

Study on Dental Fluorosis in Nagaur District, Rajasthan

By

Shubhi Shrivastava

*Dissertation submitted in partial fulfillment of the requirements of the degree
MBA Hospital and Health Management*

Academic year, 2017-2019



The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: www.iihmr.edu.in

Study on Dental Fluorosis in Nagaur District, Rajasthan

By

Shubhi Shrivastava

*Dissertation submitted in partial fulfillment of award of
MBA Hospital and Health Management*

Academic year, 2017-2019

Public Health Engineering Department, Nagaur



The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan

Ph: 0141 3924700, Fax: 3924738

Website: www.iihmr.edu.in

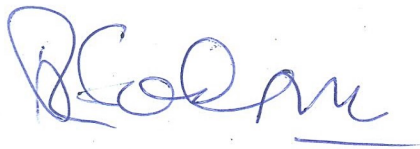
TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Shubhi Shrivastava** student of MBA Health and Hospital Management from The IIHMR University, Jaipur has undergone Dissertation training at **PHED, Nagaur** from 05th Feb'19 to 06nd May'19.

The Candidate has successfully carried out the study on “ **A study on Dental Fluorosis in Nagaur district, Rajasthan** assigned to her during her internship training and her approach to the study has been sincere, scientific and analytical.

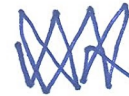
The Dissertation is for fulfillment of the course requirements.

I wish her all success in all her future endeavors.



Dr P R Sodani

Pro President
The IIHMR University



Dr Alok Kumar Mathur

Asst. Professor & Guide
The IIHMR University, Jaipur



OFFICE OF SUPERINTENDING ENGINEER, PROJECT, PHED,
CIRCLE, NAGOUR

GOGELAV PUMP HOUSE, NAGOUR-BIKANER HIGHWAY, NH-89, NAGOUR.

No./SE (P)/NAG/Certificate/2019-20/ 257-60

Dt. 15.5.19

CERTIFICATE

Under the Compliance of Orders of Chief Engineer Administration PHED, Jaipur dated 31.01.2019, Chief Engineer PMC, Nagaur letter No. 4506-09 dated 01.02.2019 and joining letter submitted by Dr. Subhi Shrivastava on dated 05.02.2019 at this office for her dissertation work for master's dissertation under MBA Course from University of IIHMR Jaipur. This is certify that Dr. Subhi Shrivastava D/o Sh. C.N. Shrivastava MBA Student of IIHMR Jaipur has satisfactorily completed a dissertation work on "Flourosis its impact and consequences" under this department from 5th Feb. 2019 to 6th May 2019.

During the period her conduct and performance towards provided responsibilities were excellent.


(Ajay Kumar Sharma)
Superintending Engineer,
PHED, Project Circle, Nagaur.

No./SE (P)/NAG/Certificate/2019-20/ 257-60

Dt. 15.5.19

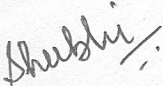
Copy to the following for necessary action and information:

1. Chief Engineer Administration PHED, 2-Civil Lines, Jal Bhawan, Jaipur.
2. Chief Engineer, PMC, RRWS & FMP, Nagaur.
3. IIHMR University Prabhu Dayal Marg, Near Sanganer Airport, Jaipur-302029
4. Dr. Subhi Shrivastava IIHMR University Jaipur.


Superintending Engineer,
PHED, Project Circle, Nagaur.

CERTIFICATE BY SCHOLAR

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled “ **A study on dental fluorosis in Nagaur district, Rajasthan** and submitted by **Dr. Shubhi Shrivastava (Enrolment No. 0675)** under the supervision of **Dr. Alok Kumar Mathur** for award of MBA in Hospital and Health of the University carried out during the period from 05/02/2019 to 06/05/2019 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.


Signature of student

ABSTRACT

Title: Dental Fluorosis in Nagaur district, Rajasthan

Author: Dr. Shubhi Shrivastava

Background: Nagaur is a centrally located district of Rajasthan. In India, for the high concentration of fluoride in groundwater, people are at risk of dental fluorosis. The problem is common in various states of India. The condition in Nagaur district of Rajasthan is worse where all villages and blocks have such a problem. Rajasthan Rural Water Supply and Fluoride Mitigation Project is being implemented in Nagaur district. Project has three approaches: i) Community approach ii) Hospital Approach and iii) School approach. The project is being implemented in 986 Villages of seven blocks of Nagaur district.

In Nagaur District (population: approximately 3.31 million) the main source of water supply is groundwater which invariably does not confirm to WHO standards as it contains excess of fluoride. Despite its unsuitability, residents are forced to use the groundwater for drinking due to a lack of other water resources, resulting in problems such as dental and skeletal fluorosis among them.

Objective: To study status of Dental Fluorosis in various age groups in six blocks of Nagaur district, Rajasthan.

Methodology: Data collected by PHED for Fluorosis mitigation program by school, community and hospital approach was accessed and assessed.

Study Design: Descriptive cross sectional study.

Sample size: 2400. Males and females (50 each) of various age groups from seven blocks of Nagaur district. Age groups are divided as:

- a) 6- 20 years b) 21-35 years c) 36- 50 years d) >55 years.

Study Area: 6 blocks of Nagaur, district in Rajasthan (viz. Kuchaman, Makrana, Degana, Ladnu, Deedwana and Parbatsar.)

Duration of study: 3 months (1st February- 7th May 2019)

Method of data collection: Secondary data was collected from PHED.

Results: Degana has highest number of Dental fluorosis affected patients in community approach whereas Makrana has highest number of dental fluorosis patients in school approach.

It can be observed that rate of Dental Fluorosis increased with increasing age. After age 36, there is no significant difference in males and females in Makrana. This difference is may be due to migrating females from other villages after marriage. It is observed that Dental fluorosis is more prevalent in males than females.

Conclusion: High level of fluoride in drinking water of villages and blocks of Nagaur district, Central Rajasthan, India, causes dental fluorosis in most people in the region and is an important health problem that needs prompt attention.

Keywords: Fluorosis, dental, hospital approach, community approach, school approach

ACKNOWLEDGEMENT

I take this opportunity to express my profound sense of gratitude to all those who helped me throughout the duration of the project.

I am highly obliged to **Shri Dinesh Sharma, CE PMC PHED, Nagaur Rajasthan** for allowing me to pursue my summer training from Public Health Engineering Department, Nagaur. This training would not have been completed without a substantial support from **Shri Ajay Sharma, SE PMC PHED, Nagaur Rajasthan** whose kind co-operation and constant encouragement helped me in the completion of the project. I would sincerely like to thank him for his guidance and constant training in providing necessary information regarding the project despite his preoccupation and busy schedule.

I would also like to thank my mentor **Dr. Alok Kumar Mathur, Assistant professor, IIHMR University, Jaipur** without whom this project would have been a distant reality.

TABLE OF CONTENTS:

Contents	Page no
Introduction	11,12
Scope of work under FMP	12-14
Implementation methodology under FMP for various activities.	15-21
Implementation schedule	21-22
Methodology	23
Results	24-34
Conclusion	35-37
Reference	38

List Of Figures:

S.No	Name of figure	Page no
Figure 4.1	Flow chart of FMP implementation	22
Figure 6.1.1	Comparison of Dental Fluorosis in various blocks in age group 6- 20 years.	24
Figure 6.1.2	Distribution of males and females affected students in age group 6- 20 years.	26,27
Figure 6.1.3	School wise distribution of students affected with Dental Fluorosis.	28
Figure 6.2.1	In Community Approach comparison of Dental Fluorosis in all 6 blocks.	29
Figure 6.2.2	Comparison of males and females affected with Dental Fluorosis in age group 21- 35 years.	30
Figure 6.2.3	Comparison of males and females affected with Dental Fluorosis in age group 36- 50 years.	31
Figure 6.2.4	Comparison of males and females affected with Dental Fluorosis in age group 50 years and above.	32
Figure 6.3.1	Total number of ANM and ASHA trained.	35

List of tables

S. No.	Table Name	Page No.
Table 6.1.1	Overall School wise Scenario of Dental Fluorosis.	26
Table 6.3.1:	Total number of ANM and ASHA trained.	34

Acronyms/Abbreviations

PMC	Project Management Cell
FMP	Fluorosis Mitigation Project
FMPU	Fluorosis Mitigation Project Unit
DF	Dental Fluorosis
JICA	Japan International Cooperation Agency
GOR	Government Of Rajasthan
CDS	Cluster Distribution System
FDL	Fluorosis Diagnostics Laboratory
IEC	Information Education Communication
CME	Continuing Medical Education
BD	Bone Deformity
PRI	Panchayati Raj Institution
FGD	Focussed Group Discussion
HB	Haemoglobin
OPD	Out Patient Department
RRWS	Rajasthan Rural Water Supply
PHED	Public Health Engineering Department
PMC	Project management cell

DISSERTATION

1) **INTRODUCTION:**

In India, the ratio of people who have access to safe water has improved from 72 percent in 1990 to 88 percent in 2008. Steady progress has been made toward the objective of providing sustainable access to drinking water throughout India. However, development of water source and water supply facilities has not kept up with the rise in water demand associated with the population growth and economic development. This results in excess dependency on groundwater, and discontinuous and unstable water supply is a constant challenge. Furthermore, in some areas, the groundwater contains substances harmful to the human body such as fluoride and arsenic, greatly exceeding the standard provided by the World Health Organization (WHO) Guidelines for drinking water quality.

