

Summer Training Report

By

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Abbreviations;

CHC; Community Health Centers

EmOC; Emergency Obstetric Care

HPS; High Performing State

JSSK; Janani Shishu Suraksha Karyakram

JSY; Janani Suraksha Yojana

LPS; Low Performing State

MMR; Maternal Mortality Rate

NFHS; National Family Health Survey

NRHM; National Rural Health Mission

PHC; Primary Health Center

PMSMY; Pradhan Mantri Surakshit Matrutava Abhiyan TBA; traditional birth attendant

SC; Schedule Cast

SCs; Sub centers

SRS, India; Sample Registration System, India

ST; Schedule Tribes

WHO; World Health Organization

Part-2

ART; Antiretroviral Therapy

DALY; Disability adjusted Life Years

NCD; Non-communicable Disease

TB; Tuberculosis

YLD; Years of Life Lost due to Disease or Disability

YLL; Years of Life Lost due to Death

Part-1

Maternal Mortality in Gujarat- A descriptive Study.

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June, 2020

Maternal Mortality trend, causes, social factors, Factors influencing maternal mortality ratio and the government schemes aimed to reduce maternal mortality ratio in Gujarat.

Executive Summary

Good or poor health of a reproductive age female is a vital criterion to decide the development of a Country or State. MDG 5 was dedicated to “Improve maternal health”. In context of Sustainable Development Goal 3 all countries decided its first target 3.1 “to reduce maternal mortality ratio to less than 70 per 100000 live births by 2030”.

As the loss of women’s life devastate the whole family and the newborn. About 2.95lacks women died during and following pregnancy and childbirth in 2017 and most of the deaths were preventable.

It is a descriptive study about maternal health and maternal mortality ratio in Gujarat State. Secondary qualitative data from NFHS about the maternal health indicator like female literacy, birth assisted by health personnel, percentage of women married before completing 18 years of age and women became pregnant before 18 years of age. Data related to maternal mortality ratio were collected from SRS India and different studies about maternal health and maternal mortality ratio were taken into account to describe the maternal mortality in Gujarat.

MMR in Gujarat has decreased from 172 during 2001-2003 rounds to 87 during 2015-2017 rounds of SRS.

A lot of social factors like age at pregnancy, number of pregnancies, poverty, time interval between two pregnancies, illiteracy, malnutrition, lack of maternal services, poor hygiene condition, poor transport services, and social customs are related to maternal death.

Major causes of maternal mortality in India are “hemorrhage (25.6% deaths) ranks 1st as, followed by sepsis (13%), toxemia of pregnancy (11.9%), abortions (8%), and obstructed labor (6.2%) while other causes together total 35.3%”.

This study shows that many factors contributes to the reduction in MMR, like increasing female literacy, increasing percentage of institutional deliveries and increasing percentage of birth assisted by skilled medical personnel.

Literate females have better knowledge of her reproductive health and health care services, so they can take decision regarding their health issues and can better utilize health care services. If the birth is assisted by a skilled medical professional and in an institution the risk factors and complications can be managed at time and can prevent maternal death which is not possible at home settings or by traditional birth attendant. Other than these factors there are many governmental schemes and programs that are aimed to reduce maternal death, like JSY, JSSK, PMSMA and many more.

INTRODUCTION

Background; “Maternal death or maternal mortality is defined by as the death of women while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of pregnancy from any cause related to or aggravated by pregnancy or its management but not from accidental or incidental cause” (WHO)

About 2.95lakh women died during and following pregnancy and childbirth in 2017. Most of these deaths were preventable.

Between 2000 and 2017 the MMR is by about 38% worldwide.

India has achieved great advancement in current years in lowering MMR by 77% from 556 per 1,00,000 live births in 1990 to 130 per 1,00,000 live births in 2016. [World Health Organization].

“MMR has reduced from 172 per 1,00,000 live births in 2001 to 91 per 1,00,000 live births in Gujarat”. [SRS, India]

Maternal health is a very important indicator of development of a country as one maternal death can cause many ill effects to the family and the newborn.

In context of Sustainable Development Goal 3, all countries have decided its first target 3.1 “to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030”. This is a descriptive study which represents the trends of MMR in Gujarat, social factors related to maternal health causes of MMR, and the factors contributing in reducing MMR in Gujarat.

“Gujarat is the State of India, located on the western coast of India has longest coastline of 1,600 km. It has states of Rajasthan and Madhya Pradesh towards the north east and east, Maharashtra and the Union Territories of Daman, Diu and Nagar Haveli, towards the south. Gandhinagar is Capital city of Gujarat and the state has 33 Districts”. [Gujarat State Portal]

Demographic Indicators;

As per official census Gujarat has total population of 6.03 Crore which is approximately 4.99% of total Indian population.

Ahmedabad is the most populated District of Gujarat with 7.20 million people, followed by Surat with 6.07million people.

Urban population of the State is 42.6%, which was 37.4% during 2001 census period, and Rural Population is 57.4% which was 62.6% during 2001.

Literacy rate in Gujarat has seen increased and is seen 79.31% as per 2011 census.

