

**Summer Training at
National Health Mission,
Gujarat**

- **Strategies for BMW Management and its Sustainability” Dahod District, Gujarat**
- **Community Based Maternal Death Review in Dahod District,**

**By
Palakkumar Ranjikan Patel**

**Under the guidance of
Dr. Susmit Jain**

**MBA Hospital and Health Management
2015-2017**



**The IIHMR University, Jaipur
2016**

CERTIFICATE

This is to certify that **Palakkumar Rajnikant Patel** student of **MBA in Health and Hospital Management** from IIHMR University, Jaipur has undergone summer training at **NHM, Dahod, Gujarat** from 1st April to 31st May, 2016.

The candidate has successfully carried out the study designated to him during summer training and his approach to the study has been sincere, scientific & analytical.

The internship is in fulfilment of the course requirements.

I wish him all success in future endeavours.



Col. (Dr.) Ashok Kausaik
Dean (Academics & Student Affairs)
IIHMR University, Jaipur



Dr. Susmit Jain
Assistant Professor
IIHMR University, Jaipur



DISTRICT HEALTH SOCIETY

DISTRICT PROGRAMME MANAGEMENT UNIT
HEALTH BRANCH - DISTRICT PANCHAYAT
DAHOD

DHS/DAHOD/CERTI/2016
DATE : 31/05/2016

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Palakkumar Rajnikant Patel, student of MBA Hospital and Health management, Institute of Health Management and Research; Jaipur BATCH 2015-17. He has done his Summer training for the period of April 1st to May 31st 2016 under District Health Society Dahod, NHM Gujarat under my guidance. During this period he has completed their study as part of partial fulfillment of course requirements, recommended for MBA Hospital and Health management with specialization in Health management, Topic of study given by NHM Government of Gujarat during his summer training was "Strategies for BMW Management and its Sustainability." He was also included in various activities to get better understanding of health system.

I wish him all the best for his future endeavours.

Date:-31/05/2016



DISTRICT HEALTH SOCIETY &
CHIEF DISTRICT HEALTH OFFICER,
DISTRICT PANCHAYAT, DAHOD.

મુખ્ય જિલ્લા આરોગ્ય અધિકારી
જિલ્લા પંચાયત દાહોડ



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ACKNOWLEDGEMENT

At the beginning We would like to express my special gratitude and appreciation to Dr.Vinod Rao Commisioner of National Health Mission (NHM) Gujarat for allowing us to pursue our summer training from National Health Mission (NHM) Gujarat.

We would also like to acknowledge with much appreciation to Dr.Jagdeep J.Pandya,CDHO (Dahod District) during training period for his time guidance, monitoring and words of encouragement. This acknowledgement note would be not complete without special thanks to Dr.Rachana R.Amaliyar (DPC-RCH) despite of her busy schedule was there to guide us throughout the period and her important suggestions and encouragement helped us to complete my training.

We would also like to acknowledge Dr. M. I. Jamnu (Quality Assurance Medical Officer) and Mr.Dineshbhai Valu (District Monitoring and Evaluation), Mr. Dharmeshbhai(Computer Operator), Mr.Niteshbhai(District Data Manager), Mr.Subhashbhai(DPMCC) and all the staff members of all departments for making our summer training unforgettable experience.

We would also like to extend our gratitude to Dr.R.M.Patel(Civil Surgeon) for his support in our study. We would also like to express gratitude to all Medical Officers, Staff Nurses, Lab technicians, Pharmacists, sweepers for their active participation in Our study.

We express my gratitude and respectful regards to our mentors, Dr. Susmit Jain Sir, Institute of Health Management and Research; Jaipur for their guidance and useful suggestions which helped us in completing our project work. This project would have been distinct reality without their guidance and support.

We would like to acknowledge our Institute and Colleagues also hold special mention to support us throughout our training period and make it a good learning experience.

Project A

**Strategies for BMW Management and
its sustainability, Dahod District,
Gujarat**

Preface

Summer training is an integral part of MBA Hospital and Health care Management as a part of curriculum of the course, students of the first year are required to undergo summer training and get in depth exposure about various departments of an organization and get better understanding of health care delivery system.

The **Major objectives of summer training programme** are as follows:

1. To get better understanding of existing health care delivery system including public and private sectors.
2. To observe the implementation of various national health programmes at National/State/District level.
3. To understand various functions of health system by interacting with various key stake- holders ,policy makers, programme managers, academicians and researchers.
4. To work/ Project assigned by respective organization.
5. To understand the work pattern of District Health Society and its organizational structure and to provide managerial and administrative skills to DHS.
6. The next objective of internship was to learn various managerial and administrative skills needed to work in a government system and to effectively implement all the health and health related programs in the government setup to ensure the overall benefit of the community.
7. To identify existing gaps in human resource, service delivery quality, data collection, Analysis and implementation of health programs in the District and to propose probable Solutions to them.
8. To coordinate proper functioning programs running in the district.

During any training period I had an overview of various programmes undertaking in District Health Society, Dahod. I also did Knowledge, Practice Based Study on-

“Knowledge, Attitude and Practice based study on BMW Management including various Medical Officers, Staff Nurses, Lab Technicians, Pharmacists in Dahod District, Gujarat. I also had an opportunity to visit District Hospital, Sub District Hospital, various CHC and PHCs.

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ABBREVIATIONS

BMW	Bio-Medical Waste Management
PHC	Primary Health Centre
CHC	Community Health Centre
MO	Medical officer
FHW	Female Health Worker
HPD	High Priority District
EMO	Epidemic Medical Officer
QAMO	Quality Assurance Medical Officer
DMO	District Malaria Officer
DLO	District Leprosy Officer
DTO	District Tuberculosis Officer
RCHO	Reproductive Child & Health Officer
DDM	District Data Manager
DFO	District Finance Officer
D M&E	District Monitoring And Evaluation
PA NUTRITION	Programme Associate Nutrition
DPMCC	District Performance Monitoring Control Centre
HCW	Health Care Waste
PPE	Personal Protective Equipment

1.1 Gujarat State profile

Gujarat State is situated between 20°1' and 24°7' north latitudes and 68°4' and 74°4' east longitudes on the west coast of India. It is bounded on the west by the Arabian Sea, on the north-west by Pakistan, on the north by Rajasthan, on the east by Madhya Pradesh and on the south and south-east by Maharashtra. and area of 196024 sq. km, representing about 6.19 percent of the total area of the country. The state has a population of 6.03 crore (2011 Census), which is approximately 4.99% percent of the total population of the country. About 42.6% of the State's population resides in urban areas, compared to 37.4 in 2001. The population density of the state is 308 as compared to the national average of. About 2, 23,722 (Census 2011) of Gujarat's population is estimated to be BPL, while 4,074,447 percent and 89, 17,174 (15 percent, 2011) are classified as SC and ST respectively. Socio-economic indicators are, in general somewhat better than the India average 79.31 percent and 70.73 percent of its total and female population respectively are literate, the corresponding figures for India being 74.04 percent and 65.46 percent respectively.

The state of Gujarat is characterized by sea-coastal, tribal, desert and geographically hostile terrain having sparse and scattered population at the periphery. Communities living in the remote and disadvantaged areas especially BPL population, tribal and women, are generally unable to access reliable and cost effective health care services. Administratively, the state has been divided into 33 districts, sub-divided into 225 Blocks, having 18618 villages and 242 towns. It has a large three-tier health infrastructure comprising 23 district hospitals 326 Community Health Centre (CHCs), 1342 Primary Health Centre (PHCs) and Sub-Centers (SCs). As Per RHS Bulletin, March 2012, M/O Health & F.W., GOI, 778 doctors at PHC's, 76 specialists at CHCs, 758 male and 875 female health (LHV) assistants are positioned in these facilities in addition to 4874 male and 6431 female health workers at sub-centers. (mohfw.nic.in/NRHM/State%20Files/gujarat.htm)

The Department of Health and Family Welfare, Government of Gujarat is committed to promote the right of every woman, man and child to enjoy a life of health and equal opportunity and making all round efforts in this direction. The department has taken steps to bring about outcomes as envisioned in the Millennium Development goals with respect to child and maternal mortality, RCH II / NRHM programme, The National Health Policy 2015 Gujarat. It aims to address the infectious diseases with respect to prevention or access to treatment and global burden diseases of non-communicable diseases and reduce catastrophic expenditure contributes to poverty.

1.2. NHM Gujarat

National Health Mission (NHM) encompassing two Sub-Missions, National Health Mission (NHM) and National Urban Health Mission (NUHM). It is both flexible and dynamic and is intended to guide States towards ensuring the achievement of universal access to health care through strengthening of health systems, institutions and capabilities. (nrhm.gujarat.gov.in)

Vision

"Attainment of Universal Access to Equitable, Affordable and Quality health care services, accountable and responsive to people's needs, with effective inter-sectoral convergent action to address the wider social determinants of health".

- Safeguard the health of the poor, vulnerable and disadvantaged, and move towards a right based approach to health through entitlements and service guarantees
- Strengthen public health systems as a basis for universal access and social protection against the rising costs of health care.
- Build environment of trust between people and providers of health services.

- Empower community to become active participants in the process of attainment of highest possible levels of health.
- Institutionalize transparency and accountability in all processes and mechanisms.
- Improve efficiency to optimize use of available resources.

The NHM shall be a major instrument of financing and support to the states to strengthen public health systems and health care delivery. This financing to the state will be based on the state's Programme Implementation Plan (PIP).

The PIP shall have following parts:

- Part I : NHM RCH Flexi pool
- Part II : NUHM Flexi pool,
- Part III : Flexible Pool for Communicable Diseases
- Part IV : Flexible Pool for Non Communicable Diseases, Injury and Trauma
- Part V : Infrastructure Maintenance

Programme running under NHM Gujarat

- RMNCH+A
- NUHM
- Routine immunization
- NDCP

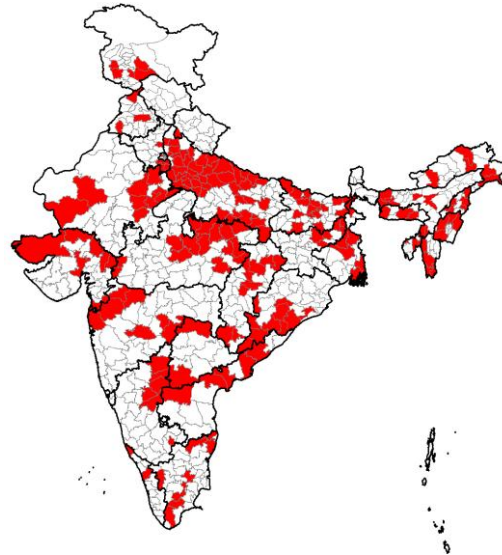
Scheme running under NHM Gujarat

- Mukhiya Mantri Amrutam
- Rogi Kalyan Samiti
- Balsakha Yojna
- JSY

STATE PROGRAMME MANAGEMENT UNIT, NRHM



1.3 Programme wise Findings, District Health Society, Dahod



1) Mission Indradhanush

Rationale:

Since the launch of Universal Immunization Programme in 1985, full immunization coverage in India has not surpassed 65% despite all efforts. Mission Indradhanush focuses on interventions to expand to more this coverage to more than 90% children.

Aim:

To strengthen key functional areas of immunization programme for ensuring high coverage throughout the country, with special attention to 201 identified high focus districts.

Introduction:

The Government of India has launched Mission Indradhanush on 25 December 2014 as a special drive to vaccinate all unvaccinated and partially vaccinated children and pregnant women by 2020 under the Universal Immunization Programme.

Under Mission Indradhanush, the Government has identified 201 high focus districts across the country. These districts have been identified based on a composite indicator, considering full immunization coverage, number of partially vaccinated and unvaccinated children and whether the district is an identified HPD or EPRP HR district. Nearly 50% of all unvaccinated or partially vaccinated children in India are in these 201 districts. Intensified routine immunization campaigns in these districts will help reduce morbidity and mortality due to vaccine preventable diseases. This will be done through special catch-up campaigns to rapidly increase full immunization coverage.

Factors affecting Implementation of Programme:

- Beneficiaries can't take advantage due to migration issue. There is no proper channel of tracking them.
- On field visit, At Most of the Session sites Activities are not carried out according to Microplanning and if they Prepond/Postpond the session, they are supposed to inform District Authority but there was gap in communication.
- Medical Officers try to cover up the issues happened at Session Site.
- BCG vials are found empty at Fatehpura.
- IEC Material is not displayed properly.

2) Navdampati Sanman Samaroah:

Rationale:

There are huge number of marriage ceremonies in Dahod District. As District is totally Tribal area, more numbers of marriages in teenager age.

Due to Inadequate Physical and Mental development and Lack of knowledge regarding sexual and fertility related problems in teenage, Increase in number of Population Growth, Maternal Death and Infant death.

To Solve all these problems,for the purpose of giving them the health related information regarding Sickle cell Anemia, Adverse effects of Tobacco consumption in fertility, We have introduced “NavDampti Sanman Samaroah”.

Benefits:

- Primary Health Check up like Hb,Sickle cell Anaemia,Contraceptive Methods.
- To Explain Dietary habits to Newly Married Female before Pregnancy and during Pregnancy.

Factors affecting Implementation of Programme:

There is strong need to sensitize the Newly Married Couple for Early Registration.

3) Janani Suraksha Yojana: “Expectations of a mother from society”

Aim: Janani Suraksha Yojana is to reduce the overall mortality ratio and infant mortality rate and to increase institutional deliveries. The Janani Suraksha Yojana has identified ASHA, the Accredited Social Health Activist as an effective link between the Government health institutions and the poor pregnant women.

Introduction: Janani Suraksha Yojana (JSY) under the overall umbrella of national rural health mission (NRHM) has been initiated by modifying the existing national maternity benefit scheme (NMBS). While nmbs is linked to provision of better diet for pregnant women from bpl families, janani suraksha yojana integrates the financial/cash assistance with antenatal care during the pregnancy period, institutional care during delivery and immediate post-partum period in a health centre by establishing a system of coordinated care by Asha, the field level workers. It is a fully centrally sponsored scheme.

Benefits:

- Under this scheme, Rs.700 will be given to every mother at starting of 7th month for nutritious food (Rs.600 for Urban area)

Objectives :

- 1) To Promote Institutional Deliveries.
- 2) To reduce overall Maternal Mortality ratio and Infant Mortality Rate.

Target Beneficiaries:

- 1) Pregnant Woman of all sectors of the society.
- 2) Irrespective of Birth order.
- 3) In Rural and Urban areas.

Strategy :

- 1) Early Registration at AWC/SC (MCHN days)
- 2) Provision of 4 ANC And 4 PNC
- 3) Early Identification of complicated cases
- 4) Role of ASHA .

Factors affecting Implementation of Programme :

- Initially the benefit is up to 02 Births only, but now that has been removed.
- This scheme implementation is mainly depending on activities of ASHA But some of them have been found very inactive during field visit.
- In the Tribal Population, Women are not aware of Benefits and they don't have account in Bank.

Add a smile to the Janani in need.....

4) Janani Shishu Suraksha Karyakram :

Rationale : About 67,000 women in india die due to Pregnancy related complications. Similarly every year approximately 13 lakhs infants die within one year of birth.Out of 9 lakh newborns who quality services both essential and emergency in public health facility without any burden of expenses.Current pace of decline is not sufficient to achieve the goals and targets committed under NRHM and MDG.

After the launch of Janani Suraksha Yojana, Number of institutional delivery has increased but not willing for stay of 48 hours hampering for provision of essential services; difficult for identification and management of complications during 48 hours after delivery which leads to high pocket expenses.

Introduction :

Janani Shishu Suraksha Karyakram launched in Mewat District, Hariyana on June 1st, A Huge signal Health for All reality. It invokes a new initiative, much emphasis on elimination of out of pocket expenses for both pregnant women and neonates. The initiative entitles all pregnant women to delivered in caesarean section.

Aim :

To ensure give all treatment to all infants till 1st year and all pregnant women in Government Hospitals.

Benefits :

- Eligible Services for children and pregnant women.
- Free facility based delivery treatment.
- Free delivery by caesarean section.
- Free Medicines and other materials.
- Free Laboratory Services (Blood and Urine Examination for child and mother), Sonography etc...
- Free Meals during Hospital Stay.
- Free Blood whenever needed.
- Free Ambulance services from home to hospital, facility to Referral centre and back to home (Mother and Newborn).

5) Kasturba Poshan Sahay Yojana:**Benefits:**

- Give 2000 Rs. Benefit to mother who registered on Mamta Divas during her pregnancy till 6 months.
- 2000 Rs. Benefit to the mother during 1st week who has delivered in the Government Based and Chiranjeevi Scheme.
- Give 2000 Rs Benefit to mother of child for Nutrition Purose after Full Immunization.
- Deposit the Money to beneficiaries directly to Bank/Post office Account.

1.4 Department Wise Findings:

District Hospital:

- Lack of Coordination between District Hospital and District Health Society.
- Good Utilization of Human Resources at Different Wards like Maternity, Orthopaedic and Surgery Ward.
- Blood Storage Unit is in Nonfunctional Condition although District is High Priority Area for Health.
- Good Transportation Facilities provided to the patient who required Tertiary Health Care.

