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Health Management Training of UGs- A Missed Opportunity!

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The objectives of undergraduates (UGs) medical education have been clearly defined. At the end of undergraduate program, the Indian Medical graduate should be able to recognize " Health for All" as a national goal, learn every aspect of national policies on health, achieve competency in holistic medicine, develop scientific temper and observe medical ethics. In consonance with the national goals, each medical institution should evolve institutional goals to define the kind of trained manpower they intend to produce. The Indian medical graduates coming out of medical colleges be familiar with the basic factors which are essential for the implementation of national health programs, acquire basic management skills in the area of human resources, material and resource management related to health care delivery system, general and hospital management, principal inventory skills and counselling. He must be able to identify community health problems and learn to resolve these by designing, instituting corrective steps and evaluating the outcome of such measures. Such a graduate should be able to provide leadership to health care team in primary and secondary health care setting, educate and motivate other members of the team and accountable to patients, community and the profession (MCI 2018).[1] All these competencies are relevant and relate to effective training of UGs in basic health managerial skills by whole of the college faculty (as institutional responsibility) and more so by the department of community medicine.

The revised curriculum lays substantial emphasis on community based teaching and acquisition of managerial skills. Similarly national health policy states that medical education must be integrated with health care delivery system so that students learn in real life situation and not in the confines of medical colleges.[2] It is widely recognized that training in health management by and large has been neglected and consequently the managerial functions of the health system are being neglected. Teaching/learning of management skills by didactic method is high and dry and quite boring for teachers and students alike. Participatory methods such as case studies, observation, interaction and demonstration could be most useful. Most textbooks do not cover health management topic adequately and adhere to purely theoretical concepts. Some of the participatory methods of learning on health management are being presented hereunder for their adoption and wider application in the existing training program of UGs.

Managing human resources in health: In a community development block, one Community Health Centre (CHC) or block level Primary Health Centre (PHC) is responsible to 1,20,000 population. Human resources at this level of organization are- 5 specialists, 4 general duty medical officers, 10 staff nurses, 5 technical support staff, 1 public health manager, 1 or 2 block level supervisors besides clerical and other support staff. In the block there are 24 subcentres, each with 2 Auxillary Nurse Midwives (ANMs) and one male mutlipurpose health worker. In all there are 72 health workers, 120 Accredited Social Health Activist (ASHAs), 120 Anganwadi workers (AWWs) besides 100-120 Village Health Nutrition and Sanitation Committees (VHNSC), Panchayati Raj Institutions (PRIs), Non-Government Organization (NGOs) and private practitioners. The subcentres have been upgraded to Health and Wellness Centres with

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an addition of 1 Mid-Level Health Provider (MLHP)-AYUSH doctor or BSc nurse. Medical officer is a key facilitating figure in the National strategy of "Health for All". He is first and foremost health manager as he is in-charge of extensive human and material resources to reach 1,20,000 people to deliver health services. Managing human resource is a major task in terms of their continued education/ training, to progressively upgrade their skills on the job training, supportive supervision and motivation, coordination, organizing work plans, monitoring, arranging supplies and providing effective leadership to health teams. The leadership role of medical officer in the overall health system is proving to be a weak link placing the success of the other more critical elements of subcentres, Village Health Nutrition and Sanitation Committees (VHSNC), ASHAs in a great jeopardy. Most medical officers/doctors are seen to be playing almost exclusively clinical curative role by spending 80-90% of their time in routine daily clinics at PHC/CHC. They are unable and unwilling to take management fucntion and liaison with the community. We must look back to the system of medical education as to how well we have imparted basic health management training to UGs. In service training through professional development courses and pre-placement training program is a partial answer to this problem. System of medical education must train them on basic health management skills during UGs and internship training program.

Health Planning: It simply means identification of health service needs / problem of community, setting priorities and goals, organizing adequate resources and ensuring organized activities/program to meet these needs by implementing the planned activities, supervising and monitoring these activities and ultimately evaluating the results of the planned activities/services. Planning in India has been decentralized to the village level. Gram sabha and equivalent urban bodies of the country are the basis of the planning process, they determine their needs and priorities and work hard to achieve their needs with the support of government.

Planning process – assessment of health service needs by health workers- a case study

Household surveys- an instrument to assess health service needs: The objective of household survey is to assess the health service needs of the community. Household survey collects information on total family members, their age, sex, literacy, occupation, marital status, disease, disability, health seeking behaviours besides determinants of health such as source of drinking water (safe water), use of sanitary latrine, economic status and use of cooking fuel. During these surveys the workers collect and compile the tally of pregnant women, eligible couples, births and deaths, causes of deaths, below poverty line families (high risk household) and total population. Annual household surveys are conducted by ASHAs and AWWs with the support of ANMs and updated continuously for marriages, pregnancy, births, abortions, deaths, causes of deaths and migration. ASHA also prepares community based assessment checklist of persons above 30 years of age for community based screening to identify high risk persons by scoring method of common determinants of Non-Communicable Diseases (NCDs) for early detection and management. In addition the village health sanitation and nutrition committee members/ Mahila Arogya Samiti in urban area members are also consulted to validate the information collected by household survey. This way the family health folders and individual health records and population data are created and priorities are determined.

Facility survey: In addition to household survey facility survey are also being conducted to collect information on available inputs (manpower, building, equipment and drugs/diagnostics etc.). Their basic purpose is to identify critical gaps which need to be addressed during planning process. Available resources are matched with Indian Public Health Standards to discover gaps at Subcentre and PHC.[3]

Workload Assessment: From the household survey data the workload and service requirements of a typical subcentre with population of 5000 can be assessed. Essential service needs from such surveys emerge as under, however these are indicative only. Workers must collect realistic workload and service requirements themselves from their own data base (household survey)

- Eligible couples enumerated (married women 15-49 years)- 850-950
- Current users of family planning methods, number of active users will vary from subcentre to

subcentre

- Pregnant women per annum: 110 -120
- Live births per annum: 100-108
- Under 5 children: 625-650
- Children between 5-6 years: 96-104
- Children 10 years of age: 94-102
- Children 16 years of age: 92-100
- Persons above the age of 30 years: 1850
- Elderly population above 60 years: 450
- Adolescents 10-19 years age group: 1000
- Anaemic pregnant and lactating mothers, children and adolescents: 50%
- Underweight under 5 children: 35% (use AWW data)
- Episodes of Diarrhoea, ARIs, Fever in children: Actual Out Patients of subcenter of last year
- Proportion of ailing persons: Actual Out patients of subcentre- approximate 8% of population
- Diabetes, Hypertension and Obesity: 9-14%

The resources required for each service are worked out by the health workers and procured as per norms of IPHS. Standard/norms of each service have been set and accordingly health worker makes a plan for delivering services to target population.[3]

Action Plan by health workers (work planning): From the household survey data health worker themselves determine their workload and realistic targets and objectives. The objectives are to provide quality services as per standard and achieve desired coverage level of each service. The workers plan their activities

Monthly work plan of MPHW Female

Week	Monday	Tuesday	Wednesday*	Thursday	Friday	Saturday
First	NCDs village-1	MCH and FP clinic	Immunization village - 3	MCH and FP clinic	AW visit-1	Open day
Second	NCDs village-2	-do-	Immunization village – 4	MCH and FP clinic	AW visit-2	Open day
Third	NCDs village-3	-do-	Immunization village - 1	-do-	AW visit-3	Open day
Fourth	NCDs village-4	-do-	Immunization village – 2	-do-	AW visit-4	Open day
Fifth	NCDs village-5	-do-	Immunization village - 5	-do-	AW visit-5	Open day

* Village health sanitation and nutrition day with ASHA and AWW once a month and fixed screening days for NCDs in villages

NCDs- Non communicable diseases; FP- Family Planning

MCH- Maternal and Child health; AW- Anganwadi

and a day wise and village wise fixed work schedule is followed by health worker to cover 5-6 anganwadi areas and 5000 population. The target population knows this work schedule to avail services. The prime activities include- home visits for tracking of beneficiaries and to identify new beneficiaries, sustained contacts with eligible couples, to provide skilled attendance at birth, home based post-natal and new born care, holding outreach session on immunization and maternal and child health services, register birth and deaths, causes of deaths, identify epidemic prone diseases and visiting anganwadis to track under 6 children for services as also follow up of immunized children for adverse events following immunization. A typical work plan is depicted as above. The work plan is flexible enough to make adjustment to respond to any emergent situations such as outbreak/ epidemic or other mass campaigns (deworming, diarrhoeal fortnight).

One day is fixed for screening of non-communicable diseases. On fixed day, fixed time and at fixed place an outreach session for immunization and MCH services is held. One outreach session per month for 1000 population in rural and 2000

population in urban slums areas is held usually on health and sanitation day. MCH and family planning clinic is held at subcentre on fixed days. On open days any missed activity of that week is undertaken. Priority for health worker is to cover and spend more time with below poverty line families.

Implementation of work plan: Planning is as good as its implementation. System of tracking the beneficiaries throughout life span has been created, thus a life cycle approach for continuum of services has come into operation. Further household survey listing has been expanded to include all persons over 30 years of age for early detection of NCDs and their management at community level. The work schedule precisely and explicitly states implementation plan. The implementation plan illustrates as to who will do what activity, at what time (time of initiation and completion of activity), and at which place with what resources. It gives an overview of activities against which monitoring can be undertaken.

Work reporting- A monitoring tool: Routine monthly monitoring report can be used to learn various indicators of monitoring system. Observing and interpreting lively monitoring process built in the health care delivery system is an extremely useful experience for students and teachers alike. With available inputs of subcentre and community the Health workers, ASHAs and AWWs generate service outputs. These outputs are regularly reported by health workers on standard format.[4] Thus regular monthly work report of a subcentre is an important monitoring tool to learn inputs, processes, outputs, efffects and impact indicators of monitoring system. This report indicates whether the activities are being carried out as planned under work schedule/plan and having expected effects on target population of 5000. For each monitoring indicator the standard of performance has been set. Health manager/ supervisors are able to identify the critical gaps between actual performance and standard performance of health worker/subcentre. Some of the expected or standard performance of various indicators in health care delivery system is indicated here under:

- Registration of pregnant women, births and deaths- 100%
- Antenatal check ups- minimum 4 complete ANCs per antenatal
- Screening of antenatals for HIV and Syphilis- 100%
- Institutional deliveries- 80%
- Initiation of breast feeding within 1 hour of birth- proportion of new born
- Institutional stay after delivery—minimum 48 hours
- Exclusive breast feeding up to 6 months – proportion of infants
- New born and post natal home visits by ASHAs- 6-7 visits
- Post natal and Neonatal home visits by ANM- minimum 4 visits
- Complimentary feeding at 6 months
- Outreach immunization and MCH session- 1 session for 1000 population in rural and 2000 population in urban area.
- Immunization coverage- 80%
- Contacts with eligible couples- 1 contact every month
- Couple protection rate- 60%
- Sputum smears- 3% of new adults attending OPD services
- Monthly blood smear examination rates
  - ✧ Area with Annual Parasite Incidence (API)>1 – 1.5% of population
  - ✧ Area with Annual Parasite Incidence (API)<1 – 0.5% to 0.7% of population
- Village health and sanitation day at each anganwadi- 1 day/month
- Supportive supervision of subcentre by health supervisor – once a week
- Supportive supervision by medical officer- once a month to each subcentre

Causes of death and sex ratio at birth are being reported regularly in the monthly monitoring report. Indicators in routine reports are expressed as simple counts and provide information on number of benefciaries provided services in the reporting month. Simple counts provide only numerator data which indicates service utilization. More important is to know whether a service is being performed as planned. This requires collecting of numerator and denominator data. Standards are the denominators in computation of performance. An indicator involves a numerator (what was the actual performance)and a denominator (the standard performance).

For example:

$$\frac{\text{Number of outreach sessions held = 2}}{\text{Number of outreach sessions planned=5}} = 40\ \%$$

The result indicated that only 40% of the sessions were held and 60% missed. Performance based incentives for each indicator are given to MLHP and Health team at Health and Wellness Centre.

In immunization coverage, a common objective is to fully immunise 80% of target children. That "Standard" is the denominator. The numerator would be actual proportion of children immunized. The performance would be :

$$\frac{\text{Number of children immunized } 72}{\text{Number of children to be immunized } 120\text{x}80} \text{ X } 100 = 75\ \%$$

The result indicates that program met 75% of its target. It also shows that actual coverage was 72/120=60% or 20 percentage point below the standard. Similarly proportion of ante-natals provided 4 Antenatal Cases (ANCs) out of total pregnancies registered can be arrived at to measure gap in performance. This information is built in the routine reporting system or available with the health workers. Hence one can find the performance gap. The root causes of performance gap can be analysed for improvement of work performance. Root causes are generally related to management processes such as poor planning, poor logistics, supplies, vacancies and non-availability of materials.

Community monitoring: Village health sanitation nutrition committee (VHSNC)/PRIs monitor local facility (subcentre, PHC) and ensures that necessary inputs, infrastructure and manpower are available for health services. It also monitors coverage/quality, effectiveness, behaviour and presence of health personnel, denial of services and negligence. It also provides feedback to the system and validates the data collected by health team. Long term objective remains to increase community participation in management of health services and social determinants of health.

Coordination: This management function can be observed on village and health sanitation day. All the service providers – Medical officer, ANM, ASHA, AWW, teachers, members of VHSNC/Mahila Aarogya Samitee (MAS) converge on one platform to deliver package of health services. This is the best forum as all departments and ministries converge at the level of village/urban ward to address health and social determinants.

Delegation and on the job training- A management function: Job functions of medical officer, health supervisors and health workers- ANMSs, ASHAs and AWWs have been revised and described in most of the textbooks of community medicine. Theory lectures on job description are not enough. Seeing is believing. Best way to learn job description are- observing health workers on their job at workstation or at an outreach session on village health and sanitation day, 4Ds screening program in schools and NCDs screening program in action at community level. Most of the health functions related to primary health care in the area of maternal and child health, national health programs on communicable and non-communicable diseases and integrated disease surveillance program have been delegated to health workers. Untied money of Rs. 10,000/- per annum is available with ANM for local action which is a fine example of financial delegation. The quality and coverage of health services largely depends on their skill to plan, organise and prepare an efficient work plan. The role of health manager (medical officer) and the health supervisors is to continuously upgrade their skills by on the job and continued education and by supportive supervision besides reviewing their work reports every month.

The case study presented on health services need assessment by household surveys, work load assessment, work planning, work reporting, monitoring and evaluation in real life situation could be a trigger as to how microplanning for a population of 5000 is being pursued at the lowest level of the health pyramid. The teachers/faculty can demonstrate this exercise to students in urban/rural setting or can bring field functionaries to classroom setting with household survey data and work schedule/plan. The other method of learning skill of planning include by allotting families to the students for interaction with the families and collection of information for action on the same household format as being used in the system. Most institutions or community medicine departments use their own learning protocols for family studies such as family folders, household survey formats, maternal and child

health cards, immunization and growth charts etc. which are altogether different from the ones being used under national health programs (NRHM, RCH, ICDS and NCDs). In our experience using household survey register and work reporting formats and other formats as being used in various national health programs are much more meaningful. That makes more sense as it provides opportunity to update the local records. The observations can be cross matched with those of health workers and gaps can be discovered for rectification. This mechanism reinforces the system and helps the workers to update their records

Evaluation: Evaluation is the cumulative result of monitoring over a period of time. It involves an assessment of " quality and quantity of achievement against the predetermined objectives and goals". Monitoring is confined to oversee ongoing operations at the levels of inputs and processes, while evaluation aims at measuring effects and outcomes of the program. Since health management and information (HMIS) is well developed now the data of the same over a long period of time can serve the purpose of evaluation- to measure the impact indicators such as reduction in morbidity, mortality, disability and improvement in nutrition and decrease in fertility. Baseline and repeat surveys such as large scale population based surveys- National Family Health Surveys (NFHS) and SRS over a long period can be used to demonstrate the impact of proven interventions and process of evaluation in the form of case studies.

Conclusion:

Personnel engaged in health care delivery system require basic health management skills to deliver health services in a planned way. Health management functions such as – health services need assessment, workload, work planning, programming, delegation, coordination, supervision, monitoring and evaluation can be best learned in life situation as illustrated in the text. Work planning /microplanning as being pursued at the lowest level of health pyramid – subcentre health team (ANMs, ASHAs, AWWs) provides an excellent opportunity to learn basic health management skills.[5]

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Assessment of Kangaroo Mother Care Services and Identifying Its Implementation Bottlenecks: Situational Analysis of Special New Born Care Units in Gujarat State of India

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Abstract:

Introduction: Kangaroo Mother Care (KMC) and optimal feeding in Low Birth Weight (LBW) infants are evidence based cost effective interventions which if properly implemented across all facilities can help to save millions of newborn. The study, focussing on status of KMC services in Gujarat State, has not been conducted so far. **Objectives:** The intent of present study was to ascertain the infrastructure, facilities, policies and practices related to Kangaroo Mother Care at Special Newborn Care Units (SNCUs) of various regions of Gujarat and to suggest strategies for effective delivery of KMC services. **Method:** A pre tested, semi structured and validated questionnaire including general information about SNCU, baseline data about KMC protocols and practices of each SNCU etc. was developed. The information was collected from all 40 Special Newborn Care Units (SNCUs) of Gujarat State of India. The data analysis was performed using EpiInfo 7 Statistical Software developed by Centres for Disease Control and Prevention (CDC), Atlanta. Simple frequency tables were used for analysis. **Results:** About 81% of the facilities reported that newborns with birth weight less than 2000 grams, either stable or with non-serious medical conditions were eligible for receiving KMC. None of the facilities were providing continuous KMC more than 12 hours. Thirty (81.08%) SNCUs had an earmarked space for performing KMC either in the form of separate ward or identified corner in the ward. **Conclusion:** The present study revealed inadequate Kangaroo Mother Care services in selected newborn care units of Gujarat State of India. The services, especially basic facilities like drinking water, food, toilet and hand washing was not available in some of the facility.

Key words: Gujarat State, Kangaroo Mother Care Services, Special Newborn Care Units

Introduction:

Low birth weight (LBW) is an essential determinant of infant's health at birth, child's survival and freedom from sickness and also mother's antenatal health and well-being.[1] Of the 20 million low birth weight (LBW) infants born globally every year, about 8 million are in India.[2] The prevalence of LBW in India is around 28% as compared to 4.5 % in developed nations.[3]

Indian Council of Medical Research (ICMR) reported wide inter-state variation in incidence of low birth weight in India with magnitude ranging from 25.9 % to 56.9%.[4] Even though Gujarat State of India has witnessed significant decline in neonatal and infant mortality, it reported incidence of LBW as high as 20.37% in certain cities.[5]

Kangaroo Mother Care (KMC) is a low resource, high impact intervention and standardized care for low birth weight infants which, like breastfeeding, should be part of routine care.[6] The clinical efficiency and health benefits of KMC have been demonstrated in several settings. Kangaroo Mother Care and optimal feeding in LBW Infants are evidence based cost effective interventions which if properly implemented across all facilities can help to save millions of

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newborn.[7]

The health system plays a vital role in effective scaling up of KMC. Addressing the barriers in implementing KMC at each level of health system helps to promote context specific health system changes for greater KMC adoption.[8] The study, focussing on status of KMC services in Gujarat State, has not been conducted so far. The intent of present study was to ascertain the infrastructure, facilities, policies and practices related to Kangaroo Mother Care at special newborn care units (SNCUs) of various regions of Gujarat and to suggest strategies for effective delivery of KMC services.

Objectives:

Primary:

1. To identify the status of KMC implementation in Special New Born Care Units (SNCU) of various health care centres in Gujarat State.
2. To assess the implementation bottlenecks at SNCUs for practice of KMC.

Secondary:

To recommend for suitable strategic actions to accelerate KMC services in Gujarat.

Method:

Study design and sample population

Gujarat is situated on the western coast of Indian Peninsula with approximate population of 67.16 million.[9] The state receives medical services through tertiary health care institutions, district hospitals, sub district and private specialty hospitals. A Cross-sectional study design was carried out between September to December 2016 in all 40 Special Newborn Care Units (SNCUs) of Gujarat either run by or receiving financial support from the government. It included 19 Medical colleges attached hospitals, 16 District hospitals, 2 Sub-district and 3 Charitable Trust hospitals.

Ethics procedures

The research protocol was approved by the Institutional Ethics Committee (IEC) of the P. S. Medical College, Karamsad (Approval No-IEC/HMPCMCE/2018/Cr. 07/102/18 dated 12/05/2018). An informed consent was also obtained from the administrative heads of all study centres.

Study Methodology

A pre tested, semi structured questionnaire was designed and validated in consultation with experts. The questionnaire primarily comprised of general information about SNCU, baseline data about KMC protocols and practices of each SNCU etc. Three key personnel were involved to collect specified information about all 40 SNCUs. They were faculty members of Department of Community Medicine of PS Medical College, representatives of KMC Foundation and UNICEF Consultants. The information was collected from three key informants namely clinicians, staff nurses and KMC providers of each health facility. The schedule was planned and face to face interview method was implemented to retrieve the data. In addition, some of the information was also collected through the observations and reviewing data generated from day to day activity.

Statistical analysis

The data analysis was performed using EpiInfo 7 Statistical Software developed by Centres for Disease Control and Prevention (CDC), Atlanta. Simple frequency tables were used for analysis.

Scoring and Grading of the health facility

The score points were set for different components of KMC services. There were total thirty points which were distributed as five points for policy and protocols, five points for awareness and knowledge, seven points for facilities, five points for recording and reporting, four points for KMC as a mode of transport and four points for other activities to promote KMC like research papers activities, awards and recognition. Based on these points, facilities were graded into six categories of 0-5, 6-10, 11-15, 16-20, 21-25 and 26-30 for necessary actions and improvement of KMC services.

Results:

A total of 40 SNCUs were approached for the survey. Out of these, 3 SNCUs were excluded from the study as in these facilities KMC was not practiced. Table 1 describes the distribution of 37 selected health facilities.

