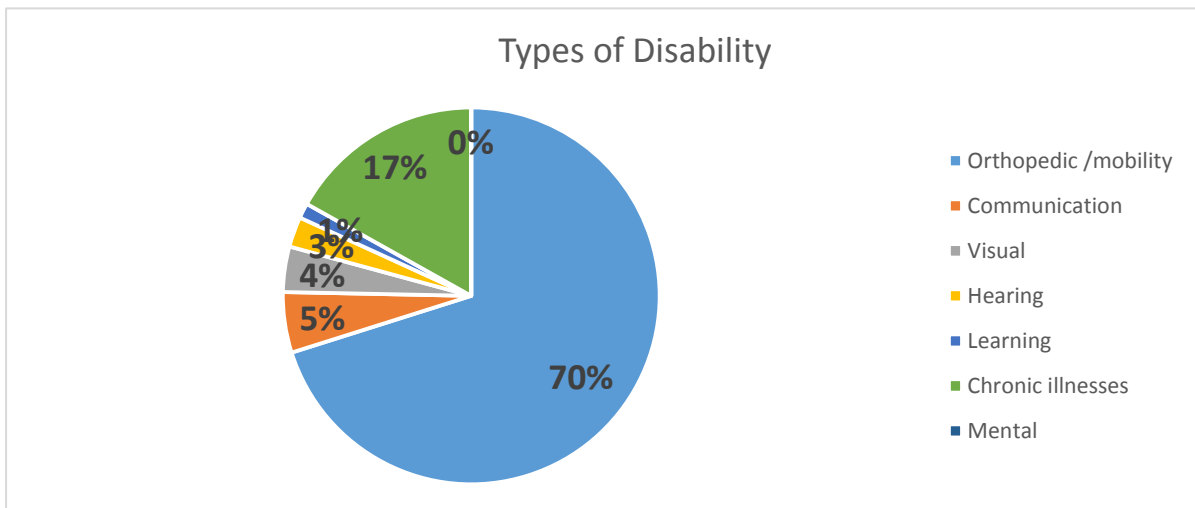


Figure 6: The Profile of the Respondents According to Type of Disability

Figure 6 shows the profile of the respondents according to the type of disability. It revealed that out of 77 respondents, 70% has orthopedic or mobility disability; 17% has disability that resulted from chronic illness. 5% has communication disability; 4% is visually disabled, 3% were hearing impaired; 1% has learning disability, and none has been reported with mental disability.

Predictors of and Barriers Associated with Health Services Utilization

Respondents experience “some extent” barriers in accessing health care services in terms of financial (over all mean of 2.81), structural (over all men of 2.71) and cognitive (over all mean of 2.6) (Table 3).

Table 3. Barriers Associated with Health Services Utilization among Persons with Disability

Type of Barrier	Over all mean	Interpretation
Financial	2.81	Some extent
Structural	2.71	Some extent
Cognitive	2.6	Some extent

Meanwhile, based on the evaluation of health care services utilization, general health/ medical services are “sometimes” utilized (over all mean of 2.67) while, rehabilitative (over all mean of 2.25), dental (2.10) and psychological (1.55) are “rarely” utilized by the respondents (Table 4).

Table 4. Utilization of Healthcare Services among Persons with Disability

Healthcare Services	Over all mean	Interpretation
General Health/ Medical Services	2.67	Sometimes
Rehabilitative	2.25	Sometimes
Dental	2.10	Sometimes
Psychological	1.55	Rarely

Based on the results of regression analysis for variables predicting health services utilization among persons with disability, age, location and monthly income are significant predictors of utilization of health care with p-value less than 0.05 (Table 5).

Table 5: Regression analysis for variables predicting health services utilization

β_j	t-statistics	H ₀	H _a	p-value	Conclusion
Age	2.04	$\beta_1 = 0$	$\beta_1 \neq 0$	0.045	Reject H ₀
Gender	-0.52	$\beta_2 = 0$	$\beta_2 \neq 0$	0.606	Accepted
Type of Disability	-0.61	$\beta_3 = 0$	$\beta_3 \neq 0$	0.547	Accepted
Location	2.30	$\beta_4 = 0$	$\beta_4 \neq 0$	0.025	Reject H ₀
Monthly Income	-4.37	$\beta_5 = 0$	$\beta_5 \neq 0$	<0.001	Reject H ₀
Educational Background	0.07	$B_6 = 0$	$B_6 \neq 0$	0.941	Accepted
<i>F- statistics: 13.93 p-value: 0.0002 RMSE: 0.48829 R-squared: 0.3113</i>					

Based on the table above, using F-statistics, it can be concluded that at least one of the independent variables is a good predictor of utilization of health services. The 31.13% variability of utilization of health services can be accounted from the given independent (predictor) variables. Furthermore, based on t-statistics, only age, location and monthly income become statistically significant predictor of utilization of health care with p-value less than 0.05. Low RMSE value of 0.48829 indicates a well-fitting

Further, the results of regression analysis for variables predicting barriers in accessing health services among persons with disability only education is statistically significant predictor of utilization of health care with p-value less than 0.05.

Table 6: Regression analysis for variables predicting barriers in accessing health services utilization

β_j	t-statistics	Ho	Ha	p-value	Conclusion
Age	-0,01	$\beta_1 = 0$	$\beta_1 \neq 0$	0.992	Accepted
Gender	0.78	$\beta_2 = 0$	$\beta_2 \neq 0$	0.436	Accepted
Disability	-0.83	$\beta_3 = 0$	$\beta_3 \neq 0$	0.412	Accepted
Location	0.82	$\beta_4 = 0$	$\beta_4 \neq 0$	0.415	Accepted
Mi	0.75	$\beta_5 = 0$	$\beta_5 \neq 0$	0.459	Accepted
Educ	-5.83	$B_6 = 0$	$B_6 \neq 0$	<0.001	Reject Ho
<i>F- statistics: 6.71 p-value:< 0.0001 RMSE: 0.72166 R-squared: 0.3652</i>					

Based on table shown, it can be concluded that at least one of the independent variables is a good predictor of the perceived barriers experienced by the respondents. The 36.52% variability of utilization perceived barriers experienced by the respondents can be accounted from the given independent (predictor) variables. Furthermore, based on t-statistics, only education become statistically significant predictor of the perceived barriers experienced by the respondents with p-value less than 0.05.

Discussion

Respondents experienced “some extent” financial barriers in accessing health care services. In low-income countries (LIC), health care and related expenditures feature prominently as causes of impoverishment. Moreover, Krishna (2006) identified the cost of treatment for illness to be the cause of 85% of all cases of impoverishment. Van Doorslaer et al. (2006) found that an additional 78 million people in 11 Asian countries fall below the extreme. One cause of low patient compliance to physical therapy is financial difficulty. Low compliance to therapy can prolong the recovery of the patient; thus, increasing the difficulty for both patient and family. Both the patient and the family experience the financial difficulty brought about by poverty. With regard to structural barriers, respondents experienced “some extent” difficulty in accessing health care services. The noted difficulty are coming from the distance of the health care facilities, transportation and the process in availing health care services and lack of initiatives coming from the government. PWD and providers both perceive transportation issues as the highest ranked barriers and physical access issues as the lowest ranked barriers (Mc Doom et. al, 2014). Further, PWD find it difficult to walk to health centers for treatment due to lack of transport, money to pay for treatment and toilet facilities and the distance is too far for people with lower-limb disabilities. There is a need to consider the different issues affecting health care access for people living with disabilities to achieve equitable access to health care services (Van Rooy, 2012). Equally, respondents generally experience “some extent” difficulty in accessing health care services due to cognitive barriers. Respondents experience barriers in availing government services, and have limited knowledge as to the law and provisions and the different services being offered to the persons with disability. This revealed an agreement with Chopra (2013), where he expressed that lack of information regarding governmental schemes and policies in favor of disabled people is another major barrier faced by them. In addition, People with disabilities also had trouble accessing health care facilities and services in part due to lack of access to adequate rehabilitation devices and services. In the case of people who are deaf or have difficulty of hearing, they have difficulties communicating with health care professionals and getting emergency services. According to WHO (2016), policy barriers are frequently related to a lack of awareness or enforcement of existing laws and regulations that require programs and activities be accessible to people with disabilities. Given these findings, we can infer that PWDs still experience difficulty in availing health care services due to limited knowledge. Limited knowledge of PWDs can affect the implementation of the program of the government in addressing the problems and the needs of PWDs. Government should focus in strengthening its information campaign drive in reaching PWD not only in the city but also in the far flung areas.

On health care services utilization, majority of the general health and medical services are utilized by PWD; services such as checkup, laboratory examination and vaccination are “sometimes” utilized. Regular checkup and laboratory examination can help prevent problems or secondary complication. Checkups can detect early problems that can be treated by conservative management. Moreover, vaccination is important not only for children with disability but also for adult and geriatric patients. Vaccination has greatly reduced the burden of infectious diseases. Further, benefits of vaccination extend beyond prevention of specific diseases in individuals. Conversely, Referrals to other health professionals, health education, nutritional counseling as well as surgical procedure are “rarely” utilized. Referral is considered an important part of patient care especially to the PWD. PWD should be referred to other specialist for further management, treatment or as needed. Dental services such as routine checkups, dental prophylaxis, laboratory and diagnostics examination are “rarely” utilized by PWD. According to National Institute of Dental Craniofacial Research, smaller-scale studies show that the population with mental retardation or other developmental disabilities has significantly higher rates of poor oral hygiene and needs periodontal disease treatment than the general population, due, in part, to the limitations in individual understanding of and physical ability to perform personal prevention practices or to obtain needed services. In the aspect of Rehabilitative Services, checkups, follow ups and physical therapy services are “sometimes” utilized by the respondents. Rehabilitation of persons with disability reduces the impact of a broad range of health conditions. Typically, rehabilitation occurs for a specific period of time, but can involve single or multiple interventions delivered by an individual or a team of rehabilitation workers, and can be needed from the acute or initial phase immediately following recognition of a health condition through to post-acute and maintenance phases. Rehabilitation involves identification of a person’s problems and needs, relating the problems to relevant factors of the person and the environment, defining rehabilitation goals, planning and implementing the measures, and assessing the effects. Educating people with disabilities is essential for developing knowledge and skills for self-help, care, management, and decision-making. People with disabilities and their families experience better health and functioning when they are partners in rehabilitation. Therapy is important for immediate recovery after the injury so as to prevent disability. Early rehabilitation interventions seem to be essential for how well a patient recover after a severe brain injury. It might even increase the chances for long-term survival. Likewise, Convincing evidence shows that some therapy measures improve rehabilitation outcomes. Therapy interventions have also been found to be suitable for the long-term care of older persons to reduce disability. Some studies show that training in activities of daily living have positive outcomes for people with stroke. Based on the researcher’s experience, patients compliance to treatment is also affected by the the cost of the therapy, chronic illness and disability usually have a greater financial impact to the patient and to the family.

Based on the regression model and the inter relationship of the variables (contextual factors, barriers and the health care services utilization) among persons with disability, only few variables in the respondents demographics can be used as predictors in both health utilization and barrier. Identifying the needs of the respondents and increasing its health literacy through health education can directly affect the utilization. In the same token, identifying the barriers and finding solutions to address those problems can greatly affect the health care services that can also affect the utilization. Increase in health care services utilization leads to inclusive health care services.

Conclusion

Generally, persons with disability are still considered part of the vulnerable sector in the country, and rates of disability were increasing due to population aging and increases in chronic health conditions, among other causes. In spite of numerous bills and law that are geared towards inclusive society, PWD still face barriers in everyday activities which have greater impact in their lives particularly on their health. As identified in research literature, people with disabilities have less access to health care services and therefore experience unmet health care needs. Like ordinary individuals, they have general health care needs and therefore need access to mainstream health care services. However, within these constraints, the study has provided much needed

information on socio economic determinants differences of PWD populations by describing differences in experienced barriers and health care services utilization. At present, health care service development is based on the assumption that service provision reflects assessed need. It is therefore suggested that these barrier and utilization data be used to inform the development of planning, particularly for PWD, where planners often lack information about the characteristics and service used of their shared care populations.

Recommendation

Identify the persons with disability in the community and develop an up-to-date databank for easy identification of the PWDs.

Create a Barrier-free environment advocacy or initiatives the enables people with disabilities to perform independent functioning as an individual so that they can participate without assistance in everyday activities.

Develop Disability Prevention Policy - Disability can be prevented through proper education. Strong policy that will focus on disease prevention that can result to disabilities. Further, this involves creation of awareness regarding measures to be taken for the prevention of disabilities during the different stages of pregnancy and other work related injuries.

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ABC STRATEGY: HOW UNIVERSITY STUDENTS PERCEPTION OF ABC STRATEGY INFLUENCES UPTAKE OF REPRODUCTIVE HEALTH PROGRAMS

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Abstract:

Background: Attitude is what influences all actions an individual undertakes in life. Young adult's attitude on sexual reproductive health has proven to have a significant influence on their sexual health lifestyle and access to healthcare. Institutions of higher learning have put in place measures to ensure student have access to youth friendly services yet this has not been matched with students utilizing the various reproductive health services within the university. To fully understand students attitude towards uptake of reproductive health services, the current study grounded on the health belief model builds on previous researches examining on youth attitudes' to sexual and reproductive health. **Methodology:** Reflecting on 178 structured questionnaire administered to undergraduate students in Kenyatta University. **Results:** This paper highlights how students' attitude to ABC strategy influences uptake of reproductive health services. Results indicated that student had a negative attitude towards abstaining, nearly half had a positive attitude to being faithful to one partner. Chi square results revealed significant relationships between uptake of reproductive health services and students attitude to abstinence till marriage ($p=0.014$), attitude in condom use ($p=0.005$). **Discussion:** Findings also showed a positive attitude to condom use contrary to some literature on the use of condoms among youths. ABC strategy had a significant impact on uptake to reproductive health programmes. The study established that students' attitude to the ABC strategy for protective sexual behaviour influenced uptake of reproductive health services. **Conclusion:** In light of these findings, the study recommends need for reproductive health programmes to redouble their efforts in strengthening the ABC strategy among university students in order to positively influence students' sexual attitudes and behaviour.

Keywords: Attitudes, ABC, Sexual reproductive health, Students, Uptake

Introduction

High risk sexual behaviors (HRSB), include multiple sexual partners, inconsistent condoms use, sex for favors, drugs and alcohol abuse that culminate in sexually transmitted infection (STI), including Human Immunodeficiency Virus (HIV), unplanned pregnancy and abortion (Johnson, 2011). Johnson further stipulates that HRSB, are established during adolescence, and often maintained into adulthood, affecting the health and wellbeing of an individual later in life. Several studies have noted that university students' engage in high risk sexual behaviors (Sinead *et al.*, 2013; Heeren *et al.*, 2012; Mwangi, Ngure and Thiga, 2012; Adam and Mutungi, 2007).

High risk sexual behavior of young adults has become of serious concern for institutions of higher learning because of the adverse consequences that are linked with young adults' engagement in HRSB (Moronkola and Idris, 2013). In addition, Moronkola and Idris noted that in the last two decades, this concern has been marked by the increasing number of reproductive health interventions aimed at young adults that have been established

in different parts of the world. Globally, there has been enormous effort to curb high risk sexual behavior among university students who are mainly young adults and form a strong pillar of every economy. As students continue to engage in HRSB it affects their health and well-being which is crucial to economic development and attainment of Sustainable Development Goals (SDG's). HRSB has been categorized as one of the health risk behaviours consistently found to correlate with increased morbidity and mortality rates among young people emanating from unplanned pregnancies, abortions, STIs, HIV and AIDS (Sinead *et al.*, 2013, Godia, 2012, Kirby *et al.*, 2010). The World Health Organization (2009b) reported that HRSB practises are estimated to be the second most important global health risk factor in the world, and linked to the spread of HIV (WHO 2009a). According to Schmidt (2015) HRSB also poses the possibility of both emotional distress and has costly physical health outcomes

Despite the availability of programmes aimed at curbing high risk sexual behavior, studies continue to reveal the increase in high risk sexual behavior among university student. In addition general uptake of reproductive health services by the adolescents and youths remains a worrying concern. (Sinead *et al.*, 2013; Heeren *et al.*, 2012; Mwangi *et al.*, 2012; Kimiywe *et al.*, 2008; Manoti 2015; Miller *et al.*, 2008; Adam and Mutungi, 2007).

Problem statement

Like many public Universities, Kenyatta University (KU) has in place RH programs and services that offer preventive and curative services on STIs and HIV. These services promote safe sexual behavior among students' through counseling, HIV testing, condom distribution, seminars and workshops on reproductive health in order to curb HRSB. However, several studies continue to show that HRSB among University students is on the increase despite the availability of a variety of reproductive health programmes to curb the behavior (Evidence to Action) (E2A), 2016; Manoti, 2015; Sinead *et al.*, 2013; Mwangi *et al.*, 2012; Kenya National Bureau of Statistics (KNBS) and ICF Macro, 2010; Kimiywe *et al.*, 2008; Miller *et al.*, 2008; Adam and Mutungi, 2007). Based on available literature so far, many of the studies conducted in universities have mainly focused on uptake of HIV and AIDS programmes especially the testing for HIV and AIDS, Voluntary Counseling and Testing (VCT) programmes. Notably, little has been done to establish the extent of uptake of programmes such as the peer counseling and mentoring services established to curb HRSB among university students. Walsh *et al.*, (2010) assert that although the implementation of such services is encouraging, creating services does not guarantee their use. Walsh *et al.*, 2010 adds that attitude is what influences all actions an individual undertakes in life. Young adult's attitude on sexual reproductive health has proven to have a significant influence on their sexual health lifestyle and access to healthcare. As a result, the foregoing discussion provides a background that necessitated the need to undertake this study which assessed how students' attitude influenced uptake of Reproductive Health Services (RHS) in Kenyatta University.

Purpose of the study

The purpose of this study was to determine students' attitudes on ABC strategy and how it influences their uptake of reproductive health services

Objectives of the study

This study was guided by the following specific objectives: 1) To assess influence of students' attitude towards abstinence on uptake of reproductive health services. 2) To establish if students' attitude on being faithful to one partner influenced uptake of reproductive health services. 3) To determine if students attitude on condom use and influenced uptake of reproductive health services.

Null hypothesis: The study hypothesised that; 1) there is no significant relationship between students' attitude towards abstinence and uptake of reproductive health services. 2) There is no significant relationship between students' attitude on being faithful to one partner and uptake of reproductive health services. 3) There is no significant relationship between students' attitude on condom use and uptake of reproductive health services.

Delimitations of the Study The study focused on university students who were residents within the KU main campus. In consideration of this, generalizations of the findings to other students in other universities must be done with caution.

Limitations of the study The study was confined only to undergraduate students in the regular mode of study programme thus locking out other students' indifferent levels of their studies and other modes of study.

Theoretical framework

This study was based on the Health Belief Model (HBM) by Rosenstock *et al.*, 1988). According to Rosenstock *et al.*, (1988) HBM is a cognitive model for understanding health risk behaviour including high risk sexual behaviour among various age groups making it suitable for this study. The HBM predicts whether individuals undertake preventive health behaviours and is contingent on five factors: (a) an individual's perception to susceptibility to an adverse health outcome; (b) an individual's perception of the level of severity of the adverse health outcome and related consequential outcomes; (c) an individual's perceptions of the benefits of given preventive behaviours in terms of helping them avoid the adverse health outcome; (d) an individual's perception of barriers to (or costs of) implementing given preventive behaviours. The fifth factor is the level of perceived self-efficacy which refers to the degree to which individuals believe that they are capable of implementing preventive actions (Rosenstock *et al.*, 1988).

In addition, students' attitude was hypothesized to influence students' engagement in high risk sexual behaviours. It was envisaged that students' with a positive attitude to behaviours that promoted safe sexual practises. Such as the ABC strategy will not indulge in high risk sexual behaviour. On the other hand, the study hypothesized that students' who had a negative attitude to adoption of the ABC strategy in their lifestyle most probably engaged in HRSB. Thus putting them at risk of encountering adverse reproductive health issues. Hence, refrain from utilizing reproductive health services on campus. Students' attitude towards service provision was also assumed to influence uptake of reproductive health services

Literature review

Students attitudes towards reproductive health services

Students' attitudes towards ABC strategy: A study by Liku, *et.al* (2010) on students' attitude towards ABC strategy at University of Nairobi (UoN) revealed that students attitude towards ABC strategy towards HIV and AIDS and unintended pregnancy prevention was not entirely positive though knowledge on ABC was relatively high (over 70%).

A study by Kairu (2006) in Kenyatta university revealed students had a positive attitude towards ABC strategy on HIV prevention. More than half of the student population interviewed (51%) had a positive attitude on abstinence, only 20% had a positive attitude to being faithful and only 17% had a positive attitude towards condom use. However their attitude on practicability of the ABC strategy abstinence was ranked number three, followed by being faithful to one partner and condom use as most effective. Therefore, this study sought to further explore if KU students attitude on ABC strategy influenced uptake of reproductive health services.

Health service providers' (HSP) attitudes have been identified as a major barrier that discourages young people from seeking or going back for reproductive health services (Godia, 2012; Obonyo, 2009). A study by Warenaus

et al., (2006) in Kenya and Zambia revealed that reproductive health services were underutilized by youths due to judgmental attitude of health providers and lack of competence coupled with lack of knowledge in youth friendly service provision. A study in Ethiopia on health workers attitude toward sexual and reproductive health services for unmarried youth revealed that some health workers were setting up penal rules and regulations against premarital sex thus restricting youths from visiting the RHS (Tilahun *et al.*, 2010). Studies also indicate that HSP influence uptake of reproductive health services as most youth report that they are afraid of HSP because they ask personal and judgmental questions and sometimes give advice that is scary which discourages them from seeking services (Godia, 2012). Thus the study sought to examine student's attitude of the health service provider's friendliness and how it has influenced uptake of reproductive health services at Kenyatta University.

Assumptions of lack of anonymity and confidentiality have been seen as a hindrance to access and uptake of reproductive health services. A study by (Kiran *et al.*, 2015) revealed that majority of student's participants (71%) said the lack of confidential services was a significant barrier to their utilization of Sexual Reproductive Health (SRH) services. Similarly, 30% believed available services were inadequate to meet their SRH needs hence did not utilize the service or sought for them elsewhere. Thus the study sought to examine KU student's attitude of the health service provider's friendliness and if confidentiality was maintained thus influencing their uptake of reproductive health services.

Research Methodology

Research design; This study used the survey research design which was cross-sectional because it was carried at one point in time. According Robson (2011), survey research seeks to obtain information that describes existing phenomena by asking individuals about their perceptions, attitudes, behaviour or values. The survey design is also convenient in collecting extensive data from a large scale of respondents within a short period of time (Mugenda and Mugenda, 2012). It yields reliable quantifiable data as it is collected at one point in time and conclusions can be inferred to the whole population (Kothari, 2004). For this study, it enabled the researcher to seek information from students on their attitudes how the attitudes influenced their uptake of reproductive health services. **Independent variables:** Students' attitude for ABC strategy was measured by a set of five items for each component scored on a five-point scale ranging from strongly disagrees to strongly agree. The attitude score was created by calculating the means of the items for each construct. Whereby, a high value score corresponded with a positive attitude and a low value score corresponded with a negative attitude.

Dependent variable The dependent variable for the study was students' uptake of RHS which was measured by student attesting to use of VCT, YFS, ACU, ICL, peer counseling, mentoring programmes and KU wellness Centre.

Target population The study targeted only registered undergraduate students' on regular mode of study residing in the main campus hostels during the first semester of academic year 2014/2015 from the month of September 2014 to December 2014.

Inclusion criteria The study only included registered undergraduate students for academic year 2014/2015 first semester residing within the main campus hostels from September 2014 to December 2014 as the main participants for the research. These students were more likely to access and utilize the services that are situated within the campus compared to nonresident students' who may decide to seek services outside the campus.

Exclusion criteria Registered undergraduate students for academic year 2014/2015 first semester who were not residents within the main campus hostels at the time of study were excluded from the study.

Sampling technique Sampling technique is part of the research plan that indicates how cases are to be selected for observation. In this study, a combination of purposive sampling, proportionate sampling and stratified and

simple random sampling were used. Kenyatta University main campus student residential area is divided into three zones which were all included in the study. In order to ensure a representative sample, proportionate random sampling was done from the three residential zones. Stratified random sampling was used to select four hostels from each zone whereby two were male hostels and two female hostels to ensure gender representation from where respondents were to be selected. Simple random sampling was used to get to the respondent.

Sample size The population for students residing in main campus was approximately 10,033 students. The sample size for the study was determined using Fisher *et al.*, (1995) formula for a population of above 10,000.

$$\frac{n = Z^2 p (1-p)}{d^2}$$

Where;

n- Sample size

Z- Statistic for a level of confidence (95% level of confidence, *Z* value is 1.962)

p- Expected proportion in the target population. (Assuming 50%, *p* =0.05)

d- Precision level of statistical significance (7%, *d*=0.07)

$$\frac{n = (1.962)^2 \times 0.5 (1-0.5)}{(0.07)^2}$$
$$n = 200$$

Therefore, from this equation a total of two hundred students (200) were selected as respondents for this study.

Data collection tool and procedure : Data from the student participants was collected by use of a self-administered questionnaire since it guaranteed anonymity and confidentiality. Kothari (2004) stipulates that use of the questionnaire is one of the major ways to elicit self-reports on people's opinions, attitudes, beliefs and values. The questionnaire contained closed-ended questions to provide specific responses and open ended items for in depth information. Open ended questions permit a greater depth of response and give an insight into the respondents' feelings, backgrounds, hidden motives and intentions (Mugenda and Mugenda, 2012).

For the administration of student questionnaire, the researcher together with the help of two trained research assistants visited the selected hostels in the evening during weekdays from 5pm to 7pm after classes. Students' approached in the selected hostel, were first engaged by creating a rapport between the researcher and student explaining the purpose of the study. Probing of the student was done to ascertain they were the ones allocated the given room. Students' consent to participate in the study was sought who upon consenting would sign the consent form and a questionnaire was then handed over for them to fill. Students' were also informed the researcher preferred to wait for them to fill up the questionnaire.

