SUMMARY OF THESIS
ON
PUBLIC HEALTH MANAGEMENT – A STUDY OF REPRODUCTIVE
AND CHILD HEALTH PROGRAMME IN GUJARAT

BY
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Reproductive and Child Health Program seeks to provide accessible, affordable and quality health care, especially to the vulnerable sections. It also seeks to reduce infant mortality, maternal mortality and total fertility rates in the country by increasing public expenditure on health, reducing regional imbalance in health infrastructure, integration of organizational structures, optimization of health manpower, decentralization and community participation. National Rural Health Mission is a major initiative to improve health care in the country which is implemented from 2005. Significant share of resources under health department is channelized under the mission and hence it is imperative to evaluate health outcomes under NRHM. While the whole chain of service delivery from policy to outcome is important, more focus is required at cutting edge level where ideas translate into action to understand the dynamics of public health management.

Importance of Public Health

Public Health is the science and art of promoting health, preventing disease, and prolonging life through the organized efforts of society (WHO). Directive Principles of State Policy of Indian Constitution consider that the State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties under Article 47. In addition, under Article 42, the State shall make provision for securing just and humane conditions of work and for maternity relief.

Evolution of Public Health System in India

In the few decades after independence, Central Government has given the policy direction and thrust to healthcare based on recommendations of a number of expert committees. An analysis of reports of various expert committees reflects the changes and developments in public health delivery system in India. Primary health care unit suggested by Bhore committee has become focal point of public health delivery. Programs based approach of Mudaliar committee has been adopted to control major communicable diseases affecting the community. Family planning was given impetus as a special activity after the recommendation of Mukherjee committee. Creation of multipurpose health workers and female health workers were the hallmark of recommendations of Kartar Singh Committee.

The strategy for health care development shifted from committee to policy based approach with the formulation of National Health Policy, 1983. Major goals of policy were to provide universal and comprehensive primary health care. An important problem
identified was the state of Maternal and Child Health Care (MCH). Reproductive and Child Health (RCH-phase I) program was launched in 1997. Subsequently, RCH-phase II which aims at an outcome-oriented program based approach was launched in 2005 along with NRHM.

**National Population Policy, 2000** provided policy framework for family planning and child health goals. The immediate objective was to address contraception, health care infrastructure, and health care personnel and to provide integrated delivery of RCH services.

**Millennium Development Goals (MDG)** is eight development goals the members of United Nations have to achieve by the year 2015. The goals for health care are: to reduce child mortality rates by two-thirds; to reduce maternal mortality rate by three quarters; to achieve universal access to reproductive health; to combat HIV/AIDS, Malaria, and other diseases with target to halt and begin to reverse the spread of HIV/AIDS; and to achieve universal access to treatment for HIV/AIDS by 2010.

**National Health Policy, 2002** was formulated from the recommendations of NPP, 2000 with key objectives to address the problem of declining sex ratio and total fertility rate. The approach was to increase the access to public health system by involving panchayat raj institutions; awareness generation activities; empowerment of women and finally, by establishing new infrastructure and upgrading existing infrastructure.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Gujarati Status in 2002</th>
<th>Goal Achievement in 2004-06</th>
<th>Goal Achievement in 2009-10</th>
<th>India Status in 2002</th>
<th>Goal Achievement in 2004-06</th>
<th>Goal Achievement in 2009-10</th>
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<tr>
<td>IMR</td>
<td>60</td>
<td>45</td>
<td>&lt;30</td>
<td>54</td>
<td>44</td>
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<td>2006-07</td>
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</tr>
<tr>
<td>TFR</td>
<td>2.9</td>
<td>2.1</td>
<td>2.8</td>
<td>2.5</td>
<td>2.1</td>
<td>2.9</td>
</tr>
<tr>
<td>MMR</td>
<td>389</td>
<td>200</td>
<td>&lt;100</td>
<td>160</td>
<td>148</td>
<td>407</td>
</tr>
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<td>2009-10</td>
<td>2006-07</td>
<td>2009-10</td>
<td>2009-10</td>
</tr>
</tbody>
</table>

Source: National Health Policy and Sample Registration System

**Gujarat Population Policy, 2002** aims to steer the State to achieve better human development indicators. The State has achieved huge strides in economic development with growth rate higher than national average on a consistent basis. However, the state has recognised the prevalence of marked socio-economic disparities and aims to address these issues. The aim is to reduce TFR from the 3.0 to 2.1 by 2010; increase the
contraceptive prevalence from 54.2% to 70%; reduce IMR from 63 to 16 per 100 births; and reduce MMR from 389 in 1992-93 to <100 by 2010.

**Rationale for Research; Review of Literature and Sources of Data**

NRHM is the vehicle for realizing the objectives laid in NHP, 2002 under RCH and other programs, and was launched in 2005. Evaluation of its performance, by comparison of goals and achievements, once in mid-period and finally towards the end of policy period in 2010 (later extended to 2012) is given in Table 1. Analysis shows that the country lags behind in achieving both mid-period and final goals. Gujarat could achieve mid-period goals but lags behind in final goals. This phenomenon requires thorough understanding to bring about suitable modifications or reforms in the policy and implementation of the program. Hence, there is rationale for detailed study of the public health management during this period.

**Literature of the Subject**

There is reasonably good literature in the subject of public health both at national and international level. Many books, papers and reports have been published from time to time by national and international organizations like ICMR, WHO, UNDP and World Bank.

A paper on Public Management and Essential Public Health Functions, published by World Bank\(^1\) provides an overview of how different approaches to improve public sector management relate to essential public health functions.

Another paper published by Public Health Foundation of India, deals with quality of health care in Malaysia, India and Ethiopia. In case of India, the study identifies the persistence of high proportion of maternal and neonatal deaths and low institutional delivery. The study has observed that issues such as poor access, poor infrastructure and facilities, ineffective treatment, poor skills, corruption and lack of responsiveness as major problems.

A working paper by Planning Commission of India\(^2\) evaluates quantity and quality of service delivery in rural public health facilities under NRHM. The paper identifies

\(^1\)Khaleghian and Monics Das Gupta - Public Management and Essential Public Health Functions, World Bank, 2005.

factors affecting the implementation of NRHM, but falls short of assessing the underlying management practices in delivery of health care services.