About 81% of the facilities reported that newborns with birth weight less than 2000 grams, either stable or with non-serious medical conditions were eligible for receiving KMC. Newborns, regardless of their birth weight were more likely to receive KMC at DH compared to MC (Table 1). None of the facilities was providing continuous KMC more than 12 hours. Thirty (81.08%) SNCUs had an earmarked space for

Table1: Basic information and facilities related to KMC according to type of facility based on interview

Details	MC*(n=19)	DH#(n=14)	SDH$ and Trust Hospitals n=4)	Total (N=37)
Babies who are currently eligible for receiving KMC				
All babies regardless their weight	1 (5.2)	5 (35.7)	0 (0)	6 (16.2)
Babies < 2000 g	11 (57.8)	3 (21.4)	2 (50)	16 (43.2)
Stable babies < 2000 g	7 (36.8)	6 (42.8)	1 (25)	14 (37.8)
Unsure	-	-	1 (25)	1 (2.7)
Average duration of KMC per baby per day				
Short (< 4 hours/day)	6(31.5)	6 (42.8)	2 (50)	14 (37.8)
Extended (5-8 hours/day)	8 (42.1)	4 (28.5)	1 (25)	13 (35.1)
Long duration (9-12 hours/day)	2 (10.5)	0 (0)	0 (0)	2 (5.4)
Continuous (>12 hours/day)	-	-	-	-
Unknown	3 (15.7)	4 (28.5)	1 (25)	8 (21.6)
Separate space for KMC				
Separate ward/unit	10 (52.6)	4 (28.5)	1 (25)	15 (40.5)
Space corner in another ward	7 (36.8)	7 (50)	2 (50)	7 (18.9)
No space	2 (10.5)	3 (21.4)	2 (50)	7 (18.9)

*MC- Medical College Hospitals, #DH- District Hospitals, $SDH- Sub-District Hospitals

performing KMC either in the form of separate ward or identified corner in the ward (Table1).

Table 2 reveals deficient KMC services at health centres. The drinking water facility was not accessible at 8 (21.62%) SNCUs. Roughly only at half of the centres, special bags or binders were available for safe holding of baby, but in place of it, local clothes like 'Saree' or 'Duppata' were used to support the baby. In more than 90% of facilities, mothers were trained for collecting and feeding 'Expressed Breast Milk' (EBM) but storage facility was available at only 21 (56.75%) SNCUs.

Table 3 highlights implementation of various policies and practices at selected SNCUs. Only in 9 (8.10%) health centres, babies were given to mother for immediate skin-to-skin contact. Father or any male member was allowed to be KMC giver only in 60% of centres.

Figure 1 illustrates the scoring and grading system of SNCUs. Out of 19 MCHs, only 4 (21.05%) scored more than 25 score points. Six MCHs and one DH scored between 21 and 25. More than 50% of the facilities belonged to category of 11 to 20 score points.

In this study, an inadequate awareness levels were observed among staffs of SNCUs regarding KMC. The awareness were observed about general concepts and perception regarding KMC practices. The nurses from only 14 (37.83%) SNCUs were well versed with guidelines of KMC. However, staff members had satisfactory knowledge about cardinal benefits of KMC.

Discussion:

Kangaroo Mother Care provides multipronged advantages to the parents, preterm and low birth weight newborn, health establishments, and the community. World Health Organization (WHO)

Table 2: Basic facilities to carry out KMC according to type of facility based on observation

Details	MC (n=19)	DH(n=14)	SDH and Trust	Total (N=37)
Hand washing facility (Elbow tap)	18 (94.7)	14 (100)	4 (100)	36 (97.2)
Drinking water facility	15 (78.9)	10 (71.4)	4 (100)	29 (78.3)
Toilet facility	13 (68.4)	8 (57.1)	4 (100)	25 (67.5)
Food facility	16 (84.2)	11 (78.5)	4 (100)	31 (83.7)
Reclining chairs / Back rest for KMC providers	17 (89.4)	12 (85.7)	3 (75)	32 (86.4)
Special KMC bags / Binder / Wraps available for safe holding baby	13 (68.4)	6 (42.8)	2 (50)	21 (56.7)
Educational posters, charts, or videos available for mothers	13 (68.4)	8 (57.1)	1 (25)	22 (59.4)
Recreational facilities like TV, reading materials	6 (31.5)	1 (7.1)	-	7 (18.9)
Facility to store Expressed breast milk (EBM)	14 (73.6)	6 (42.8)	1 (25)	21 (56.7)

Figure 1: Categorization of SNCUS by using score points

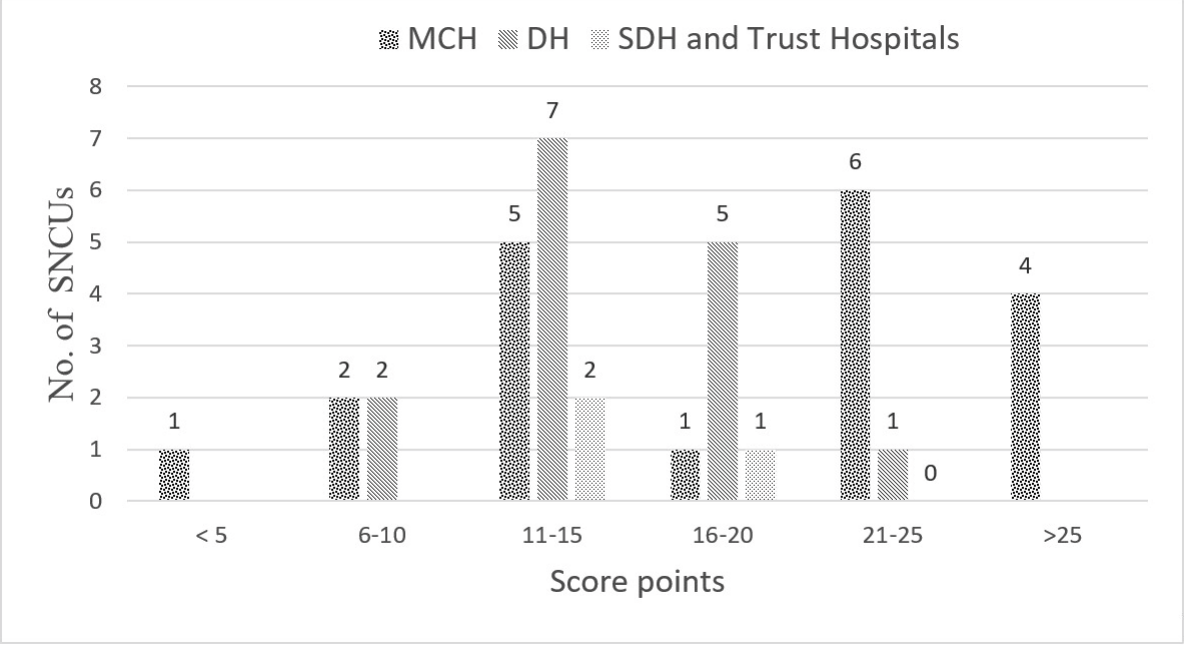

Table 3: Policy and practice related to KMC according to type of facility based on interview

Details	MC (n=19)	DH (n=14)	SDH and Trust Hospitals n=4)	Total (N=37)
All Newborns weighed soon after birth	19 (100)	14 (100)	4 (100)	37 (100)
Immediate skin to skin contact in labour room is routine for all newborns				
Yes	4 (21)	4 (28.5)	1 (25)	9 (24.3)
Sometimes	7 (36.8)	3 (21.4)	0 (0)	10 (27)
KMC is being provided to mildly sick babies	13 (68.4)	8 (57.1)	3 (75)	24 (64.8)
Father or other male members can provide KMC to baby	11 (57.8)	9 (64.2)	3 (75)	23 (62.1)
KMC is being practiced on arrival to health facility				
Yes	5 (26.3)	3 (21.4)	0 (0)	8 (21.6)
Don't know	4 (21)	1 (7.1)	1 (25)	6 (16.2)
KMC is being practiced on discharge from health facility	-	-	-	-
Yes	13 (68.4)	10 (71.4)	3 (75)	26 (70.2)
Don't Know	1 (5.2)	2 (14.2)	-	3 (8.1)
Availability of compliance chart for KMC	10 (52.6)	1 (7.1)	-	11 (29.7)

recommends three essential resources for effective KMC viz mother, personnel with special skills and supportive environment in the form of well formulated policies, equipment and organized services etc.[10] The present study revealed inadequacies in KMC implementation in selected SNCUs in the state of Gujarat.

Facilities, equipment and supplies

KMC does not require special facilities, but basic arrangements need to be done to ensure optimum health of mother and newborn.[10] 'The support binder' is the only special item required for KMC. In 37 SNCUs visited, at 16 (43.24%) units, KMC bags or binders were not available for safe holding of baby. Instead of it, obtaining and using local clothes like 'Saree' or 'Duppata' to support the baby was perceived as a challenging task by some mothers and families. Only 7 (18.9%) SNCUs had recreational facilities as they are crucial to reduce the inevitable frustrations of being away from home and in an institution.[10] Twenty two (59.4%) SNCUs provided educational material in the form of posters, charts and videos. Bergh AM et al[11] found the availability of educational posters only at 11 facilities without any video equipment. The storage facility of expressed breast milk was not available at 16 (43.23%) units, as it is an essential to maintain nutritional and anti-infective quality of breast milk.

KMC Policies and practices

Most published experience and research regarding KMC proved that early, continuous and prolonged skin-to-skin contact promotes the health and well-being of infants.[10] In current study, even though the majority of SNCUs claimed to practice continuous KMC, none of them followed the principle of having the newborn in the skin-to-skin position for minimum 20 hours per day for some of the babies (Table 1). Studies carried out in low income countries revealed

that 'father' too can conserve heat in newborns and provides an effective skin to skin contact.[12] In this study, only at 23 (62.01%) facilities, males including fathers were allowed to give KMC to babies.

Precise standardized documentation is not only the key to good patient care but also the necessary prerequisite for sound programme evaluation. Out of 37, only 16 (43.24%) units maintained a special register for documenting various information about KMC. At 4 (10.81%) SNCUs, daily KMC practice was recorded on the newborn's treatment sheet while KMC details were noted in the form of 'case notes' in remaining SNCUs. In some of the facilities,'KMC compliance charts' were available but they were not standardized.

Strategic actions and futuristic views

The present study reiterated the need to strengthen 'KMC policy and protocol' and it should be a part of pre service education and in service training of health care staff. The efforts should be made to create special area/space for KMC by infrastructural up gradation. Online monitoring software like 'ImTeCHO' or 'SNCU' portal needs to be practised to ensure uniform monitoring and evaluation of KMC services. The current study covered the first phase of assessing the status of KMC policies and practices in all SNCUs of Gujarat State of India. Based on the results and analysis, the second interventional phase of study will comprise of modular training of selected SNCU staff about baseline guidelines of KMC.

Limitations and challenges:

A thorough training was organized by the UNICEF, Gujarat for all the stakeholders regarding filling of the proforma but there were different key personnel involved to collect specified information about all 40 SNCUs may be considered as possible limitation.

Challenges were many but the most important was to involve very senior and busy professionals to collect the information about SNCUs placed in a very remote parts.

Conclusion:

The present study revealed inadequate Kangaroo Mother Care services in selected newborn care units of Gujarat State of India. The services, especially basic facilities like drinking water, food, toilet and hand washing should be made available in the vicinity of KMC area. In service training of KMC staff needs to be an integral part of comprehensive KMC services.

Acknowledgement:

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Declaration:

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Conflict of Interest: Nil

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Leadership Skills among Medical Interns - A Cross Sectional Study in A Medical College in South India

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Abstract:

Introduction: Leadership skills among medical students, plays an important role in making them competent and bringing success in their clinical practice. Physician's professional activities require them to be good team leaders. But there is a leadership crisis among medical doctors in India and leadership skills within their curricula. **Objectives:** To assess the leadership skills among interns and identify possible influencing factors among them. **Method:** A cross sectional study was conducted among 110 interns in a medical college. Leadership skills were assessed using Modified Leadership Inventory for Medical Education (LIME). Unpaired t test for association of various factors with mean scores of leadership and Karl Pearson's correlation coefficient for correlation between the scores of subcomponents of leadership skills were used. **Results:** Among the interns, 77.3% had a chance to be a leader during school/college days but only 20% had undergone leadership training. 87.3% of them had their leadership scores above average, suggesting good leadership skills. Interns who had been a leader in school/college, enrolled in Scouts/ Guides/ NCC and those who underwent leadership training had statistically significant higher mean scores. Majority had positive attitude towards leadership. There was a statistically significant, moderate correlation between the components of leadership skills. **Conclusion:** Participants had good leadership skills and there was significant association between former leadership experience and current leadership scores. Most of them had positive attitude towards leadership.

Key words: Curriculum, Leadership, Medical Students

Introduction:

Leaders in medicine have called for transformative changes in healthcare to address systems challenges and improve the health of the public.[1] The primary focus for doctors is always on their professional practice, but all doctors work within organizations and their systems. It is an important fact that doctors have a direct and far-reaching impact on patient experience and outcomes. Doctors have a legal duty which is broader than any other health professional and therefore have an intrinsic leadership role within health care services. Thus the development of leadership skills needs to be an integral part of a doctor's training and learning. Leadership is a key part of all doctor's professional work.[2]

Physician's professional activities require them to be good team leaders. In fact, doctors working in both clinics and hospitals lead small groups of healthcare professionals on a day to day basis. However, while physicians can be perceived as "smart individuals whose long-term vision sustained them through years of grueling education" this does not necessarily make them the best team leaders.[3] As leadership and management are increasingly seen as a vital part of the doctor's daily repertoire, the medical schools have started to implement leadership development programs as a routine part of curriculum with opportunities for some students to take extended study in leadership.[4]

But in India leadership development programs have not been included in the curriculum for medical students. However, some nations have started

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training programs for physician-in-training to learn and develop leadership skills.[5] Currently, very little importance is given to medical leadership in Indian Medical curriculum. Medical admission procedures which are currently in place including individual interviews focus mostly on uncovering qualities like empathy, determination and intelligence as well as skills that are used by physicians when practicing their traditional medical role.[6] There is a leadership crisis among medical doctors in India and a new leadership has to emerge from the newly qualified young doctors.[7] It is high time that the undergraduate medical students are exposed to professionalism and leadership skills within their curricula, as it plays a great role in making them competent and bringing success in their clinical practice in the future.[8]

Internship is a phase of training in which a graduate is exposed to the actual practice of medical and health care and acquire skills under supervision so that he/she may become capable of functioning independently. As a budding professional, leadership skills among them are most desired so that they can function effectively as a leader of the health team organized to deliver the health services. Hence the present study aimed to assess the leadership skills among interns and identify possible factors influencing leadership skills among them. The study also, assesses the various aspects that may help in developing leadership, so that they can address the challenges of future health care.

Method:

Study design and settings: A cross sectional study was done among interns in a private medical college in Dakshina Kannada district of Karnataka State, South India. The study was done during the period from October 2019 to December 2019.

Sample size: It was calculated based on the findings in the pilot study done among 15 randomly selected interns, which revealed that the scores of 80% of the interns were above the average score. Hence, sample size (n) was calculated using the formula $n = 4pq/d^2$, considering 80% as p, with 95% confidence interval, an allowable error (d) of 10% and a non-response rate of 10%, the sample size estimated for the study was 110.

Sampling: The district has seven medical colleges one of which was selected by convenience sampling. The total numbers of interns during the study period in the medical college were 137. List of all the interns was obtained and 110 interns were selected randomly using table of random numbers to attain the sample size calculated.

Procedure: Approval from Institutional Ethics committee and the head of the institution was obtained. The purpose and nature of study was explained to each intern following which the questionnaire was administered to those who gave consent. A validated self administered, structured questionnaire was used. The questionnaire was divided into three parts, Part A (includes details of general information, leadership training), Part B(Attitudes, and interest toward medical leadership) and Part C (assessment using Modified Leadership Inventory for Medical Education (LIME) questionnaire). Original LIME consists of 12 item Likert scale based 4 point frequency scale from Never (1), sometimes (2), often (3) and always 4). It covers, four aspects of leadership: Communication (Sensitivity to others' perspectives and ability to facilitate the sharing of ideas), Team Building (Ability to manage groups of people and fostering their effectiveness), Systems-Based Practice (Awareness of and facility with the policies and processes of healthcare) and Problem-Solving (Facility with systematic approaches to identifying and overcoming barriers).[9] Original scale has 3 items per subscale whereas the Modified LIME questionnaire which was used is a 14 item based scale, where communication and system based practice had 4 questions each. The questions added were communicated effectively nonverbally for communication and applied marketing skills to create systems improvement for system based practice. This tool used had a good reliability, which was endorsed by Cronbach's Alpha coefficient for reliability of 0.793.

Statistical Analysis: Data was analyzed using Statistical Package for the Social Sciences (SPSS trial version 16). Results were expressed as frequencies and proportions for categorical variables and mean scores with standard deviation for continuous variables. Unpaired t test was used to test the significant difference in mean scores of leadership across gender and among those who had been a leader, scouts/guides/NCC and attended leadership training (scores of leadership inventory were distributed normally as per Shapiro-Wilk test of normality, p

=0.107). Karl Pearson's correlation coefficient (r) was used to find the correlation between the scores of subcomponents of leadership skills namely communication, team building, systems-based practice and problem solving among interns. The statistical significance level was fixed at p<0.05.

Results:

The mean age of the interns was 23.6±1.4 years. Among the participants 42.7% were males and 57.3% were females. It was observed that, 77.3% of them had a chance to be a leader during school/college days and 41.8% had been enrolled in Scouts and Guides or National Cadet Corps (NCC) training. However, only 20% had undergone leadership training per se (Table1).

Among those who had undergone training program on leadership, 63.6% had their training during school days and rest 36.4% had attended during undergraduate days. Also, 50% of them attended a certified course. 40.9% had training only once, 31.8% had twice and 27.3% had repeated training more than two times.

Majority, 87.3% of the interns had the leadership scores above average score of the scale suggesting good leadership skills. Higher mean scores was found among the interns who had been a leader in school/college (38.38±7.91; p=0.04); enrolled in Scouts/ Guides/ NCC (40.02±7.37; p value 0.004) and those who underwent training (44.64±6.70; p value <0.001) and this was statistically significant as

Table 1: Mean leadership scores and association with various parameters (n=110)

Variable	Categories	n (%)	mean±SD	p value*
Gender	Male	47(42.7)	38.25±7.50	0.43
	Female	63(57.3)	37.10±7.69	
Had been a leader in School/College	Yes	85(77.3)	38.38±7.91	0.04
	No	25(22.7)	34.92±5.76	
Had been in Scouts/ Guides/ NCC	Yes	46(41.8)	40.02±7.37	0.004
	No	64(58.2)	35.84±7.33	
Undergone leadership training	Yes	22(20.0)	44.64±6.70	<0.001
	No	88(80.0)	35.83±6.77	

* Test of significance used is unpaired t test

Figure 1: Preferred type of leadership training (n=110)

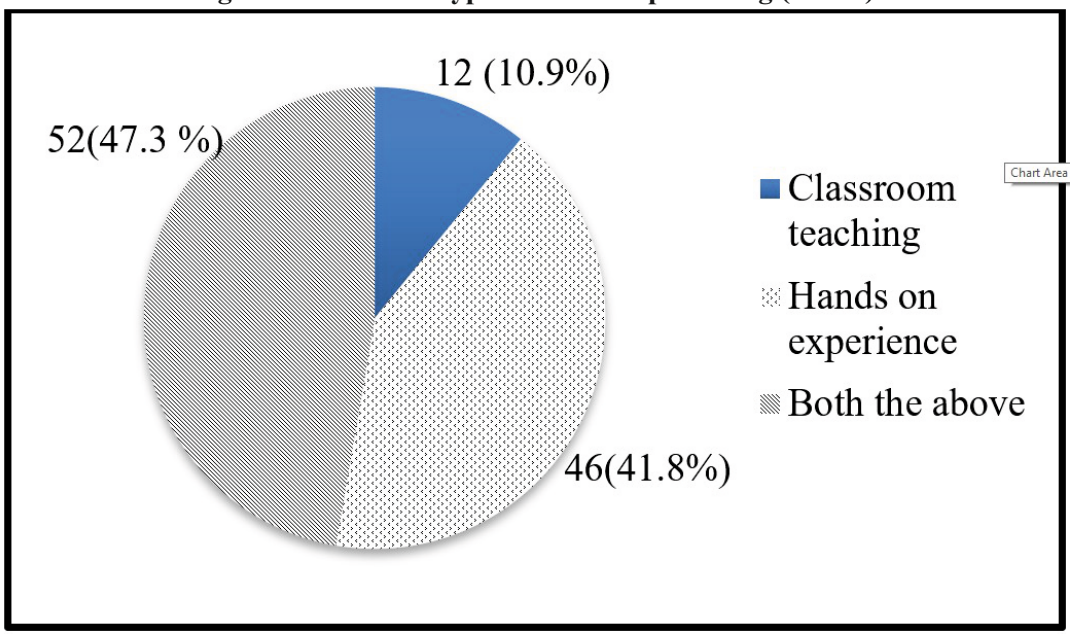
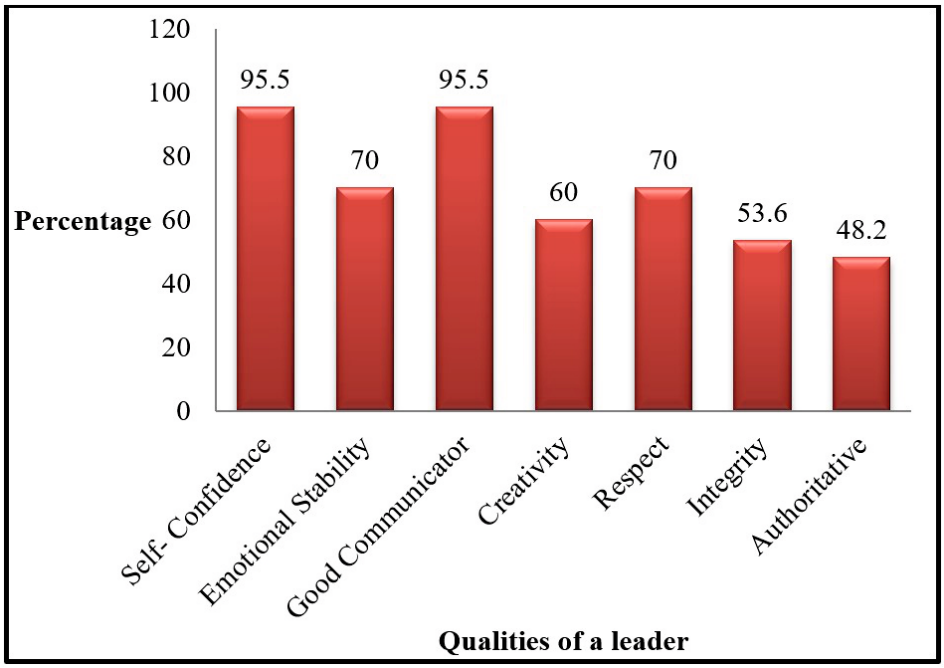


Figure 2: Qualities of a leader as expressed by interns* (n=110)



*Includes multiple responses.