Sub District Hospital:

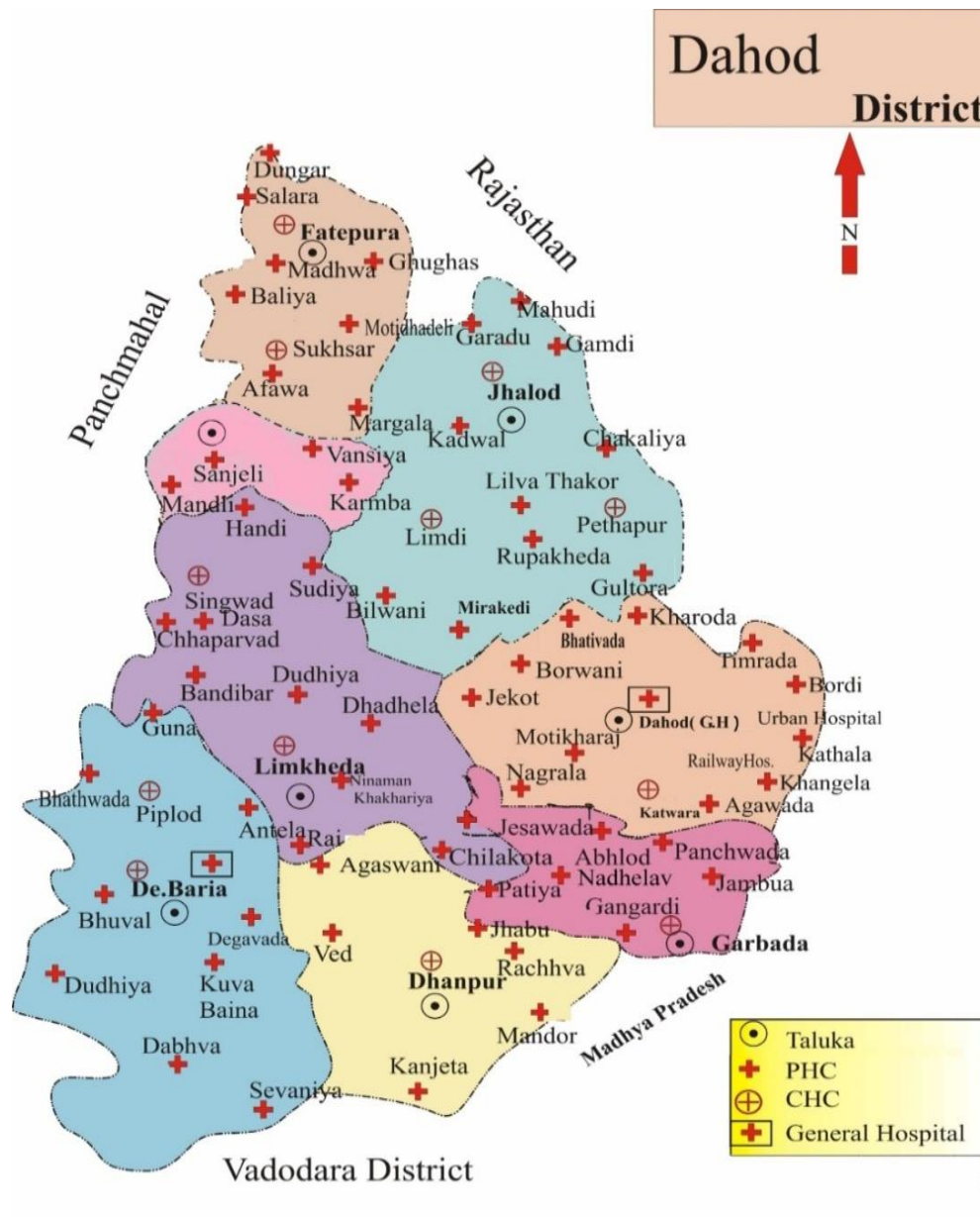
- Medical superintendent is very much accountable for his duty like Personal Observation OPD and Treatment time given to patients
- Good infrastructure but Lack of Human Resources,so they find it difficult to manage with only 2 Medical officers at a time.
- Good Coordination Between Staff Nurses of Different Department regarding Management of the patients.

Community Health Centres:

- Medical officers are very much concerned about bio medical waste management.
- BMW Bins are not cleaned properly in gynaecology and obstetric Department.
- All used syringes and needles are properly disinfected before Final Disposal.
- BMW is collected by “Samvedna” Private Authority on daily basis.
- There is no single BMW bin in OPD.
- Staff Nurse doesn't have knowledge regarding BMW Management.

Primary Health Centres:

- Shortage of Electricity in the Geographically Inaccessible Areas so Difficult to maintain Cold Chain for Vaccination.
- In the surprise visit from District, Newly Appointed RBSK Medical officers are found out running their own clinic during the job timings.
- Conflict used to occur between Medical Officers of NHM on contractual basis and RBSK Medical Officers because of Equal Amount of salary despite of so many years of Experience.
- Logistics issues were also there at Facility.
- Lack of Transport Facilities so Difficult to provide services to Beneficiaries during Immunization Programme and Various other Programmes.



Dahod

History-

The actual name is "Dohad", which later got transformed into Dahod. The Mughal Emperor Aurangzeb was born in a mosque within the fort of Dahod. There is a government polytechnic college since 1963 and it was started by Indian Prime minister Mr. Moraraji Desai and now government degree engineering college is also there. The degree college is affiliated to Gujarat University.

History of Dahod spans regions of Gujarat and Malva. The later has since been reorganized as districts in Madhya Pradesh and Rajasthan. The name Dahod derives from its former name Dohad. The name Dohad was given to the region due to its location between borders of Rajasthan (north) and Madhya Pradesh (east). Dohad literally translates to "two borders". It is estimated that Dahod is 1,000 years old.

The Mughul Empire

The Mughal Empire had an historical presence in Dahod. During the reign of Mughal emperor Jahangir, son of Emperor Akbar, Jahangir made his son Shah Jahan, who went on to succeed Jahangir, the Subedar (governor) of Gujarat. In November 1618, Mumtaz Mahal, wife of Shah Jahan, gave birth to Aurangzeb at the fort of Dahod. Aurangzeb, who later succeeded Shah Jahan as the Mughal emperor in 1658, was quoted to have ordered his ministers to show favors to this town, since it was his birthplace.

Revolution Era

Tatya Tope, the well-known freedom fighter, came to this city during the freedom fighting movement in 1857. During the British Rule, a dharma shala (free sleeping facility) in Dahod that was constructed under the reign of the Mughal Emperor Aurangzeb was converted into a small fort or gadhi. While camped in Nain Kharaj, a village in Dahod district, the revolutionary Tatya Tope attempted to capture the gadhi. A lone soldier from Bhopal was left to defend the gadhi from attacking of Tope. Colonel Iwat came rushing to the aid and began a counter attack on Dahod.

2.1.1 Geography:

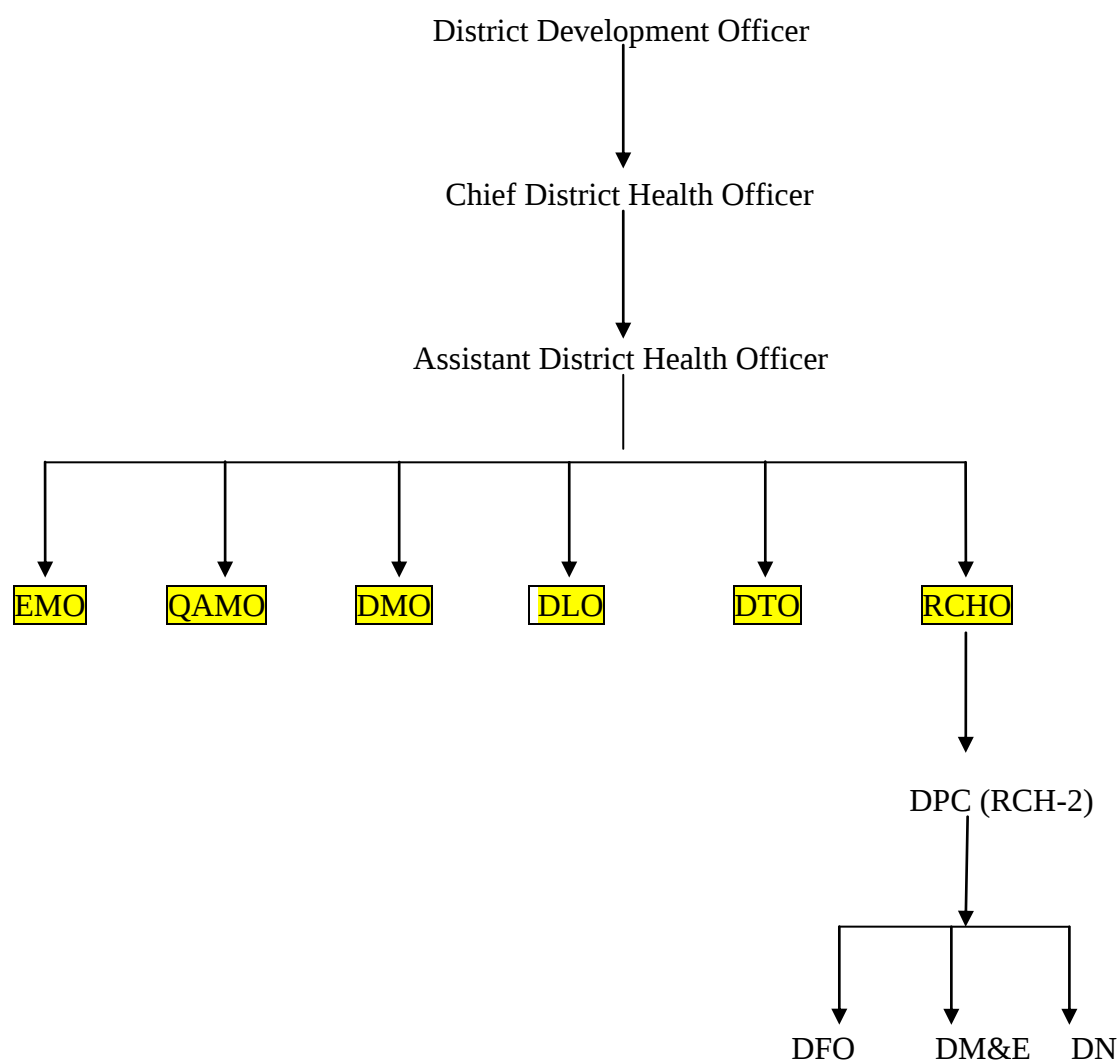
Dahod is located on the northern side of the state and located 20.30 to 23.30 Degree latitude and 73.15 to 74.30 longitudes in north and area of 3642 km is surrounded by Godhra District and Rajasthan and Madhya Pradesh state. Administrative Headquarter is Dahod district. It comprises of 08 talukas namely Dahod, fatepura, zalod, limkheda, garbada, dhanpur, devgadhbhariya, sanjeli.

2.1.2 District Profile:

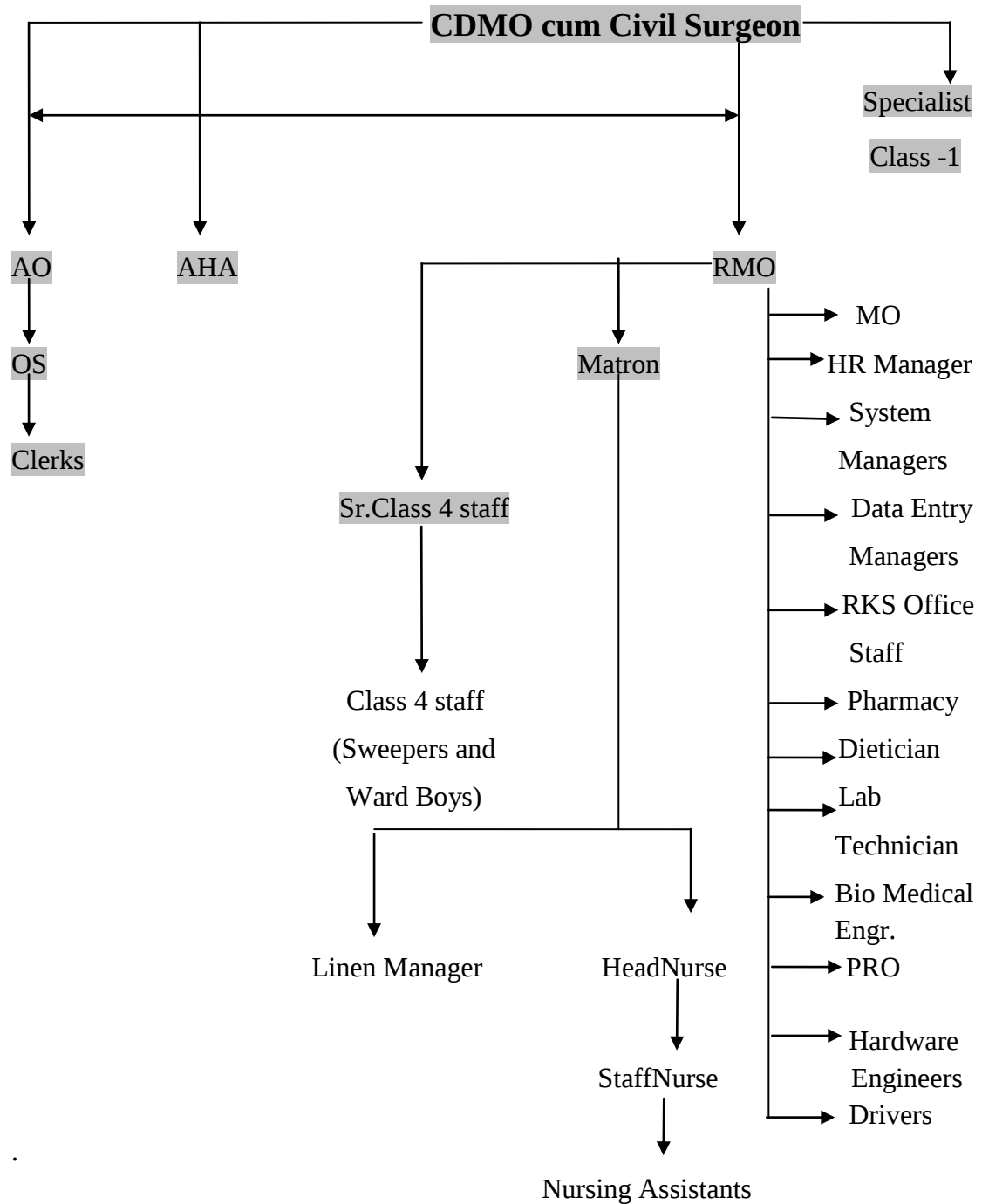
Dahod has total population of 21,27,086 as per census 2011 (Males 1,068,651, Females 1,058,435) and population growth of 29.98%. Rural population consists of 90.99% of total population and Urban population is 09.01%. Sex Ratio is 990 females per 1000 males and child sex ratio is 948 females per 1000 males and average literacy rate of district is 58.82 (as per census 2011). There are 697 villages in the district.

Health is provided by 01 District Hospital, 02 Sub District Hospital, 13 Community Health Centres, 85 Primary Health Centres (78 Functional, 07 Non functional) and 636 Sub centres (Fully functional 331). Out of 85, primary health centres are 24x7 functioning and 2960 Anganwadis.

Organogram of District Health Society, Dahod



ORGANIZATION STRUCTURE OF DISTRICT HOSPITAL, DAHOD



2.2 BMW Project

2.2.1 Background:

BMW differs from hospital waste in the sense that it is “any solid, fluid or liquid waste, including its container and any intermediate product. These products could be generated during the diagnosis, treatment or immunization of human beings or animals, in research pertaining there to, or in the production or testing of biologicals and the animal waste from slaughter houses or any other establishments.

In pursuance of the aim of reducing health problems, eliminating potential risks and treating sick people, healthcare services inevitably create waste, which itself may be hazardous to health of the health care personnels and as well as patients also.. The waste produced in the course of healthcare activities carries a higher potential for infection and injury than any other type of waste. Inadequate and inappropriate knowledge of handling of healthcare waste may have serious health consequences and a significant impact on the environment as well. Although, there is an increased global awareness among health professionals about the hazards and also appropriate management techniques but the level of awareness in India is found to be unsatisfactory.

The regulatory framework for environmental management in the health sector in India is provided by the Bio-Medical Rules (prepared in 1998; amended in 2000 and 2003, 2011 and 2016), which apply to all persons/ institutions generating and/or handling healthcare waste in any form. The Rules define bio-medical waste as “any waste which is generated during diagnosis, treatment or immunization of human beings or animals, or in research activities or in the production or testing of biological and including categories mentioned in schedule-I of the rules”. The Rules, besides identifying the various waste categories, also recommend treatment and disposal methods and the standards to be laid down for the same.

The Ministry of Health & Family Welfare commissioned the development of a National Policy document to address the issues relating to infection control and waste

management and define a framework for implementation of an Infection Management and Environment Plan (IMEP) in healthcare facilities. This policy document was commissioned under the Reproductive and Child Health Programme Phase - II, with technical and financial support from DFID and the World Bank.

2.2.2 Literature Review:

A literature search was performed to identify published studies related to BMW Management . The search was limited to full paper articles published in English. However, this review gives a broad reflection of substantial research performed across different countries, with a limited contribution from Indian studies. Electronic databases searched include ResearchGate, PubMed Central, Indian journal of community medicine, BioMed Central, ScopeMed, , Journal of academy of hospital administration, Indian journal of Public Health; Journal of pharmaceutical and biomedical sciences.

Mathur et al [1] conducted study in hospitals of Allahabad, India which includes 283 participants(93% Response Rate);comprises of 75 doctors, 60 nurses, 78 laboratory technicians, and 70 sanitary staff findings reveal that knowledge about BMW Management plan, its authorization and guidelines among healthcare personnel was high but was low among sanitary staff.

In study conducted by Bathma et al [2] in tertiary care hospitals of Bhopal (110 respondents: 38 doctors, 44 nurses, 21 Lab technicians) and 7 waste handlers/supporting staff)observed that knowledge about BMW management and handling rule was much better in doctors (92.1%) as compared to nurses (54.5%) and Lab Technician(47.6%)and other staff as well as knowledge about disease spread by improper waste management was more in doctors(92.1%) as compared to nurses (84%). and the knowledge of nurses was better for waste segregation (70.5%) as compared to doctors (52.6%) The knowledge correct method of disposal & treatment of waste was more in nurses (77.3%) as compared to doctors (50%) knowledge of

colour container used in hazardous waste and storage time of waste was higher in nurses (72.7%) as compared to doctors(47.4%).

In study by Bansal et al.[3] conducted on “Biomedical waste management: awareness and practices in a district of Madhya Pradesh“ awareness about biomedical waste was maximum among doctors (100%) followed by Para-medical workers (95.83%) and least among non medical workers (43.10%) and awareness regarding colour coding and segregation was more among Para-medical workers (51.38%) than doctors (44.82%).⁸

Saini et al [4] in tertiary level hospital,new delhi india 800 Doctors,1600 Nurses and 6000 support staff showed that consultants, residents and the scientists, respectively had (85%, 81% and 86%) knowledge about the BMW management rule as compared to nurses (60%), and that of sanitary staff, operation theater and laboratory staff was 14%, 14% and 12%, respectively.

Pandit et al.[5] in Gujarat found that all the doctors were aware about risk associated with hospital waste. 74% of all visited doctors said that HIV and Hepatitis-B are the two diseases, from which one should be careful. But awareness of the auxiliary health personnel about this fact was poor. 57% ward-boys or Aayabens did not know about the risk associated with hospital waste. So this subordinate staffs, who actually handles the waste, is at higher risk and needs to be educated.

In a study conducted by Pallavi V.Tenglikar [6] among 44 nursing homes of Gulbarga city(December 2008 to November 2009), it was observed knowledge regarding general information about HCW is assessed (with scores 0-17), the average score is highest in doctors (15.82) followed by nursing staff (12.45) and least in housing staff (8.27)

Deo et al.[7] in his study found that knowledge regarding segregation was more among paramedical staff like nurses and lab-technicians (90%) than medical staff like doctors (80.6%).

2.2.3 Problem justification :

In Early Era India had been victim for Infectious diseases .Although through strong efforts we have achieved high number of reduction but strong emphasis is still needed in this area.Proper BMW Management provides healthy environment and safe condition for live being of health care personnel and patients also still not practiced properly due to some hindering factors like 1.Dependency of Medical officer on lower hierarchy staff 2.Lack of knowledge of guideline.

2.2.4 Rationale:

Most of studies show lack of knowledge and improper practice about BMW management among health care personnels e.g Staff nurses, Lab Technician and class 4 staff and even in medical practitioners and very few studies which cover District Hospital,Community Health Centres; Primary Health Centres; So to throw light on this issue, this study is conducted.

2.2.5 Research Questions :

1. What is the current knowledge status of public health care personnels about BMW management?
2. What are the factors that hinder the practice of BMW Management among Health care personnels?
3. Is there any Difference in Knowledge, attitude and practice of Health Care Personnels from Facility to Facility?