Table 1 Demographic Characteristic of Gujarat/ India (Source; Gujarat State Portal, Census India 2011)

DEMOGRAPHIC INDICATORS	GUJARAT	INDIA
Actual Population	60,383,628	1,210,854,977
Population Growth	19.17%	17.64%
Area km ²	196,024	3,287,240
Density/km ²	308	382
Male	31,482,282	623,724,248
Female	28,901,346	586,469,174
Sex Ratio	918	943
Literacy	79.31%	74.04%
Male literacy	87.23%	82.14%
Female Literacy	70.73%	65.46%
Urban Population	42.6%	377,105,760
Rural Population	57.4%	833,087,662

Objectives of Study:

- To describe the pattern of maternal mortality in Gujarat.
- To describe the causes and social factors related to maternal mortality.
- To describe the factors contributing in reduction of MMR.
- To describe various governmental schemes and programs promoting maternal health in Gujarat.

Methods and Material;

Quantitative data from four rounds of NFHS were collected from the NFHS factsheets that are related to maternal health like, percentage of literate women, percentage of women married before age 18 and were pregnant before 19 years of age, institutional deliveries birth assisted by health personnel.

And data about the maternal deaths were collected from official website of NITI Ayog.

We are conducting this study to analyze the trend of maternal deaths from NFHS 1 to NFHS 4 and from many previous studies on maternal health factors are described that are helpful in reducing MMR in Gujarat state.

Major causes and social factors that are responsible for maternal death are described by collecting facts from WHO fact sheet and other studies related to Indian context.

Demographic indicators for Gujarat are taken from Gujarat State Portal

The collected facts, data and information are used to describe the pattern of maternal mortality, causes and social factors related to maternal death and factors that has been contributing in reducing MMR.

Data related to maternal mortality ratio were collected from NITI Ayog and SRS Gujarat. In this study MMR is maternal deaths per 1lack live births.

RESULTS AND DISCUSSION

According to NFHS data, female literacy has increased to 72.9% during NFHS 4 from 51.3% during NFHS1. Women who attended school for 10 years or more than 10 years has increased from 20.1% during NFHS 2 to 33% during NFHS 4 round. Women who got married before 18 years of age were increased from 33.4% during NFHS 1 to 40.7% during NFHS 2, while it has been decreasing since NFHS 2 from 40.7% to 24.9% during NFHS 4. Percentage of Women who were pregnant before 19 years of age has decreased to 6.5% in NFHS 4 from 12.7% during NFHS 3. There was an improvement in institutional birth rate from 36.8% in NFHS 1 to 88.5 % during NFHS 4. Rate of birth assisted by health personnel has increased from 42.5% (NFHS 1) to 87.1% during NFHS 4.

Table 2 Health Indicators [NFHS India]

Indicators	NFHS 4 (2015-16)	NFHS 3 (2005-06)	NFHS 2 (1998-99)	NFHS 1 (1992-93)
Women age 15-49 who are literate	72.9	63.8	50.3	51.3
Women married before 18 years (aged 20-24 years)	24.9	38.7	40.7	33.4
Women attended school for 10 or more years	33.0	23.5	20.1	Na
Women age 15-19 who are already mothers or pregnant at the time of survey	6.5	12.7	na	na
Institutional births	88.5	54.6	46.3	36.8
Birth assisted by health personnel	87.1	64.7	53.5	42.5
Pregnant women who are anemic (11.0g/dl)	51.3	60.8	47.4	na
All women age 15-49 years who are anemic	54.9	55.3	46.5	na

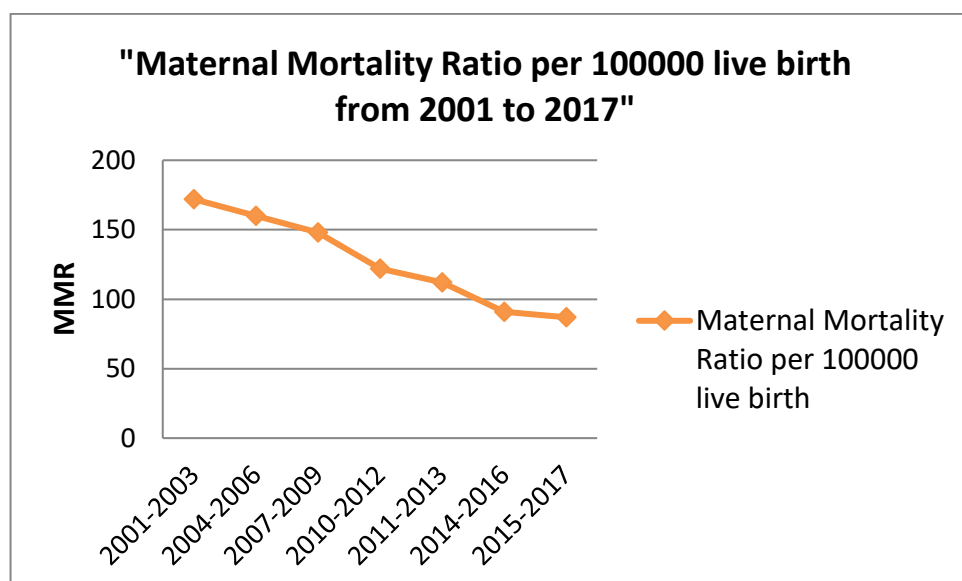
Data related to maternal mortality ratio were collected from NITI Ayog and SRS Gujarat. In this study maternal mortality ratio is maternal deaths per 1,00,000 live births.

MMR has decreased from 172 during 2001-2003 rounds of SRS to 87 during 2015-2017 rounds of SRS.