Table 2: Perceptions, attitudes, and interest toward medical leadership (n=110)

Perceptions, attitudes, and interest	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)
Leaders are born	11(10.0)	19(17.3)	26(23.6)	24(21.8)	30(27.3)
Clinicians should have leadership responsibilities	36(32.7)	49(44.5)	18(16.4)	4(3.6)	3(2.8)
When doctors become managers they lose contact with clinical work	6(5.5)	35(31.8)	35(31.8)	29(26.4)	5(4.5)
Leadership skills should be a part of the medical curriculum	18(16.4)	51(46.4)	27(24.5)	8(7.3)	6(5.5)
Introducing leadership module is a burden to the students	9(8.2)	23(20.9)	46(41.8)	24(21.8)	8(7.3)
Additional leadership/ management training is acquired in postgraduate studies	9(8.2)	31(28.2)	36(32.7)	25(22.7)	9(8.2)
Interested in taking on leadership/managerial responsibilities during the career	11(10.0)	47(42.7)	35(31.8)	11(10.0)	6(5.5)

compared to mean scores of those who did not take part in the same, respectively. There was no statistically significant difference in the mean scores across the gender (Table 1).

Majority of them, 47.3% preferred a combination of classroom teaching cum hands on training (Figure 1).

The study reveals that, self confidence (95.5%) and good communication skills (95.5%) were the most quoted qualities, among the various qualities of a leader (Figure 2).

Almost 50% of the participants did not agree with the statement that leaders are born. When the participants were asked whether clinicians should have leadership responsibilities, 77.2% were in agreement of the statement. Further, 37.3% agreed with the statement that, when doctors become managers they lose contact with clinical work while, 30.9% did not agree with the same. Also, 62.8% of the participants agreed with the statement that leadership skills should be a part of the medical curriculum. It may be noted that, 29.1% were in agreement with the statement that, introducing leadership module would be a burden to the students. For the statements acquiring additional leadership or management training in postgraduate study and interest in taking on leadership or managerial responsibilities during their careers, 36.4% and 52.7%, respectively, were in agreement of the same (Table 2).

Correlation between the four aspects of leadership in the LIME tool was checked using Karl Pearson correlation coefficient. The four aspects of leadership namely communication, team building, systems-based practice and problem solving had moderate correlation between each component and all the correlations were statistically significant ($p<0.01$). Communication correlates best with system based practices (0.564). System based practices correlates best with problem solving component(0.629). Team building component also correlates best with problem solving component (0.587) (Table 3).

Discussion:

Medical colleges are entrusted with the responsibility of training doctors to be diagnosticians and to understand resource management, financial considerations and multi-professional team working.[10] Doctors many a times are expected to take up leadership roles immediately after completion of under graduation. Despite this there is paucity of formal leadership education for medical students and there are very few opportunities for them to assume active roles in undertaking leadership projects.[11] Gulati K et al reported that, there is a leadership competency gap among physicians.[12]

Evidences have proved beyond doubt that, hospitals led by doctors are associated with significantly better performance metrics than those led by non doctors.[13] In the current study majority of the interns had good leadership skills. Also, there was a statistically significant association with previous leadership experience and better leadership skills.

Varkey P et al[1] in their study reported that, 85% (18) of students felt that leadership skills should be a part of curriculum, while in the present study all the students felt the same. In this study, when asked about how leadership should be taught and learned, 47.3% preferred a combination of classroom teaching cum hands on training, while Varkey P et al reported that, experiential learning over traditional didactic approaches was the preferred choice.[1]

In a study done in United Kingdom, among medical students,[14] 85% of respondents were in agreement that, it was important for clinicians to have managerial or leadership responsibilities, similarly in the present study, 77.2% of the participants were in agreement of the same. In the current study, 62.8% of the participants agreed with the statement that leadership skills should be a part of the medical curriculum. Similarly, Rouhani MJ et al reported that 63.2% of students were in agreement that they would have liked more management or leadership training during medical school.[14] Rouhani MJ et al in their study found that, 59.7% and 65.8% wanted to seek additional leadership or management training in postgraduate study and interested in taking on leadership or managerial responsibilities during their careers, respectively.[14] In the current study, 36.4% and 52.7% were in agreement of seeking additional leadership or management training in postgraduate study and were interested in taking on leadership or managerial responsibilities during their careers, respectively. This study also revealed that, self confidence and good communication skills were the most quoted qualities, among the various qualities of a leader, while a study in Chennai done by Sucharitha ST et al[15] among interns, perceived communication

skills, impartiality, patience, honesty, self-discipline, receptive to others opinions, knowledge of medicine, self-confidence, and guiding teams as the major characteristics of effective medical leadership.[15]

The four aspects of leadership namely communication, team building, systems-based practice and problem solving had moderate correlation between each component, in this study. A study by Stansfield RB et al,[9] also reported that the aspects of leadership showed a meaningful correlation. In the current study, it was observed that, problem solving correlates best with team building and system based practice which is similar to the findings reported by Stansfield RB et al.[9] However, there are very few studies which looked at similar aspects of leadership skills.

Table 3: Correlations between the components of leadership skills (n=110)

Components	Communication	Team building	System based practice	Problem solving
Communication	–	0.557*	0.564*	0.551*
Team Building	0.557*	–	0.555*	0.587*
Systems-Based Practice	0.564*	0.555*	--	0.629*
Problem-Solving	0.551*	0.587*	0.629*	–

*Correlation statistically significant at p value of 0.01.

Conclusion and recommendations:

In the current study, it was observed that, participants had good leadership skills and there was significant association between former leadership experience and higher leadership scores. Although most of the students had positive attitude and interest in leadership training, many of them considered that it will be a burden if introduced into curriculum. Students recognized that they need to develop leadership competencies. However, there is need for further research to identify the most effective curriculum innovations to enable students to develop leadership skills. There is an opportunity to incorporate leadership in medical curriculum as part of Attitude, ethics and communication module (ATCOM).

Limitations: Leadership skills in this study were assessed with a self reported scale. Opinion of peers and faculty regarding individual's leadership skills was not considered in the present study. Social desirability bias cannot be ruled out.

Declaration:

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Conflict of Interest: Nil

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Daily Versus Weekly Iron and Folic Acid Supplementation Regimen- A Randomized Parallel Open Label Trial among Reproductive Age Group Women in an Urban Poor Locality of Bengaluru

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Abstract:

Introduction: The global prevalence of anaemia in non-pregnant women is 30.2% and in India it is 53.2%. At least half the burden of anaemia is associated with iron deficiency. Women of reproductive age are at higher risk of developing iron deficiency because of losses during menstruation. Though Daily supplementation with iron and folic acid for a period of 3 months has been the standard as an approach for the prevention and treatment of iron deficiency anaemia among women of reproductive age, there has been limited success with the daily regimen in public health programmes, Intermittent use of oral iron supplements has been proposed as an effective alternative. **Objectives:** To compare the effectiveness of weekly and daily oral iron and folic acid therapy in improving the Hemoglobin levels among the reproductive age group women, adverse effects and compliance to both the regimens. **Method:** This was a comparative Randomized parallel open label trial conducted in an urban poor locality of Bengaluru conducted between January 2014 and January 2016. All the women in the reproductive age group (15-45 years) with mild to moderate anemia were included in the study. Sample size of 106 subjects was randomly allocated into the 2 groups (53 into weekly regimen and 53 into daily regimen). The subjects were supplemented with IFA tablets for 3 months according to their regimen. **Results:** Mean increase in Haemoglobin (Hb) in the daily group (1.92±1.1 g/dl) was significantly (p=<0.01) more when compared to that in the weekly group (0.91±0.82 g/dl). Incidence of all the Adverse Drug Reactions (ADRs) were more in the daily group compared to weekly group. However, the difference was only significant for abdominal pain and metallic taste (p=<0.01 and 0.02 respectively). The proportion of subjects reporting at least one ADR was also significantly more (p=<0.01) in the daily group compared to the weekly group. Compliance for weekly regimen (97.12%) was found to be significantly better(p=<0.01) when compared to that of the daily regimen (94.07%). **Conclusions:** Daily regimen was more effective in raising the hemoglobin levels when compared to weekly regimen. Incidence of abdominal pain and metallic taste were significantly more in the daily group compared to weekly group. Compliance for weekly regimen was significantly better when compared to that of the daily regimen.

Key words: Iron and Folic acid supplementation, Reproductive age group women, Iron Deficiency Anemia, Hemoglobin

Introduction:

It is estimated that the global prevalence of anaemia in non-pregnant women is 30.2% and in India it is 53.2%.[1,2] Anaemia has multiple causes that very often coexist; it can result from parasitic infections, inflammatory disorders, inherited disorders of haemoglobin structure, or vitamin and mineral deficiencies, including iron and vitamins A, B12 and

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folate. At least half the burden of anaemia is associated with iron deficiency. Iron deficiency is the result of prolonged negative iron balance, which can be caused by inadequate iron intake (due to insufficient dietary iron content or absorption), increased iron requirements or chronic loss of iron due to bleeding. Women of reproductive age are at higher risk of developing iron deficiency because of losses during menstruation.[3]

Iron deficiency anaemia impairs resistance to infection in all age groups, and reduces physical capacity and work performance among adolescents and adults.[3,4] In addition, women entering pregnancy with suboptimal iron reserves may be at higher risk of negative maternal and neonatal outcomes.[5] Daily supplementation with iron and folic acid for a period of 3 months has been the standard approach for the prevention and treatment of iron deficiency anaemia among women of reproductive age. Despite its proven efficacy, there has been limited success with the daily regimen public health programmes, which is thought to be primarily due to low coverage rates, insufficient tablet distribution and, and low adherence because of the side-effects (e.g. constipation, dark stools or metallic taste).[6]

Intermittent use of oral iron supplements (i.e. once, twice or three times a week on non-consecutive days) has been proposed as an effective alternative to daily iron supplementation to prevent anaemia among menstruating women.[7,8] The proposed rationale behind this intervention is that intestinal cells turn over every 5–6 days and have limited iron absorptive capacity. Thus intermittent provision of iron would expose only the new epithelial cells to this nutrient, which should, in theory, improve the efficiency of absorption.[9,10] Intermittent supplementation may also reduce oxidative stress and the frequency of other side-effects associated with daily iron supplementation as well as minimize blockage of absorption of other minerals due to the high iron levels in the gut lumen and in the intestinal epithelium.[5,7] Experience has shown that intermittent regimens may also be more acceptable to women and increase compliance with supplementation programmes.[11,12] Use of these regimens may also result in improvement in women's iron and folate status prior to pregnancy, to help prevent neural tube defects.[13] Government of India has implemented weekly oral iron folic acid supplementation (WIFS) programme to bring down the high prevalence of anemia among adolescents and thereby break the intergenerational cycle of anemia. Under the programme supervised weekly iron and folic acid supplements of 100mg elemental iron and 500µg folic acid will be administered to adolescents using a fixed day approach.[14]

There are no studies done among reproductive age group women in this part of the country to assess the effectiveness of weekly versus daily oral iron supplementation to improve the iron status of the women. Hence, in this context the present study was done to compare the effectiveness of weekly and daily oral iron and folic acid therapy in improving the Hemoglobin levels among the reproductive age group women, adverse effects and compliance to both the regimens.

Method:

This was a comparative Randomized parallel open label trial conducted in Yarab Nagar, an urban poor locality under the urban field practice area of Kempegowda Institute of Medical Sciences (KIMS), Bengaluru between January 2014 and January 2016. Institutional Ethics Committee (IEC) approval was obtained prior to the start of the study. All the women in the reproductive age group (15-45 years) with mild to moderate anemia and those willing to participate were included in the study. Mild anemia was defined as pallor of conjunctiva and/or mucous membranes, moderate as pallor of skin in addition to criteria for mild anemia and severe as pallor of palmar creases in addition to criteria for moderate anemia.[15] Women who were pregnant, lactating, those with any known hemoglobinopathies, chronic disease of liver, Cardio Vascular System (CVS), kidney and those currently taking or having taken therapeutic iron in the previous 6 months were excluded from the study. Sample size was calculated using the formula

$$n = \frac{z^2pq}{d^2}$$

z = 1.96 (Z value corresponding to a confidence level of 95%)

p(prevalence of anemia among reproductive age group women from previous studies)=56% i.e., 0.56[16]

q=1-p=44% i.e., 0.44

d (margin of error)=10 % i.e., 0.1

Substituting these values in the formula, a sample size of 96 was arrived at.

Study was conducted in 2 phases. In the first phase, a house-to-house survey was conducted covering a population of 12,385 in 2987 houses to identify all the women in the reproductive age group which came to 2209. All these women were clinically screened for anemia and 322 were found to be anemic. All these 322 women were line listed and they formed the sampling frame. Using simple random sampling technique, 106 subjects (96 + an additional 10% to compensate for dropouts if any) were selected randomly from this sampling frame after applying the inclusion and exclusion criteria. The details regarding socio demographic characteristics were collected using predesigned and pretested standardized questionnaire. All the 106 subjects were line listed and randomly allocated into the 2 groups (53 into weekly regimen and 53 into daily regimen) by using coin tossing method.

Informed written consent was taken from all the subjects for the intervention study. Initial deworming was done by giving Tablet albendazole 400 mg single dose for both the groups. Baseline Hemoglobin reading was done using Hemocue Hb 301 system for both groups. The HemoCue system utilizes the principle of oxidation of haemoglobin to hemiglobin by sodium nitrite and the subsequent conversion of hemiglobin to hemiglobinazide by sodium azide. The reagents for these reactions are contained within a small disposable microcuvette of approximately 10 microliters in volume. A venous or capillary sample is introduced into the microcuvette by capillary action and, after reaction with the reagents, the absorbance is read in the HemoCue photometer at 565 and 880 nm. The haemoglobin concentration is then displayed as a digital reading, in either g/dl or mmol/l in 15-45 seconds.[17]

The subjects were visited every Monday for 3 months and given IFA tablets (containing 100mg elemental iron and 0.5 mg folic acid) for entire week. Those in the daily group were given 7 tablets (at the rate of 1/day) of which the first tablet was consumed under the supervision of the investigators. The consumption of remaining 6 tablets was ensured by checking the empty blister packs in the subsequent visit. Those in the weekly group were given 1 tablet/week which was consumed under the supervision of the investigators. Constant motivation was given to all the subjects to consume tablets as per the schedule during every visit. Hemoglobin estimation was done after completion of 3 months of therapy. The number of tablets consumed and number not consumed in each group were noted. Compliance to each regimen was assessed based on the proportion of the number of tablets consumed out of the number to be consumed.

The Data were entered in Microsoft excel and analyzed using SPSS-21 version. Descriptive statistics such as percentages, mean, standard deviation and Inferential statistics like Paired 't' test (to find out significance of the mean increase in hemoglobin value before and after the therapy), Unpaired 't' test (to find out the significance of difference between mean increase in hemoglobin between weekly and daily IFA group) and χ^2 test (to find out the significance of difference between proportions of adverse reactions and compliance in weekly and daily group) were used.

Results:

There were 13 drop outs (5 in weekly and 8 in daily group) and finally 93 subjects (weekly =48, daily=45) were followed up for 3 months. The mean age of the subjects in the weekly group and daily group were 33.9±7.1 years and 35.0±8.0 years respectively. Around 26(54.2%) and 21(46.7%) of the subjects were Muslims in the weekly and the daily group respectively and 22(45.8%) and 24(53.3%) Hindus. Forty-four (91.7%) and 41(91.1%) were married in the weekly and daily groups respectively and 4(8.3%) and 4(8.9%) unmarried. 15(31.3%) and 12(26.7%) were from the lower middle class in the weekly and daily groups respectively, 33(68.7%) and 31(68.9%) from upper lower, 0(0%) and 2(4.4%) from lower class as per the modified Kuppuswamy's classification.

The prevalence of consumption frequency of more than or equal to once a week of green leafy vegetables and fruits were more among weekly regimen group and that of non-vegetarian food, legumes and nuts were more among daily regimen group. However these differences were not found to be significant by Chi square test(p=0.93, 0.96, 0.75, 0.11 and >0.99 respectively)[Table 1].

It was noted that in both the groups there was

Table 1: Comparison of consumption of iron rich foods between weekly and daily regimens

Food item		Frequency of Consumption		Total	P value
		< once a week	> once a week		
GLV	Weekly regimen	3(6.25)	45(93.75)	48(100)	0.93*
	Daily Regimen	4(8.89)	41(91.11)	45(100)	
Non vegetarian food	Weekly regimen	12(25)	36(75)	48(100)	0.75
	Daily Regimen	10(22.22)	35(77.78)	45(100)	
Legumes	Weekly regimen	10(20.83)	38(79.17)	48(100)	0.11
	Daily Regimen	4(8.89)	41(91.11)	45(100)	
Fruits	Weekly regimen	35(72.92)	13(27.08)	48(100)	0.96
	Daily Regimen	33(73.33)	12(26.67)	45(100)	
Nuts	Weekly regimen	46(95.83)	2(4.17)	48(100)	>0.99*
	Daily Regimen	43(95.56)	2(4.44)	45(100)	

*Fischer's exact test was used as the cells had expected counts <5

Table 2: Comparison of mean Hb% before & after intervention in weekly and daily groups

Group	Mean Hb before intervention (gm/dl)	Mean Hb after intervention (gm/dl)	t value*	95% C. I		P value
				Lower	Upper	
Weekly group (n=48)	10.10±1.25	11.02±1.31	-7.675	-1.57	-0.67	<0.01
Daily group (n=45)	9.76±1.35	11.68±1.46	-11.229	-2.26	-1.15	<0.01

*Paired 't' test with 2-sided C.I .95% was used

Table 3: Comparison of mean rise in Hb between weekly & daily groups

Hemoglobin	Weekly group	Daily group	t value*	95% C. I		P value
	(n= 48)	(n=45)		Lower	Upper	
Mean increase in Hb (gm/dl)	0.91±0.82	1.92±1.1	-4.896	-1.42	-0.59	<0.01

*Two sample independent 't' test with 2-sided C.I .95%

increase in mean Hb levels after the intervention and both these increases were found to be statistically highly significant by Paired 't' test (p=0.001 for each) [Table 2].

It was noted that mean increase in Hb in the daily group was more when compared to that in the weekly group and this difference was also found to be statistically highly significant by unpaired 't' test (p=<0.01) [Table 3].

Abdominal pain was the most common ADR in the daily group and abdominal pain and nausea were the most common ADRs in the weekly group. Incidence of

Table 4: Comparison of adverse effects of Iron & folic acid tablets in the daily and weekly groups

Adverse Drug Reaction	Weekly group(n=48)	Daily group(n=45)	P value
Abdominal pain	4(8.3)	23(51.1)	<0.01
Nausea	4(8.3)	5(11.1)	0.92*
Metallic taste	2(4.1)	9(20.0)	0.02
Diarrhea	0(0)	1(2.2)	0.97*
At least one ADR	10(20.8)	32(71.1)	<0.01

Figures in parenthesis indicate percentages. The total exceeds 100% as multiple responses were present.
*Yate's correction was used as expected cell count was < 5.

Table 5: Comparison of compliance to weekly and daily regimens

Regimen	No. Consumed (%)	No. not consumed (%)	Total no. of tablets (%)	P value
Weekly	606 (97.12)	18 (2.88)	624(100)	<0.01
Daily	3810 (94.07)	240 (5.93)	4050(100)	

Figures in parenthesis indicate percentages

all the ADRs were more in the daily group compared to weekly group. However, the difference was only significant for abdominal pain and metallic taste (p=<0.01 and 0.02 respectively) by Chi square test. The proportion of subjects reporting at least one ADR was also more in the daily group compared to the weekly group and this difference was also found to be significant (p=<0.01) by Chi square test [Table 4].

Compliance for weekly regimen was found to be better when compared to that of the daily regimen and this difference was also found to be significant (p=<0.01) by Chi square test [Table 5].

Discussion:

These were no significant differences with respect to the food consumption patterns between the daily and weekly regimen groups. Also, the selected subjects were randomly allocated into the weekly and daily regimen groups. Thereby the confounding effects of food habits, drugs, comorbidities etc., were ensured to be minimum. In weekly group, the mean hemoglobin value increased from 10.10 ± 1.25 g/dl before intervention to 11.02 ± 1.31 g/dl after intervention. In daily group it increased from 9.76 ± 1.35 g/dl to 11.68 ± 1.46 g/dl. Both these increases were found to be statistically significant (p=<0.05). The mean increase in hemoglobin in weekly group was 0.91 g/dl and in daily group was 1.92g/dl. This difference was found to be statistically significant (p=<0.05) Hence, the daily iron folic acid therapy was found to be more effective in increasing hemoglobin when compared to weekly group. Zavaleta et al. have also noted that hemoglobin levels improved significantly in both the iron supplementation groups (daily and intermittent-2days/week) compared to placebo group (p=<0.05) and daily supplements led to higher Hb increases than intermittent supplements (p =<0.05).[5] However Shobha et al., have noted that there was no significant difference in the increase in hemoglobin levels between daily and twice weekly-supplemented subjects. The probable reasons for the difference could be differences in the sociocultural characteristics of the study subjects and also age groups (the subjects in the latter study were between 13-15 years in comparison to 15-45 years in our study).[18]

Abdominal pain was the most common ADR in the daily group and abdominal pain and nausea were the most common ADRs in the weekly group. Incidence of all the different types of ADRs were more in the daily group compared to weekly group. However, the difference was only significant for abdominal pain and metallic taste. The proportion of subjects reporting at least one ADR was also more in the daily group compared to the weekly group and this difference was

also found to be significant. Shobha et al., have also noted that abdominal pain was the most common side effect in both daily and intermittent group, and incidence of all the different types of ADRs were significantly more in the daily group compared to weekly group.[19] Joshi et al., have also observed similar findings though the difference was not significant.[20]

Compliance for weekly regimen was found to be better when compared to that of the daily regimen and this difference was also found to be significant. Joshi et al., and Hyder et al., have also noted similar findings. [20,21]

The limitations of the study were that it was based on a single urban poor locality of Bengaluru and hence the findings cannot be generalized to the entire city, state or country.