Pre-testing Before commencing the study, pre-testing of the study instruments was conducted. The aim of pre-testing was to assist in determining accuracy, clarity and suitability of the research instruments and to check their validity and reliability (Mugenda and Mugenda, 2012). The pre-testing study was conducted at the school of business and involved a total of fifteen students. The fifteen students were self-sponsored students who were not residents in the main campus hostel hence could not be duplicated in the main study. Two staff members employed to offer services at the university programmes were also involved in the pre-testing. Adjustments were made in order to make the research instruments more appropriate before the actual field work begun. The responses derived from the pretest were used by the researcher to refine the questionnaire by rephrasing and editing thus ensuring that the questions conveyed the same meaning to all respondents. The pretest enabled the researcher to test the appropriateness of the study tool by ensuring that items tested what they were intended to (validity) and that they consistently measured the variables in the study (reliability). It also helped to estimate the length of time for the administration of instruments.

Validity of instruments Validity refers to the extent to which an instrument measures what it is intended to measure based on objectives (Kothari, 2004). To enhance validity of the research instruments, peer review was done where the study proposal was presented twice at the department. Consistent consultations were done by the researcher together with supervisors and other expatriates who were knowledgeable in the reproductive health field of study. This helped in establishing ambiguous questions and missing gaps in the questionnaire, and corrections were made on research items that were not clear before being used in the actual study.

Reliability of instruments Reliability of measurement is the degree to which a particular measuring procedure gives similar results over a number of repeated trials thus, pre-testing is a good way to check for reliability of the data collection instruments (Kothari, 2004). Reliability test was conducted for the likert scale items using Statistical Package for Social Sciences (SPSS) where internal consistencies were analysed using Cronbachs coefficient alpha. The results of Cronbachs Coefficient Alpha yielded a value of 0.78 which was acceptable.

Logistical and Ethical considerations

Prior to conducting the study, Permission from relevant authorities' in relation to this study was sought. Approval from the graduate school was sought permitting the researcher to proceed in the area of study. Permission from Kenyatta University Management was mandatory since the study was based within the university. An acceptance letter was issued that facilitated the researcher to conduct the study within the university. Ethical clearance was also sought from Kenyatta University Ethics Review Committee the research body in the university mandated to review proposals. A research permit to conduct the study was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) which is the national research coordinating body in Kenya. Voluntary participation and consent of respondents was sought before commencement of study and respondents were requested to sign the consent form when they agreed. The respondents were assured of confidentiality and also informed that they could withdraw from the study, when they so wished without any consequences.

Data analysis This study generated both qualitative and quantitative data. Quantitative data collected was analysed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics of means, frequencies and percentages were used to describe and summarize data. Inferential statistics used included chi-square to test relationship among variables. Data presentation was done through tables.

The qualitative data obtained from the open ended questions in the students' questionnaire was manually explored, to check for emerging themes. They were then clustered in a patterned order so as to identify variables that depicted general concepts that occurred repeatedly. Information generated was also statistically analyzed so as to elaborate on factors influencing students' uptake of reproductive health services. Chi-square test of significance at a significance level of $P < 0.05$ was used to establish the relationship between the dependent and independent variables. The chi-square test of was preferred since both the dependent and independent variables used in the study were categorical.

The targeted sample size for this study was 200 students. However, a total of 178 respondents participating in the study were used for analysis indicating a response rate of 89.0%. According to Timothy and Wislar (2012), a response rate of 85% and above is considered to be good. The non-response rate by participants was contributed to the fact that 6% of the questionnaires were not dully filled thus could not be analyzed, and 5% of the students did not submit back their questionnaires.

Research findings

Students attitude of ABC strategy as a safe sex practise

The researcher sought to obtain students' attitude on selected safe sex practise that could be attributed to students' uptake of reproductive health services. This was guided by the abstinence, being faithful to one partner and condom use (ABC) behavioural preventive strategy. ABC strategy was regarded as protective factor for behaviour change thus resulting to a positive health outcome in curbing high risk sexual behaviour.

Table 1: Students attitude towards ABC strategy

ABC strategy	Positive		Negative		Total	
	F(n)	%	f (n)	%	F (N)	%
Abstinence	71	39.9	107	60.1	178	100
Being faithful to one partner	128	71.9	50	28.1	178	100
Condom use	102	57.3	76	42.9	178	100

Findings from table 1 reveal that more than half of the students 60.1% had a negative attitude on abstaining this indicates the desire to indulge in premarital sex that can lead to high risk sexual behaviours such as early sexual debut among students. Thus students engaging in premarital sex may fear utilizing reproductive health services with the attitude that the health service providers will judge them for engaging in premarital sex. Whereas only 39.9% of the students who had a positive attitude in abstaining till marriage.

Students had a positive attitude to being faithful to one partner with nearly three quarters (71.9%) of the students agreeing it's essential to remain faithful to one partner. With only 28.1% of the students having a negative attitude towards being faithful to one partner. Thus this could result to students utilizing reproductive health services to seek services such as family planning and counseling seeing on how to have healthy relationships.

Students also had a positive attitude with more than half of the students (57.3%) feeling that it was important for one to use condom use when engaging in sex. Whereas 42.9% of the students had a negative attitude towards condom use. Negative attitude towards condom use could result to increased uptake of RHS as individuals may seek help to avert consequences associated with lack of condom use for example post exposure prophylaxis, getting emergency pills at the YFS as well as VCT services to check if they have contracted the virus.

Student's Attitude on Abstinence and Uptake of Reproductive Health Services

The study sought to establish if students' attitude in abstinence had any influence on their uptake of reproductive health services. Results, of these findings are presented in table 4.24.

Table 2 Abstinence and Uptake of RHS

Abstinence	Utilized RHS	Not utilized RHS	Total
Positive	14	57	71
	19.70%	80.30%	100%
Negative	65	42	107
	60.70%	39.3	100%
Total	79	99	178
	44.40%	55.60%	100%

$$\chi^2 = 12.432; C=0.256; df = 4; p= 0.014$$

Results presented in table 4.24 above reveal that only 19.7% with a positive attitude had utilized reproductive health services whereas more than three quarter (80.3%) who had a positive attitude did not utilize reproductive health service. This could mean that students with a positive attitude towards abstinence perceived they were safe from ill sexual health thus did not find the need to utilize reproductive health services.

Findings indicate that more than half of the students (60.7%) with a negative attitude towards abstaining utilized reproductive health services. This could be an indication that students perceived themselves at risk and susceptible to illness due to their engagement in sexual activity thus sought RHS for protective measures or treatment Whereas, only 39.3% with a negative attitude had not utilize reproductive health services.

Chi-square results ($\chi^2 = 12.432$; $C=0.256$; $df = 4$; $p= 0.014$) show there was a significant relationship between students attitude on abstinence and uptake of reproductive health services at a significance level of 0.05. Therefore, the null hypothesis that there was no significant relationship between students' attitude and uptake of reproductive health services was rejected for abstinence.

Being Faithful to One Partner and Uptake of Reproductive Health Services

Being faithful to one partner was an important variable in this study as this would probably reduce students' engagement in multiple sexual partners. Moreover, studies have shown that individuals in stable relationships have high self-efficacy on negotiating for condom use and contraceptives and are most likely to engage in safe sexual practises (Schmidt, 2015). Hence, the study sought to establish if students' attitude in being faithful to one partner had influence on uptake of reproductive health services.

Table 3 Being Faithful to One Partner and Uptake of RHS

Being faithful to one partner	utilized RHS	not utilized RHS	Total
Positive	56 43.70%	72 56.30%	128 100%
Negative	23 46%	27 54%	50 100%
Total	79 44.40%	99 55.60%	178 100%

$\chi^2 = 1.309$; $C=0.085$; $df= 4$; $p= 0.860$

Results presented in Table 3 show that 43.7% students with a positive attitude on being faithful to one partner had utilized reproductive health services whereas more than half of the students (56.3%) with a positive attitude did not utilize reproductive health services. Fining continue to reveal that nearly half of the students (46%) with a negative attitude towards being faithful to one partner utilized reproductive health services thus they perceived to be at risk of sexual health illness maybe due to their engagement in HRSB such as having multiple sexual partners. Whereas more than half (54%) with a negative attitude did not utilize reproductive health services

The Chi-square results ($\chi^2 = 1.309$; $C=0.085$; $df= 4$; $p= 0.860$) reveal there was no significant relationship between students attitude on being faithful to one partner and uptake of reproductive health services at a significance level of 0.05. Thus, the null hypothesis that there was no significant relationship on students' attitude and uptake of reproductive health services was retained for being faithful to one partner.

Students' Attitude on Condom Use and Uptake of Reproductive Health Services

Students attitude on condom use was assessed and its influence to uptake of reproductive health services. Results of this study regarding students' attitude on condom use and uptake are presented in Table 3.

Table 3: Condom use and Uptake of Reproductive Health Services

Condom use	Utilized RHS	Not utilized RHS	Total
Positive	59 57.80%	43 42.20%	102 100%
Negative	20 26.30%	56 73.70%	76 100%
Total	79 44.40%	99 55.60%	178 100%

$\chi^2=14.926$; $C=0.278$; $df=4$; $p=0.005$

Findings presented in Table 3 indicate that there was a significant relationship between students' attitude on condom use and uptake of reproductive health service. Results show that more than half of the students (57.8) with a positive attitude towards condom use had and 42.2% of the students with a positive attitude to condom use did not utilize reproductive health services. Whereas, nearly a quarter of the students (26.3%) with a negative attitude towards condom use had utilized RHS and nearly three quarter of the students (73.7%) with a negative attitude towards condom use had not utilized reproductive health services

This finding could be an indication that students who had a positive attitude to safe sexual practises engaged in positive sexual behavioural practises such as condom use and utilizing of reproductive health services. On the other hand, those with negative attitude towards safe sexual practises engaged in negative sexual behavioural practises like inconsistent/lack of condom use, not utilizing reproductive health services and hence could be at high risk of suffering from adverse consequences of engaging in high risk sexual behaviour.

The chi-square results ($\chi^2=14.926$; $C=0.278$; $df=4$; $p=0.005$) revealed there was a significant relationship between students attitude on condom use and uptake of reproductive health services at a significance level of 0.05. Thus, the null hypothesis stating that there is no significant relationship between students' attitude and uptake of reproductive health services was rejected with regard to condom use.

Discussion of findings

Students attitude influencing uptake of reproductive health services

The study established that students' attitude to the ABC strategy for protective sexual behaviour influenced uptake of reproductive health services. Students' attitude on condom use had a significant relationship in utilization of reproductive health services. This could be attributed to the fact that most of the students with a positive attitude utilized reproductive health services in order to get more information on condom use as well as get more condoms that are distributed at the RH programmes. Those with a negative attitude towards abstaining till marriage majority had utilized reproductive health services an indicator that students' were engaging in sexual relations when not married and could also mean student engagement in HRSB.

An association between being faithful to one partner and seeking of reproductive health services was discovered with majority of those who strongly believed in being faithful to one partner having sought services from the various programmes. These findings are in agreement with Kairu (2006) and Liku *et al.*, (2010) studies on students' attitude to ABC strategy have called for the need of RH programmes to redouble their efforts in

strengthening the ABC strategy among university students in order to positively influence students' sexual behaviour.

Conclusion

The study established that more than three quarter (71.9%) of the students had a positive towards being faithful to one partner. And more than half (57.3%) had a positive attitude to condom use. Nearly half (41.6%) of the respondents had a positive attitude that reproductive health service providers were friendly and maintained confidentiality. However, majority of the students' more than half (60.1%) had a negative attitude to abstaining.

Uptake of reproductive health services was significantly related to students attitude on abstinence ($p=0.014$), condom use ($p=0.005$), confidentiality is maintained ($P=0.001$) and service providers were friendly ($P=0.000$). Hence, hypothesis there was no significant relationship between students' attitude and uptake of reproductive health services was rejected for this study. Based on the findings, students' attitude was found to greatly influence uptake of RHS.

Recommendations

In view of the findings that emerged from this study, the following recommendations are made with regard to practise: Programmes need to adopt strategies that strengthen ABC strategy so as to influence students' attitude to adopt safe sex practises. A comparative study could be carried out between students residing off campus and those residing on campus to establish whether there are differences in their uptake of reproductive health services in the University.

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SUB-NATIONAL INEQUALITY OF CAESAREAN SECTION IN URBAN-RURAL AREA OF INDONESIA

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Abstract: Cesarean section is an important indicator of accessibility to the emergency obstetric care. The study aims to examine urban-rural inequality and determinant of caesarean section in Indonesia. Cross-sectional data from national household health survey (RISKESDAS) conducted in 2013 were used. A total of 49,045 aged 15-49 years having live births in the last 3 years preceding the survey was included into the analysis. We report absolute difference and ratio of caesarean rates between urban and rural for each province. The logistic regressions were used to identify determinant of caesarean section. The caesarean section rates in rural and urban were 5.4% and 13.4%; respectively. Province estimates of caesarean section rates were ranging from 3.1% in Southeast Sulawesi to 19.1% in DKI Jakarta. Sub-national inequality between urban and rural among province occurs, accounted for absolute difference between -0.2% (West Papua) to 16.2% (Gorontalo). The logistic regression indicates determinant of caesarean section includes older ages, higher education level, currently employed, living in urban area, living in rich household, had any complication during pregnancy, first child, post-term pregnancy and twin had higher caesarean section rates. This study provides evidence that sub-national inequalities of caesarean section rates between urban and rural in Indonesia remain. These inequalities might due to inadequate access to emergency obstetric care among rural subgroups. Sub-national specific intervention among rural population is needed to address these inequalities.

Keywords: caesarean section, sub-national, inequality, Indonesia

Introduction

Vaginal birth among pregnant women is considered when there is no identified risk of complication, either for the mothers or their babies (World Health Organization, 2018). When complications occur during pregnancy or labour, a caesarean section is needed as a life-saving surgical procedure (Betrán *et al.*, 2016). However, caesarean section is often performed for various non-medical reasons and lead to short- and long-term health problems (Souza *et al.*, 2010). The caesarean section should be assigned as an alternative when vaginal delivery cannot be conducted. However, the current caesarean delivery is not performed only because of medical indications, but because of patient demand.

The caesarean section rates have increased worldwide in the last two decades particularly in Latin America and the Caribbean (Betrán *et al.*, 2016). In Indonesia, the caesarean section rates have significantly increased during the last five years with 6.8% in 2007 to 12.3% in 2012 (Statistics Indonesia (Badan Pusat Statistik—BPS), National Population and Family Planning Board (BKKBN), Departemen Kesehatan and Macro International., 2008; Statistics Indonesia (Badan Pusat Statistik—BPS) *et al.*, 2013). In result, Indonesia exceed the upper limit of 10% caesarean section rates in population level, proposed by the World Health Organization (The World Health Organization, 2015). Countries with caesarean section rates above 10 percent do not show any benefit in reducing maternal and neonatal mortality (Ye *et al.*, 2016). Furthermore, high caesarean section rates should be a concern because caesarean sections can cause complications, disability or death particularly in condition of lack health facilities to conduct safe surgery (The World Health Organization, 2015). The decision to choose a caesarean delivery should follow medical procedures based on certain medical indications of the pregnancy.

Additional concerns and controversies surrounding caesarean section include inequities in the use of the procedure, not only between countries but also within countries and the costs that unnecessary caesarean sections impose on financially stretched health systems (Boatin *et al.*, 2018). In Indonesia, rapid societal development presents a considerable risk for disadvantaged populations to be left behind. There is no clear perspective about how residence differences have contributed towards maternal health intervention in Indonesia, specifically in caesarean section. Subnational analysis should be done because the provinces have local autonomy in the decentralization era, including public health autonomy. The aim of this study is to explore inequality of caesarean section rates stratified by urban-rural and examine socio-demographic determinants of caesarean section in Indonesia.

Methods

Cross-sectional data from national household health survey (RISKESDAS) conducted in 2013 were used for the analysis. We obtained official permission from the National Institute of Health Research and Development, Ministry of Health for analyzing the data. The RISKESDAS collected data on nutritional status, health services access and utilization, environmental health, infectious and non-communicable diseases, as well as blood sub-sample.

The survey employed multistage stratified sampling technique. The sampling frame of RISKESDAS 2013 consisted of 12,000 census blocks (cluster) which selected from master sample area from the 2010 population census. In each selected cluster, 25 household were selected from a complete list of households. There were 294,959 households interviewed from a total of 300,000 selected households from the sample, obtained a response rate of 98.3%. The samples were representative from 33 provinces (497 districts/cities) in Indonesia. A total of 1,027,763 household members were interviewed using structured questionnaire and data were collected through interviews by trained enumerators. In this study, we restricted our analysis to women aged 15-49 years having live births in the last 3 years preceding the survey (n=49,045).

The outcome variable was birth occurred by caesarean section. The independent variables consisted of mother's age, mother's education, mother's occupation, place of residence, house hold economic status, complication during pregnancy, parity, term of delivery and whether the delivery twin or not. Maternal age was into 3 subgroups (15-19 years, 20- 34 years, and 35-49 years). Education was based on the last education obtained by the respondent (primary education or less education, secondary education and higher education). High school or above were grouped together into higher education. Working status was divided into unemployed and employed. Place of living was divided into urban and rural.

Household economic status Socio-economic status was an index constructed from household ownership information, using polychoric correlation analysis (PCA). Variables forming the index were: 1) the primary source of drinking water, 2) cooking fuel, 3) defecation facilities ownership, 4) type of toilet, 5) final feces disposal, 6) illumination source, 7) motorcycles, 8) television, 9) water heater, 10) gas cylinder 12 kg, 11) refrigerator, and 12) cars. The index then divided into 5 levels, with quintile 5 as the highest quintile and the lowest or poorest was quintile 1.

Complication during pregnancy was divided into ever had any complication and none. Term of delivery was divided into 3 subgroups (term, preterm and postterm). Women were classified as term delivery if they delivered in 9 months of pregnancy; preterm if they had delivery in 7-8 months of pregnancy; and postterm if they had delivery in 10 months of pregnancy.

We compare inequality of absolute difference and ratio between urban and rural using Hear Plus. Descriptive statistics and multilevel logistic regressions were used to identify determinant of caesarean section. The data were analyzed using STATA version 13.0 for windows. The adjusted Odds Ratio with 95% confidence intervals was calculated in order to assess the strength of association.

Results

Table 1 shows the caesarean section rate was substantially higher in urban (13.4%) compared with rural (5.4%) and was higher among older mothers (12.0% for 35-49 yearolds) compared with younger ones (4.4% for 15-19 year olds and 9.1% for 20–24 year olds). Caesarean section rates was lowest among mothers with the lowest level of education and increased with increasing education levels, from 5.5% among mothers with primary or less education to 24.0% among mothers with higher education. Furthermore, caesarean section rates were lower among mothers from the poorest quintile and increased with increasing economic status, from 2.0% in quintile 1 to 18.4% in quintile 5. The overall difference of caesarean rates between richest and poorest in urban area was 16.4% and the richest were 9.2 times higher than poorest. The rates were higher among mothers experience with any complication during pregnancy compare to no complication (16.5% and 8.4%, respectively).

Table 1 Prevalence of caesarean section in urban and rural area of Indonesia, RISKESDAS 2013

Characteristics	Total (95% CI)	Urban (95% CI)	Rural (95% CI)
Place of residence			
Urban	13.4 (12.7 - 14.1)		
Rural	5.4 (5.1 - 5.9)		
Mother's age			
15 - 19 years	4.4 (3.0 - 6.4)	7.0 (4.0 - 12.0)	2.9 (1.8 - 4.6)
20-34 years	9.1 (8.6 - 9.6)	12.7 (11.8 - 13.6)	5.2 (4.7 - 5.6)
35 - 49 years	12.0 (11.2 - 12.9)	16.6 (15.2 - 18.0)	7.0 (6.2 - 7.8)
Mother's education			
Primary or less education	5.5 (5.1 - 5.9)	7.6 (6.8 - 8.5)	4.1 (3.7 - 4.5)
Secondary education	13.9 (13.0 - 14.9)	16.2 (15.0 - 17.5)	8.7 (7.7 - 9.8)
Higher education	24.0 (22.2 - 25.9)	26.9 (24.6 - 29.3)	15.1 (12.7 - 17.8)
Mother's occupation			
Unemployed	8.9 (8.4 - 9.4)	11.8 (10.9 - 12.6)	5.4 (4.9 - 5.9)
Employed	11.1 (10.3 - 11.8)	17.3 (16.0 - 18.8)	5.6 (5.0 - 6.2)
Household economic status			
Quintile 1	2.0 (1.7 - 2.4)	2.6 (1.7 - 4.1)	1.9 (1.5 - 2.3)
Quintile 2	4.4 (3.9 - 5.1)	5.3 (4.2 - 6.8)	4.0 (3.4 - 4.8)
Quintile 3	7.7 (6.9 - 8.6)	8.7 (7.4 - 10.2)	6.6 (5.7 - 7.6)
Quintile 4	12.0 (11.1 - 12.9)	13.5 (12.4 - 14.7)	8.5 (7.4 - 9.8)
Quintile 5	18.4 (17.2 - 19.7)	21.0 (19.5 - 22.5)	10.8 (9.4 - 12.4)
Complication during pregnancy			
None	8.4 (8.0 - 8.8)	11.9 (11.2 - 12.7)	4.6 (4.2 - 5.0)
Any complication	16.5 (15.1 - 18.0)	21.3 (19.1 - 23.8)	10.7 (9.5 - 12.1)
Parity			
1	11.2 (10.3 - 12.1)	14.8 (13.5 - 16.2)	6.5 (5.7 - 7.5)
2 - 3	9.5 (8.9 - 10.1)	13.4 (12.4 - 14.4)	5.3 (4.8 - 5.9)
≥ 4	7.5 (6.8 - 8.3)	11.0 (9.7 - 12.5)	4.4 (3.8 - 5.1)
Pregnancy			
Aterm	8.9 (8.3 - 9.6)	12.8 (11.8 - 14.0)	5.0 (4.5 - 5.5)
Preterm	10.1 (9.5 - 10.7)	13.7 (12.8 - 14.7)	5.8 (5.3 - 6.4)
Postterm	15.4 (10.8 - 21.4)	22.2 (14.1 - 33.3)	8.8 (5.4 - 14.0)

Twin

No	9.3 (8.9 - 9.8)	13.1 (12.4 - 13.8)	5.2 (4.8 - 5.6)
Yes	29.6 (23.6 - 36.5)	35.3 (26.3 - 45.5)	23.0 (16.1 - 31.5)

Overall, the caesarean section rate in Indonesia was 9.8%. The rates varied by geographic, socio-economic, and demographic factors as shown in tables 1 and Figure1. Figure 2 shows provincial caesarean section rates on a map. Provinces in the eastern part of Indonesia tended to report higher caesarean section rates than provinces in the west. The caesarean section rates varied between provinces, ranging from 3.1% in Southeast Sulawesi to 19.1% in DKI Jakarta.

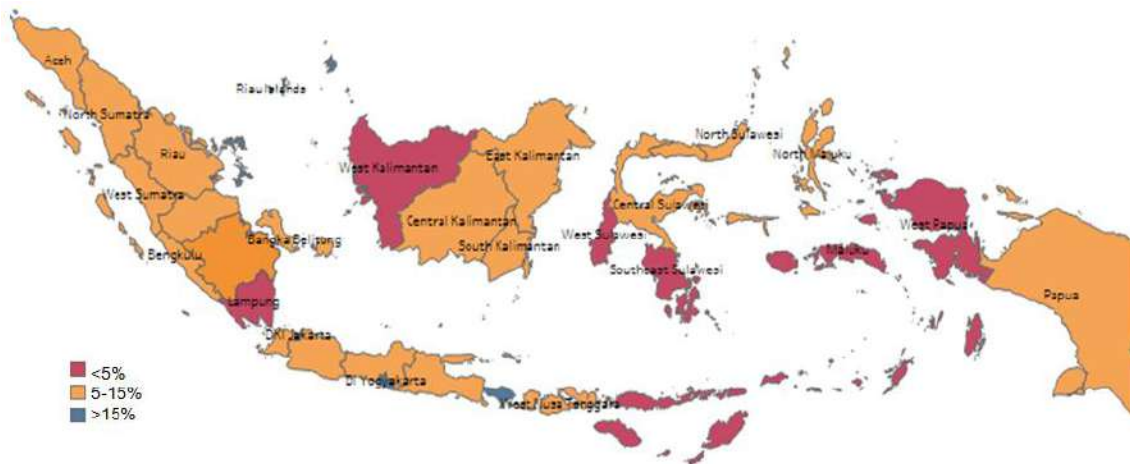


Figure 1 Caesarean section rates by Province, Indonesia, RISKESDAS 2013

Figure 2 shows provincial inequality of caesarean section rates between urban and rural. Bali likely overuse caesarean section reported the prevalence for 17.8 % point estimates and had wide gap between urban and rural (8.5%). Papua had low caesarean section rates provincial average (5.5%) and wide inequality, accounted for 13.7% point difference between urban and rural. The neighboring province, Maluku reported lower caesarean section rates (3.5%). However, the inequality between urban and rural in Maluku nearly twice compare to Papua. Furthermore, the inequality did not see any pattern between eastern and western provinces.

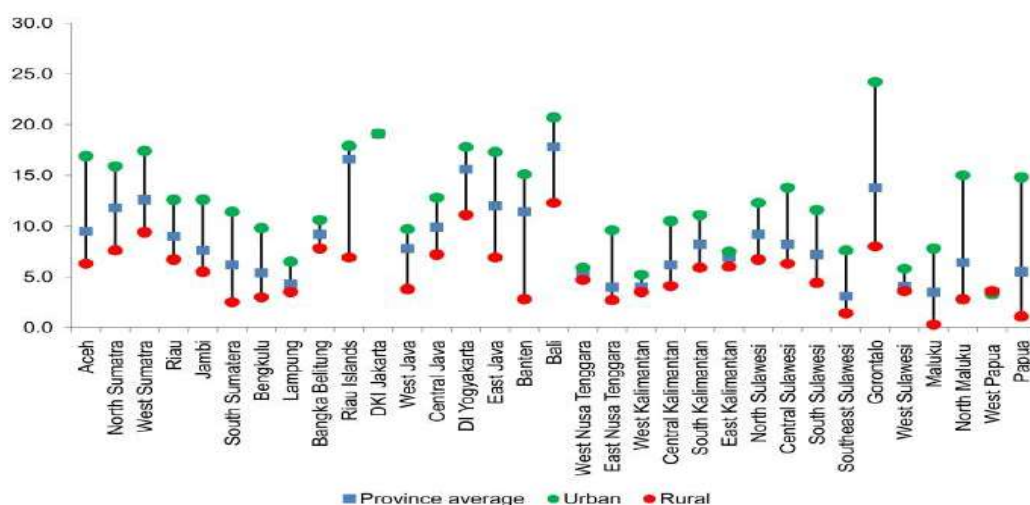


Figure 2: Urban and rural inequality of caesarean section rates by Province, Indonesia, RISKESDAS 2013

Figure 3 shows scatter plots of subnational cesarean section rates and urban-rural inequality. The subnational inequality between urban and rural accounted for absolute difference between -0.2% (West Papua) to 16.2%

(Gorontalo). West Papua, West Kalimantan, East Kalimantan, West Sulawesi and Lampung had the lowest inequality compare to other province. However, those provinces also encounter low caesarean section rates.