Located in Northwestern India, State of Rajasthan has an annual rainfall of 531 millimeters, less the national average in India (1,200 millimeters). The groundwater has been over exploited due to the limited availability of surface water, resulting in a chronic ground water shortage.

In Nagaur District (population: approximately 3.31 million) of State of Rajasthan, the main source of water supply is groundwater which invariably does not confirm to WHO standards as it contains excess of fluoride. Despite its unsuitability, residents are force to use the groundwater for drinking due to a lack of other water resources, resulting in problems such as dental and skeletal fluorosis among them. A survey in 2016 found that approximately 34 percent of children in the district between the ages of six and fourteen had fluorosis. About 80 percent of the population in the district does not have access to safe water, placing the district as having one of the most dire water shortages in the state.

BACKGROUND

- (i) Nagaur is a centrally located district of Rajasthan State of India which is a part of great Indian Thar Desert. In the district there is serious situation of depletion of ground water aquifer and deterioration in quality in the Nagaur district. GoR decided to take up Phase – II Project “The Rajasthan Rural water Supply and Fluorosis Mitigation Project (Nagaur)” under as an urgent priority to provide sustainable drinking water supply to remaining 986 villages and 7 urban towns of Nagaur District under JICA Finance.
- (ii) Public Health Engineering Department Government of Rajasthan has constituted a separate and independent “Project Management Cell (PMC): Headed by Chief Engineer of the Department. The Fluorosis Mitigation Project Unit (FMPU) will work under PMU, headed by Joint Director (Medical).
- (iii) As per the condition of JICA assisted Rajasthan Rural Water Supply and Fluorosis Mitigation Project – Nagaur, the implementation of the software part of the work of Fluorosis Mitigation Project would be carried out through hiring of NGO.
- (iv) The Objective of the Assignment: To study status of Dental Fluorosis in various age groups in six blocks of Nagaur district, Rajasthan.

2.0 SCOPE OF WORK UNDER FLUOROSIS MITIGATION PROGRAMME:

The scope of the work for carrying out the remaining activities of the Fluorosis Mitigation Programme through:

- (a) School approach
- (b) Community approach
- (c) Hospital based approaches

In 986 villages and 7 blocks in Nagaur district, Rajasthan.

2.1 SCOPE OF WORK FOR SCHOOL APPROACH

1. Developing capacity of (i) Diet Counsellors and (ii) Health Assistants to conduct survey in schools for prevalence of anaemia (low Haemoglobin) and fluoride toxicity effects among the students.
2. Developing IEC materials viz. Pamphlets, Booklets, Posters, Wall Hangings etc. for display in school corridors, library and classrooms besides distribution to the school children besides necessary pre-coded proforma for recording school data.
3. Screening the school students from all upper primary, secondary and senior secondary schools (both Govt. & Private) for prevalence of Dental Fluorosis (DF) and Bone Deformity (BD) and prepare a list of students affected by DF & BD.
4. Screening the DF & BD affected students from for prevalence of anaemia by checking check Haemoglobin (Hb) level through using portable digital Haemoglobinometer in the schools.
5. Collecting urine samples from the anaemic students and school drinking samples and handed over to the nearest Fluorosis Diagnostic Laboratories (FDLs) on the same day for fluoride testing.
6. Conducting group counselling in the schools for the Parents, Teachers and Students by the Diet Counsellors – how to eliminate toxic fluoride from the body and improve Hb by practicing interventions.
7. Conducting impact assessments (3 times) among students after practicing interventions at certain specified intervals by re-checking Hb and re-testing of urine fluoride level of the students.
8. To laminate veneering of severely DF affected students (Approx. 100 students) on pilot basis.

2.2 SCOPE OF WORK FOR COMMUNITY APPROACH

1. Developing capacity of PRI members and officials in the line Departments regarding Fluorosis Prevention & Control measures.
2. Developing IEC materials for display in gram panchayat offices, community centres, PRI offices, samudaic bhawan and other important places.
3. Developing capacity of (i) Diet Counsellors and (ii) Field Coordinators to conduct house to house survey in the community.
4. Conducting house to house health survey (100% in rural areas and 10% in urban areas) for the assessment of prevalence of Fluorosis among the community, living in the project area in a systematic manner through adequately trained personnel.
5. Organizing Focused Group Discussions (FGD) for dissemination of survey findings and creating mass awareness program on Fluorosis mitigation through Street plays, puppet shows, street marches, slogan shouting etc.
6. Conducting Impact Assessments (3 times) after practicing interventions at certain specified intervals using tablet computers (android technology and cloud networking).

2.3 SCOPE OF WORK FOR HOSPITAL APPROACH

1. Five (5) Fluorosis Diagnosis Laboratories (FDLs) are established and made functional in the following Govt. Hospitals of Nagaur district viz.
 - (i) District Hospital – Nagaur;
 - (ii) Sub-Divisional Hospital – Deedwana;
 - (iii) Govt. Hospital - Kuchaman;
 - (iv) Community Health Centre (CHC) – Jayal
 - (v) Community health Centre (CHC) – Degana as per the designs provided by PMC, PHED.
2. Laboratory Equipment, Chemicals / Reagents and other accessories for fluoride level in urine, blood and water samples and (ii) checking of Haemoglobin (Hb) of the patients besides supply of furniture for 5 FDLs are procured and provided.
3. To supply the required manpower for running the 5 FDLs.
4. (i) Laboratory Technicians, (ii) Diet Counsellors, (iii) Continuing Medical Education (CME) for Doctors (both Govt. & Private) are provide, working in Nagaur district.

5. Development, printing & dissemination of Information, Education & Communication (IEC) materials viz. Pamphlets, Booklets, Posters, Wall Hangings etc. for hospitals / patients as per requirement besides printing of adequate copies of pre-coded performa for OPDs.
6. Diet editing & Diet counselling to the Fluorosis affected patients through trained Diet Counsellors.
7. Monitoring Fluorosis affected patients till recovery.
8. Testing urine and water samples collected from schools / field and to share the data to the concern authority / Department.

3.0 IMPLEMENTATION METHODOLOGIES OF FMP FOR ACTIVITIES IN DIFFERENT APPROACHES:

The implementation methodologies /procedures of FMP works shall be as follows:

3.1 SCHOOL APPROACH (Focus is on 4 activities)

Activity 1: Development, designing, printing and dissemination of Communication materials and survey forms:

- (i) Development & designing of the communication materials by IEC Expert with the technical support from PMSC.
- (ii) Adequate number of copies of IEC materials & survey are printed.
- (iii) Dissemination of the IEC materials to the identified places (Schools / Education Dept. etc.).

Activity 2: Screening of students

- (i) The NGO staff (already engaged in CDS packages under RRWS&FMP) would screen the students (3,00,000 numbers) based on the symptoms of Dental Fluorosis (DF) and Bone Deformity (BD) and prepared a list of students for further health checking.