Conclusions:

Both daily and weekly IFA regimens can lead to significant rise in Hemoglobin levels in the reproductive age group women. However, the increase was significantly more with daily regimen compared to weekly regimen. Hence daily regimen seemed to be more effective in raising the hemoglobin levels. Incidence of all the different types of ADRs were more in the daily group compared to weekly group. However, the difference was only significant for abdominal pain and metallic taste. Compliance for weekly regimen was found to be significantly better when compared to that of the daily regimen.

Declaration:

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Conflict of Interest: Nil

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Study of Hypertension and Dyslipidaemia with Obesity in patients with Type II Diabetes Mellitus

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Abstract:

Introduction: Diabetes and hypertension are among the most common non-communicable diseases affecting our population. They are the important risk factors for cardiovascular morbidity and mortality. **Objective**: The study was performed to estimate the association of hypertension and dyslipidaemia with increasing body weight and obesity in Type II diabetics. **Method:** This one year cross sectional study was conducted by enrolling 677 diabetics subjects from rural health training centre of integral institute of medical sciences, Lucknow, India. MS excel was used for data analysis. Descriptive statistics were used for number and percentages and associations were estimated using chi-square test. **Results:** Most of the subjects belonged to overweight category (36.91%) followed by obese (32.3%). Majority of subjects (38.4%), were within 40 – 50 years of age in which most of them belonged to overweight category (39.2%) followed by obese (31.5%). Out of total study subjects, 62% were males and 38% were females. Means of HbA1C, lipid parameters, blood pressure were found significantly associated with dyslipidemia and hypertension. **Conclusion:** Association of hypertension and dyslipidemia in obese diabetics signifies that these patients may be at a higher risk of developing cardiovascular diseases and a precise action or self-care management is required.

Key words: Dyslipidaemia, HbA1c, Hypertension, Type II Diabetes Mellitus

Introduction:

Diabetes Mellitus (DM) is a foremost public health problem all over the world.[1] Magnitude of diabetes mellitus is growing worldwide at an alarming rate. Around 170 million people were suffering from this ailment worldwide in the year 2000 and the prevalence of diabetes is expected to be twice by 2025 as per WHO reports.[2] Diabetes mellitus is a most common non-communicable ailment even in developing country like India. It affects life expectancy of closely 40 million people in India and of equivalent magnitude in other developing countries. India is identified as diabetes capital. Epidemiological development has led to rise of diseases like diabetes, obesity and associated metabolic disorders.[3-5] Diabetes and its types enforces incorrectly high human, economic and social costs on countries at all income categories. About 1.5 million deaths have been attributed to this deadly disease. Load is rising speedily among the lower and middle class earning countries like India.[6] Starting of diabetes among Indians happens a decade earlier than compared to the western world.[7,8] Most of the studies have also shown that optimum blood pressure control and within range lipid profiles confer cardiovascular benefits in patients with type II diabetes. Decrease in 10 mm Hg systolic blood pressure was connected with risk reduction of 12% in diabetic complications, 15% in diabetes related deaths, 11% in myocardial infarction and 13% in micro-vascular complications.[9,10] Similarly,

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decrease in the levels of low-density lipoprotein cholesterol (LDL-C) caused in lower occurrence of major coronary artery risks in diabetics.[11] Apparently, obesity plays a pernicious role in the patho-physiology of hypertension and diabetes, hereafter clustering of risk factors seems to have a superior influence on worse disease outcomes rather than separate risk factors.[12] Thus, metabolic syndrome, such as diabetes with associated occurrence of hypertension, dyslipidaemia, pro-inflammatory and prothrombic states can add towards composite pathological situations involving many pathways.[10] The existing literature evidences evaluating the association of hypertension and dyslipidaemia in obese diabetics is scarce. Thus, the present study, was aimed at investigating the association of hypertension, dyslipidaemia with obesity in diabetics.

Method:

This prospective cross-sectional community-based survey was conducted from December 2018 to December 2019 and enrolled 677 diabetics subjects aged 18 years and above residing in the study area for at least two years. The sample size needed for the study was calculated using the equation: $n = z^2 p[1 - p] /d^2$

Where n = the sample size; z = the statistic for the 95% level of confidence used in the power analyses, which was 2.58; p = the expected prevalence or the proportion used, which was 0.5; and d = the precision used, which was 0.05. The minimum sample size estimated for the study was 666 patients. The study enrolled 677 patients who were attending the centre during the study period.

The purposive sampling technique was used to select the study subject. The study area comprised of the field practice areas of the rural health training centre of the Department of Community Medicine, Integral institute of medical sciences and research, Lucknow, India.

Inclusion criteria:

1. All the participants having history of diabetes mellitus for more than 5 years at the time of enrolment.
2. Participants who have given written consent.

Exclusion criteria:

1. Pregnant women and seriously sick persons (bedridden or in terminal phase of chronic disease).
2. All patients of Type I diabetes mellitus.

- Patient's data was then segregated according to body mass index (BMI, kg/m²) described below;
- Obesity Degree of obesity was categorized as per National Heart, Lung and Blood Institute's definition for overweight and obesity.[13] Body mass index (BMI, kg/m²) was calculated using the formula given below: BMI = weight (kg)/ (height)² (m)
- BMI based weight categories include, underweight; <18.5 kg/m², normal weight; 18.5-24.9 kg/m2and overweight; 25-29.9 kg/m². Greater than 30 kg/m² was classified as obese.
- Patient's having fasting glucose > 125 mg/dL, having HbA1c levels > 7%. DM was defined according to the levels of HbA1c as per American Diabetes Association (ADA) Guidelines 2015. HbA1c levels of < 7% and > 7% were considered controlled and uncontrolled diabetes, respectively.[14]
- Hypertensive patients: Before the measurement the patients were asked to empty their bladder, it was also ensured that caffeine or nicotine were not consumed within last 30 minutes of attending OPD. Then the patient was asked to sit comfortably on chair, having his/her both legs rested on floor for atleast 5 minutes and the cuff should be . Then two readings of blood pressure were taken and average of the two was taken and charted. The patients having systolic and diastolic blood pressure more than 140 and 90 mm Hg, respectively[15] were considered as hypertensives.
- Dyslipidemia: The patients enrolled were advised to get the needed investigations done in the institute`s lab. Patients were measured dyslipidemic based on elevated cholesterol or serum triglycerides levels. A total cholesterol (TC) level > 200 mg/dL or triglyceride (TG) level > 150 mg/dL was considered as abnormal[16]. Similarly, low density lipoproteins (LDL) > 100 mg/dL or high density lipoproteins [HDL] < 40 mg/dL in men and < 50 mg/dL in women were measured for dyslipidaemia.

Ethical Consideration:

The study was approved by the Institutional Research Committee [IRC] & the Institutional Ethics Committee [ERC].

Statistical analysis:

Data entry and statistical analysis were performed using the Microsoft Excel. Chi-square test and t-test were used to estimate the association of demographic variables and to examine the proportions of disease prevalence with respect to obesity class. Statistical significance was taken as p value < 0.05.

Results:

Age gender wise distribution of study subjects with respect to BMI described in table 1. As per BMI categories, most of the subjects belonged to overweight category [36.91%] followed by obese [32.3%] and minimum percentage of study subjects comprised in underweight category i.e., [3.4%]. Maximum number of study subjects,260 [38.4%], were within 40 – 50 years of age in which most of them from overweight category [39.2%] followed by obese 31.5%. Out of total study subjects, 62% were males and 38% were females. (Table 1)

Table 2 described the distribution of hypertensive and non- hypertensive study subjects with respect to BMI. In non-hypertensive study subjects, 33.9% were obese, in pre-hypertensive study subjects, 33.3% were obese and in hypertensive study subjects, 36.2% were obese. Maximum percentage of obese study subjects were belonged to hypertension category. Out of total study subjects, one fourth of the study subjects were belongs to normal weight category.(Table 2)

Table 3 shows the variation in un-controlled Lipid Profiles of study subjects with respect to BMI. Out of total, obese study subjects, nearly 36.4% subjects had uncontrolled total cholesterol, 40.9% with uncontrolled triglycerides, 42.1% with un-controlled low density lipoproteins and 38.1% with un-controlled high density lipoproteins. Similar results were also found in overweight category. In normal weight category, about 25.8% subjects had uncontrolled total cholesterol, 24.0% with uncontrolled triglycerides, 22.1% with un-controlled low density lipoproteins and 23.8% with un-controlled high density lipoproteins. (Table 3)

Table 4 illustrates that the glycaemic control, lipid profile and blood pressure values. Maximum variation was found in Triglyceride [mg/dl], followed by total cholesterol [mg/dl] and HbA1c [g%] showed minimum variation in results. In which the Means of HbA1C, lipid parameters, SBP and DBP which highlights the statistically significant association with dyslipidemia

Table 1: Age and gender wise distribution of diabetics with respect to BMI

Variables	Under Weight [< 18.5] n= 19	Normal Weight [18.5 – 24.9] n=182	Over Weight [25.0 – 29.9] n=241	Obese [>60.0] n=235	Total n=677
Age group [years]					
18-20	4[33.3]	5[41.7]	2[16.7]	1[8.3]	12
20- 30	4[9.1]	15[34.1]	13[29.5]	12[27.3]	44
30- 40	4[2.4]	35[21.0]	62[37.1]	66[39.5]	167
40 – 50	5[1.9]	71[27.4]	102[39.2]	82[31.5]	260
50 – 60	0[0.0]	41[27.2]	43[28.5]	67[44.3]	151
>60	2[4.7]	15[34.9]	19[44.2]	7[16.3]	43
Total	19	182	241	235	677
Gender					
Male	11[2.6]	110[26.2]	145[34.5]	154[36.7]	420
Female	8[3.1]	72[28.0]	96[37.4]	81[31.5]	257
Total	19	182	241	235	677

Table 2: Distribution of diabetics with respect to BMI and Hypertension

Variables	Under Weight [< 18.5] n= 19	normal weight [18.5 – 24.9] n=182	Over Weight [25.0 – 29.9] n=241	obese [>60.0] n=235	Total n=677
Normal	10[4.4]	70[31.3]	68[30.4]	76[33.9]	224
Pre-hypertension	5[2.9]	44[25.7]	65[38.1]	57[33.3]	171
Hypertension	4[1.4]	68[24.1]	108[38.3]	102[36.2]	282
Total	19	182	241	235	677

**The chi-square statistic is 9.51. The p-value is 0.15. The result is not significant at p < .05*

Table 3: Distribution of Altered Lipid Profiles of Diabetics according to BMI

Variables	Under Weight [< 18.5]	Normal Weight [18.5 – 24.9]	Over Weight [25.0 – 29.9]	Obese [>30.0]	Total
Total Cholesterol	7[3.1]	58[25.8]	78[34.7]	82[36.4]	225
Triglycerides	6[2.4]	61[24.0]	83[32.7]	104[40.9]	254
Low density lipoproteins	5[2.6]	42[22.1]	63[33.2]	80[42.1]	190
High density lipoproteins	5[3.1]	38[23.8]	56[35.0]	61[38.1]	160

**The chi-square statistic is 2.22. The p-value is 0.99. The result is not significant at p < .05*

Table 4: Glycaemic control, lipid profile and blood pressure values among diabetics

Variables	Mean ± SD		t value	P value
	Male	Female		
HbA1c [g%]	6.98 ± 1.34	6.01 ± 2.20	76.23	<0.001
Total cholesterol [mg/dl]	205 ± 43.21	199 ± 51.0	87.98	<0.001
Triglyceride [mg/dl]	156.21± 57.77	149.8± 61.1	34.66	<0.001
HDL [mg/dl]	78.87 ± 8.09	76.23 ± 9.99	67.66	<0.001
Systolic BP [mmHg]	134.40 ±15.56	128.8 ±22.3	44.76	<0.001
Diastolic BP [mmHg]	87.78 ± 8.99	91.3 ± 11.2	89.78	<0.001

and hypertension.(Table 4)

Discussion:

Hypertension in Type II diabetic patients clusters with other CVD risk factors such as microalbuminuria, central obesity, insulin resistance, dyslipidaemia, hypercoagulation, increased inflammation and left ventricular hypertrophy.[17] This clustering of risk factors in diabetic patients ultimately results in the development of CVD, which is the major cause of premature mortality in these patients. Many studies suggested that hypertension, dyslipidaemia and diabetes are common conditions associated with obesity.[18,19] In present study, majority of male, between 40 – 50 years of age, belongs to overweight and obese. Moreover, obese exhibited percentage increases, compared to normal weight population. According to

studies suggests, obesity can contribute towards hypertension, dyslipidaemia and hyperglycaemia, thus can modulate cardiovascular disease [CVD] risks.[10] In this regard, HbA1c, triglycerides, total cholesterol and blood pressure, SBP & DBP, has been shown to associate significantly with obesity in diabetics of Indian origin.[20] Numerous studies suggest that most of diabetics, regardless of gender, having hypertension, dyslipidaemia and obesity were often reported in patients above 50 years of age.[18] In present study, pre-hypertensive study subjects, 33.3% were obese and in hypertensive study subjects, 36.2% were obese. Many literature suggest that hypertension and diabetes are strongly associated with body weight and obesity.[19,21] A study conducted in Spain showed that diabetics having obesity are more prone to develop hypertension and dyslipidaemia - 92.6% patients had dyslipidaemia and 73.7% had hypertension.[16] Similarly, it is reported that the prevalence of hypertension in western population increase with age and obesity, yet even adjusted for age and obesity, hypertension prevalence was still 1.5 times higher in diabetics.[23] In addition, present study showed maximum percentage of obese study subjects were belonged to hypertension category. Literature also determined that type II diabetes and hypertension are strongly associated with, the retina and kidney, while the alike association having lower evidence for obesity and dyslipidaemia.[24,25] Literature suggested that hypertension along with diabetes are key players in expanding diabetic problems and cardiovascular disease risks rather than obesity and dyslipidaemia. Moreover, the association between diabetes and metabolic dysregulators, such as dyslipidemia and obesity have been reported previously.[26] In this regard, a strong association has been observed between HbA1c of diabetics (type II) and dyslipidemic obesity, with strong positive association of HbA1c with triglycerides and cholesterol.[20,26] Ogbera AO reported reduced HDL-C and elevated LDL-C to be the prevalent lipid abnormalities in their patients with DM and only few were on treatment.[27] In present study, almost 36.4% obese subjects had uncontrolled total cholesterol, 40.9% with uncontrolled triglycerides, 42.1% with un-controlled low density lipoproteins and 38.1% with un-controlled high density lipoproteins. Similar results were also found in overweight category. In addition, Prabodh et al reported that the negative association of HDL and HbA1c imply that with an elevation of HbA1c, HDL value declines and positive correlation of TG and TC with HbA1c suggest that higher the HbA1c, more is the lipid values A fall in HDL is due to the accelerated activity of hepatic lipase in diabetics.[20] The quantitative changes in lipid profile is due to increased availability of glucose for VLDL synthesis and decrease in lipoprotein lipase to clear VLDL from the circulation. Increased production of VLDL and reduced clearance result in the elevation of triglycerides.[20] Hypertension is associated with a four fold increased mortality among patients with DM and antihypertensive therapy is found to be beneficial.[28] Dyslipidemia is a well established risk factor for CVD and when hypertensioncoexists with DM, risk of CVD increases by 75% and further contributes to morbidity and mortality.[9,17]

Conclusion: The association of hypertension and dyslipidemia in obese diabetics suggests that these patients may be at a higher risk of developing cardiovascular diseases. This warrants an immediate precise action or self-care management. Further follow up studies need to be done in these patients to find the extent of contribution of hypertension and Dyslipidemia individually or both to the development of cardiovascular complications.

Recommendations: The subjects who were at higher risk of developing cardiovascular diseases should be screened for other complications (Retinopathy, Neuropathy, Nephropathy), along with diet modifications, physical activity, Self blood glucose monitoring {SBGM}, and adherence to treatment.

Declaration:

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Conflict of Interest: Nil

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Assessment of Functioning of Health and Wellness Centers in a District of Western Gujarat

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Abstract

Introduction: Ayushman Bharat is an attempt to move from a selective approach to health care to deliver comprehensive range of services spanning preventive, promotive, curative, rehabilitative and palliative care. To ensure delivery of Comprehensive Primary Health Care services, existing Sub Health Centers and Primary Health Centers are converted to Health and Wellness Centers (HWC). **Objective:** The main objective of our study is to assess functionality of HWCs in various blocks of Jamnagar district and to determine prevalence of non-communicable diseases in the community. **Method:** It is a cross sectional study conducted between August-December 2019. A semi-structured proforma containing questionnaires was used for data collection. Data were entered and analyzed in Microsoft Excel version 2007. There are 58 health and wellness centers in Jamnagar, of which, we randomly select 50% of centers from each taluka, so total of 29 HWCs selected, four among them could not be assessed, so our final sample size would be 25. **Results:** Our study observed satisfactory performance of health and wellness centres except barring a few indicators. Community health officers and multipurpose workers are available in about majority of centers. The study found that the prevalence of hypertension, diabetes mellitus, oral Cancer, breast cancer, and cervical Cancer was 20.44%, 11.03%, 0.73% 0.45% and 1.02% respectively. Staff at the centers was in need of vital training like Techo, refresher training etc. **Conclusion:** Majority of health and wellness centers are functioning as per the guidelines laid down by the Government barring a few services like laughing club, music therapy, meditation etc.

Key words: Health and wellness centers, Ayushyaman bharat, Comprehensive primary health care, Yoga.

Introduction:

The National Health Policy, 2017 has envisioned Health and Wellness Centres (HWCs) as the foundation of India's health system. Under this 1.5 lakh centres will bring health care system closer to the homes of people. These centres will also provide free essential drugs and diagnostic services.[1,2] Under this initiative, 150,000 Sub Centres (SCs) and Primary Health Centres (PHCs) will be strengthened as Health and Wellness Centres. Currently, the SCs and PHCs meet only 20% of health care needs and provide services limited to reproductive, maternal, new-born, child and adolescent health (RMNCH+A) and some communicable disease management.

Ayushman Bharat Yojana is a key initiative undertaken by the Government of India to achieve Universal Health Coverage which adopts a continuum of care approach and aims to address health holistically at all the levels –Primary, Secondary and tertiary. It comprises of two major initiatives, namely, Pradhan Mantri Rashtriya Swasthya Suraksha Mission (PMRSSM) or the National Health Protection Scheme and the Health and Wellness Centers (HWCs).[3] These Wellness Centers will be upgraded to handle noncommunicable diseases like cancer, CVD, diabetes and respiratory diseases etc. and will provide a seamless continuum of care that ensures the principles of equity, quality, universality and no financial hardship.[4,5]

Objective:

The main objective of our study is to assess functionality of HWCs in various blocks of Jamnagar

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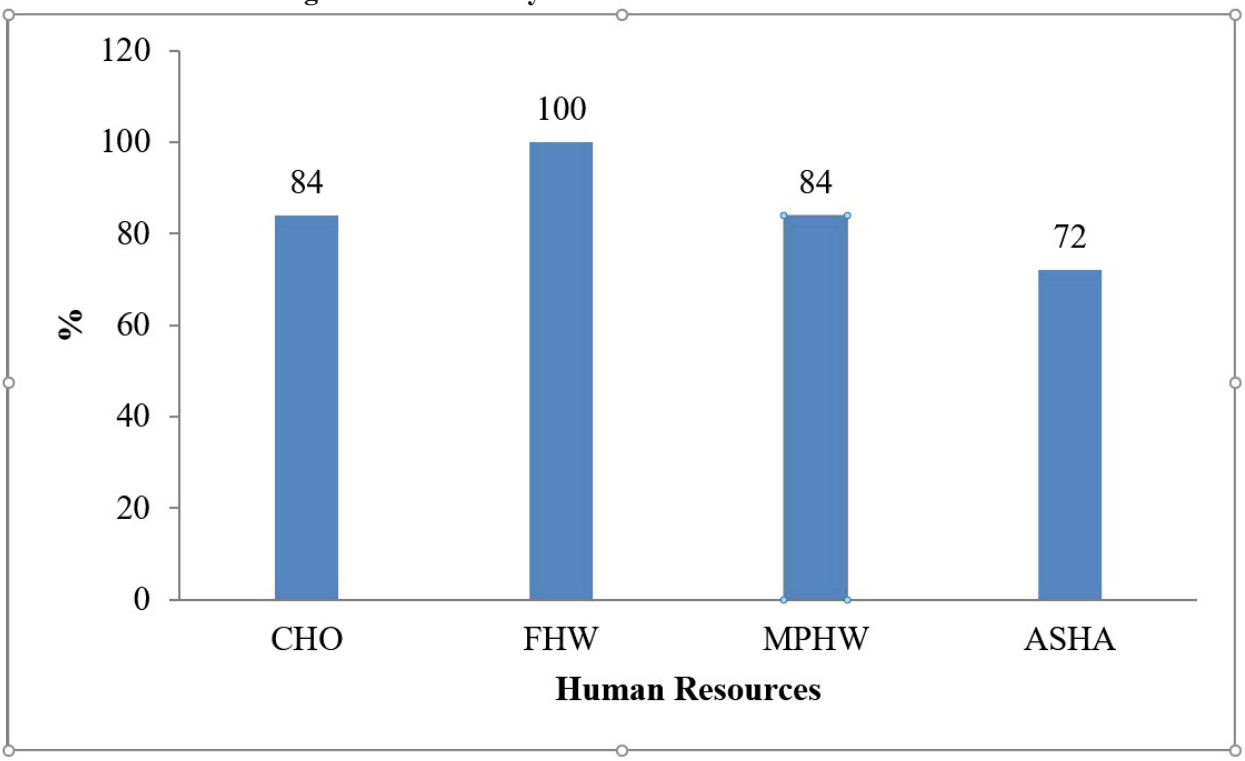
Figure 1: Availability of human resource at HWCs.



district and to determine prevalence of non-communicable diseases in the community.

Method:

This cross-sectional study was conducted to evaluate health and wellness centers of Jamnagar district (Both structure and process evaluation). There are 58health and wellness centers in Jamnagar, of which, we randomly select 50% of centers from each taluka, so total of 29 HWCs were selected, four among them could not be assessed, so our final sample size would be 25. Among them, 18 were sub health centers, while 7 were Primary Health Centres. Selected Health and wellness centers were visited between August -December 2019 and relevant data were collected using a proforma semi-structured questionnaire. Prevalence of various Non-Communicable diseases were calculated using CBAC (Community Based Assessment Checklist) forms available at HWC which was filled and prepared by health workers using house to house survey in the community. Apart from this, we also conducted short qualitative interviews of HWC staff namely Community Health Officers.