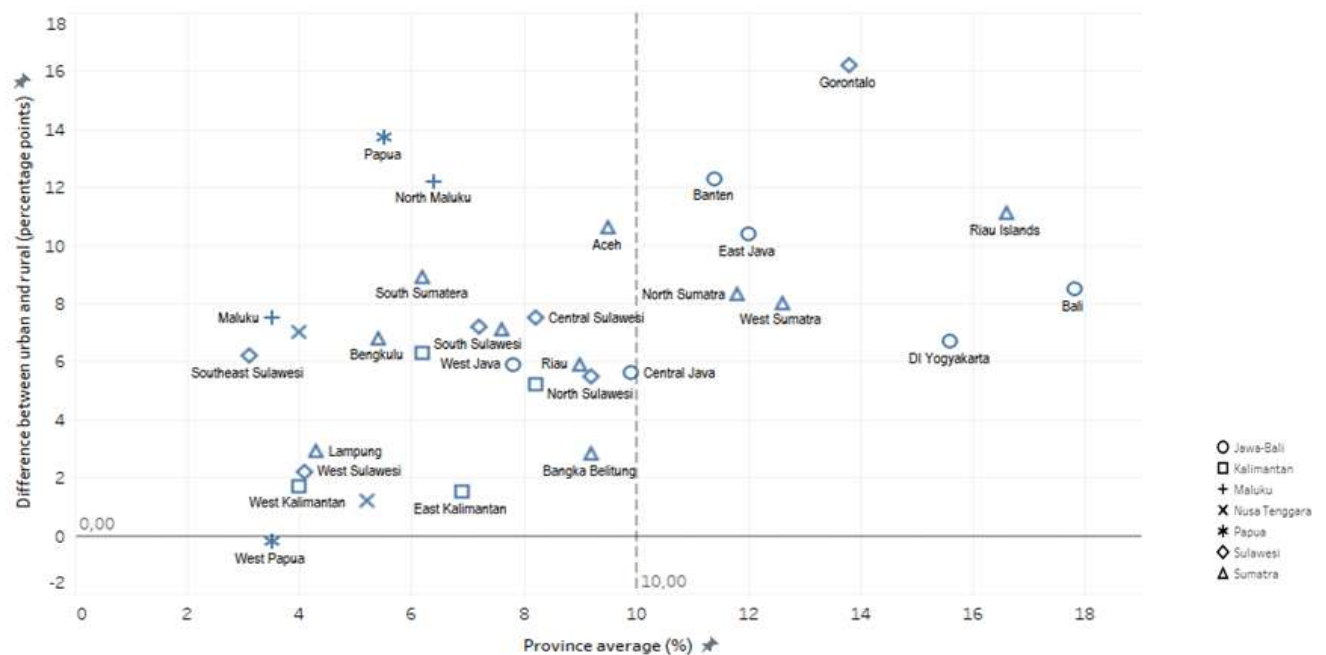


Figure 3: Scatter plots of subnational cesarean section rates and urban-rural inequality (difference between urban and rural) in Indonesia, RISKESDAS 2013

Table 2 presents the adjusted odds ratios from the logistic regression analysis in urban and rural area. The results show that caesarean section rates associated with household economic status. Mothers from the quintiles 4 and 5 had more than three times the odds of caesarean section from the lowest quintile (OR = 3.50 for quintile 4 and OR = 4.98 for quintile 5), while mothers from quintiles 2 and 3 had more than 1.5 times the odds of caesarean section compared with mothers from the lowest quintile (OR = 1.82 for quintile 1 and OR = 2.57 for quintile 3). There was no evidence for a statistically significant association between caesarean section and mother's occupation.

Table 2 Adjusted association between caesarean section and socio-demographic in urban and rural, Indonesia, RISKESDAS 2013

Characteristics	Total		Urban		Rural	
	AOR*	95% CI	AOR*	95% CI	AOR*	95% CI
Mother's age						
15 - 19 years	1.00					
20-34 years	1.52	(0.99 - 2.33)	1.32	(0.68 - 2.55)	1.89	(1.17 - 3.07)
35 - 49 years	2.70	(1.74 - 4.19)	2.33	(1.19 - 4.55)	3.48	(2.05 - 5.91)
Mother's education						
Primary or less education	1.00					
Secondary education	1.69	(1.50 - 1.92)	1.76	(1.50 - 2.07)	1.50	(1.24 - 1.82)
Higher education	2.64	(2.25 - 3.12)	2.69	(2.19 - 3.29)	2.46	(1.86 - 3.26)
Mother's occupation						
Unemployed	1.00					
Employed	1.11	(0.99 - 1.24)	1.18	(1.03 - 1.36)	0.94	(0.79 - 1.12)

Place of residence						
Urban	1.00					
Rural	0.71	(0.63 - 0.79)				
Household economic status						
Quintile 1	1.00					
Quintile 2	1.82	(1.42 - 2.33)	1.74	(1.06 - 2.88)	1.83	(1.37 - 2.45)
Quintile 3	2.57	(2.02 - 3.26)	2.46	(1.54 - 3.92)	2.75	(2.06 - 3.67)
Quintile 4	3.50	(2.76 - 4.43)	3.51	(2.21 - 5.58)	3.46	(2.59 - 4.64)
Quintile 5	4.98	(3.92 - 6.34)	5.23	(3.28 - 8.35)	4.20	(3.09 - 5.72)
Complication during pregnancy						
None	1.00					
Any complication	2.26	(2.00 - 2.56)	2.13	(1.82 - 2.50)	2.58	(2.16 - 3.09)
Parity						
1	1.00					
2 - 3	0.76	(0.67 - 0.85)	0.80	(0.69 - 0.93)	0.65	(0.54 - 0.78)
≥ 4	0.55	(0.46 - 0.66)	0.59	(0.47 - 0.73)	0.47	(0.35 - 0.63)
Pregnancy						
Aterm	1.00					
Preterm	1.17	(1.06 - 1.30)	1.16	(1.02 - 1.32)	1.21	(1.03 - 1.41)
Postterm	2.16	(1.36 - 3.45)	2.34	(1.23 - 4.48)	1.87	(1.05 - 3.33)
Twin						
No	1.00					
Yes	5.57	(3.88 - 8.02)	5.09	(3.17 - 8.16)	6.44	(3.63 - 11.43)

Note: Estimates are also adjusted for province (not shown in the table)

Discussions

There were higher caesarean section rates among urban and lower rates among rural and the rates varied between provinces. The rates in urban area Indonesia was exceeds the World Health Organization(WHO) recommendation limit of 10 percent(The World Health Organization, 2015). In addition, the WHO data analysis results in 159 countries from 1980 to 2012 show that the proportion of caesarean section above 10 percent was not associated with a reduction in maternal and neonatal deaths (Ye *et al.*, 2016). While caesarean section rates in urban area nearly bellow recommendation limit of 5 percent.

This study shows the inequalities of caesarean section rates between urban and rural within province remain. Low level of caesarean section rates and wider inequalities between urban and rural in several provinces, such as Papua and Maluku may be due to lack of skilled health staff and health infrastructure, including inavailabilityof emergency obstetric care. Indonesian Health Facility Survey (RIFASKES) showed that nearly 50 percent of public hospital was not accredited and the percentage much higher in Papua and Maluku, accounted for 78% and 93%, respectively(Badan Penelitian dan Pengembangan Kesehatan Kemenkes RI, 2011). Absence of obstetrician and surgeon also lead to lower caesarean section rates, where only 29% of public hospital in Maluku have obstetrician and nearly half did not have surgeon. Other reasons for low level of caesarean section rates includes economic reasons, urge to vaginal delivery(Chigbu and Iloabachie, 2007; Boatin *et al.*, 2018). Geographical barriers also lead to inequality in accessing emergency obstetric care, where most of Maluku province area were consist of oceans while Papua mainly mountains(Hodge *et al.*, 2014).

This study shows an increasing trend in the proportion of caesarean section delivery in mothers along with higher level of socioeconomic status. The results of a multivariate analysis showed that women with the richest economic status were four times more likely to have caesarean section deliveries. This is in line with previous research in the continued analysis of RISKESDAS 2010 (Suparmi and Basuki, 2011) and other studies in Canada (Leeb *et al.*, 2005), Ethiopia (Gebremedhin, 2014) and China (Sufang *et al.*, 2010) and data analysis of DHS in 26 countries (Calvillo *et al.*, 2015). Higher rates of caesarean section in richest quintile were likely due to higher proportion of elective caesarean section. Studies conducted in Jakarta show the proportion of elective caesarean delivery was higher than the proportion of emergency sectional delivery (Andayasari *et al.*, 2015). Several factors that lead to higher rates of caesarean section includes individual factors such as urge to caesarean delivery because of fear of pain during labor, fear of death, cosmetic appearance and sexual functioning. Cultural factor also may lead to high caesarean section rates such as choosing the date of the baby's delivery on the basis of luck and fate for the future (Boatin *et al.*, 2018). Health system support may escalate caesarean section rates such as higher financial incentives and lower tolerance to any complication in health facility.

Several studies have shown that women with a history of caesarean section without a medical indication of elective caesarean section have a higher risk of abnormal placental attachment in the uterine or uterine part of the uterine wall part of the uterus (placenta accreta) at subsequent births, this can lead to heavy bleeding during labor (The Royal Australia and New Zealand College of Obstetrician and Gynaecologist., 2016). In addition, caesarean section delivery has a cost burden (Borgi *et al.*, 2003), lengths of hospitalization and a higher risk of illness when compared with a normal delivery (Souza *et al.*, 2010; Siti Maisyaroh Fitri Siregar and Jemadi, 2013).

This study also showed that mothers aged 36-49 years were three times more likely to have caesarean section delivery than women aged 15-19 years. This is because in mother age over 35 years have a risk of complications in childbirth. This finding is in line with a study by Zhife He *et al* in China that the proportion of caesarean section delivery in mothers older than 35 years is greater than for normal delivery (He *et al.*, 2016).

The results of multivariate analysis showed parity associated with caesarean section, where caesarean section was more prevalent in the first pregnancy. This finding is in line with research conducted in China (Feng *et al.*, 2012) and Australia (Toohill *et al.*, 2014). The psychological condition of expectant mothers and there is fear of childbirth pain was lead to higher rates of caesarean section (Toohill *et al.*, 2014). However, this finding was in contrast to studies in Africa that show the proportion of caesarean section increased with increasing parity (Gebremedhin, 2014). The higher parity is associated with risk of complications in labor. This difference is possible because of the high proportion of sectional births in Indonesia.

This study had potential limitation to be considered in interpreting the findings. Firstly, this inequality analysis was based on simple measure of ratio and difference which can be use for clarity and ease of understanding. Secondly, data on caesarean section rates were based on mothers self-reporting from a cross-sectional survey. Thirdly, the survey did not have detailed information on some predictors related to caesarean section, such as, on placenta previa, breech position, cord prolapsed, failure to progress in labor, repeated caesarean sections, cephalopelvic disproportion, fetal distress, birth defects, and demand to have caesarean section from the subjects as well as from the respective medical doctors. However, despite these limitations, this study had a large sample size (n=49045) and the data were nationally representative and can be aggregated into province and districts level data.

Conclusion

The result of this study shows the sub-national inequality of caesarean section rates between urban and rural. Additionally, factors associated with caesarean section delivery in urban and rural include pregnancy complications, post-term pregnancy, multiple births/twin, maternal age over 35 years, and high socioeconomic status. Overall, urban more likely had higher caesarean section rates. This study suggest that it is necessary to

ensure that pregnant women living in rural area have better access to caesarean section and increase alertness especially for mothers with high level of economic status in urban area not to conducting caesarean section without medical indication. In addition, there is a need for health promotion related to the side effects of caesarean section without medical indication.

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Appendix

Appendix Table 1 Urban and rural inequality of caesarean section rates by Province, Indonesia, RISKESDAS 2013

Province	Total (95% CI)	Urban (95% CI)	Rural (95% CI)	Difference urban vs rural	Ratio urban vs rural
Aceh	9.5 (7.9 - 11.3)	16.9 (13.3 - 21.1)	6.3 (4.8 - 8.2)	10.6	2.7
North Sumatra	11.8 (9.9 - 14.0)	15.9 (12.7 - 19.7)	7.6 (5.7 - 10.0)	8.3	2.1
West Sumatra	12.6 (10.4 - 15.0)	17.4 (13.2 - 22.5)	9.4 (7.4 - 11.8)	8.0	1.9
Riau	9.0 (7.4 - 10.9)	12.6 (9.7 - 16.2)	6.7 (5.1 - 8.9)	5.9	1.9
Jambi	7.6 (5.8 - 9.8)	12.6 (8.9 - 17.4)	5.5 (3.7 - 8.1)	7.1	2.3
South Sumatera	6.2 (4.6 - 8.2)	11.4 (8.2 - 15.6)	2.5 (1.6 - 3.9)	8.9	4.5
Bengkulu	5.4 (3.9 - 7.5)	9.8 (6.4 - 14.5)	3.0 (1.6 - 5.4)	6.8	3.3
Lampung	4.3 (3.2 - 5.9)	6.5 (3.9 - 10.4)	3.5 (2.3 - 5.3)	2.9	1.8
Bangka Belitung	9.2 (6.8 - 12.2)	10.6 (7.3 - 15.1)	7.8 (4.7 - 12.5)	2.8	1.4
Riau Islands	16.6 (12.4 - 21.7)	17.9 (13.2 - 23.8)	6.9 (4.4 - 10.6)	11.1	2.6
DKI Jakarta	19.1 (15.1 - 23.8)	19.1 (15.1 - 23.7)	-	NA	NA
West Java	7.8 (6.8 - 9.0)	9.7 (8.2 - 11.3)	3.8 (2.7 - 5.2)	5.9	2.5
Central Java	9.9 (8.7 - 11.1)	12.8 (11.0 - 14.8)	7.2 (5.9 - 8.8)	5.6	1.8
DI Yogyakarta	15.6 (12.0 - 19.9)	17.8 (13.2 - 23.5)	11.1 (6.7 - 17.8)	6.7	1.6
East Java	12.0 (10.9 - 13.2)	17.3 (15.3 - 19.3)	6.9 (5.7 - 8.3)	10.4	2.5
Banten	11.4 (9.4 - 13.7)	15.1 (12.3 - 18.3)	2.8 (1.6 - 4.9)	12.3	5.3
Bali	17.8 (14.8 - 21.1)	20.7 (16.6 - 25.4)	12.3 (8.8 - 16.7)	8.5	1.7
West Nusa Tenggara	5.2 (3.9 - 6.9)	5.9 (4.2 - 8.3)	4.7 (3.0 - 7.4)	1.2	1.3
East Nusa Tenggara	4.0 (3.2 - 5.0)	9.6 (7.2 - 12.8)	2.7 (1.9 - 3.7)	7.0	3.6
West Kalimantan	4.0 (2.9 - 5.5)	5.2 (3.2 - 8.2)	3.5 (2.3 - 5.3)	1.7	1.5
Central Kalimantan	6.2 (4.5 - 8.4)	10.5 (6.9 - 15.6)	4.1 (2.6 - 6.6)	6.3	2.5
South Kalimantan	8.2 (6.6 - 10.2)	11.1 (8.1 - 14.9)	5.9 (4.2 - 8.3)	5.2	1.9
East Kalimantan	6.9 (5.2 - 9.2)	7.5 (5.1 - 10.9)	6.0 (4.1 - 8.7)	1.5	1.3
North Sulawesi	9.2 (6.9 - 12.1)	12.3 (8.1 - 18.1)	6.7 (4.5 - 9.9)	5.5	1.8
Central Sulawesi	8.2 (6.5 - 10.3)	13.8 (10.2 - 18.3)	6.3 (4.4 - 9.0)	7.5	2.2
South Sulawesi	7.2 (5.8 - 8.9)	11.6 (8.4 - 15.6)	4.4 (3.3 - 5.8)	7.2	2.6
Southeast Sulawesi	3.1 (2.3 - 4.3)	7.6 (5.2 - 10.9)	1.4 (0.8 - 2.4)	6.2	5.5
Gorontalo	13.8 (10.2 - 18.2)	24.2 (17.0 - 33.1)	8.0 (5.0 - 12.6)	16.2	3.0
West Sulawesi	4.1 (2.6 - 6.6)	5.8 (2.7 - 12.0)	3.6 (2.0 - 6.6)	2.2	1.6
Maluku	3.5 (2.1 - 6.0)	7.8 (4.4 - 13.5)	0.3 (0.1 - 1.1)	7.5	24.2
North Maluku	6.4 (4.9 - 8.4)	15.0 (10.9 - 20.1)	2.8 (1.6 - 4.7)	12.2	5.4
West Papua	3.5 (1.9 - 6.2)	3.3 (1.1 - 9.4)	3.6 (1.7 - 7.1)	-0.2	0.9
Papua	5.5 (3.8 - 7.9)	14.8 (9.7 - 22.0)	1.1 (0.6 - 1.9)	13.7	13.5

Note: Estimates and 95% CIs are reported as percentages

RELATIONSHIP BETWEEN NUTRITIONAL STATUS, HEALTH STATUS, FOOD CONSUMPTION, AND LIFESTYLE TO WORK PRODUCTIVITY OF COCOA FARMER

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Abstract: Agricultural sector only contributed 14.43% of total GDP despite labor from this sector is the largest labor force in Indonesia. Cocoa is one of the leading commodities in agricultural sector, sub sector plantation. One of the ways to improve the productivity of cocoa is giving an attention about the good nutrition and good health of the cocoa farmer that have been widely known as a factor to improve work productivity of farmers. This study is cross-sectional study. The objective of this study was to analyze the relationship between nutritional status, health status, food consumption, and lifestyle to work productivity. The subjects were 58 male cocoa farmers in two districts of Polewali Mandar aged 18-65 years old. Most of subjects (39.7%) have a normal nutritional status and 10.3% of subjects are central obesity. Then, 46.6% of subjects have a pre-hypertension. There is no relationship between nutritional statuses to work productivity. Then, there is a relationship between health status (blood pressure) and amount of cocoa picked per day (kilograms) and health status (central obesity) and number of absent days to plantation due to sick

Keywords: cocoa farmer, health status, nutritional status, work productivity

Introduction

The central bureau of statistics notes that labor from agricultural sector is the largest labour force in Indonesia, which reached 37.18 million persons per February 2013. This amount represents 32.61% of Indonesian total labor force (BPS, 2014). Despite the large population of agricultural labour, the agricultural sector only contributed 14.43% of total GDP. This condition indicates that work productivity in agriculture sector is low. Cocoa is one of the leading commodities in plantation sub sector. The cocoa development has a potential part in the economy development. Cocoa commodities contribute consistently as a sources of foreign exchange and very important in Indonesia's economic structure (Arsyad, Sinaga, & Yusuf, 2011). Based on the the economic side, cocoa contributes the third largest foreign exchange after palm oil and rubber (Hasibuan, Nurmawati, & Wahyudi, 2012). One of cocoa production centers in Indonesia is West Sulawesi. Development of cocoa in West Sulawesi has been done since the 1980s by the local community in here. One of the way to improve the productivity of cocoa is give an attention about the good nutrition and good health of the cocoa farmer.

Health status and nutritional status of workers will influence the work productivity of workers. One of the phenomenon about health status of farmer and people in rural area is non-communicable disease which impacts rural areas as well as the major urban center. Indonesia Basic Health Research (2013) shows an increase in prevalence of non-communicable diseases in West Sulawesi in 2007-2013. Based on various study, there is a significant relationship between nutritional status with work productivity in the traditional rice farmers of Julupamai village. Besides that, there is a strong association between having more health risks and higher presenteeism (Boles, Pelletier, & Lynch, 2004). The mean percentage of presenteeism (percentage of time impaired at work) rises for each level of cumulative health risks, ranging from 1.3% average presenteeism for individuals with zero risks to 25.9% presenteeism for individuals with eight risks. Absenteeism also increases as

health risks accumulate, with a clear difference between low levels and high levels of risk, but the range is smaller (0.0% to 6.3%) and fluctuates among mid-level of risk. So, employees who have more health risks will experience more absenteeism and presenteeism than employees with fewer risks. Nwaiwu et al. (2016) conducted the study on farmers in Ahiauzu Imo, Nigeria and shows that poor health status would have a negative impact on the productivity of farmers. Various studies above have shown the problem of low productivity with one of the factors is the nutritional status and health status of farmers. Based on these problems, researcher interested to examine the relationship between nutritional status, health status, food consumption, and lifestyle to work productivity of cocoa farmers in Polewali Mandar, West Sulawesi.

Methods

This study is cross sectional study design and conducted at cocoa plantation in 2 sub-districts (Anreapi District and Mapilli District) located in Polewali Mandar Regency, West Sulawesi Province. The study was conducted in July-August 2017. This study is a part of study entitled Sustainability and Profitability of Cocoa-based Farming Systems in Indonesia collaboration between AIC (Australian-Indonesian Center) with InterCafe LPPM Bogor Agricultural University, Hasanuddin University and Sydney University, Australia. The subjects are 58 male cocoa farmers in 2 sub-districts of Polewali Mandar. The inclusion criteria of the subjects were 1) men aged 18-65 years, 2) cocoa farmers, 3) in a good condition (not sick) when we do the assessment at that time 4) willing and stay in the study site during the study to conduct interviews and anthropometric measurements, body composition and pressure blood directly.

Determination of the minimum number of samples is calculated using the following formula (Sujarweni 2012):

$$n = Z^2 \frac{p(1-p)}{d^2}$$

Based on Indonesia Basic Health Research (2013) the prevalence of central obesity among farmers in West Sulawesi is 11.5%. The absolute precision used is 10% and the confidence level is 95 percent or $\alpha = 0.05$ so the minimum number of samples needed in the study after adding 10% of the anticipated drop-out is 45 people. Minimum sample is 45 people. The sample used in this study was 58 male cocoa farmers who were in accordance with the inclusion and exclusion criteria set by the researchers.

Primary data include subject characteristic, nutritional status (BMI, waist circumference and waist hip ratio), body composition, blood pressure, food consumption (food recall 2x24 hours), eating habits and lifestyle. Data collected through direct interview with subjects.

Anthropometric measurements

To measure anthropometric variables of weight, height, BMI, waist circumference (WC), hip circumference (HC), waist to hip ratio (WHR) and body compositions, participants were asked to remove their shoes, socks, hat, jewelry, accessories (e.g. watch, keys, cell phone). Body composition was measured using OMRON HBF-305 BIA (Bioelectrical Impedance Analysis). The precision of weight, height, and WC was 0.1 kg, 0.1 cm and 0.1 cm, respectively. BMI was computed as follow: weight (kg)/ (height [m] × height [m]) (kg/m²). Obese was defined as BMI ≥ 25. Central obesity was defined as WC > 90 cm or WHR ≥ 0.9 for men.

Health status measurement

Health status was measured by case of central obesity and hypertension. Central obesity was defined as Waist circumference > 90 cm or WHR ≥ 0.9 for men. Waist and hip circumference are measured using measuring tape (meter). WC is measured in light clothing at the narrowest point immediately below the lowest rib and above the iliac crest; HC was measured at the level of the maximum circumference. WHR was calculated as a waist to hip

ratio (i.e. WC [cm]/HC [cm]). Blood pressure (BP) was measured in a sitting position, and the subject were rested for at least 5 minutes before the measurement. Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured using an automated measurement device (Omron, Model HEM-7211, Kyoto, Japan) with a proper cuff size on the left arm. Blood pressure was obtained twice at 1-minute interval, and the average of two readings was used to represent SBP and DBP, respectively. Subject were classified as hypertensive if the SBP ≥ 140 mmHg and DBP ≥ 90 mmHg. Subject were classified as pre-hypertensive if the average SBP if the SBP 120-139 mmHg and DBP 80-89 mmHg.

Food Consumption

Food consumption data includes data intake and type of food using the 2x24 hours food recall method. The level of adequacy of energy and nutrients (protein, fat and iron) is obtained by comparing the consumption of energy and nutrients with the adequacy of the energy and nutrients of the subject. Calculation of the level of nutritional adequacy is calculated according to the recommended nutritional adequacy (Ministry of Health of Indonesia 2013). Food diversity is assessed using the IDDS (Individual Dietary Diversity Score) method. The way to obtain a food diversity score is to use a 1x24 hour food recall method by paying attention to the weight of food consumed at least 10 grams. The food diversity score category is low (if consuming ≤ 3 types of food groups every day), moderate (if consuming 4-5 types of food groups every day) and high (if consuming ≥ 6 types of food groups every day)

Lifestyle

The lifestyle in this study is seen from the subject's habits of several things. These include smoking in a day (number of stems), daily coffee consumption habits (frequency and amount of coffee consumption), alcohol consumption habits (frequency and amount of alcohol taken), breakfast habits (yes or no), consumption habits of fruit vegetables every day (yes or no) and exercise habits (yes or no, frequency per week). Data obtained by asking directly to farmers using the interview method and filling in the questionnaire.

Work Productivity

Work productivity in this study was obtained by two ways. The first way was the amount of cocoa picked per day (kilograms) and the second way was the number of absent days to plantation in the last 1 month due to illness/health reason. Data obtained by asking directly to farmers using the interview method.

Statistical Analysis

The analysis used in this study was spearman-test and pearson-test, based on the normality data and purpose of the study. The, the normality data test used Kolmogorov-smirnov test.

Ethical statement

The written informed consent was obtained from each participant after explaining the purpose of the study. Ethical approval was approved by the Ethics Committee at Institut Pertanian Bogor (4758/IT3.26.1/KEPMSM/PL/2017). Each participant was also informed that he had the right to terminate the data collection process at any point. Those who did not provide consent to participate were excluded from the study. Data were collected anonymously and was only used for study.

Results

Table 1 shows that most subjects had a normal nutritional status (39.7%). Most of the cocoa farmers in the study had normal abdominal circumference (89.7%) and 10.3% of subjects were central obese with abdominal

circumference greater than 90 centimeters for men. Meanwhile, data from the waist hip ratio measurement, most subjects had a normal WHR of 58.6% and another 41.4% had WHR at risk category. Higher the waist circumference and RLPP increases the risk of non-communicable diseases (NCDs) and chronic diseases such as cancer, cardiovascular disease, diabetes, hypertension and others. Then, most subjects had a pre-hypertension. Work productivity in this study defined by 2 ways, the amount of cocoa picked per day (kilograms) and the number of absent days to the plantation due to health reason in the past 1. Data shows most subjects (62.1%) picked 1-25 kilograms of cocoa per day and most of subjects (58, 6%) have zero days for absent day related to health reason in the last 1 month.

