The 5th Joint Technical Meeting between NMCHC Cambodia and NCGM Japan

16th December 2016
9:00 - 12:00 at Room 311, NMCHC

National Maternal and Child Health Center (NMCHC)
Phnom Penh, Cambodia

National Center for Global Health and Medicine (NCGM)
Tokyo, Japan

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Contents

The 5th Joint Technical Meeting between National Maternal and Child Health Center and National Center for Global Health and Medicine

16th December 2016
9:00 - 12:00
at
Room 311, NMCHC

Objective

To share/reconfirm the framework and all activities of the collaboration based on the MOU between NMCHC and NCGM,
To know the progress of each activity of the collaboration based on the MOU between NMCHC and NCGM since the 4th meeting on 8th December 2015.

Participants

Prof. Rathavy and NMCHC team
Dr. Kamata and NCGM team
NCGM local staff
(technical and administrative assistants / interpreters)
SCGO / JICA Cambodia / JICA II NeoC Project / Nagasaki University
Phnom Penh Municipal Health Department
Other relevant organizations

Language

English and Khmer
simultaneous interpretation from Khmer to English using headphone,
consecutive interpretation from English to Khmer

1

Keynote Speech

Greeting Honorable Guests, Ladies and Gentlemen!

On behalf of National Maternal and Child Health Center, I am very pleased to have an honor to welcome and thank Mr. Mitsuaki KAMATA, Dr. Chiaki MIYOSHI and NCGM Team for attending this meeting beside the busy schedule. I also would like to thank JICA staffs, all NMCHC staffs and Dr. Ngy Mean Heng, director from Phnom Penh Municipal Health Department.

This is the 5th meeting under Memorandum of Understanding on collaboration between NMCHC and NCGM. I am delighted to see a great progress and cooperation between both Centers. As Mr. Mitsuaki KAMATA has already mentioned, the relationship between both centers as well as with JICA has been existed since 1992 until now.

We have the honor to receive the new training center and also renovate the old building that supported by the government of Japan. This building was inauguration on 28, November 2016. We have had the big room for meeting and training.

However, Cambodia still has more challenges to face in order to achieve the goal of government strategic plans 2014-2018 which has been set that by 2018, Cambodia has to reduce:

- Death rate of mothers to 130 on 1 000 000 lives
- Death rate of children under 5 years old to 42 on 1000 births
- Death rate of babies under 1 year old to 32 on 1000 births
- Death rate of neonatal to 20 on 1000 lives

On the other hand, Ministry of health also focuses mainly on the intervention in neonatal care and nutrition, and cervical cancer early diagnosis and treatment.

Therefore, this meeting will present all the progress, good experiences that are useful for organizing the next Health Strategic Plan in the future.

Once again, I would like to thank everyone in this meeting and wish you all healthy and successful all the time. Please enjoy and be safe during your stay in Phnom Penh!

Prof. Tung Rathavy

Director of the National Maternal and Child Health Center (NMCHC)
Ministry of Health, Cambodia

2

Keynote Speech

Chum Riap Suo (Hello), Madam Chair, Prof. Tung Rathavy, Ladies and gentlemen, It is my great honor to extend my sincere congratulation on behalf of NCGM today.

In this precious occasion, I would like to express my congratulations on the inauguration for this new training center last month. I am very happy to be here, in this meeting room of new building, supported by the government of Japan.

Since 1992, from the Ministry of Health and then to this National Maternal and Child Health Center (NMCHC) in Cambodia, NCGM committed its technical collaboration continuously. During more than two decades, there have been four technical cooperation projects by JICA to improve the status of maternal and child health in Cambodia. A lot of staff NCGM has been working with you.

Moreover, it has been just four years since His Excellency Prof. Eng Huot and the NCGM President signed a Memorandum of Understanding (MOU) for a direct collaboration in December 2012. During these years, various activities including personal exchange, training, research and technical cooperation have been implemented under the framework of MOU. Furthermore, since last year 2015, the number of activities based on NMCHC has increased because the International Promotion of Technologies Program, which is a new scheme of ODA by the Ministry of Health and Labour, Japan launched. I believe all activities are meaningful for the further improvement of health status in Cambodia.

For instance, in the 'Project for Improving Women's Health Care of Factory Workers Focusing on Cervical Cancer' with JICA, we started to work on the improvement of women's health through screening and early treatment of cervical cancer in factories.

Also, in the research on the 'follow-up for chronic malnutrition among children in rural Cambodia, we are trying together regular monitoring for growth and development of children, as a joint cohort study among NMCHC, Nagasaki University, and NCGM. I heard the results of these studies have been already reported in both national and international academic conferences.

As a joint monitoring mechanism of our direct collaboration, I think it is very important for all of us to share the progress or plan of all activities within the framework of our MOU, in this meeting today. I also expect the fruitful discussion although the time is limited.

Last but not least, I do hope NMCHC and NCGM many more success, further collaboration and friendship forever! Okun churan (Thank you) .

Mitsuaki Kamata

Director-General, Bureau of International Health Cooperation,
National Center for Global Health and Medicine, Japan

1

Overview of joint activities within the framework of MOU between NMCHC and NCGM and the progress since Dec. 2014

Dr. Chiaki Miyoshi
National Center for Global Health and Medicine, Japan

Who are we – NCGM ?
(former IMCJ)

独立行政法人
国立国際医療研究センター
NCGM National Center for Global Health and Medicine

- ✓ **Core institute of Japan's international health cooperation**
  - ➢ **Formulate and implement projects with JICA**
  - ➢ **Dispatches technical advisors to many countries**
  - ➢ **Organize training courses in Japan and other countries**

Memorandum of Understanding (MOU) on collaboration between NMCHC and NCGM
18Dec2012

Joint activities within the framework of collaboration

NMCHC and NCGM have been conducting joint activities as follows:

1. Personnel exchange programs;
2. Training;
3. Research;
4. Technical cooperation; and
5. Others

Objectives of today

1) To share/reconfirm the framework and all activities of the collaboration based on the MOU between NMCHC and NCGM,

2) To know the progress of each activity of the collaboration based on the MOU between NMCHC and NCGM since the last 4th meeting on 8 December 2015.

Activities for each field in 2016

Fields / Activities	Neonatal care	Midwifery and obstetric care
1. Personnel exchange programs	- Doctors including residents /nurses from Japan to Cambodia/ staff from Cambodia to Japan	- Midwife / Doctors from Cambodia to Japan
2. Training		
3. Research	- Follow-up research • Outcome of newborn infants discharged from NCU at NMCHC • Chronic malnutrition among children in Steung Trang district, Kampong Cham	- Researches related to midwifery care - Study on premature labor and newborn care
4. Technical Cooperation	- Revision of clinical manual - Joint morning round - Joint case conference - Data report and analysis	- Womens' health and Cervical Cancer project
5. Others		

All activities in 2016-2017

Partner	1) JICA	2) SCGO/ JSOG/ NCGM		3) NCGM	4) NCGM	5) NCGM	6) Nagasaki University
Style	GR*	IPT***	Research	IPT	Research	Research	Research
Period	2015-18	2016	2016	2016	2015-17	2015-17	2015-18
Topic	**Cervical cancer Screening** - TA ** - Training		**Premature labor and newborn care at national hospitals**	**Neonatal care**	**EENC at facilities**	**Child malnutrition survey**	**Midwifery care at health centers in PP**
Presenter	Prof. Soeung			Dr.Sody Dr.Hosokawa	Dr.Kitamura (Dr. Sugiura)	Dr.Iwamoto	Dr.Matsui

*GR: Glass-Roots, ** TA: Technical Assistance,
*** IPT: International Promotion of Technologies (Japan's MOH)

Activity report until now

2

Improvement of neonatal mortality in Neonatal Care Unit at National Maternal and Child Health Center in Cambodia, based on continuous collaboration with Japan

Dr. Shinichi Hosokawa
National Center for Global Health and Medicine, Japan
Dr. Seang Sody
National Maternal and Child Health Center, Cambodia

Background

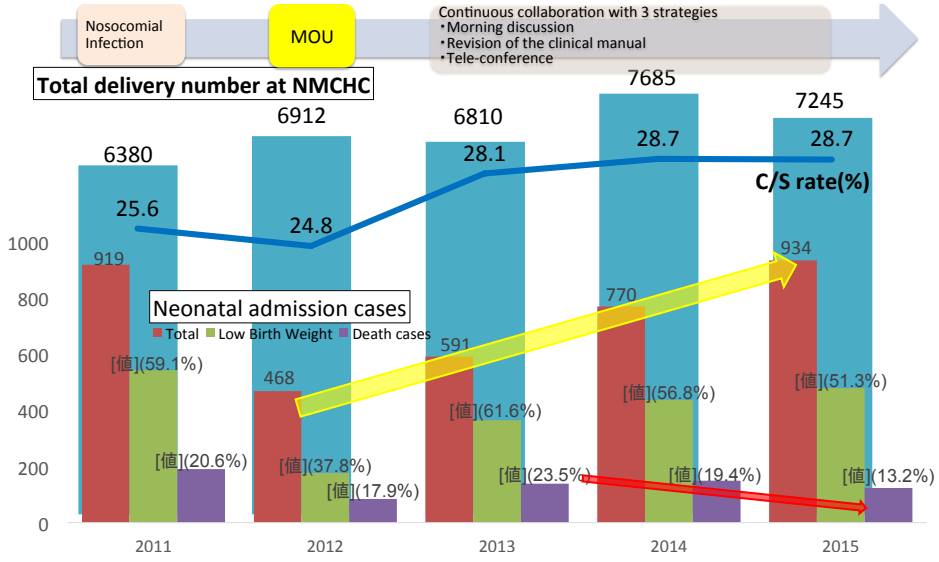
- In Cambodia many newborns die each year. Newborn mortality rate stands at 18 per 1000 live birth in 2014.
- Cambodian government has made a strong commitment to reduce newborn mortality rate.
- National Maternal and Child Health Center (NMCHC) is a top-referral hospital in Cambodia.
- Since 1992, National Center for Global Health and Medicine (NCGM) started its collaboration at NMCHC. Moreover, in December 2012, His Excellency Prof. Eng Huot and the NCGM President signed a Memorandum of Understanding (MOU) for a direct collaboration.
- We have input our efforts in this cooperation to manage sick and premature newborns born in NMCHC and to improve the quality of care and the newborn mortality.

2

Objectives & Methods

- Objectives:
  - To reveal the changes in newborn mortality and evaluate the effect through our cooperative activities
- Methods:
  - Through a certain period, we have acted in accordance with a fixed protocol with the collaboration between NMCHC and NCGM.
  - We have 3 strategies to strongly support our cooperative activities.
    1) Starting of the morning discussion to share problems and to standardize the plan
    2) Revision of the clinical manual to unify the procedure
    3) Starting of the Tele-conference with Tele-communication system to solve problems and raise our motivation in according to regular technical cooperation from Japan.
  - We collected and analyzed the NMCHC hospital data retrospectively. Data were analyzed using chi-square test. P value of < 0.05 was considered statistically significant.