Researcher assessed wellness centers as per essential and desirable services, whereas availability of essential medicines, adequate staff and their training etc. were essential services whereas laughing club, music therapy etc. were desirable services.

Data were entered and analyzed in Microsoft Excel version 2007.Ethical approval from institutional ethical committee has been obtained.

Result:

Present study revealed a fairly satisfactory performance of wellness centers located in the district. Out of 25 HWCs 72% were sub centers while 28% were primary health centers upgraded as health and wellness centres.

Table 1: Details regarding availability of Infrastructure

Infrastructure	Yes (%)	No(%)
Branding done	23 (92%)	2 (8%)
Signage available	24 (96%)	1 (4%)
Waiting area	22 (88%)	3 (12%)

Female health workers are available at all the HWCs. community health officer and MPHS are available at 84% of HWCs.FHW were present at all (100%) oh HWCs, CHO and MPHW both were available at 84% of HWCs. (Figure 1)

At majority of HWCs infrastructure like Branding, Signage of 12 services, OPD time, Lab test, BMW,

Table 2: Assessment of wellness activities carried out at HWCs

Activity	Yes (%)	No(%)
Laughing club started	4 (16)	21 (84)
Music therapy started	4 (16)	21 (84)
Reaiki therapy started	2 (8)	23 (92)
Meditation therapy	12 (48)	13 (52)
FGD On NCD/mental heath/ENT/Eye care/ Oral care/	23(92%)	2(8%)
FGD for Adolescent health, maternal and child health	24(96%)	1(4%)
FGD for Geriatric &palliative health	22(88%)	3(12%)

Table 3: Training status of health and wellness centres staff

Training	Yes (%)	No(%)
Population base screening NCD training	17(68)	8(32)
Techo+NCD training	18(72)	7(28)
NCD PAP smear training	9(36)	16(64)
VIA training	4(16)	21(84)
Yoga training	20(80)	5(20)
Arogya samanvay training (n=21)	15(71.42)	6(28.57)
Health & wellness orientation training	14(66.66)	7(33.33)

Figure 3: Prevalence of NCDs in community

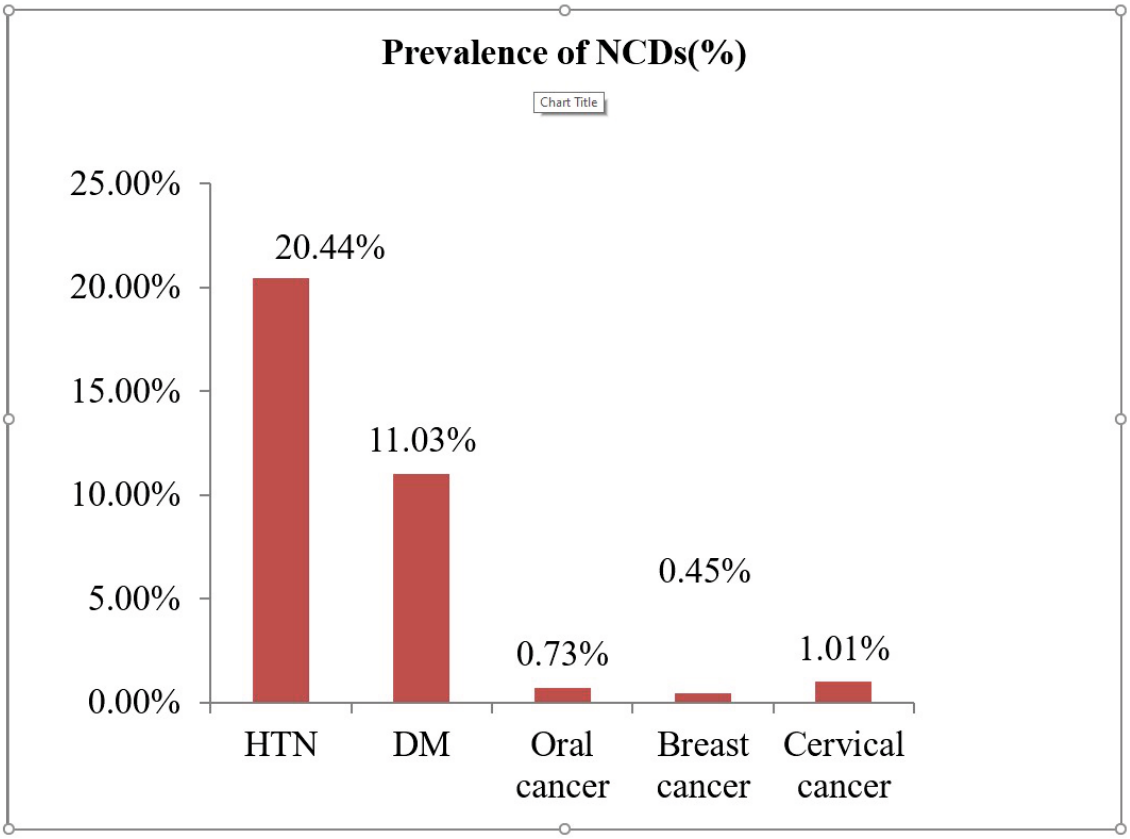
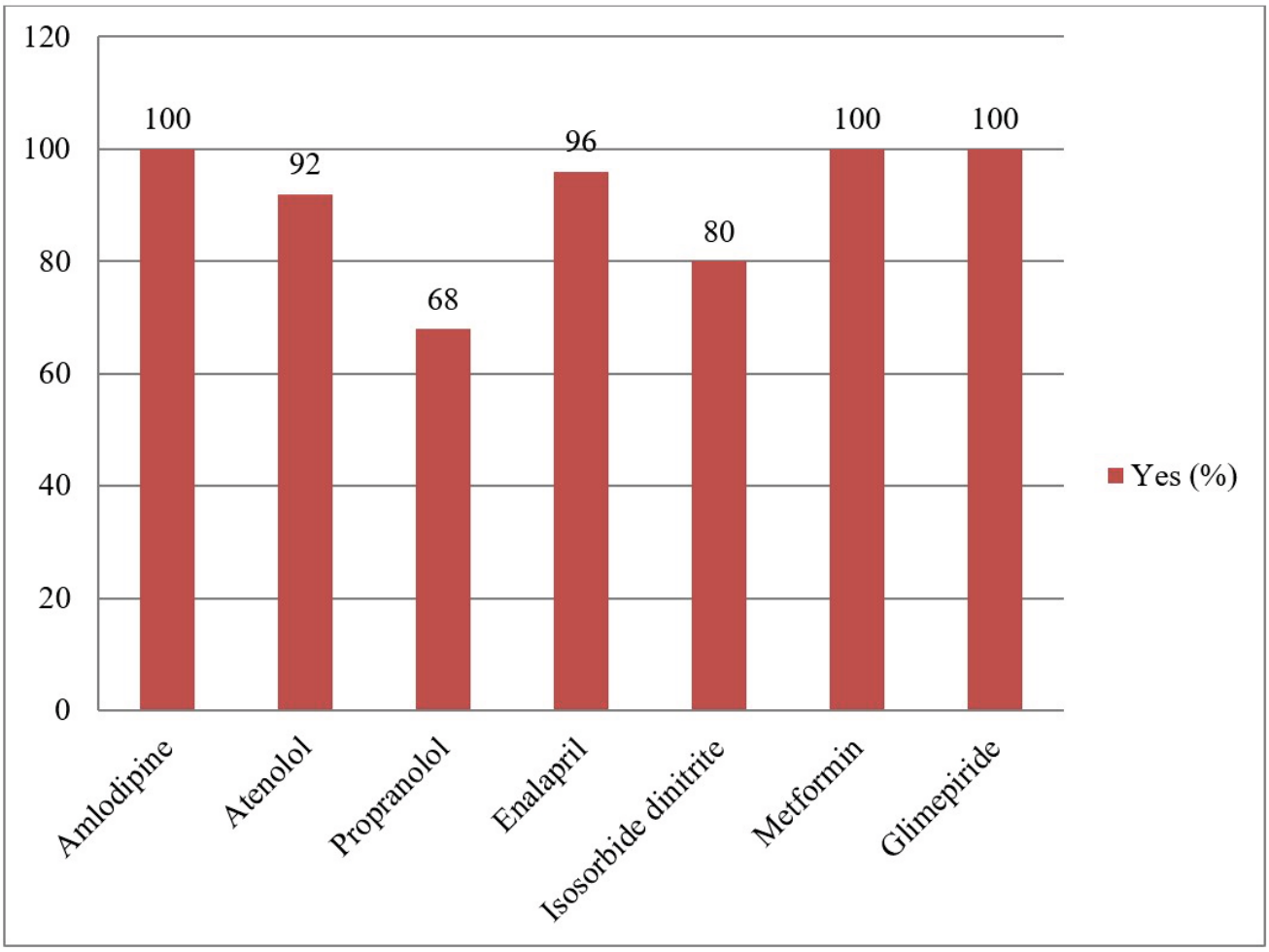


Figure 4: Availability of essential medicines at HWCs



Geriatric OPD and Yoga time and Waiting area were adequate.(Table 1)

Focal Group discussions (FGD) were carried out on Adolescent health, immunization, and maternal and child health every week on the day of Mamta day in 24 out of 25 centers. Focal group discussion(FDG) on NCD and Geriatric health was carried out twice a month in 23 and 22 out of 25 centers. (Table 2). We observed 4 FGDs on the occasion of Mamta day and participated in the same, and for the rest of the centres, we got information for conducting FGDs from the Community Health Officers.

The prevalence of hypertension, diabetes mellitus, oral cancer, breast carcinoma and cervical carcinoma in the community was 20.44%, 11.03%, 0.73%, 0.45% and 1.02% respectively.(Figure 2)

Our study found that all essential medicines and consumables were available in adequate quantity at wellness except few like propranolol (available in 68% wellness centres), isosorbidedinitrate (80% of centres).(Figure 3)

Discussion:

The up gradation of existing sub health centers and primary health centers in rural areas to health and wellness centers for providing comprehensive health care services is an example of equitable distribution in primary health care. Our study revealed a fairly satisfactory performance of wellness centers functional in our district. Regarding availability of staff pattern, a wellness center should be equipped with one male and one female health worker, one community health officer and ASHA workers. The study found that health workers and ASHA workers were available in all wellness centers, but the post of community health officers were filled up in 84% of wellness centers.

The guideline says that a wellness center should be equipped with all essential infrastructure like branding, signage etc.[6] We also evaluated wellness centers about their infrastructure and observed that

majority of health and wellness centers (92%) had branding, signage of all 12 essential services, OPD timings, biomedical waste guidelines etc. available. Yoga time table was written in 75% of wellness centers. Waiting areas were adequate with good seating capacity.

Health and wellness centers conductsome wellness activities like Yoga and meditation, laughing club, Music therapy etc. Yoga and meditation has a positive impact of non-communicable diseases.[7] We found that in only half (48%) of wellness centres, Yoga and meditation therapy was being carried out regularly. Moreover, only 16% wellnesscenters carried out laughing and music therapy regularly.

Non communicable diseases can be prevented by health education in the community using focal group discussion. We observed that about 90% of wellness centers were conducting focal group discussion and imparting knowledge about non-communicable diseases, mental health issues, adolescent health, geriatric health, immunization practices etc.

Table No.3 shows the training status of the wellness staff. Training is very essential for staff as one learns a lot and implement in practice for betterment of community. We observed that only 36% of staff had taken training of non –communicable diseases, 72% were trained in Techo+NCDtraining, Yoga training by 80%, Aarogyasamanvay by 71.42%, while only 16% staff were trained with PAP smear or VIA training for detection of cervical carcinoma.

In this epidemiological transition phase, there is a sharp rise in incidence and prevalence of non communicable diseases for the last few decades. Our field investigators checked CBAC (community based Assessment checklist) forms that were filled by ASHA workers and FHWs for screening of community for non-communicable diseases. From these CBAC forms, we determined prevalence of various non communicable diseases. The prevalence of hypertension, diabetes mellitus, oral cancer, breast carcinoma and cervical carcinoma was 20.44%, 11.03%, 0.73%, 0.45% and 1.02% respectively. Previous prevalence studies on diabetes mellitus and hypertension in India, although not completely comparable with our study due to different methodology and sample sizes, have also confirmed this increase in prevalence of diabetes[8-11] and hypertension[8,12-14] over a period of time.

Continuous and uninterrupted supply of essential medicines and consumables is vital to the functioning of a wellness centres and it must be ensured by the community health officer that all essential medicines should be available all the time in the centres. Our study found that all essential medicines and consumables were available in adequate quantity at wellness except few like propranolol (available in 68% wellness centres), isosorbidedinitrate (80% of centres).

Conclusion:

We observed that majority of health and wellness centres were functioning as per prescribed guidelines, with few exceptions. We observed deployment of staff, availability of essential drugs and consumables etc. were satisfactory in most of the health and wellness centres, though there is a need of vital training of community health officers in the field of non-communicable diseases, their screening methods, follow-up training etc.

Limitation:

This cross-sectional study included only health and wellness centers of one district. Conducting more multi-centric studies involving many HWC across districts or state could provide a meaningful insight and better result of HWCs and that can be generalized and can be helpful for policy makers to take appropriate decisions and bolster functioning of the same.

Declaration:

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Conflict of Interest: Nil

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Mid-Level Health Providers- Their Perceptions and Background Knowledge Pertaining to Comprehensive Primary Health Care and Health and Wellness Center

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Abstract

Introduction: To achieve universal health coverage, concept of Health and Wellness Center (HWC) was given under Ayushman Bharat. For providing health care services through HWC, cadre of Mid-Level Health Provider (MLHP) is introduced who would be leading primary health care team at HWC. **Objective:** This study was undertaken with objective to assess the factors favoring to join this course and baseline knowledge of Comprehensive Primary Health Care (CPHC) and Health and Wellness Center (HWC) among course candidates **Method:** It was a cross sectional study conducted among candidates of certificate course in community health at PSC (Program Study Center) of Medical College at South Gujarat through self-administered semi-structured Performa. **Results:** Career changing opportunity was considered as a major factor to pursue Certificate Course in Community Health (CCCH) course and obtaining MLHP position at HWC. Accessibility of HWC and role in advocacy generation were perceived major needs for it in community. Preventive, Promotive and Curative functions were mentioned as functions of HWC and geographical accessibility with delivery of functions in effective manner were perceived as chief characters of ideal HWC. Along with these, they mentionedcleanliness of center, community involvement and client satisfaction as its other characters. **Conclusion and Recommendations:** Baseline knowledge of the candidates pertaining to need, functions and ideal HWC was found almost satisfactory but it needed reinforcement and clarity. These results should be used for proper planning of curriculum and implementation of CCCH course to fulfill gaps in knowledge. We recommend that similar exercise should be carried out at all PSCs for effective implementation of course curriculum.

Key words: Certificate Course in Community Health, Health and Wellness Center, Mid-Level Health Provider

Introduction:

Universal Health Coverage (UHC) represents equity in access to quality health services to people in need without subjecting those to financial hardships.[1] To achieve the vision of UHC, Government of India launched a flagship scheme- Ayushman Bharat which was based on recommendation by National Health Policy 2017.

Ayushman Bharat aims towards continuum of care across primary, secondary and tertiary levels by two main components namely Health and Wellness Centers (HWCs) and Pradhan Mantri Jan Arogya Yojana (PM-JAY). HWCs are identified as focal point for comprehensive primary health care (CPHC) as envisaged under Ayushman Bharat. Existing Sub centers and PHCs will be transformed to HWC. It was announced in February 2018 by Government of India that 1, 50,000 of such HWCs would be created across the country.[2]

Mid Level Health Providers (MLHP) cadre was created to ensure effective delivery of CPHC through HWCs. They will be leader of health care team at HWC with Multi Purpose Health Workers (MPHWs) and ASHAs.

Basic qualification required for MLHP is B.SC.in Community Health or a Nurse (GNM (General Nursing and Midwifery) or B.Sc.) or Bachelor in Ayurvedic Medical science (BAMS). They will undergo 6 months Certificate Course in Community Health under state government recognized universities. They will be

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trained for a set of primary health care competencies through an accredited program which gives them exposure of both theories as well field level practical work based knowledge along with on job capacity building.[3]

The concept of HWC and inclusion of MLHP cadre is revolutionary step by bringing focus on better primary health care of community by behavior modification to reduce risk of developing chronic morbidity and mortality along with reduction in burden on secondary and tertiary levels of health care.

There are total 50 PSCs in Gujarat which certify approximately two thousand MLHP per batch. This is a six month duration course hence by taking baseline data of these course candidates, the course content structure can be designed and modified in such manner which would be beneficial for effective teaching in six months. This study was an initial step in that direction which can be taken up on larger scale later on.

Objectives:

1. To understand factors favoring decision to join CCCH course and program study center.
2. To explore the perceptions of CCCH candidates towards need, functions and characteristics of idea health and wellness center.
3. To understand their knowledge about job responsibilities of Mid Level Health Provider.
4. To know their expectations from CCCH course.

Method:

Study type: Cross sectional study

Study area: Program Study center of CCCH course at Medical College of South Gujarat.

Study participants: Candidates of CCCH who had taken admission at mentioned Program study center

Study process: Above mentioned Program Study Center (PSC) is a designated center by Indian Institute of Public Health, Gandhinagar (deemed university) and total forty seats are allotted to this center (maximum forty candidates per PSC is allowed in state) per batch. Their admission process is coordinated centrally by State Institute of Health and Family Welfare. All the seats were filled for January 2020 batch at concerned PSC and all the forty candidates reported on day. This study was approved by institutional ethics committee and informed written consent was obtained from the candidates. All the forty candidates had given consent to take part in the study and filled the Performa.

Study Tool: Semi structured Performa was made which explored basic demographic information of candidates, their factors favoring for pursing course, needs, functioning and characteristics of ideal HWC, their expectations from course and preferred teaching methods. Performa was made in vernacular language for their better understanding and response.

Performa was administered at the start of the course so that actual background knowledge of candidates could be checked. On day one this self-administered Performa was given to the candidates. Since it was first day of their course, rapport building was done with them by the faculties of department. Candidates were explained the aim of conducting this study along with assurance to maintain confidentiality of the data. Their verbal informed consent was obtained after which validated semi-structured Performa was given. Each question was explained to the candidates before they filled the Performa to maintained uniformity in understanding by all.

Data analysis:

Data entry and analysis was done using MS excel. Descriptive statistics is reported in the form of frequency and percentage in tables and figures.

Results:

Total 40 candidates of CCCH participated in the study. 85% were females and 15% were male candidates. Candidates' mean age was 26(SD=2.5) years. Their educational qualifications were GNM (85%), B Sc Nursing (12.5%) and BAMS (2.5%). Mean work experience was approximately 3 years before they joined this course.

On inquiring about source of information about CCCH course and their admission process to participants, majority (85%) enlisted friends followed by internet and social media (15%), family and relatives (10%) and newspaper/news (10%). On inquiring in depth, friends shared advertisement of admission to participants.

Out of 40 candidates enrolled for CCCH course at PSC (table 1), career changing opportunity or better career opportunity in terms of government job profile, substantial monetary benefit, status in community was the major driving force (85%) to pursue the course. Improving community's health status by active

Table 1: Distribution of driving factors for pursuing CCCH course

Sr.No.	Driving factors	Number	%
1.	**Better opportunity (career changing opportunity)**	**34**	**85**
	1.Educational opportunity and change in job profile	15	37.5
	2.Substantial Monetary benefit	7	17.5
	3.Government Job	5	12.5
	4.CHO posting and status	8	20
2.	**Community Related Work**	**18**	**45**
	1.Generating awareness and removing misconception from community	9	22.5
	2.Improving health status of community	9	22.5
3.	**Public health related work**	**8**	**20**
	1.Effective health care delivery	5	12.5
	2.Updated knowledge of national health programmes	2	5
	3.To reduce maternal and child mortality rate	1	2.5
4.	**Social/ Family**	**6**	**15**
	1.Future job opportunity near to home	3	7.5
	2.No night duty / family time	2	5
	3.Prefer living in village	1	2.5
5.	**No answer**	**2**	**5**
	Total responses	**69**	
	Total candidates	**40**	**100**

(multiple responses permitted)

involvement in community related and public health related work were other driving forces for pursuing the course. 15% candidates reported Social or Family reasons as deciding force to join course.

Reputation of institute as per feedback of previous candidates and geographical proximity to residence were two main determinants reported by candidates to select specific study center. (Table 2)

Candidates were inquired about their perception about need of HWC in community. Approximately one out of three responses was regarding geographical accessibility while advocacy and awareness of health services in community was responded by 32.5% candidates. 15% of candidates responded affordability (free of cost treatment) as a need for HWC. Few of them (7.5%) felt timely appropriate treatment as need of HWC. (Table 3)

Table 4 describes candidates' knowledge about functions of HWC;almost half of responses were indicating preventive services in terms of awareness in community, MCH and geriatric related preventive services as functions of HWC. Model health care delivery point for imparting basic health care in community was perceived as function of HWC by one fourth of candidates. Integrated care center for services was also reported as function of HWC.