Table 1. Characteristics of subjects

Characteristics of subjects	n	%
Body mass index		
Underweight	6	10.3%
Normal	23	39.7%
Overweight	15	25.9%
Obesity	14	24.1%
	22.77 ± 3.18	
Waist circumference		
Central obesity	6	10.3%
Normal	52	89.7%
	78.15 ± 9.51	
Waist and hip ratio (WHR)		
At risk	24	41.4%
Normal	34	58.6%
	0.88 ± 0.05	
Blood pressure		
Hypertension	20	34.5%
Pre-hypertension	27	46.5%
Normal	11	19.0%
Number of cocoa picked / day (kg)		
1-25 kilograms	36	62.1%
26-50 kilograms	17	29.3%
51-75 kilograms	1	1.7%
76-100 kilograms	4	6.9%
Number of days absent due to health reason (days)		
0 days	34	58.6%
1-3 days	20	34.5%
More than 3 days	4	6.9%

The result of this study shows that there is no relationship between nutritional status, and work productivity of cocoa farmers. The results of this study are in line with the research of Mahardikawati VA (2008) which shows that there is no relationship between nutritional status which is reflected by the body mass index (BMI) with the level of work productivity. This is presumably because the level of work productivity is more influenced by the consumption of nutrients, especially iron. So that IMT is not directly related to work productivity. The relationship between nutritional status and work productivity can be shown in Table 2.

Table 2: Relationship between nutritional status and work productivity of cocoa farmers

Variable	Number of cocoa picked / day		Number of days absent due to health reason	
	r	p	r	P
body mass index	0.087	0.516	-0.230	0.083
Body fat percentage	-0.067	0.618	-0.190	0.153

Regarding health status, there is a significant relationship between health status seen by blood pressure and the number of cocoa picked per day (kilograms). The results of this study indicate that someone who has higher blood pressure (suffering from pre-hypertension or hypertension) has lower work productivity when viewed from the number of cocoa picked per day (kilograms). In addition, there is also a significant relationship between health status seen from the incidence of central obesity with the number absent day to the plantation due to health reason. Farmers who suffer central obesity have a higher number of absent day due to health reason compared to farmers who do not suffer from central obesity. Relationship between health status and work productivity can be shown in Table 3.

Table 3: Relationship between health status and work productivity

Variable	Number of cocoa picked/ day		Number of days absent due to health reason	
	r	p	R	p
Central obesity	0.114	0.392	0.275	0.037 ^a
Hypertension	-0.366	0.005 ^a	-0.085	0.525

^a Correlation test *spearman* was significantly associated at $p < 0.05$

The result of this study his is consistent with research from Robroek et al. (2010) in 10,624 workers in 49 Dutch companies in 2005-2009 which stated that obese workers had higher sick leave compared to normal weight workers (OR 1.27, 95% CI 1.11-1.46). Another study from Pronk et al. (2004) on 683 workers showed that work performance was related to the body mass index (BMI) category. Regarding hypertension, the results of this study are in line with the research of Busingye et al. (2014) where it is known that the cause of the decline in work productivity of a person or group is due to an increase in high blood pressure. However, health is not a major factor that can reduce work productivity, work motivation is considered to affect someone's performance.

Table 4 shows the relationship between food consumption and work productivity of cocoa farmers. The food consumption studied included energy intake, protein intake, fat intake, iron intake and food diversity score using the IDDS (Individual Dietary Diversity Score).. Statistical test results related to the relationship between lifestyle and work productivity of cocoa farmers can be seen in table 4.

Table 4: Relationship between food consumption and work productivity

Work productivity of cocoa farmers	Number of cocoa picked / day		Number of days absent due to health reason	
	r	p	r	p
Energy intake	-0.035	0.796	-0.005	0.968
Protein intake	-0.144	0.281	0.127	0.342
Fat intake	-0.061	0.647	0.011	0.936
Iron intake	-0.240	0.069	0.029	0.827
Food diversity score (IDDS)	-0.092	0.493	0.063	0.641

Statistical test using the *Spearman* test showed no association between consumption of food seen from an intake of nutrients to work productivity of cocoa farmers Another study from Mahardikawati VA (2008) on 92 female tea picking subjects in PTPN VIII, Bandung showed that although the levels of energy, protein, vitamin A and

vitamin C consumption did not correlate with sample work productivity, high levels of iron consumption were associated with levels high work productivity ($r = 0.248$, $p < 0.01$). Then, Statistical tests using the *Spearman* test showed no relationship between the score of food diversity and the productivity of cocoa farmers. Results from Mahardikawati study (2008) showed that the level of labor productivity is influenced by the level of consumption or intake of specific nutrients especially iron. This study showed that the level of food diversity does not affect the work productivity of cocoa farmers.

Table 5 shows the relationship between lifestyle and work productivity of cocoa farmers. The lifestyle studied was between smoking habits, coffee consumption, alcohol consumption, exercise breakfast and daily consumption of vegetables and fruits. Statistical test results related to the relationship between lifestyle and work productivity of cocoa farmers can be seen in table 5.

Table 5: Relationship between lifestyle and work productivity

Work productivity of cocoa farmers		Number of cocoa picked / dayNumber of days absent due to health reason		
		p	r	p
Smoking habits	-0,130	0.330	0.182	0.171
Coffee consumption habits	0.077	0.566	0.125	0.658
Alcohol consumption habits	0.219	0.099	0.107	0.426
Breakfast habits	0.228	0.085	-0.152	0.255
Exercise habits	-0.038	0.775	0.038	0.774
Fruit and vegetable consumption	-0.124	0.355	-0.030	0.822

Statistical tests using the *Spearman* test showed that there was no relationship between the lifestyle of the subject and the work productivity of cocoa farmers. This is presumably because the subject's lifestyle has more influence on health status. Furthermore, health status will affect the level of work productivity, so that lifestyle does not directly affect the work productivity of cocoa farmers. The results of this study are not in line with the research of Robroek *et al.* (2010) in 10,624 workers in 49 Dutch companies in 2005-2009 showed that smoking (OR 1.45), obesity (OR 1.29) and lack of fruit consumption (OR 1.22) were associated with *productivity loss* when work

Conclusion

There is no relationship between nutritional status to work productivity. But, there is a relationship between health status (blood pressure) and amount of cocoa picked per day (kilograms) and health status (central obesity) and number of absent day to plantation due to sick. Recommendations regarding result of this study are improving an education about food diversity, exercise and non-communicable disease (NCDs) and the importance of health care & nutrition counseling participation in village

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SPATIAL EFFECT OF REFILLING DRINKING WATER DEPOTS TOWARD DIARRHEA IN PAGATAN, SUB DISTRICT OF KUSAN HILIR, TANAH BUMBU DISTRICT, SOUTH KALIMANTAN

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Abstract: The growth of drinking water refill service business in Indonesia is one of the most promising and growing business in recent years. On the other hand, along with the conditions of diarrhea cases in this region remain concerned. This research aimed to identify spatially the influence of the existence of refilling water depots and the quality of its products to the incidence of diarrhea in Tanah Bumbu District. The study held in Kota Pagatan, sub district of Kusan Hilir District of Tanah Bumbu in November-December 2017. Water samples are taken at every depot with complete procedure and marked spatially then sample was assessed microbiologically to determined *E.coli* and *Coliform* contamination. The bacteria-positive depot on examination of the sample is categorized as 'contaminated' contrarily no bacteria depot is categorized as 'clean'. Diarrhea case data in the area of the data was taken from 2016 research data in the form of respondent data, location and household characteristics related to patient's family status and access to drinking water. Furthermore, the two types of data are integrated into spatial analysis to analyze the spatial relation of the depot's water quality with the distribution of diarrhea cases. There is a spatial suitability between the density of the depots' position and the density of the diarrheal cases found. The concentration of 'contaminated' depot has a significant effect on the characteristic profile of the most of patients who were in the vicinity of the depot.

Keywords: Diarrhea, spatial effect, drinking water access, refilling water depots

Introduction

The growth of refill drinking service business in Indonesia is one of the most promising and growing business in recent years. Each year there is a significant increase in the number of depots. Various facilities to get ready-to-drink water at affordable prices become the main choice of middle-income society. (Rahmitha, Utami and Sitohang, 2018) Tanah Bumbu District itself especially Pagatan City is one of the areas that have increasing number of depots from many years ago either having license to operate as well which has no operational license.

On the other hand, diarrhea in the Pagatan region has remained high in recent years. Diarrhea data in the pagatan area is experiencing a downward trend, however the incidence of this disease is still a major public health problem in this region. (Pagatan City Health Service, 2016) A few years ago before 2010, the Pagatan area was a slum area and inadequate infrastructure. At present, infrastructure development in Pagatan has increased significantly including kampung roads and drainage so that the sanitation of the area has improved. (Kuswandi, 2017) The circumstances is in contrast to cases of diarrhea that do not show a significant reduction.

Pathogenic agents that cause diarrhea such as *coliform*, *Escherichia coli*, *Vibriospp*, etc. can contaminate water and food through some carrier media such as teapots, gallons, (Wandriavel, Suharti and Lestari, 2012) even an entire refilling drinking water machine. The existence of these pathogens indicates that poor hygiene and sanitation also maintenance of equipment related to the provision of drinking water. (Rumondor, Porotu'o and Waworuntu, 2014) Data on the relation between the contaminated depots and diarrhea cases in Pagatan area is not yet available and the weakness of drinking water surveillance by the local health office is the basis of this study held.

It can be hypothesized that the growth of refill depots relates to cases of diarrhea in the Pagatan City. This paper is expected to provide input for stake holder so that the regulation can be implemented thoroughly for refill drinking water producers as well as improve the routine inspection of refill depot as a surveillance effort in maintaining drinking water quality in Pagatan City.

Methods

The study was held in Pagatan City, Subdistrict of Kusan Hilir, District of Tanah Bumbu in November-December 2017. Area of Pagatan selected because this region has the most refill drinking water depots in Kusan Hilir Sub district that is numbered 42 Depots which were successfully examined. Water samples taken at each depot after marked with Global Positioning System (GPS), water retrieval must be complete procedure in accordance with the suggested by the equipment provider then the samples were checked at the Microbiology Laboratory of National Agency of Research and Development Tanah Bumbu to determine the contamination of *E. coli* and *coliform* in water sample. The examination technique used Most Probable Number (MPN) and Total Plate Count (TPC) to calculate the amount of contamination in the sample. Selective media used are TCBS, McConkey, XLD, EMB agar and IMVIC methods. The bacteria-containing depots on examination of the sample were categorized as 'contaminated' and that no bacteria in the sample were categorized as 'clean'.

100 Diarrhea case data in the area of the field was taken from research data in 2016 (Andiarsa *et al.*, 2016) (Andiarsa, Setianingsih and Sulasmi, 2017) in the form of respondent data, location and household characteristics related to patient's family status and access to drinking water. The data were analyzed descriptively to present the distribution of the characteristics and access of drinking water of the household of the patient by referring the P value to determine the significance of each variable to the diarrhea.

Furthermore, the combination of the two data is scored based on the village area or id location to determine the effect status of the depot in the area. Scores are determined based on the high, medium, or low level of cases and 'contaminated' depots in the area. The greater the number of cases and 'contaminated' depots which were marked in red, the higher the risk of the village being exposed to diarrhea due to 'contaminated' depots which was we then refer to as effect status. Effect status score can be viewed in the following scheme:



Figure 1 Effect status scoring scheme

Both types of data were integrated into spatial analysis to see the spatial linkage of the depot water quality results with the distribution of diarrhea cases. Spatial analysis was using Quantum GIS open source software application version of *Nodebo*TM. Spatial analysis used a simple technique of overlay and heatmap techniques. Heatmap analysis was used to determine depot concentrations and their relation to diarrhea cases. The heatmap was made at a radius of 500 m from the contaminated depot as the center of analysis, the more dense the number of depots in a particular area the higher the concentration and the impact that the depot may cause.

Result

Pagatan city is one of the most populous areas in Kusan Hilir Sub District with a population of 46,735 people and characteristics of the city along the coastline and several rivers close to the sea estuary. Pagatan is positioned by 3.3300° S- 3.6092° S and 115.5900° E-115.9335° E with an altitude of less than 10 meters above sea level. Most of the economic activity in the region is a trade area and a small part of agriculture in the suburbs.

The results of observation and interviewed with heads of households from 100 patients in the city of Pagatan has a tendency to support diarrhea cases arisen. This shows some risk factors have a significant role to the occurrence of diarrhea in the household. Table 1 describes some characteristics of the patient and the condition of the household. The most of the work of the head of household were employees and entrepreneurs or traders who throughout the day spent at work. Most patients are in the age group 0-5 year old which were have more vulnerable than other age groups. Most households have a high density of home inhabitants, although inhabitants' density was not significant, it was a main determinant of its impact on household health status.

Table 1 Household characteristics of diarrhea patient.

No	Variable		N (%)	P
1	Gender of diarrhea patient	Male	46	0,905
		Female	54	
2	Work of head of household	Employee	25	0,000

		Entrepreneur	37	
		Farmer	18	
		Labour	10	
		Unemployed	10	
3	Age group of diarrhea patient	0-5 year old	70	0,000
		6-15 year old	1	
		16-55 year old	23	
		>56 year old	6	
4	Number of inhabitants	2 people	4	0,510
		3 people	7	
		4 people	27	
		5-10 people	51	
		>10 people	1	
5	Number of diarrhea patient	1 people	66	0,075
		2 people	22	
		3 people	11	
		4 people	1	

The availability of drinking water is determined by the ability of households to access drinking water for their household needs. Table 2 illustrates that the majority of patient households were consumers of refill drinking water depots, as access affordability and low prices and other convenience factors make the majority of households considering using refill water as their primary drinking water source. The next fact that some of these households did not retreat their drinking water such as boiling it before it is consumed also they use a water jug for storage that is kept refilled without being washed for long time period. However, the physical quality of drinking water in Pagatan area is quite good.

Table 2 Access of drinking water

No	Variable		N (%)	P
1	Type of drinking water	Bottled water	3	0,000
		Refilled water	68	
		Local water provider (PDAM)	23	
		Drilled well	1	
		Dug well	2	
		River	3	
2	Drinking water treatment	Boiled	38	0,000
		Radiation	3	
		Filtered	1	
		Untreated/ not boiled	58	
3	Drinking water storage	Dispenser	28	0,000
		Caldron/teapot	67	
		Jug	1	
		Pot/sauce pan	4	
4	Drinking water quality	Murky/turbid	1	<0,05
		Taste	3	

The following table is the result of water quality inspection from all visited refill depots. The 42 samples examined, 23 depots were declared to be 'contaminated' with water products at a large amount of contamination of average 6,087 ($0 \leq \mu \leq 38$) MPN / 100ml and 297,420 ($30 \leq \mu \leq 2330.67$) CFU / ml. This indicates that the quality of refill drinking water was not allowed for consumption based on WHO recommendation which states that good drinking water is having 0 values on each of MPN or TPC examination.

Table 3 Results of MPN and TPC inspection on refilling water depots

Number of Depots	Category	Mean MPN (MPN/100ml)	Mean TPC (CFU/ml)
19	Clean	0	0
23	Contaminated	6.087 ($0 \leq \mu \leq 38$)	297.420 ($30 \leq \mu \leq 2330.67$)

The distribution of cases and the presence of refilling water depots in the city of Pagatan have a corresponding concentration in which the patient was most likely close to the location of the refill drinking water providers. The proximity of this location determines the accessibility of the urban community so they prefer to use water refills as their primary drinking water source. Figure 1 shows that the refill drinking water depot is spread evenly in the residential area of Pagatan City and is very close to the patient.

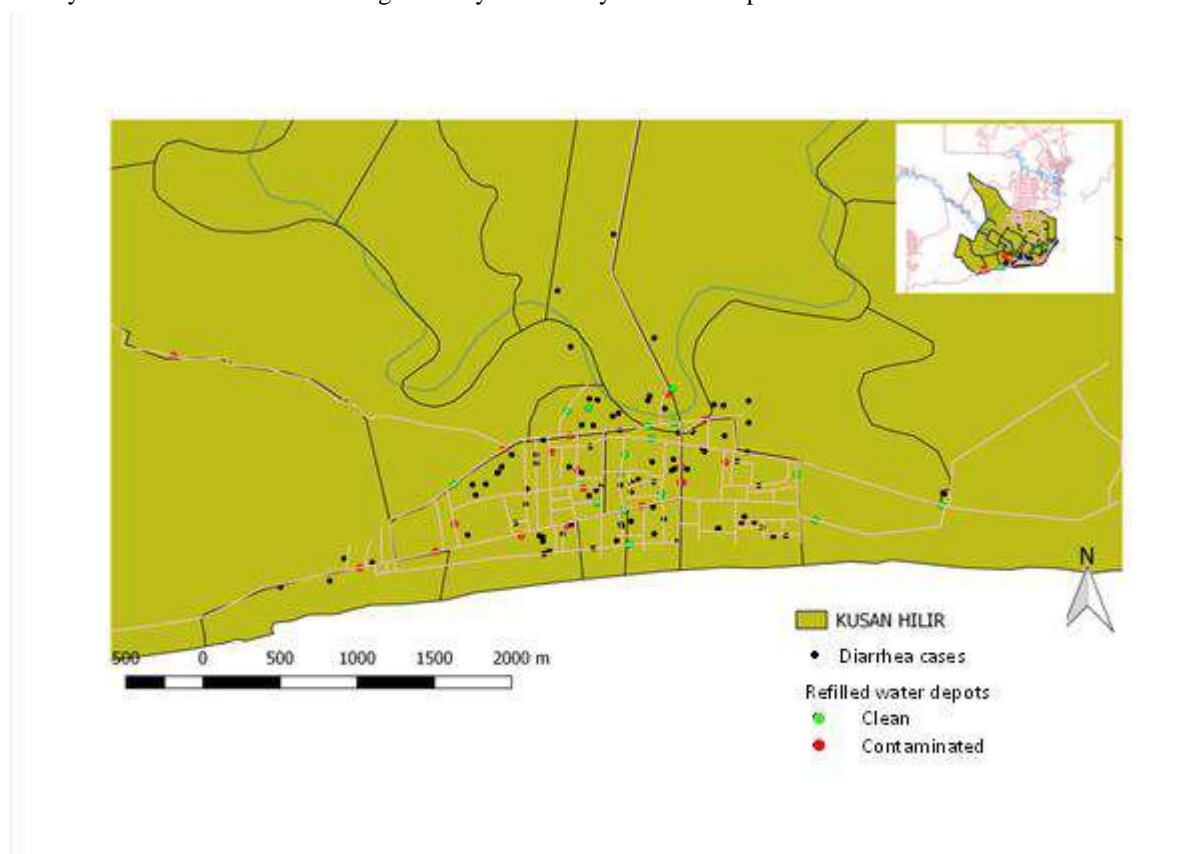


Figure 2 Distribution of refilling water depots and diarrhea cases

The scoring of effect status (figure 3) shows that there are several villages or id locations that have high effect status especially Batuah, Kota Pagatan, Pasar Baru, and Wiritasi located in the center of Pagatan area while some villages on the suburbs of Pagatan such as Mudalang, Muara Pagatan, Sei Lembu, Baru Gelang, Betung and Beringin have medium effect status and some are low. Heatmap is used to facilitate cluster identification where there was high risk concentration so that it becomes the influence for the surrounding exposure.

ID Location	Cases	Contaminated Depots	Effect Status
Batuah	19	86%	9
Muara Pagatan	1	100%	5
Muara pagatan tengah	1	0%	1
Tanete	4	0%	1
Wiritasi	8	100%	6
Kota Pagatan	20	67%	8
Mudalang	2	100%	5
Juku Eja	5	0%	1
Pasar Baru	12	14%	7
Kampung Baru	1	0%	1
Pagar Ruyung	6	0%	2
Manurung	4	0%	1
Gusunge	4	0%	1
Pejala	4	100%	1
Sei lembu	2	100%	5
Pulau Satu	4	0%	1
Baru Gelang	2	100%	5
Betung	0	100%	5
Beringin	0	100%	5

Figure 3 Heatmap of effect status based on id location

Figure 4 below explains that the concentrations of ‘contaminated’ depots were at the center of Pagatan City and some other suburbs. There is a correspondence between the density of the depots’ position and the density of the diarrheal cases found. This figure shows ‘contaminated’ depot hotspot having an impact of up to 500 meter radius toward diarrhea patient with a characteristic access to drinking water that has been described.

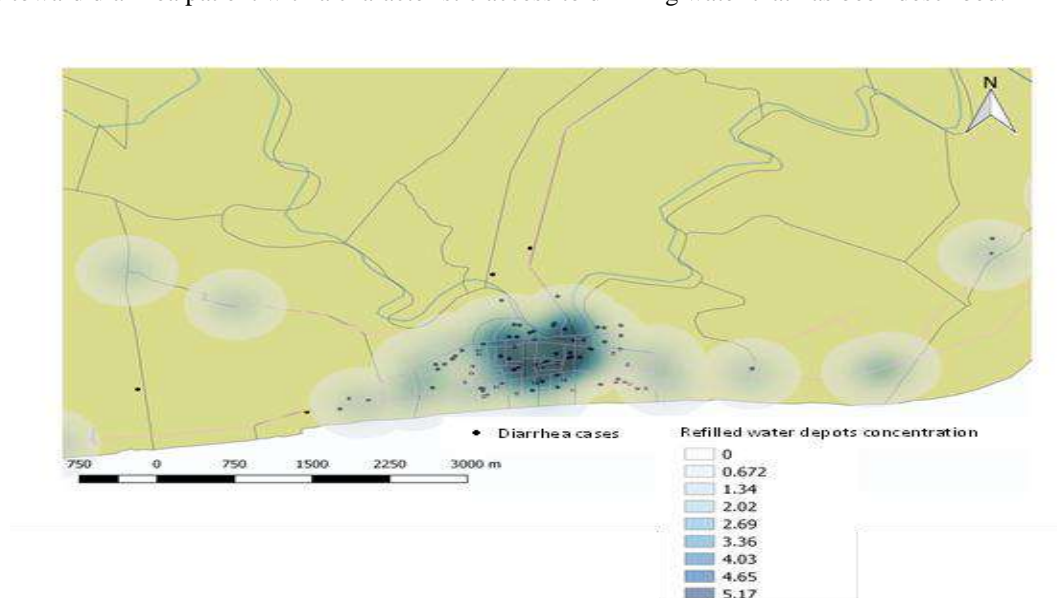


Figure 4: Heatmaps of ‘contaminated’ depots and diarrhea cases

Discussion

The results clearly indicate a significant spatial relationship between cases of diarrhea with the presence of refill drinking water depots in the City of Pagatan. Pagatan community was one of urban communities which was

always have a tendency in choosing the practicality in meeting their needs, including in access to drinking water. Refill depots have proven to change the pattern of Pagatan community's drinking water access behavior by providing convenience and affordable prices in obtaining drinking water in a practical way. The data shows that most respondents choose refilling drinking water as their drinking water even most of them directly drink the water without processing first. The contrast is shown in research in Jakarta which was refilling water users were more at no risk of diarrhea.(Sima *et al.*, 2012)

In Indonesia, refilling drinking water is the third largest source of drinking water used by the community with a percentage of 17.2%.(Kemenkes, 2011; Wandrivel, Suharti and Lestari, 2012)This drinking water refill business has expanded widely and become a source of income for depot entrepreneurs and become a necessity for consumers.(Bayer, 2013)This condition created new characteristics for the community behavior in terms of the ability to seek access to drinking water was easier and cheaper. Government regulation has arranged related to this refilling drinking water business to accommodate the needs of the community, such as maintaining the quality and safety of drinking water products, sanitation inspection, and standard operating procedures of the provision of refillingwater.(Indonesian Ministry of Health, 2014)However, the implementation in the community was often not in accordance with the directed. In the process of water sampling we witnessed some depots did not have an operational permits and claimed to have never visited the officer for water inspection.

Lack of supervision from health workers is very influential on this business work system and will directly affect the quality of the product. 42 depots examined, 23 of depots' water product claimed to be 'contaminated' with high levels of contamination (mean 6,087 ($0 \leq \mu \leq 38$) MPN / 100ml and 297,420 ($30 \leq \mu \leq 2330.67$) CFU / ml). This was not in accordance with government regulations that do not allowed drinking water contaminated with *E.coli* or *Coliform* at all.(Indonesian Ministry of Health, 2010)

Pagatan city is one of the most densely populated cities in Tanah Bumbu and the capital city for Kusan Hilir sub district. Increasing population growth every year seems to trigger the growth of this refill depot business. Increasing the need for drinking water is not accompanied by an increase in efforts to maintain the quality of drinking water product by doing according to the procedure. Several depots were found serving by delivered drinking water using plastic jerry cans and then transferred to consumers' gallon without have to wash the gallon first. Some depots also did not have the equipment to wash gallons and there were moss grew inside of the gallon of the seller's inventory that would normally be exchanged for the consumer's gallon. This has become a normal sight in the drinking water refill business in the region.

By the distribution of cases, we overlay with a heatmap 'contaminated' depot in the Pagatan area. At a radius of 500 meters from a 'contaminated' depot is an area of impact for the user community around the depot. It can be seen that the densest cluster of diarrhea cases was at the centre of the Pagatan area (Batuah, Pasar Baru, Kota Pagatan and Wiritasi) as well as the corresponding density of the 'contaminated' depots in the same area. This area is the center of economic activities of Pagatan city where in this area there are traditional markets, fish market and most shops and densely populated settlements are also concentrated in this area. Most depots were also found to be close to sources of contaminants such as markets, sewers, landfills, rivers, slums and so on. Some of these factors become one of the determinants of hygiene and sanitation in business in the region. (Sulistiyandari, 2009; Puspitasari, 2018)Scores of effect status and heatmap indicate that there is a significant spatial influence of 'contaminated' depots on the occurrence of diarrheal cases in the Pagatan area.