The challenges and opportunities for health care managers are discussed in the book, "Strategic Issues and Challenges in Health Management". The lowest income groups in India receive the smallest share of subsidies for curative health care. A judicious combination of supply and demand side strategies will be required to tackle this. Supply-centric strategy practised for a long time failed to reach the poor. A demand-driven approach requires improvement in availability of essential services, accountability and empowerment of clients.

The book on public health, “Essentials of Public Health Management”, discusses public health management as the art of using all available resources to accomplish a given set of tasks in a timely and economical manner. An important aspect of public health leadership is monitoring activities of practitioners. Governance is the oversight in the public health system, whereas management is implementation of activities.

Given the poor health indicators in the country, the book “Primary/Rural health Care System and Hospital Administration” suggests three urgent reforms. First, it is time to accept that the government has at best limited capacity to deliver health services and hence a radical shift in strategy that gives greater opportunity to poor to choose between private or public health care providers is needed. Second, the Government must introduce long term training courses for practitioners engaged in treating routine illness. And finally, there is urgent need to accelerate availability of qualified doctors.

According to Jeffrey D Sachs, NRHM is the single largest mobilization of public health measure in the world. This has broken three common myths: First, the burden of disease among the poor is somehow inevitable. Second myth is that the aid from rich countries is wasted. But poor countries are capable of managing effective health care programs when helped. Thirdly, there is myth that families have more children because of fear of high childhood mortality. With effective health care this declines since families feel confident that their children will survive.

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5 Goel, S.L: Primary/Rural Health Care System and Hospital Administration, Deep & Deep Publications Private Ltd, New Delhi, 2010.
A report by the World Bank\(^7\) defines six core performance domains: quality, efficiency, utilization, access, learning, and sustainability and provides a compendium of metrics used to measure organizational performance.

Human Development Report for Gujarat published in 2004 focuses on the link between economic growth and human development and makes suggestions to achieve higher levels of human development. The report focuses on growth in agriculture, industry, labour and expenditure on social sectors and links it with development of education, health, poverty, gender and weaker sections like tribal people.

A detailed analysis of books, papers and reports shows that there have been studies on health sector both at macro and micro level. The studies cover evaluation of national health policies, management of health care delivery, performance in health care functions and improvement in indicators and human development. The works on the subject dwell mostly on achievements and shortcomings, organizational structure of public health, inequity in health care and shortage of resources. However, it is observed that no significant research has been undertaken to study and assess management of public health delivery after launch of NRHM in 2005, which can reveal the areas of strengths and weaknesses in implementation and take necessary measures to achieve the desired goals.

**Sources of Data**

Many agencies collect and collate data on health care indicators through population and sample surveys. These data provide valuable details of health care status in the country. The key sources of data are **decadal census reports** which are a valuable source of information on demography, and many other socio-cultural and demographic parameters. **District Level Health Survey** provides estimates of maternal and child health, family planning and other reproductive health indicators. **National Family Health Survey** provides state and national information on mortality, family planning, maternal and child health and nutrition. **SRS bulletins** provide estimates of birth, death and infant mortality rates. **Socio-Economic review of Gujarat** gives a profile of socio-economic activities and achievements in different sectors of the state’s economy. **Gujarat Health Statistics** presents the recent health statistics of State and National programs for all the districts\(^8\).

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\(^8\) Health Statistics, Gujarat, 2009-10: Vital Statistics Division, Commissionerate of Health, Medical Services, Medical Education and Research, Gujarat State, January, 2011.
Purpose of Research

From the above analysis, the purpose of research is to study the management of public health delivery system in Gujarat was undertaken in following steps.

1. To study changes in key health care indicators in primary health with particular focus on maternal and child health during RCH Phase II under NRHM in the country, Gujarat State and districts of Gujarat.

2. To study the status of health sector in the country and state: Socio-economic status; structure and functioning of health sector; health organizations; stakeholders; health legislation; health infrastructure; health personnel; health programs and; health status.

3. To study the RCH program under NRHM: Objectives, Evolution, Approach and Management before and after the introduction of NRHM.

4. To assess the performance of the RCH indicators in all districts of Gujarat before and after introduction of NRHM and estimate improvement in performance. And, on this basis, select 3 districts for field survey.

5. To study the supply and demand side of health care delivery by undertaking field survey of health workers and beneficiaries by administering questionnaires. The purpose is to ascertain the planning, organization, implementation, infrastructure, human resources, monitoring and finance from health workers. Beneficiary survey is to assess the awareness, availability, access and affordability of health services.

6. To undertake statistical analysis of data collected from the field survey; $\chi^2$-test of hypothesis to estimate the significance of association between various factors and identify factors responsible for changes in key health parameters in these districts.

7. Based on above, to propose appropriate suggestions to policy makers to improve public health delivery in Gujarat.

Healthcare System in India

An analysis of demographic pattern shows a steady fall in crude birth and death rates from 39.3% and 18.9% in 1961 to 22.5% and 7.3% in 2009 in India. IMR, TFR and MMR too have consistently decreased during this period. Rate of decline in birth rate is likely to accelerate in future. Life expectancy has been improving over this period and sex ratio has improved from 930 in 1961 to 940 in 2011. However, the country has a long way to go before attaining the levels achieved by developed countries and many developing countries.
Socio-Economic Profile shows that between 2005 and 2010, the GDP and per capita income increased by 49% and 40% respectively. Human development index has increased from 0.482 to 0.547 in the same period. The multi-dimensional poverty index estimated on the basis of income, consumption, access to resources etc has improved from 0.313 to 0.283. However, the level of poverty in the country has declined only marginally from 28.6% in 2004-05 to 27.5% in 2010. The period has also witnessed a modest increase in public expenditure in health and education from 3.8% to 4.2% and 4.1% to 4.2%.

Health Profile

Subsequent to the launch of NRHM, CBR, CDR and population growth have decreased. However, the rate of improvement is slowing down in MMR and TFR, whereas improvement in IMR has accelerated after NRHM. While the institutional delivery has improved at a steady level, improvement in full ante-natal check up and full immunization has accelerated. Contraceptive use has shown only marginal improvement.