Table 3 “Maternal Mortality Ratio per 100000 Live Births” (NITI Ayog)

Maternal Mortality Ratio per 100000 live birth	Year	Source
172	2001-2003	niti.gov.in
160	2004-2006	niti.gov.in
148	2007-2009	niti.gov.in
122	2010-2012	niti.gov.in
112	2011-2013	niti.gov.in
91	2014-2016	SRS, India
87	2015-2017	SRS, India

Figure 2 Trend of MMR in Gujarat (NITI AYOOG)



Causes and social Factors related to Maternal Death:

“A maternal death is the death of women while pregnant or within 42 days of termination of pregnancy, irrespective of duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental cause”. (WHO)

According to WHO major complications that account for nearly 75% of maternal deaths are;

- Excessive Bleeding usually after childbirth)
- Infections in most cases after childbirth
- High blood pressure during pregnancy
- Complications during and after delivery
- Unsafe abortion.

The remainder are caused by or associated with indirect causes like infections such as malaria or related to chronic conditions like diseases or diabetes.

Causes for maternal mortality can be divided into direct obstetric cause and indirect cause.

“Direct causes are those resulting from obstetric complication of pregnancy state, from intervention, omissions, incorrect treatment or chain of events resulting from any of the above, these include hemorrhage, sepsis, toxemia of pregnancy, obstructed labor, Unsafe abortion. And indirect cause can include any pre-existing medical condition or disease that developed during pregnancy and which was not due to direct obstetric causes, like any other chronic diseases of cardiac, renal hepatic or metabolic diseases, anemia, malignancy or injury and accidents”. [Ann L. Montgomery, Usha Ram]

Social factors related to maternal death can include;

- Age at pregnancy.
- Number of children and pregnancy
- Poverty
- Time interval between two pregnancies
- Malnutrition
- Level of education
- Lack of maternal health services
- Poor environmental and personal hygiene
- Poor transport facility to the hospital.
- Social customs

[Sultana Jesmin Ahmed, MirAlam Siddhique, Nasima Sultana]

“In India hemorrhage (25.6%) ranks first as the cause of maternal death, followed by sepsis (13%), toxemia of pregnancy (11.9%) abortions (8%) and obstructed labor (6.2%) while other causes together total 35.3%”. [Punita Arora]

In a study in Tertiary Care Institute of Central Gujarat where 92 maternal deaths were studied from October 2016 to March 2018, it was found that 57.60% of maternal mortality were due to direct causes that are Eclampsia (29.30%), Hemorrhage (20.60%), Septic abortion (3.30%), Ruptured uterus (2.20%), amniotic fluid embolism (1.10%), puerperal sepsis (1.10%), and indirect causes for maternal death accounts 42.40%, such as hepatitis (21.70%), heart disease (9.80%), anemia (3.30%), H1N1 influenza (3.30%), cerebral malaria (1.10%) and other indirect causes accounts 3.30%. [Kanika P. Kanchwala, Mahima Jain]

MMR and factors influencing MMR

Maternal mortality is usually determined by many factors that can be medical, social, economic some examples are maternal literacy, institutional birth, birth assisted by a skilled health professional, age at marriage and age at pregnancy, women receiving antenatal care services, proper sanitation percentage of anemia in women of reproductive age poverty and many more.

There is correlation between female literacy and MMR, as an educated female can take decisions regarding her health and about her reproductive life. She can have necessary knowledge, more availability and accessibility of

different contraceptives. A literate female is mostly empowered and less likely to experience poverty, and can maintain good nutritional status. A literate female can utilize different health care services effectively and can get the benefit of different maternity programs run by government.

As literacy level of a female increases, her age at marriage and age at first pregnancy also increases, which reduced the risk of maternal mortality.

“Female literacy programs depress maternal mortality ratios not only in short run but also have long term effects of reducing maternal mortality ratio”. [Vijayan K. Pillai]

Table 4 MMR and factors affecting MMR (NFHS and SRS)

Year	% of Female Literacy (NFHS)	% of women married before age 18 years	% of women became pregnant before 18 years of age	% of Institutional Birth	% of birth assisted by Health personnel	MMR
1998-99	50.3	40.7	NA	46.3	53.5	172
2005-06	63.8	38.7	12.7	54.6	64.7	160
2015-16	72.9	24.9	6.5	88.5	87.1	91

“Women’s education, husband’s education, wealth quintile and region of residence were documented as most important factors associated with maternal healthcare service utilization. The ANC visit was found to be vital in the utilization of safe delivery and postnatal care [Rajesh Kumar Rai, Prashant Kumar Singh, Lucky Singh]”

Marriage before attaining 18 years of age can be due to many factors, cultural, social and economic. In India child marriage is a very common practice since ages especially in rural India, it may be due to that child marriage is deep seated cultural practice in India, it can be due to lack of education and poverty. Girls marrying at early age cannot complete their education and are not well aware about their health and reproductive health issues, range of different contraceptives, and antenatal care. Marriage at an early age leads to adolescent pregnancy and pregnancy related complication that can cause increased MMR.