This refilling drinking water business is considered very helpful if reflected from the side of the economy and accessibility to improve the welfare of the community.(Sima and Elimelech, 2013) It will be even more valuable if compensated by consistent quality control of this business product. The regulation properly implemented, good equipment and maintenance operations, sanitary hygiene of the place of business, and good personal hygiene from the handlers (Rahmitha, Utami and Sitohang, 2018) would be able to contribute well to the quality of products provided to the community. However boiling water before drinking may reduce the risk of diarrhea in the community.(Hairani *et al.*, 2017)

Conclusion

There is a spatial correlation between the density of the refill depots and the distribution of the diarrheal cases found. The concentration of 'contaminated' depot has a significant effect on the characteristic profile of the majority patients which were being around in the area of the depot.

Recommendation

- For refilled water provider: standard procedure to operate the refilled water machine should be done, use improved water source, good maintenance of entire machine routinely, good personal hygiene of handlers and change the filter regularly.
- For consumer: water should be boiled before consume and clean up the water dispenser regularly.
- For government: local regulations on refilled drinking water management need to be applied properly.

Author Contribution

DA design concept of analysis, design study, perform spatial analysis, writing manuscript; DES, IS and SH perform analysis and writing manuscript; EH and H prepare equipment and assist technical activities in the field.

Acknowledgement

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INEQUALITY TRENDS OF ANTENATAL CARE AMONG WOMEN IN INDONESIA 2002-2012

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Abstract: Antenatal care (ANC) is a major component of maternal health services for preventing adverse pregnancy outcomes. As one of maternal health indicator for universal health coverage and Sustainable Development Goals (SDGs), it is important to monitor the distribution of the coverage among social dimension stratification. The study aims to examine inequality trends in the use of ANC services of Indonesian women aged 15-49 years based on the data from the Indonesia Demographic Health Surveys (IDHS) 2002, 2007 and 2012. Inequalities are measured using socioeconomic and demographic stratification variables such as urban-rural, mother's education and household wealth index. We also performed analysis of social determinants of health and their relationship with ANC. The trend of ANC utilization shows narrower gap according to social dimension stratification. The urban-rural difference for ANC has been reduced from 15 to 10.5 percentage points. The education-related inequality in ANC also declined nearly 40% from 2002 to 2012. A similar downward trend was observed for wealth-related inequality merely between the last two periods of survey. The trend in ANC use was entirely confounded by socioeconomic and demographic changes over time. The adjusted odds ratios for wealth quintile and education substantially decreased. A reduction in the inequality dimension through time suggests that both access and equality are improving in ANC use. Monitoring of trends needs to be continuously done among disadvantaged groups so that programs are in place for more targeted health development plans.

Keywords: antenatal care, inequality, health services, IDHS, Indonesia

Introduction

Antenatal care contributes to achieving Sustainable Development Goals by monitoring the progress on the target to reduce maternal mortality. Antenatal care (ANC) plays an important role in preventing adverse pregnancy outcomes. The importance of ANC lies in its capacity to identify risks and detect complication and educate women with information on danger signs and symptoms. It enables monitoring of the well-being of mother and fetus as well as the signs of any obstetric complications that might be treated (Chalmers et al., 2001). While the SDG strategy in expanding coverage of antenatal care (ANC) was notable in Indonesia, improvements in maternal health outcomes did not always follow. Maternal mortality ratio (MMR) remains unacceptably high representing 305 per 100,000 live births (Badan Pusat Statistik, 2016) or estimated to be nearly ten times higher than its closest neighbors, Malaysia and Brunei Darussalam (Adashi et al., 2013).

The slow pace of reduction in maternal mortality has urged many nations to begin addressing inequalities in maternal health with regard to both access to care and levels of MMR. The inequalities in maternal health care show discrepancies between the richer and poorer populations, as well as between different socioeconomic statuses (World Health Organization and Ministry of Health of Indonesia, 2017). Indonesia, across its rich and diverse ethnic groups, economic and geographical landscapes, faces challenges in addressing inequalities. While some population groups have better access to healthcare services, others are disadvantaged. Monitoring of such inequalities is therefore a fundamental part to improve access to health care of those who are disadvantaged and to ensure that Indonesia fulfills its commitment of leaving no one behind (Hosseinpoor et al., 2016).

Within-country inequalities, however, should be described for a broad range of dimensions. At the same time, having comparable disaggregated data is essential to track inequalities at subnational level (Hosseinpoor et al., 2016). Demographic and Health Survey (DHS) serves as one of the main data sources for monitoring trends and inequalities in the use of maternal health care services due to the quality of the data and comparability over time (Corsi et al., 2012). In this study, we assess data from three consecutive Indonesia Demographic and Health Surveys (IDHSs) to explore the trends of inequalities in ANC uptake among women of reproductive age. The aim is to understand further the extent to which inequality in the coverage of ANC across socioeconomic and geographical dimension vary over time. A better understanding of the magnitude and determinants of inequalities in maternity care may help contribute to tackling these disparities and offering insights to policymakers about potential public health strategies towards a more integrated and accessible health care for all.

Methods

Data sources

This study was performed using secondary data of IDHS for the periods of 2002, 2007 and 2012. All were nationally representative household survey conducted by the Statistics Indonesia in collaboration with the National Population and Family Planning Board and the Ministry of Health of Indonesia. The dataset was retrieved from the DHS website at <http://dhsprogram.com> and reported in aggregate. The IDHS collects information on demographic and population, health indicators, such as contraceptive knowledge and use, maternal and child health, and nutritional status of mothers and children to assist in the country's monitoring and impact evaluation. It ensures comparability across regions, countries and time using globally standardized questionnaire.

Study population

Ever-married women age 15-49 who gave their last birth in the preceding five years of each survey were included as eligible participants.

Variables

Women who received ANC at least four visits (ANC 4+) in their last pregnancy were considered as outcome variable, recorded as a binary variable (yes/no) in the dataset. The World Health Organization (WHO) recommends that every pregnant woman should have a minimum of four focused ANC visits (Carroli et al., 2001). The inequality dimensions used in this study were as follows: educational level, wealth status and place of residence (rural/urban). Other independent variables included age at birth, birth order and subnational region. Demographic characteristics of each respondent, their housing conditions and household wealth indicators were recorded in the Household Questionnaire, whereas reproductive history and ANC information for women was captured in the Women's Questionnaire. Table 1 describes the variables and how they were defined.

Statistical methods and analysis

Trends of ANC 4+ utilization was calculated from frequency percentages by the survey years to observe the changes over time. Inequalities in ANC 4+ coverage was estimated across wealth quintiles and educational attainment and compared by using slope index of inequality as absolute measure among the subgroups of population. Slope index of inequality is a complex measure to quantify the absolute difference in predicted values of a health indicator between the most and least advantaged group, while taking into consideration the entire distribution of subgroups using an appropriate regression model (Hosseinpoor et al., 2016). It is calculated as:

$$SII = v_1 - v_0, \text{ for favorable health intervention indicators (1)}$$

Difference was also used to measure disparities in ANC 4+ coverage between urban and rural areas. The inequality analysis was done by using WHO Health Equity Assessment Toolkit Plus (HEAT Plus) software. Database was generated from disaggregated data of IDHS which were uploaded to HEAT Plus in a specific format. Once uploaded, these data were used to explore inequalities within socioeconomic and demographic dimensions in graphs.

We generated frequency tabulation to describe socio-demographic characteristics and their distributions over three consecutive survey periods of 2007, 2012 and 2017 which were compared by using a chi-squared test. Binary logistic regression was performed to obtain both crude and adjusted odds ratio (OR) for the outcome variable using the Wald test to assess the statistical significance at 95% confidence intervals (CI), taking into account survey design (sampling weights and strata). The analysis was adjusted for all the other variables (age at birth and birth order) which might have any confounding effect. SAS Studio was used for analyzing data.

Table 1 Summary of the variables used in this study

Variable name	Definition
ANC at least four visits (ANC 4+)	Percent of women age 15–49 with a live birth in five years period preceding the survey who received antenatal care four times or more. The indicator is based on standard questions that ask if, how many times, and by whom the health of the woman was checked during pregnancy.
Educational level	The highest level of education attended by the women. It is categorized into ‘no education’, ‘primary’, ‘secondary’ and ‘higher’. ‘No education’ refers to women who confirmed having no formal education. ‘Primary’ refers to women with some level of formal education or completed primary education, including those with middle school. Women who completed up to 12 years of formal education or those whose education ended at the upper secondary/high school level consider as having ‘Secondary’ level. Women who were having ‘Higher’ level are those who completed at least 15 years of formal education, including those with college, polytechnic or university level studies.
Wealth status	Wealth status was calculated using household assets data collected from IDHS surveys, such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilities. It is categorized into 5 wealth quintiles: Lowest, Second, Middle, Fourth, and Highest.
Place of residence	The civil subdivision of a country in which the individual resides. It is traditionally distinct by urban and rural.
Age at birth	The age of women at birth of last child. It was coded into three categories as follows: < 20 years, 20-34 years, 35+ years.
Birth order	The order in which a child is born. It was coded into four categories as follows: 1, 2-3, 4-5 and 6+.

Results

Table 2 shows the socio-demographic characteristics among Indonesian women age 15-49 years who had their last birth within 5 years prior to the surveys. A total of 41,945 women were included in the last three IDHS, where 2002 IDHS, 2007 IDHS and 2012 IDHS included 12,760, 14,430 and 14,782 women, respectively. The majority of women delivered their babies at the age of 20-34 (74.2% in 2002, 75.1% in 2007 and 74.7% in 2012). The proportion of women who gave the last birth at the younger age group decreased from 11.7% in 2002 to 9.0% in 2012. The same is true for birth order, where the proportion of multiparous (6+) women declined in the year 2012 compared to 2002. The percentage of women having no education reduced by more than 50% (4.5% in 2002 and 1.9% in 2012) and higher level of education was almost doubled from 6% in 2002 to 11.9% in 2012. However, there is no clear pattern for the percentage of women by wealth status.

Table 2 Socio-demographic characteristics among women age 15-49 in Indonesia, IDHS 2002-2012

Socio-demographic characteristics	2002	2007	2012
	N = 12,760	N = 14,403	N = 14,782
Age at birth			
<20	11.7	9.9	9.0
20-34	74.2	75.1	74.7
35-49	14.0	15.0	16.3
Birth order			
1	33.6	34.6	37.5
2-3	46.1	46.8	48.1
4-5	12.9	13.2	10.7
6+	7.4	5.4	3.6
Place of residence			
Rural	53.2	58.0	50.2
Urban	46.8	42.0	49.8
Education level			
No education	4.5	3.3	1.9
Primary	48.6	41.2	32.2
Secondary	40.8	47.7	54.0
Higher	6.0	7.9	11.9
Wealth status			
Poorest	22.3	21.4	20.5
Poorer	19.5	19.9	19.5
Middle	20.5	20.0	19.9
Richer	19.6	19.5	21.0
Richest	18.3	19.1	19.1

Trends in ANC 4+ coverage

Figure 1 depicts an increasing trend in ANC 4+ utilization from 2002 to 2012. Proportion of utilizing ANC 4+ showed a tendency to increase overtime with the increasing status of household economic. A huge gap between poorest and richest was reported in 2002, whereas in 2012 the gap was quite decreasing. Similar to economic status, the proportion of ANC 4+ coverage by education level rose between 2002 and 2012. Although gradients of its use among women with no education and women with higher education widened from 2002 to 2007, the gradients of ANC use among women who completed primary education and those with higher education decreased from a difference of 25% point in 2002 to 16.7% point in 2012. Furthermore, the trend in ANC 4+ utilization did not change much across type of residence, marked by confidence intervals that were still in the same range. Over the past 10 years, the urban-rural difference for ANC 4+ coverage reduced from 15% point to 10.5% point, showing that the gap between urban women and their rural counterparts was slightly narrower.

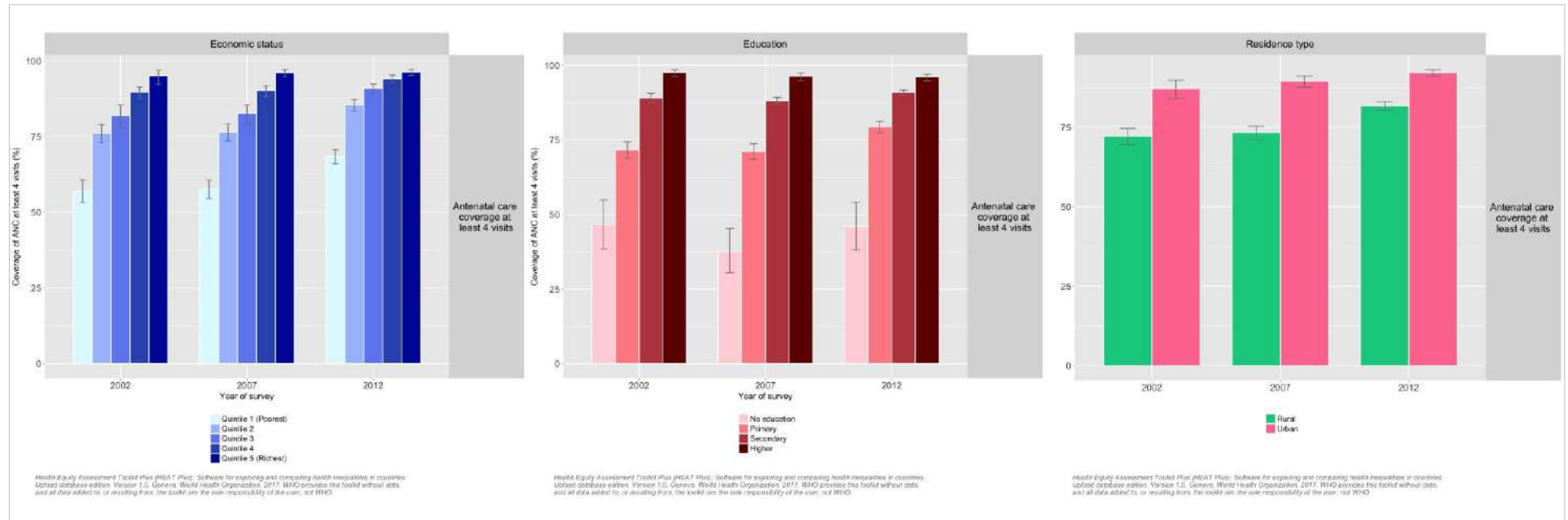


Figure 1 Trends in ANC 4+ coverage according to economic status, education and residence, 2002-2012 IDHS

In multi variable analysis, when the effects of covariates were controlled statistically using binary logistic regression model, all socio-economic, maternal and demographic factors remained significant predictors of ANC 4+ use, except place of residence (Table 3). Among socio-economic variables, household economic status and mother's education were both powerful predictors for ANC 4+ use. However, adjusted ORs for economic status tend to decrease overtime. In 2002, mothers with higher education were almost nine times more likely (OR: 8.67; 95% CI: 3.54-21.24) to use ANC 4+, while in 2012, the likelihood was smaller (OR: 2.57; 95% CI: 1.45-4.57). Women with older age of birth also tend to get access to ANC 4+ services. In contrast, negative association was found between birth order and ANC 4+ use as the utilization was less common among women with birth order six or above.

Table 3 Associations between socio-demographic characteristics and antenatal care visits among women age 15-49 in Indonesia, IDHS 2002-2012

Socio-demographic characteristics	ANC 4+ utilization								
	2002			2007			2012		
	Adj. OR*	95% CI	P-value	Adj. OR*	95% CI	P-value	Adj. OR*	95% CI	P-value
Age at birth									
<20	1.00			1.00			1.00		
20-34	1.74	1.18 - 2.57	0.00**	1.82	1.37 - 2.43	0.00**	1.58	1.19 - 2.09	0.00**
35-49	2.18	1.46 - 3.27		2.26	1.55 - 3.29		1.80	1.24 - 2.63	
Birth order									
1	1.00			1.00			1.00		
2-3	0.74	0.58 - 0.95	0.00**	0.61	0.50 - 0.74	0.00**	0.72	0.59 - 0.89	0.00**
4-5	0.44	0.32 - 0.60		0.43	0.33 - 0.55		0.55	0.41 - 0.72	
6+	0.27	0.20 - 0.38		0.20	0.14 - 0.29		0.36	0.24 - 0.54	
Place of residence									
Rural	1.00			1.00			1.00		
Urban	0.90	0.62 - 1.30	0.57	1.15	0.93 - 1.43	0.20	1.10	0.90 - 1.34	0.35
Education level									
No education	1.00			1.00			1.00		
Primary	1.56	0.95 - 2.56	0.00**	1.66	1.05 - 2.61	0.00**	1.34	0.84 - 2.13	0.00**
Secondary	2.48	1.58 - 3.90		2.50	1.54 - 4.06		1.91	1.20 - 3.04	
Higher	8.67	3.54 - 21.24		4.87	2.33 - 10.17		2.57	1.45 - 4.57	
Wealth status									
Poorest	1.00		0.00**	1.00		0.00**	1.00		0.00**
Poorer	1.93	1.54 -		1.86	1.54 -		1.94	1.56 -	

		2.42		2.24		2.42
Middle	2.21	1.57 - 3.09	2.16	1.69 - 2.75	3.09	2.41 - 3.96
Richer	3.20	2.26 - 4.54	3.21	2.43 - 4.23	4.11	2.99 - 5.65
Richest	5.54	3.03 - 10.15	7.21	4.65 - 11.19	6.47	4.36 - 9.61

Trends in ANC 4+ inequalities

Figure 2 shows the changes in inequality of ANC 4+ utilization across economic status and education level from 2002 to 2012. The following figure is the result of inequality calculation using slope index of inequality (SII) as a summary measure of inequality. The SII indicated existence of inequalities in ANC 4+ utilization for two different dimensions. As shown in the figure, the coverage of ANC 4+ has increased substantially as inequalities declined. The general downward trend for SII by economic status was seen. A reduction of SII for ANC 4+ was observed across economic status, although the value slightly increased between 2002 and 2007. The absolute inequalities in ANC 4+ across education level also declined overtime. A slight decrease of SII was observed from 2002 to 2007, but the trend was reduced sharply between 2007 and 2012. The gap between the richest and poorest varies by province (Figure 3). Most provinces in Java and Bali region has narrower gap between poorest and richest in the use of ANC 4+ over the past decade. As seen in the figure above, Jakarta, Banten and West Nusa Tenggara have successfully reduced the gap more than 65%.

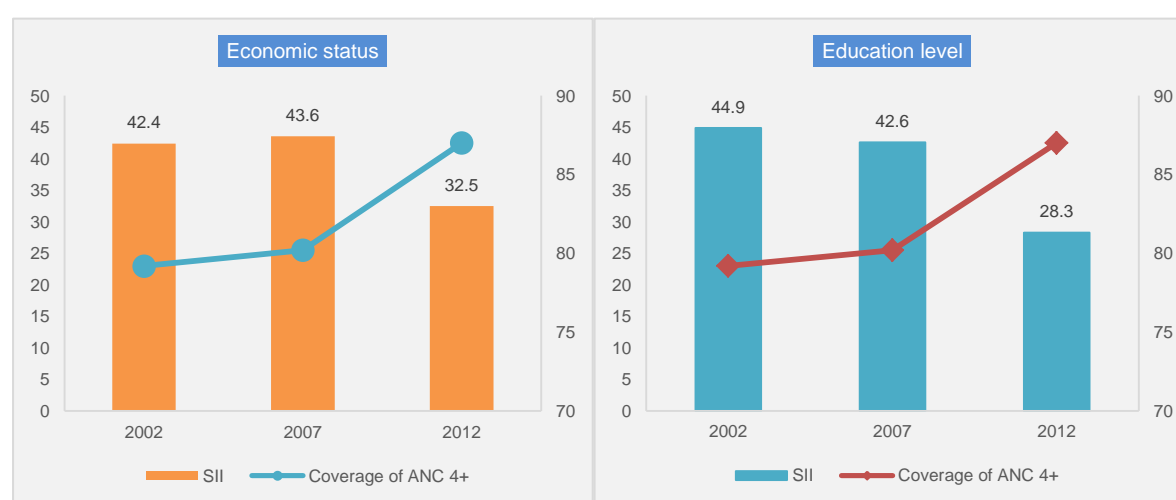


Figure 2 Inequality trends in ANC 4+ coverage across economic status, education and residence, 2002-2012 IDHS

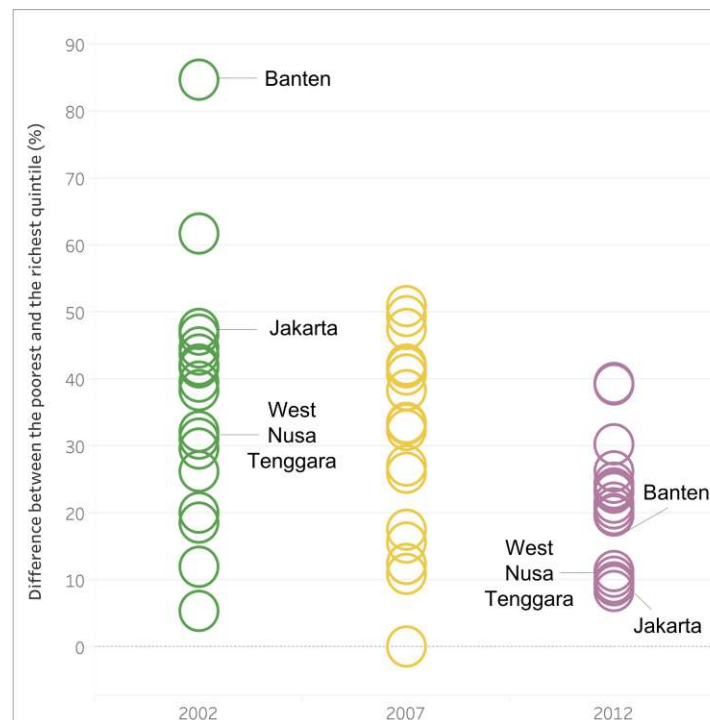


Figure 3 Inequality trends in ANC 4+ coverage across subnational region, 2002-2012 IDHS

Discussion

This study revealed that Indonesia is experiencing a substantial progress in the reduction of health inequalities and positive change in the social determinants of health over the past decade. Socioeconomic, urban-rural and geographical inequalities in ANC were particularly pressing. Utilization of ANC services has also increased, reflecting improved coverage and access. Nevertheless, women who are rich, well-educated and living in urban settings still have greater opportunity to access ANC 4+. Our findings are in line with evidence on several low and middle-income countries which reported low utilization of ANC 4+ among poor and uneducated women (Nababan et al., 2018; Rahman et al, 2017; Anwar et al, 2015; Molina et al., 2013). A systematic review identified that financial constraints are barrier for poor people in developing countries to access care. Women's education was also the best predictor of ANC visits as better educated women were more likely to receive the recommended number of ANC visits (Simkhada et al., 2008)

Reductions in the inequality of ANC 4+ services reflected substantial use among women at rural areas in Indonesia. This can be explained by the increasing role of private sector in maternal health services, especially midwives. Heywood and Choi (2010) found that among women who received antenatal care, they mostly received it from a private sector provider, such as midwife and village midwife. In Indonesia, the expansion of public and private facilities began before the 1990s. By then, the government allowed facilities to be established and staffed in many remote areas, resulting a rapid expansion of public health facilities and medical staff (Heywood and Harahap, 2009). Since decentralization in 1999, the deployment of medical professionals is in the hand of local authorities. They have focused on increasing the availability of health care and health professionals by improving community access to services through auxiliary health centers, including community health centers (*Puskesmas*) (Heywood and Choi, 2010).

However, uneven distribution of health facilities and labors brings an impact to the variation of healthcare coverage among provinces. The finding of this study is not much different from the results of inequality analysis of access to drinking water and sanitation across subnational regions done by Tin Afifah et al (2018). The wider gap found in the Eastern provinces of Indonesia which is known to be a geographically challenge. Another

problem is the distribution of labor and facilities that are not evenly distributed throughout Indonesia. Most provinces in Java regions have easier access and sufficient number of health workers who are able to serve ANC 4+. To define responsibilities towards basic health services in local governments as well as to ensure the equity in access, Minister of Health has therefore launched a regulation number 43/2016 that consists of minimum standard of services in health sector, including the coverage of ANC 4+ (Ministry of Health of Indonesia, 2016). Given the growing number of private health provider, the standards in quality have been a great concern. Thus, further quality improvements at this provider are still utmost.

Another contributing factor is the government's commitment to improving the country's health system through the provision of social health insurance for the poor. Until the end of 2013, the main pro-poor social health insurance in Indonesia was *Jamkesmas*, financed by the central government. *Jamkesmas* was managed by the Ministry of Health and provided beneficiaries with free health services in *Puskesmas* and hospitals. Another type of insurance for the poor is *Jamkesda*, which is funded by the local government (province/district level). Such insurance programs enable the poor to gain access to health services (Achadi et al., 2015). In addition, an insurance scheme for maternal healthcare or *Jampersal* provides comprehensive maternal health service coverage to those who are not covered by *Jamkesmas*, *Jamkesda*, or any other health insurance scheme. The benefit packages of *Jampersal* include the coverage for antenatal care, delivery care, postpartum care for mother and newborn, and family planning (Achadi et al., 2015). An assessment study in two districts in Indonesia – Garut and Depok - showed that nine in 10 (93.9% and 96.3%, respectively) women used *Jampersal* for antenatal check, increased slightly after three years of implementation (Achadi et al., 2015).

The findings of this study indicated that women's education was associated with ANC 4+ use. The likelihood of women using those recommended maternal healthcare services increased along with the increased educational attainment among women. Likewise, another study found increased odds of not attending ANC services among women with a low level of education (Titaley et al., 2010). Thaddeus and Maine (1994) suggested a theoretical framework explaining that social factor, such as education, as a key factor determining care-seeking decision and ultimately influencing the utilization of maternal healthcare services. Empowering women with formal education enhance women's capacity in recognizing their rights to health and making proper decisions for their health (Achia and Mageto, 2015). Women with a proper education also have capability to seek and obtain healthcare information and use it accordingly (Rai et al., 2012). Hence, higher schooling years may contribute to improving adequate maternal healthcare (Kurniati et al., 2018).

A 9-year compulsory education policy has increased length of school years as well as improved knowledge for both men and women. This also has an impact on women's capability in seeking health services for them. This is consistent with the results of the study conducted by Samarakoon and Parinduri (2015) which is shown that education increases contraceptive use and promotes reproductive health practices. Moreover, education allows women to gain literacy skills, enables them to process information, and develops their cognitive behavior. Therefore, when a woman is educated, she is able to take better care of herself (Duflo, 2012). Nonetheless, education may be insufficient to change deeply rooted societal attitudes or improve gender relations such as decision-making authority. Many parts of Indonesia are still governed by local tribes and norms (Kevane and Levine, 2003), which may hinder women to make household decisions by themselves. Moreover, patrilineal kinship in Indonesia often inhibits women's access their inheritance rights after marriage (Rammohan and Johar, 2009). The 2012 IDHS results show that having no permission from husband is reported as one reason for not accessing health care encountered by 5% women in Indonesia (Statistics Indonesia et al., 2013).