District is the vital link between the State and primary health centres and sub-centres. The 3-tier of health centres comprising of CHC, PHC and sub-centre provide preventive and promotive health care. FHW is crucial in providing RCH services and is supported by MPHW, village health guides, traditional birth attendants and Anganwadi workers.

Private sector, voluntary organizations and indigenous medical practitioners play an important role in health delivery system. Looking to the past experience, it can reasonably be expected that private sector’s contribution would be substantial in the urban tertiary sector.

Health Organizations in India: The Medical Council of India supervises quality and standards of medical education in India; grants recognition of medical qualifications; gives accreditation to medical colleges; grants registration to medical practitioners; and monitors medical practice in India. Indian Medical Association is a national organization of doctors which looks after the interest of doctors and the well being of the community at large. Nursing Council of India, Dental Council of India and Pharmacy Council of India regulate the respective professions. The Indian Council of Medical Research is the apex body for formulation, coordination and promotion of biomedical research in India which has a special focus on public health.
Health Legislations: Constitution of India outlines the duties of the State in provision of health care in Articles 42 and 47 of Directive Principles of State Policy as discussed earlier. Medical Termination of Pregnancy Act, 1971 provides for abortion services to woman in an approved clinic or hospital under stipulated conditions. The Pre-Natal Diagnostic Techniques (PNDT) Act, 1994 has provisions to regulate use of ultra sound machines to curb their misuse for determination of sex of the foetus. Food Safety and Standards Act, 2006 lays down standards for articles of food and to regulate availability of safe and wholesome food for human consumption. Drugs and Cosmetics Act, 1940 aims to curb the prevalence of spurious drugs which is a major public health concern.

Health Programs in the Country: Second phase of RCH program, RCH II commenced from 2005 along with NRHM for five years after the end of RCH Phase I⁹. The main objective of the program is to bring about a change in three critical health indicators: reducing total fertility rate, infant mortality rate and maternal mortality rate.

National Vector Borne Disease Control Program is for prevention and control of vector borne diseases i.e. Malaria, Dengue, Lymphatic Filariasis, Kala-azar, Japanese Encephalitis and Chikungunya in India. Revised National Tuberculosis Control Program (RNTCP) comprises of detection by sputum smear microscopy examination among symptomatic patients; administration of anti-TB drugs under the direct observation of health care provider. National Leprosy Eradication Program aims at elimination of leprosy based on early diagnosis, prevention of disability and medical rehabilitation.

Integrated Disease Surveillance Project (IDSP) is a decentralized surveillance program intended to detect early warning signals of impending outbreaks and help initiate timely and effective response. Rashtriya Swastha Bhima Yojna is a new health insurance scheme for the BPL families in unorganized sector to provide insurance cover from major health shocks that involve hospitalization. Janani Surakhsha Yojna is a safe motherhood intervention under the NRHM with the objective to reduce maternal and neo-natal mortality by promoting institutional delivery among the poor pregnant women under the supervision of FHW and the medical officer,

Health Care Delivery in Gujarat

Gujarat State, located in the western part of India possesses a total land area of 196924 sq. km and was established in the year 1960. For administrative purposes the State

is organized into 26 districts, 225 talukas and 18066 villages. There are 242 towns and urban agglomerations including 8 municipal corporations. From the inception, the State has witnessed not only significant rise in the State domestic product but a structural change in economy which has become highly industrialized and getting rapidly urbanized.

Demography: The population of the State increased from 506 lakhs in 2001 to 603 lakhs in 2011. Analysis shows a drop in annual growth rate in population from 2.06% during 1991-2001 to 1.77% in 2001-11. Urban population has increased from 37.35% in 2001 to 42.58% in 2011. The sex ratio has marginally declined from 920 to 918 between 2001 and 2011.

Socio-Economic Profile: Gujarat has strived to attain a high and balanced socio-economic development. The overall literacy was 79.31% in 2011 with a female literacy of 70.73% which was an increase from 69.14% and 57.80% respectively in 2001. The State domestic product has witnessed a strong annual growth of 12.63% during 2001-11 compared to 9% for the country. The growth in per capita income is 11% compared to 7.6% for the country. BPL population was 16.8% in Gujarat compared to 27.5% for the country in 2004-05. Poverty is higher in rural areas at 19.1% and 16.8% in urban areas.

Health Profile of Gujarat: An analysis of major health indicators shows progressive improvement in health status in the State. Life expectancy of both female and male has increased from 1998-2002 to 2008 by 6.4 and 1.5 years, higher than national average of 4.6 and 1.5 years. Though IMR and MMR have improved, attaining outcome targets of less than 30 for IMR and less than 100 by 2012 appears to be a tough challenge. Improvement is seen in institutional delivery, total immunization and contraceptive prevalence.

Number of PHC and sub-centres has remained the same in Gujarat, between 2005 and 2009. However, the state has better average in terms of average number of villages and population covered per health centre. New CHC were started during the period. Analysis of health personnel shows a shortfall level of 27% for health workers and 5% for doctors.

Evolution of Maternal and Child Health Program: In 1952, National Family Planning Program was launched with the objective of population stabilization. Family planning services were integrated with MCH and nutritional programs from fifth five year plan.

Universal immunization program was launched in 1985 to provide universal immunization to infants and pregnant women and was strengthened in 1992-93 under
Child Survival and Safe Motherhood (CSSM) project. In 1996, Reproductive and Child Health Program (RCH I) was launched with following components: planning, CSSM, reproductive health and prevention/management of RTI/STD/HIV. Client-centric approach, participatory community needs assessment; capacity building, management information system and target free approach.

**RCH Phase II Program:** The second phase of RCH program commenced from April, 2005 along with NRHM for five year period up to 2010 (later extended to 2012). The main goals were to bring about a change in three critical health indicators: to reduce the IMR; to reduce maternal mortality; and to reduce TFR. To achieve these goals, NRHM will facilitate improved access and utilization of quality health services; forge partnership between central, state and local Governments; involve panchayat raj institutions; provide flexibility to states to promote local initiatives and; develop framework to promote inter-sectoral convergence.

