



STIKep PPNI Jawa Barat, Bandung - INDONESIA
National Cheng Kung University Hospital - TAIWAN
Bandung, 16th – 17th July, 2018

Conference Book
International Conference on Health Care
and Management

“Evidence to inform action on supporting and implementation of
SDGs”

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This book published by:

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Welcome Message



Assalamualaikum Warahmatullahi Wabarakatuh

Dear honorable guests,
Sustainable Development Goals (SDGs) as an agreement of sustainable development objectives agreed by all countries at the 2015 UN sessions. Each country including Indonesia has an obligation to implement this joint development plan by applying universal, integration and inclusive principles by ensuring that no one missed or “No-one Left Behind” Indonesia has Nawa Cita or 9 priority agenda which should synergize with SDGs and can be used as health program application in Indonesia to also achieve SDGs.

On behalf of the organizing committee and the Nursing Society of Indonesia, I am glad to invite you to join ICHM 2018 (International Conference on Health Care and Management) in Bandung, Indonesia on July 16-17, 2018.

The conference is expected to reveal some solutions for evidence-based health care and scientific facts to be discussed by various viewpoints from diverse speakers from around the world with the title “Evidence to inform action on supporting and implementation of SDGs. Through the International Conference is expected to improve health services, especially in the field of nursing in Indonesia to improve the human development index.

We hope all participant could benefit from the exciting program and will surpass your expectation and that will be an inspiring event.

Warm regards,



Dhika Dharmansyah
Conference chair



Assalamu'alaykum Wr.Wrb
Good morning and best wishes for all of us.

Ladies and gentlemen, in such a great and happy day, let's praise and thank to Allah Swt who has given us grace and mercy to all of us to gather in this International Conference on Health Care Management event today.

First of all, we would like to gratitude and appreciate highly to national Cheng Kung University Hospital has given the opportunity and confidence to our institution STIKep PPNI Jabar for the second time in collaboration to organize International Conference on Health Care Management with theme: "Evidence to inform action on supporting and implementation of SDGs". This event is one of follow up The memorandum of Understanding between NCKUH with STIKep PPNI Jabar.

STIKep PPNI Jabar is as a nursing education institution carry out the mandate to create professional nurse, we must implement all TRIDHARMA University activities in academic atmosphere that aims to broaden and improve nursing and existence of nurse profession capacity in nation developing continually.

As we know the university academic quality is determined by its researches and graduates result quality. The research work results may be either a right against managing intellectual wealth equity as well as scientific work which is able to be publicized through scientific journals and scientific gathering forums of the same scientist background both in national and international level.

Nevertheless, the publishing of journal researches is published by its university. Nowadays, it is irregular because there are both financial and scientific manuscript availability drawbacks. Scientific regular manuscripts are very limited because manuscript contributor is only from its university as well.

The high education Research and technology ministry data in 2017, it stated that there were an increase of research work publishing done by practitioners, academicians and researchers of Indonesian. The amount of Indonesian research publishing on international journal certifiable indexed Scopus tended to increase. The high education Research and technology ministry data on December 1st 2017 noted that Indonesia scientific research publishing reached 14.100 journals. Meanwhile, on October 1st 2017 there were as many as 12.098 journals.

However, internally nurse profession scientific research journals are still less of publishing. It is alleged to the low of quantity and quality publishing about nursing. One of the drawbacks is rarely the interaction between nursing scientists and experts in scientific conferences. Some efforts are carried out by STIKep PPNI to encourage and to accelerate sharing knowledge amongst the nursing experts. Accordance to the goals, National Cheng Kung University Hospital Taiwan and STIKep PPNI have made MoU and held as this International conferences organizer. Hopefully, it is able to bridge all stakeholders, practitioners, and academicians in supporting the quality of the human resources especially, nurses and health workers as well.

The honourable ladies and gentlemen,
Nowadays, in the global era, the transformation runs rapidly and consequently it makes the knowledge based society. Information and communication technology development are very important in on its role in manifesting society development based on the knowledge. The higher education of society will be higher of health service quality demands specially nurse.