A great emphasis has been made on the state of health inequality in Indonesia in accordance with the spirit of SDGs to leave no one behind. On the one hand, ANC 4+ coverage is reaching better, and inequalities are decreasing, yet the main challenge in Indonesia is the high maternal mortality rate. Antenatal check is a tool for early detection of high risk and complications. It helps women to recognize delivery preparation in order to give birth safely. Various efforts have been made by the Ministry of Health, such as pregnancy class and birth

preparedness program which allow women to plan for delivery, including referral system during pregnancy and delivery complications (Ministry of Health, 2015). However, the implementation of such programs has been continued to be a challenge for Indonesia to improve access to ANC services which requires increasing public health awareness.

Conclusions

The current study indicates improved social determinants of health in Indonesia, which at the same time also reduces health inequalities. Our findings imply the need for research solutions to reduce inequality in maternal health services, and to determine the factors responsible for the persistence of inequality in maternal health services, particularly recommended ANC services. Recognizing reproductive health as a basic right of women regardless of socio demographic and economic status is important in formulating national policy and programs to address inequality in maternal health service utilization. Thus, it is important to monitor utilization trends among disadvantaged groups and consider ways to incorporate adequate and quality service delivery with comprehensive financial scheme (universal health coverage). Promoting women's empowerment and awareness to their needs of maternal healthcare has another imperative strategy to reduce the cultural barriers.

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IMPROVEMENT STRATEGIES OF JOB PERFORMANCE: A PERSPECTIVE ON NURSING PROFESSION IN VIETNAM

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Abstract: As an increase in overloaded general hospitals in Vietnam, nurses are under intensive pressure but receive little opportunities for learning new technical skills and for developing an obvious career path. Meanwhile, nurse performance is essential to quality outcomes of healthcare services. Therefore, this study aims to investigate primary drivers of nurse performance by using the structural equation model approach to analyze a survey of 366 nurses working in four hospitals in Ho Chi Minh City and Bac Lieu province, Vietnam. The results show the facilitating effects of affective commitment and self-leadership on job performance, but not continuance commitment and communication competence. Also, the empirical evidence supports that perceived organizational support and psychological safety indirectly impact job performance through affective commitment. Job resources, however, are insignificantly related to affective commitment. The study indicated that nurses with a high degree of self-leadership and affective commitment to the organization are prone to attain high job performance. Therefore, managers should implement strategies to enhance nurses' conception of self-leadership and affective commitment, which would be an efficient approach to improve quality healthcare services. This study also makes some explanations for the divergence between the previous literature on factors affecting nurse performance and that in Vietnamese hospital context.

Keywords: job performance, nurses, affective commitment, self-leadership

Introduction

In most professions, human resource management has been catching great attention as its direct influence on the prosperity and sustainable development of the organization (Becker and Gerhart, 1996, Rogers and Wright, 1998, Sheehan, 2014). Particularly in the healthcare field, managerial practices are increasingly applied to promote the competency of nurses. According to Lee and Ko (2010), nurses are on the front line of caregiving to patients in partnership with various positions like physicians, medical technologists, and administrative staff. Hence, the performance of nurses is closely associated with services quality and organizational outcomes. The identification of factors boosting nurses' job performance (JP) has become an essential research topic in the field of healthcare in different economic and cultural backgrounds.

Currently, scholars have explored a large number of factors impacting job performance such as work environment, job satisfaction, leadership styles (Kacmar *et al.* 2009, Platis *et al.* 2015, Manning, 2016). In this research, we aim to analyze the effect of organizational commitment on raising job performance. Organizational commitment (affective, continuance and normative commitment) is among the most critical elements due to its role in anticipating organizational goals, absenteeism, turnover, and productivity (Wasti, 2003). It is crucial to recognize the positive outcomes of high organizational commitment and to encourage nurses' participation in organizational activities to improve the operational effectiveness (Liou, 2008). Previous studies showed that affective commitment (AC) and normative commitment have a positive interconnection, meaning that they have the same pattern of correlation (Meyer *et al.* 2002). While the other dimension, continuance commitment

(CCM), seems to have particular patterns. Hence, this research will place focus only on the significance of affective and continuance commitment.

Furthermore, affective commitment has been found as the strongest predictor of nursing performance (Meyer *et al.* 2002, Qaisar *et al.* 2012). As a result, our study will examine its possible drivers including perceived organizational support (POS), psychological safety (PS), and job resources (JR). In particular, employees' positive feeling at work can be boosted under the environment where they perceive greater organizational support (Lee *et al.* 2010) and a sense of psychological safety (Kark and Carmeli, 2009). Also, the provision of job resources was proved as an important element to create a positive work setting, which in turn increases employees' affective commitment (Kirk-Brown and Van Dijk, 2016). Although previous studies have confirmed the significant contribution of these factors on raising affective commitment, further investigation in different contexts is still necessary to evaluate the generalization of these findings.

In today hospitals' setting, nurses are holding the major responsibilities for the internal management of patient care. Therefore, self-leadership (SL) should be considered as an essential factor in the construct of job performance. The implication of self-leadership might encourage the ability of self-control and responsibility among nurses, which results in favorable organizational outcomes (Manz, 1983). Prussia *et al.* (1998) showed that the relationship between self-leadership and performance outcomes is mediated by nurses' self-efficacy. Likewise, Lee and Ko (2010) revealed that self-efficacy is a facilitator of high-quality nursing care. However, few researchers have examined the direct contribution of self-leadership in determining nurse performance.

According to Moreland and Apker (2016), nursing practices involve executing care services to patients on the most frequent basis and also interacting with patients' families and other nursing teams. Moreover, Commission (2012) shows that communication-related problems account for 50% of confliction among nurses. Taken together, these suggested that the nursing job is highly based on interpersonal communication. Yu and Ko (2017) asserted that a high level of effective communication could reduce such negative events occurred in hospitals, which positively influenced job performance. Thus, it is necessary to improve communication competence (CCP) in the nursing organization.

The purpose of this study is to confirm the significance of nurse performance's drivers in Vietnamese hospitals with distinctive characteristics. The findings enable us to suggest some practical implications to enhance nursing competencies, which in turn helps promote quality and safety in the healthcare community.

Literature Review

Perceived organizational support, affective commitment, and continuance commitment

Perceived organizational support refers to the extent to which employees believe that their organizations value their contributions and care for their well-being. According to Shore and Wayne (1993) and El Akremi *et al.* (2014), under the perception of organizational support, nurses may expect that hospitals would reward their increased effort towards work goals and satisfy their needs of praise and approval. The perceived organizational support can satisfy emotional needs in the workplace such as esteem, approval, and partnership; thus, affective commitment is regarded as its major outcomes (Rhoades *et al.* 2001). The previous studies also show that the recognition of organizational support is the predictor of continuance commitment, which refers to the cost associated with leaving the organization. The more benefits receive from the current employment, the more valuable organizational membership is; therefore, employees need to keep attached with the organization as they acknowledge the noticeable sacrifice on quitting the job (Shore and Tetrick, 1991, El Akremi *et al.* 2014). Nurses are more likely to create a bond with their hospitals in the presence of high organizational support because they see a more favorable interrelationship between their contributions and comparable rewards (Shore and Tetrick, 1991). Hence, the following two hypotheses are proposed:

H1: Perceived organizational support has a significant direct effect on affective commitment.

H2: Perceived organizational support has a significant direct effect on continuance commitment.

Psychological safety and affective commitment

Psychological safety is the perception where an individual can express his or her self without worrying about negative effects on self-image, status or career (Kahn, 1990). In other words, a work environment characterized by a high level of psychological safety can encourage employees' interpersonal risk-taking. With the perceptions of interpersonal trust and mutual respect, they feel safe to raise questions, seek feedback, report mistakes, or express new ideas without fear of vulnerability (Edmondson, 1999, Kark and Carmeli, 2009). Therefore, psychological safety can foster learning behavior, productive problem resolution as well as positive work experiences which lead to positive organizational outcomes and increased work engagement (Baer and Frese, 2003). Under such a work setting where they can perform their job autonomously with the sense of comfort, nurses tend to get more involved with their organization, thereby being pleased to maintain their membership as they desire. In general, psychological safety is expected to impact the affective commitment of nurses positively, thus coming up with the following hypothesis:

H3: Psychological safety has a significant direct effect on affective commitment.

Job resources and affective commitment

Job resources refer to those physical, psychological, social, or organizational aspects of the job that are instrumental in reducing job demands, attaining work goals and nourishing personal growth, learning and development (Bakker and Demerouti, 2007, Demerouti *et al.* 2001). In this research, we assess job resources through two dimensions: job complexity and job autonomy. There is an increasing demand for complete autonomy in the workplace for employees to meet the requirement of more advanced work (Chung-Yan, 2010). Job resources are either intrinsically stimulative as they fulfill the primary desire for autonomy, competence, and belongingness; or extrinsically stimulative as they provide conditions to obtain work success (Schaufeli and Bakker, 2004). Through this prompting process, the provision of valued job resources provokes positive outcomes like work involvement (Demerouti *et al.* 2001), to which employees are likely to respond with a highly affective commitment to their organization (Kirk-Brown and Van Dijk, 2016). Thus, job resources are hypothetically assumed to have a positive effect on nurses' affective commitment:

H4: Job resources have a significant direct effect on affective commitment.

Affective commitment, continuance commitment, and job performance

Affective commitment refers to an employee's emotional attachment to, identification with, and involvement in the organization (Meyer and Allen, 1991). Whereas, continuance commitment, the less common but still equally applicable approach, is viewed as the remaining with the organization stemmed from the perceived losses incurred when the employment relationship is discontinued. Committed employees will remain with the current organization as their wish; but for those with high continuance commitment, it is based on their need. Like Tett and Meyer's (1993) findings, some recent studies have indicated that three dimensions of organizational commitment, including affective, continuance and normative commitment, are linked to job performance. Fu and Deshpande (2014) had revealed the significant correlation between organizational commitment and job performance through a study of Chinese employees in an insurance company. Likewise, Khan *et al.* (2010) found the significance of organizational commitment in determining Pakistan employees' work performance. Hence, the following hypotheses are proposed:

H5: Continuance commitment has a significant direct effect on job performance.

H6: Affective commitment has a significant direct effect on job performance.

Self-leadership and job performance

Self-leadership refers to the act of self-influencing to monitor actions and cognitions in a direction that encourages the desired behavior (Manz, 1983, Manz, 1986). In other words, in the presence of autonomy and responsibility, self-leadership appears as an intrinsic motivation to manage oneself to perform must-be-done tasks even if they are naturally motivating or not. It is indicated that nurses' self-leadership and job performance are closely correlated with each other (Chang *et al.* 2006). Stewart *et al.* (2011) also suggested that enhanced self-leadership at the individual level is significantly associated with promoting job performance as such employees are more likely to generate higher productivity at work. In addition, self-leadership appears as a facilitator to employees' effective goal-setting process that in turn should lead to the improvement of the whole organization performance (Neck *et al.* 2003). Therefore, the following hypothesis is proposed:

H7: Self-leadership has a significant direct effect on job performance.

Communication competence and job performance

Communication competence refers to the ability to align the manner of speaking appropriately through good grammatical and social knowledge. Communication competence, one of the valuable resources, is expected to foster job performance among nurses in healthcare organizations (Bae, 2008, Im *et al.* 2012, Park *et al.* 2015). Kang and Yu (2016) reported that in the presence of communication competence, the correlation between self-leadership and job performance seemed to be more strengthened. Previous studies also found that employees equipped with adequate training to build up communication skills would display more positive outcomes (i.e., reduced anger, decreased emotional stress, improved mental wellness, and low level of burnout) (Swain and Gale, 2014). In addition, communication is reported as the most difficult task in the clinical setting, indicating the necessity of ensuring that adequate strategies are implemented to boost nurses' communication ability (Park and Lee, 2003). Accordingly, the following hypothesis is proposed:

H8: Communication competence has a significant direct effect on job performance.

Research Methodology

Measurement

To measure the latent variables observed in this study, we construct the measurement scale which contains 36 items with reference to the scales developed in previous researches. First, job resources are assessed through the one-item Decision Authority scale and two-item Skill Discretion scale from Karasek Jr (1979), which examines its two dimensions: job autonomy and job complexity respectively. Then, the three-item scale is adopted from Baer and Frese (2003) to assess psychological safety. This scale evaluates nurses' perceptions of safety and mutual respect in working place. To measure perceived organizational support, we use five items from Eisenberger *et al.* (1986) scale which investigates whether nurses acknowledge the assistance from their hospitals. Next, affective commitment with five items and continuance commitment with three items are adopted from Tett and Meyer (1993). The four-item scale developed by Houghton and Neck (2002) is applied to measure self-leadership among nurses, which examines the ability to manage oneself towards work goals. The communication competence measure is based on the measurement of Canary and Spitzberg (1987), consisting of four items which evaluate the success in nurses' workplace interaction. Finally, job performance is assessed through a nine-item scale proposed by Ko *et al.* (2007), which investigates its two subscales of competency (the first six items) and attitude (the last three items). A five-point Likert scale (1 = strongly disagree, 5 = strongly agree) is used to evaluate respondents' extent of agreement with each statement on the questionnaire.

Questionnaire design

According to Green (1991), the minimum sample size is determined by the formula $8 \cdot m + 50$, where m is the number of measurement items. In this study, the survey spreads out over 366 participants so that it sufficiently satisfies the requirement corresponding to 36 items. The questionnaire is designed into two main sections, which are (1) demographic characteristics, including respondents' name, gender, age, number of working year in healthcare field, number of working year in the current organization, number of organizations that they have been worked for; and next (2) 36 items measuring eight latent variables in the hypothetical model. Besides, for best fitting in Vietnam context, all items in the questionnaire are translated into Vietnamese language and partly adjusted for respondents' better understanding.

Data collection

The survey is conducted in Ho Chi Minh City and Bac Lieu Province, Vietnam by a paper-based questionnaire administered directly to participants. There are two phases in data collecting procedure, including pilot test and official survey. First, the pilot test with a sample size of 36 nurses is carried out to evaluate the measurement scale before spreading to a larger scale. After being adjusted based on the pilot test's results, the final questionnaires are distributed to the nursing staffs of four hospitals. After the deletion of invalid questionnaires, the data extracted from 366 valid observations are used in the final analysis.

Results

Demographic characteristics

Table 1 indicates the demographic data of 366 respondents. Most of them are women, and the majority of respondents are under 40 years old (78.1%). In addition, their experience in the nursing industry varies from less to more than eight years, with the rate at 50.3% and 49.7%, respectively. Most of them have served their current hospitals for under 20 years (nearly 91.8%), and the number of hospitals for which they have worked is mostly under 2 (at 95.9%).

Table 1 Demographic characteristics.

Characteristics	Number (N = 366)	Percentage
Gender		
Male	150	41.0%
Female	216	59.0%
Age		
21 – 40	286	78.1%
Above 40	80	21.9%
Experience		
1 - 8 years	184	50.3%
Above eight years	182	49.7%
Number of working years in the current hospital		
Under 20 years	336	91.8%
Above 20 years	30	8.2%
Number of hospitals		
Under two hospitals	351	95.9%
Above two hospitals	15	4.1%

Reliability analysis

Exploratory Factor Analysis (EFA) is carried out to verify the underlying relationships among measured variables (i.e., whether a set of variables consistently load on the same factor based on strong correlations). First, the coefficient of Cronbach's alpha is computed for each factor to evaluate the internal consistency of the measurement items. According to Hair *et al.* (1998), the Cronbach's alpha value, which ranges between 0 and 1, reveals better reliability among items if it is relatively higher. More specifically, the value of around 0.9 is considered as excellent, around 0.8 as very good, from 0.6 to 0.7 as adequate and below 0.5 as unreliable. In this study, all measured variables present good values of Cronbach's alpha which are nearly or above 0.8, except for JR valuing at 0.637 (see Table 2). Nevertheless, it is suggested that the value over 0.6 is also acceptable in exploratory research (Fornell and Larcker, 1981).

The KMO measure (0.805) satisfies the recommended acceptable level which must be higher than 0.5. Bartlett's Test of Sphericity, Sig. (0.000) is less than 0.05 and total variance explained (69.836%) is larger than 50%, which is within the recommended acceptable level. According to Hair *et al.* (1998), observed variables are considered valid when their factor loadings are over 0.5, and there are no major cross-loadings between factors (the difference between the loadings should be more than 0.3). In this study, most items have significant factor loadings, which are illustrated in Table 2. However, the two items JP6 and JP7 are removed because of major cross-loadings. JR1 is also erased as its loading is considerably lower than 0.5, while JR2 (factor loading is 0.474) is still acceptable since it is very close to the requirement.

Confirmatory factor analysis

The next step is to validate the measurement model through confirmatory factor analysis (CFA). The acceptable level for Composite Reliability (CR) and Average Variance Extracted (AVE) is 0.7 and 0.5 respectively as recommended by Hair *et al.* (1998). While the values of most items are acceptable, we need to eliminate SL2 to better its value (see Table 3).

In addition, a measurement model with high values of model fit indices is suggested to present a higher level of goodness-of-fit. These indices (shown in Table 4) are the normalized chi-square, root mean square error of approximation, goodness-of-fit index, incremental index of fit, and comparative fit index. Most of the model fit indices exceed the requirement of acceptance, except for GFI is less than but very close to the standard, indicating that the measurement model in this research obtains a considerable goodness-of-fit.

Structural equation modeling and Hypothesis testing

Structural equation modeling (SEM) is an approach to assess the overall fit of the structural model by using Maximum likelihood estimate which is conducted in the software AMOS 20.0. All the fit indices observed in this analysis is measured based on the same reference standards in CFA. As shown in Table 4, most indices are within the range of acceptance, while some nearly satisfy the requirement.

Moreover, the hypothesis will be accepted if its path coefficient is presented as statistical significance. The summary of the estimated standardized path coefficients is presented in Table 5. At the 0.05 level of confidence, most of the path coefficients are positively significant, except for those from JR to AC, CCM to JP, and CCP to JP. As observed from the result, POS has a significant impact on both CCM and AC. Thus, hypothesis H1 and H2 are supported. The impact of PS on AC is statistically significant, indicating that H3 is supported; while H4 is not accepted because of the insignificant coefficient from JR to AC. Moreover, the result shows that both AC and SL are significantly positively related to JP, but there is no significant impact of CCM and CCP on JP. Hence, hypothesis H6 and H7 are accepted, while H5 and H8 are rejected.

Table 2 Factor loadings in EFA, CFA, and Cronbach's Alpha.

Variables	Measurement Items	EFA	CFA	Cronbach's Alpha
Perceived organizational support (POS)	POS1	0.712	0.750	0.871
	POS2	0.685	0.734	
	POS3	0.791	0.827	
	POS4	0.757	0.780	
	POS5	0.685	0.681	
Affective commitment (AC)	AC1	0.734	0.785	0.877
	AC2	0.749	0.780	
	AC3	0.771	0.839	
	AC4	0.669	0.710	
	AC5	0.678	0.711	
Continuance commitment (CCM)	CCM1	0.655	0.697	0.801
	CCM2	0.734	0.835	
	CCM3	0.722	0.734	
Psychological safety (PS)	PS1	0.786	0.858	0.789
	PS2	0.695	0.756	
	PS3	0.637	0.667	
Job resources (JR)	JR2	0.474	0.479	0.637
	JR3	0.977	1.014	
Self-leadership (SL)	SL1	0.629	0.601	0.781
	SL3	0.780	0.880	
	SL4	0.756	0.738	
Communication competence (CCP)	CCP1	0.641	0.662	0.826
	CCP2	0.802	0.837	
	CCP3	0.773	0.788	
	CCP4	0.655	0.666	
Job performance (JP) Competence	JP1	0.692	0.727	0.866
	JP2	0.684	0.710	
	JP3	0.780	0.766	
	JP4	0.840	0.877	
	JP5	0.694	0.673	
Job performance (JP) Attitude	JP8	0.611	0.632	0.756
	JP9	0.938	1.034	

Table 3 Composite Reliability and Average Variance Extracted.

Variable	CR	AVE
Perceived organizational support (POS)	0.872	0.577
Affective commitment (AC)	0.879	0.594
Continuance commitment (CCM)	0.816	0.597
Psychological safety (PS)	0.801	0.573
Job resources (JR)	0.673	0.514
Self-leadership (SL)	0.786	0.554
Communication competence (CCP)	0.830	0.552
Job performance (JP) - Competence	0.830	0.710
Job performance (JP) - Attitude	0.866	0.566

Table 4 Model fit indices in CFA and SEM.

Model fit indices	Thresholds	CFA	SEM	References
χ^2/df	1-3	2.215	2.377	Barbara (2001)
RMSEA	<0.08	0.058	0.061	Bentler and Bonett (1980)
GFI	≥ 0.90	0.863		Tabachnick <i>et al.</i> (2001)
IFI	≥ 0.90	0.904	0.887	Bentler and Bonett (1980)
CFI	≥ 0.90	0.903	0.886	Bentler and Bonett (1980)

Table 5 Results of the model in SEM.

Hypothesis	Path	Path coefficient	S.E.	C.R.	P
H1	CCM \leftarrow POS	0.304	0.053	5.709	***
H2	AC \leftarrow POS	0.270	0.055	4.936	***
H3	AC \leftarrow PS	0.275	0.072	3.806	***
H4	AC \leftarrow JR	0.137	0.081	1.684	0.092
H5	JP \leftarrow CCM	0.014	0.037	0.388	0.698
H6	JP \leftarrow AC	0.089	0.039	2.284	0.022
H7	JP \leftarrow SL	0.216	0.050	4.294	***
H8	JP \leftarrow CCP	0.061	0.041	0.133	0.133

*** Statistically significant at the 0.001 level of confidence.

In this study, it is found that the effect of SL on JP (path coefficient is 0.216) is more considerable than other three predictors including CCM, AC, and CCP (0.014, 0.089, and 0.061, respectively). The path coefficient of PS to AC (0.275) reveals its better contribution compared to that of POS (0.270) and JR (0.137).

Discussion

The results indicate that affective commitment is significantly related to job performance among nurses, which is consistent with previous studies of Jaramillo *et al.* (2005), Fu and Deshpande (2014), and Khan *et al.* (2010). This implies that when nurses feel a greater sense of emotional connection with their hospital, they will put more concern in the organization's welfare, which intrinsically motivates themselves to generate higher performance. Also, the findings of our study reveal the mediating effect of perceived organizational support on the correlation between affective commitment and job performance due to the significant path coefficients of POS to AC and AC to JP. In line with Darolia *et al.* (2010), the care of employees' well-being and the tendency to reward increased efforts from the organization would facilitate nurses' affective bond to their hospitals, which make them feel an obligation to contribute more for the collective benefits. Comparatively, psychological safety is observed as a more significant mediator between affective commitment and job performance. Under the sense of safety, comfort and mutual respect, positive work experiences and work engagement are easily witnessed from those whose performance is affected by positive attitude and behavior towards the organizational optimization (Kirk-Brown and Van Dijk, 2016). For example, in the psychologically safe environment where nurses can freely make contributions to the group discussion on treatment methods for patients, they are inclined to feel strong involvement with the job and then generate higher productivity. With the aim of promoting job performance through enhanced affective commitment, managerial strategies like anti-discrimination approach and the principles of social inclusion (being included within a group) are necessarily implemented to reduce psychologically and socially harmful manners such as bullying or harassment (Shain, 2009).

The results, however, show that the provision of job resources (job autonomy and job complexity) does not necessarily induce a higher level of affective commitment. This is incompatible with existing findings that job resources can reinforce employees' affective attachment with organizations (Salanova *et al.* 2005). This insignificance of job resources might come from the particular characteristics held in Vietnam, which considers nursing as a professional career that requires the advanced level of knowledge or expertise rather than creative works. Indeed, nurses are required to follow the guidelines for proper documentation and appointments from the physician in any given task (Frank-Stromborg *et al.* 2001). Therefore, it might not be a bothersome constraint to nurses when they must adhere to the exacting standards to provide care services, indicating a minimal demand for autonomy in the workplace. However, the level of nursing training quality and the scope of practice in the future will observe many changes. Nurses will be able to take in in-depth training programs on a local and global scale, thus creating incentives for them to contribute valuable ideas as well as participate directly in the process of improving nursing service quality. This warrants further investigation into the granting of job autonomy, the recognition of the nurses' role, and their effect on nursing performance in Vietnam. In addition, future studies examining other dimensions of job resources in various hospital scales are also necessary.

This study reveals that continuance commitment emerges as an insignificant driver of job performance, which aligns with Gong *et al.* (2009) study that although enhanced performance may be explored in the organization characterized by high level of affective commitment, it may not when it comes to continuance commitment. This is somewhat opposed to the study of Fu and Deshpande (2014) who showed that organizational commitment through its three dimensions (affective, continuance and normative) is a major predictor of job performance among Chinese employees. Meanwhile, Schrock *et al.* (2016) addressed an adverse effect of continuance commitment on job performance. They found continuance commitment weakening the positive association between affective commitment and job performance. In the Vietnamese healthcare industry, the insignificance of continuance commitment may result from the inadequate enthusiasm for the job. This means that nurses with high continuance commitment may perceive the maintenance with their organization simply as a need because they want to avoid the side bets associated with leaving the current job. For these individuals, the likelihood of engaging in supportive behaviors towards organizational goals is uncertain (Shore and Wayne, 1993). In general, there exists a disparity in these findings; consequently, future studies should be conducted to clarify the role of continuance commitment in determining job performance and other possible drivers in different economic, cultural and occupational backgrounds.

The findings of our study show that the facilitating effect of communication competence on job performance does not exist. This is antithetical to previous researches announcing communication competence as the important driver of job performance (Im *et al.* 2012, Yu and Ko, 2017). They pointed out that nursing performance is notably promoted as a consequence of the improved interpersonal competence. These findings imply that the degree of communication competence's influence may vary by job characteristics among different work settings. Indeed, in today's hospitals, every department requires its employees to meet specific skills. Nursing staffs in Clinical or Internal Medicine Department mainly interact with patients and their guardian day by day. Thus they are expected to be able to communicate well because obtaining communication capacity are inclined to facilitate their performance. However, it does not necessarily mean that nurses who acquire the average or lower level of communicating skills are constrained away from the advancement in work outcome. For example, nurses working in Department of Surgery, Department of Anesthesiology, or Department of Resuscitation, are not obliged to be excellent at cooperation because of their distinctive occupational characteristics which are not mainly based on direct intercommunication with patients. This infers that their evolved performance might derive from other potential variables such as their increased effort to boost technical skills. Therefore, it is not so startling that the development of communication competence may bring about minor improvement in Vietnamese nursing services.