**NRHM in Gujarat**

NRHM is the umbrella program of Government of India, launched in 2005 subsuming all major public health initiatives including RCH II.

**Vision:** The overall goal is to improve the quality of life of people of Gujarat as articulated in the Gujarat Vision 2010 and State Population Policy 2002. The specific objectives are

1. Reduce MMR from 172 (in 2006) to 100 per 100000 live births by 2012
2. Reduce IMR from 50 to 30 by 2012
3. Stabilize population by reducing TFR from 2.4 to 2.1 by 2012

**NRHM Plan**

1. **Institutional Strengthening:** The State would engage the service of experts/consultants and put effective management systems to strengthen the state health society, state empowered committee on RCH, state supervisory board and other authorities.
2. **Training:** Capacity building is recognised as priority intervention in RCH II. For this, a capacity building of program management staff at district level has been planned.
3. **Financial Management:** Program Director is responsible for disbursement and accounting of funds. Tailor made accounting software is provided for disbursement of funds and its monitoring.
4. **Quality Assurance:** Quality Assurance is important to minimize variations in health care by standardizing managerial and clinical practices and procedures to improve
outcomes. This is institutionalized by establishing quality assurance teams at State and district level.

5. **Behaviour Change Communication**: To achieve the goals set under the program, there is a need to increase the coverage, demand and utilization of services. Communication strategy is to be formulated keeping in mind these objectives.

6. **NGOs involvement in RCH II**: Gujarat is well known for its voluntary movements and cooperative movement. NGOs partnership is envisaged for running PHC, programs like pulse polio, HIV/AIDS and ICDS, training and awareness programs.

7. **Convergence and Coordination**: To achieve synergy, NRHM plan seeks convergence in planning, activities and resources among concerned departments. State Health Society and District level committee monitor convergence.

8. **District Implementation plans**: These plans are prepared based on local needs with community specific interventions and thrust on demand generation. After two years the objectives are revisited based on information collected through community needs assessment.

9. **Thrust Activities under NRHM/RCH II**:
   a. **Comprehensive malnutrition Scheme**: Realizing the need to address malnutrition in the state, a life cycle approach aimed to improve quality of food intake, universal coverage of pregnant, lactating mothers and children up to 14 years through Mamta Abhiyan, ICDS and MDM and iron supplementation for adolescent girls is incorporated in the plan. b. **Strengthening Outreach Services**: Mamta Abhiyan\(^{10}\) is an approach to strengthen outreach of RCH Services. It aims at preventive, promotive and curative services through convergence with ICDS and participation of community. c. **Services to difficult areas and marginalized communities**: To address equity issues in health, initiatives like Chiranjeevi yojna to provide access of indigent sections to quality maternity services were taken up. To reach out to marginalized communities living in far-flung areas, the state has Mobile health units functioning in tribal, peri-urban and difficult areas. d. **Public Private Partnerships**: Under Chiranjeevi Yojna, a PPP initiative, all BPL families are covered. Under this scheme, an expectant mother from BPL family is given entitlement coupon for deliveries. She can use it to go to an identified private provider for delivery.

10. **Reporting System**

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\(^{10}\) Yoong, Joanne- Does Decentralization Hurt Childhood Immunization?- Department of Economics, Stanford University, October 20, 2007.
The program lays special emphasis on timely submission of reports. Software and MIS tools have been developed for use up to PHC level where they will ensure uniformity and regularity in data collection and reporting.

**Research Approach and Methodology**

As the purpose of the research is to study the management of public health delivery, the focus of the study is field, at the level of health centres. District is the unit for the implementation of RCH Program. Therefore, the effectiveness of functioning of public health delivery system can be evaluated by analysis of performance of health care outcomes at district level. At the cutting edge level, health care is provided by FHW and MPHW at sub-centres and PHC. Thus the availability, quality, efficiency and effectiveness of management of health centres in terms of infrastructure, manpower and resources are critical for the performance of the public health delivery system.

On the other hand, demand for health services emanates from people, mainly women and children in case of RCH program. Beneficiaries of these services who seek preventive and curative health care are potential consumers of the services. The aim of NRHM is to enhance the demand for health care to improve the indicators.

**Two Stage Study**

Considering all these aspects, methodology for research requires a two stage study of public health management. In the first stage, performance of all districts is evaluated for various health care outcomes by measuring key RCH indicators. The aim is to evaluate the performance of districts before and after the introduction of NRHM and assess the improvement during the period. Based on this, three districts are selected for second stage of research. The steps involved in the first stage are:

**First Stage Research**

1. The key indicators chosen to evaluate the maternal, child and family planning outcomes were: institutional delivery, full ANC check-ups, full immunization of children, prevalence of contraceptive use, total fertility rate and sex-ratio were selected. The main source of data was Census, DLHS and NFHS reports, and SRS bulletins.
2. Assess the performance of indicators in all the districts before and after the implementation of NRHM program and estimate improvement during the period.
3. Actual performances for each district are estimated by calculating the relative performance with respect to the overall performance in Gujarat, taking State’s
performance as benchmark. Districts above zero have performed better than state average and those below zero have performed below state average.

4. Percentage improvement (or otherwise) for each of the selected parameter is estimated. An equal weighted average of the percentages is estimated to ascertain the overall improvement in the district performance.

5. In the next step, districts were ranked for performance before the launch, after the launch and improvement during the period. Based on the ranks, districts were classified into three groups: above average, average and sub-average performers.

6. One district from each category was selected for field survey on a random basis. District selected were Junagadh, Ahmedabad and Bharuch.

Second Stage Research- Field Survey: Assessment, Analysis & Findings

After selection of districts, field survey was undertaken in the second stage which has two components: survey of health workers to ascertain supply of public health delivery and survey of beneficiaries to ascertain the demand and satisfaction with services.

Survey of Health Workers

Supply side management was studied through survey of health workers at PHC and sub-centres to ascertain factors which affect public health delivery: planning; organization; human resources; infrastructure and facilities; activities and targets; time management; finance and monitoring & review. Survey aims to identify the key work areas of health workers from their point of view. Efforts for improving the awareness of beneficiaries, and targeted activities were also assessed. Availability of infrastructure and facilities are also evaluated. Key issues related to human resource management which is the most critical factor in delivery of health care was also assessed. Time management, monitoring and review, and exercise of financial powers were also assessed in the survey.