Accordance to the effort, this International conference aims to,

1. Facilitate the knowledge sharing between health experts and nurses to encourage the goal of health human resource quality.
2. Produce health scientific and nursing articles deserve to be published on international scopus indexed journal.
3. Make communication networking amongst Universities, research institution, nurse practitioners, and other stakeholders.

I truly believe that all participants through the 2 days in international conference, our goals above are able to be manifested well.

Finally, I would like to thank to all of participants diligently and with spirit of attending this international conference on health care management.

Wish the conference is able to be knowledge sharing event and delightful and successful as well, the conference will be enlightened and interchange will do great help for us after attending this conference, especially STIKep PPNI Jabar and generally for all profession nurses to provide health services to communities, aamiin ya robbal alamin.

Wassalamu'alaykum Wr.wb.

Kindest regards,



The Dean of STIKep PPNI Jabar



Excellencies, Distinguished Delegates, Ladies and Gentlemen,
Selamat Siang,

I'm ChyunYu Yang, the superintendent of National Cheng Kung University Hospital in Tainan, Taiwan.

On behalf of our hospital, it is my pleasure and privilege to welcome all of you to participate in the international conference on health care and management 2018.

To our eminent speakers and delegates who have come from UK, Netherland, Korea, Japan, Thailand, Singapore, Taiwan, and Indonesia, I bid you a very warm welcome to Bandung. We are indeed honoured to have you here with us. We have about 1.000 participants from different place in Indonesia and countries gathered here today, making our conference a truly meaningful one.

This is our second time collaborate with STIKEP PPNI Jawa Barat to hold an international conference. Last year, we have very successful conference with the theme focus on infection control and disaster management. And this year, our conference theme is "evidence to inform action on supporting and implementation of SDGs".

The Sustainable Development Goals (SDGs) known as the global goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. Goal 3 addresses all major health priorities and calls for improving reproductive, maternal and child health; ending communicable diseases; reducing non-communicable diseases and other health hazards; and ensuring universal access to safe, effective, quality and affordable medicines and vaccines as well as health coverage.

However, the world seems still far from ending maternal mortality, with more than 303,000 deaths in pregnancy or childbirth occurring annually. NCDs are also a growing problem, causing 40 million deaths in 2015.

But, All in all, we can take comfort in the fact that SGD indicators are moving in the right direction. Yet we still have plenty of work to do.

I wish in the next two day and a half, we have the opportunity - and indeed the responsibility - to prepare and add knowledge related the current situation and progress reflection of SDGs.

In closing, I encourage delegates to participate actively in the interesting discussions over the next two days. I wish everyone a successful and fruitful conference.

Thank you.

Conference Committee

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ANALYSIS OF HEAVY METAL LEVELS IN WATER FROM CITARUM WATERSHED IN WEST JAVA

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ABSTRACT

Background: Water pollution is caused by industrial waste that is not treated well. Fish that live in it will be polluted by heavy metals contents that are harmful to human health. Lack of public awareness will aggravate those condition. **Objectives:** The objectives of the study were to determine the levels of pollutant contents (Cu, Pb, Cd, Cr, and Hg) in pond water and rivers in the Citarum River Basin. **Methods:** Heavy metal level examination is done by Atomic Absorption Spectrometer (AAS) method to find out pollutant content in pond water and river water. The pool water samples were taken from several points in the Ciganitri area while the river water samples were taken in the Cikapundung area. **Results:** Contents of contaminants in river water as follows: Cu (0.0237 ± 0.0014) mg/L, Pb (0.0038 ± 0.0032) mg/L, Cd ($0.00013 \pm 5.7 \times 10^{-5}$) mg/L, Cr (0.0042 ± 0.0004) mg/L, and Hg (0.0012 ± 0.0011) mg/L, while the contaminant contents in pond water are: Cu (0.030267 ± 0.0112) mg/L, Pb (0.0025 ± 0.0025) mg/L, Cd ($3.3 \times 10^{-5} \pm 5.7 \times 10^{-5}$) mg/L, Cr (0.0272 ± 0.0344) mg/L, and Hg (0.0006 ± 0.0008) mg/L. Cu pollutants in pond water and river has exceeded the threshold in the river water exceeding the standard grade water quality threshold, so has the level of Hg in river water. Levels of contaminants Cu and Cr in pond water is higher than river water, although both of them are under the threshold. **Conclusions:** Water from river and pond in Citarum watershed contain contaminants Cu, Pb, Cd, Cr, and Hg, but only Cu and Cr contents is exceeding the standard quality threshold. The metal content in the river can be derived from industrial waste disposal along the Citarum river basin. It is suggested to the relevant agencies to conduct counseling about the dangers of heavy metals on health, as well as for the community, especially the industry to be more concerned about the environmental conditions and not to dispose of waste into the river that can cause water and fish contamination in it.