Extracted from the results, it is observed that self-leadership is the significant predictor that makes the greatest contribution to the enhancement of nursing performance. These findings support the study of Chang *et al.*

(2006) who reveals that job performance can be improved through the appropriate programs boosting self-leadership. Of particular importance is what should be implemented to improve self-leadership among nurses; thereby, the provision of various training programs and education that pursue such improvement is necessary. In particular, the knowledge acquired from courses investigating self-assertion and self-expression could be practiced to efficiently deal with typical and specific cases in daily tasks (Yu and Ko, 2017). Besides, it also calls for the organization's interest in forming a work setting that inspires nurses to present their innovative and active self-leadership. Additionally, the potential approach to horn nurses' capacity of self-leading is to regularly encourage their straightforward self-reflection on previous experiences and their openness to adapt in the future. The method of reviewing with a trusted partner or mentor and getting appropriate feedback from parties might work here (Angelucci, 2005).

Conclusion

As an important element related to a hospital's effectiveness and reliability, service quality assessed through nurses' job performance has been examined in many previous studies. This study focuses on exploring determining factors in improving job performance among nurses in Vietnamese hospitals. The results show that affective commitment and self-leadership are the direct and significant predictors of job performance, but not continuance commitment and communication competence. It also reveals that perceived organizational support and psychological safety are indirectly related to job performance under the mediating role of affective commitment. Furthermore, improvement in self-leadership is proved as a more efficient method to raise nursing performance because of its better influence than that of affective commitment.

These findings suggest some useful procedures to cultivate nurses with required competence to provide high-quality care services. Firstly, approaches targeting a work setting that gives employees a sense of inclusion, safety, and interpersonal respect should be pursued. Besides, if nurse managers apply proper rewarding policies to praise nurses' increased efforts and take good care of their development, it is possible to reinforce nurse performance through a strong affective bond with the organization. Secondly, the managerial approach should aim to strengthen nurses' ability in self-leadership. Results-Based Management style is suggested as an advanced method which sets specific goals and tightly keeps pace with the work to attain desired outcomes. After that, the process of reviewing on both individual and collective scale is necessary to strive for improvement in later performance. Additionally, various education programs and training activities tailored to each nursing department's characteristics should be provided to raise the awareness of the necessity to stimulate productivity through self-leadership. In short, the expected outcomes of these programs would be the delivery of proficient and reliable care services by qualified nurses in the environment with high professional ethics.

Our study also makes some explanations for the divergence between previous literature on factors affecting nurses performance and that in the Vietnam context. However, regarding the generalizability of the findings, future researches need to be conducted to investigate other potential job performance's predictors in various hospital size and characteristics. Another limitation of this study is that the possible effect of the disparity between countries on the quality of health care services is not considered. Hence, an international research comparison would be worthwhile.

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PALATAL RUGAE AND LIP PRINT PATTERN STUDY AS THE ALTERNATIVE METHOD OF MASS NATURE DISASTER VICTIM IDENTIFICATION

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Abstract: The most common method of forensic identification is dental, fingerprint, and DNA. However those have a limitation such as high price, and limited cases. Palatal fold (rugae) and lip print pattern are a unique, stable and resistant morphological landmark for identification. The purpose of this study is to examine the characteristic of rugae palatina and lip print pattern and the resemblance to the Minangkabau family relationship. This cross-sectional study, in 27 pure blood Minangkabaunese families. The sample was taken randomly. Palatal rugae was extracted from alginate printing. Lip print was taken on white paper after lips colored with red lipstick. IBM SPSS 17 is used for statistical analysis. The results show that there is similarity of rugae palatina based on family relationship. The circular male rugae has similarities to that of the father ($p < 0.05$). Circular rugae in girls is derived from the mother, wavy ones are derived from both parents ($p < 0.05$). Lip print pattern doesn't show the significant result. Conclusion is similarities of rugae palatina are influenced by genetic factors. Rugae palatina is good alternative identification method in forensic science. Palatal rugae pattern can be considered to be taken in routine dental medical record.

Keywords: palatal rugae, lip print pattern, odontology forensic

Introduction

After the tsunami in the northern island of Sumatra, Indonesia in 2004, earthquakes occurred periodically moving southward to the Sunda Strait. The Province of West Sumatra is located in the western part of Sumatra island which has become an international focus because of frequent disasters and the discovery of seismic gaps that could potentially cause an earthquake of magnitude 8.8 - 8.9 SL (Imamura *et al.*, 2012). The most common ethnic groups in West Sumatra are Minangkabau ethnic. Minangkabau has the only matrilineal lineage in Indonesia (Fanany, 2014). A total of 7 districts and cities are disaster prone areas with 921,349 people living in the red zone (Imamura *et al.*, 2012).

Identification of disaster victims is a very challenging process in forensic science. At this time the most commonly used methods are fingerprint, dental and DNA identification. DNA is the most accurate but very expensive, especially in large natural disasters. Dental identification is very useful in natural disasters that cause very many casualties, even success reaches 75% (Rath and Reginald, 2014). However there are certain case when these methods cannot be done, therefore the secondary method need to be conducted.

Rugae palatina is a unique and potential oral cavity landmark if a dental method cannot establish identification (Sharma, Saxena and Rathod, 2009). "Rugae Palatina" is terminology which refers to a series of irregular elevated ridges produced by folding of palatal mucose membrane on hard palate anterior part, spreading from papilla incisivum transversely. In 1932, Trobo Hermosa, a Spanish investigator proposed the study of palatal rugae is called "Palatoscopy" or "Rugoscopy" (Pillai *et al.*, 2016).

For the first time, in 1932 Edmond Locard proposed an identification method using lip print pattern. This method is called *cheiloscopy* (Narwal *et al.*, 2014). Lip print pattern is the cracks (*sulci labiorum*) in the form of

wrinkle and groove on the lips transition zone between labial mucosa and skin (vermilion border) (Khanna, 2015). Because of the accuracy, simplicity, efficiency, lip print pattern is considered as the alternative secondary forensic identification method. Lip print pattern is usually collected by various ways. Cottone (1981) introduced using lipstick as the easiest way to trace the pattern (Sandhu *et al.*, 2012).

The uniqueness of the structure of the rugae palatina and lip print patterns can be questioned whether it can determine the similarity between relatives in one family. The purpose of this study is to examine the similarity of palatal and lip print pattern among family members in native Minangkabau ethnic groups

Method

This cross sectional study included 27 families consist of father, mother, and biological daughter and son which is chosen randomly in 3 native Minangkabau district : Luhak 50 Kota, Luhak Agam , and Luhak Tanah Datar. This study have qualified the ethical clearance on September 2017 (ethical clearance No. 080/KEP/FK 2017). Respondent signed informed consent after being informed about the purpose and instructions of this study . Data were collected from October 2017 – February 2018 .

Maxillary impression was made with irreversible hydrocolloid impression material (alginate) (©GC scent) on impression tray . Dental cast was made with mixture of dental stone type 3 and water which is mixed based on W:P ratio . The cast was analyzed twice by 2 observers,. Palatal rugae on the cast were measured and classified according to shape with Thomas - Kotze method and size with Sunita Kapali method.

Thomas- Khotze

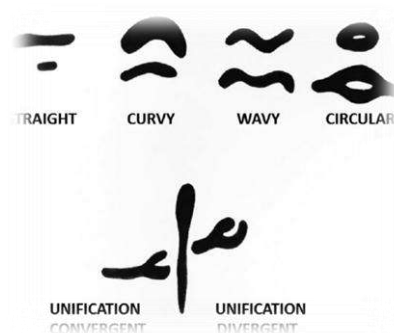
Curved

Wavy

Straight

Unification

Circular



Sunita Kapali

Primary

A – 5 to 10 mm

B – 10 mm or more

Secondary

Secondary rugae (3-5 mm)

Fragmentary

Fragmentary Rugae (< 3 mm)

Lip print pattern were collected with lipstick method. The respondents were asked to put a red lipstick (©Pixy) on their lips and let it drier for 1 minute. Lip prints were taking on a 10 cm length cellophane tape with respondents open their lips slightly and press evenly from central to lateral part of lips for seconds. The tape was removed then attached in a piece of white paper . The paper was scanned by scanner then analyzed and classified according to Suzuki-Tsuchihashi lip print pattern classification as follows : (Tsuchihashi, 1974)

Table 1. Lip print pattern classification by Suzuki- Tsuchihashi (Tsuchihashi, 1974)

Type I	Clear-cut grooves running vertically across the lip
Type I'	The grooves are straight but disappear half-way instead of covering the entire breadth of the lip
Type II	The grooves fork in their course
Type III	The grooves intersect
Type IV	The grooves are reticulate
Type V	The grooves do not fall into any of the Types I-IV, and cannot be differentiated morphologically

Data were analysed using IBM SPSS 15 statistical software . Goodness of fit test was used to examine the similarities between pattern among family members .

Result

This study took place in 3 native Minangkabau districts (Luhan Nan Tigo). Guguak , Situjuh and Tanjung represented Luhak 50 Kota. Luhak Tanah Datar was represented with Tanjung Baru and Baso, Banuhampu and Tanjung Raya in Luhak Agam . Twenty seven families were observed, but only 13 families had complete family consist of father, mother and son, and 11 families had father, mother and daughter.

Table 2. Similarities of palatal rugae pattern

		p-value							
		Rugae Shape				Rugae Size			
		Curve	Straight	Wavy	Unification	Circular	Primary	Secondary	Fragmenter
Son n=13	β_0	,148	,038	,083	,177	,635	,007	,144	,168
	β_1	,749	,699	,119	,684	,005	,434	,385	,647
	β_2	,370	,356	,466	,903	,326	,197	,194	,538
	Y	,612	,577	,270	,916	,011	,216	,176	,761
Daughter n=13	β_0	,257	,108	,027	,142	,316	,004	,095	,465
	β_1	,516	,303	,093	,456	,018	,289	,480	,797
	β_2	,855	,167	,032	,720	,015	,827	,299	,094
	Y	,791	,151	,085	,601	,043	,547	,342	,202

The shape and size of rugae do not show a significant similarity relationship between children - father and child - mother. But there are specific patterns that can be derived. Circular rugae on boys tends to be inherited from father ($p = 0,011$). Circular rugae pattern on girls is derived from father and mother, wavy rugae come from the mothers ($p < 0,05$). Meanwhile in lip print analysis, the pattern doesn't show the significant similarity between children and parents .

Table 3. Similarities of lip print pattern

Goodness of fit						p-value
Quadrant		I	II	III	IV	
Son n=13	β_0	,526	,879	,289	,084	,270
	β_1	,322	,051	,235	,728	,881
	β_2	,659	,195	,160	,446	,106
	Y	,589	,066	,243	,629	,247
Daughter n=13	β_0	,697	,093	,436	,566	,839
	β_1	,477	,955	,305	,790	,083
	β_2	,076	,355	,498	,939	,946
	Y	,111	,618	,500	,962	,200

Discussion

Serving legal matters and community services are another tasks for dentist aside doing examination, diagnosis, and treatment of oral and maxillofacial lesions. Forensic identification is one of humanity service dentists can do to help victim investigation and legal affairs .

Postmortem reports, Finger prints, DNA and dental record are known to be successful primary method to identify victims in forensic science field. If the primary method is not sufficient, secondary method is needed. Lip print and palatal rugae pattern can be instrument in forensic identification and verification of a person presence on the crime scene (Sharma, Saxena and Rathod, 2009)

This current study was carried out to find out whether there is any association between parents and children lip print patterns. The result of our study is there's no significant similar lip print pattern inherited from parents to children means there are no patterns which is very identical. The pattern was completely different from parent, and this difference is considered to be individualistic and unique. Our result is in concordance with Silpha et al study who find no significant association among family members(Shilpa Patel, IshPaul, Madhusudan.A.S., Gayathri Ramesh, 2010) . *This study use lipstick to record the pattern. This method is have weakness because the oil and moisture secretion from sebaceous and sweat gland on the edges of the lips can change the prints. Also the smudging of lip prints because of uneven pressure on the lips while taking the records leading to unidentified pattern.*(Sharma, Saxena and Rathod, 2009) . While recording the pattern, observer should pay more attention when pressing the tape to avoid smudging. *Therefore further study should be carried out with larger sample size and latest imaging technologies.*

From this study it can be concluded that the shape of rugae can be used to determine the relationship and similarity between relatives. On boys, the most shape derived from his father is circular pattern. This is similar to our previous pilot project (Kasuma *et al.*, 2014) states that the rugae circular pattern is similar between children and parents. This result is in concordance with Pasiga and Hardianti's (Daeng Pasiga and Hardianti, 2017) who did study on Bugise ethnic. The form of rugae is more similar between father and child than mother and child. In girls, the circular pattern is inherited from father and mother, while the wavy pattern come from mother. This result has similarities with the study (Patel *et al.*, 2015) which states the relationship of the rugae pattern shows a positive correlation between the child and his parents. Wavy rugae patterns are derived more from the mother than from the father.

The shape of the rugae palatina pattern is derived by the parents. Genetics affects the formation of morphologic characteristics so that the pattern is not the same for everyone. According to Mendel's theory, each parent's gene

will be passed to his child. The inherited properties will be seen if the gene is the dominant gene. Environmental factors influence the formation of palatine rugae, and are determined by genes. Genes regulate the orientation of collagen fibers during embryogenesis and the diversity of palatine rugae patterns in different populations. Palatine rugae is formed in the 3rd intrauterine month, its growth is regulated by epithelial-mesenchymal interactions in which extracellular matrix molecules are expressed during this development (Kasuma *et al.*, 2014).

Palatal rugae shape is stable and the quality and quantity doesn't change due to aging. This characteristics is caused by the rugae position in oral cavity. Palatal rugae is protected by tongue, teeth, cheeks, and alveolar process, ensure it to be not impaired by trauma, orthodontics treatment and finger sucking (Pillai *et al.*, 2016). Palatal rugae is unique topography, no one have similar pattern. Because of the uniqueness and accuracy that match fingerprints identification, palatal rugae pattern is taken as medical record document in South America, especially in certain case where fingerprints cannot be collected (Paliwal, Wanjari and Parwani, 2010; Wichnieski *et al.*, 2012). Another specialty of palatal rugae is the durability. Palatal rugae can last up to 7 days after death and can withstand heat, for example degree 3 burn. Because of its uniqueness, stability, and resistance to damage it is this that causes rugae palatina to be a very potential anatomical landmark (Pillai *et al.*, 2016).

Conclusion

There is a hereditary factor in the pattern of palatal rugae. Lip print pattern doesn't show the significant similarities among family members but the pattern is different from each other's. Palatal rugae can be a genetic marker for identification in the future. We hope this research can contribute to the forensic odontology especially in the Minang and Deutro Malays

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VALIDITY AND RELIABILITY TEST OF MEDICATION ADHERENCE RATING SCALE FOR PSYCHOSIS (MARS) INSTRUMENT INDONESIAN VERSION

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Abstract: Assessment of medication adherence is an important part of pharmacological treatment of psychotic disorders. This study aims to obtain a valid and reliable instrument to assess medication adherence in psychotic patients. This is a cross-sectional study conducted in the Psychiatric Outpatient Clinic of Cipto Mangunkusumo Hospital from January to July 2017. Subjects were recruited through consecutive sampling (n = 100, aged 18-59 years old). Psychotic disorders were diagnosed using Structured Clinical Interview and Diagnosis DSM-IV. The instrument was translated, adapted to Indonesian culture, and back-translated. Content validity and test-retest reliability (n = 35 using systematic sampling) of MARS Indonesian version were evaluated. All items in the instrument are relevant to theory, as showed by content validity coefficient of 0.90. Construct validity test showed that the items represent theoretical as well as conceptual construction of medication adherence. Internal consistency reliability was good, with Cronbach's alpha of 0.80 and 0.798 in the test-retest evaluation. This study produced a valid and reliable MARS Indonesian version. Currently there is no other instrument assessing medication adherence in psychotic patients in Indonesia.

Keywords: medication adherence rating scale, psychosis, reliability, validity

Introduction

The World Health Organization in 2001 estimated 450 million people worldwide suffered from mental illness, as well as about 10% of adults suffering from mental disorders today and 25% of the population is expected to experience mental disorders during their lifetime. This disorder generally occurs to young adults aged 18-21 years. According to the National Institute of Mental Health, mental disorders account for 13% of the overall disease and are expected to increase to 25% by 2030. The incidence will contribute to the increasing prevalence of mental disorders in different countries (World Health Organization, 2011, World Health Organization, 2016, Rössler, *et al.*, 2005). According to Indonesia Ministry of Health Research in 2013 the highest prevalence of mental disorders in Indonesia is found in Yogyakarta and Aceh Provinces of 2.7 per mil each, while the lowest in West Kalimantan are 0.7 per mil. The prevalence of severe national mental disorder is 1.7 per mil. The prevalence of severe psychiatric disorders in Indonesia is 0.3 to 1% and usually occurs between 18 and 45 years. Psychosis is a mental disorder characterized by distortions of thoughts, feelings, ability to judge reality and the ability to communicate with others (Sadock and Sadock, 2009).

Psychosis includes schizophrenia, schizophrenia-like disorder, schizoaffective disorder, delusional disorders, severe depression with psychotic symptoms, and bipolar affective disorder with psychotic symptoms (American Psychiatric Association, 2005). Noncompliance with medication becomes a problem of / with the management of psychotic patients, resulting in the frequent recurrence of re-hospitalization, prolonged hospitalization, shortened non-hospitalization time and worsening morbidity (Lacro, *et al.*, 2002). Non-adherence to psychotherapy patients based on meta-analysis studies are 20-50% (Kane and Kishimoto, 2013). This disobedience resulted in patients resistant to the drugs given, requiring higher doses of drugs or drug

replacement, and causing relapses in 80% cases within the first two years after discontinuation of the drug (NIMH, 2016). Noncompliance may also result in longer hospital admissions and shorten the non-hospitalization time, which in turn will increase the burden of medical expenses. The support of the family or friends as well as the immediate environment is required for the patient to adhere to treatment (Rössler, *et al.*, 2005).

Given that poor adherence is a problem that needs attention on the management of psychosis, it is necessary for clinicians to detect non-adherence problems in taking antipsychotic medications. Medication Adherence Rating Scale (MARS) is one of the measuring tools which, according to the research has good validity and reliability to measure the compliance of psychotic patients in taking medication. MARS has now been used in several countries, including Australia, United States of America, United Kingdom, Portugal, and France (Fond, *et al.*, 2016, Zemmour, *et al.*, 2016, Thompson, *et al.*, 2000, Cohen and Swerdlik, 2005). Currently in Indonesia, especially in the Department of Psychiatry Faculty of Medicine University of Indonesia, Cipto Mangunkusumo Hospital does not yet have a valid and reliable instrument for measuring medication adherence in psychotic patients, therefore investigators aim to test the validity and reliability of MARS Indonesian version.

Methods

The samples were recruited based on inclusion and exclusion criteria.

Inclusion criteria:

1. Psychotic patient respondents were assessed with Structured Clinical Interview For DSM (SCID);
2. Respondents aged more than 18 to 59 years of age group;
3. Respondents are psychotic patients in a cooperative state for testing;
4. Respondents can understand the Indonesian language well with the parameters of education level graduated from Junior High School (Junior High School);
5. Respondents can read and write;
6. Respondents were conscious and able to focus, maintain, and divert adequately with Glasgow Coma Scale (GCS) examination;
7. Respondents were willing to be a respondent and fill out informed consent.

Exclusion criteria:

1. Subjects with mental retardation, which data were obtained from medical record information;
2. Subjects with impaired central organic nervous system, history of head trauma, and substance abuse, data obtained from medical records.

Results

Translation of the Medication Adherence Rating Scale instrument was performed by two translators who never seen or known this instrument. Translated results were then discussed by a group that consisted of the researcher and Mental Health experts. In the process of discussion, there were some questions that are considered difficult to be understood by the samples, for example question number 9. The initial translation of question number 9 reads "I feel strange, like the zombiw, when taking medicine". This statement was considered confusing because the majority of Indonesians are not familiar with the words "zombie." The discussion then agreed to replace the words "zombie" with "robot." The results of the discussion were then back translated and sent to the original authors of the MARS instruments, who are Kathrine Thompson, Jayashri Kulkarni, Alex A. Sergejew of the University of Melbourne, and they finally approved the adaptation (Thompson, *et al.*, 2000).

The process of translation translation (Back translation) Instruments into English

The translations in Indonesian were translated back to English by two different bilingual translators, who had not previously known about the MARS instrument. The results were then compared with the original version. This was done in order to see whether there was any significant differences in the items of the instrument's questions. The results of the reverse translation were sent to the instrument creator of MARS for approval.

Process of Testing Instruments

The trial process of MARS Indonesian version was performed on 10 samples. The samples were the patients of Psychiatry Outpatient Clinic in Cipto Mangunkusumo Hospital.

Test Validity and Reliability

The validity test of MARS Indonesian version was tested in a sample of 100 people, based on the instrument validity test recommendations that stated that samples could range from 30-500 samples. To test the reliability of MARS instrument, the researcher used a sample of 35 people based on the calculation of minimum sample with correlation coefficient of 0.5 at 95% degree of confidence and 80% power, with a result of 29 people.

Demographic Characteristics of Research Subjects

Table 1 described the demographic characteristics of the samples of this study. The samples had an average age of 31.3 years with age range of 18 to 55 years. Based on the normality test using Kolmogorov-Smirnov test, it was known that the sample had a p value of 0.006 which indicated that the data was not normally distributed. A total of 62 samples was male while the other 38 samples were female. The sample had a diverse level of education with the highest distribution was high school education level of 56 people. Data on marital status indicated that 87 samples were married while 13 were not married at the time of the study. Data on employment indicated that the majority sample did not have a job (49 people). The majority of samples' diagnosis in this study was schizophrenia (64 people). Throughout the course of the study, no patients were excluded; all samples filled out the questionnaire completely.

Table 1 Demographic Characteristics of the Samples (n=100).

Characterisstic		Median	Min-Max
Age		30	18-55
Sex	Male	62	62
	Female	38	38
Education	Primary School	4	4
	Secondary High School	20	20
	Senior High School	56	56
	Mechanical School	1	1
	Diploma	4	4
	Undergraduate	9	9
Marital Status	Postgraduate	6	6
	Married	87	87
	Unmarried	13	13
Pekerjaan	Labor	2	2
	Teacher	2	2

	Housewife	5	5
	Worker	15	15
	Farmer	2	2
	Entrepreneur	25	25
	Unemployed	49	49
Diagnosis	Bipolar	2	2
	Depression	10	10
	Acute Psychosis	4	4
	Schizoaffective	20	20
	Schizophrenia	64	64

Internal Consistency Reliability Test

The internal consistency reliability of the MARS Indonesian version was determined by calculating the value of Cronbach's Alpha. The value of Cronbach's Alpha was calculated for every instrument subscale.

Table 2 Internal Consistency Reliability of the Medication Adherence Rating Scale Indonesian version, First Test.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
q1	3.9100	5.962	.704
q2	4.1900	5.085	.740
q3	4.1800	5.644	.779
q4	4.3400	6.368	.803
q5	4.1900	5.085	.740
q6	4.1800	5.644	.779
q7	3.6200	6.097	.788
q8	3.7600	5.477	.767
q9	3.7600	6.043	.701
q10	4.1900	6.216	.710

Table 3 Internal Consistency Reliability of the Medication Adherence Rating Scale Indonesian version, Second Test.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Cronbach's Alpha if Item Deleted
q1	3.8100	5.754	.711
q2	4.1690	5.075	.740
q3	4.1950	5.654	.779
q4	4.3430	6.388	.798
q5	4.2960	5.055	.740
q6	4.3800	5.654	.779
q7	3.6700	6.077	.788
q8	3.7700	5.372	.767
q9	3.7900	6.042	.701
q10	4.1800	6.316	.712

Content Validity Test

Testing the content validity was done based on the assessment by two Mental Health experts. Each of the experts gave an qualitative assessment for each statement on the MARS Indonesian version, using a scale of 1 to 4, i.e. 1 (irrelevant) scale, 2 (somewhat relevant), 3 (quite relevant), and 4 (very relevant). After the assessment was completed, the data was processed in a 2x2 table.

Based on the 2x2 table above, it was deduced that the content validity coefficient for the MARS Indonesian version was 0.9. The formula produced values that range from +1 to -1, positive values indicate that at least half the value of valuing items as important/essential. The larger the Content Validity Ratio (CVR), the more "important" and the higher the validity of the content. The CVR value obtained in this study was 0.9, which indicated that the items used has good content validity (Zygmunt, *et al.*, 2002).

Construction Validity Test Using Factor Analysis Method

Factor analysis was performed to know the factors that make up the MARS Indonesian version. Prior to performing factor analysis, it was ensured that the requirements for performing factor analysis were fulfilled. The first requirement was the inter-item correlation value ranging from 0.07 to 0.72. These results indicated that there was no strong correlation between items which showed multicollinearity. The Kaiser-Meyer-Olkin Test Measure of Sampling Adequacy gave a value of 0.896 indicating that the sample was adequate for factor analysis. Bartlett's Test of Sphericity gives $P < 0.01$ which indicated the correlation matrix was not an identity matrix. Based on these results, it was known that the requirements for performing factor analysis were fulfilled.

Table 4 Determination of adequate sampling by Kaiser-Meyer-Olkin Test and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.896
	Approx. Chi-Square	1360.654
Bartlett's Test of Sphericity	Df	99
	Sig.	.000

Factor analysis was done by using Principal Component Analysis method which extracted four factors. The method is used to determine the minimum number of factors that play a role in achieving maximum variance in the data. This method can also be used to reduce data. The method used in this research is Varimax rotation method with Kaiser Normalization. Based on preliminary research conducted by Kathrine *et al.*, it is known there were 4 factors that made up the MARS instrument. These factors included attitude towards treatment, behavior towards treatment, antipsychotic side effects, and attitude toward antipsychotic treatment.

Table 5 Factor Analysis of MARS Indonesian Version Using Varimax Rotation Method.