Survey of Beneficiaries/ Patients

Though public health services are made available to the entire population, the actual market depends on socio-economic and demographic profile of the people. Health care providers in the market include traditional health practitioners, health healers, nurses and qualified private practitioners apart from health centre facilities. The target group was persons who had availed RCH services in recent past. The purpose was to ascertain the impact of initiatives under RCH II and NRHM from them.

The purpose of beneficiary survey was to assess the management of public health delivery at health centres from a demand side perspective. Socio-economic factors like
literacy, income, poverty, occupation, caste, age, family and gender of beneficiaries affect the health seeking behaviour. The survey ascertained: awareness of public health programs; availability of health care personnel and resources; accessibility in terms of physical infrastructure and facilities and; affordability in terms of cost of health care, spending on private health care and willingness to pay for better services. Purpose of visit, quality of health care and repeat visits to health centres in future was also assessed.

**Sampling Strategy and Data Collection**

Sample for survey of health workers was selected randomly among all the health workers of the districts. In case of beneficiaries, respondents who had availed health care service in health centres in the last 2 years were selected on a random basis. Thus, a stratified random sampling method was adopted in case of beneficiaries/patients.

Sample size was estimated based on the population size of the health workers in these districts and for 5% confidence level of estimating statistical variates. In case of health workers, the sample size was 50, 67 and 55 in Ahmedabad, Bharuch and Junagadh districts. In case of beneficiaries/patients the sample size was estimated at 95, 91 and 94 respectively with a total of 280 for all districts.

Separate questionnaires were prepared for Health Workers and Beneficiaries/patients for field survey and both were administered in Gujarati. The questionnaire was organized to gather the response of health workers and beneficiaries to obtain their experience, feedback and assessment on different issues of management of health delivery. To obtain different type of information nominal, ordinal and cardinal responses, ranking and continuous scales were used in the questionnaire.

**Data Analysis**

The collected data was verified for completeness and consistency. Then the data was entered in MS-Excel spreadsheets with proper codification based on the type of data. Codified data was classified and organized into different categories to facilitate analysis.

Based on the above, tabulations were made for further analysis. In case of health workers, tables were generated with district and gender as basic parameters. The broad categories were health functions, planning, infrastructure, facilities, human resources management, monitoring and time management. In case of beneficiaries tables were generated for each demographic and socio-economic factor: age, family size, occupation, income, poverty, caste and education of beneficiaries/patients against key behavioural variables, attributes and opinions.
Tables were generated with numeric as well as percentage distribution for different categories. Thus, the tables could be used for further statistical analysis and ascertaining key relationships to make meaningful interpretations

\( \chi^2 \) - Test of Hypothesis

The strength of association between various factors and attributes, behaviour and opinions were ascertained by \( \chi^2 \) - Test of hypothesis. This was carried out for various factors and parameters across the districts\(^{11}\).

Pearson's chi-square statistic was used for comparison based on tests of goodness of fit and tests of independence. For estimating the chi-squared test statistic, \( X^2 \), degrees of freedom, d and probability, p, **Version 4.0 of PEPI software** was employed. Null hypothesis was defined as absence of significant difference between the districts in the chosen parameters. This was evaluated at 95% confidence level based on which the null hypothesis was accepted or rejected (rejected for p<=0.05)\(^{12}\).

Based on this, the tabulated data was further analyzed to deduce and derive interpretations\(^{13}\) for districts, State, category of health worker and category or group of beneficiaries on the basis of which recommendations are formulated.

**Multiple Linear Regressions (MLR)**

MLR is a very useful statistical model which can explain the strength of relationship between dependent and independent variables and significance of each independent variable. The regression equation generated from MLR\(^{14}\) has predictive value to the extent these factors affect the dependent variable and also gives the directional impact based on the sign of the coefficient. MLR was performed for key dependent variables: Target Achievement and Motivation Level in case of health workers and Quality of Service and Repeat visit in case of beneficiaries. MLR was performed with the **Statistical Package for Social Sciences**\(^{15}\) (SPSS) version 19.

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\(^{11}\) Stockburger, David W- Introductory Statistics - Concepts, Models and Applications, Missouri State University, Revised Version, 1998

\(^{12}\) DiMaria, Rose Ann- Understanding and Interpreting the Chi-square Statistic (\( \chi^2 \)): WVU School of Nursing, Charleston Division

\(^{13}\) McCreery, Charles: The Chi-Square Test- A test of association between categorical variables, Oxford Forum, Psychological Paper No. 2007-1.

\(^{14}\) Trammer, Mark and Mark Eliot: Multiple Linear Regression, Cathie Marsh Centre of Census ans Survey Research.

For each of the dependent variable, SPSS was run for all the possible independent factors obtained from the survey in the first iteration. In subsequent iterations, independent variables which have no significant impact or correlation were eliminated. Eventually, the process identifies key factors significantly affecting the dependent variable. Null hypothesis was that each independent variable has no significant impact at 95% confidence level. The key test statistics applied for analysing and interpreting the output are: sigma (if p <= 0.05, then the hypothesis is rejected); R², the coefficient of determination explains the percentage of variation in dependent variables due to the selected independent variables and; Beta β, the coefficient of the independent variable. The magnitude and direction of β indicates the nature of influence on dependent variable.

**Key Findings from First Stage Study:** The first stage research of the performance of the districts reveal that in overall improvement, Junagadh district (31.8%) has done better than other districts. Navsari (43%) had done better than other districts before NRHM and Rajkot (25.8%) after NRHM.

Indicatorwise analysis shows that while some districts have done well in many indicators, some of them have fared poorly in many indicators. In TFR, Banaskantha, Surendranagar and Bhavnagar have shown good improvement whereas Valsad, Dahod and Sabarkantha have low improvement. In ANC full coverage highest improvement was in Junagadh, Amreli and Rajkot and the lowest in Sabarkantha, Dangs and Narmada. Improvement in institutional delivery was the highest in Junagadh, Kutch and Jamnagar and lowest in Dangs and Sabarkantha. Improvement in full vaccination was the highest in Dahod, Surat and Narmada and lowest in Bharuch and Amreli. Improvement in contraceptive prevalence was highest in Banaskanta, Patan and Valsad and lowest in Narmada, Bhavnagar and Navsari. Sex ratio witnessed highest improvement in Dangs, Kheda and Ahmedabad and lowest in Kutch, Amreli and Surat.