Keywords: Citarum, Cu (Cuprum), Heavy metals, Hg (Mercury), Pb (Plumbum)

INTRODUCTION

“Heavy metals are individual metals and metal compounds that can impact human health. Eight common heavy metals are discussed in this brief: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. These are all naturally occurring substances which are often present in the environment at low levels. In larger amounts, they can be dangerous. Generally, humans are exposed to these metals by ingestion (drinking or eating) or inhalation (breathing). Working in or living near an industrial site which utilizes these metals and their compounds increases ones risk of exposure, as does living near a site where these metals have been improperly disposed. Subsistence lifestyles can also impose higher risks of exposure and health impacts because of hunting and gathering activities” (Martine & Griswold, 2009).

“Heavy or toxic metals are trace metals which are detrimental to human health and having a density at least five times that of water. Once liberated into the environment through the air, drinking water, food, or countless varieties of man-made chemicals and products, heavy metals are taken into the body via inhalation, ingestion and skin absorption. If heavy metals enter and accumulate in body tissues faster than the body’s detoxification pathways can dispose of, then a gradual build-up of these toxins occurs. High concentration exposure is not a necessity to produce a state of toxicity in the body, as heavy metal accumulation occurs in body tissues gradually and, over time, can reach toxic concentration levels, much beyond the permissible limits” (Suruchi & Khanna, 2011). Human activities such as industrial production and transportation release a high amount of heavy metals to the bio sphere (Sardar, et al., 2013).

Citarum River is the longest and largest river in West Java Province. The 297 km of flowing river stretches from the upper reaches of Situ Cisanti which is located at the foot of Mount Wayang South of Bandung City, empties into the Southern coast of Java Island precisely in Muara Gembong of Bekasi Regency. Geographically the Citarum River Region lies at 106 ° 51'36 "- 107 ° 51' East Longitude and 7°19'-6°24' South Latitude, with an area of ± 11,323 km². The Citarum River area of approximately 12,000 km² covers 13 districts/municipals administrations within West Java Province: Bandung, West Bandung, Bekasi, Cianjur, Bogor, Indramayu, Karawang, Purwakarta, Subang, Sumedang, Bekasi City and Cimahi City. Citarum River is an estuary of about 36 tributaries. Based on Presidential Decree Number 12 Year 2012 on Determination of River Region, Citarum River Region consists of 19 watersheds. There are 3 reservoirs namely Saguling, Cirata and Jatiluhur which serves as a power plant and supporting existing irrigation systems in the region. All of these reservoirs are in one stream of the Citarum River and are located in 4 districts (Cianjur, West Bandung, Purwakarta, and Karawang). Citarum River is a source of water for various community activities that live nearby. The activities that use Citarum river water source are: agricultural activities, fisheries, power plants, raw water sources, water sources for industrial activities, and waste water disposal site. The liquid waste comes from: a) household and urban wastes: residents' wastes, hotel wastes and hospitals discharged directly into Citarum River and its tributaries; b) industrial waste in upstream Citarum located in Malaya, Rancaekek, Cimahi, Banjaran, Cisirung and Batu Jajar areas.