2.2.6 Objective :

- To assess the Knowledge, attitude and practice of BMW Management amongst health care personnels of Dahod District.

Category/Column	Waste Category	Treatment and Disposal	Container
Category-1	Human anatomical Waste(Human tissues, organs,body parts)	Incineration	Non chlorinated plastic bags
Category-2	Animal Waste(animal tissues,organs,body parts carcasses,bleeding parts,fluid,blood and experimented animals used in research, waste generated by veterinary hospitals/colleges, discharge from hospitals, animal houses	Incineration	Non chlorinated plastic bags
Category-3	Microbiology and & Biotechnology waste and other laboratory waste (wastes from clinical samples,pathology,biochemistry, hematology, blood bank,laboratory cultures,stocks or specimens of micro organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biological toxins, dishes and devices used for transport and culture)	Process follows three steps: 1.Disinfection at source by chemical treatment <u>or</u> autoclaving/microwaving followed by 2.Mutilation/Shredding and after that 3.Final disposal in secured landfill or disposable of recycle wastes(plastics or glass) through registered or authorized recyclers	Non chlorinated plastic bags Puncture Proof Container for sharps
Category-4	Waste sharps (needles,glass syringes or syringes with fixed needles,scalpels,blades,glass etc., that may cause punctures and cuts. Includes both used and unused sharps)	Disposal in secured landfill or Incineration	Non-chlorinated plastic bags Puncture Proof Container for sharps

Category-5	Discarded medicines or Cyto- toxic drugs(waste comprising of outdated, contaminated and discarded medicines	Disposal in secured landfill or Incineration	Non chlorinated plastic bags
Category-6	Soiled waste (Items contaminated with blood, body fluids including cotton, dressing and plaster casts, linen, bedding, other material contaminated blood)	Incineration	Non chlorinated plastic bags
Category-7	Infectious Solid Waste(waste generated from disposable items other than waste sharps such as tubings,hand gloves,saline bottles with IV tubes,catheters,glass, intravenous sets etc	follows three steps: 1.Disinfection at source by chemical treatment <u>or</u> autoclaving/ microwaving followed by 2.Mutilation/Shredding and after that 3.Final disposal in secured landfill or disposable of recycle wastes(plastics or glass) through registered or authorized recyclers	Non chlorinated plastic bags
Category-8	Chemical used in production of biological, chemical used in disinfection, as insecticides etc...	Chemical treatment and discharge into drains meeting the norms Solid disposals in secured landfill	Non chlorinated plastic bags, Puncture Proof Container for sharps
Category-9	Incineration Ash	ash from incineration of any biomedical waste	Disposal in municipal landfill.

Category-10	Chemical used in production of biological chemicals used in disinfection as insecticides	Chemicals used in production of biological,chemicals used in disinfection,as insecticides etc.	Chemical using 1% sodium hypochlorite solution and discharge into drains for liquid and secured landfill for solids.
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1. ● Waste minimization
2. ● Segregation
3. ● Codification
4. ● Handling
5. ● Transportation
6. ● Treatment
7. ● Disposal

Definitions

Primary Health Centre (PHC): Is the health facility in a rural setting and is the first level of contact of the community with a doctor. Primary Health Centre caters to a population of 30,000 in plains and 20,000 in difficult (hilly, tribal) areas.

24-hour functioning PHC: A PHC equipped for providing round the clock delivery services and newborn care with referral linkages in addition to all other services and emergencies that any PHC is required to provide.

Waste Minimization:

Waste minimization is defined as the prevention of waste production and/or its reduction. It involves specific strategies, changes in management and behavioural change. Methods of waste reduction include modification of purchasing procedures, control of inventory, and production of less toxic materials when discarded as wastes. No actions should however be taken that would impact on the quality and limit the access to health care.

Segregation:

Segregation is in some ways a minimization of wastes. In fact, it reduces the quantity of wastes which are hazardous and therefore require special attention and treatment. Segregation is the separation of wastes into the following categories: sharps, infectious non-sharps and non-hazardous waste (similar to household waste). Segregation of PHC waste occurs on site at the time the waste is generated, for example, when an injection is given and the needle and syringe are placed in a waste container, or when packaging is removed from supplies and equipment.

Codification

Codification is a colour-coded system which define the containers in which waste must be stored once segregated – for example: yellow or red for infectious waste and black for non-infectious waste.

Handling

Handling concerns the collection, weighing and storing conditions. In general, the maximum time of storing should not exceed 24 hours.

Treatment

Treatment modifies the characteristics of the waste. Treatment of wastes mainly aims at reducing direct exposure less dangerous to humans, at recovering recyclable materials, and at protecting the environment. For wastes from PHC, the main aim is to disinfect infectious waste, to destroy disposable medical devices, in particular used

syringe needles, which should not be reused, or at least to render them inaccessible or sterile prior to plastic reprocessing.

Disposal

Disposal refers to the final placement of treated waste, using a sanitary landfill or any other environmentally acceptable method of final storage appropriate to the local conditions.

1. The minimisation of the occupational and public health risks associated with the management of PHC waste, and 2. The minimisation of volume and mass of infectious sharps and non-sharps.

2.3 Methodology

2.3.1 Research Design

Descriptive Cross-sectional Study. Quantitative component will include schedule based survey, to assess the knowledge, attitude and practice of BMW Management at District Hospital, Sub District Hospital, CHC,PHC .

2.3.2 Target Population:

Health Care Personnels of District Hospital, Sub District Hospital, Primary Health Centres, and Community Health Centre of Dahod District.

2.3.3 Study Participants

Medical officers of PHC and CHC, Lab Technician, Pharmacist and Staff Nurses of Primary health Centres.

2.3.4 Sampling:

Purposive NonRandom Sampling Method is Used to carry out the Study.

2.3.5 Sample Size

Serial No.	Designation of Participant	Number Of Participant
01.	Medical Officers	21
02.	Staff Nurse	40
03.	Lab Technician	25
04	Pharmacist	08
05.	Sweeper	25
		119

2.3.6 Study Tool

For quantitative data collection, schedule based survey was conducted, where the investigators would record the study subjects' responses. A Collection Tool is Structure based Questionnaire. A self-developed, consisting of both open-ended and closed-ended(checklist) items were used. The study population comprised of Medical Officers, Staff Nurses, Lab Technicians, Pharmacists, Sweepers of CHC's and PHCs. Data was collected during field visit.

2.4. Ethical Considerations

An informed consent process will be carried out prior to the start of any data collection.

All potential participants will be given a chance to ask questions before starting any of the research activities. Field staffs will assist with the informed consent process by sitting in on the session with the participants and making sure the participants understand the study procedures and are comfortable asking questions. Participants will be informed and reminded that they may refuse to answer any and all questions and may discontinue their involvement in the study at any time.

2.5 Ethical Approval

The study will be presented to the ethical committee of IIHMR University, Jaipur. Quantitative data will be collected as a part of this study, using the above mentioned tools.

10. Health Facilities visited

1. District Hospital, Dahod
2. Sub District Hospital, Devgadh-bariya; Dahod
3. CHCs
 - Zalod
 - Limdi
 - Sanjeli
4. PHCs
 - Borwani
 - Nagrada
 - Gangardi
 - Abhlod
 - Panchwada
 - Zabu
 - Kanjeta
 - Antela
 - Dabhva
 - Ghughas
 - Rai Bar
 - Dasa
 - Bandibar
 - Mandli
 - Karamba
 - Kadwal

Chakaliya
Gultora
Lilva Thakur
Mirakhedi
Pethapur
Rupakheda

Observations :

1. District Hospital Dahod

- All the BMW Bins are in well maintained condition.and get cleaned properly.
- All the bins are covered with bags.
- All used syringes and needles are properly disinfected before Final Disposal.
- BMW is collected by “Samvedna” Private Authority on daily basis.

2. Sub-District Hospital, Devgadhbariya

- All the BMW Bins are in well maintained condition.and get cleaned properly.
- All the bins are covered with bags.
- All used syringes and needles are properly disinfected before Final Disposal.
- BMW is collected by “Samvedna” Private Authority on alternative day basis.
- Staff Nurse are interested to increase their knowledge about BMW Management and currently some of them are unaware of BMW Guideline.
Wrappers of Tobacco and Gutkha were thrown in Black BMW Bin.

3. Community Health Centre, Zalod

- There is only one yellow bin in OPD and which is open and overfilled.
- BMW Handling is taken care of by staff nurse and Medical officers are dependent on staff nurses regarding segregation and disinfection of BMW.

4. Community Health Centre, Limdi

- There is no single BMW bin in OPD and Pharmacy Department.
- BMW Bins are not cleaned properly in gynaecology and obstetric Department.
- Lab Technician is not aware of segregation of BMW and he has filled the form by asking someone's help.

5. Community Health Centre, Sanjeli

- All the BMW Bins are in well maintained condition and get cleaned properly.
- All the bins are covered with bags.
- All used syringes and needles are properly disinfected before Final Disposal.
- BMW is collected by "Samvedna" Private Authority on daily basis.
- There is no single BMW bin in OPD.
- Staff Nurse doesn't have knowledge regarding BMW Management.

6. Referral Hospital and Community Health Centre, Pethapur

- Doctors are very much interested to increase the knowledge and they have asked BMW Guideline.
- BMW is not collected from laboratory in regular interval.
- There is one single BMW Bin in Pharmacy.

7. Primary Health Centre, Panchwada

- All the BMW Bins are in well maintained condition and get cleaned properly.
- All the bins are covered with bags.
- All used syringes and needles are properly disinfected before Final Disposal.

8. Primary Health Centre, Borwani

- There is no single BMW bin in OPD.
- Lab Technician doesn't have enough Knowledge about BMW Guideline and Management.

9. Primary Health Centre, Zabu

- Medical Officer at PHC shows negative attitude about BMW Management.
- Sharp waste like needles were destroyed directly into Blue BMW Bin without cutting them and getting them disinfected.
- Staff Nurse doesn't have knowledge about BMW Guideline.

10. Primary Health Centre, Ghughas

- Sharp waste like needles were destroyed directly into Blue BMW Bin Without getting them disinfected with 1% Sodium Hypochlorite.
- BMW is not collected by "Samvedna" Private Authority on daily basis.

11. Primary Health Centre, RaiBar

- Sharp waste like needles were destroyed directly into Red BMW Bin without cutting them and getting them disinfected.
- Medical Officer rely on Staff Nurse for BMW Management.

12. Primary Health Centre, Dasa

- Sharp waste like needles were destroyed directly into Blue BMW Bin without cutting them and getting them disinfected.

13. Primary Health Centre, Bandibar

- Medical Officer at PHC and other staff members show negligence about BMW Management.
- BMW Bins are overfilled and having tobacco stains and don't covered by BMW Bags.
- Even after the instructions from DPC to MO of PHC, BMW Bins were in same condition in subsequent visit.
- There was a single bin in Labour Room although it is 24/7 PHC.

14. Primary Health Centre, Mandli

- Class 4 staff members don't have proper knowledge about segregation of BMW and not doing proper transportation of BMW.
- BMW Bins are overfilled and not cleaned properly in Laboratory.

15. Primary Health Centre, Rupakheda

- Doctors are very much interested to increase the knowledge and they have asked BMW Checklist.
- Improperly placed BMW Bins are in Pharmacy Department.

16. Primary Health Centre, Chakaliya

- There was a single bin in Labour Room.
- Pharmacists, Lab Technician and Staff Nurses don't have knowledge about BMW Management.

17. Primary Health Centre, Lilva thakur

- Staff Nurses doesn't have knowledge about BMW Management.
- BMW Bins are having tobacco stains.
- Wrappers of Tobacco and Gutkha were thrown in BMW Bin.

2.6 Discussion :-

This study is conducted in Dahod District and Public Health Facility covered are Dahod District Hospital, Devgadhbariya Sub District Hospital; Primary Health Centres, Community Health Centres ,119 Public Health Care Personnels (21 Medical Officers, 40 Staff Nurses,25 Lab Technicians,08 Pharmacist,25 Sweepers) were participated in this study.

Table 1.Number of correct response for questions on Knowledge regarding BMW

Questions		Doctors (n=21)(OUT OF 84)	Staff Nurse (n=40)	Lab Technicians (n=25)	Pharmacists (n=8)
Awareness about Personal Protective Measures		(86.90%)	38(95%)	24(96%)	8(100%)
Unders tanding of colour coding	Red bag	(97.62%)	25(62.5%)	20(80%)	07(87.5)
	Black Bag	(95.24%)	34(85.00%)	23(92%)	06(75%)
	Yellow bag	(91.67%)	28(70%)	19(76%)	08(100%)
Awareness about discarding objects causing punctures or cuts.		(97.62%)	36(90%)	20(80%)	7(87.5%)
Awareness about discarding of Needles		(94.05)	39(97.5)	24(96%)	08(100%)
Awareness about discarding of Anatomical Waste		(70.24 %)	28(70%)	15(60%)	3(37.5%)

As per BMW rules, waste should not be stored beyond 48 hours	(91.67%)	27(67.50%)	16(64%)	2(25%)
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Studies in other developing countries like Iran, Bangladesh and Pakistan also have similar findings, showing lack of knowledge, insufficient availability of personal protective equipment (PPE), Improper segregation of infectious & Non infectious waste, and Lack of revised BMW Guideline .[08][09][10] Similar findings were recorded in our study where the HCWs expressed their difficulty in following norms due to Non availability of needle cutters, lack of coloured bins and covers/bags, lack of Strong Monitoring and Supervision. The study showed that Medical Officers have least knowledge (86.90%) about personal protective equipment (PPE) compare to Staff Nurse (95%), Lab Technician(96%),Findings shows that > 50% of the Lab Technicians and 50% of the Staff Nurses don't have knowledge regarding BMW Guideline where 75% of Pharmacists have proper knowledge about BMW Guideline. Knowledge regarding Segregation Of Waste is least in Medical Officers(40.47%) However most of the Nursing staff had poor knowledge (62.5%) regarding the segregation of waste into Red BMW Bin. and segregation of waste into Yellow BMW Bin.(70%).

Table 2 : Attitude regarding BMW Management

Questions	Doctors (n=21)	Staff Nurse (n=40)	Lab Technicians (n=25)	Pharmacists (n=8)
BMW Management is your Responsibility.	15(71.43%)	36(90%)	21(84%)	6(75%)
BMW should be segregated into different categories	21(100%)	40(100%)	24(96%)	7(87.5%)

Your knowledge regarding BMW is Adequate.	09(42.86)	27(60%)	14(56%)	6(75%)
Safe management of BMW is not an extra burden of work	15(71.43%)	35(87.5%)	21(84%)	5(62.5%)

With respect to the attitude regarding the waste management,(28.57%) Medical Officers don't feel that BMW Waste Management is their responsibility and it causes an extra burden of workload. Only 42.86% Doctors think that their knowledge is adequate about BMW Management. 96% Class 4 people feel that BMW Waste Management is their responsibility and 64% Class 4 People feel that their knowledge about BMW is not adequate.

53.57% Medical Officers and 75% Staff Nurses didn't underwent Training for BMW Management, This study has helped us in identifying this gap and the necessity for training them. This study has also made us realize that such training programmes should be conducted regularly and make it compulsory for all the HCWs to attend. Practice of not recapping needles is less in Medical Officer (80.95%) is less than Staff Nurse (95%),Lab Technicians (92%).This was similar to the findings of studies done in Rajkot, Jaipur and Karnataka.[11][12][13].

Table 3. Practice on BMW management

Questions	Doctors (n=21, 21*4=84)	Staff Nurse (n=40)	Lab Technicians (n=25)	Pharmacists (n=8)
Undergone training in bio-medical waste management	(46.43%)	14(35.0%)	18(72%)	6(75%)
Proper Cleaning of BMW Bins	(97.62%)	38(95%)	24(96%)	08(100%)
BMW Transportation	(96.43%)	40(100%)	24(96%)	08(100%)

in closed container.				
Practice of not recapping the used needle.	(80.95%)	38(95%)	23(92%)	04(50%)
Practice of not throwing Anatomical waste in open areas	(63.10%)	37(92.50%)	20(80%)	08(100%)
Discarding of used needles in needle destroyer	(96.43%)	39(97.5%)	06(96%)	08(100%)

This can be achieved by conducting regular training programmes for the HCWs and updating them, providing the necessary resources like PPE, coloured bags for disposal, having enough supply of disinfectants and to develop protocols for disinfection, transportation & disposal of waste. By displaying posters of colour coding & segregation of waste at various points of generation of waste in the hospital. Regular surveillance and monitoring of the practices is also needed.

68% Of the class 4 People have the knowledge of complications of not discarding BMW on regular basis.76% Of class 4 People have the practice of transporting waste BMW in closed container; While 92% have proper knowledge of Hand Washing Techniques.

2.7 Conclusion :-

Findings show that Medical officers (86.90%) have least knowledge regarding Personal Protective Measures compare to Staff Nurse (95%), Lab Technician (96%). And Staff Nurse Understanding about Colour Coding is comparatively less than Medical Officers, Lab Technicians and Pharmacists. Awareness about discarding Objects is less in Laboratory Technicians compare to Medical officers and Staff Nurses. Awareness about discarding needles is less in Medical Officers (94%) than the Lab Technicians (95%), Staff Nurses (97.5%) and Pharmacists (100%).Knowledge regarding BMW Storage Rules is least among Pharmacists (37.5%) compare to Lab Technicians (64%) and Medical Officers (91.67%).

Staff Nurses (35%) and Medical Officers (46%) have not underwent Training Programme compare to Lab Technician (72%) and Pharmacists (75%).Practice of not recapping needles is less in Medical Officer (80.95%) is less than Staff Nurse(95%),Lab Technicians(92%).

2.8 Recommendation :

- Specific Training session should be Conducted for BMW Management, and give emphasis to change their attitude for BMW Management and to make them feel that BMW Management is also a part of their Responsibility.
- Training for Staff Nurse, Pharmacist Class 4 People should be conducted in Local Regional Language (Gujarati).
- Strong Monitoring and Evaluation should be conducted from District Quality Assurance Cell and also at facility Quarterly Assessment should be conducted by Medical officer by taking Personnel Interest and Best Performers should be greeted by Certificate of appreciation.
- There should be Predefined Way to Transport BMW in Facility.
- Staff Nurses should be encouraged to remove accessories like Bangles, Rings, Wrist Watch, Bracelet etc. before planning to carry out for delivery.
- Proper Supply of logistics like BMW Bags and Aprons; Gum Boots should be Provided.
- Revised Guideline should be provided to Health Care Facility by District Quality Assurance Cell.
- Focus Group Discussions should be conducted of selected Participants and should be guided by Subject Expert and with proper guiding Questions.
- BMW Record Register should be properly maintained by Respective Person.

- There should be Separate Storage Rooms for BMW with Lock and Key.
- There should be Proper Labelling Of BMW before Final Disposal.
- Final Disposal Site should be visited by Medical Officers atleast twice in a year.
- BMW Management is neglected in OPD, Pharmacy Department specially so that should be taken care of.