3



Result2:Analysis of total neonatal admission cases

＊: probability <0.05, N.S. :no significance

Fiscal year	2011	2012	2013	2014	2015	Comparison of each fiscal year
Total Admission cases	919	468	591 ↑	770 ↑	934 ↑	＊
Mortality rate (%)	20.6	17.9	23.5	19.4 ↓	13.2 ↓	＊
Ratio of Low Birth Weight (%)	59.1	37.8	61.6	56.8 ↓	51.3 ↓	＊
Average of body weight at birth (g)	2232.5	2011.0	2109.8	2221.7	2297.0	＊
Average of APGAR score at 1 minute	4.2	3.8	3.9 ↑	4.2 ↑	4.5 ↑	＊
Average of APGAR score at 5 minutes	5.4	4.9	5.0 ↑	5.3 ↑	5.5 ↑	＊
Reason of Admission (Ranking)						
Asphyxia	1	1	1	3	3	
Premature	2	2	2	1	2	
Infection	3	3	3	2	1	
Respiratory Illness	4	4	4	4	4	
Neurological Disease	6	5	6	6	6	
Others	5	5	5	5	5	

Result3:Analysis of Survival or Death cases

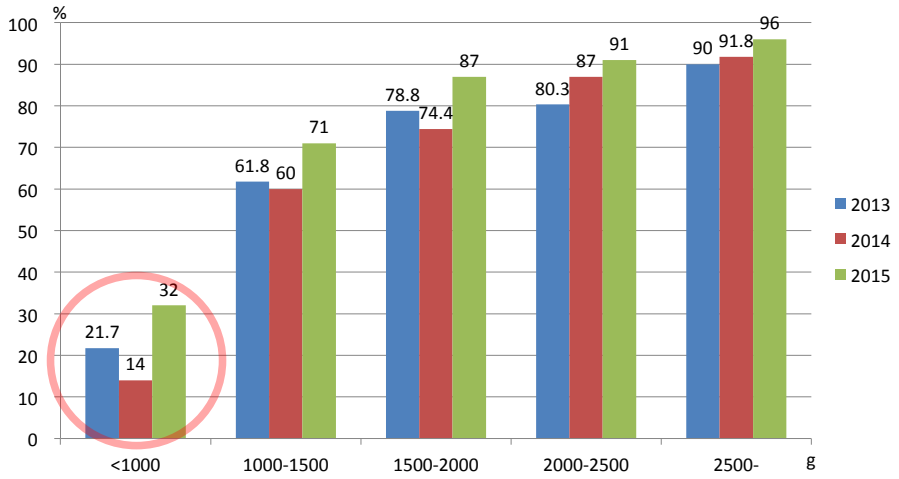
Fiscal year	2011		2012		2013		2014		2015			
Survival or Death cases(★)	Survival	Death	Survival	Death	Survival	Death	Survival	Death	Survival	Death	Comparison of each fiscal year	Two-group comparison
Average of BW at birth (g)	2447.6	1597.8	2351.1	1531.9	2385.1	1623.2	2479.9	1649.2	2517.2	1597.3 ↓	＊	＊
Average of APGAR at 1 min	4.7	2.8	4.1	2.7	4.3	2.6	4.5	3.1	4.7	2.9 ↑	＊	＊
Average of APGAR at 5 mins	5.8	3.8	5.2	3.6	5.5	3.5	5.6	3.9	5.7	3.8	＊	＊
Reason of Admission (Ranking)												
Asphyxia	1	1	1	1	1	1	3	2	3	2		
Premature	3	2	3	2	2	2	2	1	2	1		
Infection	2	5	2	4	3	5	1	4	1	4		
Respiratory Illness	4	3	4	3	4	3	4	3	4	3		
Neurological Disease	6	6	5	5	6	4	6	4	6	6		
Others	5	4	5	5	5	6	5	6	5	4		
Treatment(%)											Comparison of each fiscal year	Two-group comparison
Oxygen	83.2	98.0	88.3	94.0	97	98.6	100	100	100	100	＊	N.S.
Incubator/Warmer	87.0	95.3	90.6	96.4	97.6	100	99.2	100	100	100	＊	N.S.
Antibiotics	98.8	95.3	79.6	86.9	95.3	96.4	99.5	100	100	100	＊	N.S.

17/03/29

(★)Exclude cases by transfer or without approval ＊: probability <0.05, N.S. :no significance

6

Result 4 : Survival rate between the groups divided by birth weight



Discussion1

- The diagnosis and treatment policy of NCU's staff came to be unified by creating new clinical manual based on cooperation with Japan, and also that they can be provided stable high quality medical care to the sick and premature newborn.
- They always have the awareness of the issues and can transferred into action in according to the morning rounds everyday and the tele-conference (carried out 45 times during the period of 2012 to 2015) with the resolution promptly and supportively obtained from Japan.
- In addition, it is a very important point that NCU staff are continuing these activities with the desire and the high motivation of the currently.
- Through these activities, as a result, the overall neonatal mortality rate has improved. Especially we consider that the improvement of APGAR score by resuscitation contribute to decrease asphyxia admission cases and improve its mortality.

Discussion2

- Admission cases of premature infants has decreased, but still remains a mortality rate of extremely-low-birth-weight infants is very high, so we need endeavor to some improved and specialized measures for premature infants in the future.
- For example:
  - Make sure that Steroid is used for pregnant women who have pre-term delivery.
  - Better cooperation with the Department of Obstetrics and Gynecology
  - Strengthen the practice of fetal status monitoring for early detection of risk factors and on time intervention.
  - Providing immediate newborn care (drying & skin to skin contact with mother in the first 60 minutes, exclusive breast feeding, and resuscitation soon after birth if needed)
  - Focus more on the treatment for premature newborns (respiratory support by CPAP, nutrition, ...)
  - Start the practice of KMC method for premature babies in maternity ward
  - Focus more on infection control(clean delivery, hand washing, ...)

Conclusion

- While admission of newborns has increased, we were able to improve the neonatal mo rtality in recent years in accordance with a fixed protocol with the collaboration betwe en NMCHC and NCGM.
- The mortality of asphyxia has decreased because we can now save many asphyxia case s of normal weight newborns since we try to do appropriate resuscitation procedure as soon as possible.
- The determination of all NCU doctors and nurses lead to a better result in sick newbor ns care compare to the previous years in accordance with the guidance of the NMCHC l eaders and the Ministry of Health and with the support from NCGM cooperate activitie s.
- However, the mortality rate of premature newborns(extremely and very low-birth-wei ght infants) is still high.
- We will try to strongly improve this issue with 3 strategies from now on.

Qestion and Answer

Q1

Do you have any method to prevent fetal distress?

Answer

NCU can prevent after the baby birth if the apgar score of baby is not good, now we can reduce the newborn distress. We cannot prevent for fetal distress during labour, it is the role of midwife and Dr. in delivery room.

Q2

What have helped to staff through teleconference meetings? How does it process?

Answer

The teleconference meeting is to share the knowledge and experience between Health staff in Japan and Cambodia. If we have the problem; they (Japans side) have shared their experience. We conduct the meeting every month; we select the topic of presentation. Then discuss among of them.

3

[Progress Report]
Women's Health and Cervical Cancer Project
(July 2015 to November 2016)

Prof. Sann Chan Soeung
Head of Scientific Committee,
Cambodia Society of Gynecology and Obstetric

Presentation outline

1. SCGO and JSOG background to the Joint Project
2. Why the cervical cancer project is important in Cambodia ?
3. SCGO-JSOG Project for Women's Health & Cervical Cancer
4. Kick-Off Meeting
5. Progress & Planned Activities
6. KAP Survey Mar-April 2016
7. Health Education for Factory Workers
8. Training
9. Others:
    1. Donation of Shimodaira machine and equipments
    2. Increasing membership of the SCGO
    3. Office of the SCGO

2

Cambodia Obstetrics Gynecology Society

SCGO Société Cambodgienne de Gynécologie et d'Obstétrique

Purposes :

(1) Promotion of educational and scientific meetings

(2) Circulate scientific information among Ob/Gyn members

(3) Execute training and scientific research program

•Ob/Gyn members : 160

日本産科婦人科学会 Japan Society of Obstetrics and Gynecology

JSOG

Objective :

To contribute to the welfare of human beings and society through improvement of obstetrics and gynecology

- Public Interest Incorporated Association

•Ob/Gyn members : 15,990

3

After several years' communication and technical exchanges:

SCGO-JSOG Joint Project
- Women's Health and Cervical Cancer-

29 July 2015
Signing of Minutes of Memorandum of the Project at the Ministry of Health, Cambodia

JICA Grassroots Technical Cooperation Project

4

SCGO-JSOG Project
for Women's Health & Cervical Cancer
(JICA Grass-roots Technical Cooperation Project)

<Goal>

Early diagnosis and treatment system of uterine cervical cancer is established at 3 national hospitals in Cambodia, and not only women who have access to hospitals but also factory workers benefit from this system

Photo credit – Lt. Sumi CSR Brochure, Rt. PPSEZ blog

5

Why the cervical cancer project in Cambodia

1. Disease burden of cervical cancer
2. Estimated trends of disease burdens
   - MMR decrease in Cambodia
   - Cx cancer increase in resource-limited settings in the future
3. Female workers' health situation in Cambodia

Photo credit –PPSEZ blog

Problems

- Cambodian Female Factory Workers (FFWs) seem not to have access to cervical cancer information and screening services
- System of cervical cancer screening program, early diagnosis, and early therapy is weak
- Doctors' capacity of early diagnosis and therapy is limited

Solutions

For FFWs
-Health promotion and awareness raising
-Ensuring easy access to opportunities of cervical cancer screening/health checkups/health info

SCGO and JSOG will strengthen the Doctors' capacity and the System

7

PROJECT FOR IMPROVING WOMEN'S HEALTH CARE OF FACTORY WORKERS FOCUSING ON CERVICAL CANCER
JICA Grassroots Technical Cooperation

HUMAN RESOURCE AND SYSTEM DEVELOPMENTS FOR CERVICAL CANCER EARLY DIAGNOSIS AND TREATMENT
The Program for International Promotion of Japan's Healthcare Technologies and Services funded by Ministry of Health, Labour, and Welfare Japan

Implementer

SCGO and JSOG

NCGM Japan

Period	3 years from Oct 2015	July 2015 to January 2016
Contents	For female factory workers - Health Promotion - Cervical cancer screening For three national hospitals - Development of a system for early diagnosis and therapy	For gynecologists in three national hospitals - Technical Training in Japan - Protocol Development