Table 5 reveals perceptions of enrolled CCCH candidates about characteristics of ideal Health and Wellness center. Appropriate scientific information about primary prevention of disease (30%) was perceived as integral character of ideal health and wellness center followed by free of cost treatment

Table 2: Distribution of determinants to select study center

Sr. No.	Determinant(s)	Number (n=40)	%
1	Institute reputation	29	72.5
	1.Better teaching	15	37.5
	2.Regular classes taken by quality teachers	4	10
	3.Got chance to study in medical college	3	7.5
	4.Center is good and known	6	15
2	**Geographical proximity to residence**	**28**	**70**
3	**No other option as per choice available due to merit**	**1**	**2.5**
	Total responses	**58**	
	Total candidates	**40**	**100**

(multiple responses permitted)

Table 3: Distribution of perception of need of Health and Wellness center amongst CCCH candidates

Sr No.	Perceived Need	Number (n=40)	%
1.	**Accessibility**	**15**	**37.5**
	a.Geographical accessibility (Primary health care near to home)	14	34
	b.Gender accessibility (females r not allowed to go out of village)	1	2.5
2.	**Advocacy / Awareness**	**13**	**32.5**
	1.To create awareness about government services / new diseases	13	32.5
3.	**Primary prevention of Communicable and Non communicable diseases**	**9**	**22.5**
4.	**Affordability**	**6**	**15**
	Free of cost treatment	6	15
5.	**Availability**	**7**	**17.5**
	a.Primary health care delivery point at village level	4	10
	b.Timely appropriate treatment available	3	7.5
6.	**Miscellaneous**	**12**	**30**
	a.To reduce maternal and child mortality rate	4	10
	b.For betterment of community health	4	10
	c.Integrated center / Focal center / Nodal center	3	7.5
	d.Timely referral (referral point)	1	2.5
7.	**No answer**	**1**	**2.5**
	Total Responses	**61**	
	Total candidates	**40**	

(multiple responses permitted)

Table 4: Distribution of knowledge of functions of health and wellness center (HWC)

Sr. No.	Knowledge domain	Number (n=40)	%
1.	**Preventive**	**19**	**47.5**
	1.Prevention of diseases (MCH, geriatric etc.)	8	20
	2.Creates awareness in community	11	27.5
	3.Prevention of maternal and child mortality	2	5
2.	**Model Health care delivery point**	**10**	**25**
	1.Basic health care is provided	5	12.5
	2.Providing better health services	5	12.5
3.	**Curative for minor ailments**	**10**	**25**
	1.OPD services	7	17.5
	2.Treatment of patients in villages near to home	3	7.5
4.	**Integrated care center for government health programmes/ Focal center / Nodal center**	**5**	**12.5**
5.	**Miscellaneous**	**3**	**7.5**
	a.Operational effectiveness in terms of population	1	2.5
	1.Covers population of 4 to 5 thousand	1	
	b.Integration with other non pharmacological measures like Yoga	1	2.5
	c.Referral point to higher center	1	2.5
6.	**Don't know**	**2**	**5**
7.	**No answer**	**6**	**15**
	Total responses	**57**	
	Total Candidates	**40**	

(multiple responses permitted)

(30%) availability, diagnosis and treatment of minor ailments (25%) and geographical accessibility and infrastructure as per guidelines (17%). Candidates mentioned about cleanliness of center, community involvement in functioning of center, regularility of services, client satisfaction, adequate human resource and referral linkages also as characteristics of ideal HWC. 3 (7.5%) candidates couldn't mention a single perceived characteristic for ideal HWC.

CCCH course is prerequisite to get appointment as Community Health Officer (CHO) at Health and wellness center. An attempt was made to understand their knowledge about various job responsibilities of CHO. Majority of candidates responded Community health promotion (72.5%) mainly through Behavior change communication (BCC) as primary responsibility followed by clinical care and screening (65%) which included national health programmes related activities. 40% of candidates considered support, supervision, management and record keeping as one of the responsibilities. 2 (5%) candidates responded local outbreak prevention and control was one of the characters of ideal HWC. (Table 6)

Expectations of candidates from CCCH and preferred method of teaching and expected future

Table 5: Distribution of perception of characteristics of ideal Health and Wellness Center (HWC) amongst CCCH candidates

Sr. No.	Characteristic of ideal HWC	No.	%
1.	**Primary prevention of diseases**	**13**	**30**
	1.Disease related information (HE and IEC) is provided	13	30
2.	**Affordability**	**12**	**30**
	1.Health services are available free of cost	12	30
3.	**EDPT (Curative) secondary prevention**	**10**	**25**
	1.Disease diagnosis and treatment of minor ailments provided timely	10	25
4.	**Geographical proximity / infrastructure**	**7**	**17.5**
	1.Located centrally amongst catchment area/ Infrastructure as per guideline	7	17.5
5.	**Hygienic**	**5**	**12.5**
	1.Clean center	5	12.5
6.	**Community involvement**	**4**	**10**
	1.Respect given to community/Cooperative staff	3	7.5
	2.Addressing problems of community	1	2.5
7.	**Regularity of services**	**3**	**7.5**
	1.Regular OPD conducted	2	5
	2.Yoga sessions conducted regularly	1	2.5
8.	**Miscellaneous**	**4**	**10**
	1.Client satisfaction	1	2.5
	2.HR should be available and knowledgeable as per guidelines	2	5
	3.Referral linkages are there	1	2.5
9.	**No Answer**	**3**	**7.5**
	Total Responses	**61**	
	Total candidates	**40**	

(multiple responses permitted)

changes in their life after completion of course:

Majority of candidates responded to acquire scientific knowledge of public health, improvement of communication skill and building up confidence as expectations from CCCH. Few of them responded about learning skills of community involvement for public health related interventions at the end of CCCH course.

In continuation, candidates were inquired about their preference of teaching methodologies to fulfill their expectations effectively. As medium of education and evaluation is vernacular language, majority of candidates suggested modules should be translated in vernacular language for better understanding. They suggested interactive and interesting teaching instead of didactic teaching method. Field exposure with

Table 6: Distribution of knowledge about Job responsibilities of CHO

Sr. No.	Job Responsibility	Number	%
1.	**Community Health Promotion**	**29**	**72.5**
	1.Behavior change communication (BCC)	27	67.5
	2.Creating awareness regarding exercise, healthy diet, Yoga	1	2.5
	3.Maintaining cleanliness in community	1	2.5
2.	**Clinical Care Provision and Screening**	**26**	**65**
	1.OPD services including NCD screening	16	40
	2.Providing satisfactory health services to community	4	10
	3.NHP related activities	5	12.5
	4.Referral services	1	2.5
3.	**Support, Supervision and Management**	**16**	**40**
	1.Community visits (ANC, PNC)	6	15
	2.Management of place of work, Administration, On job training of staff working under CHO	5	12.5
	3.Record maintenance	4	10
	4.Regular data entry in Techo (Reporting of data in appropriate software's)	1	2.5
4.	**Local outbreak prevention and control**	**2**	**5**
5.	**Don't know**	**2**	**5**
6.	**No answer**	**1**	**2.5**
	Total Responses	**86**	
	Total Number of candidates	**40**	

(multiple responses permitted)

proper planning was also suggested method of teaching by candidates.

Discussion:

The study was conducted with candidates who recently joined CCCH course. The objective of study were to assess factors for pursuing course, selection of center and as well as understanding of functions of CHO and characteristics of ideal HWC. The baseline assessment would be useful for course.

Major source of information regarding CCCH course was friends. CCCH course is in demand due to job security and nature of job. Better opportunity in terms of career changing opportunity and tag of government job were major deciding factors to join course. Government of Gujarat is allocating position of Community Health Officer (CHO) based on state wide merit list which includes fixed salary with performance based incentive. It is envisaged that CHO will play pivotal role in preventive, promotive and curative management in community. Currently there are more than 50 program study centers (PSCs) with approximate uptake of 2000 candidates as identified by Government of Gujarat. Central admission process as per merit list basis was adopted by state. Institute reputation and geographical proximity were major determinants perceived by candidates to select PSC to pursue course.

The National Health Policy recommended

strengthening the delivery of Primary health care, through establishment of HWC as a platform to deliver Comprehensive Primary Health Care (CPHC).[4] Recently joined candidates perceived geographical accessibility, for effective delivery of advocacy and health education and as a platform for primary prevention with affordable cost as needs of HWC. Most of the responses were as per needs perceived by National Health Policy, 2017. Understanding about actual needs of HWC before joining as CHO amongst candidates helps them to perform effectively.

HWC concept has defined extended range of services and deliverables to community.[2] Majority of candidates perceived preventive care as major function followed by curative services and model delivery point. Few of them perceived it as an integrated care center for community. HWC is envisaged as a center for integrated care in community.[3] This concept needs to be effectively emphasized amongst candidates during their course tenure to produce expert CHOs.

Introducing the concept of ideal HWC is essential for future CHOs.[5] Primary prevention, affordability, early diagnosis and prompt treatment or referral, geographical proximity were major characteristics mentioned by candidates. Few of candidates mentioned cleanliness, community involvement, regularity of services and client satisfaction as desirable characteristics of ideal HWC. The vision of ideal HWC was present amongst candidates who need reinforcement and completion during their course period through theory sessions and practical sessions. The job responsibilities of CHO are clearly defined in objective manner.[2] On inquiring about candidates' awareness about it, majority reported community health promotion, screening and clinical care provision, supervision and monitoring as major job responsibilities. Their perceptions mostly covered whole sphere of job responsibilities of CHO. It needs to be reinforced during course.

Authors made an attempt to understand candidates' expectations and preferred method of teaching during course execution. Majority of candidates responded to receive scientific knowledge of public health and skill building of interventions including communication skill as expectation from course. Teaching in vernacular language for better understanding was main demand from candidates. They mentioned mixed approach of theoretical teaching with involvement of candidates and practical exposure to HWC as preferred method of teaching.

Conclusion and Recommendations:

The candidates of CCCH course were interviewed before initiation of actual teaching to know their reasons to join course and understanding about HWC primarily. Majority of candidates envisaged CCCH course and CHO posting as career changing opportunity and PSC reputation and geographical proximity to home played major role in PSC selection. The perceptions of need, functions and ideal HWC were explored and it was found that majority of candidates were having almost satisfactory knowledge regarding concept of HWC. It needs to be further addressed during CCCH course implementation. It is recommended that baseline evaluation of various concepts is a fruitful exercise to be carried out at all PSC for effective implementation of course.

Declarations:

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Conflict of Interest: Nil

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Assessing the Clinical and Anthropological Profile of HIV Positive Adolescents in Surat, Gujarat: A Cross-Sectional Study

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Abstract:

Introduction: Adolescents (10–19 years) and young people (20–24 years) continue to be vulnerable to Human Immunodeficiency Virus (HIV) infection despite efforts to date. HIV-infected adolescents with long standing HIV infection often face considerable physical challenges - delayed growth and development, stunting/wasting and malnutrition. **Objectives:** (a) To study the clinical profile of HIV infected adolescents (b) To assess the anthropometric profile using age-standardized scores. **Method:** The cross-sectional study was conducted at HIV clinic, at Anti-retroviral Treatment (ART) Centre, Surat (Tertiary Care Level Institute) among adolescents between age-group 13-19 years during December-2015 to February-2016. Based on the desk review, total 134 adolescents were identified, out of which 105, could be contacted during study period and fit in the inclusion criteria. Participants who were alive, on Pre-ART/ART and their status had been disclosed and gave consent for the interview were included in the study. **Results:** Majority of the participants were on ART (95.3%). About half (55.6%) of the participants had suffered from opportunistic infection. Majority of the patients were at WHO stage I (93.75). Mean CD4 count during study was 640 cells/cubic mm (SD±401.42). Out of 105 participants, 14.5% were suffering from severe thinness and 14.5% were suffering from thinness & 36.2% participants were suffering from severe stunting and 16.4% were suffering from stunting. Mean age of participants was 15.64 years (SD ±2.02). Majority of the participants belonged to Socio-economic class IV (36.8%) and class III (31.1%) followed by Class V (17%), class II (13.2%) and Class I (1.9%). **Conclusion:** The anthropometric measurements suggest that nutrition aspect is not fully recovered, as majority of the participants suffer from stunting and wasting; stunting more than wasting indicating chronic malnutrition.

Key words: Adolescent, Anthropometry, CD4 count, HIV-AIDS, Malnutrition

Introduction:

Adolescents (10–19 years) and young people (20–24 years) continue to be vulnerable, both socially and economically, to Human Immuno deficiency Virus (HIV) infection despite efforts to date. Adolescents and young people represent a growing share of people living with HIV worldwide.

According UNAIDS estimates in 2019, number of adolescents living with HIV would be 1.6 million.[1] In 2018 alone, 190,000 [59,000-380,000] adolescents between the ages of 10 and 19 were living with HIV.[2] In India in 2017, 21,00,000 people were living with HIV.[3]

HIV-infected adolescents with long standing HIV infection often face considerable physical challenges - delayed growth and development, late puberty, stunting/wasting, malnutrition, etc.[4] The perinatally infected children, as the immune system weakens, grow slowly and become vulnerable to recurrent infections and illnesses. Hence, as they become adolescents, they are already physically stunted and vulnerable to innumerable infections.[5]

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Beginning at birth, HIV-infected infants often have smaller size and lower birth weight than non-infected children born to HIV-infected women. The causes of growth dysregulation are varied, and can be due to alterations in gastrointestinal function, chronic or repetitive infections, and alterations in metabolic and endocrine function. The metabolic and endocrine effects may be the consequence of the primary infection or secondary to the use of any of the medications required to treat HIV infection and its complications.[6]

In HIV-infected individuals, poor nutritional status is a strong predictor of survival, even after controlling for CD4+ cell counts: A weight loss of >66% of ideal body weight was linked to the timing of death in Acquired Immunodeficiency Syndrome (AIDS) patients.[7, 8] Padmapriyadarsini and Swaminathan reported that a nutritional assessment should be conducted for all patients irrespective of the stage of HIV disease in order to assess status and identify potential problems promptly. [9]

Hence, the current study was undertaken to understand the clinical profile and anthropometry specifically among adolescents as they are often neglected in research compared to young adults or children.

Objectives:

(a) To study the clinical profile of HIV infected adolescents

(b) To assess the anthropometric profile using age-standardized scores

Method:

This is a cross-sectional study among adolescents living with HIV and attending Anti Retroviral Treatment (ART) Centre. The study was conducted at ART Centre, Surat (Tertiary Care Level Institute) among adolescents between age-group 13-19 years during December-2015 to February-2016.

Desk-review of ART Centre data, Surat of those registered at ART centre in age-group between 13-19 years was conducted. ART Centre was established in 2006, all the patients registered since 2006, who were in adolescent age-group during study period were selected for the study. Total 134 adolescents were identified, out of which 105, could be contacted during study period and fit in the inclusion criteria. Participants who were alive, on Pre-ART/ART and their status had been disclosed and gave consent for the interview were included in the study.

Data collection tools included Pre-designed form, ART cards, Weighing scale and Stadiometer. Height for the age (for stunting) and Body Mass Index (BMI) for the age (for wasting) were calculated using Standardized Age-specific Z-scores prepared by World Health Organization (WHO) for adolescents. Thinness, severe thinness, stunting and severe stunting were labelled based on these scores. If the value was less than 2 Standard deviations (2SD) than the score for that age, it was labelled as thinness or stunted and less than 3 Standard deviations (3SD) was labelled as severe thinness and severe stunting. Modified Prasad classification was used to classify participants on the basis of socio-economic classification. All India Consumer Price Index of November 2015 was referred for the same.

Study was approved by Human Research Ethics Committee (Institutional Ethical Committee), Government Medical College, Surat and NACO (National AIDS Control Organisation). Identities of the participants were protected at all times and participation was voluntary.

Results:

Socio-demographic Profile:

The study participants included were from varied socio-economic and demographic backgrounds as depicted in Table 1. Mean age of participants was 15.64 years (SD ±2.02). Majority of the participants were boys (67.9%) followed by girls (32.1%). The religion respected by majority of the participants was Hindu (90.6%) followed by Muslim (9.4%). Nearly half of the participants belonged to Gujarat (53.8%) and the other are migrants from other states (46.2%). The study reported that 24% of the participants have dropped school while 76.4% have continued their education. Majority of the participants belonged to Socio-economic class IV (36.8%) and class III (31.1%) followed by Class V (17%), class II (13.2%) and Class I (1.9%).

Clinical History

As depicted in Table 2, Out of total 105 participants, majority of the participants were on ART (95.3%) followed by Pre-ART (4.7). Out of total 105 participants, 91 (85.8%) had acquired HIV by vertical transmission followed by unknown (5.6%), blood

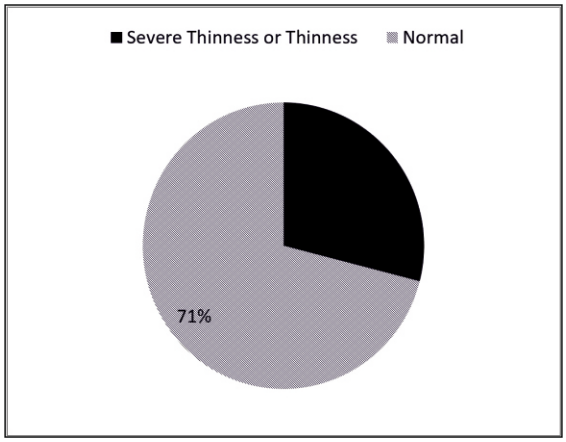
transfusion 4 (3.8%), and others (4.8). About half (55.6%) of the participants had suffered from opportunistic infection. Out of these 61 participants, almost half (31) had suffered from tuberculosis.

At registration, about one-third of the participants (32.15) were at WHO stage II followed by WHO stage III (25.5%) as shown in Table 3. Currently, majority of the patients were at WHO stage I (93.75). Median CD4 count at registration was 280 cells/cubic mm (Inter Quartile Range: 169-527). Median CD4 count during study period was 545 cells/cubic mm (Inter Quartile Range: 309-910).

Anthropometric Measurements:

Mean weight of the participants was 34.57 kilograms (SD±8.03). Mean height of the participants was 142.77 centimeters (SD±11.46). BMI for the age was calculated using Z-scores prepared by WHO for adolescents (10-19yrs). According to these scores, 14.5% participants were suffering from severe thinness and 14.5% were suffering from thinness as demonstrated in Figure 1. Height for the age was calculated using Z-scores prepared by WHO for adolescent. According to these scores, 36.2% participants were suffering from severe stunting and 16.4% were suffering from stunting which is shown in Figure 2.

Figure 1: Pie-chart depicting distribution of participants according to Body Mass Index for age (indicator for thinness or wasting)



Discussion:

Out of total 105 participants, 91 (85.8%) had acquired HIV by vertical transmission followed by blood transfusion 4 (3.8%), 2 (1.9%) by intravenous route, 1 (0.9%) by homosexual route, 1 (0.9%) by heterosexual route and 6 (5.6%) route of transmission were unknown. Study conducted by Marfatia Y S et.al in 2008 at Vadodara, India reported that 64% of HIV-Positive adolescents were infected by vertical

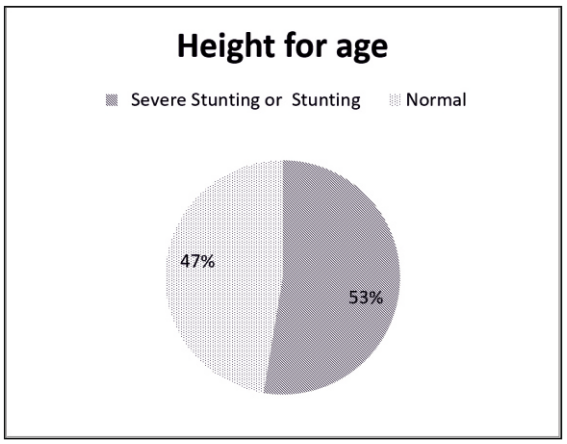
Table 1: Socio-demographic profile among participants

Variable	Categories	Frequency (%) n=105
1.Age	Mean age	15.64±2.022
2.Sex	Boy Girl	72(67.9) 33(32.1)
3.Religion	Hindu Muslim	95(90.6) 10(9.4)
4.Native State	Gujarat Other	56(53.8) 49(46.2)
5.Education	Continue Dropped	81(76.4) 24(23.6)
6.Socio-Economic Class (Modified Prasad Classification)	I II III IV V2	2(1.9) 14(13.2) 33(31.1) 38(36.8) 18(17.0)

Table 2: Distribution of participants according to Clinical History

Variable	Categories	Frequency (%) =105
1.ART Status	Pre-ART On ART	5(4.7) 100(95.3)
2.Route of transmission	Vertical Homosexual Heterosexual intercourse Injecteble Drug use Blood transfusion Unknown	91(85.8) 1(0.9) 1(0.9) 2(1.9) 4(3.8) 6(5.6)
3.Oppurtunistic Infections H/o	Yes TB Other No	61(55.6) 31 30 44(44.4)

transmission, followed by12% by blood transfusion, Figure 2: Pie-chart depicting distribution of participants according to Height for age (indicator for stunting)



12% by sexual transmission and 12% unknown.[10]

In the present study, at registration, about one-third of the participants (32.15) were at WHO stage II followed by WHO stage III (25.5%).Currently, majority of the patients were at stage I (93.75). The findings indicate improvement in clinical WHO staging after ART initiation among the study participants. Prakash P et. al reported that 41.0% HIV-Infected children were in WHO clinical stage 1 and 17.9% were in stage 4 at registration. [11]

Mean CD4 count at registration was 373 cells/cubic mm (SD±316.27) and current mean CD4 count was 640 cells/cubic mm (SD±401.42) in the present study. This indicated the significant clinical improvement after ART Initiation. Out of 105 participants, 61 (55.6%) had suffered from any form of opportunistic infection. Out of these 61 participants, almost half (31) suffered from tuberculosis. Study conducted by Ferrand et al in 2010 reported 44% of the HIV Positive adolescents had suffered from tuberculosis.[12] Salhanda D. et al in a study conducted at Mangalore reported that Tuberculosis was the most common opportunistic infection [13]. BMI was calculated using Z-scores prepared by WHO for adolescents (10-19yrs). According to these scores, 14.5% participants were suffering from severe thinness and 14.5% were suffering from thinness & 36.2% participants were suffering from severe stunting and 16.4% were suffering from stunting. Swetha G et al. reported 46 (59.7%) HIV infected children were stunted, 36 (46.8%) were underweight and 15 (19.5%) had low BMI for age. [14] Ferrand et al. reported 73% HIV-infected adolescents suffering from thinness and 52% suffering from stunting. [12]

Table 3: Distribution of participants according to CD4 count and WHO staging

Variable	Categories	Frequency (%) n=105
1.WHO stage (**at registration**)	I II III IV	32(30.2) 34(32.1) 27(25.5) 12(11.3)2
2.WHO stage **(study period**)	I II III IV	99(93.4) 3(2.8) 2(1.9) 1(0.9)
3.CD4 Count (**at registration**)	Median number	280 cells/cumm (IQR: 169-527)
4.Cd4 Count (**study period**)	Median number	545 cells/cumm (IQR: 309-910)

The limitation of the study was the lack of baseline anthropometric measurements of the participants on registration; which was overcome by using Standardised age-specific scores for adolescents prepared by WHO for wasting and stunting.