Water pollution is caused by industrial waste that is not treated well. Fish that live in it will be polluted by heavy metals contents that are harmful to human health. Lack of public awareness will aggravate its condition. Based on the problems, this study aimed to find out the content of heavy metal pollutants in some points of the Citarum river, to compare the contents of heavy metal pollutants in pond water in Ciganitri area and river water in Cikapundung area.

METHODS

Heavy metal level examination is done by Atomic Absorption Spectrometer (AAS) method to find out pollutant content in pond water and river water. The pond water samples were taken from several points in the Ciganitri area while the river water samples were taken in the Cikapundung area. Sample Water sampling was taken from 2 locations, namely Ciganitri area to get sample of pond water and in Cikapundung area to get river water sample. Each location is taken in 2 different places. Water sampling is conducted at a depth of 1 meter below the water level. The sampling method was carried out in accordance with the method used in previous study. Water samples were taken using a water sampler at each sampling site. In each place is taken as much as 5 liters of water for the sample in and taken to the laboratory for examination of the ingredients of the contaminants. The laboratory used is the ITB laboratory that has gained accreditation status. The parameters of heavy metals examined include: Cu, Pb, Cd, Cr and Hg. The content of heavy metals in water compared with the value of river water quality standards in accordance with government regulation Number 2 of 2001 on water quality management and water pollution control.

RESULTS

Analysis of contaminant content in pond water and river water was done on several heavy metals, ie Cu, Pb, Cd, Cr and Hg. For sample of pond water taken at Ciganitri area, while river water taken at Cikapundung area. Analysis of Pb, Cd and Hg concentrations in waters was measured using Atomic Absorption Spectrophotometry (AAS) Atomic Absoprometinometric Spectrophotometry / SAA Buck Method 200A Atomic Absorption Spectrophotometry (AAS). Result of physicochemical quality measurement of pond water and river water in Citarum River Basin area, that is Citaitri and Cikapundung area as follows:

Table 1. Results of Pond Water Physicochemical Quality Measurement at Citarum River Basin

Parameter	Results	Government Regulation Number 82/2001	
		Water Quality Standard Class I	Water Quality Standard Class III
Copper (Cu) (mg/L)	0.030267±0.0112	0.02	0.02
Lead (Pb) (mg/L)	0.0025±0.0025	0.03	0.03
Cadmium (Cd) (mg/L)	0.000033±5.7×10 ⁻⁵	0.01	0.01
Cromium (Cr) (mg/L)	0.0272±0.0344	0.05	0.05
Mercury (Hg) (mg/L)	0.0006±0.0008	0.001	0.002

Table 2. Results of Physicochemical Measurement of River Water at Citarum River Basin

Parameter	Results	Government Regulation Number 82/2001	
		Water Quality Standard Class I	Water Quality Standard Class III
Copper (Cu) (mg/L)	0.0237 ± 0.0014	0.02	0.02
Lead (Pb) (mg/L)	0.0038 ± 0.0032	0.03	0.03
Cadmium (Cd) (mg/L)	0.00013 ± 5.7×10 ⁻⁵	0.01	0.01
Cromium (Cr) (mg/L)	0.0042 ± 0.0004	0.05	0.05
Mercury (Hg) (mg/L)	0.0012 ± 0.0011	0.001	0.002

The results showed that Cu content in pond water and river water exceeded the standard quality of water class I and III, while mercury content (Hg), only in river water that exceeds the threshold. The content of Cromium in pond water and river water are still below the standard quality threshold. Cromium content in pond water was higher than river water. For other heavy metal content, such as Lead (Pb) and Cadmium (Cd) are still below the quality standard threshold.

The results of the analysis of Copper content (Cu) in water samples taken from rivers in Cikapundung area (Table 1) and pond water in Ciganitri area (Table 2) contain contaminant material that exceeds water quality standard I and III. Standard of Cu in water is 0.02 mg /L, while the content of Cu from pond water of 0.030267 ± 0.0112 mg/L and river water of 0.0237 ± 0.0014 mg/L. Content of Cu in pond water is higher than Cu content in river water. In addition, the mercury (Hg) in river water is higher than the water quality standard class I. The other heavy metal content of Lead, Cadmium and Mercury in river water are higher than that in pond water.