As per the data MMR is more when age of female becoming pregnant is lower than 19 year. “Sepsis is recognized as one of the leading causes of maternal mortality, and there is an elevated risk of sepsis (including septicemia during labor, major puerperal infection, systemic inflammatory response, and septic shock) among teen age mothers. Untreated sepsis may lead to a cascade of sequential organ failure”. [Sarka Lisonkova, Jayson Potts, and Michael S. Kramer]

Nove et al found in their study “a J shaped curve for age distribution of maternal mortality with a slightly increased risk of maternal mortality in adolescent compared with women aged 20-24 years (MMR 260 vs. 190

maternal deaths per 1,00,000 live births for 144 countries combined)” [Andrea Nove, Zoe Matthews, Sarah Neal, alma Virginia Camacho]

In India during first round of NFHS percentage of institutional delivery was only 26 and since then it has been increasing. Delivery at home is mostly carried out by unskilled traditional birth attendance, which is not safe for mother as well as child. A home-based setting is more prone for infection and sepsis that can lead to maternal death. An institute is more equipped to handle complicated and high-risk pregnancy and to fight the complication arise during delivery. For examples hospitals have blood banks and can prevent maternal death due to postpartum hemorrhage. In institutes there are trained medical personal to deal with high risk pregnancy, which can result in reduced MMR.

Most of maternal death occur due to excessive bleeding, infections mostly after childbirth, unsafe induced abortion, pregnancy related hypertensive disorder and obstructed labor, these deaths can be easily prevented by simple health initiatives like care during pregnancy and after delivery and childbirth carried by trained medical health professional.

Traditional birth attendance is not skilled to handle the complicated or high-risk pregnancies, and they do not have any skill to solve the complication during birth like hemorrhage or obstructed labor, while skilled birth attendance can deal with such complication and can prevent maternal death.

Government Schemes; Aimed at reducing MMR

To reduce MMR and to provide qualitative Maternal Health services, different programs and schemes has been implemented in Gujarat.

- **“Pradhan Mantri Surakshit Matrutava Abhiyan” (PMSMA)**

The PMSMA has been launched by the ministry of Health and Family welfare (MoHFW), Government of India. The program aims to provide assured, comprehensive and quality antenatal care, free of cost, universally to all the pregnant women.

Transportation between health institutions are provided by CHC ambulance owned by state. This program was started on June 9, 2016 in entire Gujarat for early identification and treatment of high-risk pregnancy of 2nd and 3rd trimester under the guidance of specialist.

Essential antenatal care and other necessary health services is provided by specialist at every Public Health Institute at 09th of every month.

Goals and Objectives of PMSMA

- To make sure that every pregnant woman must get minimum one checkup during 2nd or 3rd trimester by specialist.
- Improve quality of care during antenatal visit. This include ensuring of provision of following services;
 1. Essential diagnostics.
 2. Screening for the applicable clinical conditions.
 3. Proper treatment of any pre-existing clinical condition such as anemia, pregnancy induced hypertension, gestational diabetes etc.
 4. Appropriate counseling services and proper documentation of services rendered.
 5. Additional service opportunity to pregnant women who have missed antenatal visits.
- Identification and line listing of high-risk pregnancies based on obstetric or medical history and existing clinical condition

- Appropriate birth planning and complication readiness for each pregnant woman especially those identified with any risk factor
- Special emphasis on early diagnosis, adequate and appropriate management of women with malnutrition.
- Special focuses on adolescent and early pregnancies as these pregnancies need extra and specialized care.

- **“Janani Suraksha Yojana” (JSY)**

It is a scheme under the National Health Mission to provide healthy and safe motherhood. It has been implemented with the aim of reducing mortality of mother and newborn by increasing percentage of delivery in the health institution among poor pregnant women.

The scheme was implemented on 12 April 2005 by Honorable Prime Minister.

JSY is sponsored by central government, which provides cash assistance with delivery and post-delivery care. This scheme has identified that ‘accredited social health activist’ can act as an effective link between the Government health centers and pregnant women.

Table 5 Eligibility for cash assistance under JSY (NHM, India)

LPS	All the pregnant women giving birth in government health centers such as subcenters, primary health center, community health center, general wards of district or state hospitals.
HPS	All poor/scheduled cast/scheduled tribe women delivering in Governmental Health Centers such as SC, PHC, CHC, FRU, general wards of district or state hospitals.
LPS&HPS	BPL/SC/ST women giving birth in non-governmental institutions

LPS; Low Performing States namely, Uttar Pradesh, Uttarakhand, Bihar, Madhya Pradesh, Chhattisgarh, Assam, Rajasthan, Orissa, and Jammu and Kashmir.

HPS; High Performing States, remaining states are HPS.

Table 6 Cash provided for Delivery in Health facility in Rs (NHM, India)

category	Rural area		Total	Urban area		Total
	Mother's package	ASHA's package		Mother's package	ASHA's package	
LPS	1400	600	2000	1000	400	1400
HPS	700	600	1300	600	400	1000

- **“Janani Shishu Suraksha Karyakram” (JSSK)**

It is a program of GOI and Government of Gujarat to provide free and cashless services to pregnant women including normal and caesarean delivery, care after childbirth up to 42 days and care of sick newborn up to 1 year in Government Health Centers in rural and urban areas. On 1st June 2011 this program was launched by Government of India.

More than 12 million pregnant women were expected to get benefit from this program who access Government health facility for childbirth. This scheme encourages those who chose to deliver at homes to go for delivery at health facility.