8

Implementation structure

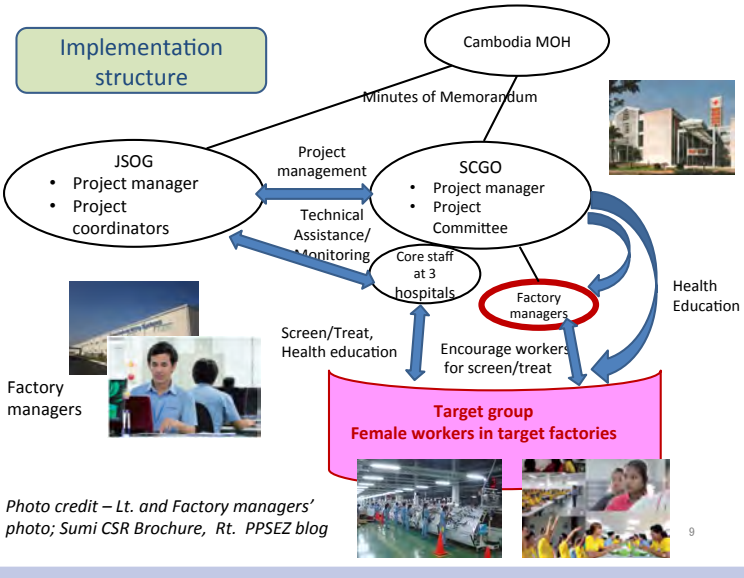


Photo credit – Lt. and Factory managers' photo; Sumi CSR Brochure, Rt. PPSEZ blog

9

Project for Improving Women's Health Care of Factory Workers Focusing on Cervical Cancer

<Project purpose> Number of workers who receive "Screen and treat" (Early diagnosis and treatment) of cervical cancer increases in the target factories

Photo source: UNFPA Cambodia

<Outputs>

1. Female workers in the target factories increase awareness of cervical cancer and women's health care
2. Factory managers encourage their workers to go to cervical cancer screening
3. "Early diagnosis and treatment" is established in 3 pilot hospitals

Project for Improving Women's Health Care of Factory Workers Focusing on Cervical Cancer

- The project aims at improving the capacity of physician working at the **National and Maternal Child Health Center, Calmet Hospital, and Khmer Soviet Friendship Hospital** in conducting screening and treatment of cervical cancer.
- Increasing awareness on cervical cancer and sexual and reproductive health among female factory workers and targeted factory managers through providing health education.
- The assessment of knowledge, attitude and practice (KAP) towards cervical cancer and other sexual reproductive health will contribute to appropriate development of key health messages for health education and an effective advocacy for factory manager to support cervical cancer screening for female factory workers.

11

Kick Off Meeting

Joint activities so far (July 2015)

Briefing about the project to factory managers in PPSEZ

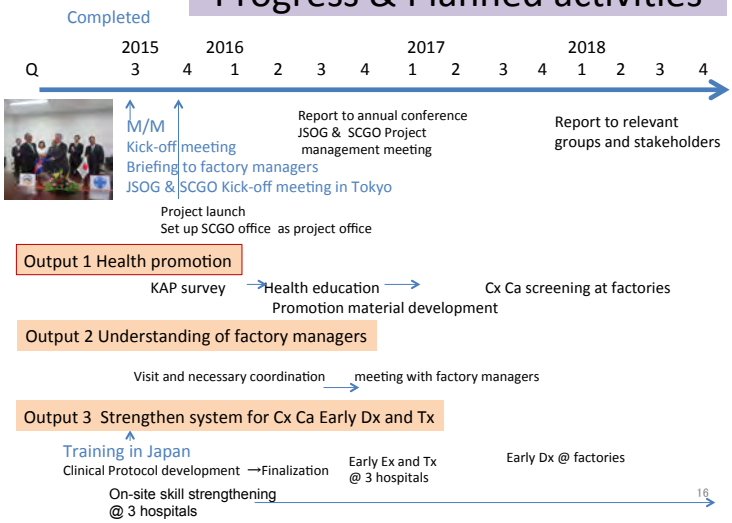
SCGO JSOG Kick-off Meeting in Cambodia at NMCHC July 2015

Activities in Japan (Sep 2015)

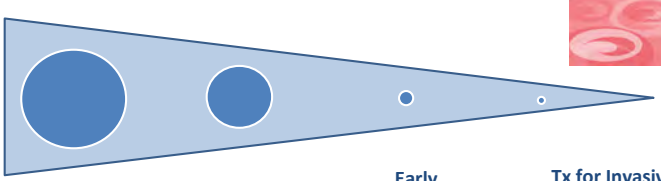
Kick-off Meeting at JSOG Office in Central Tokyo with both Societies' Board Members

Progress & Planned Activities

Progress & Planned activities



Cx Ca Prevention and Control – Comprehensive approach



Primary Prevention
-Health education
-(& HPV vaccine)

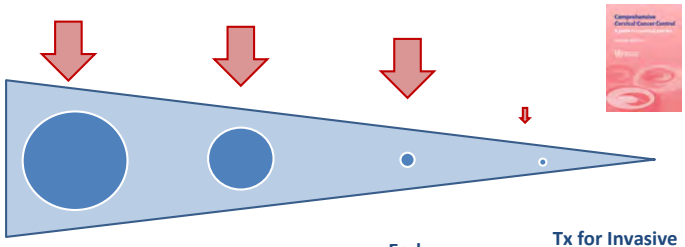
Cx Screening
-Pap smear
-VIA (visual inspection with Acetic Acid)
-(HPV testing)

Early Treatment
- Leep
-Cryotherapy

Tx for Invasive Cancer
-Surgery
-Radio Tx
-Chemo Tx

Source: Comprehensive cervical cancer control- A Guide to essential practice – Second edition , WHO, 2014 (The figure was made by H Obara, based on the content of the Guide) 17

Project's Strategic Focus



Primary Prevention	Cx Screening	Early Treatment	Tx for Invasive Cancer
-Health education -(&HPV vaccine)	-Pap smear -VIA -(HPV testing)	- LEEP - Cryotherapy	-Surgery -Radio Tx -Chemo Tx
Factory female workers	Gynecologists in the three pilot hospitals		

Source: Comprehensive cervical cancer control- A Guide to essential practice – Second edition , WHO, 2014 (The figure was made by H Obara, based on the content of the Guide) 18

KAP Survey-Interview Factory Worker at PPSEZ in March & April 2016

KAP Survey-Interview factory worker at PPSEZ in Mar & April 2016

National Institute of Public Health to conduct interview factory workers at Sumi (Cambodia) Wiring System Co., Ltd. The aim to exploring knowledge, attitude and practices toward cervical cancer and Other reproductive health services. A total of 443 women in among 900 women.

Health Education for Factory Workers

Output and activities in the PDM

Output 1 **Female workers in target factories increase awareness on cervical cancer and women's health care**

1-1 Check the environment of the factories, discuss with factory managers and identify the target factories

1-2 Conduct KAP survey on women's health care at target factories

1-3 Develop health message and materials for health education for factory workers

1-4 Conduct health education and advocacy activities for workers at target factories

Output 2 **Factory managers promote women's health care for their workers and encourage their workers to receive cervical cancer screening**

2-1 Conduct advocacy activities to managers of target factories

2-2 Coordinate with factory managers and take measures to encourage workers to go to cervical cancer screening (taking leave for going to hospital for cancer check-up, etc.)

22

Results of KAP survey (June 2016 by NIPH)

・Most factory worker had heard about cervical cancer, regardless of marital status. However, they have little idea on cause, prevention, screening and treatment.

・Most common sources of information is relatives/friends, and SMS. Few information from health facilities, including factory infirmary.

・Their knowledge on other reproductive health was insufficient. Married women showed more willingness to join the health education on ANC, postnatal care, HIV and family planning.

Need to have health classes by medical staff for factory workers on accurate messages and encourage women to receive services

1) Cervical cancer

- To enhance health provider's knowledge about cervical cancer
- To develop various types of education material (in factories/hospitals, for class/ counseling)

2) Other reproductive health services（Family planning, etc.)

Activities 1-3. Develop health message and materials for health education for factory workers:

About Cervical cancer *(supported by Japanese expert)*

Style	Purpose of use	Distribution plan
Slides (Power point)	・For education class	SUMI Cambodia and other target factories
Leaflets	・For distribution to women	Factories (at health education class) Hospitals (NMCHC, Calmette Hosp, KSFH)
Flip charts	・For counseling or small class ・To enhance provider's knowledge	SUMI Cambodia and other target factories Hospitals (NMCHC, Calmette Hosp, KSFH, Kosamac Hosp)

Including a reading part for health providers

Activities 1-3. Develop health message and materials for health education for factory workers: *other topics*

Style	Slides for education class
Distribution	To SUMI Cambodia
Topics	A. Women's Health (including menstruation, vaginal discharge, daily behavior, life plan etc.) B. Birth Spacing (Natural methods fecundation etc.) C. Birth Spacing (Modern methods)

SUMI Cambodia had some classes about women's health in October

Activities1-4. Conduct health education and advocacy activities for workers at target factories: *Health education @ a factory*

Place: @SUMI Cambodia
Topics: Cervical cancer
Providers: Nurses @SUMI Cambodia
Supervisors from SCGO: Prof. Kanal, Prof. Soeung, Ms Vutha
Expert: Ms. Oishi
Date: Preparation 1day (ToT)
Implementation 2 days, 26th and 29th, August 2016) at lunch time
Numbers of class: 6 class
Attendance: 700 (80-150 participants each class)

Training

Training in Japan

- Objectives
  1. To deepen the knowledge and skill on cervical cancer screening and treatment (colposcopy and cyto-pathological diagnosis, LEEP/conization, follow-up)
  2. To acquire the knowledge on population-based cervical cancer management system (primary prevention-screening-treatment)

Training in Japan

Year 2015
6 members of implementer team from 3 national hospitals
4 SCGO board members
1-Cervical Cancer management system
2-Prepare the clinical protocol development for cervical cancer in Cambodia

Year 2016
7 implementers from 3 national hospitals
1-Clinical management of cervical cancer (early and advanced stages)
2-Cytology

Training in Japan in Sept 2015

1- <u>Training program on</u> will attended by

- Dr. Korn Aun, Calmette Hosptial
- Dr. Lay Sanine, Calmette Hosptial
- Dr. Uy kyna, Khmer Soviet Friendship Hospital
- Dr. Chhit Maryan, Khmer Soviet Friendship Hospital
- Dr. Krouch Rayounette, NMCHC
- Dr. Ea Lyna, NMCHC

Activities in Japan (Sep 2015)

Training workshop

Training in Japan from 22 Sept to 22 Oct 2016

1- <u>Training program on 22 Sept to 22 Oct 2016 for Clinical management</u> will attended by

- Dr. Meng Kalyan, Calmette Hosptial
- Dr. Khan Sokchann, Calmette Hosptial
- Dr. Koun Lika, Khmer Soviet Friendship Hospital
- Dr. Kim Lumpini, Khmer Soviet Friendship Hospital
- Dr. Hang Sovannara, NMCHC (6-22 Oct 2016)

2- <u>Training program on 06-22 Oct, 2016 for Cytology</u>
will attended by

- Dr. Leang Sophat, Khmer Soviet Friendship Hospital
- Dr. Pen Soryan, NMCHC

Training course for development of humans resources and systems for cervical cancer early diagnosis and treatment in Cambodia (Sept-Oct 2016)

Handover ceremony (June 22, 2016)

JICA provide Shimodaira high frequency surgical instrument set(Machine, Cart and stabilizer) and equipment (Biopsic Forceps) to three national hospital director through JSOG and SCGO, and presided by H.E. Prof. Eng Huot.