DISCUSSION

The water quality standard is a measure of the limits or levels of living things, substances, energies, or components that exist or must exist and/or pollutant elements that are tolerated in water. The determination of water quality standards other than designated beneficial water uses, is also based on real water quality conditions that may lie between one region and another. The classification of water quality according to Government Regulation Number 82 of year 2001 on Water Quality Management and Water Pollution Control is set to be 4 (four) classes, namely: a) first class, water that can be used for drinking water, and/or other designations that require the same water quality as that usefulness; b) second class, water whose designation may be used for water recreation facilities, freshwater fish farming, livestock, water to irrigate crops, and or other designations that require the same water quality as those uses; c) third grade, water which can be used for the cultivation of freshwater fish, livestock, water to irrigate crops, and or other designations that require the same

water quality as those uses; and d) the fourth grade, the water of which the designation may be used to irrigate crops and/or other designations which require the same water quality as the use.

The development of various industrial activities around the river using heavy metals Cd, Pb, and Hg causes the element to pollute the river water. If there is an increase in the concentration of heavy metal substances Cd, Pb and Hg in aquatic areas, it can increase the level of toxic concentration for aquatic life, thus potentially as a harmful pollutant. Cadmium, Lead and Mercury are toxic, carcinogenic, bioaccumulative and biomagnetic (Miller, 2007); (Plaa, 2007). Freshwater contains both organic and inorganic materials that can adsorb metals, so that heavy metal contamination in fresh water is easier to occur (Supriatno & Lelifajri, 2009). The heavy metals can originate naturally and from human activities whether they come from industrial waste or from household waste (Fardiaz, 1995).

Pollutants from industrial wastes can pollute river water and have negative impacts such as changes in estuary ecosystems such as changes in temperature, pH, BOD and COD and heavy metal content that greatly affects the life of aquatic flora and fauna. This waste usually comes from industry and households involving metal elements such as Lead (Pb), Arsenic (As), Cadmium (Cd), Mercury (Hg), Chromium (Cr), Nickel (Ni), Calcium (Ca), Magnesium (Mg), and Cuprum (Cu). Waste is generally a waste that can not or difficult degradation by microorganisms, so that will happen accumulation (Heriyanto, 2011).

The content of Copper (Cu) in river water and pond water exceeds the threshold of water quality standard class I and III. The high level of Cu in river and pond water is possible that the pond and river area in this study are close to the industry where the factories dispose of their waste. Most of the waste contain Cu contaminants. As well as research conducted in Semarang, the high content of Cu may be derived from industrial wastes discharged into water bodies, thus polluting river water (Kariada & Martuti, 2012). The Cu can enter into all strata of the environment, whether in the strata of water, soil or air (the atmosphere layer). Copper entering into the strata 3 environment can come from a variety of sources (Palar, 2004). Exposure to copper in a long time in humans will cause the accumulation of chemicals in the human body that in a certain period of time will cause the adverse effects of health of the population (Widowati, 2008).

Cu content in pond water that exceeds the quality standard can be caused by domestic waste from human activities that produce waste containing Cu. Heavy metals such as Copper (Cu) if its existence exceeds the allowed threshold can harm the environment, including humans. When inhaled: if inhaled chromium at high concentrations can cause irritation. In contact with skin: immediate contact with dust or chromium powder may cause skin irritation. In contact with eyes: Direct contact with dust or chromium powder may cause eye irritation. If swallowed: chromium metal is very difficult to absorb through the gastrointestinal tract. Adequate absorption of some chromium compounds may cause dizziness, severe thirst, abdominal pain, vomiting, shock, oliguria or anuria and possibly fatal uremia (Palar, 2004).