Free services given to pregnant women under this program are;

1. Cashless delivery
2. C- section
3. Drugs and consumables
4. Diagnostic services
5. Food during stay in health institutions
6. Free provision of blood
7. Exclusion from user charges
8. Transportation service from home to health institution and between health facilities in case of referral
9. Drop back from health facility to home after 48 hours stay.

Free services provided for Sick newborn and infant;

1. Treatment needed.
2. Drugs and consumable
3. Diagnostic Services
4. Provision of blood
5. Exclusion from user charges
6. Transport from home to Health Institutions and between facilities in case of referral
7. Drop back from health facility to home.

- **“Referral Transport”**

Transportation facility from home to health institution;

EMRI Ambulance services are currently available throughout Gujarat State through toll free number 108.

Transportation from health facility to home;

Transportation is provided by rental vehicle or ambulance owned by state.

Drop back vans are called as khilkhilat vans that are deployed by every district of the state.

Inter Facility Transport; free inter facility transfer are provided by state owned CHC ambulance, PHC vehicle per 108.

- **“Janani Shishu Suraksha Karyakram Helpdesk”**

JSSK Helpdesk along with one counselor is established at 41 Centers which include selected medical College Hospitals, District Hospitals and CHC in order to facilitate all entitlements implementations and coordination with khilkhilat.

- **“Extended JSSK”**

For the further reduction in MMR, a special focus on full Antenatal Services is essential. Hence the state has implemented Extended JSSK since January 2019, the scheme ensures free pick up and drop back facility for antenatal services to each pregnant woman.

- **“Chiranjivi Yojana”**

This scheme involves non-governmental sector specialists for providing services related to safe delivery, primarily for socio economically weaker sections, and this scheme was initiated by ‘The Health and Family Welfare Department’.

Benefits of Chiranjivi Yojana;

1. This scheme strengthens the BPL people in various ways
 2. This program gives poor free service of delivery care in non-governmental institute
 3. It gives instant availability to Emergency Obstetric Care (EmOC) when needed.
 4. It helps in decreasing out of pocket expenditure.
 5. It also provides them the choice of several providers nearby from which they can choose from.
 6. This service indicates that it is possible to grow collaboration of governmental and non-governmental sectors at big scale to provide skilled birth attendance and EmOC to poor women at a relatively small expenditure.
 7. The program is now associated with EMRI services for removal of delay in transport time. EMRI is providing free ambulance services to all sections of the society in entire Gujarat state.
- **“E- Mamta”**; it ensures tracking of high-risk mother.
 - **“Mamta Sakhi” (Birth Companion Scheme)**; “under this scheme a female family member is allowed to be at the side of pregnant women at the time of delivery in governmental institutions. The presence of birth companion during childbirth meant that the women was never left alone during this intensely stressful and frightening time of her life”.
 - **“Mamta Doli”**; Quick transportation to the health center for delivery from home can play a very important role in reducing MMR
So, in some unreachable and remote area of Gujarat the scheme named “Mamta Doli” was implemented by Gujarat Government to help pregnant women.
Aim of this scheme is to get the pregnant women to closest pick up point from where she can be transported to the health facility by 108 transport for institutional delivery or the pregnant women is directly transported to health institution by Mamta Doli service provider.
 - **“Mamta Card**; In Gujarat Mother and Child Protection Card is known as Mamta Card. It has been developed as a tool for families to learn, understand and follow positive practices for achieving good health of pregnant women, young mothers and child”.
Gujarat has been using Mamta Card since 2005. In the year 2013-2014 total 15,00,000 Mamta Cards has been accepted to distribute in whole State to provide women and her family to give information about different health services which they can utilize for the health and well-being of pregnant women and newborn.
Under this scheme the women and families are given knowledge about health, nutrition and development of young children, so that they can make decisions about their health and well being.

[<https://nrhm.gujarat.gov.in>]

Conclusion;

This study shows that MMR in Gujarat has decreased from 172 during 2001-2003 to 87 during 2016-2017 round of SRS. This study also found that there are many factors that are related to Maternal Mortality ratio, like increased maternal literacy, increased utilization of maternal health care services, increased % of institutional

deliveries and birth assisted by skilled medical professionals, reduction in child marriage and young pregnancies. Along with improved health care behavior and factors related to maternal health there are many programs held by government of India and Government of Gujarat which contributes to reduce MMR. Reduction in MMR is not evident due to a single factor in stead there are many factors contributing to reduction in MMR. Important factors which are related to improved maternal health are increased rate of female literacy resulting in improved health seeking behavior of women and improved decision making about their health. Improved rate of institutional deliveries gives a safe and infection free environment with all the facilities to fight complications of pregnancies, like sepsis, hemorrhage, anemia safely conducted abortion which is not available at home-based settings. Increased rate of birth assisted by skilled health professional also helps in preventing maternal death as they are skilled and well trained to treat complications like hemorrhage during delivery, while TBA are not skilled to fight such complications.

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Part-2

Report on Online Course An Introduction to Global Health (University of Copenhagen)

Course Description;

Global health is truly a transdisciplinary area of work. Many issues like climate change, pandemics and protection of refugees, opportunities and dilemmas linked with globalization of health professionals, the multiplying the business of insurance and hospital, and growth in health care seeking in another country are the examples of issues that can only be addressed by collaborating local, national and international actions and governance.

This course provides knowledge regarding the overall idea, conceptualization, definition and challenges of global health and result and effects of different health pragmas and policies on people's lives. It gives the understanding of how can we measure the global health burden (DALY), and risk factors associated with different diseases.