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Annexures:-

Bio Medical Waste Checklist

Name and address of the health centre :

Date of the interview :

Respondent's Name (**Medical Officer**) :

Age : Sex : Male/Female

Basic Educational Qualifications : Graduate/Post Graduate

Working Experience :

Working Experience at this health facility(completed years) :

Sr No.	Give Your answers	OPD	LABORATORY	PHARMACY	LABOUR ROOM
1.	How many no. of BMW Bins as per BMW Guide line (Red, Yellow, Blue, and Black) & Green Bins for General Waste.?				
2.	How many no. of BMW Bags as per BMW Guide line (Red, Yellow, Blue, and Black) & Green bags for General Waste.?				
3	Are Puncture proof Containers for Sharps / Blue Bags available at centre? 1.Yes. 2.No.				
4	Are Mutilators (Needle / syringe cutters) available? 1.Yes 2.No				
5.	Is PHC equipped with Calibrated Weighing machine for BMW? 1.Yes 2.No				

6.	Equipments for personal protection like Gloves, Caps, Masks, Aprons & Gum boots etc. used adequately As per BMW Guide line? 1.Yes 2.No				
7.	Is 1 % fresh Sodium hypochlorite or Bleaching Powder Solution As per BMW Guide line available or not?. 1.Yes 2.No				
8.	Is BMW Record Register is maintained on daily basis? 1.Yes 2.No				
9.	Are BMW Storage Rooms With Lock & Key? 1.Yes 2.No				
10	Is skilled person for Collection and Transportation of BMW?? 1.Yes 2.No				
11	Is Dedicated & Trained Infection Control Nurse there at centre? 1.Yes 2.No				
12	Did you receive training session conducted on of BMW handling? 1.Yes 2.No (If the answer is 2 than skip Q.no 13,14)				
13.	How many times training is received and What is the duration of training?				
14.	Did you find that training is useful? 1.Yes 2.No				
15.	Is the waste segregated at the site of generation?? 1.Yes 2.No				
16	Is the sharp infectious waste disposed in punctured proof containers? 1.Yes 2.No				
17	Is the Non sharp infectious waste is disposed (syringes,gloves,masks,blood bags and urine bags disposed in Red Plastic bins or bags? 1.Yes 2.No				

18	Is non infectious (General)waste e.gpacking Materials, Cartons, Fruit and vegetable pills, Syringe and needle wrappers, Medicine covers to be disposed in Green/Black plastic bins or bags.? 1.Yes 2.No				
19	Is Anatomical Infectious waste (Placenta, body parts) to be disposed in yellow plastic bins or bags? 1.Yes 2.No				
20	Is the infectious waste and non infectious waste mixed at the source of generation? 1.Yes 2.No				
21.	Is the waste covered in covered bins? 1.Yes 2.No				
22.	Is the bins cleaned up with more than 3/4 th level? 1.Yes 2.No				
23.	Is the bins cleaned with soap and disinfectant regularly? 1.Yes 2.No				
24.	Is the stored waste kept beyond 48 hrs? 1.Yes 2.No				
25.	Is the waste transported in closed containers? 1.Yes 2.No				
26.	Are the waste collection bins/Trolleys/wheel barrow used for transporting waste? 1.Yes 2.No				
27.	Is your bio medical waste disinfected and mutilated before final disposal? 1.Yes 2.No				
28.	Is the anatomical waste to be deep burried/incinerated? 1.Yes 2.No				

29.	Are the syringes to be cut and chemically disinfected with 1% sodium hypo chlorite solution at the source of generation before final disposal? 1.Yes 2.No				
30.	Is the infected plastics to be chemically disinfected or autoclaved ,shredded and send for final disposal? 1.Yes 2.No				
31.	Is the sharp injury reported and is it reported within 7 hrs. If yes then please mention the count per month 1.Yes 2.No				
32.	Is the detachment of barrel and plunger done before disinfecting the syringe? 1.Yes 2.No				
33.	Is the sharp waste mixed with other waste? 1.Yes 2.No				
34.	Is the practice of recapping or bending of needles done? 1.Yes 2.No				
35.	Is the sharp discarded in poly bags? 1.Yes 2.No				
36.	Is the vials and ampoules disposed in sharp containers? 1.Yes 2.No				
37.	Is the anatomical waste disinfected before final disposal? 1.Yes 2.No				
38.	Is the anatomical waste disposed in unsecured open areas or in any water bodies? 1.Yes 2.No				
39.	Is the personal protective gears like mask and gloves used while handling sputum cups and slides? 1.Yes 2.No				
40.	Is the sputum cup or slides disinfected with <u>5 % hypochlorite solution</u> for at least one hr? 1.Yes 2.No				
41.	Is the sputum cups finally disposed inside the premises? 1.Yes 2.No				

42.	Is the slides of the Sputum test disposed in sharp container? 1.Yes 2.No				
43.	Is the discarded blood bags punctured before disinfection in 5 % sodium hypochlorite solution for at least 1 hr.? 1.Yes 2.No				
44.	Is the blood bag discarded without mutilation and disinfection for final disposal? 1.Yes 2.No				
45.	For How much duration is the plastic waste like IV set,bottles,syringes,latex gloves, catheters etc.cut by scissors before disinfection in 1% sodium hypochlorite solution? 1.Yes 2.No				
46.	Is liquid waste spillage (blood, body fluid; pus or any discharge) disinfected by adding 1% hypochlorite solution before cleaning.? 1.Yes 2.No				
47.	Is the hand washing done before and after any procedure. i.e. After examination of how many patients? 1.Yes 2.No				
48.	Is all staff immune to hepatitis B and tetanus vaccine? 1.Yes 2.No				
49.	Does the hospital personnel visit the final disposal site even if outsourced or done outside the hospital? 1.Yes 2.No				
50.	Do you know the hazards of improper BMW management? 1.Yes 2.No				
51.	Do you feel BMW Management is your Responsibility? 1.Yes 2.No				☐
52.	Do you feel BMW should be segregated into different categories? 1.Yes 2.No				☐

53.	Do you think your knowledge regarding BMW is Adequate? 1.Yes 2.No	☐
54.	Do you think safe management of BMW is an extra burden of work? 1.Yes 2.No	☐

Bio Medical Waste Checklist

Name and address of the health centre:

Date of the interview:

Respondent's Name:

Designation: (**Staff Nurse/Multi Purpose Health Worker**):

Age: Sex: Male/Female

Basic Educational Qualifications:

1. Graduate 2.Post Graduate 3.Others (specify)

Professional Qualifications:

1.Diploma holder

2.Degree holder

3.Certificate holder

Working Experience(completed years):

Working Experience at this health facility (completed years):

Sr No.	Give Your Answers.	
01.	What are the objectives of BMW Management? 1.Reduce the infectious/hazardous nature of the waste 2.Reduce the volume of waste 3.Prevent misuse of the waste 4.Ensure occupational safety and health	☐
02.	How many no. of BMW Bins as per BMW Guide line (Red, Yellow, Blue, and Black) & Green Bins for General Waste are available?	☐
03.	How many no. of BMW Bags as per BMW Guide line (Red, Yellow, Blue, and Black) & Green bags for General Waste are available?	☐
04.	Are Puncture proof Containers for Sharps / Blue Bags available at centre? 1 .Yes 2.No	☐
05.	Are Needle/syringe cutters available at centre? 1.Yes 2.No	☐
06.	Is any training session conducted for BMW management? 1.Yes 2.No	☐
07	Which BMW Guideline is followed at centre? 1. BMW Guideline 1998 2. BMW Guideline 2011 3. BMW Guideline 2016	☐
08.	Are Personal protected equipments like Gloves, Caps, Masks, Aprons & Gum boots etc. used adequately As per BMW Guide line or not? 1.Yes 2.No	☐
09.	Infected plastic, syringes, dressing, gloves, masks, blood bag are disposed in which container? 1.Yellow 2,Green 3.Red	☐
10.	Is Non infectious (general) waste material cartons, Fruit and vegetable pills, Syringe and needle wrappers covered to be disposed in green/black plastic bins? 1.Yes 2.No	☐
11.	Is Anatomical Infectious Waste (Placenta, body parts) disposed in which container? 1.Blue 2.Yellow 3.Black	☐

12.	Is the infectious and non infectious waste mixed at source of generation? 1.Yes 2.No	☐
13.	Is the bins cleaned with soap and disinfectant regularly? 1.Yes 2.No	☐
14.	For How Much duration BMW is kept in the facility? 1.24 hours(1 day) 2.48 hours(02 days) 3.More than 48 hours	☐
15.	Is BMW transported in which type of container? 1.open 2.closed	☐
16.	Are the waste collection bins/Trolleys/wheel barrow used for transporting waste? 1.Yes 2.No	☐
17.	Are the syringes to be cut and chemically disinfected before final disposal? (If Answer is 2 than skip Q.17) 1.Yes 2.No	☐
18.	Which chemical is used in disinfection of syringes?	
19	Are gloves used while handling and syringe? 1.Yes 2.No	☐
20.	Is the sharp waste mixed with other waste? 1.Yes 2.No	☐
21	Is the practice of recapping or bending of needles done? 1.Yes 2.No	☐
22.	Is the anatomical waste disposed in open areas or in any rivers? 1.Yes 2.No	☐
23.	Is Anatomical Waste to be deep buried/incinerated?	☐
24	Do you feel BMW Management is your Responsibility? 1.Yes 2.No	☐

25	Do you feel BMW should be segregated into different categories? 1.Yes 2.No	☐
26	Do you think your knowledge regarding BMW is Adequate? 1.Yes 2.No	☐
27	Do you think safe management of BMW is an extra burden of work? 1.Yes 2.No	☐

Bio Medical Waste Checklist

Name and address of the health centre:

Date of the interview:

Respondent's Name:

Designation: **Lab Technician/Pharmacist**

Age: Sex: Male/Female

Basic Educational Qualifications:

1. Graduate 2. Post Graduate 3. Others (specify)

Professional Qualifications:

1. Diploma holder

2. Degree holder

3. Certificate holder

Working Experience:

Working Experience at this health facility (completed years):

01.	What are the objectives of BMW Management? 1.Reduce the infectious/hazardous nature of the waste 2.Reduce the volume of waste 3.Prevent misuse of the waste 4.Ensure occupational safety and health	☐
02.	How many no. of BMW Bins as per BMW Guide line (Red, Yellow, Blue, and Black) & Green Bins for General Waste are available?	☐
03.	How many no. of BMW Bags as per BMW Guide line (Red, Yellow, Blue, and Black) & Green bags for General Waste are available?	☐
04.	Are Puncture proof Containers for Sharps / Blue Bags available at centre? 1 .Yes 2.No	☐
05.	Are Needle/syringe cutters available at centre? 1.Yes 2.No	☐
06.	Is any training session conducted for BMW management? 1.Yes 2.No	☐

07.	Which BMW Guideline is followed at centre? 1.BMW Guideline 1998 2. BMW Guideline 2011 3.BMW Guideline 2016	☐
08.	Are Personal protected equipments like Gloves, Caps, Masks, Aprons. used adequately in the Pharmacy/Lab As per BMW Guide line or not? 1.Yes 2.No	☐
09.	Infected plastic, syringes, cotton/Gauze piece dressing, gloves, masks, blood bags are disposed in which container? 1.Yellow 2.Green 3.Red	☐
10.	Is Non infectious waste material cartons,Syringe and needle or slide wrappers covered to be disposed in green/black plastic bins? 1.Yes 2.No	☐
11.	Is Anatomical Waste (Placenta, body parts(organs);body fluids disposed in which container? 1.Blue 2.Yellow 3.Black	☐
12.	Is the bins cleaned with soap and disinfectant regularly? 1.Yes 2.No	☐
13.	For How Much duration BMW is kept in the facility? 1.24 hours(1 day) 2.48 hours(02 days) 3.More than 48 hours	☐
14	Is BMW transported in which type of container? 1.open 2.closed	☐
15	Is your bio medical waste disinfected and mutilated before final disposal? 1.Yes 2.No	☐
16	Is the anatomical waste to be deep burried /incinerated? 1.Yes 2.No	☐
17	Are the syringes to be cut and chemically disinfected with 1% sodium hypo chlorite solution at the source of generation before final disposal? 1.Yes 2.No	☐
18	Is the General waste to be chemically disinfected before final disposal? 1.Yes 2.No	☐
19	Is the sharp waste mixed with other waste? 1.Yes 2.No	☐

20	Is the practice of recapping or bending of needles done? 1.Yes 2.NO	☐
Question no.21 to 26 for Lab Technician only		
21	Container with specimens(except glass) are discarded in which bag/bin? 1.Blue 2.Yellow 3.Red 4.Black	☐
22	What is the procedure of management of tissues received in formalin? 1.Discard it in yellow bag and disposal by incineration. 2.Discard it in black bag and disposal by incineration. 3.Discard it in Yellow bag and disposal by deep burial/open landfill area.	☐
23	Is the procedure of mouth pipeting is in practice or not? 1.yes 2. No	☐
24	Which procedure has to be followed in the case of spill/leak of blood infectious material? 1. 10% sodium hypochlorite is poured on surface and allow it for one hour. 2. 5% sodium hypochlorite is poured on surface and allow it for 30 minutes. 3. 10% so sodium hypochlorite is poured on surface and allow it for 15 minutes.	☐
25	Is the cloth used for cleaning the blood spill reused? 1.Yes 2.No	☐
26	Tubes with blood samples are reused or not? 1.Yes 2.No	☐
27	Is the anatomical waste disposed in open areas or in any rivers? 1.Yes 2.No	☐
28	Is the sputum cups finally disposed inside the premises? 1.Yes 2.No	☐
29	Are the slides of the Sputum test disposed in sharp container? 1.Yes 2.No	☐
30	Do you feel BMW Management is your Responsibility? 1.Yes 2.No	☐
31	Do you feel BMW should be segregated into different categories? 1.Yes 2.No	☐
32	Do you think your knowledge regarding BMW is Adequate? 1.Yes 2.No	☐

33	Do you think safe management of BMW is an extra burden of work? 1.Yes 2.No	☐
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Bio Medical Waste Checklist

Date of the interview:

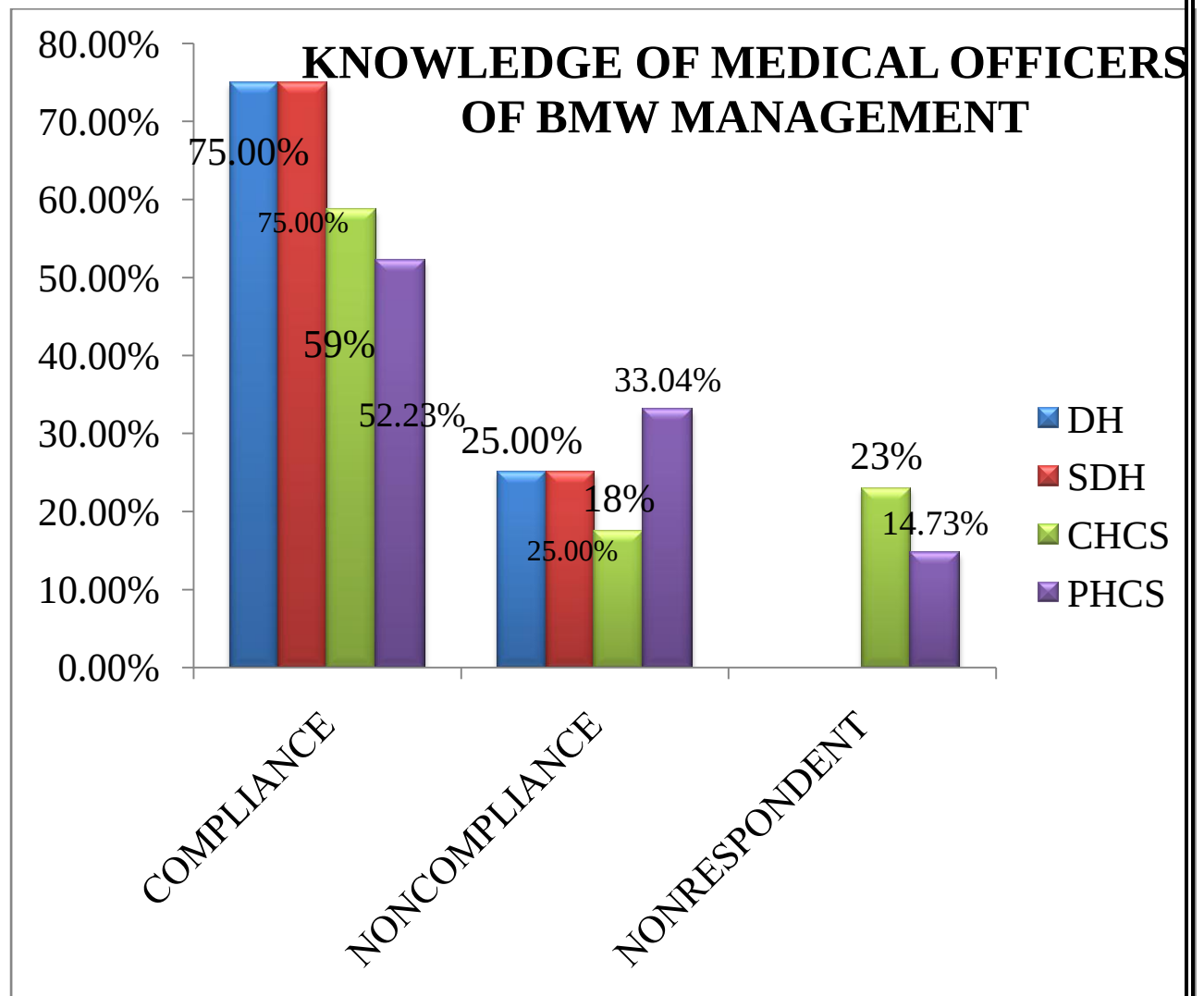
Desingnation : Class four staff member

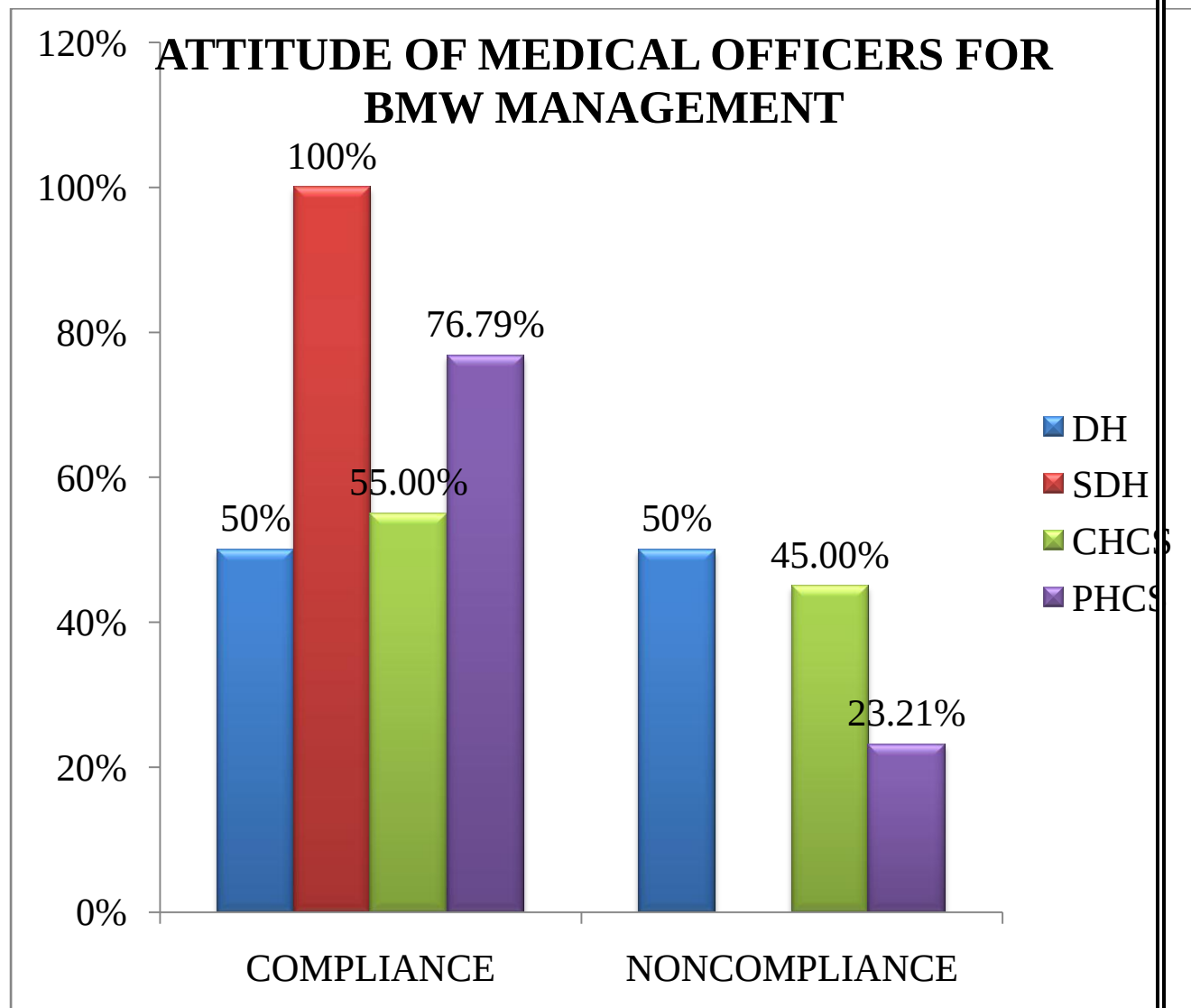
Basic Educational Qualifications:

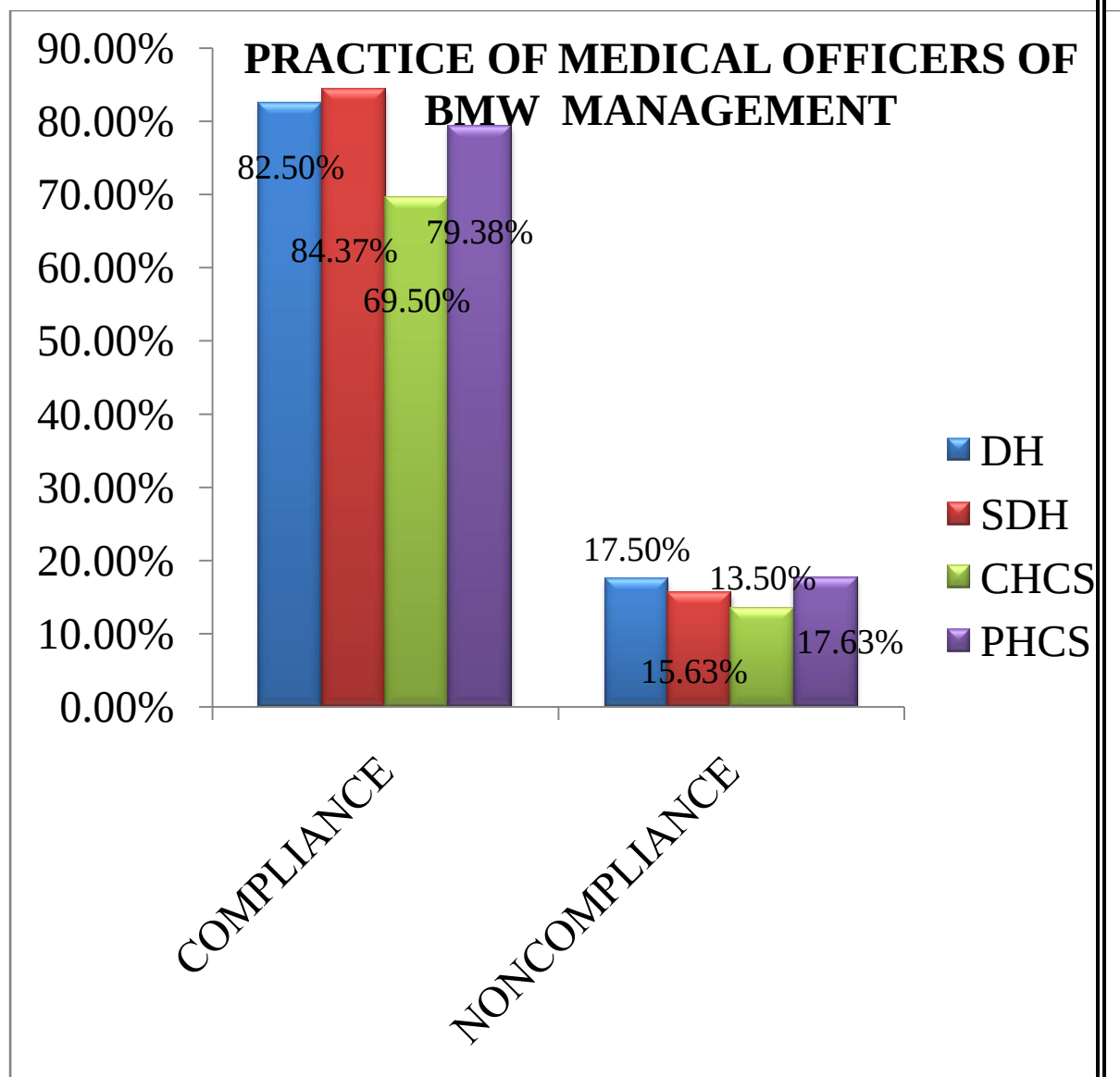
1.10th fail 2.10th pass 3.12th pass 4.Graduate

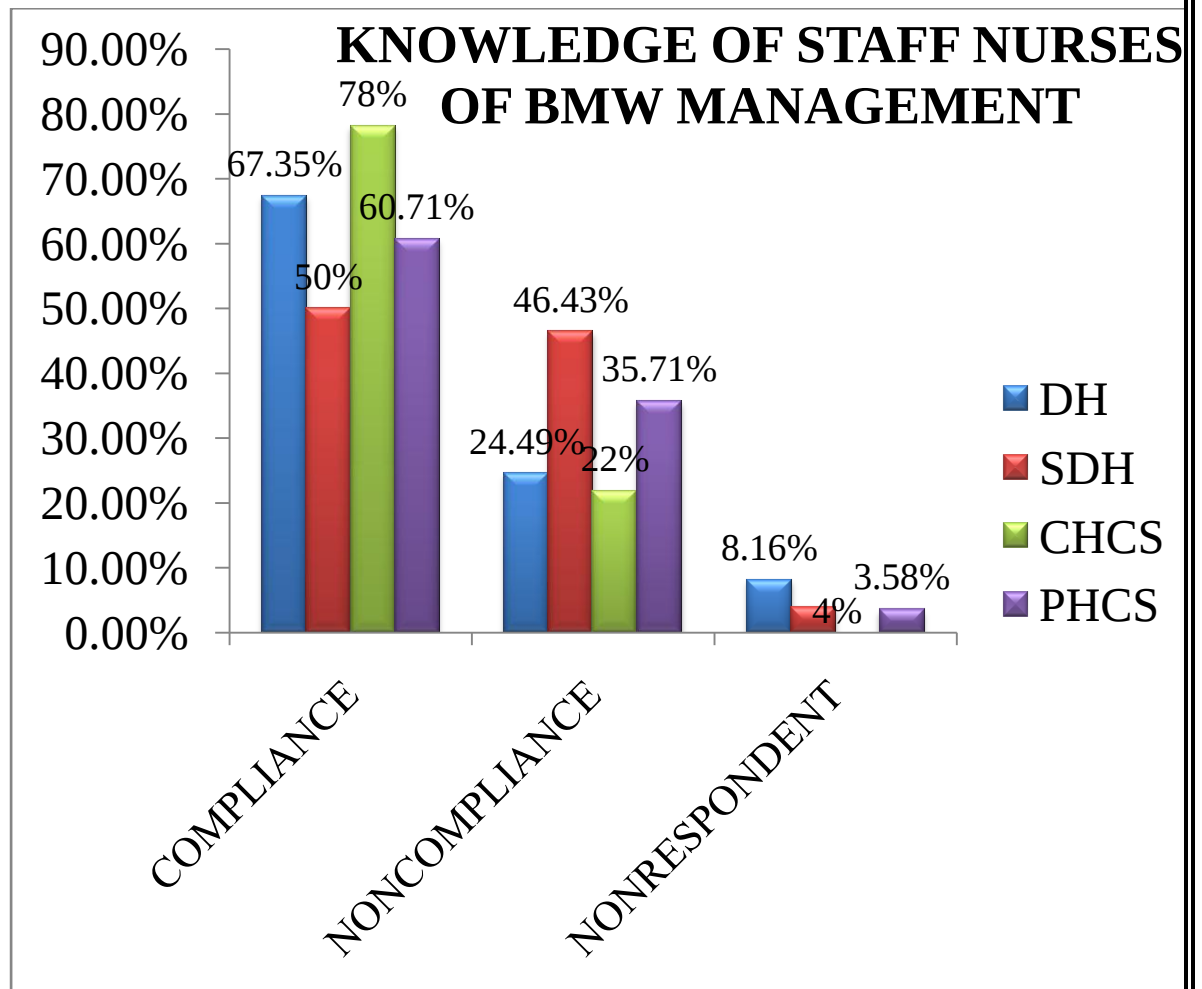
01.	Do You Know about BMW? 1.Yes 2. No	☐
02.	What things are included in BMW?	
03.	If BMW Management is not done on daily basis?	
04.	Do you wear Gloves, Masks while handling of BMW? 1.Yes 2. No	☐
05	Do you Chemically disinfect BMW before final disposal? 1.Yes 2. No	☐
06	Do you use any trolley for transportation of BMW? 1.Yes 2. No	☐
07	Have you received any training for BMW Management? 1. Yes 2. No	☐
08.	Do you transport BMW in open container? 1. Yes 2. No	☐

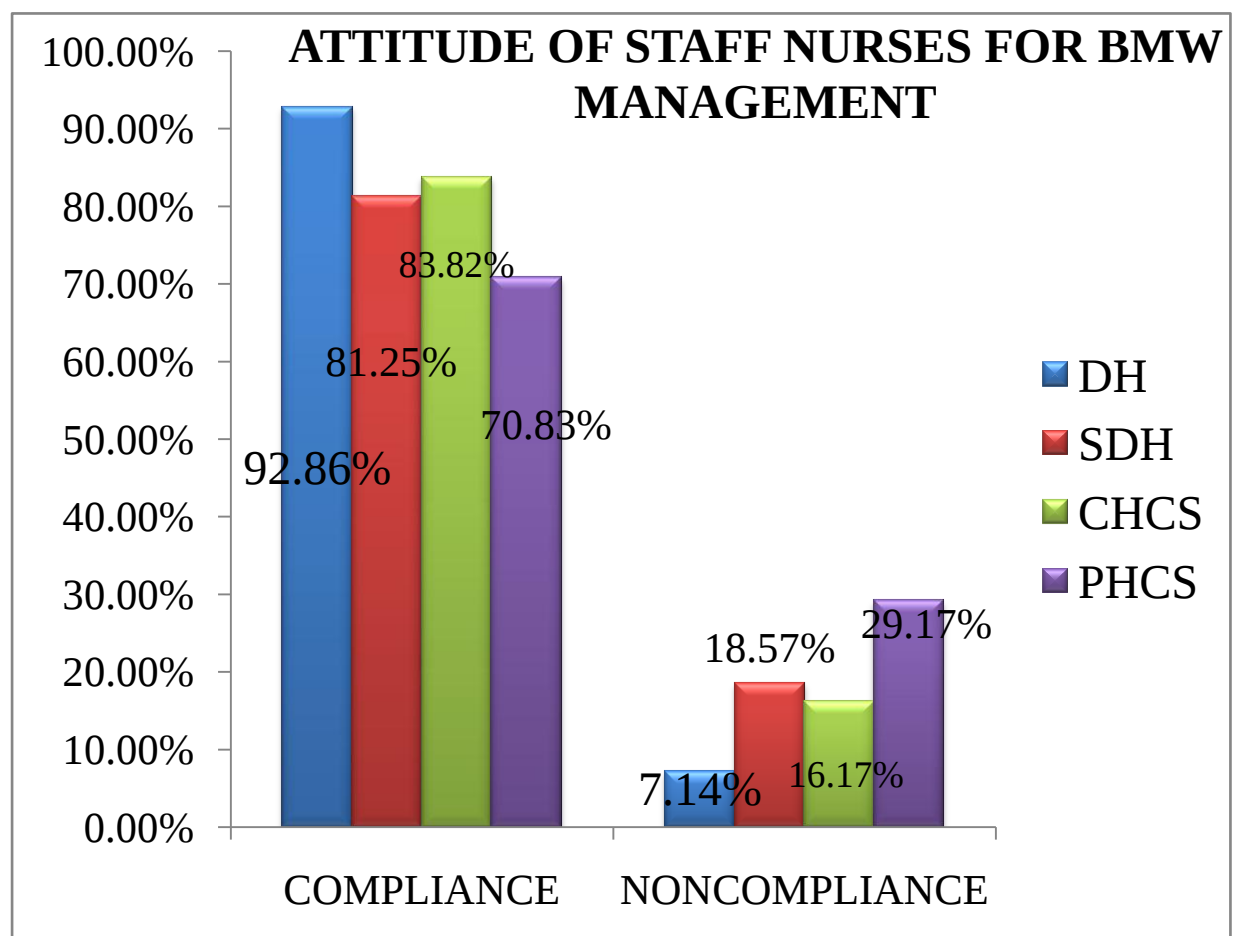
09.	Do you dispose BMW during OPD time? 1. Yes 2. No	☐
10.	Is there any Predefined way for transportation of BMW? 1. Yes 2. No	☐
11.	Do you know correct technique of Hand washing? 1. Yes 2. No	☐
12.	Is BMW Bin overfilled? 1. Yes 2. No	☐
13.	Is this correct technique of hand washing which is shown in picture? 1. Yes 2. No	☐
14.	Do you feel BMW Management is your Responsibility? 1.Yes 2.No	☐
15.	Do you feel BMW should be segregated into different categories? 1.Yes 2.No	☐
16.	Do you think your knowledge regarding BMW is Adequate? 1.Yes 2.No	☐
17.	Do you think safe management of BMW is an extra burden of work? 1.Yes 2.No	☐