Lead (Pb) is a type of heavy metal that is toxic, which when entered into the body will be bound to proteins, so that only a few are excreted. The entry of Pb into the body of a living organ can pass through the digestive, respiratory, and penetrating channels through the skin. Pb content depends on the existing activities in the area, such as in industrial areas, highways, and landfills (Sudarwin, 2008). The content of Pb in pond water and river water in the Citarum river basin is still below the standard water quality threshold for class I and class III. Lead can effect on human health. The symptoms of acute lead poison in gore headache, irritability, admiral pain and various symptoms related to the nervous system. Lead enlephalopatayis characterized by sleeplessness and restlessness. Children may be affected by behavioral disturbances, learning and concentration difficulties (Hailesslassie & Gebremedhin, 2015).

Cadmium does not exist in nature as native metal but principally as sulfide ore namely greenokite, which is strongly associated with the zinc sulphide as salphalerite, and is recovered from some copper ores during smelting and refining. It is rarely found in natural water. Cadmium is considered to be toxic if its concentration exceeds 0.01 mg/L both in drinking and irrigation water (Hem, 1989; (Hailesslassie & Gebremedhin, 2015). The effects of acute cadmium are high blood pressure, kidney damage, destruction of testicular tissue as well as destruction of red blood cells. In

industry, cadmium is used mainly for electroplating on other metal to prevent corrosion, for paint, printing ink, plastics, electrical batteries and fluorescent, as well as video tubes. Many of these uses tend to make the element available to water that comes in contact with buried wastes. Another factor of importance is the tendency for cadmium to enter the atmosphere through vaporization at high temperature. Therefore, cadmium may be liberated to the environment in metallurgical processes and in the combustion of fossil fuel. Pollutant cadmium in water may arise from industrial discharges and mining wastes (Taha, 2004). Health effects in halation of Cadmium fumes or particles can be life threatening, and although acute pulmonary effects and dates are uncommon, sporadic cases still occur: Cadmium exposure may cause kidney damage (Hailelassie & Gebremedhin, 2015).

Chromium is a heavy metals, pollutants, and micronutrients that are important to the body. Type of chromium that has toxic effects to the organism is hexavalent chromium (Wirespathi, Raharjo, & Budijastuti, 2012). Heavy metals Pb and Cr are the types of metals that can cause poisoning to living things (Palar, 2004). The content of Chromium contaminants in pond water and river water is still below the standard water quality grade I and class III. Cr levels in pond water are higher than Cr levels in river water, ie: 0.0272 ± 0.0344 mg/L for pond water and 0.0042 ± 0.0004 mg/L in river water. The dynamics of metal content of Pb and Cr in water vary and depends on environmental temperature and climate, during the rainy season the content of Pb and Cr will be smaller due to the dissolution process while in dry season the content will be greater due to water evaporation (Darmono, 2001). Cr content in water can be accumulated by fish, making it harmful for people who consume fish that come from waters or ponds containing high Cr content.

Mercury (Hg) is one of the most malignant metals in the environment which is listed by the International Program of Chemical Safety as one of the six most dangerous chemicals in the world's environment (IRIS 1993). Methyl mercury pollution in the 1950s (Clarkson, 2002). The MeHg level in some freshwater fish species is surprisingly very high and toxically Unacceptable. The MeHg level found in the carnivorous fish species dysfunction and do pose a risk factor for atherosclerosis, CDV (Moumita, Santinath, Madhumita, & Mahua, 2012).The mercury content in river water is higher than water pool of mercury can be derived from erosion of natural sediment, discharge from refineries and factories, run off from landfills, and run off from farmland. Contaminants source of mercury in river water more than pond water, so it is possible that the content of mercury in the river water is higher than pond water.

CONSLUSION

Water from river and pond in Citarum watershed contain contaminants Cu, Pb, Cd, Cr, and Hg, but only Cu and Cr contents is exceeding the standard quality threshold. The metal content in the river can be derived from industrial waste disposal along the Citarum river basin. It is suggested to the relevant agencies to conduct counseling about the dangers of heavy metals on health, as well as for the community, especially the industry to be more concerned about the environmental conditions and not to dispose of waste into the river that can cause water and fish contamination in it.

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