- (i) The Haemoglobin (Hb) level in blood of DF and BD affected students shall be checked by the Health Assistant (Agency staff) using portable Haemoglobin meter. Training of the Health Assistants (Agency staff) shall be provided by Experts (PMSC).
- (ii) The urine samples of the anaemic students (low of Hb) shall be collected by the Field Assistants (Agency staff) and handed over to the respective FDL (under Hospital Approach) on the same day. The Agency also collect and deposit school drinking water samples (2500 Nos.) to the FDLs.
- (iii) The Laboratory Technicians of the FDLs shall carry out the testing as per the standard protocol and communicate the test results to PMC/PMSC for sharing with the students & school authority. (Necessary funds for testing samples viz. consumables & reagents would be provided to the respective FDLs).

Activity 3: Prevention & Control

- (i) Agency shall organize Parents -Teachers Meetings (PTMs) in all schools in consultation with District / Block Education Officer.
- (ii) Diet Counsellors (Agency staff) shall provide diet editing & diet counselling to the parents along with their wards and share the outcome of the test results of the school authority.

Activity 4: Impact Assessment

- (i) First impact assessment (50% of students) after one month of practising interventions shall be conducted by Agency staff using the survey forms. During impact assessments, checking of Haemoglobin and collection of urine samples from the students shall be done by the Agency staff.
- (ii) Second impact assessment (25% of the students) after three months of practising interventions shall be conducted by Agency staff using the survey forms. During impact assessments, checking of Haemoglobin and collection of urine samples from the students shall be done by the Agency staff.

- (iii) Third impact assessment (15% of the students) after eight month of practising interventions shall be conducted by Agency staff using the survey forms. During impact assessments, checking of Haemoglobin and collection of urine samples from the students shall be done by the Agency staff.

3.2 COMMUNITY APPROACH (Focus is on 6 activities)

Activity 1: Capacity building of Panchayati Raj Institution (PRI) members

- (i) The Master trainers shall be identified by the Agency staff and they would be trained by PMSC Experts.
- (ii) Capacity building of 1000 Panchayati Raj Institution (PRI) members by the Agency.
- (iii) Identification of the participants through Zilla Parishad / Block Panchayat, logistical and other related arrangements i.e. fixing venue, food, and stationaries shall be arranged by Agency.

Activity 2: Development and dissemination of communication materials (in Hindi & English)

- (i) The Agency with the technical guidance of Experts shall develop all the communication materials, which shall be reviewed by Experts & approved by the competent authority.
- (ii) Adequate number of copies (IEC materials) shall be printed as per specifications and distributed to the identified places for the dissemination through Agency staff

Activity 3: Development of software (MIS) for conducting house to house survey using android based technology.

- (i) The MIS software shall be developed by the Agency with technical support of PMSC.

- (ii) The house to house survey will be done by the Agency with the help of approved format.

Activity 4: Conducting house to house survey.

- (i) The Agency shall conduct the house to house survey (5.0 lakh households, which includes baseline as well as three impact assessments and terminal evaluations) in rural areas (100 % households) and urban areas (10% households) through trained personnel using tablet computers (android technology and cloud networking).

Activity 5: Sharing the survey findings

- (i) Diet Counsellors (Agency staff) shall organize the Focused Group Discussions (FGD) in the villages and places shall be fixed in consultation with PRIs.
- (ii) Necessary background materials for organizing the FDG shall be provided by Agency.
- (iii) Diet Counsellors shall share the outcome of the survey results to the public during the FDG and also discuss the prevention & control measures and the final outcome.

Activity 6: Impact Assessment

- (i) First impact assessment (50% of households) after one month of practising interventions shall be conducted by Agency staff using the android based technology.
- (ii) Second impact assessment (25% of households) after three month of practising interventions shall be conducted by Agency staff using the android based technology.
- (iii) Third impact assessment (15% of households) after eight month of practising interventions shall be conducted by Agency staff using the Android based technology

3.3 Hospital Approach (Focus is on 6 activities)

Activity1: Establishment of 5 Fluorosis Diagnostic Laboratories (FDLs):

- (i) To establish Fluorosis Diagnostic Laboratories (FDLs) 5 numbers in 5 Govt. hospitals as mentioned below:
 - (a) Construction of 2 FDLs at (i) Community Health Centre-Jayal and (ii) Community Health Centre-Degana as per specifications.
 - (b) Renovation / minor repair work for 3 FDLs as per requirement at (i) District Hospital - Nagaur, (ii) Sub-Divisional Hospital – Deedwana and (iii) Govt. Hospital at Kuchaman. [Civil work for 2 FDLs at Deedwana & Kuchaman is incomplete, construction work of Nagaur FDL completed but not made functional].

Activity 2: Development, designing, printing and dissemination of IEC materials.

- (i) Development & designing of the IEC materials would be prepared by IEC Expert (Agency staff) with the technical guidance of PMSC.
- (ii) Adequate number of copies shall be printed and distributed to the identified places / patients for the dissemination besides pre-coded proforma for recording patient's history in the OPDs.

Activity 3: Procurement of laboratory equipment and other Reagents / Chemicals for 5 FDLs.

- (i) To procure necessary equipment & other essential accessories, reagents / chemicals miscellaneous laboratory items for fluoride testing in blood, urine and water samples and for checking Haemoglobin shall be procured by the Agency. The list of equipment for testing fluoride and checking Haemoglobin (Hb) are already provided in original FMP plan.

Activity 4: Capacity building of Laboratory Technicians, Diet Counsellors, ASHAs, ANMs and CME for Doctors

- (ii) Capacity building of Laboratory Technicians (1Lab Technician per FDL x 5 FDLs = 5 Lab Technicians - 10 days duration) and Diet Counsellors (1 Diet Counsellor per FDL x 5 FDLs = 5 Diet Counsellors - 5 days duration) shall be organized at Nagaur FDL and in a reputed institute respectively with the technical guidance of PMSC.
- (iii) Capacity building of ASHAs (2500 nos.) and ANMs (700 nos.) {half- day duration} are being conducted by PMSC / PMC in batches at PHCs / CHCs located in various Blocks.
- (iv) Continuing Medical Education (CME) for Doctors (350 numbers) shall be organized at Nagaur. CME for doctors in hospitals where FDLs are located shall be for 2 days duration; for other Government & private hospital doctors shall be for 1day duration. The invitation to Resource Persons, call letters for the participants through Medical & Health Department, necessary logistic arrangement including fixing the venue, honorarium for Resource persons, incentives to participants, procurement of background materials, refreshments shall be taken care by Agency.

Activity 5: Patient Management

- (i) The patients attending the OPDs, history of the complaints retrieved, shall be examined by the trained doctors and the suspected cases shall be referred to the FDL for confirmation of the Fluorosis disease.
- (ii) Fluorosis confirmation testing shall be done in the 5 FDLs of the respective hospitals by trained Lab Technicians only.
- (iii) Patients shall collect the test results and show it to the doctor.

- (iv) If fluorosis is confirmed, doctor shall advise the patient to visit the FDL again for practising interventions.
- (v) Necessary diet editing and diet counselling shall be provided by the Diet Counsellor in the FDLs.

Activity 6: Operation & Maintenance of the FDLs including sample testing:

- (i) Requisite Performa for recording patient's history, Biochemical test reports, referral cards etc. to be printed as per requirement by the Agency.
- (ii) The FDLs should have stock of required chemicals and other related items at least for 3 months.

4. IMPLEMENTATION SCHEDULE (40 MONTHS)

The implementation schedule for the balance FMP works for all the three approach activities shall be 40 months.

The following implementation framework is formed:

- (i) **Project Management Cell (PMC), PHED:** The Chief Engineer, PMC, RRWS&FMP will be the Nodal Officer for smooth functioning and implementation of the project and he will communicate & coordinate with JICA and District Collector, Nagaur. One Joint Director / Deputy Joint Director, from Health Dept., GoR would be deputed to PHED for overall supervision of the FMP activities.
- (ii) **Project Monitoring & Supervision Consultants (PMSC):** Necessary technical support for developing background materials, IEC materials, monitoring & supervision, reviewing & recommendation of documents shall be done by PMSC.