Item No.	Factor			
	1	2	3	4
Q2	.896	.259	.056	.065
Q3	.870	.261	.086	.148
Q1	.730	-.076	-.082	.006
Q4	.724	.579	.338	.147
Q5	.110	.871	.039	.238
Q6	.000	.864	.220	.189
Q8	.356	.672	-.252	-.447

Q7	.047	.863	-.052	.045
Q9	.080	.234	.861	.019
Q10	.171	.226	.060	.877

Based on the matrix above, the researcher obtained the composition of statements in the Indonesian version of MARS that could be divided into the following four factors:

- Factor 1, including item number 1, 2, 3, and 4. The division of those four items to the attitude toward treatment subscale was in accordance with the original version of MARS.
- Factor 2, including items 5, 6, 7, and 8. The division the four items to the behavior towards medication subscale was in accordance with the original version of MARS.
- Factor 3 consisted of item number 9 corresponded to the antipsychotic side effects subscale in the original version of MARS.
- Factor 4 consisted of item number 10 which corresponded to the attitude toward antipsychotic treatment subscale in the original version of MARS.

Discussion

The validity and reliability test of the MARS Indonesian version in psychotic patient showed a valid and reliable result. The study was conducted at the Cipto Mangunkusumo Hospital (RSCM) Jakarta Psychiatric Outpatient Unit, taking into account that RSCM is a national referral hospital that receives patients from all economical levels and educational background. It is considered to be representative of the clinical population and can be applicable to similar settings.

The MARS instrument is an instrument composed of 10 questions that can be used to assess medication adherence in patients with psychosis (World Health Organization, 2016). In the process of translating the MARS instrument into Indonesian, there was one question that the community finds difficult to be understood by Indonesian in general, that is question number 9. The result of the initial translation of question number 9 reads "I feel strange, like the zombie, when taking medicine." This statement was considered confusing because the majority of Indonesians are not familiar with the words "zombie." The discussion then agreed to replace the words "zombie" with "robot." The results of the discussion were then confirmed to the original authors of the MARS instruments, namely Kathrine Thompson, Jayashri Kulkarni, Alex A. Sergejew of the University of Melbourne and they approved the adaptation (Thompson, *et al.*, 2000).

This study was conducted in as many as 100 people with abnormal distribution. The internal consistency reliability test in this study showed the Cronbach's Alpha of 0.8, while the retest test showed internal consistency value of 0.798. Meanwhile, Cronbach's Alpha values for the instrument subscale show values in the range 0.74 to 0.81. This indicates that the MARS Indonesian version had a good internal consistency. The results of this study did not vary much with the results of original version of MARS instrument by Kathrine *et al* that reported Cronbach's Alpha value of 0.75. Validity and reliability tests are also conducted in several other countries, like Australia and France. The tests conducted by Zemmour *et al.* in France used a sample of 319 people consisting of 53 women and 266 men with sampling location in homes for schizophrenic patients. As for data analysis, they were using software PASW 17.0.2 and MPLUS 7.2.2 (Zemmour *et al.*, 2016). Unlike research conducted in Indonesia, the study by Zemmour *et al* used the Richard Formula-20 coefficient to determine the reliability value of the instrument, and found a reliability coefficient of 0.7. Research using 66 research subjects consisting of 51 women and 15 men was performed in outpatient clinics in Australia. The validity test used in Thompson *et al.*'s research is multimethod matrix (Thompson, *et al.*, 2000). The reliability test in that study used Cronbach's Alpha (internal consistency) and the test-retest method with Cronbach's alpha

at 0.75, this is not much different from the research done in Indonesia with Chronbach's alpha score 0.8.1 There are similarities of method and characteristics between current study and study by Kathrine *et al*, such as location of sampling at outpatient clinics, inclusion criteria of respondents with psychosis, average age of respondents 37.6 years (SD = 11.09 years) and data analysis using multitrait multimethod matrix.

The content validity test gave the results of content validity coefficient of 0.9. These results suggest that the MARS Indonesian version is relevant in assessing adherence to drug consumption in psychotic patients. Two experts have only a difference of relevance, i.e. the statement number 6 where expert 1 gives a good rating (score = 3) while expert 2 gives a bad rating (score = 2). The statement reads "Unnatural for my mind and body to be controlled by drugs." However, since there is no significant difference (different 1 score between the assessment of the two experts), statement number 6 is retained in the final version.

The construction validity test using factor analysis method, it is found that the MARS Indonesian version composed of four factors: attitude towards treatment, behavior towards medication, antipsychotic side effect, and attitude towards antipsychotic treatment. These four factors are consistent with the results of initial research conducted by Thompson *et al*. (Thompson, *et al.*, 2000).

Strengths in this study are that the researchers received training by mental health experts to make the diagnosis psychosis using SCID. The strength of the MARS Indonesian version has been tested for content validity, test-retest reliability and factor analysis to assess the internal consistency of the instrument after a retest within two weeks after the first test with good test results. The weakness of this research is that the sampling is randomly selected. The weakness of this instrument is that there is no comparable instrument for drug compliance assessment in Indonesia that has been validated. Moreover, the questionnaire is a self-rated form which can overestimate compliance by 30% (Thompson, *et al.*, 2000).

Conclusion

The MARS Indonesian version has been tested for validity and reliability, question items tailored to the culture of Indonesia. The results of validity and reliability test of the instrument are at a good level and repeated tests produced consistent results. The medication compliance assessment instrument in an Indonesian version for psychotic patients may be used as a baseline screening routine to find out medication adherence in psychotic patients by assessing factors including attitude towards treatment, behavior towards medication, antipsychotic side effect, and attitude towards antipsychotic treatment to increase treatment outcomes.

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THE CLINICAL PATHWAY IN THE ORAL AND MAXILLOFACIAL SURGERY'S SERVICES AS A QUALITY MANAGEMENT TOOL, IN DR. SOETOMO HOSPITAL, SURABAYA, INDONESIA

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Abstract: A Clinical Pathway is a comprehensive method of planning, delivering, and monitoring patient care. As efforts continue to streamline the delivery of services at all levels of care and settings, it is essential that quality management and utilization management professionals respond in a proactive manner to facilitate quality outcomes while decreasing cost and increasing efficiency. The aim of a Clinical Pathway is to enhance the quality of care across the continuum by improving risk-adjusted patient outcomes, promoting patient safety, increasing patient satisfaction, and optimizing the use of resources. However, there has not been any report on the implementation of the Clinical Pathway in Oral and Maxillofacial Surgery services in Indonesia. This research used observational methods and cross sectional design, with observational analysis and binary logistic regression. The population of this research was Clinical Pathway of Odontectomy were collected from medical records during January to December 2017 in ward surgery room of Dr. Soetomo hospital in Surabaya Indonesia. The Result obtained in this study, mostly completeness of Clinical Pathway were filled as the pattern. The amount of the sample in this research were 41 Clinical Pathway, which 87,8 % were fit according to the quality and cost indicator. The Variation in drug administration, treatment, and operator did not significantly influence (chi square = 0,93 ; df= 0 ; p value =1,00000)

Keywords: clinical pathway, clinical variation, continuous quality improvement, evidence-based medicine, health care processes, integrated care pathways

Introduction

Clinical Pathway(CP) also known as critical pathway critical pathway, care maps, integrated care pathway is an integrated management planning with the purpose of the patient's interest and provide sequence and exact time of action to achieve optimum efficiency (Panella et al, 2005, Every NR et al, 2000)

With the publication of the Indonesian Health Act No 24 2011 regarding about the Social Security Administration Agency or “Badan Penyelenggaraan Jaminan Sosial (BPJS)” where the rule states that the implementation of Health BPJS has to be done since the 25th of November 2012 and operational by the 1st of Januari 2014 and does not operate under the Ministry of Health, according to the Minister of Home Affairs Regulation article 61 2007. (Dody F, 2010) Dr. Soetomo Regional Public Hospital as a Regional Public Service Agency provides service to society based on the principal of efficiency and productivity prepares steps and strategies to carry out the Clinical Pathway for every diagnosis. (Nining D.S. Ismawati and Nugroho Setyawan, 2013)

Clinical Pathway as a service guideline in Soetomo hospital has been used since 2011 until now, (SK Direktur RSUD Soetomo, 2010, SK Direktur RSUD Soetomo, 2013) however there has been no report of research on the effectiveness and efficiency of clinical pathway at the service of Oral and Maxillofacial Surgery both in Indonesia and in International.

The purpose of this study is to determine the clinical pathway used by the Oral and Maxillofacial Surgery Division in odontectomy service during 2017 as a tool for quality control and cost control. The benefit of this research is that it can be used as a clinical pathway audit material that is being used in the service guidance whether it is appropriate and effective in quality control and cost control so that improvement can be done to improve service quality.

Method

The type of this research is observational analytic research and cross sectional design, The population of this research was Clinical Pathway of Odontectomy were collected from medical records during January to December 2017 in ward surgery room of Dr. Soetomo hospital in Surabaya Indonesia.

The sample in this study is the entire population data ie the treatment of odontectomy with general anesthesia using clinical pathway in daily care in the room at the surgery ward which is treated by Oral and Maxillofacial Surgery Division from January to December 2017. We evaluate applying clinical pathways to process and outcome indicators, and to the costs sustained to assist the patient through the activity-based costing. This research uses technique non-probability sampling which is purposive sampling.

The data collection time of this study is estimated to take 2 weeks in June of 2018. The type of data used is secondary data, data processing is done with SPSS 20, the data is presented in the form of tables and drawings. Ethical clearance has been proposed with number 0459/124/VI/2018 as the cornerstone of research ethics that focused the hospital patients are subuded in patients in the hospital. A tool for evaluating clinical pathways using clinical pathway sheets of odontectomy procedures (surgical removal of embedded wisdom teeth).



 PEMERINTAH PROVINSI JAWA TIMUR RSUD Dr. SOETOMO Jln. Mayjen Prof. Dr. Moestopo No. 6-8 Surabaya				RM 02	
TEMPLATE CLINICAL PATHWAYS					
IMPACTED TOOTH					
Patient's Name :	Date of Birth :	Body's Weight :	Body's Height :	Medical Record Number:	
.....kgcm	
Early Assasment:	Kode ICD10 : K 01.1	Planning lenght of care : ...3... days Room of care : R.			Room charged/day :
Services Activity		Date/ hour Incharge	Date / hour Discharge	Lenght stay:	Cost :
	
Interview	Pain <input type="checkbox"/> (+) <input type="checkbox"/> (-)		Swollen gums <input type="checkbox"/> (+) <input type="checkbox"/> (-)		Partial/ Un erupted tooth <input type="checkbox"/> (+) <input type="checkbox"/> (-)
	others:				
Phisical Examination	Partial appeared tooth/disappear <input type="checkbox"/> (+) <input type="checkbox"/> (-)		Swollen gums <input type="checkbox"/> (+) <input type="checkbox"/> (-)		Redness gums <input type="checkbox"/> (+) <input type="checkbox"/> (-)

Figure 1: the current lenght of stay on odontectomy procedure

Name of Dokter (DPJP)		Length GRC (day)	Final Assessment	ICD-10	Procedure	ICD-9-CM
Police (P) / Examination (EC) / Operator (O)			Primary :		1. Viable	85.4
1					2. Odontectomy	85.1
2					3. Root	85.1
3					4. Prosthesis	86.34
4					5. Antibiotic	
5			Secondary :		2. ART/VE/Out cath	86.6
					3. Lab exams	86.8
					4. Dental exam	87.8
			Complication :		5. Pathologic	78.1
			Pathology :			
Name of Nurses / Other Healthcare staff					1	
1					2	
2					3	
3						
Name of Supervisor		Supervisor's sign		Date of Supervision		

Figure 2: ICD of the procedure during treatment

4. Discharge planning	<input type="checkbox"/> (+) <input type="checkbox"/> (-)		<input type="checkbox"/> (+) <input type="checkbox"/> (-)	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	
5. Oral hygiene	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	
Outcome					
1. Swollen			<input type="checkbox"/> (+) <input type="checkbox"/> (-)	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	
2. Bleed			<input type="checkbox"/> (+) <input type="checkbox"/> (-)	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	
3. Pain			<input type="checkbox"/> (+) <input type="checkbox"/> (-)	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	
4. Parosteal/ Numb	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	<input type="checkbox"/> (+) <input type="checkbox"/> (-)	
Varian :					
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
Total Cost :					Rp.

Research Result

From the evaluation and recording of the Clinical Pathway sheet during January to December 2017 it was found that the sheet was filled completely by a medical service provider according to the point / item that was loaded. From the observation, there were 41 clinical pathway samples with observation on variation: drug difference, length of hospitalization, operator change.

Table 1 Likelihood Ratio Test

	Model Fitting Criteria	Likelihood Ratio Test		
Effect	-2 log likelihood of Reduced Model	Chi - Square	Df	Sig
Intercept	9.274a	.000	0	.
Varobat	13.938	4.664	2	.097
Tindakan	11.022b	1.748	4	.782
Operator	10.634b	1.360	2	.507

In the likelihood ratio of the table, the observed variables were the type of drug, the type of action and the difference of the operator.

Tabel 2 Model Fitting Information

Model	Model Fitting Criteria -2 Log likelihood	Likelihood Ratio Tests		
		Chi Square	Df	Sig.
Intercept Only	17.696			
Final	9.274	8.422	8	.393

In the table above obtained sig figure is 0.393 greater than the value of p (0.05)

Discussion

From the results of research on 41 clinical pathway odontectomy in the oral and maxillofacial surgery division at Dr. Soetomo hospital Surabaya which is the total population of clinical pathway odontectomy procedure, meaning no samples that dropped out.

The result of statistical calculation with binary logistic regression found significance value equal to 0,393 which is bigger than p value <0,05, which can be interpreted that the variable measured have a meaningful influence to its dependent variable that is length of hospitalization. The length of hospitalization is used as a measure / indicator of service quality where with the assured quality of service, the length of treatment can be controlled according to the therapy guidelines. The length of hospitalization in addition to reflecting the quality of service can also be used as a tool for the control of patient care costs in hospitals. (Yangga D Nur and Setya Haksama, 2016)

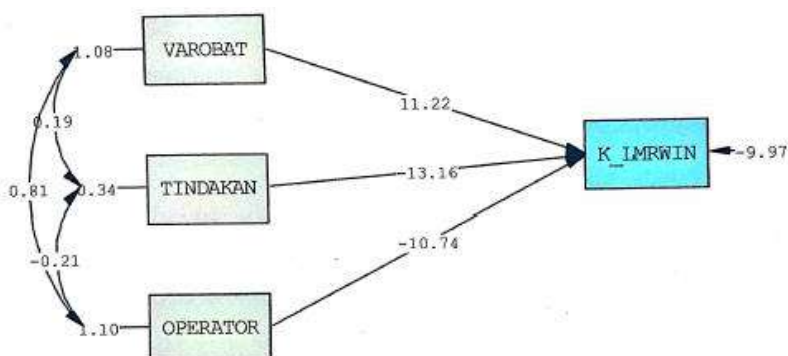


Figure 4: Path analysis

Quadratic number obtained from each variable on length of stay: the influence of the number of actions on length of hospitalization = 13,16; type of drug = 11.22; operator difference = - 10.74. Medium between variable independent against one another is small

In the path analysis of each variable shows the effect on the length of hospitalization. In the clinical pathway has been determined all items / points to be done both examination, treatment and action, including the type of drug to be given. If there is a discrepancy with the items on the clinical pathway sheets are allowed if there are exceptions due to the patient's special condition, collision on administrative difficulties and the number of human resources. However, on path analysis of clinical pathway data of oral and maxillofacial surgery showed that all of these variables did not affect the duration of hospitalization, where variation of drug type resulted in 11.22 (1.25%) variation of action of 13.16 (1.73%) and operator variation of -10.74 (1.15%) where chi square is 0.93, df = 0 and p = value = 1,00000

Conclusion

Clinical Pathway samples studied were 41 cases, with observed procedures being odontectomy, with observed variables being drug type, operator variation, and variation in the number of measures. From the calculation of statistical analysis of binary logistic regression, it is found that the variation of three variables is not significant to the length of hospitalization.

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THE NUMBER OF MISSING PERMANENT MOLAR TEETH BASED ON CHARACTERISTICS OF RESPONDENT ON LUBUK BUAYA PUBLIC HEALTH CENTER

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Abstract: Permanent molar are the teeth that mostly missing. In Padang, the Caries Index is 2.78, Missing-Teeth Index is 2.29, Missing Teeth Index percentage is 82.4% with 9.2% of denture usage. Lubuk Buaya Public Health Center has the highest number of permanent tooth extraction in Padang. The purpose of this study is to look at the relationship of number of missing permanent molar teeth with the characteristics of respondent. The design of this study is using descriptive method. The number of samples are 97 respondents with age range between 25-44 years-old, who live in Lubuk Buaya Public Health Center working area that meet inclusion criteria. About 90,7% of respondents lost 1-4 permanent molar while 9,3% respondents lost 5-8 molar. Most of male (84.6%) and female (97,8%) lost 1-4 molar teeth. Almost all of age range lost 1-4 molar. All respondent with only elementary school level of education lost 5-8 molar teeth, while other level of education lost 1-4 molar. Gender, age and the level of education affect the number of missing permanent molar teeth on Lubuk Buaya Public Health Center working area. Lower education level lead to the higher number of missing permanent molar teeth.

Keywords: permanent molar teeth, characteristics of respondent

Introduction

Tooth loss increases with age as a cumulative impact of caries, periodontal disease, and treatment failure or trauma. Nicola et al., stated that permanent molars are the most missing teeth compared with premolars, canines and incisors (Damyanov, 2012).

The impact of losing one permanent molars if it not replaced with dentures are the pathological migration of the adjacent teeth and antagonists, periodontal trauma, interdental caries, loss of contact points due to migration, gingival recession, calculus, and premature occlusion. The mastication function will be disrupted if it loses some permanent molars. If 4 teeth are missing it will cause 8 teeth that are not working for mastication. If the total number of teeth is 32 then 25% of chewing efficiency decreases so that interrupt nutrient intake (Arifzan, 2010). Omar states that the loss of all or most of the molar teeth will have an occlusal impact, decreasing the vertical dimension of the face. If tooth has been loss for a long time period, it may cause interference with Temporomandibular Joint (Omar, 2001).

Basic Health Research (Riskesdas) stated that to achieve the target of health services in 2010, various programs such as promotive, preventive, protective, curative and rehabilitative have been conducted. World Health Organization set indicators, including 5 years old children 90% are caries free, 12 years old children has dental caries damage (DMF-T index) of one tooth, the dental-extraction-free of 18-year-old population (component M = 0), the population aged 35-44 had at least 20 teeth by 90%, the population aged 65 and older still had teeth works by 75%, and people without teeth is $\leq 5\%$.

The DMF-T index in Indonesia is 4.8 with the M-T (Missing Teeth) index of 3.9. This means that on average 5 tooth damage per person, an average of 4 teeth per person is extracted. The percentage of MTI (Missing Teeth

Index) in Indonesia is 79.6%, while the percentage of fixed and removable denture usage is only 4.5%. In West Sumatra the DMF-T index is 5.3, M-T 4.3, MTI 81% and the percentage of denture usage is 5.8%. In Padang City, DMF-T index was 2.78, M-T 2.29, MTI 82.4% with percentage of denture

usage is 9.2% (Riskesdas, 2007). The most permanent dental extraction from 20 Puskesmas in Padang City in 2011 is the Lubuk Buaya Health Center.

Materials and method

This study describes the number of missing permanent teeth based on the characteristics of respondents, such as gender, age, and education of respondents with descriptive research design. Sampling was done by purposive sampling method. Data were obtained from 97 respondents with age range 25-44 years. The data were collected through interview method by using questionnaire which consisting independent variable (characteristic) and dependent variable (number of permanent molar tooth loss) at Lubuk Buaya Public Health Center from Koto Tangah Sub-district office. To see the relationship of the two variables, Chi-square test was used with p value 0.05.

Results

The frequency distribution of respondents based on characteristic of gender is shown in Table 1.

Table 1 Frequency distribution of respondents based on characteristic of gender

No	Gender	F	%
1	Male	42	43,3
2	Female	55	56,7
Total		97	100

The number of female respondents were more than male respondents.

Distribution of respondent characteristics by age can be seen in Table 2.

Table 2 Distribution of respondent characteristics by age

No	Age (y.o)	F	%
1	25 - 29	40	41,2
2	30 - 34	18	18,6
3	35 - 39	12	12,4
4	40 – 44	27	27,8
Total		97	100

Most of respondents are coming from 25-29 years age group as shown in Table 2.

The frequency distribution of respondents based on education level characteristics can be seen in Table 3.

Table 3 The frequency distribution of respondents based on education level characteristics

No	Education Level	F	%
1	SD	6	6,2
2	SMP	10	10,3
3	SMA	46	47,4
4	DI	1	1,0
5	DII	1	1,0
5	D III	3	3,1
6	S 1	29	29,9
7	S 2	1	1,0
Total		97	100

The highest education level of most respondents is high school level.

The frequency distribution of the number of permanent tooth loss respondents can be seen in Table 4.

Table 4 Number of Permanent Molar Dental Losses in Community Aged 25-44 y.o. in Lubuk Buaya Public Health Center

Number of Permanent Molar Losses	F	%
1-4 permanent molars	88	90,7
5-8 permanent molars	9	9,3
Total	97	100

Most of respondents lost 1-4 permanent molars

Table 5 Relation of Gender of Respondent to Number of Molar Teeth Loss

Gender	Number of Molar Loss		Total	P
	1-4 teeth	5-8 teeth		
Female	84,6%	15,4%	100%	0,035
Male	97,8%	2,2%	100 %	

Table 5 shows the results of the analysis of the relationship between the gender with the number of permanent molar tooth loss, as many as 44 (84.6%) female respondents and 44 (97.8%) of male respondents lost 1 to 4 permanent molars. From the result of chi square statistic test, obtained the p value = 0.035 with $p < 0,05$, hence there is significant relation between gender with amount of permanent molar tooth loss.

Table 6 Relation of Age of Respondents with Number of Molar Teeth Loss

Age (y.o)	Number of Molar Loss		Total	P
	1-4 teeth	5-8 teeth		
25-29	97,5%	2,5%	100%	0,005
30-34	100%	0	100%	
35-39	91,7%	8,3%	100%	
40-44	74,1%	25,9%	100%	

Based on table 6, it can be seen the results of the relationship analysis between age with the number of permanent molar tooth loss. The data show that 18 (100%) of respondents with age range 30-34 years lost 1-4 permanent molars. Then 7 (25.9%) of respondents with age range 40-44 years lost 5-8 permanent molars. From the results of chi square statistical tests, obtained p value = 0.005, then there is a significant relationship between age with the number of permanent molar tooth loss.

Table 7 Relation of Education Level of Respondent with Number of Molar Teeth Loss

Education Level	Number of Molar Loss		Total	P
	1-4 teeth	5-8 teeth		
Elementary Shool (SD)	0%	100%	100%	0,000
Junior High School (SMP)	100%	0%	100%	
Senior High School (SMA)	93,6%	6,4%	100%	
College / University (PT)	100%	0%	100%	

Based on table 7, it can be seen the result of the relationship analysis between the level of education with the number of permanent molar tooth loss. The data show that 6 people (100%) of respondents with Elementary School Education level (SD) lost 5-8 permanent molars. While 100% of respondents the level of Junior High School Education level and College level lost 1-4 permanent molars. In the high school education group there were 44 people (93.6%) losing 1-4 permanent molars. From the results of chi square statistical test, it obtained p value = 0.000, $p < 0.05$, then there is a significant relationship between education level with the number of permanent molar tooth loss.

Discussion

Based on the number of tooth loss, 9 respondents (9.3%) lost 5 to 8 permanent molars and 88 respondents (90.7%) lost 1 to 4 permanent molars. The first permanent lower left molars are the most commonly extracted teeth, with as many as 87 (20%). This is because permanent molar are the first teeth to erupt also are the longest-used teeth, so they are often destroyed/decayed and then extracted. In addition, there are still many people who think if the first permanent molars are extracted then there will be a replacement due to eruption in the period of mixed teeth (Hedge, 2011).

Based on the annual report of Padang City Health Office 2014, dental disease is one of 10 most common diseases in the Public Health Centers. People usually comes after the tooth has pulp disorder. This led the ratio of fill and extraction in the city of Padang to 0:28 while the target is 1:1.7

The cause of permanent tooth loss according to research conducted by Montandon (2012) is caries. The molar teeth are the largest and have pits and fissures. This surface is the most sensitive part to caries. The sensitivity of the occlusal surface to caries is due to the morphology of the pits and fissures. Food debris and bacteria will be trapped in a narrow and deep pit and fissure, not allowing toothbrush fibers to be able to clean it so caries will occur in that area.

Based on the result of chi square statistic test, it is obtained that the p value $<0,05$, this means there is a significant relation between characteristic of respondent with amount of permanent molar tooth loss in Work Area of Lubuk Buaya Health Center.

Respondents of male and female gender have the same pattern which mostly have lost 1-4 permanent molars, as reflected in 44 female respondents (84.6%) and 44 male respondents (97.8%).

Respondents aged 35-44 years who lost 5-8 permanent molars were 8 respondents (88.9%). Respondents aged 30-34 years who lost 1-4 permanent molars were 18 respondents (100%). Respondents aged 25-29 years lost 1-4 permanent molars were 39 respondents (97.5%). This is in line with Agtini research (2010) which states that tooth loss increases in the age group of 35-44 years.⁹ Permanent molar loss increases with age because permanent molar are the first teeth to erupt so they are often destroyed/decayed and then extracted.

Based on education level, most of the respondents came from high school education level, which is 46 respondents (47,4%). All respondents with elementary school education lost 5-8 tooth. While all respondents with the final education is junior high level and college level, lost 1-4 teeth. This indicate that number of tooth loss is increasing if the final level of education is lower.

Higher level of education will lead to higher level of people knowledge about the impact of permanent molar loss. This is because the role of education is to increase knowledge, generate positive traits, and community capacity (Notoadmodjo, 2003). Higher level of education will lead to higher level of people awareness to maintain oral health. If a person maintains good oral hygiene then the amount of tooth loss can be minimized, because the teeth with extraction indication will also be minimized.

Knowledge is essential to the formation of person's actions, knowledge will affect a person in adopting behavior (Notoatmodjo, 2003). In addition, according to Zaini et al (2002) knowledge is the memory of the material studied, which includes the memory of the material of the facts and complete theories, will be reflected from someone's actions.

Based on the results of this study, it is found that there is a significant relationship between gender, age and education level of society with the number of permanent molar tooth loss in the Work Area of Public Health Center Lubuk Buaya.

Conclusion

The number of permanent molar tooth loss is affected by gender, age, and final education level. Loss of 5-8 permanent molars was experienced by most of the respondents with elementary school education level.

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