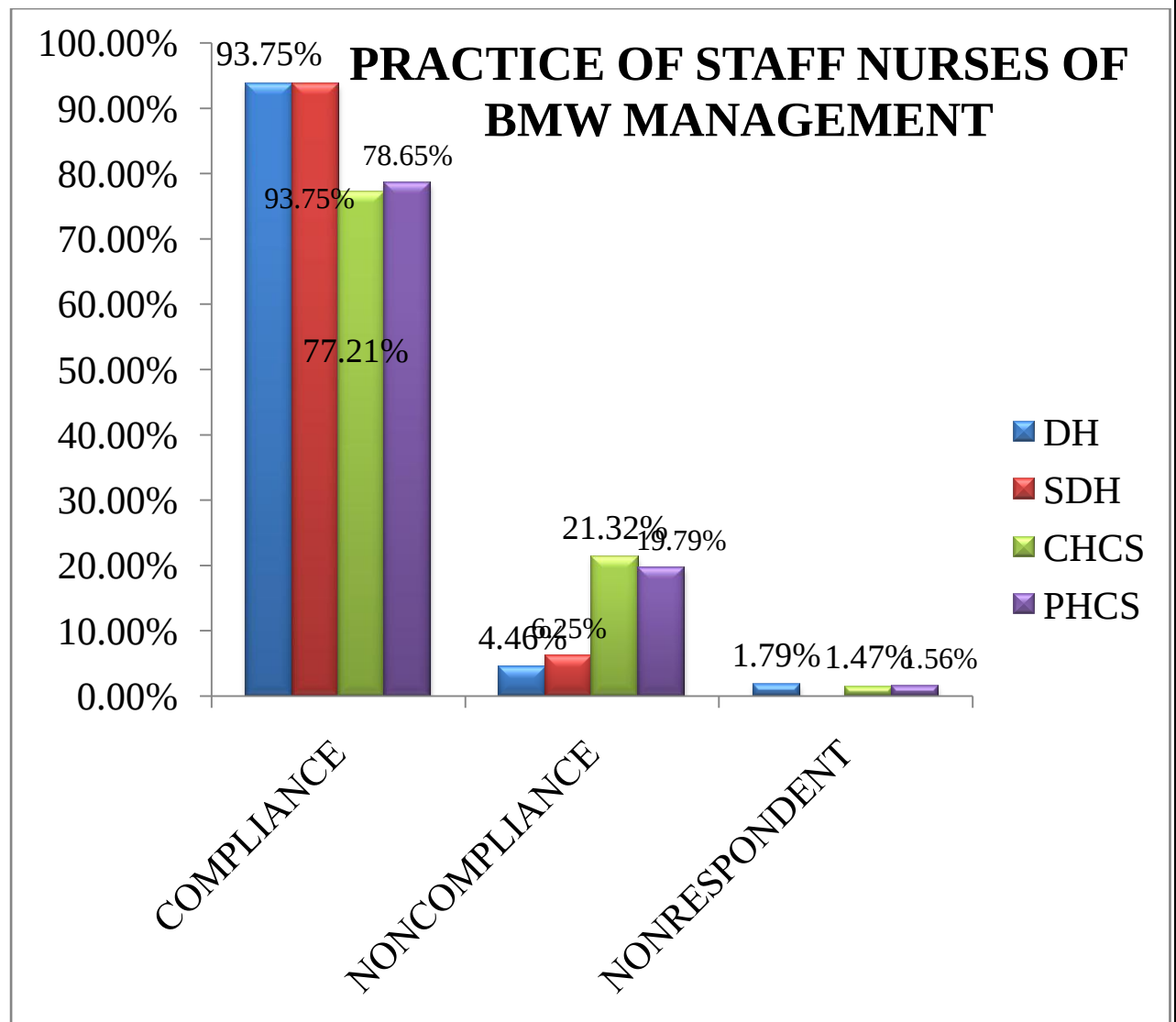


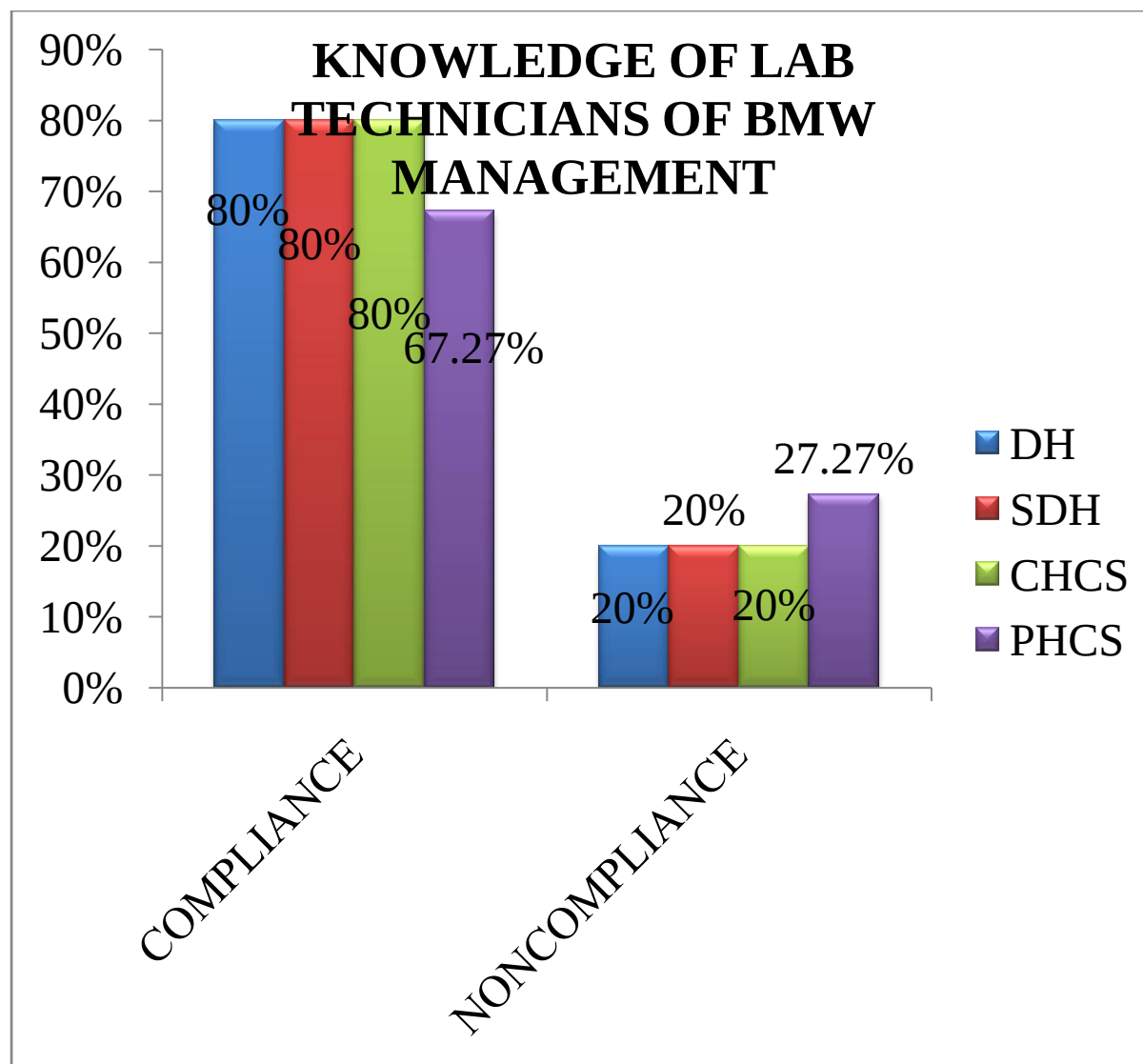


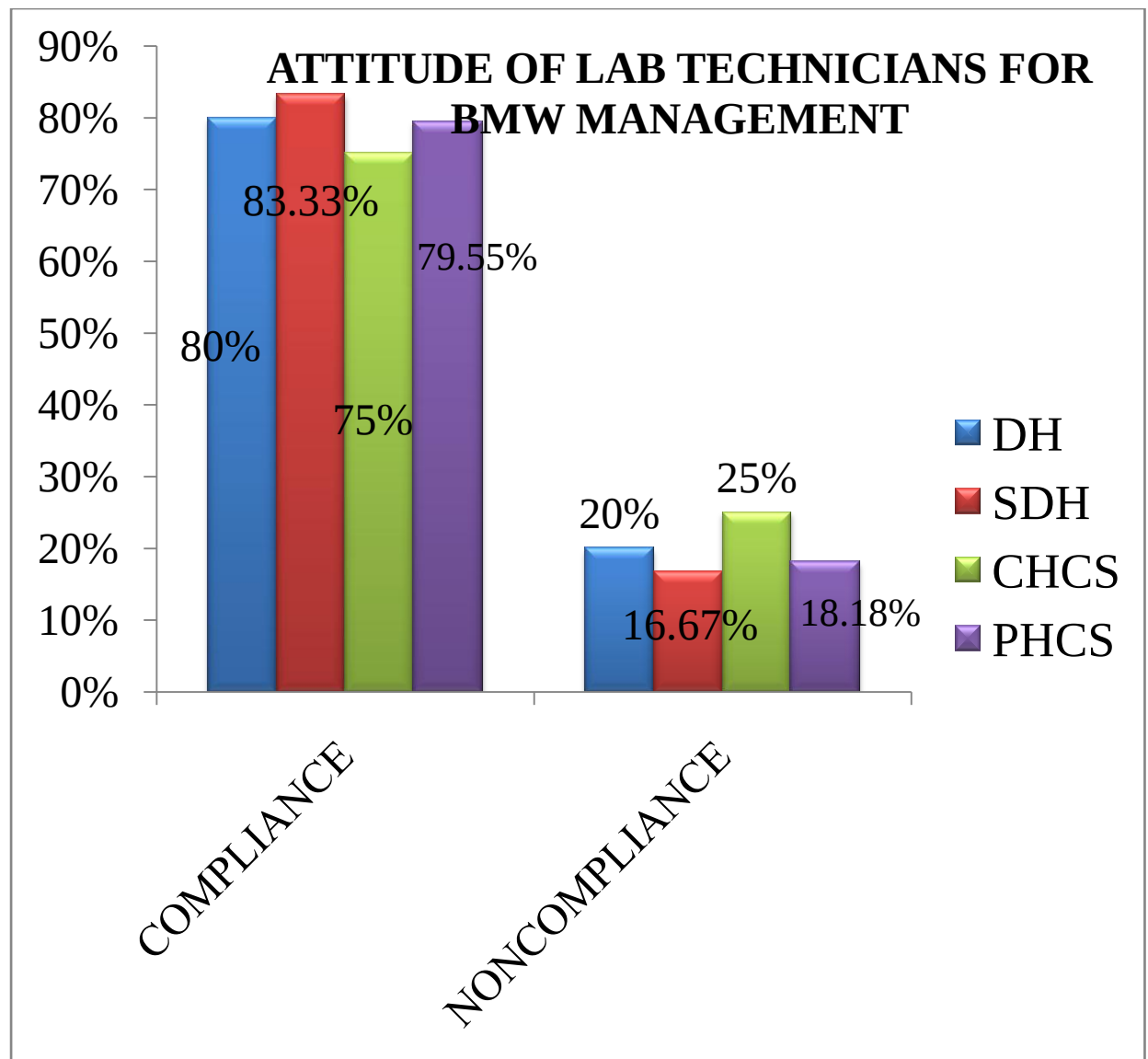


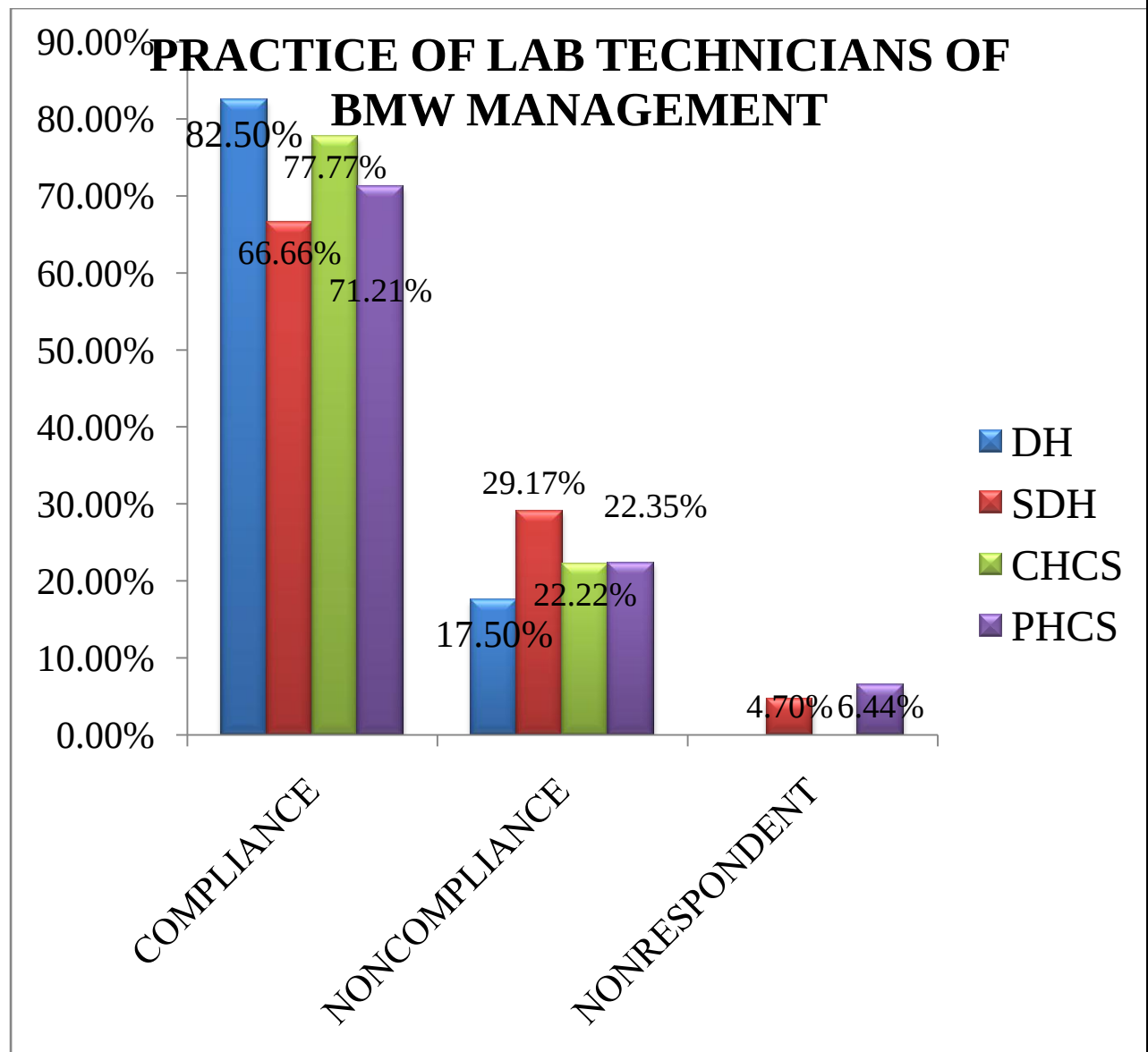


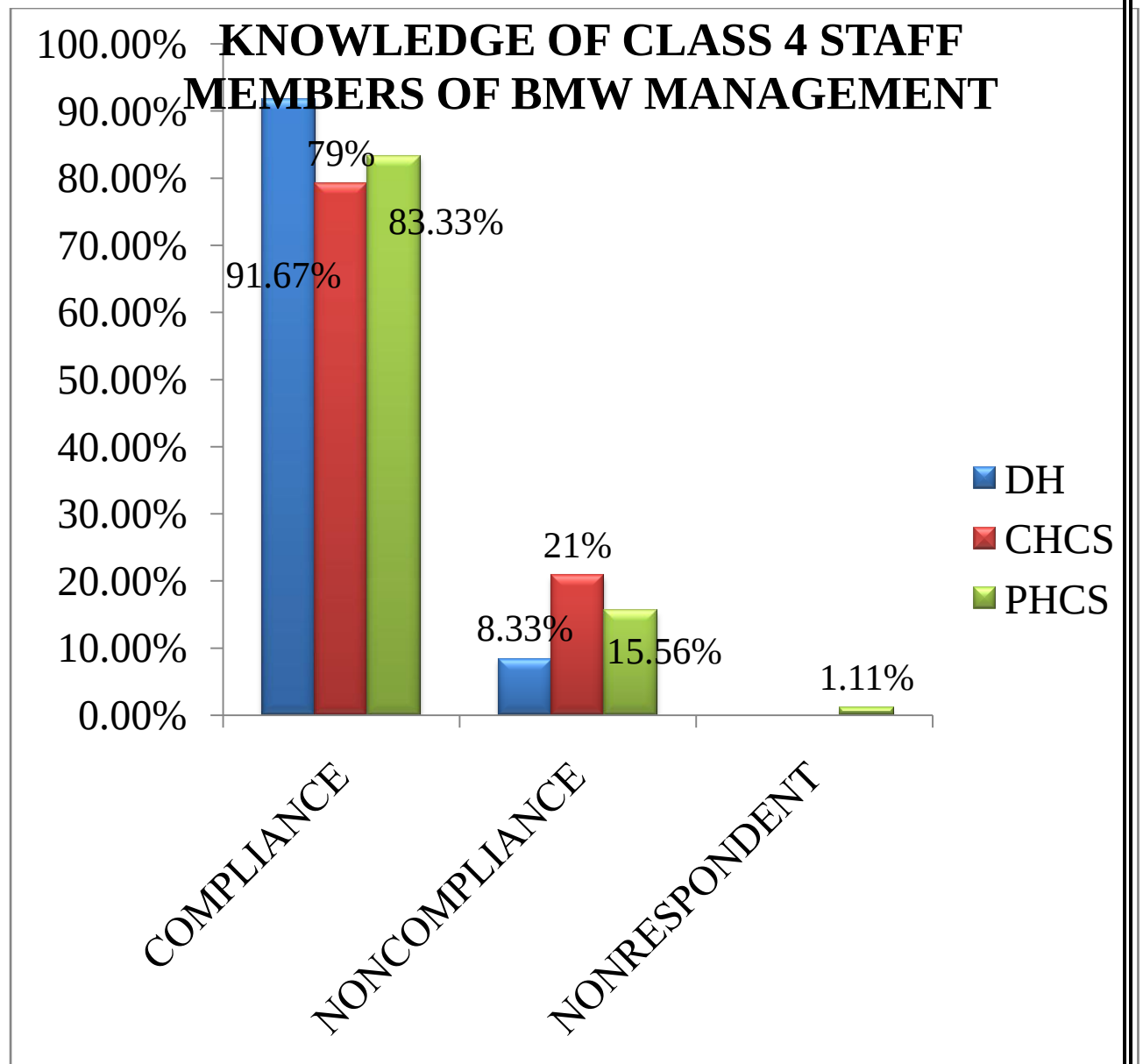


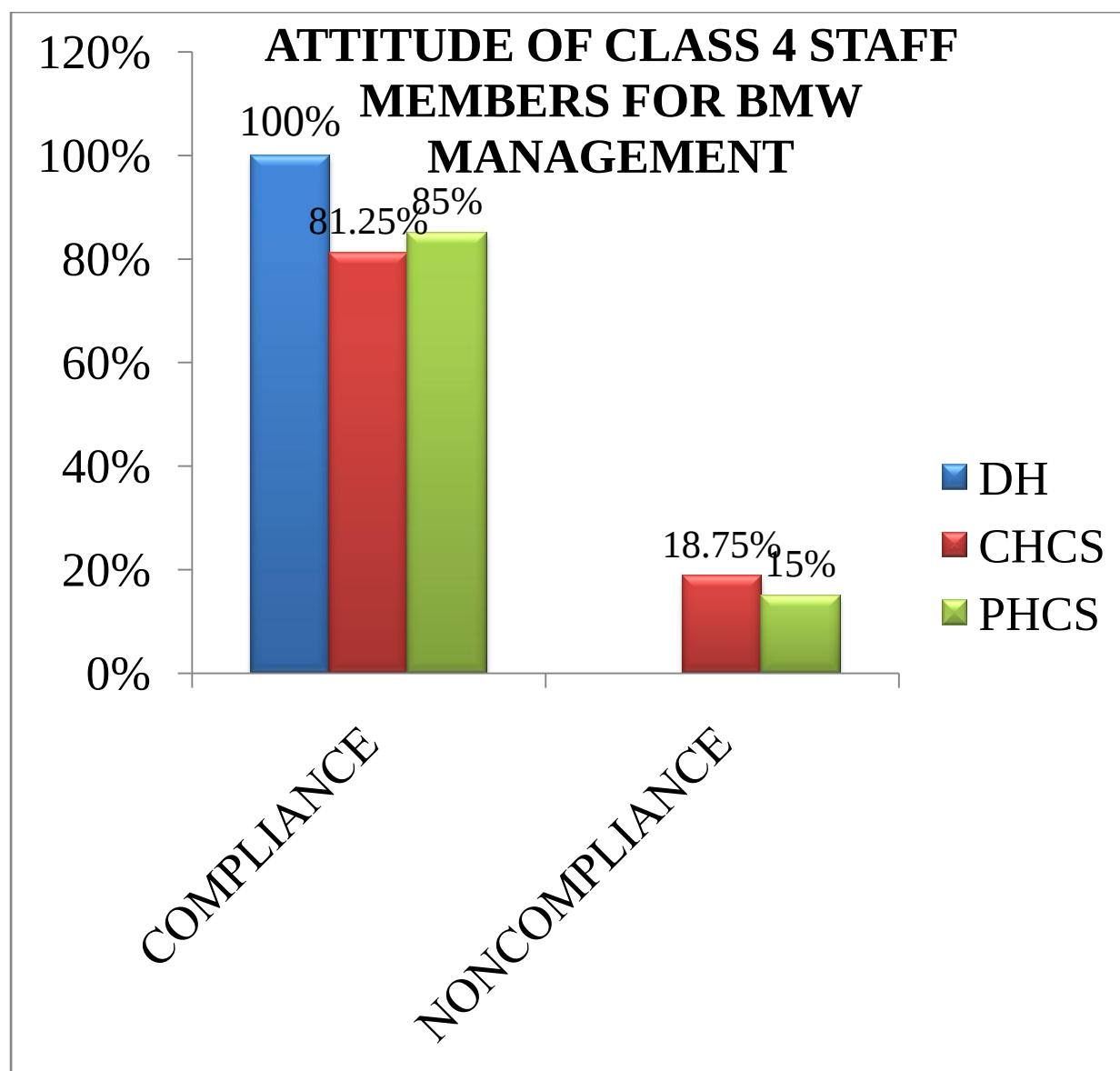


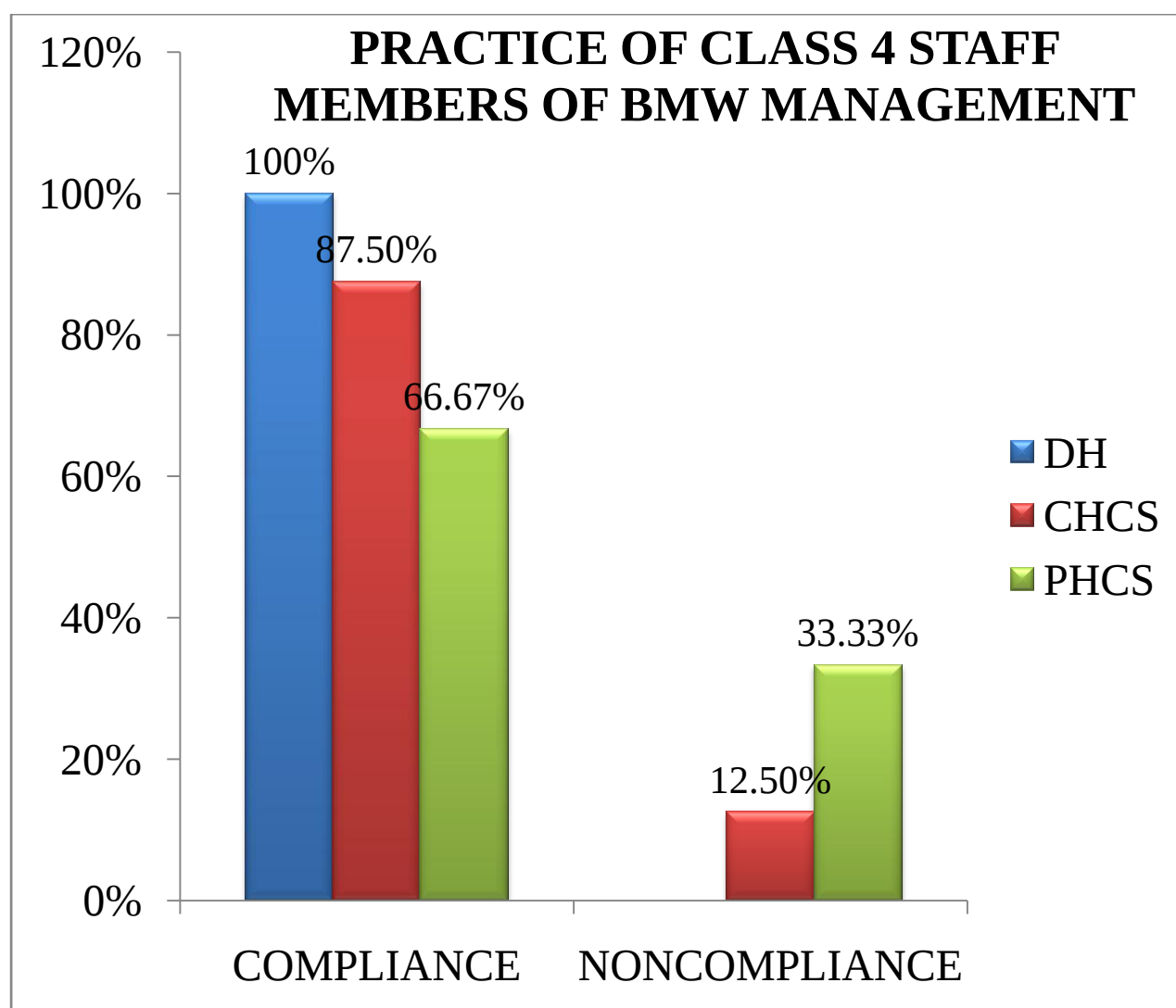












TIME SCHEDULE-

	Name of the department	Date of visit	% of time spent	Interacted with (Name & Designation)
1.	District panchayat office,Dahod		Approx 40%	Dr. J.J Pandya(CDHO SIR) Dr.Pahadiya (ADHO) Dr.M.I.Jamnu(QAMO) Dr. Rachana Amailyar(DPC-RCH)

				Mr.Nitashbhai (DDM) Mr.Dineshbhai Valu(D M & E) Mr.Dharmeshbhai Machar(Data Operator)
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Project B

Community Based Maternal Death Review in Dahod District, Gujarat

Preface

Summer training is an integral part of MBA Hospital and Health care Management as a part of curriculum of the course, students of the first year are required to undergo summer training and get in depth exposure about various departments of an organization and get better understanding of health care delivery system.

The **Major objectives of summer training programme** are as follows:

1. To get better understanding of existing health care delivery system including public and private sectors.
2. To observe the implementation of various national health programmes at National/State/District level.
3. To understand various functions of health system by interacting with various key stakeholders ,policy makers, programme managers, academicians and researchers.
4. To work/ Project assigned by respective organization.
5. To understand the work pattern of District Health Society and its organizational structure and to provide managerial and administrative skills to DHS.
6. The next objective of internship was to learn various managerial and administrative skills needed to work in a government system and to effectively implement all the health and health related programs in the government setup to ensure the overall benefit of the community.
7. To identify existing gaps in human resource, service delivery quality, data collection, Analysis and implementation of health programs in the District and to propose probable Solutions to them.
8. To coordinate proper functioning programs running in the district.

During any training period I had an overview of various programmes undertaking in District Health Society, Dahod. I also did Study on-

“Community Based Maternal Death Review in Dahod District, Gujarat”. I also had an opportunity to visit District Hospital, Sub District Hospital, various CHC and PHCs.

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1. MDR Project

1.1 Overview:

Maternal Health in Gujarat

Objectives of the state to improve Maternal Health

- To reduce Maternal Mortality Ratio.
- To increase the Early ANC registration.
- To ensure 3 or more than 3 ANC visits to all the expectant mothers and special attention to high risk pregnancies
- To decrease the incidence and progress of Anemia in pregnant and lactating women.
- Provide adequate opportunities for safe deliveries and to increase institutional deliveries.
- To improve the coverage of post - partum care.
- To increase access to Emergency Obstetric Care for complicated deliveries through strengthening of FRUs.
- To increase access to early and safe abortion services.
- To ensure the Maternal Death audit of all Maternal Deaths.
- To ensure JSSK entitlements in all Govt. institutions deliveries.

Maternal Health Schemes in Gujarat

Janani Suraksha Yojana (JSY)

JSY is a safe motherhood intervention under the National Rural Health Mission (NRHM). Its main aim is to reduce maternal and neo-natal mortality by promoting institutional delivery among the poor pregnant women. There is a notable increase in Institutional deliveries among the BPL, ST and SC population under this scheme. Benefits under the scheme are cash assistance with delivery and post-delivery care upto 2 live births. Financial plan includes the following: a)

Home delivery Rs 500/- b) Institutional Delivery in Rural Area Rs 700/ c) Institutional delivery in Urban Area Rs 600/- and d) For caesarean delivery Rs. 1500.

Mamta Ghar:

In some areas the state is determinants the ability to bring the necessary technical skills that is economic, geographical and operational for women's help. When female required access to a continuum of care, including appropriate management of pregnancy, delivery, post -partum care and access to life-saving obstetric care when complications arise are crucial to Safe Motherhood.

Mamta Sakhi (Birth Companion Scheme)

Under this scheme a female family member allow to be at the side of pregnant woman at the time of delivery in government institutions. So the presence of birth companion during childbirth meant that a woman was never left alone during this intensely stressful and frightening time of her life.

Mamta Doli

Reduction in delay due to transportation to the health facility for Institutional Delivery is of utmost importance for bringing down the MMR. In view of the above the State Govt. has decided to implement the Mamta Doli initiative in certain inaccessible areas of Gujarat. The purpose of the initiative is to bring the pregnant women to the nearest motor able point from where she can be picked up from ambulance receiving point for further transportation by EMRI 108 vehicle for Institutional Delivery or transportation of the pregnant women directly by the Mamta Doli service providers.

Mamta Abhiyan

Mamta Abhiyan is outreach preventive and promotive services for ANC and PNC are designed under MAMTA Abhiyan. MAMTA Abhiyan has four components including MAMTA Divas (Health & Nutrition Day), MAMTA Mulakat (PNC Home visit), MAMTA Sandarbh (Referral services) and MAMTA Nondh.

1.1.1 Introduction:

The maternal mortality ratio is the number of women who die from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and childbirth or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, per 100,000 live births.

Maternal Mortality Ratio (MMR) in India has shown an appreciable decline from 254/100,000 live births in the year 2004-06 as per the latest RGI-SRS survey report, released in April 2009. to 112/100,000 live births in 2013. However, to accelerate the pace of decline of MMR in order to achieve the NRHM and MDG Goal of less than 100 per 100,000 live births, there is a need to give impetus to implementation of the technical strategies and interventions for maternal health. Levels of maternal mortality vary greatly across the regions, due to variation in underlying access to emergency obstetric care, antenatal care, anemia rates among women, education levels of women, and other factors. The importance of MDR lies in the fact that it provides detailed information on various factors at facility, district, community, regional and national level that are needed to be addressed to reduce maternal deaths. There are two types of analysis to review Maternal Death:-

1. Community Based Maternal Death
2. Facility Based Maternal Death

TABLE 01. Health Indicators of Gujarat and Dahod

Demographic Profile	Gujarat State	Dahod District
Indicator	Total	
Total population (In crore) (Census 2011)	60439692	2127086
Maternal Mortality Rate	122	98.33
Crude Birth Rate (SRS 2013)	20.8	30.3

Crude Death Rate (SRS 2013)	6.5	8
Sex Ratio (Census 2011)	918	990
Child Sex Ratio (Census 2011)	886	948
Available Health facility		
No of villages	18618	697
No of Sub centers	9156	636
No of PHCS	1342	85
No of CHCS	326	13
Sub District Hospital	17	1
District Hospital	23	1

1.1.2 Literature Review

A retrospective analysis of maternal deaths was carried out from January 1986 to December 2005 at the Department of Obstetrics and Gynaecology, R. G. Kar Medical College and Hospital, Kolkata, India. Records were divided into four 5-yearly periods: 1986-1990; 1991-1995; 1996-2000; and 2001-2005, for comparison of the trends. The initial interval from 1986 to 1990 was chosen as the reference period.(Bhattacharyya et al. 2008; Jain et al).The study found that indirect causes were responsible for 18% (total number of maternal deaths in study = 1223) and 51% (total number of maternal deaths in study = 192) of deaths, respectively.

A nationwide sample survey in India observed that 23.4% deaths occurred during ante partum period, 21% deaths were due to indirect causes, and 59.1% deaths occurred in health facilities in 2003 (Indian council of Medical Research, 2003)

SEWA implemented a family-centre safe motherhood and new-born survival project for 7 years from 1 April 2004 to 31 March 2011 which catered to the entire Jhagadia block consisting of 168 villages with a population of 175 000, which is mainly tribal, rural and poor.This study is secondary analysis of prospectively collected community-based data of every pregnancy and its