Flow chart for FMP implementation: Strategy

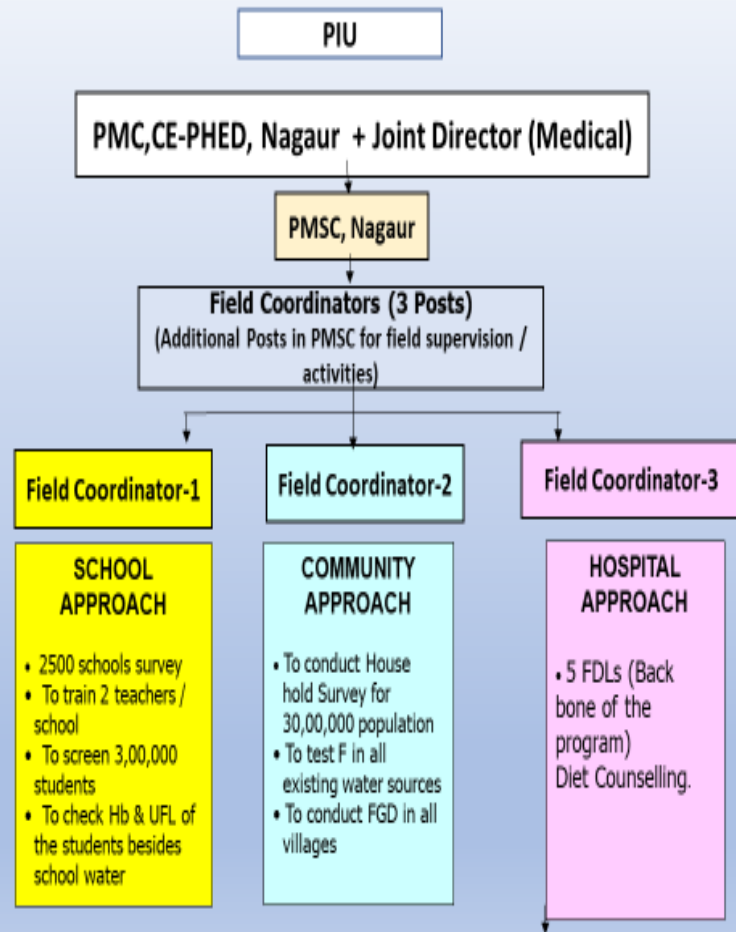


Figure:4.1: Flow chart of FMP implementation

5.0 METHODOLOGY:

5.1 Research Question:

What is the status of Dental Fluorosis in various age groups in six blocks of Nagaur district, Rajasthan?

5.2 Objective: To study status of Dental Fluorosis in various age groups in six blocks of Nagaur district, Rajasthan.

5.3 Method: Data collected by PHED for Fluorosis mitigation program by school, community and hospital approach was accessed and assessed.

5.4 Study Design: Descriptive cross sectional study.

5.5 Sample size: 2400. Males and females (50 each) of various age groups from seven blocks of Nagaur district. Age groups are divided as:

a) 6- 20 years b) 21-35 years c) 36- 50 years d) >55 years.

5.6 Study Area: 6 blocks of Nagaur, district in Rajasthan (viz. Kuchaman, Makrana, Degana, Ladnu, Deedwana and Parbatsar.)

5.7 Duration of study: 3 months (1st February- 7th May 2019)

5.8 Method of data collection: Secondary data was collected from PHED.

6.0 RESULTS:

6.1 School Approach:

Dental Fluorosis survey along with puppet show for awareness generation on Fluorosis mitigation under school approach of FMP is done in six blocks.

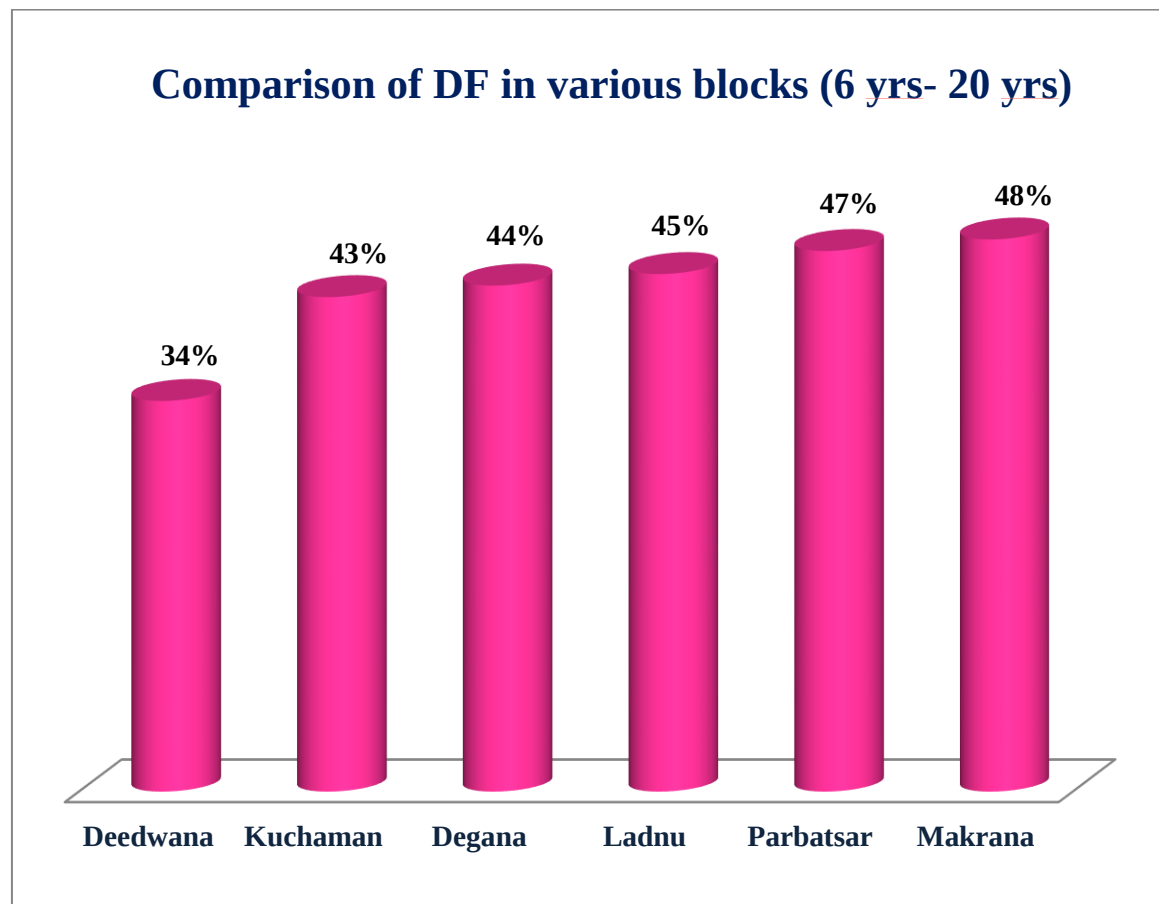


Figure 6.1.1: Comparison of Dental Fluorosis in various blocks in age group 6- 20 years.

Interpretation: It is observed that Makrana has highest Dental fluorosis affected patients followed by Parbatsar, Ladnu, Degana, Kuchaman whereas Deedwana has lowest number of affected patients in school approach (Age group: 6 years- 20 years).