Second module of the course gives description of infectious disease and their relation to poverty and development and brief description of diarrheal diseases, malaria and HIV, that are still unfinished agenda in most part of the world.

Third module gives understanding of NCDs, mental health and injuries. It gives details of risk factors associated with NCDs and its determinants and drivers and joint risk factors. Under NCDs diabetes is explained in details as it is appearing as a new epidemic and affect all parts of the world. Mental health, injuries and effects of pesticides are also explained in this module.

Fourth module deals with maternal and child health are discussed.

Fifth module gives a brief introduction on the effect of environmental, climate and migration on population health. It describes major environmental health challenges, change in whether condition and its impacts on health, health challenges faced by refugees, internally displaced population and migrants in both high- and low-income countries.

Sixth module covers diseases related to food and water with attention on important role of sanitation and hygiene in relation to human development and child malnutrition.

Objectives of the course;

- To understand global health, challenges of global health, and how to measure burden of global health.
- To understand the relation between infectious disease and poverty, development and living condition, and three infectious disease affecting major part of the world namely, diarrheal disease, malaria and HIV.
- To explain global burden, risk factors, determinants and drivers of non-communicable diseases.
- To explain mental health in a global perspective, effects of pesticides.
- To explain the concepts of maternal and child health.
- To explain environmental health challenges, effects of climate change.
- To explain health challenges of refugees, internally displaced population and migrants.
- To give an understanding of childhood malnutrition, disease related to water, sanitation and hygiene.

Course Contents;

1. Defining and Measuring Global Health
2. Infectious Disease

3. Non-Communicable Disease and Injuries
4. Maternal and Child Health
5. Environment, Climate and Migration
6. Food and Water
7. Health Systems and Global Health Governance

Learning Methodology:

Course is discussed by a large number of researchers from different departments of University of Copenhagen. It also included interviews with researchers and experts from other institutions as well as guest appearance by non-researchers.

The course consists of seven modules, each module consists of a number of short video lectures and small online activities that introduce to a different area of global health. At the end of each module there is a graded quiz, and one need to pass the graded quizzes to pass the course.

Key Learning;

Global health; “is those health issues that transcend national boundaries and governments and call for actions on the global forces that determine the health of people” [Kickbush, Sand J Public Health 2006]

Epidemiological Transition; “Omran proposed that all the communities have already moved or will move, through specific transitional phases where infectious diseases over time will be replaced by non-communicable diseases, Omran defined this model or trend as epidemiological transition”.

DALY; “it is defined as one-year loss of healthy life; it measures the periods of healthy life years lost due to disease or disability or death related to a specific disease”. It measures and compare the impact of different diseases.

DALY combines two measures; years of life lost due to early death (YLLs), and years of life lost due to disease or disability (YLDs) so we calculate DALY by adding up YLLs and YLDs. To calculate YLD we need to know incidence of disease, duration of disease (how long a person, on average live with the disease in that population) and disease severity weight (between 0-1)

Major determinants of change in global disease burden;

- Changes in demographic characteristics
- Industrialization and Nutritional Transition
- Economic development
- Changing weather condition and disasters
- War and disputes
- Improvement in health services
- Technological innovation in health care and health technology
- Agricultural intensification
- Loss and deterioration of natural resources

Nutritional transition; Increase in overall calorie intake, fat intake (specifically cheap oil rich in saturated fatty acid and trans fatty acid), Change in composition of carbohydrate (mostly a shift from complex carbohydrate to more simple carbohydrate composition, decline in dietary fibres and micro nutrients, Increase in salt intake.

Co-morbidities; it is co-existence of two diseases, in an individual or population. It may be two diseases that are infectious, or two non-infectious (NCDs) diseases or it may be one disease that is infectious and another that's non-infectious. So sometimes, disease may themselves increases the risk and determine the outcome of another disease, Example of such co-morbidity is HIV plus TB.

Infectious disease; in 19th century, most people die before the age of 40-50 years, and 500 per 1000 children were dying before the age of 5 years from infectious disease combined with malnutrition. About 50% women giving childbirth were dying due to childbed fever or puerperal sepsis as the practitioner did not know the importance of hand washing.

Not only introduction of antitoxin and vaccines helped in controlling infectious disease but the most important factor to control infectious disease was improved socio-economic condition, better housing and nutrition, one example is Chagas disease.

Diarrheal diseases: “is defined as passage of three or more loose or watery stools a day” (WHO). Diarrhoea can be a clinical manifestation of a disease in intestinal tract, can be caused by one or combination of several bacterial, viral or parasitological agents. These diseases are one of the three leading causes of child death in children below five years of age. About 58% of diarrheal disease deaths can be ascribed to unsafe water, poor sanitation and hygiene.

Excreta management, hand hygiene and water and food hygiene are essential practices to implement for prevention of diarrheal disease.

Malaria; it is caused by infection of plasmodium (parasite). They are all transmitted by female anopheline mosquito feeding on humans. Its symptoms include fever and general malaise, and in severe cases respiratory problems, impaired consciousness and multi-organ failures. Malaria cases are declining and its reason is directly or indirectly socioeconomical.

Elimination and eradication of malaria may be possible by applying many methods, like control effects aimed at breaking the parasite life cycle, removal of mosquito breeding sites through drainage, indoor insecticide spraying and bed nets treated with long-lasting insecticides are tried and tested methods.