For the purpose of field survey districts of Junagadh, Ahmedabad and Bharuch were selected. Junagadh had below average performance (-7%) before and above average performance after NRHM (20%) with highest improvement during NRHM (31.8%). Ahmedabad had above average performance before (12%) and after (12.1%) NRHM with an improvement (3.5%) which is near State average. Bharuch had above average (11.1%) performance before and below average (3.6%) performance after NRHM with an improvement (0.5%) below the State average. These districts are also located in distinct
geographical regions: Ahmedabad in north-central, Junagadh in Saurashtra and Bharuch in South Gujarat thereby representing different geographical regions and social groups.

Key Findings from Field Survey

Supply of Health Care: Health Workers

Health Planning: It is found that the involvement of local bodies like Gram Panchayat and Gram Sabha and NGO in preparation of health plan is weak. Even when there is involvement, the quality is below desired level. Significant difference across the districts is observed in quality of involvement of groups.

Infrastructure: Though health centres have been built, connectivity by road and transport infrastructure has to be improved in one-third of cases, especially in remote villages. In most cases, visit to beneficiary houses is by walk which can be time consuming and reduce the productivity. Facilities: Condition of health centres and amenities like toilet, sitting etc., was found to be good or very good. No significant difference is found in infrastructure and facilities across districts. Resources: In one-third of cases, health workers have reported stock-out of drugs. Condition of equipments is mostly good or very good.

Activities: Though target based planning and execution is prevalent in some activities like family planning, it is nearly absent in key child health care activities like immunization. Significant variation is observed in level of difficulty in achieving the targets. An important objective of NRHM is to improve the demand for health care among the people. However, it is revealed that more than 1/3rd rarely approach for services. Home visit to beneficiaries were found to be low in Ahmedabad. Significant difference is observed in place of visiting beneficiaries.

Human Resources: The level of motivation in found to be good or very good in less than half the cases. Involvement in decision making was good in quarter of the responses in which there is variation across districts. Quality of evaluation is perceived to be good in 40% cases. Similarly, satisfaction with pay and allowances was found to be good in 44% cases. As much as 42% feel very high burden of work and 73% think the clarity of work is low. More than 50% perceive poor opportunity for career growth. Most of them find quantum of training to be sufficient and quality of training to be good or very good. Significant variation is observed across districts except in clarity of work, satisfaction with pay and allowances and quality of training.
Monitoring & Review: Reporting and reviews are found to be useful in most cases. However, many of them think that the number of reports is high. No significant difference is found in reviews whereas there is significant difference in reporting.

Time Management: Though there is significant difference in activity-days across districts, only around half of the health workers feel that they can use their time productively.

Financial Powers: A quarter of health workers feel that it is easy to exercise financial power to undertake repairs and maintenance works and 30% feel they can do emergency purchases when they need it. Significant difference is observed across districts in emergency purchases and no significant difference in repairs and maintenance works.

Regression:

In case of health workers, Target Achievement (TarAch) and Motivation (Mot) are the key outcome and output factors which are influenced by many other factors. MLR on all independent variables gives an R² of 0.368 which can explain 36.8% of performance. Factors which have significant (Sig <= 0.05) impact on target achievement are involvement in decision making (IDecM), burden of work (BWrk), chances for promotion (CProm) and reporting(Rep). These factors explain 23.2% of performance (R² = 0.232).

\[
TarAch = 1.757 + 0.273*Idem + 0.583*Bwrk + 0.149*Cprom - 0.171*_rep
\]

Regression for motivation as dependent variable was performed on all the independent variables with an estimated R² of 0.525. Thus these factors explain 52.5% of level of motivation of health workers. Key factors are involvement in decision making (IdecM), evaluation of work (EvaWrk) and review of work (RevWrk) which significantly explain the level of motivation (R² = 0.411).

\[
Motivation = -0.282 + 0.301*IdecM + 0.315*EvaWrk + 0.230*RevWrk
\]

A comparison of common factors clearly show that involvement in decision making and monitoring emerge as key factors for target achievement whereas promotion and evaluation of work are important for motivation of health workers.

Demand of Health Care: Beneficiaries/Patients

Demographic Factor: Majority of beneficiaries in Ahmedabad were less than 25 years whereas in Bharuch and Junagadh majority were 26-35 years group. Female respondents
were younger than the male. Significant difference was observed in age groups across districts. No significant difference was observed in family size of respondents.

**Socio-Economic Factors:** No significant difference was observed in occupation, which in majority cases was household work for female and Labour for male. Majority of respondents had below Rs 3000 monthly income, especially in Ahmedabad. Most of the respondents were BPL, with highest share in Ahmedabad. Most of the beneficiaries were non-literate in Ahmedabad and primary level educated in Bharuch and Junagadh. Caste composition varies depending on the region. Significant difference is observed in these factors.

**Awareness Programs:** Largest participation was in immunization followed by family planning and communicable diseases programs. ASHA workers are the most visited health personnel which show the strong penetration of NRHM. No significant difference was found in type and extent of participation whereas significant difference is found in utility of awareness programs.

**Health care Seeking Behaviour:** Health workers tend to have strong influence on beneficiaries, but decisions are taken by spouse or parents. Purpose of visit to health centre is immunization followed by communicable diseases and family planning. No significant difference is found except in purpose of visit.

**Infrastructure & Facilities:** Availability of transport and condition of roads vary significantly. Situation is same for condition of health centre and amenities and cleanliness.

**Quality of Service:** In majority of cases Doctors/ Health workers were available in health centre. Though majority found the quality of service as good, there is a significant variation.

In many cases drugs/lab services had to be obtained from outside. Majority would return to health centre in future, though there is variation in this regard. Significant variation is observed in most of parameters of quality.