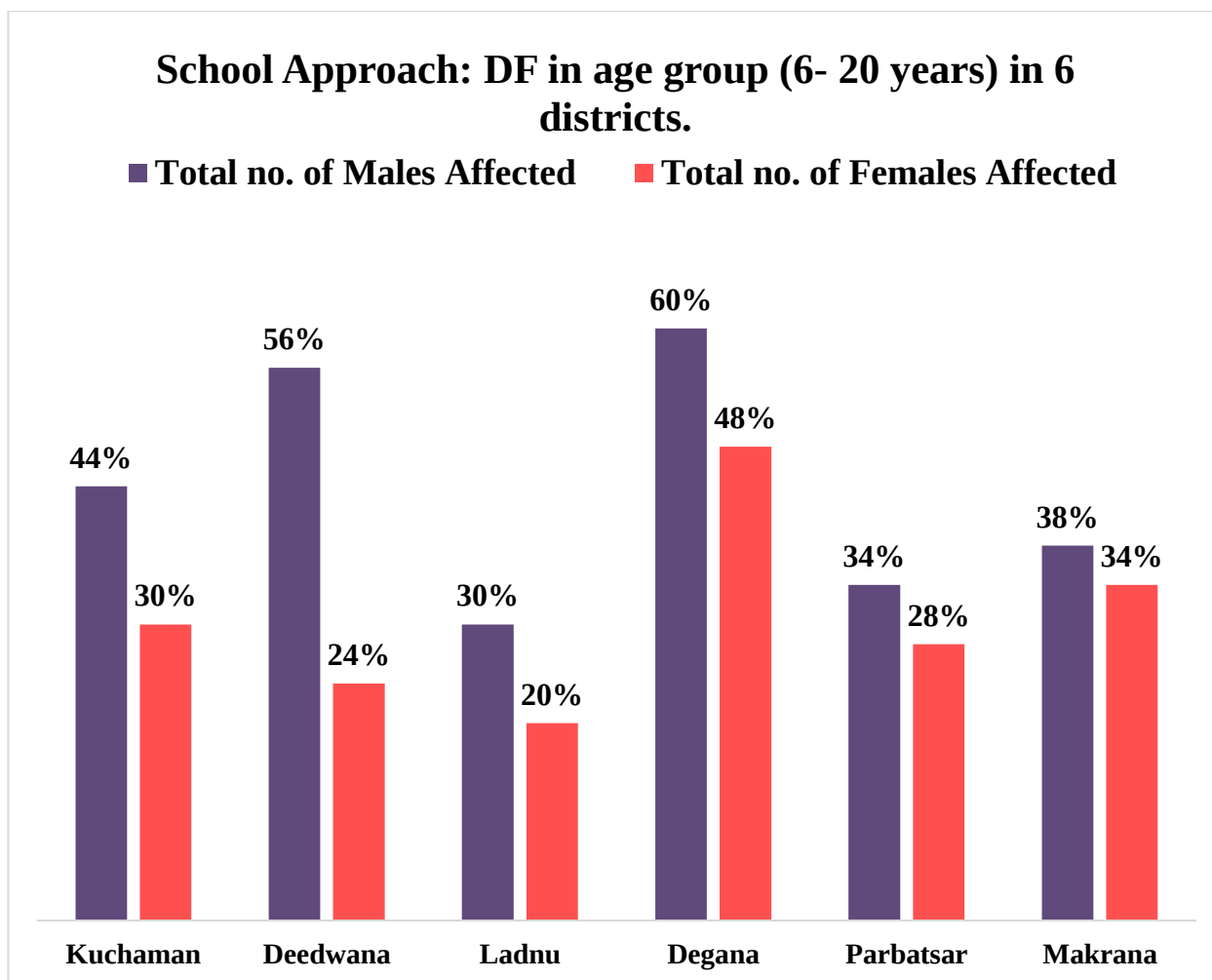


Figure 6.1.2: Distribution of males and females affected students in age group 6- 20 years.

Interpretation:

Degana (60%) has highest number of Males affected followed by Deedwana (56%), Kuchaman (44%), Makrana (38%), Parbatsar (34%), Ladnu (30%). Degana (48%) has also highest number of Females affected followed by Makrana (34%), Kuchaman (30%), Parbatsar (28%), Deedwana (24%), Ladnu (20%). Overall, Degana has highest measure of Dental fluorosis followed by Deedwana, Kuchaman, Makrana, Parbatsar, Ladnu. It is also observed that dental fluorosis is more prevalent in males than females in the age group of 6-20 years of age. (n=600)

Table 6.1.1: Overall School wise Scenario of Dental Fluorosis.

S. No.	Date of survey	Name of the Block	Name of School	Strength of students school	Students present during screening	Nos. of students affected with DF	% of students affected with DF
1.	02.03.19	Kuchaman	JNV, Kuchaman City	471	402	193	48.0
2.	08.03.19	Deedwana	GGSS School, Deedwana	303	256	139	54.3
3.			GSS School, Deedwana	328	201	86	42.8
4.	09.03.19	Ladnu	SVGM School, Ladnu	357	333	87	26.1
5.			BLS SS School, Ladnu	254	123	27	21.9
6.	11.03.19	Degana	GSS School, Degana	114	99	70	70.7
7.			SVGM School, Degana	305	281	109	38.8
8.	15.03.19	Parbatsar	GSS School, Parbatsar	227	174	78	44.8

9.			GUPS, Parbatsar	32	32	13	40.6
10.			GSS School, Makrana	304	177	66	37.6
11.	16.03.19	Makrana	GGSS School, Makrana	317	215	54	25.1
Total =				3012	2293	922	40.2%

Interpretation: Till date, 2293 students out of 3012 has been screened to identify the prevalence of Dental Fluorosis (DF) in 11 Schools located in Kuchaman, Deedwana, Ladnu, Degana, Parbatsar and Makarana blocks. It was observed that students affected with DF are in the range of 21.9% to 70.7% with an average of 40.2%.

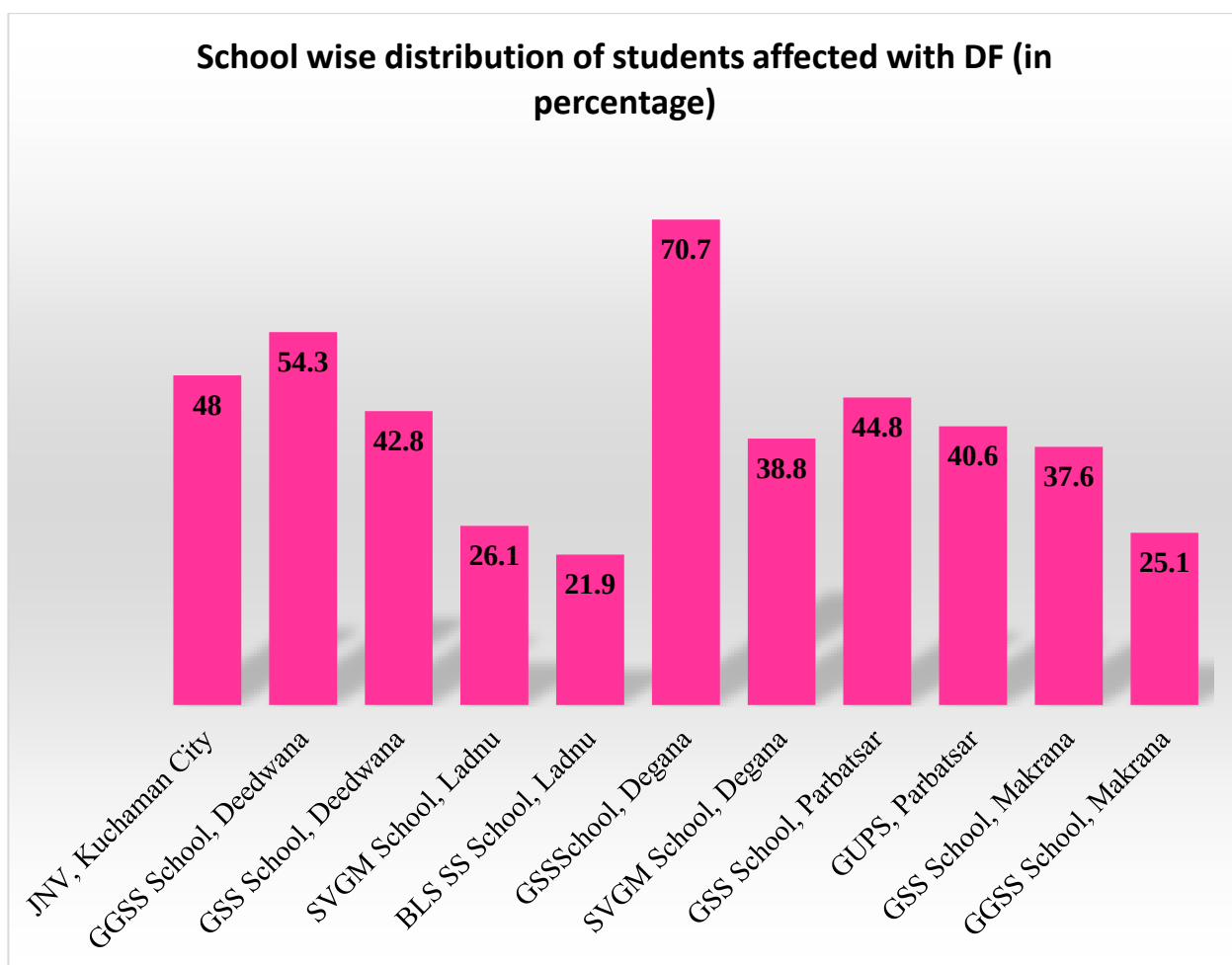


Figure 6.1.3: School wise distribution of students affected with Dental Fluorosis.