outcomes from 2002 to 2011 in a rural, tribal area of Gujarat, India as part of safe-motherhood programme implemented by voluntary organization, SEWA Rural. The programme consisted of community-based interventions supported by a first referral unit, and promotion of institutional deliveries. For every maternal death, a verbal autopsy was conducted. The incidence rates for maternal mortality according to place, cause and timing of maternal deaths in relation to pregnancy were computed. Annual incidence rate ratios (IRR) and 95% confidence intervals, adjusted for caste and maternal education, were estimated using poisson regression to test for linear trend in reduction in mortality during the study period. Thirty-two thousand eight hundred and ninety-three pregnancies, 29 817 live births and 80 maternal deaths were recorded. Maternal mortality ratio improved from 607 (19 deaths) in 2002–2003 to 161 (five deaths) in 2010–2011. The institutional delivery rate increased from 23% to 65%. The trend of falling maternal deaths was significant over time, with an annual reduction of 17% (adjusted IRR 0.83 CI 0.75–0.91, P -value <0.001). There were significant reductions in adjusted incidence rate of maternal deaths due to direct causes, during intrapartum and post-partum periods, and those which occurred at home. However, reductions in incidence of maternal deaths due to indirect causes, at hospital and during antepartum period were not statistically significant. Most maternal deaths are now occurring at hospitals and due to indirect causes.

Secondary data analysis of the Chiranjeevi scheme in Gujarat by Mavalankar et al. (2009) revealed that more than 800 obstetricians have joined the scheme and more than 269000 poor women have delivered in private facilities in 2 years. It found that percentage of institutional deliveries among poor women increased from 27% to 48% between April 2007 and September 2008. In addition, there are fewer reported maternal and newborn deaths among the beneficiaries compared with the number of deaths expected in the absence of the scheme.

Anwari et al. studied obstetric patients admitted to ICU at Armed Forces Hospital, Riyadh, Kingdom of Saudi Arabia from 1997 to 2002. The study found that the two most common indications for admitting obstetric patients to ICU were hemorrhage and Hypertension. They concluded that invasive hemodynamic monitoring and ventilator support were the two main interventions. Improving quality of care before and after admission to ICU may reduce maternal morbidity.

Cecattiet al. studied 673 women admitted in ICU with severe maternal morbidity and could identify 194 cases of MNM and the 18 maternal deaths by WHO criteria. They concluded that with the WHO criteria for MNM they were able to identify almost all cases of death and organ failure. Between October 2002 and September 2007, 673 women with SMM were admitted, and among them 18 died. The identification of at least one of the WHO criteria in women who did not die defined the case as a near miss. Organ failure was evaluated through the maximum SOFA score above 2 for each one of the six components of the score, being considered the gold standard for the diagnosis of maternal near miss. The aggregated score (Total Maximum SOFA score) was calculated using the worst result of the maximum SOFA score.

Roostet al. has done Facility-based cross-sectional study in metropolitan La Paz, Bolivia. MMR was 187/100,000 live births and SMR was 50/1000 live births, with a relatively low mortality index of 3.6%. and they reported MMR as 187/100,000 LB and MNM as 50/1,000 LB, with a relatively low mortality index (MI) of 3.6%. They concluded that Severe haemorrhage and severe hypertensive disorders were the main causes of near-miss, with 26% of severe haemorrhages occurring in early pregnancy. Sepsis was the most common cause of death. The majority of near-miss cases (74%) were in critical condition at hospital admission and differed from those fulfilling the criteria after admission as to diagnostic categories and socio-demographic variables.

Prospective or retrospective reviews of medical records were conducted in nine referral hospitals in three countries (Benin, Côte d'Ivoire, and Morocco) was carried out by Filippiet al. and they Classified disease-specific criteria for identifying MNM cases which are based on five main categories of complications at term. They calculated the incidence of near-miss obstetric events, near-miss cases, and maternal deaths related to hemorrhage, hypertensive diseases of pregnancy, dystocia, infections, and anemia and analyzed these according to hospital and timing relative to admission.

Study carried out by Sri et al. 2012 during time period from April to November 2010. This is a fact-finding visit in January 2011 to investigate the 27 maternal deaths reported in the district, they found out that 23 (28.8%) women had to seek care at two or more hospitals and also an

absence of antenatal care despite high levels of anaemia, absence of skilled birth attendants, failure to carry out emergency obstetric care in obvious cases of need, and referrals that never resulted in treatment. They documented lack of accountability, discrimination against and negligence of poor women, particularly tribal women, and a close link between poverty and maternal death.

A retrospective case control study conducted in UK, at tertiary care centre, The cases consisted of all women who had emergency peripartum hysterectomy between 1 January 1993 and 31 December 2003. Controls were women who delivered immediately before and after the indexed case. there were 15 cases of emergency peripartum hysterectomy in 31,079 deliveries, giving the incidence of 0.48 per 1,000. They concluded that Haemorrhage due to placenta praevia especially in repeat C section was the main indication for emergency peripartum hysterectomy (47 %). Differences between cases and controls were compared with chi², Fisher exact and Student t tests. Multiple logistic regression analysis was performed to identify independent risk factors for emergency peripartum hysterectomy.

(Kumar et al. 2010) found out that The maternal mortality ratio (MMR) has fallen from 407 deaths per 100 000 live births in 1997–1998 to 212 in 2007–2009 and concluded that The increase in institutional deliveries with improved referral linkages is one of the important reasons thought to have resulted in reduction in MMR in India. (Sample registration system, Office of Registrar General, India 1998,2012).

1.1.3 Objectives:

- To understand the socio-demographic and obstetric history of the subjects.
- To identify the cause of maternal death in Dahod District and suggest possible intervention to reduce and prevent maternal death.

1.2 Methodology

1.2.1 Study Design:

Descriptive ,Quantitative in nature.

1.2.2 Target Population

Maternal Death occurred in Financial year of 2015-16 in Dahod district Gujarat.

1.2.3 Sampling

Nonrandom Sampling.

1.2.4 Sample Size

59 Maternal Death which comprises of 8 talukas of Dahod District.

1.2.5 Methods / Tools of Data Collection

The present study is based on the secondary data obtained by Gujarat health department through Community Based Maternal Death Review (verbal autopsy form) in 8 talukas of Dahod District (Dahod, Devgadhi Baria, Zalod, Sanjeli, Limkheda, Garbada, Dhanpur, Fatepura). All the data was in Gujarati, which was translated into english and was analyzed by using Microsoft EXCEL.

1.3 Discussion:

Section 1

Maternal death in Talukas of Dahod District

In the last financial year (April 2015- March 2016), total maternal death was 59. Among 8 talukas of Dahod district, Devgadhi Baria (24 per cent) recorded highest number of maternal death as compared to other talukas followed by Dahod taluka with 19 per cent (Table 2) (Chart 1). Zalod and Garbada talukas with similar number of death (14 %) is in third position. Fatehpura and Dhanpur are better performing talukas since the number of maternal death is less with 5 per cent and 3 per cent respectively.

Table 2 Total number of Maternal Deaths in the Talukas of Dahod District(n=59)		
Taluk Name	Total No. of deaths	%
Dahod	11	18.64
Zalod	8	13.56
Sanjeli	6	10.17
Fatehpura	3	5.08
Garbada	8	13.56
Dhanpur	2	3.39
Devgadhi Baria	14	23.73
Limkheda	7	11.86
Total	59	100.00

Maternal death in PHCs under Talukas

It is evident (Table 3) that highest number (7 per cent), of maternal death was at Karamba PHC which is under Sanjeli taluka. Followed by Karamba PHC were Dudhiya, Kuvabena, Gangardi, Jekot, Khangela PHCs each with 5 per cent maternal death.