HIV; There are two types of HIV, Type 1 HIV and Type 2 HIV. Type 1 HIV is causing pandemic and is evolved from chimpanzee. It was eventually realised that that an effective treatment of HIV had to consist of a combination of drugs, we call it as ART or antiretroviral therapy.

Table 1 Interventions for HIV depending on mode of Transmission

Mode of transmission	Reduces risk somewhat	Reduces risk substantially
Mother to child	Caesarean section ART to mother during delivery	ART of mother during 2 nd trimester
Vaginal sex	Treatment of HIV and circumcision of HIV positive man	Condoms, ART of HIV positive partner
Anal sex	Treatment of STDs, avoid anal	Condoms, ART of HIV positive

	intercourse	partner
Injective drug use		Use of clean needles and other harm reduction intervention, ART of HIV positive person

Noncommunicable Diseases; “are the diseases that one cannot catch from someone else and share common risk factors, common causes and determinants and therefore share opportunities for mitigation and prevention”. In last 10 years WHO outlined, there are four diseases with four modifiable risk factors,

Table 2 Non-communicable diseases and their common Risk Factors (4 diseases, 4 modifiable risk factors, WHO)

	Tobacco use	Unhealthy diet	Physical inactivity	Harmful use of alcohol
Cardio-vascular	√	√	√	√
Diabetes	√	√	√	√
Cancer	√	√	√	√
Chronic respiratory	√			

Diabetes; 70% of cases of diabetes occurs in low- and middle-income countries. Cardiovascular diseases stands on rank one as cause of death globally. 23 million are expected to die from these diseases by the year 2030, Lung Diseases or chronic respiratory diseases; causes 7% of death worldwide these diseases are deadly in synergies between TB and HIV, and other infectious diseases, and chronic obstructive pulmonary disease and lung cancer. Cancer, causes approximately 1 in 9 deaths annually. Some cancers are linked to infections, some to nutrition and alcohol, some are linked to environmental pollutants.

Determinants of NCDS; NCDs are actually linked with poverty, lower level of education, poor housing condition, poorer neighbourhood, unemployment. these can be called as social determinants of health. Social determinants are also influenced by political environment, and policies. Urbanization and globalization come with risks to social determinants of health. 80% of NCDs can be prevented through primary prevention through modifying risk factors and behaviour, such as reducing tobacco and alcohol consumption, fat, salt intake, preventing obesity, promoting physical activity and improving environmental conditions such as air quality and urban planning.

Diabetes; is basically a disease of poor glucose control and metabolism. It is of two types; type 1 and type 2.

Diabetes affect eye through retinopathy, kidney by causing end stage renal disease, heart attack, strokes and amputation. A person dies on average between 12-14 years earlier than a person without diabetes there is a huge increase in diabetes cases, probably driven by major changes in lifestyle. Example nutritional transition, physical inactivity.

People with diabetes are at high risk for developing several kinds of infections, specially group B streptococcus, fungal infection, UTI, and ones they develop infection those infections tend to be much more resistant, due to high level of glucose. That’s why it is very necessary to start developing integrated models of care where we don’t treat infectious disease and NCD as separate entities.

Orphan or neglected disease; no body care about these diseases, as it's a very rare disease, or it is frequent in the area where there is no money, like Chagas disease, like hypertension in Africa, diabetes in India until now. So, to manage such diseases one must think of integrated approach of management and control by identifying common risk factors or common symptoms. Example diabetes and leprosy, they both have common symptoms like peripheral neuropathy, ulcer, superinfection, cataract, blindness and loss of sensation on hands and feet. Another example is TB and diabetes, Diabetes and hypertension.

In 2004, worldwide the burden of disease of mental disorders, was about 13%, and majority of that was due to depression. It is projected that, mental disorders depression in particular, will be the leading cause of burden of disease up to 2020-2030. The reasons may be different, like lifestyle changes like economic recession, high unemployment, potential alcohol use, increasing suicide rate, industrialization, and improved health of overall population.

Self-harm by pesticides; WHO states that “pesticide self-poisoning is the single most important cause of suicide worldwide”. For self-harm control we have to work at three levels; first legislative level, second administrative level and third approach is individual or working on personal level.

In 2004 WHO health assembly adopted a strategy which included five priority areas of broad reproductive healthcare;

1. Improving antenatal, delivery, postpartum and new-born care
2. Providing high quality services for family planning, including infertility services.
3. Eliminating unsafe abortion
4. Combating sexually transmitted infections including HIV, reproductive tract infection and other gynaecological morbidities
5. Promoting sexual health

There are three barriers to the use of contraceptives; Supply chain barriers, Availability of information, Cultural barriers.

Unsafe abortion: “defined as the procedure for terminating the pregnancy that is performed by the individual lacking the necessary skills, or in an environment that does not conform the minimal medical standards, or both” (WHO).

To reduce abortion rates, better family planning services and women's abilities to control their own fertility is needed. WHO estimates that 13% maternal deaths are due to unsafe abortion.

mHealth: “basically, the practice of medicine and public health supported by mobile devices such as mobile phones”. Its benefits are using mobile tools in gathering community and clinical health data, direct provision of care by telemedicine, use of text messages to improve adherence of treatment therapy for TB, HIV and malaria, increasing approach to medical education and training for health workers, to link pregnant women to health system.