34

Current SCGO Member

Month/Year	Actual		
	Total	F	M
1997	25	20	5
20 November 2015	225	139	86
23 June 2016	244	142	102
18-19 November 2016	287	160	127

Our SCGO regularly make seminar in June and Symposium in November every year.

35

SCGO Office set up in October 2016

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4

Preliminary Results of a Study on "Management of Preterm Labor, Delivery and Newborn at National Hospitals in Cambodia"

Prof. Sann Chan Soeung
Head of Scientific Committee,
Cambodia Society of Gynecology and Obstetric

Background

- Preterm birth is defined as a delivery before 37 weeks of gestational age. Premature children present high risks of disability such as disorders of the respiratory, liver, kidney, nutritional and growth difficulties, blood and sensory systems, as well as neurological and cognitive development disabilities.
- Improvement of prenatal, obstetric and neonatal care in Neonatal Intensive Care Units (NICU) is accountable for increasing preterm survivors. However, there are limited and inadequate scientific evidences related to the management of preterm labor, delivery and newborn at the national hospitals in Cambodia
- National hospitals have a main role in managing preterm deliveries and newborn care in Cambodia, thus, patients records at these hospitals could be used to review current clinical management of newborn care in Cambodia.

Objectives

- This study generally aims to explore the quality of maternal and newborn health services at national hospitals.
- It will specifically:
  - Determine the current clinical management of preterm labor/ delivery and newborn care
  - Identify outcomes of newborn against the clinical management of preterm labor/delivery and newborn care

Methods

- Cross-sectional study is designed to review hospital records and patient documents related preterm delivery in period of three months from August to October, 2016.
- Three national hospitals are selected for this study;
  - National Maternal and Child Health Center (NMCHC)
  - Calmette hospital
  - Khmer Soviet Friendship hospital
- A total of 282 records of preterm birth were collected for this study

Acknowledgement 1:	
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Administrative Supporters:	
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Prof. Tung Rathavy	Director National Maternal Child Health Center
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Board Members	Cambodia Society of gynecology and Obstetric
Coordinators	
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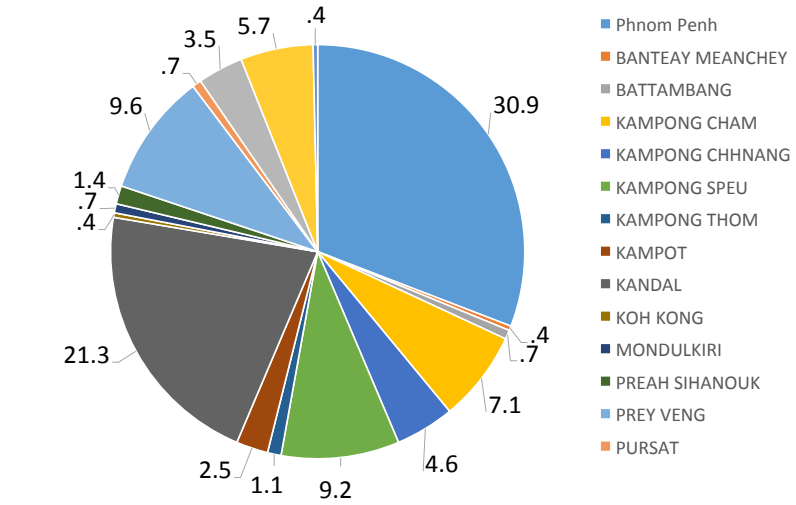
Principle investigator	
Dr.Chau Darapheak	Head of National Public Health Laboratory, NIPH
Co investigators	
Dr. Im Sethikar	Chief Neonatology Unit, Calmette Hospital
Dr. Chhun Samsophea	Chief Maternity Ward, Calmette Hospital
Dr. Srey Sopaha	Chief Maternity ward, NMCHC
Prof.Seang Sody	Chief NCU, NMCHC
Dr.Soeung Sophornmony	Chief Maternity KSF hospital
Dr. Siek Meng	Chief Neonatology Unit, KSF hospital
Doctors and Staffs	3 National Hospitals

Residential Location of Mother



Characteristics of Sample

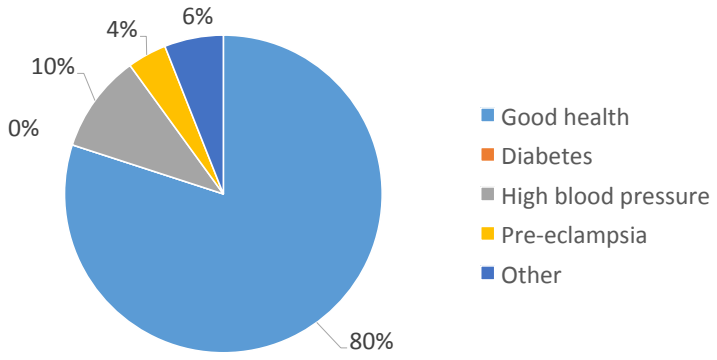
Mother characteristics	n	%
Mean age of mother (min-max)	27.7 (14-45)	
Professions of mother		
Housewife	92	32.9
Government staff	12	4.3
Factory workers	98	35
Private company or NGOs	7	2.5
Other	70	25
No record	1	0.4

NOTE: Other professions: Cleaner, farmer, hair dresser, seller, student, and tailor

Birth History of Mothers with Preterm Birth

Birth History of Mother	**Mean (Min-Max)**
Number of previous pregnancy	1.7 (0-11)
Number of total previous delivery	1.6 (0-9)
Number of previous term delivery	1.3 (0-8)
Number of previous premature delivery	0.1 (0-1)
Number of abortion	1.0 (0-4)
Mean of ANC visit for the index pregnancy	3.5 (1-4)

Health Status of Mother



NOTE: Other including Asthma, Shock, Hemorrhage, Hepatitis B, Stillborn, PROM, Edema

Characteristics of labor of preterm birth

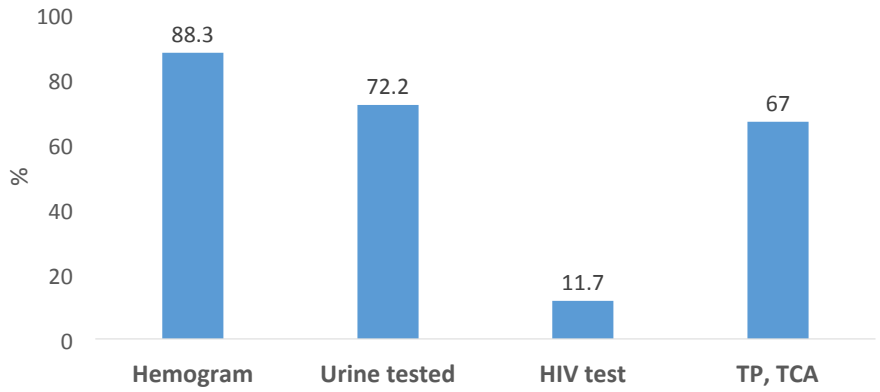
Characteristics of labor	n	%
Number of fetus		
Single	256	90.8
Twin	26	9.2
Age of pregnancy (in weeks and days)		
Mean age of pregnancy (in week) at the admission (min-max)	32.1 (26-36)	
Mean age of pregnancy (in day) at the admission (min-max)	3.3 (0-6)	

Characteristics of Labor of Preterm birth

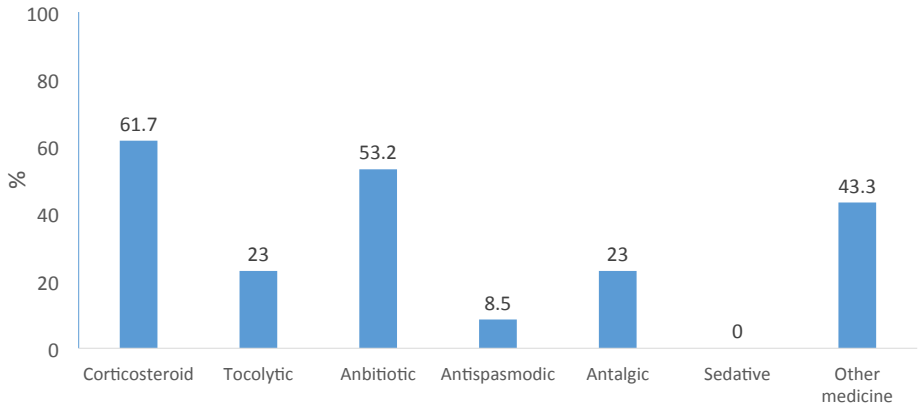
Methods for calculating gestational week	***n***	***%***
Based on last period	63	22.3
Based on Ultrasound result	203	72
Not recorded	16	5.7
Reason for admission	***n***	***%***
Labor pain	94	33.5
PROM	77	27.4
Pre-eclampsia	5	1.8
Eclampsia	50	17.8
Bleeding	15	5.3
Infections	1	0.4
Other	39	13.9

NOTE: Other including cesarean, induced delivery, cord prolapse, breach

Main tests performed before delivery



Types of Drugs Prescribed before Delivery



NOTE: Other medicine including Vitamin, Furosemide, Gentamycine, Hydralzine, Oxytocin, Uterogestan

Characteristics of the Delivery

Characteristics of delivery	n	%
Mode of Delivery		
Normal delivery	203	72.5
Cesarean Section	71	25.4
Delivery with other intervention	6	2.1
Induced labor		
Yes	34	12.1
No	246	87.9
Drug used for induced labor		
Oxytocin	5	14.7
Prostaglandin	29	85.3

Indication for Intervention

Indication for intervention	*n*	*%*
Prolonged labor	2	0.7
Abnormal presentation	26	9.2
Placenta praevia	11	3.9
Placenta abruption	2	0.7
High Blood Pressure	2	0.7
Pre-Eclampsia/Eclampsia	49	17.5
Previous C-section	4	1.4
Fetal distress	7	2.5
PROM	50	17.9
Other	27	9.6
No record	100	35.7