Interpretation: According to survey in all schools of Nagaur, GSS School had maximum dental fluorosis affected students.

6.2 Community Approach:

Awareness generation program (for FMP) through social activities (viz. Nukkad, Natak, Puppet show etc.) is also carried out by the NGOs engaged under RRWS & FMP besides their regular activities in the community.

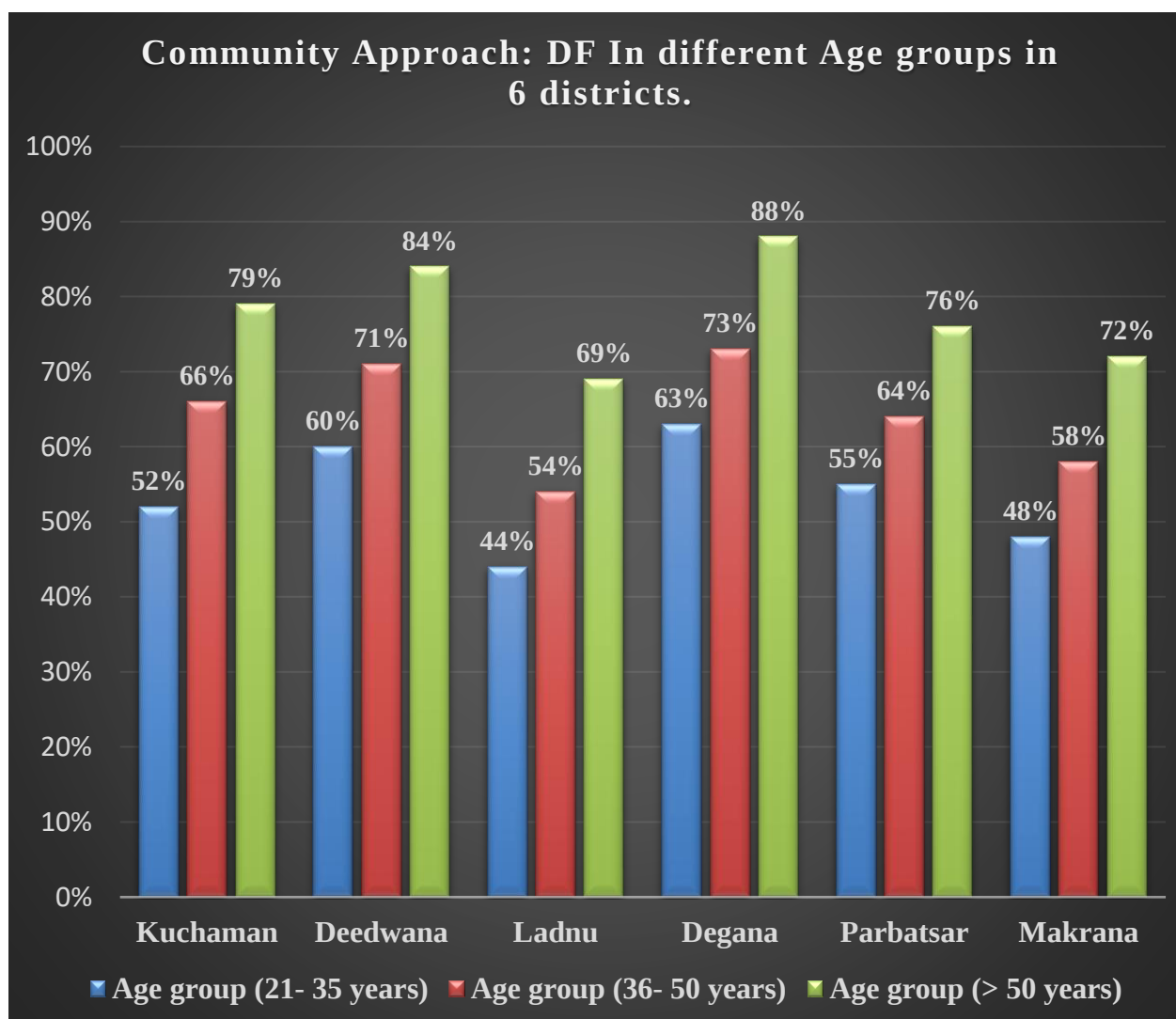


Figure 6.2.1: In Community Approach comparison of Dental Fluorosis in all 6 blocks.

Interpretation:

- Age group (21- 35 years): Degana (63%) has highest measure of Dental fluorosis followed by Deedwana (60%), Parbatsar (55%), Kuchama (52%), Makrana (48%), Ladnu (44%).
- Age group (36- 50 years): Degana (73%) has highest measure of Dental fluorosis followed by Deedwana (71%), Kuchaman (66%), Parbatsar (64%), Makrana (58%), Ladnu (54%).
- Age group (>50 years): Degana (88%) has highest measure of Dental fluorosis followed by Deedwana (84%), Kuchaman (79%), Parbatsar (76%), Makrana (72%), Ladnu (69%).

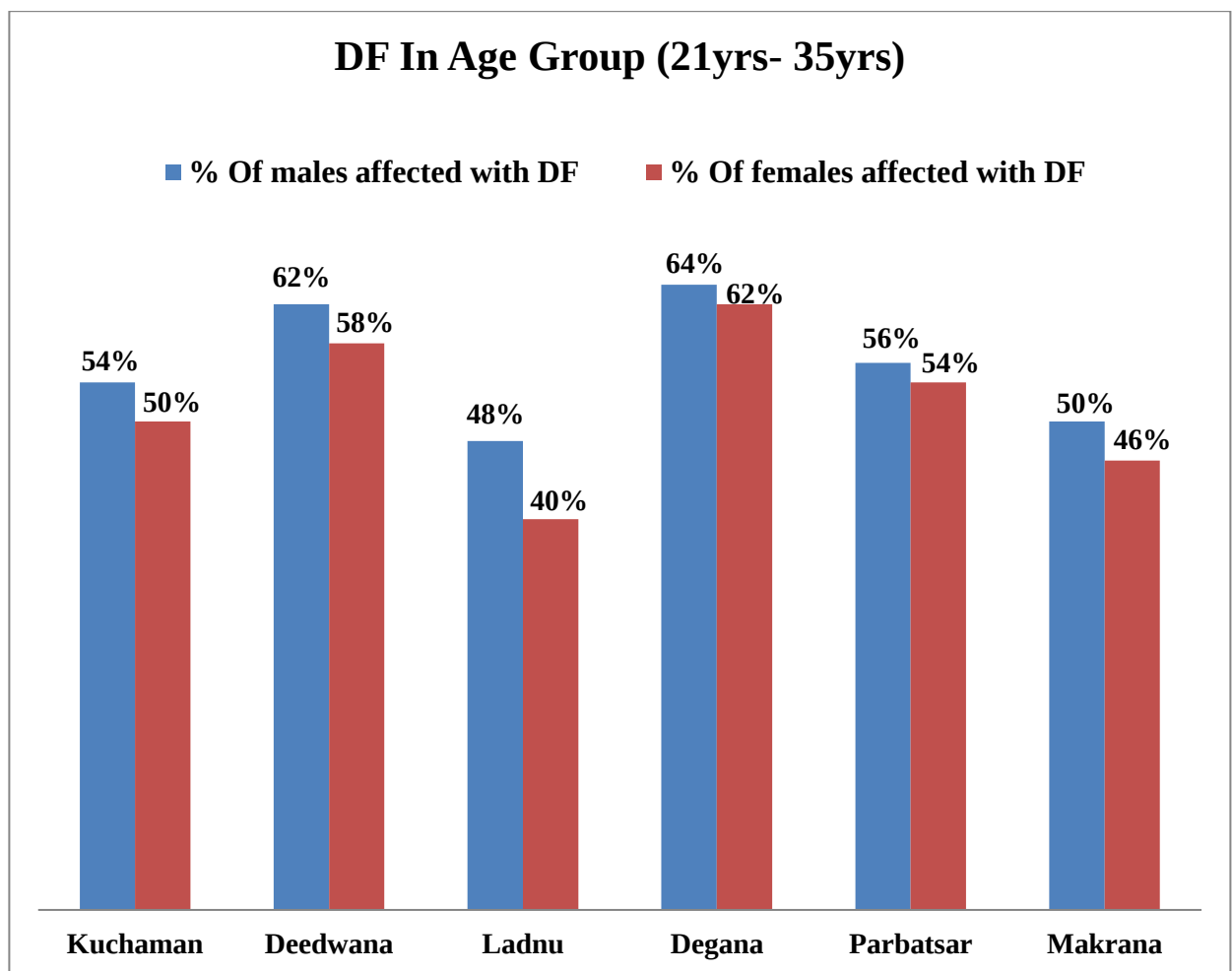


Figure 6.2.2: Comparison of males and females affected with Dental Fluorosis in age group 21- 35 years.