Conclusion:

The anthropometric measurements suggest that nutrition aspect is not fully recovered after treatment, as majority of the participants suffer from stunting and wasting; stunting more than wasting indicating chronic malnutrition. Malnutrition and infections form a vicious cycle. It was observed in the study as almost half of participants had suffered from opportunistic infections even if on ART. This instigates the need for further research and interventions in the nutrition domain for the adolescents living with HIV so that they may live healthy and well-nourished lives.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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A study on Facility (Hospital) upkeep, hygiene promotion and Support services at Primary Health Centers of western Gujarat: Assessment of performance parameters by using Kayakalp tool

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Abstract:

Introduction: Primary Health Centre (PHC) is the cornerstone of preventive and promotive health care. Thus services provided at PHCs should be quality care and adequate care. To promote the same, GOI has started award giving based on performance of health facility under different themes. The present study was intended to have insight of the implementation status of swachhta guidelines (Kayakalp). **Objective:** To assess the Facility upkeep, Support services and Hygiene promotion at Primary Health centers of western Gujarat. **Method:** The cross sectional study carried out in 33 PHCs (universal sample) of Jamnagar district from 2017 to 2018. The assessment were done for following three categories: 1. Thematic Area 2. Criteria 3. Checkpoint. Under this study three thematic areas (from total 6), Hospital/Facility Upkeep, Support Services and Hygiene Promotion were covered. The data were obtained in present study in the terms of score for each variable. The score divided into up to 50%, 50%-70% and more than 70% then it was compared with different criterion under each theme and data were entered in Microsoft Excel version 2007. Data collection was done through Staff interview, Observations, patient Interview, Record review. Ethical clearance was taken from Institutional ethical committee before commencement of the study. **Results:** For criterion ; Maintenance of Open Areas, Facility Appearance, Infrastructure Maintenance, Illumination, water sanitation, pharmacy store, outreach services majority of health facilities obtained score >70%, whereas for Water conservation, pest & animal control, Laundry Services and Linen Management, Security services it was around 50%. Community Monitoring & Patient Participation & Information Education and Communication was observed average as per the criteria used. **Conclusion:** Half of the health facilities performed satisfactorily in work place management. Involvement of Local community and organization in monitoring and promoting cleanliness. poor performance was seen regarding water conservation like maintenance of Water supply system, the preventive measures which were taken to reduce wastage.

Key words: Facility upkeep, Quality of care, Health facilities

Introduction:

After the launch of "SWACHH BHARAT ABHIYAN (SBA)" on 2nd October 2014, "KAYAKALP" initiative was launched by the Ministry of Health & Family Welfare on 15th May 2015 to complement these efforts.[1]

Primary Health Centre (PHC) is the cornerstone of rural health services, a first port of call to a qualified doctor of the public sector in rural areas for the sick and those who directly report or referred from Sub-Centers for curative, preventive and promotive health care. Standards are the main driver for continuous improvements in quality.

Design characteristics of the hospital such as lighting, ventilation, supportive workplaces, proper layout, and maintenance of the exteriors and interiors can help to reduce errors and stress, and improve outcomes. Activities which are directed for proper

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maintenance of hospital upkeep enable health facilities to carry out the functions in a safe and secure environment.[1]

Support services in the hospital play a major role in ensuring that they provide the defined services in an efficient manner and also enable the other staff of the hospital to carry on the activities which are required for patient care delivery. An engaged and integrated support service team has significant effect on hospital services which allows patients to heal quicker, promotes a safer environment, and improves the satisfaction of staff, patients, and families. The contributions made by support service personnel in today's hospitals have become a crucial component to the organisation's success.[1]

Hospitals being an integral part of society, as social and medical organizations, provide plentiful opportunities for healthcare workers to interact with representatives from different sections of society in the form of patients, their attendants and visitors. Hence, health facilities are most suited for hygiene promotion and can play a pivotal role in hygiene promotion. Improving access to safe water and sanitation facilities leads to healthier families and communities. However, when people are also motivated to practice good hygiene, health benefits of the community are significantly increased. This could be through hand washing practices, cleaning practices, safe waste disposal methods and other good practices regarding hygiene and sanitation. The goal of hygiene promotion is to help people understand and develop good hygiene practices, so as to prevent diseases and promote positive attitudes towards cleanliness. Several community development activities can be used to achieve this goal, including education and learning programmes, encouraging community management of environmental health facilities, and social mobilisation and organisation. Hygiene promotion is not simply a matter of providing information. It is more a dialogue with communities about hygiene and related health problems to encourage and improved hygiene practices.[1]

Thus services provided at PHCs should be quality care and adequate care. To promote the same, GOI has started award giving based on performance of health facility under different themes under Kayakalp skim. Thus in present study was conducted to assess the 3 themes named Facility upkeep, Support services and Hygiene promotion at Primary Health centers of Jamnagar district, Gujarat.

Method:

It was a cross sectional study conducted at primary health centers of western Gujarat during 2017 to 2018, to evaluate health facilities in accordance with swachhta guidelines; drafted by Ministry of Health and Family Welfare, Government of India. There are 33 PHCs in study district. All PHCs were included in the study, thus universal sample of study district was undertaken. The study protocol was reviewed and ethical clearance was obtained from the Institutional Ethical Committee. Kayakalp is the major tool of the study to assess the PHCs in study district and in accordance with the available facilities prescribed by Ministry of Health and Family welfare, Government of India. All requirements of the assessment are arranged systematically at following three categories: 1. Thematic Area 2. Criteria 3. Checkpoint. (Reference) Under this study three thematic area such as Hospital/Facility Upkeep, Support Services and Hygiene Promotion were covered. The data were obtained in present study in the terms of score for each variable.[2] The score divided into up to 50%, 50%-70% and more than 70% then it was compared with different criterion.[2] under each theme. First theme was (A) Hospital/Facility Up keep and under which 10 criteria's were there, namely (A1) Pest & Animal Control, (A2) Landscaping & Gardening (A3) Maintenance of Open Areas (A4) Facility Appearance (A5) Infrastructure Maintenance (A6) Illumination (A7) Maintenance of Furniture & Fixture (A8) Removal of Junk Material (A9) Water Conservation (A10) Work Place Management. Second theme was (B) Hospital Support Services, under which 5 criteria namely (B1) Laundry Services and Linen Management(B2) Water Sanitation (B3) Kitchen Services(B4) Security Services (B5) Outsourced Services Management and third theme (C) Hygiene Promotion under which 5 criteria namely (C1) Community Monitoring & Patient Participation (C2) Information Education and Communication (C3) Leadership and Team work(C4) Training and Capacity Building(C5) Staff Hygiene and Dress Code.

The data were collected by principal investigator, using four assessment methods 1. Observations (OB):

Where information was gathered through direct observation e.g. Level of Cleanliness, Display of Protocols, Landscaping, Signage etc. 2. Staff Interview (SI): Information was gathered by inter acting the concerned staff to understand the current practices, competency, etc. such as steps in hand washing, method to clean floor, wearing gloves.3.Record Review (RR): Where information was extracted from the records available at the facility. Few examples are availability of filled-in Housekeeping checklist, culture report for microbial surveillance, minutes of meeting of infection control committee. 4. Patient Interview (PI): Some information was gathered by interacting the patients or their attendants e.g. counselling of patients on hygiene. Before data collection piloting was done. The principal investigator underwent training for data collection in the Institute itself & independently collected data from all the health facilities. Data were entered and analyzed by using Microsoft excel. The data obtained in present study were in the terms of score for each variable. The score divided into up to 50%,50%-70% and more than 70% then it was compared with different criterion under each theme, frequency of respective categories are mentioned.[2]

Table 1: Distribution of PHCs according to Hospital/Facility Upkeep (N=33)

% Score / Criterion	<=50%	50-70%	>70%
A1 Pest & Animal Control	**15**	**7**	**11**
A2 Landscaping & Gardening	**10**	**7**	**16**
A3 Maintenance of Open Areas	**4**	**6**	**23**
A4 Facility Appearance	**8**	**3**	**22**
A5 Infrastructure Maintenance	**5**	**4**	**24**
A6 Illumination	**6**	**4**	**23**
A7 Maintenance of Furniture & Fixture	**8**	**1**	**24**
A8 Removal of Junk Material	**12**	**5**	**16**
A9 Water Conservation	**15**	**8**	**10**
A10 Work Place Management	**10**	**6**	**17**

Results:

Majority of the PHCs, scored less than 70% in pest & animal control under this heading presence of stray animals in PHC premises, cattle trap at entrance, measures for pest control, measure for mosquito free environment like usage of mosquito nets by patients, availability of mosquito net, wire mesh in windows, water collection in PHC premises were checked. Sixteen PHCs have scored more than 70% in landscaping and gardening. Open areas were well maintained in most PHCs. Hospital appearance criteria like well plastered building, facility name display at entrance, absence of outdated posters were fulfilled by majority of PHCs. Infrastructure is well maintained and illumination was also adequate at utmost PHCs. Patient beds, mattresses, furniture at nursing station and offices also up to the mark in 24 health facility. Half of the facility scored less than 70% in junk material management. Out of 33 health facility 15 were not having adequate water conservation policy. Staff periodically sorting useful and unnecessary items at work station, arranging useful articles in systematic manner and work stations were found clean in most facility.

Laundry Services and Linen Management was adequate in 12 PHCs. Water Sanitation and pharmacy store management was satisfactory in majority of the PHCs. For security services almost 80% PHCs scored less than 50%. Outreach services were acceptable in about 70% PHCs as they scored more than 70% for

that particular variable.

Under the theme of hygiene promotion patient participation was found adequate in 15 PHCs. IEC and Team work was satisfactory in 14 PHCs. In majority of PHCs Training and Capacity Building was sufficient but under the criterion of Staff Hygiene and Dress Code high number of PHCs have shown Inadequate score.

Discussion:

Control measures of stray animals e.g. cattle traps were not available in many health facilities. Prevention of entry of stray animals is necessary to prevent animal bites and harms to patients. Pest control and mosquito control measures were not effectively implemented. Effective implementation of insect control measures can set an example in community for same practice at their home. Only 28.57% health facilities have scored more than 70% in pest and animal control. The annual estimated number of dog bites in India is 17.4 million, leading to estimated 18,000-20,000 cases of human rabies per year.[3] As rabies is not a notifiable disease in India and most deaths occur in rural areas where surveillance is poor, it is widely believed that this figure may be an underestimate.[4]

Maintenance of Front area, Parks, Open spaces, Internal Roads, Pathways, Herbal Garden was found good in about half of the health facilities and about one third health facilities were worst performing. Only 47.62% health facilities have scored more than 70% in landscaping and gardening. Good surrounding of health facilities improve aesthetic look as well as give pleasure to staff and patients.

Abandoned/dilapidated building and water logging was not found within the premises in more than two third of the health facilities. Around 66.67% health facilities have scored more than 70% in maintenance of open area. Water logging in health facility premises will lead to mosquito breeding sites and it may further increase the cross transmission of vector born disease among patients. Each species of vector has characteristic climatic requirements and

Vector competence for a given biotype of parasite.[5-8] This flags the need to keep each element of the disease triangle (Figure 1) in mind because the

Table 2: Distribution of PHCs according to Support Services (N=33)

% Score / Criterion	<=50%	50-70%	>70%
B1 Laundry Services and Linen Management	**13**	**8**	**12**
B2 Water Sanitation	**5**	**3**	**25**
B3 Pharmacy and store	**7**	**8**	**18**
B4 Security Services	**27**	**2**	**4**
B5 Outreach services	**6**	**4**	**23**

Table 3: Distribution of PHCs according to Hygiene Promotion (N=33)

% Score / Criterion	<=50%	50-70%	>70%
C1 Community Monitoring & Patient Participation	**13**	**5**	**15**
C2 Information Education and Communication	**16**	**3**	**14**
C3 Leadership and Team work	**13**	**6**	**14**
C4 Training and Capacity Building	**3**	**11**	**19**
C5 Staff Hygiene and Dress Code	**18**	**5**	**10**

climatic requirements of each vector-pathogen combination needs be taken into account in order to develop a realistic measure of risk.[8-10]

Similarly name of the health facility and signage were prominently displayed at appropriate places and walls were well plastered and painted in more than two third health facilities. Almost 71.43% health facilities have scored more than 70% in hospital appearance criteria. Good signage system is crucial for health facility visitor for way finding as well as this will be a time saver for patients and maintain the flux in health centre.

Around two third of health facilities have well maintained the Infrastructure, they have intact boundary wall and functional gates and adequate facility for parking of vehicles. Score in infrastructure maintenance was found more than 70% in 76.19% health facilities. The similar findings were correlated for the Kayakalp India data.[11]

All junk material stored in the hospital poses a potential fire risk and can lead to accumulation of pests in these areas. Policy regarding junk material and separate space for junk was not found adequate in more than half health facilities Only 26.19% health facilities have scored more than 70% in water conservation criteria. Salih H.M. Aljabre said having a policy and a set of procedures that regulate the handling of healthcare waste is essential for the implementation of an effective plan of management. The policy and procedure ought to take into consideration the peculiar setting of the hospital.[12]

Criteria regarding Stock (including reserve) of Linen, cleanliness and changing frequency of Bed-sheets and pillow Cover have low score. Scores regarding water sanitation and outreach services were favourable. Security services of hospitals are of cardinal component, being public dealing organisations PHCs are visited by hundreds of people every day. It is very difficult to anticipate the surly intentions of antisocial elements. It is also not easy to check visitors without offending their sentiments. A study by Darasingh et al. found Thirty four Percent of blanket covers were culture positive for pseudomonas (16.7%) and aerobic spores (17.3%). Surgeon gown (20%) and patient's suit (20%) showed positive culture for aerobic spores and Klebsiella respectively.[13] Collins et al, 1987, suggested that total counts on finished linen should not exceed one organism per 10cm2 on a regular basis. Similarly Walter and Schillinger[14] proposed that bacterial counts on processed linen of < 20 colony forming units /100 cm2 are equivalent to complete pathogen removal, and Christian et al[15] suggested that 106 – 107 reductions in viable bacteria would be effective in reducing risk of infection. However, at present no standards for maximum safe bacterial level exist.[16]

Around 40.48% health facilities have scored higher score in community monitoring and patient participation. Collective efforts for promoting the overall hygiene in hospital increase the accountability of society and staff in maintaining and promoting the cleanliness drive.

IEC regarding importance of maintaining hand hygiene, Swachhta Abhiyaan and use of toilets was not displayed in more than half of the health facilities. Score was more than 70% in 35.71% health facilities. IEC activities can provide people with the opportunity to develop their personal knowledge, skills and confidence and to reconsider their attitudes, beliefs and behaviour. It can increase awareness, provide information, persuade and motivate people to change behaviour. Score regarding Training and Capacity Building and Standardization was good in about half of the health facilities but Leadership and Team work score was found average or below average in more than half of the health facilities.

When all the criteria regarding Hygiene Promotion were combined, it is found that slightly more than one third of health facilities were scored satisfactorily. Only 42.42% PHCs and 33.33% PHCs have scored more than 70% score. Through hygiene promotion people can understand and develop good hygiene practices, so as to prevent diseases and promote positive attitudes towards cleanliness. In a study by Arogya foundation Jharkhand, It was observed that during the organization of activities in the school, poster and chart developed by AFI were displayed to convey the message on health and hygiene. So far as the students are concerned, considerable change in hygiene practice was observed. Hand washes after use of toilet and before meal was found in practice among 98.8% of the student respondents. Behavioral changes related to personal hygiene was observed and 79% of the respondents were found habitual in nail cutting etc. 98.8% of the student respondents were found accustomed with use of toilet.[17]

Conclusion:

Very poor performance was seen regarding water conservation like maintenance of water supply system, the preventive measures which were taken to reduce wastage and improve reuse of water and functional rain water harvesting system. Proper work place management optimizes the use of work place resources, minimizes risks, and increases productivity of employees. Half of the health facilities performed satisfactorily in work place management. Inefficient handling or processing of linen can present an infection risk both to staff and patients who subsequently use it. Scores regarding Pharmacy and store was average in health facilities. Involvement of Local community and organization in monitoring and promoting cleanliness, Patients Awareness about their responsibility of keeping the health facility clean and system to take feed-back from patients and visitors for maintaining the cleanliness of the facility was lacking in more than half of the health facilities.

Recommendations:

Measure to control stray animals should be implemented effectively. Many health centers in the study were lacking mosquito screening in windows so this should corrected with immediate effect. Larvivorous fish pond should be constructed in each and every health facility to cultivate this mosquito larvae eater fish. Maintenance of Front area, Parks, Open spaces, Internal Roads, Pathways, Herbal Garden should be done periodically. We must assign one staff who regularly inspects these all area and in case of any flaws he comes to know he must report to facility head. Facility head must have single check once a month in order to review the efforts of the assigned staff. The staff should be made conscious about junk policy of health facility and dedicated space should be in health centre for junk materials the staff should be sensitized periodically about available water conservation, as they are part of local community and can educate others only when they themselves had been sensitized enough. Water harvesting system should be installed in all health facilities. Different colored bed sheet can be used on alternate days or every day as feasible, to ensure regular change of linen on patient's bed. One of the health facilities during study was found to follow the same approach. One security guard must be available round the clock at health facilities. It is one of the crucial recommendation regarding crowd management and staff safety at health facilities. As we found during study that some health facilities had display message pertinent to sanitation on case paper. Similar concept should be followed by other health facilities too. We must promote active and representative participation to enable all community members to meaningfully influence the decision that affect sanitation and hygiene in health facilities. Engage community members in learning and understanding sanitation issues at health facilities, and the economical, social, environmental, psychological and other impact associated with these.

Declarations:

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Conflict of Interest: Nil

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Hospital Based Study among Glaucoma Patients to Assess Their Knowledge Regarding Various Aspects of Glaucoma

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Abstract:

Introduction: Glaucoma is a chronic condition and if not properly controlled will lead to blindness. So it is very important that patients on treatment for glaucoma should know about the course and outcome of the disease. Many patients stop the treatment because of treatment cost and also due to the prolonged treatment duration. **Objectives:** To find out the current level of knowledge of their disease among glaucoma patients attending a tertiary care hospital in south India. **Method:** It was a cross sectional hospital-based study. Study participants included already diagnosed patients attending glaucoma clinic. A structured validated pretested questionnaire was given to collect data. The questionnaire was given to 320 patients attending glaucoma clinic during their routine visit. Grading was done based on the percentage of questions answered. Data were analyzed with SPSS version 18; (SPSS Inc; Chicago, IL) **Results:** The mean age was 59.34 ± 8. 86years.Femaleswere more aware compared to males. Only 40% (108) of patients knew that glaucoma can cause blindness. Socioeconomic factors had significant association only with awareness of the disease. Educational status had significant association with awareness about the disease as well as the treatment received. Disease duration did not have any significant association with awareness about glaucoma. **Conclusion:** Determinants of knowledge about glaucoma in this study were female gender, higher socioeconomic status and higher educational levels. Even glaucoma patients who are on treatment for glaucoma did not have sufficient knowledge about their disease.

Keywords: Glaucoma ,Knowledge, South India

Introduction:

Glaucoma is a chronic progressive optic neuropathy that requires long term treatment and follow up. It is the second leading cause of blindness globally. The number of patients with open angle glaucoma is highest in Europe (23.9% of open angle glaucoma patients in the world) followed by china (18.9%) and then India (18.6%) in 2010.[1] By the year 2020 as per the model calculations the number of glaucoma patients will increase by about 20 million over the decade.[1] India will become the second largest country with glaucoma surpassing Europe by the year 2020.[1] Among those with glaucoma worldwide 74% are having open angle glaucoma and 26% angle closure glaucoma.[2] The asymptomatic nature of the disease along with irreversible blindness it causes makes it a major public health challenge. Early detection, prompt treatment and regular follow-up may prevent or arrest disease progression to some extent. Many patients present late due to lack of awareness about the disease and risk factors. In a study by Vijaya et al 90% of glaucoma patients were unaware of the disease.[3] Failure of awareness leads to late detection and affects the management in preventing blindness from the disease.

Method:

The study was conducted after getting ethical clearance from the Institutional Research and Ethics Committee. Our aim was to find out the current level of knowledge of the disease among glaucoma patients attending glaucoma clinic in a tertiary care hospital. It was a cross sectional hospital-based study. Study

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participants included patients attending glaucoma clinic whowere willing to participate in the study. The study period was three months from July-September 2019.

A structured validated pretested questionnaire was given to collect data and was filled by the interviewer as the patients gave their response. The questionnaire was given to 320 already diagnosed glaucoma patients on follow up. The questions were translated to the regional language Malayalam and then translated back to English. Demographics of the study subjects like age, gender, socioeconomic status and educational status were noted. Socioeconomic status was categorized as Above Poverty Line(APL) and Below Poverty Line (BPL) based on their status in their ration card. Mode of diagnosis of glaucoma and duration of the disease was also noted.

The questionnaire was divided into three parts. The first part evaluated the patient's knowledge about the disease, the second part evaluated the knowledge about the treatment and the third part evaluated the knowledge about the various risk factors of the disease. Knowledge was defined as the basic understanding of the disease and was graded based on the number of questions answered by the patient when more than one question was answered. If at least one question was answered then he or she is considered to have knowledge about it. Grading was done based on the percentage of questions answered. On answering 100% of questions excellent grade was given,75% good, 50% fair, 25% average and 0% poor grade. Data were analysed with SPSS version 18; (SPSS Inc; Chicago, IL) expressed as simple percentage and proportions. Chi square test was used to evaluate association between awareness / knowledge of glaucoma and demographics of study subjects. The odds ratio (OR) and 95% confidence interval (CI) were calculated to measure the association between variables. P value <0.005 was considered as statistically significant.

Results:

All the selected patients participated and the response rate was 100%.The response obtained from 270 patients with glaucoma were analysed (response rate -100%). Rest 50 were discarded as the information were not complete.