**Documentation:** This was found to be useful but not available uniformly in all centres.

**Financial Issues:** Majority of the beneficiaries availed service from private practitioners and most of them spent less than 3000 in previous year. Majority of respondents are willing to pay for better services.

**Demographic and Socio-Economic Factors:** Analysis of these factors with respect to health care reveals interesting associations. Age group has significant impact on health seeking behaviour but not on awareness and willingness to pay for better services. Family
size has no significant impact on health seeking behaviour and willingness to pay for better services but has impact on awareness and purpose of visit. Income, poverty level and literacy have impact on all aspects of health care. Same is the case with caste of the respondents. Occupation of the respondents has impact on the health seeking behaviour but not on awareness and willingness to pay for better services.

**Regression:** In case of beneficiaries, the dependent factors identified were quality of service availed (QualServ) and repeat visit to the health centre (RepVist). Linear multiple regressions were performed on socio-economic variables and health delivery variables obtained in the survey.

Regression performed for quality of services with all socio-economic factors as independent variables generated an estimated $R^2$ of 0.066 which indicate that socio-economic factors do not explain the quality of service availed by beneficiaries. None of the factors have significant impact on the quality of services. The $R^2$ for regression performed on Health delivery factors is 0.57, which indicates that a substantial 57% of quality of services is explained by these factors. Among the factors, utility of awareness programs (UtilAwar), vehicle availability (VehAval), cleanliness (Clean) and counselling (Couns) emerge as statistically significant factors affecting the dependent variable. MLR performed on these four factors has an estimated $R^2$ of 0.499, which indicates that 50% of quality of services is explained by these factors.

$$\text{QualServ} = 0.178 + 0.148 \times \text{UtilAwar} + 0.142 \times \text{VehAval} + 0.275 \times \text{Clean} + 0.374 \times \text{Couns}$$

In case of repeat visit to health centre, the regression on socio-economic factors gives an $R^2$ of 0.151. Regression performed on Health delivery factors generates an $R^2$ of 0.247. Only quality of service (QualServ) is found to have statistically significant impact on repeat service to health centre. Simple linear regression performed on this factor generated an $R^2$ of 0.208 and $\beta$ coefficient of 0.456.

$$\text{RepVisit} = 0.279 + 0.456 \times \text{QualServ}$$

Thus among beneficiaries utility of awareness programs, vehicle availability, cleanliness and counselling are the key and significant factors in improving the quality of services as well as repeat visit of beneficiaries.

**Recommendations**
Findings from survey of health workers and beneficiaries provide insight into practices in public health management from both supplier and consumer sides of health care. These findings reveal the extent to which the intentions in NRHM are translated into action. They are the basis for formulating recommendations for improvement in the health care delivery in Gujarat and Country and also identify future scope for further study.

Health Workers

**Health Planning:** The extent and quality of involvement of local bodies like Gram Panchayat and Gram Sabha in preparation of health plan is weak. Though there is institutional mechanism for participation, it requires proper implementation. It is desirable to have a mechanism for approval of health plan at gram panchayat level with an inbuilt incentive mechanism to encourage preparation of well thought-out plans.

**Infrastructure:** Though health centres have been built, connectivity by road and transport infrastructure has to be improved, especially in remote villages. These centres can be given priority in District Planning funds. In order to improve mobility of health workers, subsidised loan for purchase of 2-wheelers can be provided. **Facilities:** Condition of health centres and amenities like toilet has to be more women-friendly as they constitute larger share of service providers as well as beneficiaries.

**Activities-Target Determination:** It is observed that there is significant variation in difficulty in achieving the target. This requires that the process of target setting should be scientific while taking into account of the local issues.

**Demand for Health Care:** An important objective is to improve the demand for health care among the people. However, it is revealed that more than 1/3 of people rarely approach for services. Thus the latent demand for these services needs to be converted to real demand which will improve the health care outcome. Socio-economic and demographic characteristic of those people can be identified for focussed targeting of awareness programs.

**Drug Availability:** In some cases, health workers have reported stock-out of drugs. Supply chain management and storage of drugs has to be addressed depending on the consumption pattern, distance from main storage centre and other emergency supplies available. A proper real time inventory management system can help to overcome the problem to a large extent.
**Vacancy of Health Personnel:** The vacancy level in health workers is 27%. There is an urgent need to recruit personnel to fill these vacancies and have larger share of female as health workers.

**Burden and Clarity of Work:** Burden of work improves the performance in terms of target achievement. However, absence of clarity of work among the health workers in their day-to-day work has to be addressed at the district level by preparing and updating job chart, prioritising tasks of each health worker and reviewing the performance on that basis. Though health organization must be capable of responding to emergency and unforeseen situations, all the regular activities must be planned and organized properly. Absence of clarity can be significant reason for high burden of work.

**Involvement in Decision Making:** This emerges as key factor for improvement of performance and motivation of health workers. Since health workers are the main interface in public health delivery system, their knowledge and feedback are important for success of health care initiatives. An institutional mechanism for their involvement in decision making would enhance the effectiveness of delivery system.

**Opportunity for Career Growth/ Promotion:** Though there is limited scope for improvement in this respect, health workers can be considered for posting as staff nurse in addition to public health nurse after providing relevant short/medium duration training.

**Performance Evaluation:** High degree of variation is found across the districts which require reasonable level of standardization, uniformity and timely submission. Moreover, this may have detrimental effect on the morale and motivation of employees if it is not seen to be just and fair.

**Pay & Allowances:** Substantial proportions of health workers are not fully satisfied with the pay & allowances. Since pay and allowances in Government are based on periodic pay commission recommendations, it is difficult to make any major changes. However, Health Department may devise monetary and non-monetary rewards to recognize outstanding achievements and contribution to health care personnel at different levels.

**Training:** Though the quality of training was found to be good in all districts, it was found to be inadequate in some cases. Training and workshops have to be conducted to meet minimum level of requirements for all health workers. In addition, need-based
training programs can be designed after assessing the feedback of health workers and doctors.

**Monitoring & Review:** In reporting, there is significant variation across districts. This can be standardized to some extent using information technology and based on the experience in the districts to ensure optimality and effectiveness. Since too much of reporting has adverse impact on performance, this has to be optimized with use of technology.