Continuum of care: It refers to the idea of a continuity of care for the individual at different time points in life, during adolescence, pregnancy, childbirth, postpartum, and as a child, and throughout the health system. So, care should be available whenever it is needed, but it also requires functional linkages between different level of care

in the health system. finally, continuum of care is built upon the idea that different causes of morbidity and mortality are interlinked.

Environmental Health: 24% of the global disease burden was linked with environmental risk factors. In children 34% of disease burden is attributed to the environment. Poor quality water, insufficient access to water, lack of appropriate sanitation and personal hygiene. Especially insufficient hand washing impacting human health. Increase in chemical and metal in water, and air quality due to growing industrialization have to consider.

Cooking and heating with solid fuels and open fire, Increased use of motor vehicles, industrial production, burning of fuels for heating results in elevated levels of air pollution.

Quick and speedy random and non-sustainable patterns of urban development are making cities central point for many emerging environmental hazards, this includes solid waste disposal, waste water management, provision of safe water, sanitation, noise, food safety among vendors, traffic, occupational injury prevention and air quality.

Another environmental health issue is water resource development, refers to the infrastructure and management required to control freshwater, to meet demands in agriculture, entity or reservoir for drinking water, irrigation schemes, water reservoir and large dams.

Shrinking forest cover, on sustainable production system, changes in weather condition and impulsive management of natural resources affects livelihood, biodiversity, food security, migration pattern and human health. Agricultural production is severely affected by soil degradation, mainly from loss of top soil due to accumulation of salts in the soil surface.

There are three main environmental determinants for health, that are land or soil, water resources and air.

Climate change and health: at the surface of earth, each of the last three decades has been successively warmer than any preceding decade since 1850, Globally, sea level rise and the rate of severity, of extreme weather events such as storms and tropical cyclones are also expected to increase. WHO consider three kinds of impact on human health due to climate change; first relatively direct impacts, caused by extreme weather events. Second more indirect health consequences of various climate change and resulting damage to ecosystem. Third we have various adverse health consequences that occur in relation to climate induced population displacement, conflict situation, and derive social disruption, like psychological stress.

Refugee: “is a person who is outside the country of his nationality, and is unable to or owing to such fear, is unwilling to avail himself of the protection of that country”.

Internally displaced persons: “are persons or groups who have been forced or obliged to flee or to leave their homes or places of habitual residence”.

Such population face increased risk from poor housing, lack of access to food, water and sanitation, crowding, and exhaustion, loss of protective structure of family and community, language barriers and violent and dangerous environment, disrupted treatments of chronic diseases these factors may increase their morbidity and mortality. Injuries due to violence, traffic accidents, unsafe working and living conditions may increase, causing increased morbidity and mortality, this has been called triple burden of disease for displaced population.

International migrants: person who are residing in countries other than their country of birth, there were 231 million international migrants in 2013. There were 20 million refugees as of end of 2014. Asylum seeker 1

million, and stateless people are around 12 million. undocumented migrants, some of whom were trafficked are estimated around 27 million and domestic workers. Effects of increased migration within country from rural to urban area is increase in slums, slums have great challenges in terms of water and sanitation.

Several areas are of concern for migrant health are, determinants of health, health outcomes, access to healthcare and healthcare policies. Formal (economic, and legal limitation to access to healthcare) and informal barriers (on the side of migrant patient and healthcare staff or system, including language, culture, newness to healthcare system) may affect migrants' access to healthcare.

Nutrition and Infectious diseases; undernutrition and infections are common in low income setting and coexists. that have casual bidirectional relationship, that is undernutrition leads to infection and infection may lead to undernutrition. Infections impair nutritional status through reduced appetite and reduced absorption of nutrients and increased utilization and excretion of nutrients.

Sanitation and development goal; most important barrier for attaining sanitation is limited funds. And one has to find a way to convince people to use toilets, and design and promote the toilet people can afford. Schools are the perfect institutions for promoting sanitation.

Disease related to water, sanitation and hygiene; a lot of environmental disease burden can be attributed to few key risk areas, that are, water supply and sanitation, vector born disease, poor ambient and indoor quality, and toxic substances. These factors kill about 1.7 million people annually. Safe disposal of faecal material and washing hands after contact with adult or child stool is the best way to prevent diarrheal disease.

UHC; “Universal Health Coverage; is a strategy to ensure that all people obtain the health services that they need without suffering financial hardship when they pay for them”.

Elements of UHC strategy;

1. Making sure that everyone is able to get the needed health services.
2. Making sure that health services are of adequate quality to be effective.
3. Making sure that anyone using these health services should not suffer from financial hardship.

Strategies to raise revenue for health;

1. Improved tax systems.
2. Government should re-prioritize its budget. (increase health budget).
3. Implement sin taxes, on certain goods harmful to the society, like tobacco and alcohol.
4. To advocate for more development assistance for health, through building more and stronger bilateral partnership with donor countries.

Factors affecting use of public health care facilities are; availability, accessibility, cost (direct and indirect), quality of care and delay in service.

Medical tourism; is defined as a particular form of patient mobility, where patients travel across borders to receive medical treatment. The treatment must be planned, voluntary and non-acute. Costs of treatment play big role in decision making process of where to go for treatment.

There are many factors that determines a patient motivation to become medical tourist; pull factors; are the factors that attracts patient towards destination country. Push factors; are factors that pushes or drive them away from their original country.