NOTE: Other including hemorrhage, fetus malformation, and severe oligoamnios

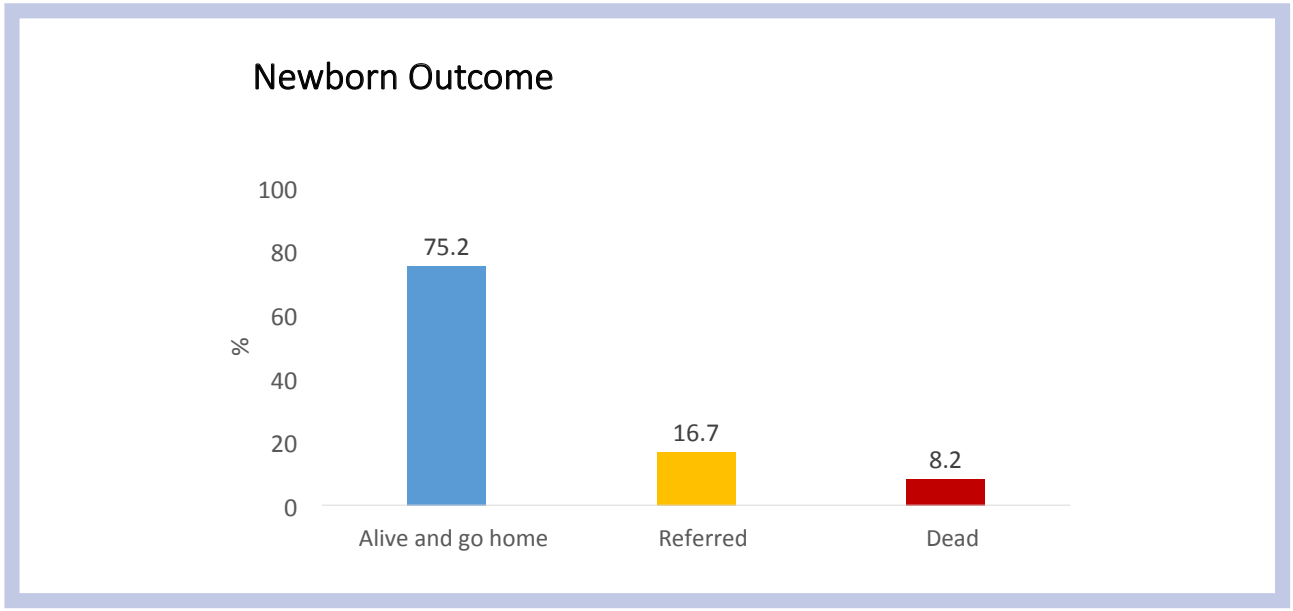
Characteristics of Preterm Newborn

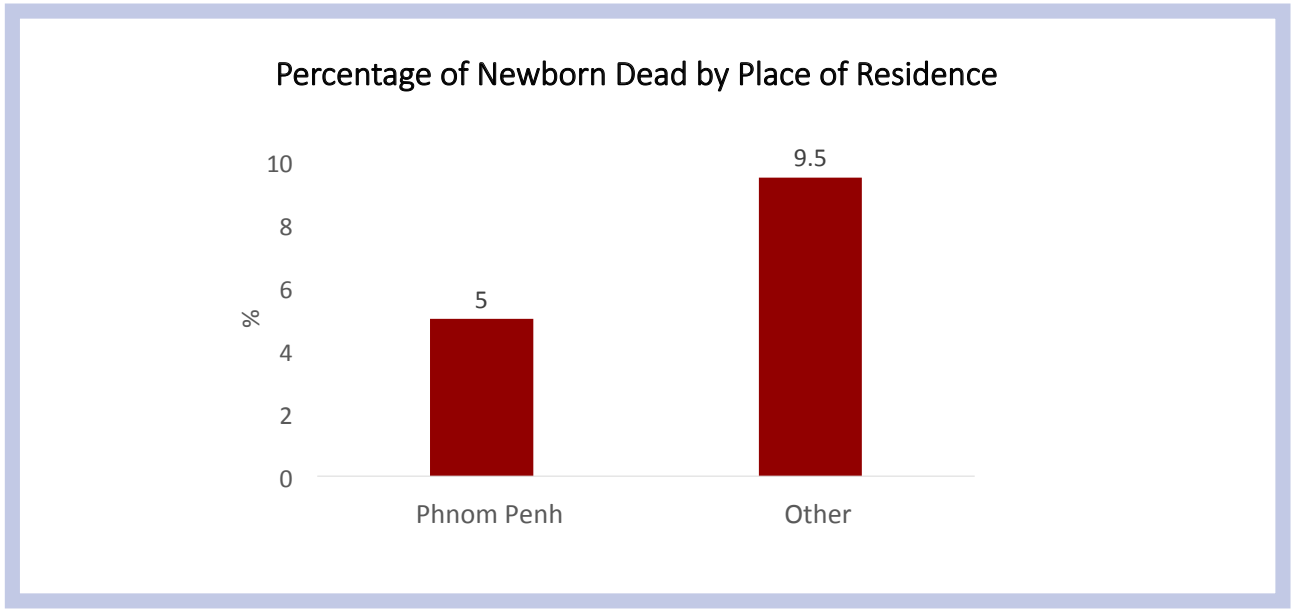
Newborn characteristics	**n**	**%**
Having hospital ID for newborn		
Yes	163	68
No record	79	32
Mean weight of newborn in gram (min-max)	1822 (700-5850)	
Mean APGAR score at 1 minute (min-max)	5.33 (0-10)	
Mean APGAR score at 5 minute (min-max)	6.4 (0-10)	
Mean APGAR score at 10 minute (min-max)	7.4 (0-10)	
Newborn resuscitation		
Yes	212	76
Not performed	61	21.9
No record	6	2.2
Methods used for newborn resuscitation		
Oxygen and mask	14	5.0
Mask and bag	40	14.2
Intubation	7	2.5
Aspiration	153	54.3

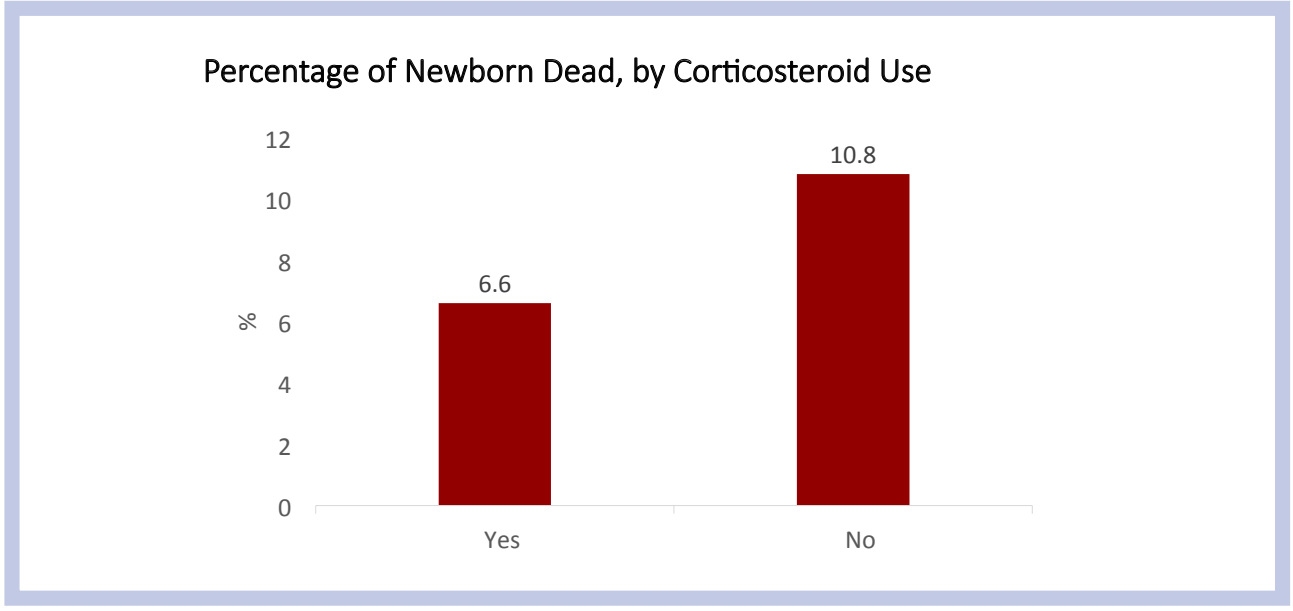
Neonatal Care and Management

Neonatal Care and Management	**n**	**%**
Neonatal care and management in Neonatal unit		
Yes	176	63.5
No treatment for newborn	101	36.5
Treatment are used in the Unit		
Oxygen	89	50.6
Antibiotics	137	77.8
Infusion	144	81.8
Surfactant	3	1.7
CPAP	51	28.9
Mechanical ventilation	8	4.6
Phototherapy	34	19.3
Others	105	59.7

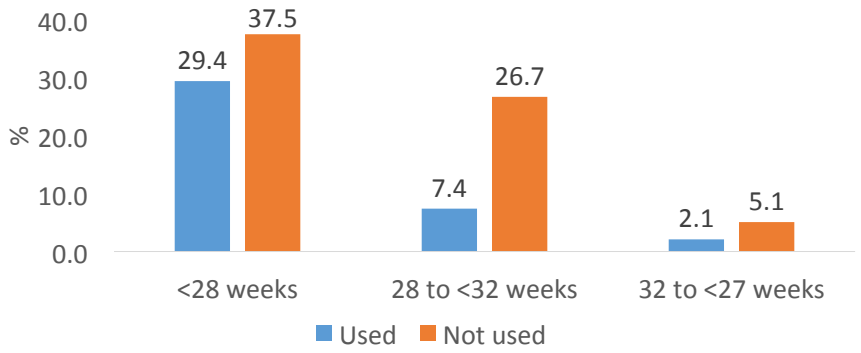
NOTE: Others including Aminophylline, Cimetidine, Vitamin K1, Gardenal


Newborn Outcome
100
80
60
40
20
0
%
75.2
16.7
8.2
Alive and go home
Referred
Dead

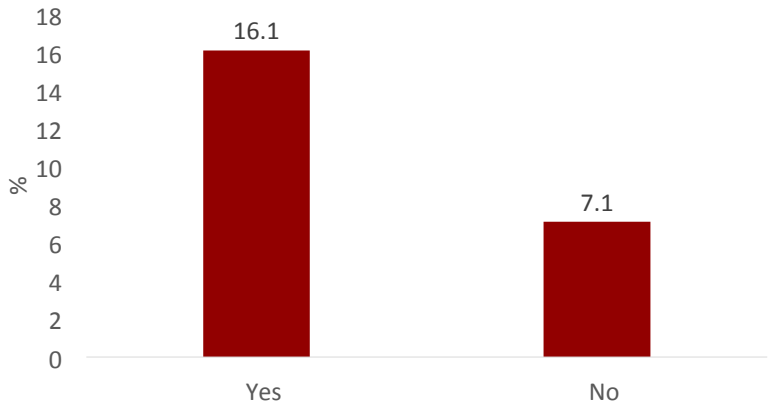

Percentage of Newborn Dead by Place of Residence
10
8
6
4
2
0
%
5
9.5
Phnom Penh
Other


Percentage of Newborn Dead, by Corticosteroid Use
12
10
8
6
4
2
0
%
6.6
10.8
Yes
No

Percentage of Newborn Dead, by Gestational Age and Corticosteroid Use



Percentage of Newborn Dead, by Induced Labor



Conclusions

- The proportion of preterm baby death at the 3 National hospitals is 8.2%. However, there are unknown status of newborn babies which had been referred elsewhere. Thus, the proportion of newborn dead might be slightly higher than 8.2%.
- Reasons for admission are labor pain and PROM. However, Pre-eclampsia and Eclampsia is 19.6% which shows it is still predominant in Cambodia. Preterm baby has lower APGAR score than full term baby.
- Management of Preterm labor, delivery and newborn care seems not standardized.
- The % of newborn dead varies across different groups of women receiving different types of drug or interventions. For example, Outcome of newborn is better in mothers from Phnom Penh than from provinces, and better in corticosteroid use, especially 28-32 weeks.