Interpretation: Degana has highest measure of Dental fluorosis followed by Deedwana, Kuchaman, Makrana, Parbatsar, Ladnu in age group of 21- 35 years. It is also observed that Dental fluorosis is more prevalent in males than females. (n=600)

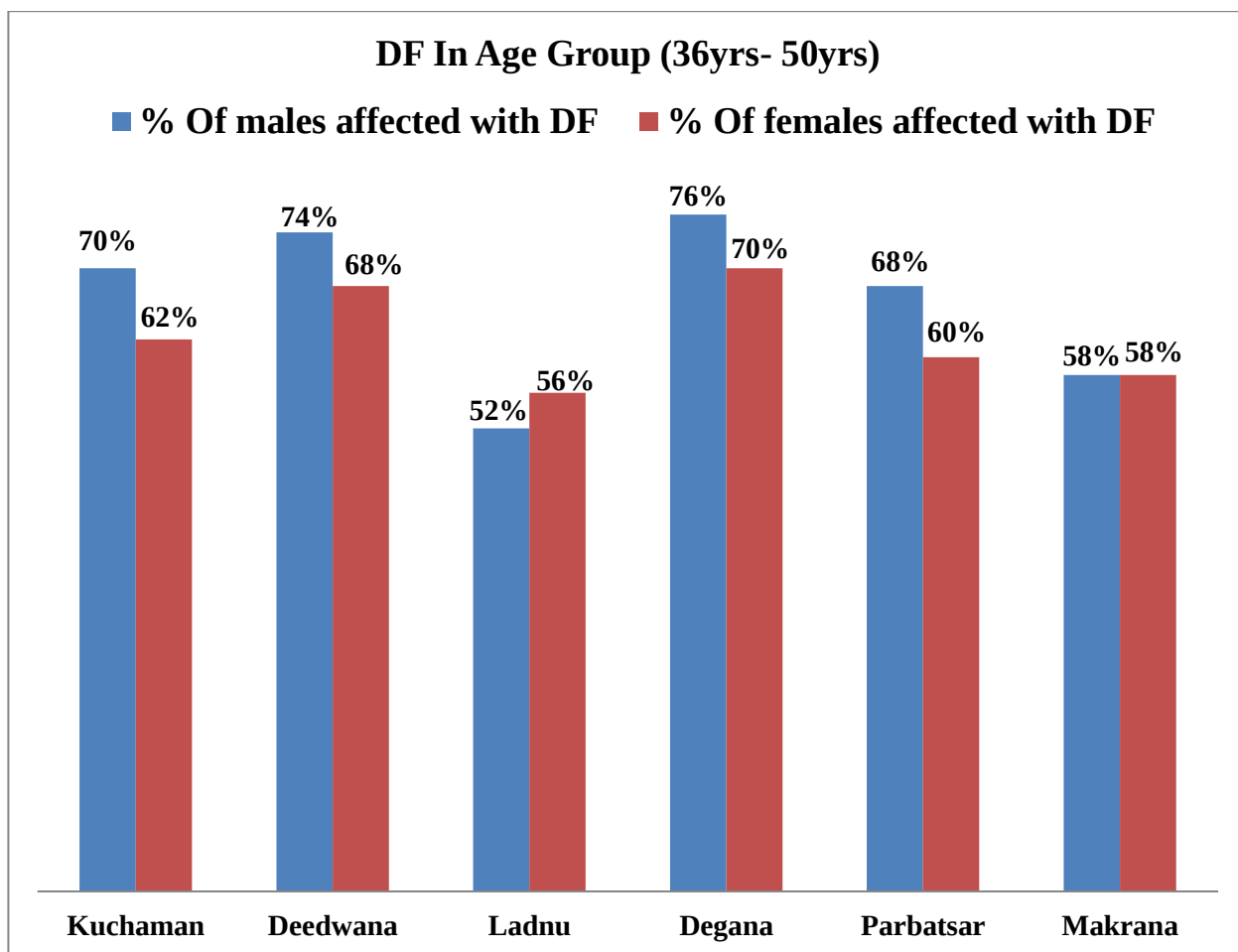


Figure 6.2.3: Comparison of males and females affected with Dental Fluorosis in age group 36- 50 years.

Interpretation: After age 36, there is no significant difference in males and females in Makrana. This difference is may be due to migrating females from other villages after marriage. (n=600).

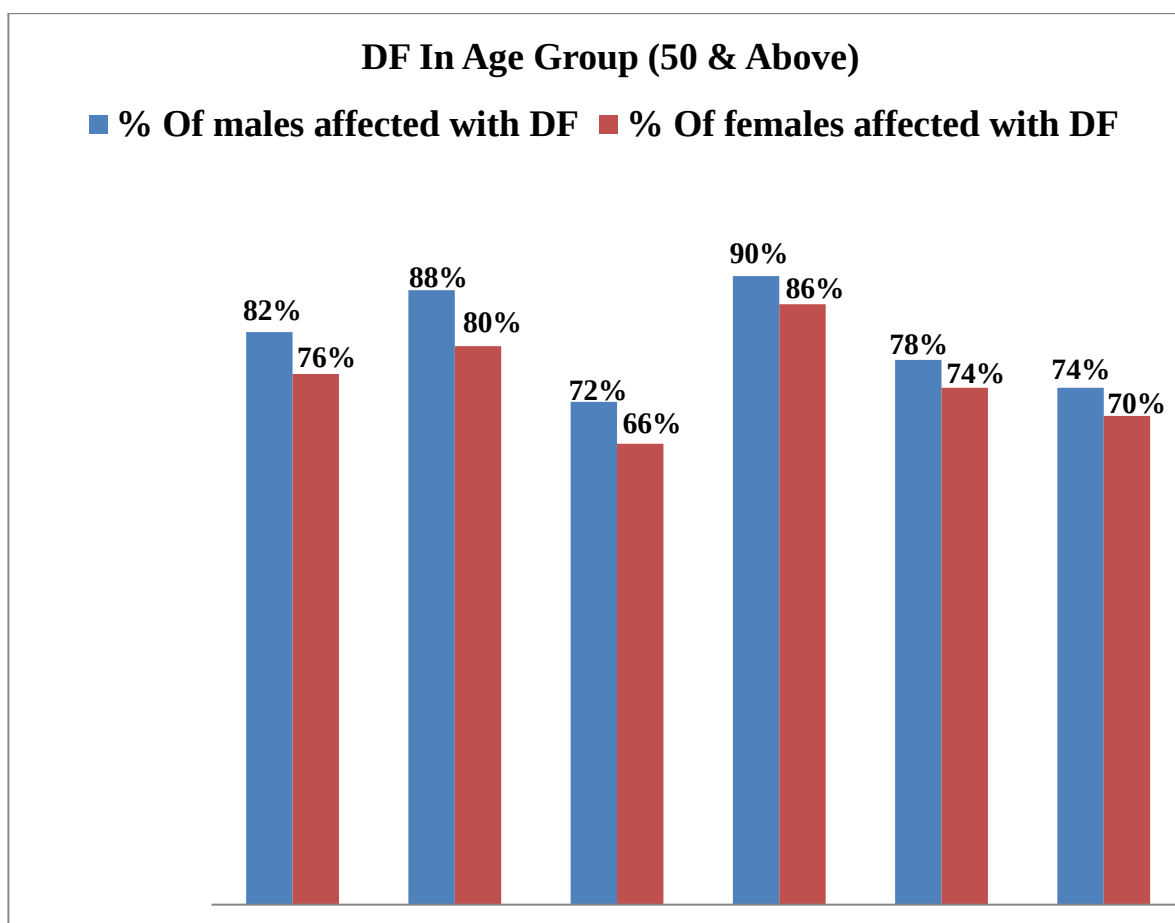


Figure 6.2.4: Comparison of males and females affected with Dental Fluorosis in age group 50 years and above.