Table 3
Maternal death in PHCs under Talukas(n=59)

Taluka Name	PHC Name	Total No of deaths	%
Dahod	Khangela	3	5.08
	Kathala	1	1.69
	Moti Kharaj	1	1.69
	Borvani	2	3.39
	Jekot	3	5.08
	Kharoda	1	1.69
Zalod	Kadval	2	3.39
	Rupakheda	2	3.39
	Bilvani	1	1.69
	Mahudi	1	1.69
	Mirakhedi	1	1.69
	Gultora	1	1.69
Sanjeli	Mandli	2	3.39
	Karamba	4	6.78
Fatepura	Balaiya	1	1.69
	Dungar	1	1.69
	Margala	1	1.69
Garbada	Jambua	1	1.69
	Pachwada	1	1.69
	Gangardi	3	5.08
	Jesawada	2	3.39
	Patiya	1	1.69
Dhanpur	Ved	1	1.69
	Rachhava	1	1.69
Devgadh Baria	Kuvabena	3	5.08
	Dabhava	1	1.69
	Guna	1	1.69
	Antela	1	1.69
	Bhuval	2	3.39
	Deghavada	1	1.69
	Sevania	1	1.69
	Dudhiya	3	5.08
	Bhathwada	1	1.69
Limkheda	Dhadhela	2	3.39
	Dasa	2	3.39
	Dudhiya	2	3.39
	Handi	1	1.69
Total		59	100

Section 2

Socio –Economic and Obstetric history details of the Subjects

Religion of the subjects reveals that the entire (100 per cent) subject belonged to Hindu (Table 4). Besides, it was evident that among the different caste group, maternal death was high among scheduled tribe (74 per cent), followed by other backward caste (22 per cent) and scheduled caste (2 per cent). Educational status of the subjects revealed that a large number (78 per cent) of the subjects were illiterate. Out of 15 per cent of the women had completed their primary education. Very few of the subjects had completed higher secondary (3 per cent) and graduation (2 per cent).

It was found that almost half of the subjects (47 per cent) were housewife. Among the other half, a large number (32 per cent) of them were involved in agricultural activities followed by 15 per cent in non-agriculture daily wage and remaining 5 per cent in other work.

Table 04. Socio –Economic Profile(n=59)		
Categories	No	%
Religion		
Hindu	59	100
Caste		
SC	2	3.39
ST	44	74.58
OBC	13	22.03
Total	59	100
Education		
Illiterate	46	77.97
Upto 8 th	9	15.25
10 th Pass	1	1.69
Upto 12 th	2	3.39
Graduation	1	1.69
Total	59	100
Occupation		
Housewife	28	47.46

Agriculture labour	19	32.20
Non-Agriculture-daily wage	9	15.25
Others	3	5.08
Total	59	100

Obstetric History

Table 04 shows the gravida of the subjects. It is evident that a large number (42 per cent) of the subject's gravida was one, followed by two (19 per cent) respectively. Nearly 40 per cent of the subject's gravida status was more than 2 in which for 13 per cent of them, gravida status was more than 5 as well. With regard to live-births, one-fourth of them had one live birth. An equal number of them (10 per cent) had 2 and 3 live births whereas 15 per cent of them had more than 2 live births. Notably, the number of still birth (3 per cent) was found to be less.

Number of children of the subjects revealed, three- fourth of them (75 per cent) with less than 2 children, followed by 3-4 (19 per cent) and 5 children (7 per cent) respectively.

Table 4		
Obstetric History(n=59)		
Categories	No	%
Gravida		
1	25	42.37
2	11	18.64
3	6	10.17
4	9	15.25
More than 5	8	13.56
Total	59	100.00
Live births		
0	23	38.98
1	15	25.42
2	6	10.17
3	6	10.17
More than 4	9	15.25
Total	59	100.00
Previous still birth		

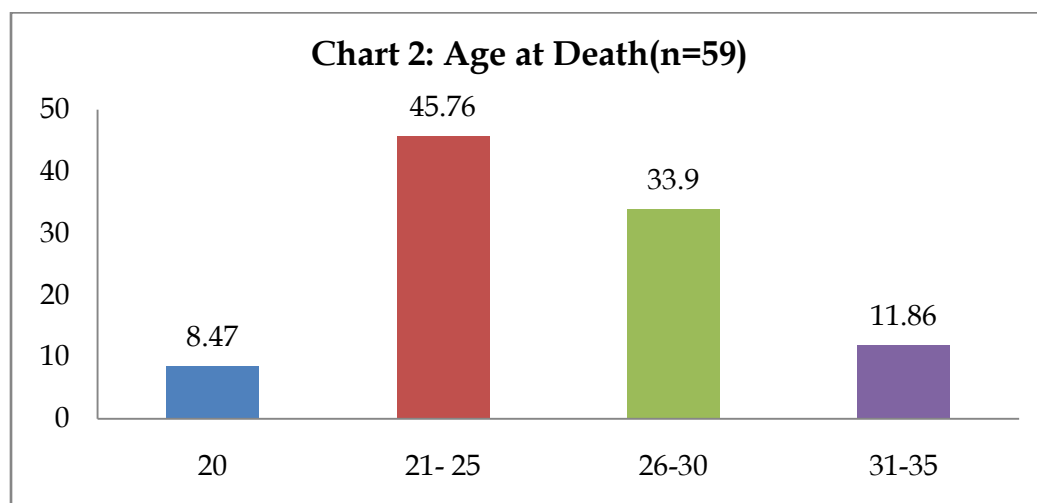
2	1	1.69
More than 4	1	1.69
No. Living Children		
≤ 2	44	74.58
3-4	11	18.64
≥ 5	4	6.78
Total	59	100.00

Section 3

Maternal Death in Dahod District

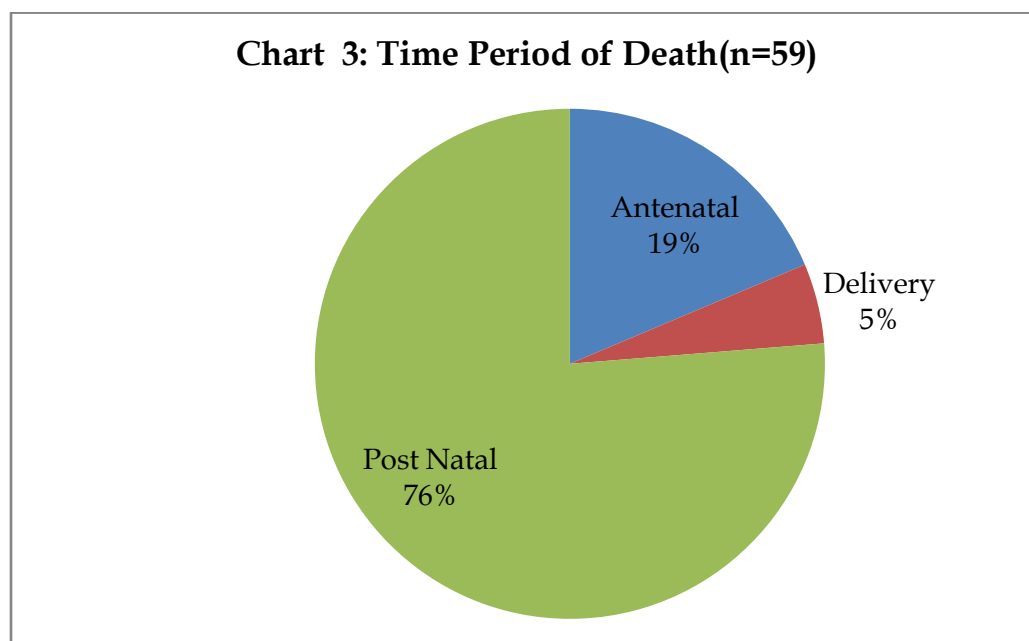
Age at death

Almost half (46 per cent) of the mothers who died were in between 21 to 25 age group. With 34 per cent, maternal death was high in 26-30 age groups. Notably less than 10 per cent of the maternal death was in the age of 20 (Chart 2).



Time Period of Death

Three- fourth of the maternal death had happened during post-natal period (Chart 3),19 per cent of the death was during antenatal period and only 5 per cent was during delivery. Thus, it is important to identify the factors contributing to death during post-natal period.



Duration of Death

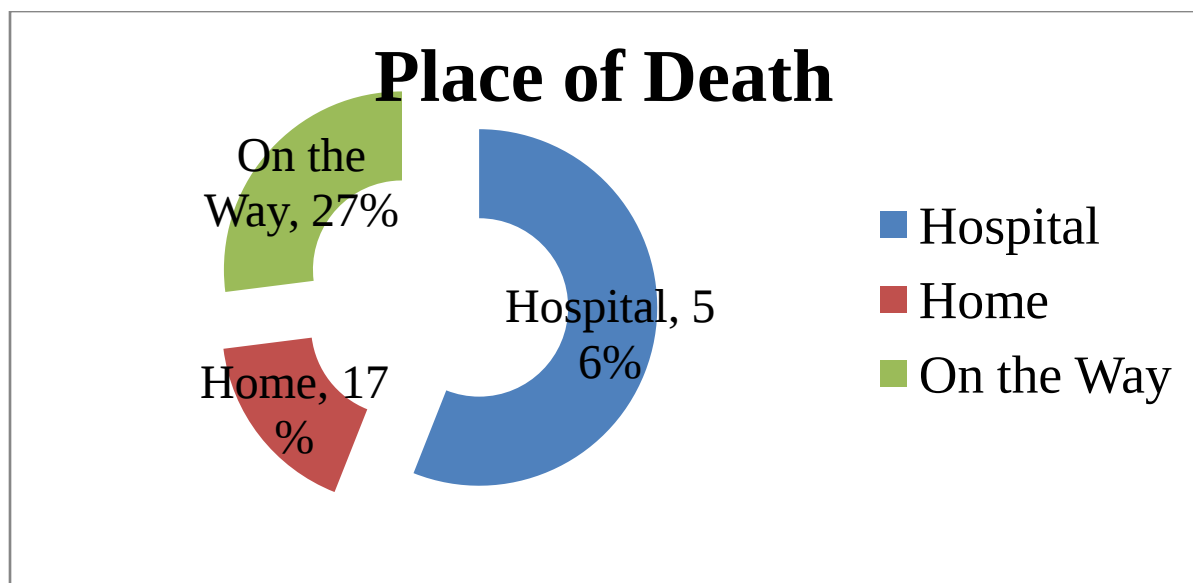
A large number of maternal deaths were after 29th week of pregnancy (Table 6). 17 per cent of the maternal death was in between 17- 28th week. Very few (3 per cent) of the deaths were in 30th and 36th week. Besides, only 3 per cent of maternal death was in less than 16th week.

Table 06		
Week of Death(n=59)		
	No	%
Week of Death		
<16 weeks	2	3.39
17-28 week	10	16.95
≥ 29 week	45	76.27
30 week	1	1.69
36 week	1	1.69

Total	59	100.00
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Place of Death

More than half (56 per cent) of the maternal death had happened in the hospital (Chart 4). Slightly more than one-fourth (27 per cent) of the maternal death had happened' on the way' from home to hospital. 17 per cent of the death was at home.



Death by Type of Hospital

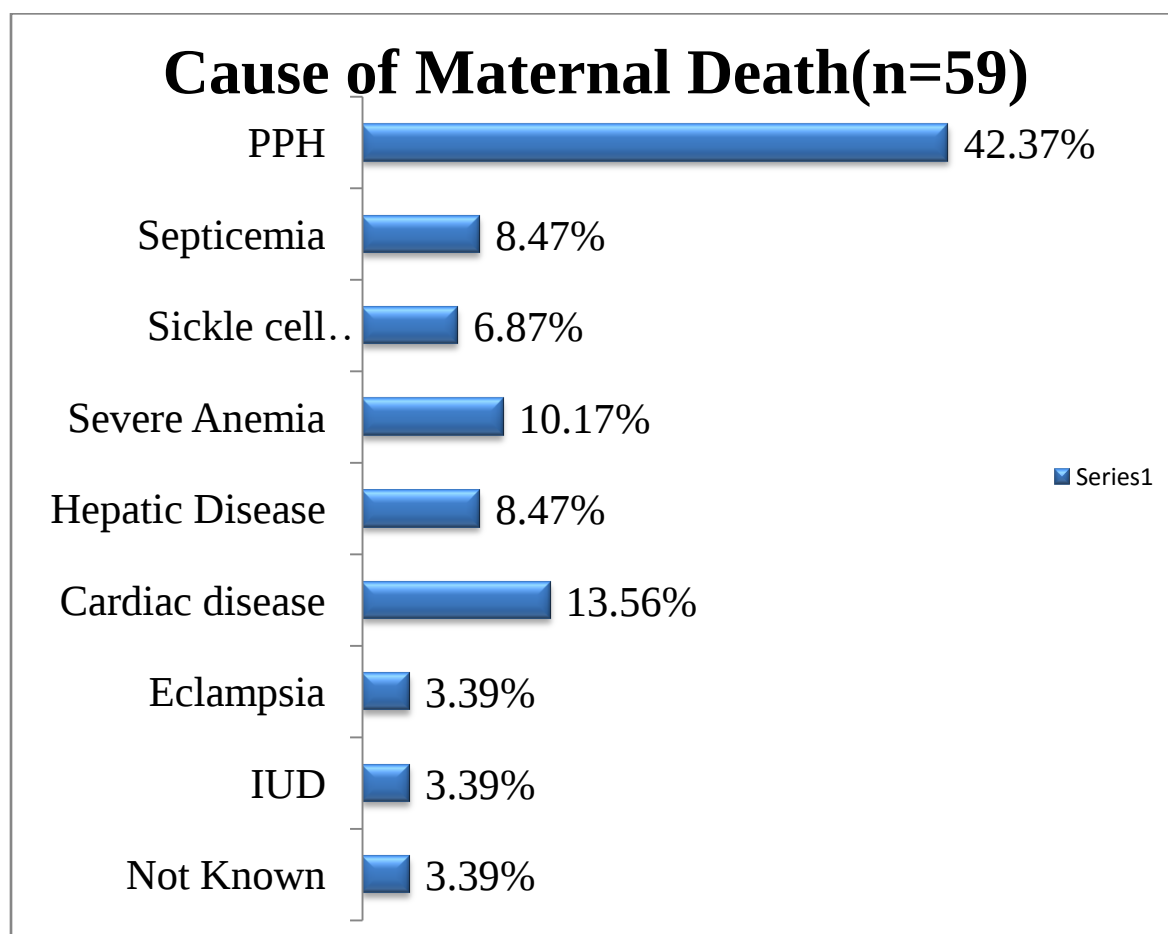
Maternal deaths by type of hospital reveals that among those maternal death happened in hospital, a large number of them were in private hospitals (39 per cent) (Table 07). Slightly more than one-fourth (27 per cent) of the maternal death was in Medical college hospital followed by district hospital (18 per cent). Number of deaths in Sub-district hospital (6 per cent), PHC (6per cent) and CHC (3 per cent) was less.

Table 07 Maternal Death by Type of Hospital(n=59)		
Type of Hospital	No	%
Private	13	39.39
Medical College Hospital	9	27.27
District Hospital	6	18.18

Sub-District Hospital	2	6.06
CHC	1	3.03
PHC	2	6.06
Total	33	100.00

Cause for Maternal Death

It is evident from chart 5 that the leading/major causes of maternal death in the study area were PPH (42 per cent). Cardiac diseases such as acute myocardial infarction, acute cardio respiratory arrest, thrombo embolism and pulmonary embolism are the causes for maternal death among 14 per cent of them. 10 per cent of the maternal death was due to severe anaemia and anaemia. For 8 per cent of them, hepatic diseases such as jaundice, hepatic with anaemia, hepatic with jaundice and hepatic coma was the reasons for their death. Similar percentage (8 per cent) of maternal death was due to Septicaemia. Sickle cell crisis was the reason for death for 7 per cent of them.



ANC Checkup

It is evident that half of the subjects (51 per cent) had received 2 to 3 ANC checkup. Almost 14 per cent of the subjects did not have even 1 ANC checkup. 19 per cent received only one ANC checkup.(Table 08).

Table 08 ANC Check –up(n=59)		
No of Visit	No	%
0 Visit	8	13.56
1 Visit	11	18.64
2 to 3 visit	30	50.85
4 and above visit	10	16.95
Total	59	100

Type of Delivery and Outcome of Delivery

Type of delivery of the subject's reveals that for a large number (41 per cent) of them delivery was normal and only few had C-section (3 per cent) (Table 09). With regard to outcome of delivery, for a large number of them, it was live birth but the child died after birth. For one-fourth of them, outcome of the delivery was still birth.

Table 09 Type of Delivery and Outcome of Delivery(n=59)		
	No	%
Delivery Type		
Normal	24	40.68
C-Section	2	3.39
Don't know	33	55.93
Outcome of Delivery		
Still Birth	15	25.42
Live Birth & Infant death	26	44.07
Don't know	18	30.51

1.4 Summary

Devgadh Baria recorded highest number of maternal death as compared to other talukas in Dahod district. Besides, highest number of maternal death happened at Karamba PHC which is under Sanjeli Taluka. Socio-economic profile of the subjects revealed that maternal death was high among scheduled tribe, illiterate and among 21-25 years old women. Most of them were housewife. Mostly maternal death was during post- natal period and after 29th week of pregnancy. Large number of maternal death happened at private hospital.PPH was major cause of maternal death. It was evident that half of them received 2-3 ANC check-up. Large number them delivery was normal only few of them were C- section. Large number of women delivered live birth but some of died within one year and few of them delivered still birth.

1.5 Conclusion

Devgadh Baria recorded highest number of maternal death as compared to other talukas in Dahod district. Besides highest number of maternal death happened at Karamba PHC which is under Sanjeli Taluka.

Socio-economic profile of the subjects revealed that maternal death was high among scheduled tribe,illiterate and among 21-25 years old women. Most of them were housewife. Mostly maternal death was during post- natal period and after 29th week of pregnancy.(3rd Trimester) Large number of maternal death happened at private hospital.PPH was major cause of maternal death. It was evident that half of them received 2-3 ANC check-up. Large number them delivery were normal only few of them were C- section. Large number of women delivered live birth but some of died within one year and few of them delivered still birth.

- Devgadhi Baria recorded highest number of maternal death as compared to other taluks in Dahod district.
- Highest number of Maternal death happened at Karamba PHC which is under Sanjeli Taluka.
- Maternal death was high among scheduled tribe followed by other backward caste and scheduled caste.
- Large number of women were illiterate.
- It was found that almost half of the women were housewife.
- Almost half of mother was died between 21 to 25 age group.
- Three fourth of maternal death happened during post- natal period.
- A large number of maternal deaths were happened after 29th week of pregnancy.
- Large number of maternal death happened at private hospital.
- PPH was major cause of maternal death.
- More than three fourth of Pregnant women were not received their complete ANC check-up.
- Large number for female delivered normal only few of them were C- section.
- Large number of women delivered live birth but some of died within one year and few of them delivered still birth.

1.6 Suggestions:

There are huge number of marriage ceremonies in Dahod District. As District is under High priority Area, more numbers of marriages are happening below legal age, 90 per cent tribal community present. Large number of women were Illiterate.

There are so many problems like Inadequate Physical and Mental development and Lack of knowledge regarding health like sexual and fertility related problems in teenage, Increase in number of Population Growth, Maternal Death.

To Solve all these problems and for the purpose of giving the health related information to Newly Married couple regarding Importance of anemia like Iron Deficiency Anemia and Sickle cell Anemia, To Promote early ANC Registration and ANC checkup, PNC checkup Adverse effects of Tobacco consumption in fertility, We have introduced New Initiative “NavDampati Sanman Samaroh”.

Give special training to ASHA and FHW to identify high risk mother and to get them admitted in Mamta ghar.

Migration is major issue of concern in this district, strengthening migration tracking program me by developing microplanning and liasoning with other district where population is migrated.

Strengthening Mamta session for ANC and PNC to reduce Pregnancy related Complications like Anemia in ANC, Sepsis in PNC and PPH during and after 48 hours of delivery etc.