Recommendations

- There is a strong need for reviewing the preterm labor, birth and neonatal care and management protocol and its implementation at the neonatal unit in hospitals.
- Corticosteroid use is highly recommended especially 28-32 weeks.
- Clinical care need to be improved especially in provinces. Clinical trainings and material support are helpful to health providers regarding the management of premature labor, delivery and newborn care.
- Promoting standardized quality of maternity service delivery, particularly in newborn care in each national hospital should be highly considered.

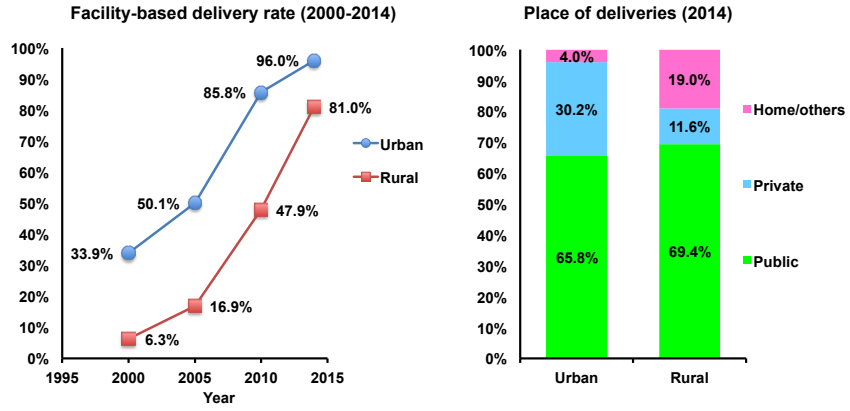
25

5

Effect of implementation of "individual midwifery care" on medical interventions during delivery, and on maternal and neonatal health in Phnom Penh, Cambodia

Dr. Mitsuaki Matsui
Nagasaki University
School of Tropical Medicine and Global Health

Facility-based deliveries in Cambodia has been increasing



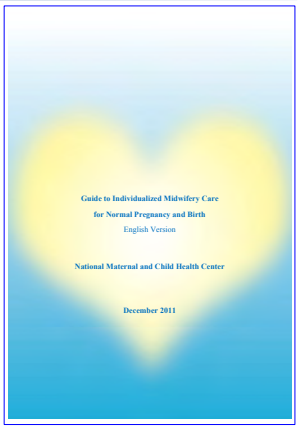
Source: Cambodia Demographic and Health Surveys. 2000, 2005, 2010, 2014

Question in quality of care in facility-based delivery

- Most of deliveries are normal cases and carried out in public health centres in Cambodia.
- However, little is known about "evidence-based delivery care" and "outcome of newborns" in Health Centre levels.

Creation and application of "A Guide to Individualized Midwifery Care for Normal Birth"

- NMCHC created ***"Guide to Individualized Midwifery Care"***
- We have conducted training courses by using this guide to health centre staff in Phnom Penh



Methods

2013 Preparation phase
- discussion with NMCHC and PPMHD

⇩

2014 Provision of training to HC staff

⇩

2015 Survey to evaluate the effect of the training at HC

Survey Methods

Participants

- Women who gave birth in eight public health centres in Phnom Penh.
- Only singleton and cephalic presentation cases were recruited.

Survey Methods

Data collection

- Direct observation was carried out, after receiving the informed consent from each woman until birth of baby
  - ✓ Two to Four observers were deployed in each HC.
  - ✓ All the care and medical interventions during delivery courses were recorded.
  - ✓ Measurement of “cord blood” and “oxygen saturation” were carried out.

Cord blood measurement

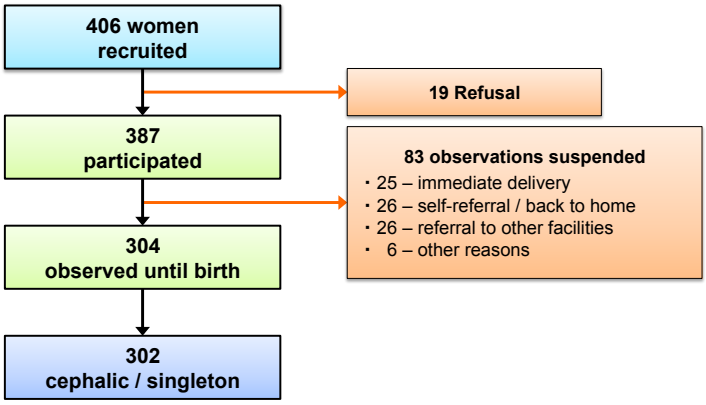
- “Acidosis” is one of indicators to evaluate foetal condition *in utrero*.
- Umbilical arterial blood is collected immediately after delivery, then **pH** is measured.
- UA-pH <7.20 is considered as acidosis.

Percutaneous oxygen saturation (SpO_2)

- SpO_2 shows oxygenation level in a newborn.
- SpO_2 <80% at 5 minutes, or <90% at 10 minutes after birth indicates ‘respiratory problem’.

Results

Participants



Results: characteristics of the participants

Age	
18-24	42%
25-29	31%
30以上	27%
median [IQR]	26 [23-30]
Parity	
0	39%
1	37%
2	16%
3回以上	9%
Number of ANC	
0	4%
1～3	27%
4 +	69%
median [IQR]	5 [3-8]

Mode of delivery	
Normal vaginal	95%
Vacuum extraction	5%
Body weight at birth	
< 2,500g	4%
2,500g-3,999g	94%
4,000g +	2%
mean [SD]	3,077 [410]

Results: observations during delivery process

Observed duration	
10～59	28%
60～119	21%
120～359	27%
360以上	23%
median [IQR]	127 [51-347]
Number of foetal heart rate (BCF) check	
0	68%
1	16%
2 +	17%
Number of vaginal exam (TV)	
0	13%
1	24%
2	24%
3 +	39%

Invasive medical interventions	
Artificial rupture of membrane	30%
Oxytocin use (drip infusion)	18%
Oxytocin use (i.m. injection)	2%
Valsalva manoeuvre	80%
Uterine fundal pressure	23%
Episiotory	44%
(Primipara)	(73%)
(Multipara)	(27%)

Results: outcomes in women and neonates

Lacerations	
1st degree	31%
2nd degree	25%
3rd degree	13%
4th degree	1%
cervical	3%
UA-pH	
～7.100	3%
7.100～7.149	4%
7.150～7.199	13%
7.200～	80%
median [IQR] 7.264 [7.212-7.297]	
SpO_2	
<80% at 5 min.	13%
<90% at 10 min.	11%

17% of women experienced severe laceration

20% of newborns experienced acidosis *in utero*;

11-13% of newborns experienced instability in respiration

Results [summary]

- Outcome both for women and neonates were unfavourable
  - Laceration, Acidosis
- Care and intervention during childbirth process were not appropriate
  - Auscultation of FHR (BCF)
  - Invasive medical interventions
- No risk factors for ‘severe laceration’ and ‘acidosis’ was identified among observed items in this study.

Next steps

- Additional trainings are required to reduce the unfavourable outcomes:
  - Appropriate observation of foetus during delivery
  - Appropriate management of foetus, if any signs of acidosis found
  - Gentle delivery process to avoid lacerations
- These additional training may be integrated into the current guide of *individualized midwifery care*

Contents of new operational research

- Revision of the current guide
- Additional interventions
  - Involvement of women's group in order to provide basic knowledge on 'normal birth process' to pregnant women.
  - 'supportive supervision' to facilitate exchange of knowledge and skill among midwives.
- Expansion of involvement of other health centers, in order to increase the statistical power in the study

Acknowledgement

- This work has been carried out in collaboration with National Maternal and Child Health Centre and Phnom Penh Municipal Health Department.
- Research grants from the Japan Society for the Promotion of Science (JSPS) KAKENHI and Toyota foundation are secured for future research.

Qestion and Answer

Q1

Why did you not conduct "Individual Midwifery Care" training at PPMH (Phnom Penh Municipal Hospital)?

Answer

We may be able to include the staff in PPMH. However, they have already received same training in the year 2015 or 2016, which was supported by an international NGO. We prefer to focus on health centre level first, then we will discuss training for PPMH with PPMHD.

Q2

Did you have the outcome of "Individual Midwifery Care" training?

Answer

We did not have enough data yet to prove the difference between the before and after training. We will have the activities next step: 1-Additional trainings are required to reduce the unfavorable outcomes, 2-These additional training may be integrated into current guide of individualized midwifery care.