**Financial Powers:** NRHM and RCH II provide for financial powers to health workers to undertake minor repairs and emergency purchases. In practice, it is not easy to exercise these powers and hence requires simplification of procedures and training of health workers in procurement.

**Demand for Health Care: Beneficiaries/Patients**

**Age of Beneficiaries:** Most of the male beneficiaries avail health care only after the age of 25. Thus, they do not have proper guidance and counselling before the marriageable age. In general, RCH activities tend to be women and child centric and rightfully so. However, men being key decision makers in most of the households, they have to be targeted for adolescent, pre-marriage and peri-conceptional counselling and awareness programs.

With increase in age, the type of health service required undergoes a change: from maternal health to immunization to family planning. Maternal health and nutrition have moderate demand in all age groups. Thus, right services have to be made available to the right age groups by the health care system.

**Income and Literacy:** Income level of respondents is a key differentiator of various aspects of health care and right and relevant health care can be designed based on the income level of families within a given social milieu.

**Migration:** It is observed that Scheduled Tribe population in Ahmedabad have low participation in awareness programs. People of tribal community migrate to urban centre for seasonal and short term work with families. Special attention may be required for migratory population to avail health care.

**Awareness Programs:** Since level of participation in maternal health programs require to be increased and sustained over a longer period, it can be linked to some other activities or
incentives so that there is meaningful participation by beneficiaries. Utility of awareness programs has to be assessed for their impact to improve quality of services.

**NGO:** It was found that they were active in Ahmedabad which is an urban centre but nearly absent in other two districts which are largely rural. Funds provided to NGO under NRHM should have incentive structure to provide services in remote and rural areas of the State.

**Guidance seeking / Decision Making Behaviour:** While the source of guidance could be family or health workers, decision making is a personal choice or by spouse. Thus members of the family especially spouses and parents must be engaged in awareness programs.

**Purpose of Visit to Health Centre:** Maternal health and nutrition do not constitute key reasons for visit to health centre even among female. This situation needs rectification so that the beneficiaries are well targeted and demand for these services improves.

**Infrastructure:** Similar to findings from health workers surveys, sizeable share of beneficiaries indicate the need to improve availability of transport and road connectivity. Hence priority has to be given to provide funds to improve road connectivity in weak areas.

**Facilities:** Condition of health centre, cleanliness and availability of water, toilet etc., varies across districts. During this survey, the need for improvement was found in Ahmedabad, followed by Junagadh and Bharuch.

**Counselling at Health Centre:** This has a strong bearing on the quality of services. There is significant variation in counselling and quality of service across the districts. This is particularly low in Ahmedabad on both the counts. Even repeat visit is low in Ahmedabad. Socio-economic and other characteristics require detailed study to examine and understand the problem.

**Drug/Lab Services:** In nearly 50% cases, beneficiaries had to get drugs or laboratory services from outside. This needs to be addressed with proper supply chain and inventory management as discussed earlier. Similarly reliable lab services must be made available and can even be outsourced by providing space for laboratory at the health centre premises.
**Documentation & Records:** This was found to be extremely useful by beneficiaries. However, the availability is not extensive and uniform. Effective use of information technology tools can ensure a reliable and useful database for this purpose.

**Repeat Visit to Health Centre:** Analysis of repeat visit shows that beneficiaries with higher literacy are likely to visit again compared to those with low literacy. Similarly BPL beneficiaries are less likely to return compared to non-BPL. Thus, the low literacy and low income beneficiaries require extra focus so that they return to health centre for health care.

**Future Scope**

**Multi-Agency Approach for Immunization:** Target based planning and execution is nearly absent in key child health activities like immunization. Given the need to improve immunization level in the State, it can be evaluated whether there is a case for multi-agency approach involving private partners to address the issue by involving qualified private health practitioners by providing reasonable service charges.

**Time Management:** Nearly half of the health workers think they are not able to use their time very effectively. This is an issue which depends on many factors like planning, local issues, burden of work and personal issues. Information technology can be an important tool for effective time management. However, it requires a detailed study to understand this issue properly as this is linked to many other factors like local priorities and emergencies.

**Income:** In Ahmedabad which is an urbanized district most of the beneficiaries were from low income groups whereas in Bharuch and Junagadh, which are largely rural, sizeable proportion of non-low income groups avail health centre services. This relationship has to be explored with further detailed study to understand the implication of income in totality.

**Literacy:** Similar to income, in Ahmedabad more proportion of beneficiaries are non-literate compared to other districts. Multiple interpretations similar to the above can be made in this case also and hence requires further study.

**Migration:** People of tribal community migrate to urban centre for seasonal and short term work with families. But they may not have access to public health services during the stay which is the reason for low percentage of demand for service. This issue also requires thorough study and assessment to make proper policy initiatives.
**Purpose of Visit:** It was observed that the purpose of visit of poor, low income, low literate and backward caste beneficiaries is mainly to treat communicable diseases. In contrast, other groups visited for immunization and family planning services. This shows that the vulnerable sections approach for curative rather than preventive health care. Detailed further study is required to understand this phenomenon to make suitable policy initiatives.

**Visit to other health practitioners:** Majority of the beneficiaries had visited other health practitioners before coming to health centre. This resistance to visit health centres as first choice of health care is a phenomenon which requires thorough study and examination.

**Finance:** Nearly 3/4th of beneficiaries are willing to pay for better services. Strangely, this share is high among the low income group, less literate and labour groups. It is important to evaluate this phenomenon, ascertain the factors driving this opinion and make meaningful deductions.

**Conclusion**

Management of public health delivery at the field level requires multi-pronged reforms in health delivery system. At one level this includes, improving the process of preparation of health action plan, reducing gaps in the availability of health personnel, meaningful involvement of stakeholders at the local level, improving the motivation, eliminating factors which hamper productivity, reorganize health workers and simplification of procedures to facilitate exercise of financial powers. At another level, a customer-centric approach needs to be inculcated in the health care service to enhance demand for these services. This is the recurring theme in the work as assessed from the surveys. This requires an approach in which the socio-economic and demographic factors of the target population must be understood and incorporated in formulating policy and devising the action plan.