Interpretation: Degana has highest amount of Dental fluorosis followed by Deedwana, Kuchaman, Makrana, Parbatsar, Ladnu. It is also observed that males are more prevalent than females. (n=600). It can be observed that rate of DF increased with increasing age.

6.3 Hospital Approach:

Training on Fluorosis Mitigation for ASHAs & ANMs of Nagaur, Parbatsar, Degana and Jayal blocks of Nagaur district is done. The training programs were jointly organized by PMSC and PMC, PHED. IEC material distributed to the Participants on the day of training program. The details of the program organized are as follows:

S. No.	Date	Name of the block	No. of Batches	ASHAs & ANMs trained
1.	December, 2019	Nagaur	6 Batches	309
2.	January, 2019	Parbatsar	6 Batches	281
3.	February, 2019	Degana	5 Batches	256
4.	March, 2019	Jayal	6 Batches	323
5.	April, 2018	Ladnu	5 Batches	162
	Total Participants =			1331

Table 6.3.1: Total number of ANM and ASHA trained.

Similar programs would also be conducted in the remaining blocks of Nagaur district viz. Deedwana, Kuchaman and Makrana shortly.

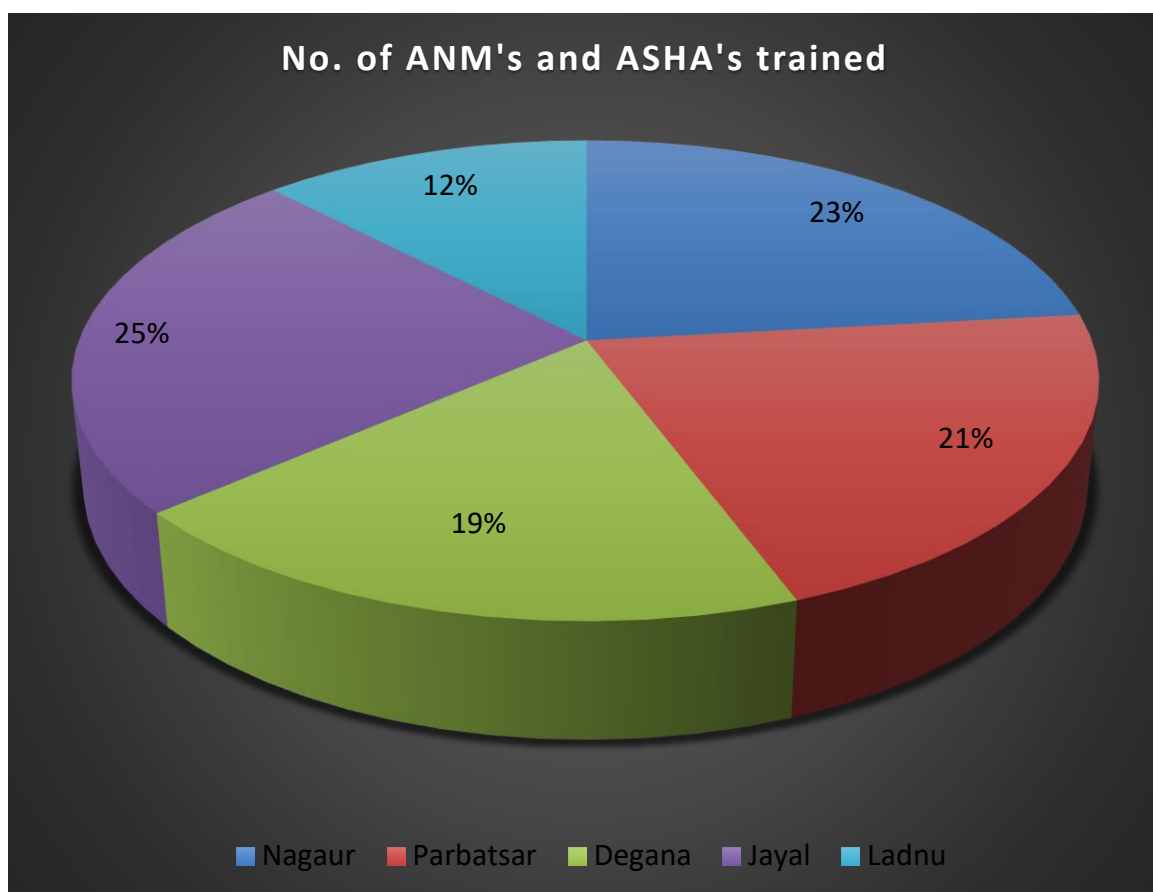


Figure 6.3.1: Total number of ANM and ASHA trained.

Interpretation:

Training of fluorosis mitigation for ASHAs & ANMs of Nagaur, Parbatsar, Digana and Jayal blocks of Nagaur is completed. Similar programs are also conducted in the remaining blocks of Nagaur district i.e Deedwana, Makrana and Kuchaman.

7.0 CONCLUSION:

- Degana has highest number of Dental fluorosis affected patients in community approach whereas Makrana has highest number of dental fluorosis patients in school approach.
- It can be observed that rate of Dental Fluorosis increased with increasing age.
- After age 36, there is no significant difference in males and females in Makrana. This difference is may be due to migrating females from other villages after marriage.
- High level of fluoride in drinking water of various blocks of Nagaur district, Central Rajasthan, India, causes dental fluorosis in most people in the region and is an important health problem that needs prompt attention.
- Age group (21- 35 years): Degana (63%) has highest measure of Dental fluorosis followed by Deedwana (60%), Parbatsar (55%), Kuchama (52%), Makrana (48%), Ladnu (44%).
- Age group (36- 50 years): Degana (73%) has highest measure of Dental fluorosis followed by Deedwana (71%), Kuchaman (66%), Parbatsar (64%), Makrana (58%), Ladnu (54%).
- Age group (>50 years): Degana (88%) has highest measure of Dental fluorosis followed by Deedwana (84%), Kuchaman (79%), Parbatsar (76%), Makrana (72%), Ladnu (69%).

<u>School Approach</u>	<u>Community Approach</u>
• Makrana has highest Dental fluorosis affected patients (48%) followed by Parbatsar (47%), Ladnu (45%), Degana (44%), Kuchaman (43%) whereas Deedwana (34%) has lowest dental fluorosis affected patients	• Age group (21- 35 years): Degana (63%) has highest measure of Dental fluorosis followed by Deedwana (60%), Parbatsar (55%), Kuchama (52%), Makrana (48%), Ladnu (44%). • Age group (36- 50 years): Degana (73%) has highest measure of Dental fluorosis followed by Deedwana (71%), Kuchaman (66%), Parbatsar (64%), Makrana (58%), Ladnu (54%). • Age group (>50 years): Degana (88%) has highest measure of Dental fluorosis followed by Deedwana (84%), Kuchaman (79%), Parbatsar (76%), Makrana (72%), Ladnu (69%). • It can be observed that rate of DF increased with increasing age.

- Degana (60%) has highest number of Males affected followed by Deedwana (56%), Kuchaman (44%), Makrana (38%), Parbatsar (34%), Ladnu (30%).
- Degana (48%) has highest number of Females affected followed by Makrana (34%), Kuchaman (30%), Parbatsar (28%), Deedwana (24%), Ladnu (20%).

- It is observed that Dental fluorosis is more prevalent in males than females.
- After age 36, there is no significant difference in males and females in Makrana. This difference is may be due to migrating females from other villages after marriage.

References:

- <https://www.indiawaterportal.org/sites/indiawaterportal.org/>
- <http://medind.nic.in/iay/t12/i3/iayt12i3p124.htm>
- <https://www.webmd.com/children/fluorosis-symptoms-causes-treatments>
- <https://www.mouthhealthy.org/en/az-topics/f/fluorosis>
- https://www.who.int/water_sanitation_health/diseases-risks/diseases/fluorosis/en/
- <https://www.colgate.com/en-us/oral-health/basics/fluoride/fluorosis>
- <http://nhp.gov.in/disease/non-communicable-disease/fluorosis>

Thank You

To Mitigate Fluorosis

Say
NO
to



SUPARI
&
TOBACCO



Say
Yes
to