NMCHC

6

Observational Study for Early Essential Newborn Care (EENC / INC) Practices in NMCHC, Cambodia

Dr. Tomomi Kitamura
National Center for Global Health and Medicine, Japan

Summary of Study Results

Study overview
Objectives of the study

1 To identify the current clinical practices of EENC (INC)

2 To identify the clinical environment, availability and usage of equipment and supplies, and hospital policies relating to EENC (INC)

3 To discover a perception of a postpartum mother towards the clinical practices of EENC (INC)

4 To provide feedbacks to the hospitals and the Ministry of Health

4

Study overview
Methods

Study design

A cross sectional descriptive study

Study period

5/9/2016- 29/9/2016

Study sites

- National Maternal and Child Health Center
- Khmer Soviet Friendship Hospital
- Kampong Cham Provincial Hospital

5

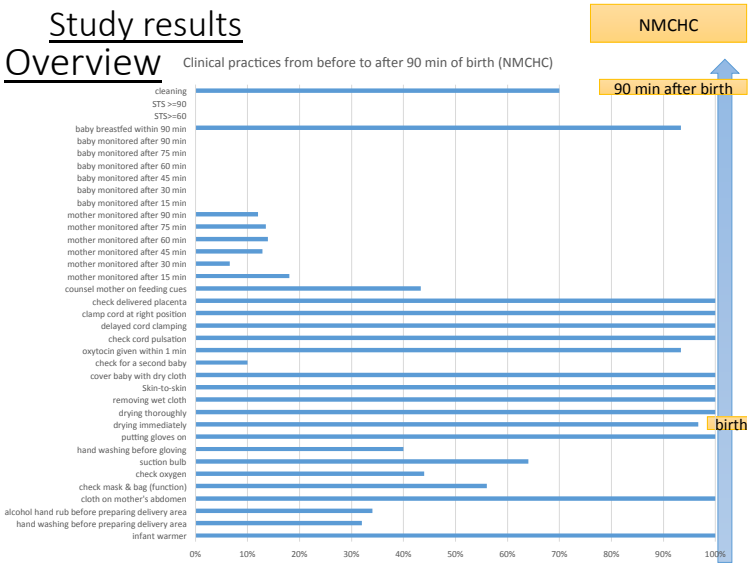
Study results

Observed cases

National Hospital Names	Number of cases included in pre-birth preparation	Number of cases included in immediate post-partum/ newborn care
NMCHC	25	15
KSFH	13	12
Kampong Cham	17	11
Total	55	38

Study results

Overview



Study results

Clinical skills of EENC achieved

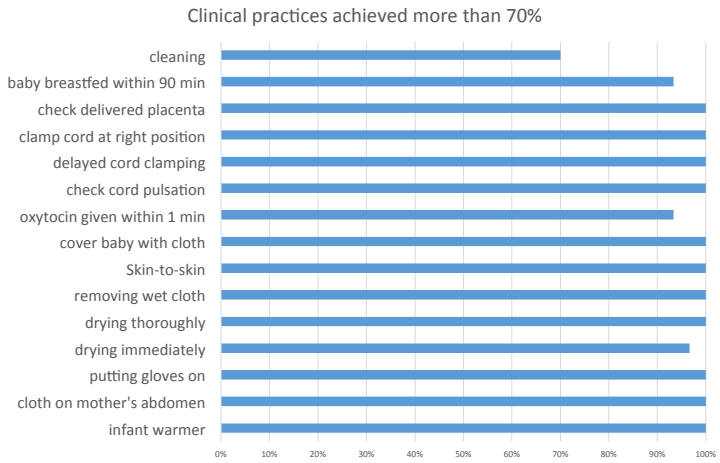
- more than 70%

- from 40% to less than 70%

- less than 40%

Study results

Clinical practices achieved more than 70%



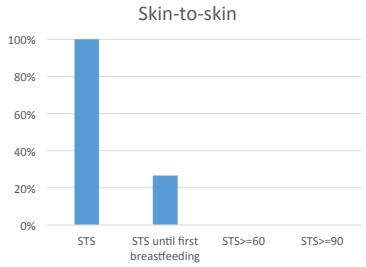
Study results

Clinical practices achieved more than 70%

- EENC core practices: well implemented
  - ➢Drying immediately and thoroughly
  - ➢Skin-to-skin
  - ➢Delayed cord clamping

The research team observed:

- Skin-to-skin care has been interrupted by the routine cares:
  - ✓ Measurement (body weight)
  - ✓ Injection (Vitamin K)



Average time for the first skin-to-skin care: 15 minutes.

The babies came back and re-started Skin-to-skin care after the routine care.

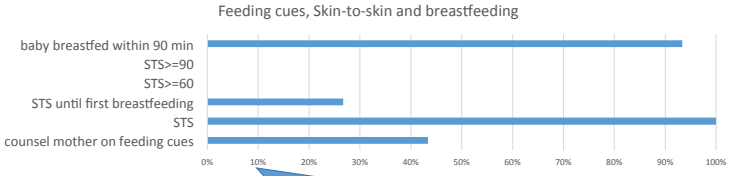
■Survey A-(1) Clinical EENC Practices- Results

Clinical practices achieved more than 70%

- Breastfeeding: well implemented

The research team observed:

- The staff has been working very hard to facilitate breastfeeding even though they are very busy.
- The staff seemed to provide more hands-on support for breastfeeding, rather than explaining feeding cues.



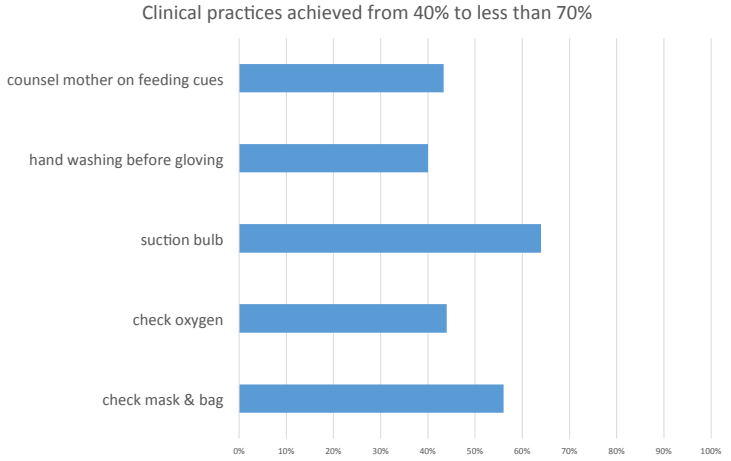
Baby Friendly Hospital Initiative
- Step 3: Benefits of breastfeeding
- Step 4: Early initiation of breastfeeding

(encouraged to look for signs when the babies are ready to breastfeed)

Photo source: UNICEF/WHO, Breastfeeding Promotion and Support in a Baby-Friendly Hospital- 20 hour Course

■Survey A- (1) Clinical EENC Practices

Clinical practices achieved from 40% to less than 70%



■Survey A-(1) Clinical EENC Practices- Results

Clinical practices achieved from 40% to less than 70%

- Preparation for newborn resuscitation is sometimes missing

➢Check if mask & bag are functional

The research team strictly checked whether the staff checked that the pop-up valve moved when bag was pushed.

➢Check if oxygen is ready

➢Prepare the suction bulb for emergency situation

The research team observed:

- The neonatal resuscitation preparation is the best among 3 hospitals in Cambodia.

Can we predict which baby is going to need resuscitation and which baby is not…?

■Survey A-(1) Clinical EENC Practices- Results

Clinical practices achieved from 40% to less than 70%

- Hand hygiene: hand washed, but touching unclean surface afterwards

➢Before preparing the delivery area or equipment

➢Before gloving

The research team strictly checked the staff kept their hands clean after hand washing.

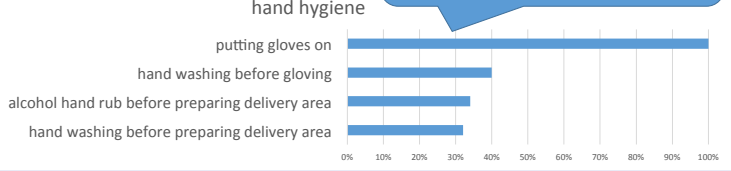
- The research team observed:

- The staff did hand washing, however they were often interrupted by the other tasks and touched unclean surface as

✓Discuss with your colleagues

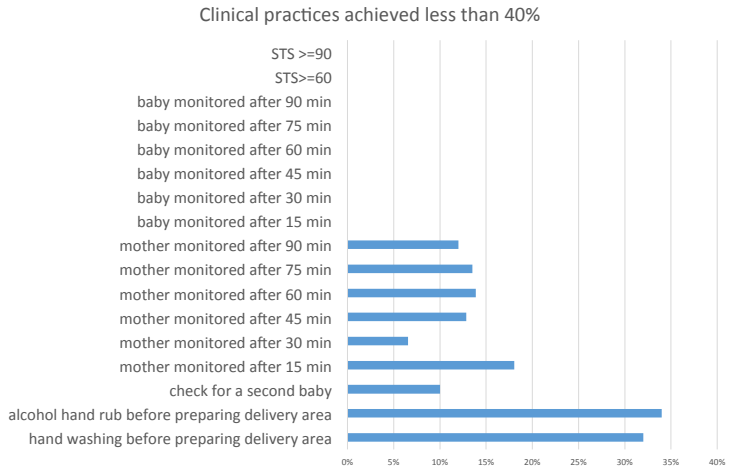
✓answering your mobile phones

Being a "teaching hospital", it is important to show good hygiene for young health care workers and to reduce nosocomial infection .



■Survey A-(1) Clinical EENC Practices- Results

Clinical practices achieved less than 40%



■Survey A-(1) Clinical EENC Practices- Results

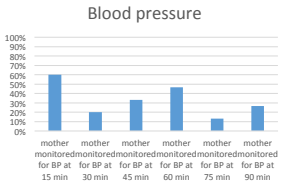
Clinical practices achieved less than 40%

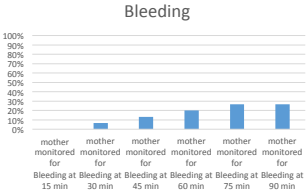
- Monitor mother and baby every 15 minutes: seems to be difficult, however

The research team strictly checked the staff checked 5 vital signs for mothers and 3 vital signs for babies.

The research team observed:

- The staff checked the key vital signs for post-partum women.
- Sometimes babies are left out.





The research team observed:

- The staff often talked to the mother and the family to give health education and to provide breastfeeding support.

14 times per person

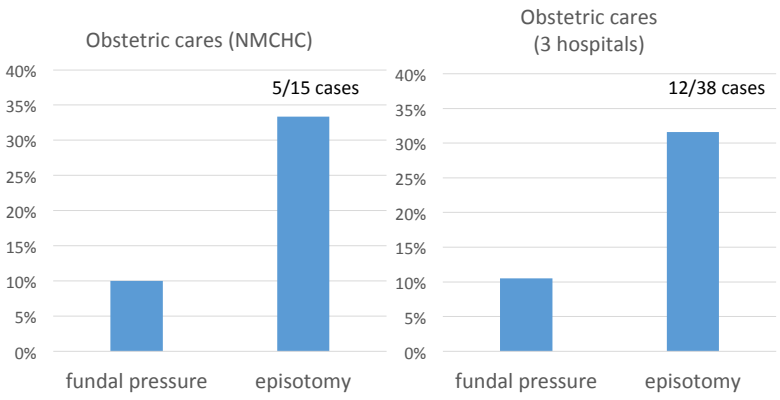
Interaction between the patients and the staff (average frequency)

Minutes after birth					
Within 15 minutes	15-29 minutes	30-44 minutes	45-59 minutes	60-74 minutes	75-90 minutes
2	2	2.2	1.9	3.1	1.5

■Survey A-(1) Clinical EENC Practices- Results

Obstetric cares

- Fundal pressure & episiotomy



Provisional Recommendations
(based on the preliminary results)

- To be confirmed or revised based on the final results -

Results	Provisional recommendations
Well provided- EENC core practices	Ensure the continuation of EENC core practice provision. Consider to implement skin-to-skin care until first breastfeeding.
Well provided- breastfeeding	Ensure the continuation of high breastfeeding rate. Consider the breastfeeding support methods to decrease the burden of the staff.
Clinical practice which can be improved – hand hygiene	Ensure good hand hygiene.
Clinical practice which can be improved –neonatal resuscitation	Further improve the preparation for the worst case scenario for every newborn (mask & bag, suction bulb for emergency cases).
Clinical practice which can be improved – monitoring	Ensure continuation of monitoring key vital signs of postpartum women. Consider monitoring of newborn infant.

Progress & Planned Activities on EENC/INC

Progress of study activities

6/2016

8/2016

Pre-study meetings

10/2016

Feedback meetings

9/2016

Observations at hospitals

Analysis **(3/2017)** →

Final report **(English; 6/2017)** **(Khmer; 9/2017)**

20

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Japan International Cooperation Agency

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7

Proportion of chronic malnutrition is dominant in male children in Kampong Cham province, Cambodia

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Background

- Child mortality in the world has been decreasing consistently. However, around 5.9 million children died in 2015 and 45% of them were with malnutrition (WHO,2015).
- Malnutrition during 'the first 1000 days' (from pregnancy period to two-year- old of the child) crucially affects physical and mental development, performance in the long perspective.
- Cambodian Demographic and Health Survey in 2014 said 24% children under-five-years-old were underweight (low weight-for-age: WFA) and 32% were stunted (low height-for-age: HFA).
- Factors that influence on chronic malnutrition* especially in transition period from neonatal to infant age has been still unknown.
- There are various cross-sectional factors which induce/ determine the significance of chronic malnutrition. Therefore, countermeasure against chronic malnutrition with multi-sectorial cooperation is recognized as a difficult challenge until now.

* Chronic malnutrition: Children whose hight-for-age Z score in below -2SD from the mean of the reference population of WHO child growth standards (stunting) (CDHS,2014)

Objective

- This research aims to grasp the real situation of chronic malnutrition among children until two-years-old in rural Cambodia.
- To detect factors, which influence on the occurrence of child malnutrition, we launched a prospective cohort study in Stung Trang in Kampong Cham.
- This is a report of cross sectional survey as the baseline in February-March 2016.

Method for cross sectional survey

- The survey team visited all households of children under two-years-old in 11 villages covered by two health centers in Stung Trang, Kampong Cham.
- The survey team measured weight and height of 318 children and interviewed their caregivers, after getting informed consent.
- Using the soft (WHO Anthro Version 3.2.2), we described nutritional status for age (months) and sex.

Result (1) Situation of malnutrition by age and sex

Table 1 Numbers and % of Underweight (by sex)**

Age (months) Boy Girl

月齢	男児 Underweight		女児 Underweight	
	(n)	低体重児	(n)	低体重児
0–5	32	3.1%	23	4.3%
6–11	29	24.1%	23	4.3%
12–23	77	26.0%	65	16.9%
計	138	20.7%	111	11.4%

Table2 Numbers and % of Stunting* (by sex)**

Age (months) Boy Girl

月齢	男児 Stunting		女児 Stunting	
	(n)	低身長児	(n)	低身長児
0–5	32	6.3%	23	8.6%
6–11	29	13.7%	23	0%
12–23	77	19.5%	65	12.5%
計	138	15.9%	111	11.4%

**Underweight:
Children whose weight for-age Z score in below -2SD from the mean of the reference population of WHO child growth standards

***Stunting:
Children whose hight-for-age Z score in below -2SD from the mean of the reference population of WHO child growth standards

(CDHS,2014)

Result(2) Comparison of Z-score by age (months)

Age(months)

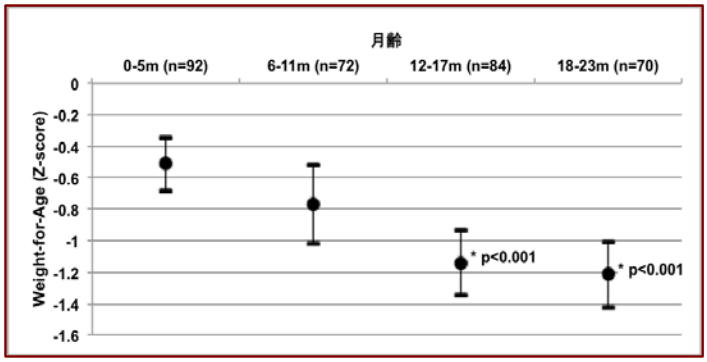
月齢	(n)	WAZ 平均値 [95%CI]	HFA 平均値 [95%CI]	WHZ 平均値 [95%CI]
0–5	92	−0.51 [−0.68～−0.35]	−0.28 [−0.50～−0.05]	−0.39 [−0.62～−0.17]
6–11	72	−0.77 [−1.02～−0.52]	−0.35 [−0.60～+0.10]	−0.73 [−0.96～−0.49]
12–17	84	−1.13 [−1.35～−0.93]	−0.77 [−0.99～−0.54]	−1.07 [−1.27～−0.86]
18–23	70	−1.21 [−1.42～−1.01]	−0.98 [−1.22～−0.75]	−1.01 [−1.21～−0.81]

Average [95%CI]

- Z-score: how much below -2SD from the mean of the reference population
- Malnutrition: when Z-score is below -2SD from the mean of the reference population
- WAZ: Z-score of weight-for-age
- HAZ: Z-score of height-for-age
- WHZ: Z-score of weight-for-height

Result(3a) Comparison of WAZ by age (months)

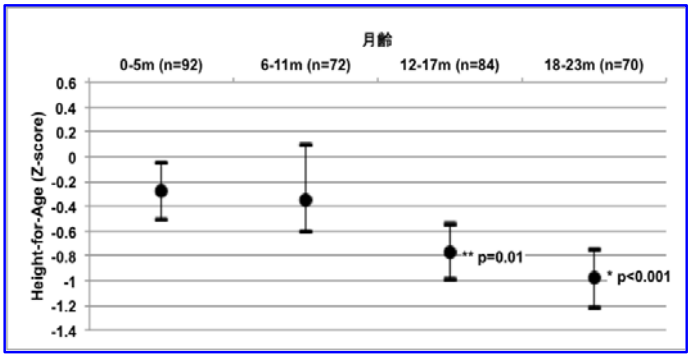
(Average ± 95%CI, p-value was tested by Student's t-test followed by Bonferroni correction)



In comparison with 0-5months, WAZ significantly reduced at 12-17months and 18-23months.

Result(3b) Comparison of HAZ by age (months)

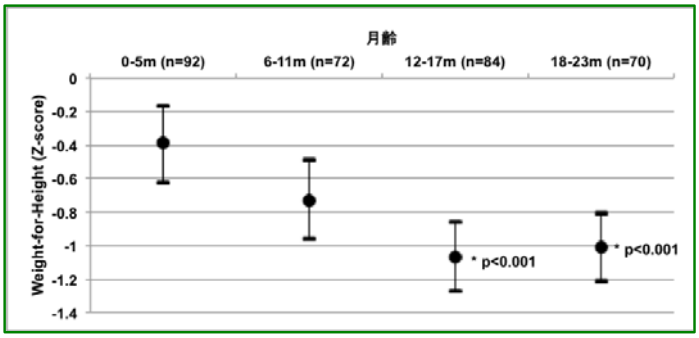
(Average ± 95%CI, p-value was tested by Student's t-test followed by Bonferroni correction)



In comparison with 0-5months, HAZ significantly reduced at 12-17months and 18-23months.

Result(3c) Comparison of WHZ by age(months)

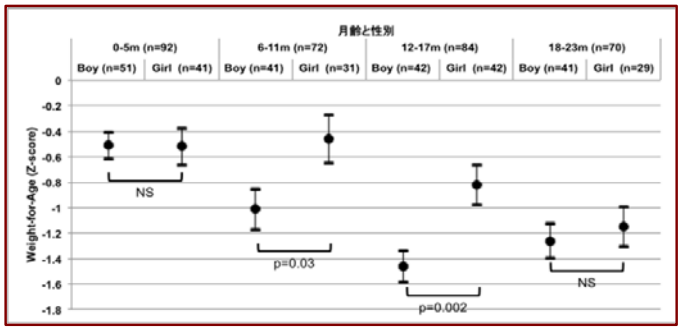
(Average ± 95%CI, p-value was tested by Student's t-test followed by Bonferroni correction)



In comparison with 0-5months, WHZ significantly reduced at 12-17months and 18-23months.

Result(4a)Comparison of WAZ by age(months) and sex

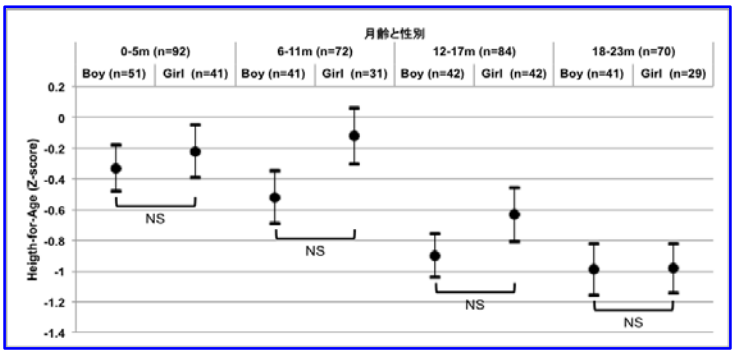
(Average ± Standard Error)



There was a significant difference between boys and girls at 6-11months and 12-17months.

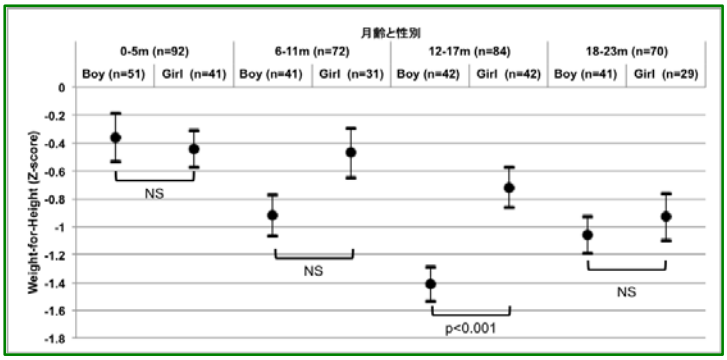
Result(4b)Comparison of HAZ by age(months) and sex

(Average ± Standard Error)



Result(4c)Comparison of WHZ by age(months) and sex

(Average ± Standard Error)



There was a significant difference between boys and girls at 12-17months.

Conclusion

- **As previous studies reported, the significance of malnutrition had increased after six-month old around when the complementary food started.**
- **On the other hand, this is the first report in Cambodia about the different prevalence of malnutrition by sex from around one-year old.**
- **We want to identify risk factors, which affect this fact (especially on chronic malnutrition) in our on-going follow-up cohort study every month since April 2016.**

Notes

- **This research was supported by the Grant for NCGM (27-5).**
- **This report was given the 'best poster presentation award' in the 31st annual meeting of the Japan Association for International Health on 3-4 Devember 2016, Kurume, Japan.**

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