The mean age was 59.34 ± 8. 86 years. The minimum age was 20 years and maximum 78 years. Forty-three percentage of subjects were in the 61-70 years age group (n=116). Among the participants, 57.8 % (n=156) were females and 42.2% (n=114) were males. Females were more aware (57.3%, n=118)

Figure 1: Distribution of cases based on the type of glaucoma

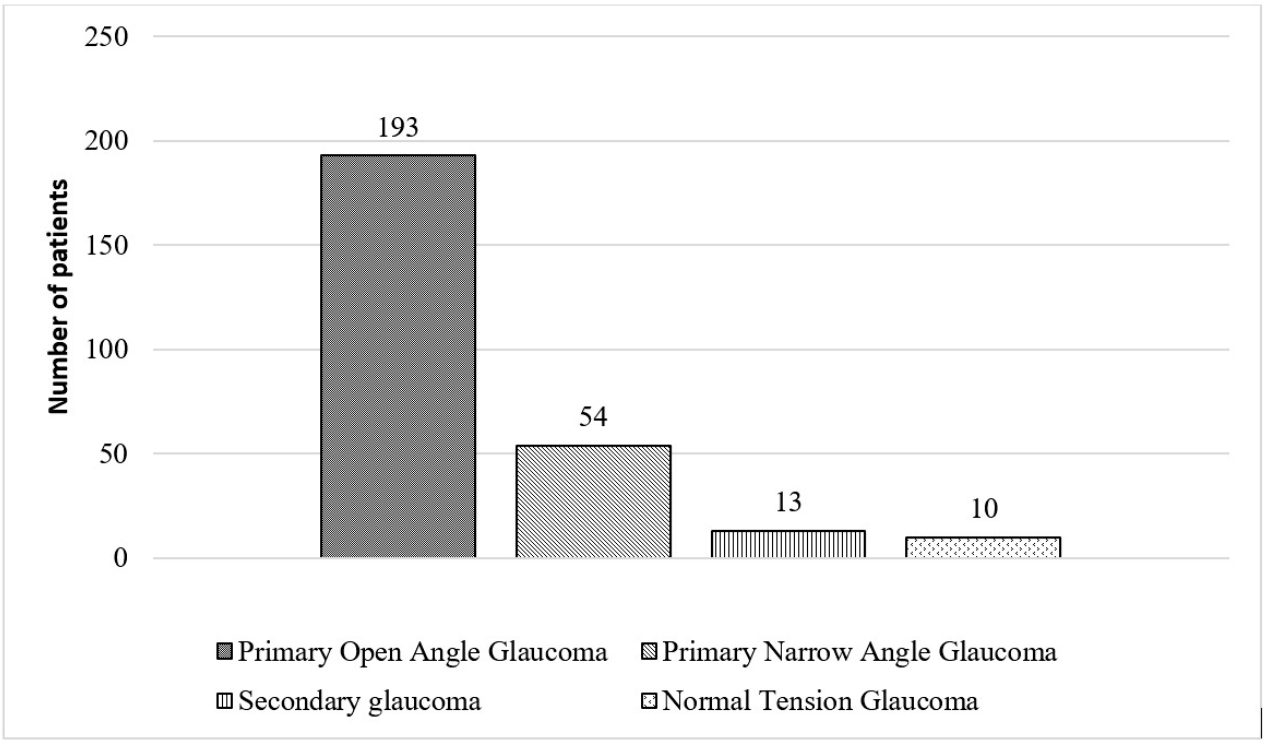


Table 1:Knowledge among study participants (n=270)*

SN	Knowledge about the disease	YES	
		n	%
1	Do you know that Glaucoma is asymptomatic	149	55.2%
2	Do you know that Glaucoma is slowly progressive	69.6%	188
3	Do you know that Glaucoma can cause blindness	108	40%
	Knowledge about the treatment		
1	Do you know that anti-glaucoma drugs decrease eye pressure	220	81.5%
2	Do you know that anti-glaucoma drugs don't increase vision	175	64.8%
3	Do you know that timing of drugs is important	164	60.7%
4	Do you know that Glaucoma requires lifelong treatment	168	62.2%
5	Do you know thatGlaucoma requires frequent follow up	152	56.3%
	Knowledge about the risk factors		
1	Do you know that Glaucoma has familial predisposition	111	41.1%
2	Do you know that Diabetes is a risk factor	75	27.8%
3	Do you know that Hypertension is a risk factor	44	16.3%
4	Do you know that Smoking is a risk factor	25	9.3%
5	Do you know that Ischemic heart disease is a risk factor	44	16.3%
6	Do you know that Steroid intake can predispose to glaucoma	23	8.5%

*Multiple responses

Table 2: Summary of knowledge about various aspects of Glaucoma among studyparticipants

Knowledge	Knowledge(n=270)			
	Yes		No	
	n	%	n	%
Knowledge about the disease	206	72.69%	64	23.7 %
Knowledge about treatment	254	94.1%	16	5.9%
Knowledge about risk factors	137	50.7%	133	49.3%

compared to males (42.7% n=88). Two hundred and thirty-one participants (93.7%) were undergraduates and rest 17(6.3%) were postgraduates. 76% of participants were in the above poverty line group (n=205) and 24% were in the below poverty ne group (n=65).

One hundred and eighty-four patients (68%) were diagnosed during routine eye check-up. Only Sixteen (5.9%) came to the outpatient department requesting for screening of glaucoma. Fifty-one (19%) patients were diagnosed after having severe visual loss. Nineteen patients (7%) were diagnosed during an eye camp.

Primary open angle glaucoma was seen in 193 patients (71.5%) primary narrow angle glaucoma in 54 patients (20%), secondary glaucoma in 13(4.8%) and

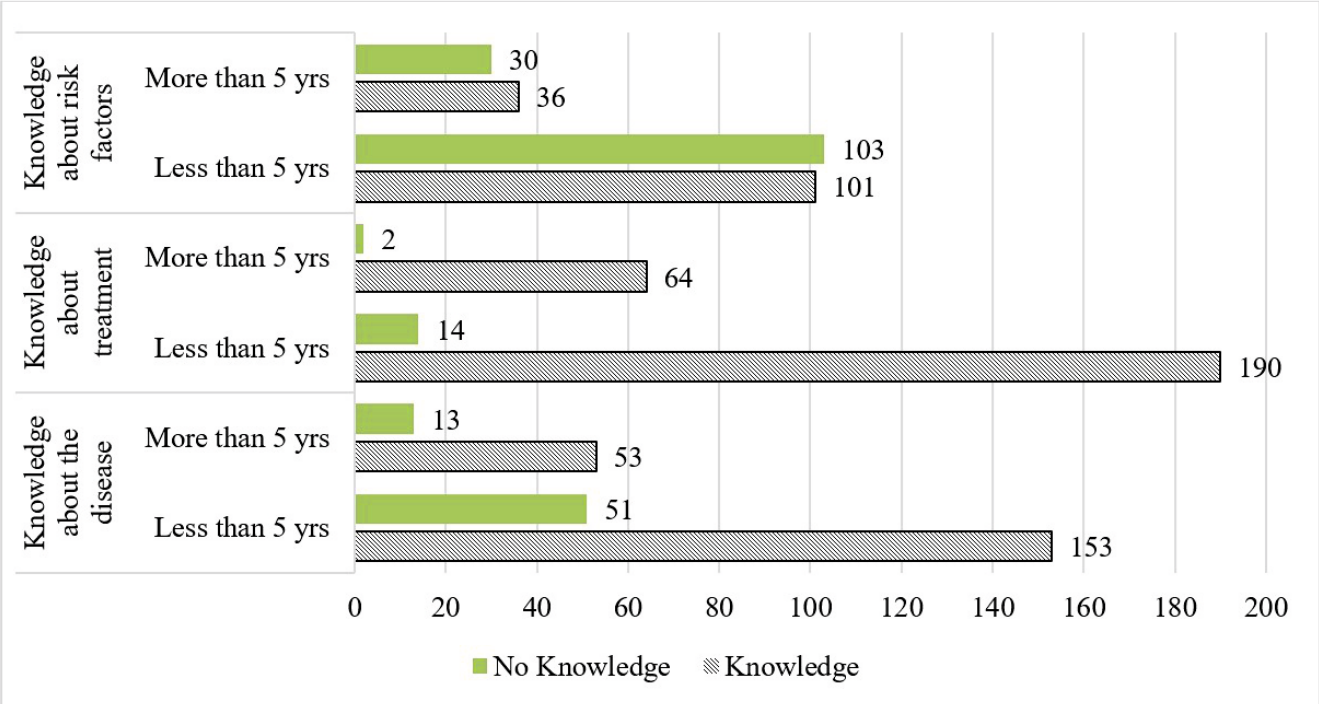
Table: 3 Frequency distribution ofKnowledgeof glaucoma based on socioeconomic factors

Knowledge		Socioeconomic status		OR	CI
		BPL*	APL#		
Knowledge about the disease	Knowledge	56 (86.2%)	150 (73.2%)	2.281	1.058-4.921
	No Knowledge	9 (13.8%)	55 (26.8%)		
Knowledge about the treatment	Knowledge	61 (93.8%)	193 (94.1%)	0.948	0.295-3.048
	No Knowledge	4 (6.2%)	12 (5.9%)		
Knowledge about risk factors	Knowledge	29 (44.6%)	108 (52.7%)	0.724	0.413-1.267
	No Knowledge	36 (55.4)	97 (47.3%)		

Table 4: Frequency distribution of Knowledge of glaucoma based on Educational factors

Knowledge		Educational statues		OR	CI
		Undergraduate	Postgraduate		
Knowledge about the disease	Knowledge	189 (74.7%)	17 (100)	0.917	0.881-0.956
	No Knowledge	64 (25.3%)	0 (0%)		
Knowledge about the treatment	Knowledge	237 (93.7%)	17 (100.0%)	0.933	0.903-0.964
	No Knowledge	16 (6.3%)	0 (0%)		
Knowledge about risk factors	Knowledge	125 (49.4%)	12 (70.6%)	0.407	0.139-1.189
	No Knowledge	128 (50.6%)	5 (29.4%)		

Figure 2: Knowledge of glaucoma based on Disease duration



normal tension glaucoma in 10 patients (3.7%). (Figure 1)

Only 40% (108) of patients knew that glaucoma can cause blindness. The asymptomatic nature of primary open glaucoma was known only to 149(55.2%) of patients and 188 patients (69.6%) knew that glaucoma has a slowly progressive course. The importance of timing of anti-glaucoma medications was aware only in 164 (60.7%) patients. Only 56.3% (152) of patients knew that glaucoma requires frequent follow up and 168 (62.2%) patients were aware that the treatment of glaucoma is life-long. Familial predisposition of glaucoma was known only to 41.1% of patients. Majority were unaware about the various risk factors of glaucoma. (Table 1)

Two hundred and fifty-four patients (94.1%) had some knowledge about various treatment aspects of glaucoma. But they were not much aware about the disease such as its course and progression and also less aware about the various risk factors.(Table 2)

Socioeconomic factors had significant association only with Knowledgeof the disease. Patients in the higher socioeconomic status were more knowledgeable about the disease when compared to those with lower socioeconomic status. No association was noted with Knowledge about the treatment or risk factors.(Table 3)

Educational status had significant association with Knowledge about the disease as well as the treatment receivedbut no association with Knowledgeabout the risk factors. Those who are more educated were more knowledgeable about glaucoma.(Table 4)

Disease duration did not have any significant association with Knowledgeabout glaucoma. Odds ratio for Knowledge was 0.736 (95% CI 0.317-1.4595), p value (0.24) Odds ratio for knowledge about risk factors was 0.817 (95% CI 0.468-1.426) p value (0.28) and that for treatment 0.424 (95% CI 0.094-1.917) with a p value (0.20).(Figure 2)

32.6% had good knowledge about the disease, 33% had excellent knowledge about treatment but majority that is 76% had poor knowledge about the risk factors. (Table 5)

Discussion:

In our study the awareness about the disease is 72.69% which is similar to a study by celebi AR et al in which awareness about glaucoma was 76% and another study by Nkum et al in which the awareness was 74%.[4,5]

Females were more aware compared to males in our study. Similar observation was noted by Tenkir A et.al, Sathyamangalam RV et al, Nkiru et al and Saw et al.[2,3,6,7] This may be either due to the fact that glaucoma is more common in females or they may be more careful about their health related issues as per Isawumi et al[8] Thapa et al noticed that males were more aware than females.[9]

In our study majority of glaucoma patients were diagnosed on routine eye check-up.Nonecame requesting for screening of glaucoma. This shows that the awareness of glaucoma among public is very low. Routine screening for glaucoma should be ensured for all patients after the age of forty. Song et.al[10] in his study investigated to know whether mass glaucoma screening using non mydriatic fundus camera was more useful in early detection of glaucoma compared to opportunistic case finding in a primary eye clinic. They found that mass screening definitely helped to diagnose early glaucoma.

Majority of participants knew that glaucoma is asymptomatic and slowly progressive. But only less than half of patients knew that their disease would cause blindness. De Gaulle et al[11] found that the knowledge that glaucoma can cause blindness was there in 99.1% of patients where as in our study it is only 40%. About 60% knew about the importance of timing of their medications and their effect on the disease but knowledge about the requirement of regular follow up was there only in 56%. This indicates the need for educating these patients as irregular or poor follow up may lead to progression of the disease. Only 40% or less had knowledge about the risk factors of glaucoma. Majority of the participants (58.9%) didn't know that glaucoma runs in families. This reduces the detection of glaucoma among family members. Risk of glaucoma after steroid intake was known only to 8.5% of participants. So, it is important for the treating physicians to inform the patients that those on long-term topical and systemic steroids are at a risk for developing glaucoma and that they should have proper eye check-up at regular intervals.

When overall grading of knowledge about glaucoma was done among study subjects, we found that even though majority of patients had knowledge about the treatment received, they had less knowledge about the course and prognosis of their

disease. Knowledge about risk factors was very poor. This indicates the need for educating all patients with glaucoma about their illness in detail which may be helpful in better disease control as well as screening and early detection of the disease

Socioeconomic factors had significant association only with awareness about the disease. Patients with higher socioeconomic status were more aware about the disease when compared to those with poor socioeconomic status, and this was statistically significant with a p value of 0.001. This could be due to the better access to health care as well as sources of information like newspaper, television and internet for these individuals.

Educational status had an important role in the awareness and knowledge about glaucoma in our study. All those with tertiary level of education were aware about glaucoma when compared to those with primary level of education (p value 0.002) and all of them had knowledge about the treatment they received (p value 0.005) .But the interesting finding noted was that even among educated patients there were people who did not know about the various risk factors of the disease .This may affect screening of relatives and early detection of glaucoma. A positive association between educational status and awareness was noted in other studies conducted by Sathyamangalam R et al, Celebi et al, Nkumet al and Rewri et al.[3,4,5,12] This indicates the lack of education about glaucoma among those who are at risk.

There were lesser odds of patients with glaucoma more than 5 years to be aware about the disease when compared to those less than 5 years. Disease duration did not have any significant association with knowledge about glaucoma treatment or risk factors. This finding is significant because it shows that even patients with long duration of glaucoma did not have sufficient knowledge about their illness which in turn may adversely affect their treatment and follow up.

Mbadugha CA et al in his study noticed that duration of disease was positively related to the awareness of glaucoma.[13] Positive family history, higher educational status and longer duration of disease was found to have positive association with awareness in a study conducted by Kizor-Akaraiwe et al[6] Rajendrababu et al[14] found that family screening for first degree relatives of glaucoma patients with glaucoma can really help in diagnosing those patients who are presently under diagnosed in the population.

Uma et al[15] noticed that the awareness about various aspects of glaucoma among medical and paramedical professionals were very low. Almost all medical persons were aware about glaucoma but majority didn't know that it causes damage to optic nerve.

Conclusion:

Factors affecting knowledge about glaucoma in this study were female gender, higher socioeconomic status and higher educational levels. Even glaucoma patients who are on treatment for glaucoma did not have sufficient knowledge about their disease especially the risk factors.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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A Descriptive Study to Assess Relationship between Body Fat Percentage and Obesity at a Tertiary Level Health Facility

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Abstract:

Introduction: The prevalence of obesity is increasing in Indian adults at alarming rate and causing high burden of chronic diseases due to relatively high Body Fat Percentage (BFP) compared to other ethnic groups. There is a dearth of studies on assessment of obesity by using BFP measurement. This study was undertaken to strength the reliability of BFP in assessment of obesity. **Objective:** To find out the relationship between body fat percentage and obesity among adults aged 18-59 years. **Method:** A total of 228 subjects were included in the study from the in-patients admitted to tertiary care hospital by systematic random sampling method. In the interview, socio-personal characteristics were collected using pre-tested, semi-structured questionnaire. Anthropometric measurements were conducted to calculate BMI based on Asia-Pacific classification and waist circumference based on International Diabetes Federation guidelines along with body fat percentage was measured using standard guidelines. The t- test, ANOVA and correlation was used to determine the relationship between obesity and BFP. **Results:** A significant association between Body Fat Percentage (BFP) and obesity measured by Body Mass Index (BMI) and Waist Circumference (WC) was observed across the categories and sex. Positive correlation was observed between BMI and waist circumference ($p<0.001$), BMI and body fat percentage ($P<0.001$) and waist circumference and body fat percentage ($P<0.001$). **Conclusion:** The study shown significant association and positive correlation between body fat percentage and obesity measured by BMI and waist circumference at lower cut-off among Indian adults indicating BFP is a reliable measure for assessment of obesity.

Key words: Anthropometry, Body fat percentage, Body mass Index, Obesity, Waist circumference.

Introduction:

Obesity is an accumulation of excess fat which may leads to impairment of health and reduction in life expectancy.[1] Global Burden of Disease (GBD) study estimated that number of obese individuals has increased from 921 million in 1980 to 2.1 billion in 2013.Globally, obesity leading to 3.4 million deaths and 3.8% of Disability Adjusted Life Years annually. The global obesity prevalence is predicted to reach 18% in men and over 21% in women by 2025 indicating obesity is a major public health concern in the world.[2-3]

In India, NFHS – 4 (2015-16) shown that the prevalence of obesity was 19.6% in men and 20.7% in women and prevalence is doubled in the past 15 years. The reason behind rapid increase in the prevalence is mainly due to modern lifestyle such as increase in sedentariness and consumption of energy rich food.[4]

It is clear that obesity plays a major role in causing chronic diseases such as type II diabetes mellitus,

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hypertension, dyslipidemia, cancers and related cardiometabolic complications and the cost of medical care for obese patients is 30% higher compared to normal weight peers.[5]

The evidence shows that South Asians (Indians) are having relatively high body fat percentage (BFP), lesser lean muscle and skeletal mass compared to other ethric groups and prone for relatively higher risk of cardiovascular complications and premature death at lower cut-off for body mass index and waist circumference.[6]

Majority of the studies in obesity used indirect measures of fat mass in the body such as BMI and waist circumference. Whereas, body fat percentage measurement using bio-electrical analysis is a simple, quick and non-invasive method for assessment of fat mass in defining obesity and finding the relationship between obesity and BFP will definitely strength the reliability of BFP in assessment obesity.[7]

In the Indian adults, published data on relationship of BFP with obesity is limited. Such study act as a guidepost for future studies on assessment of obesity based on BFP. Because, the burden of obesity in India is increasing at faster rate compare to world average and needs urgent attention. In this context, the present study was undertaken to investigate the relationship between body fat percentage and obesity based on BMI and waist circumference

Method:

The present descriptive study was undertaken in a medical college hospital, Kempegowda Institute of Medical Sciences Hospital and Research Centre (KIMSH&RC) at Bengaluru by involving 228 adult in-patients (18 years to 59 years) from September to November 2016.

After obtaining institutional ethics committee clearance, study subjects were enrolled from the department of medicine by using systematic random sampling technique where every 5th ambulatory in-patient willing to participate were included and seriously ill patients were excluded. The sample of 228 was arrived at by considering prevalence of 17.17% with absolute precision of 5% and 95% confidence limits using the formula $n = 4\,pq/L^2$.[8]

The interview method was used to collect data on socio-personal characteristics by using a pre-tested, semi-structured questionnaire after obtaining informed written consent from the subjects. Assessment of anthropometric measurements such as height, weight, waist circumference and percentage body fat were conducted using standard procedures and guidelines by trained medical investigator. The generalised obesity was assessed by using BMI based on WHO Asia-Pacific guidelines (overweight >23kg/m²and obesity >25 kg/m²) and an International Diabetes Federation (IDF) guideline was adopted to assess central obesity (>90 cm for males and >80 cm for females).[9]

Body fat percentage was assessed by using Bio-electrical impedance analysis (BIA) method. In this method, body fat percentage was calculated by feeding details such as age, sex and height of each subject into the instrument OMRON body fat monitor (HBF – 306) by undertaking required precautions.[10]

The data was analysed using SPSS version 21.0, IBM Corp, Armonk, NY, USA. The ANOVA and t test were used to compare mean body fat percentage among different groups of BMI and WC. The t-test was used to compare mean body fat percentage of both sex with their BMI and waist circumference and correlation was used to find out the relationship between BMI, waist circumference and body fat percentage.

Results:

Out of 228 study subjects, 130 (57%) were males and 98 (43%) were females. The mean age of the study population was 36.9±13 years, mean BMI and waist circumference was 23.8 ±4.7 kg/m2and 83.1±10.2 cm. Mean body fat percentage was 30.2±7.9. (Table 1)

Table 1: Baseline information of study subjects

Variable	Mean ± SD	
	Men	Women
Age (years)	37.4±7.2	36.1±5.7
Height (cm)	167±6.6	160±4.5
Weight (kg)	67.4±5.7	59.9±5.6
BMI (kg/m2)	24.1± 4.7	23.3±4.4
Waist circumference (cm)	85.0± 6.2	79.5±5.3
Percentage body fat	29.6± 4.9	31.0±5.1

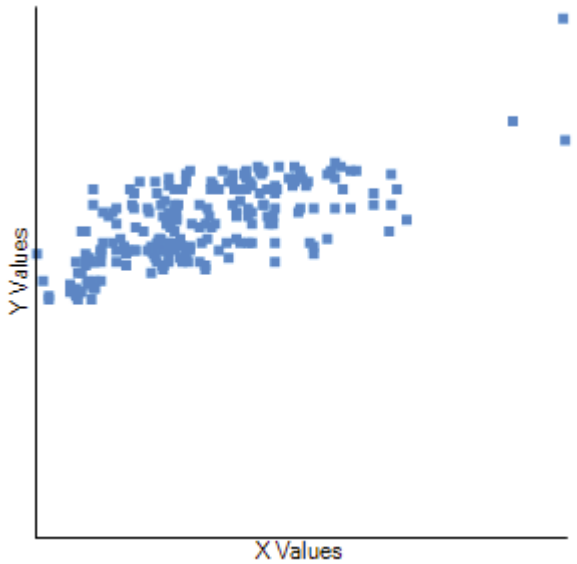
The mean body fat percentage was significantly higher across the categories of BMI and mean values were increasing with increase in BMI among subjects ($F=87.7$, $p<0.01$). Similarly, BFP was significantly

Table 2: Comparison of mean body fat percentage values across different BMI and WC categorise

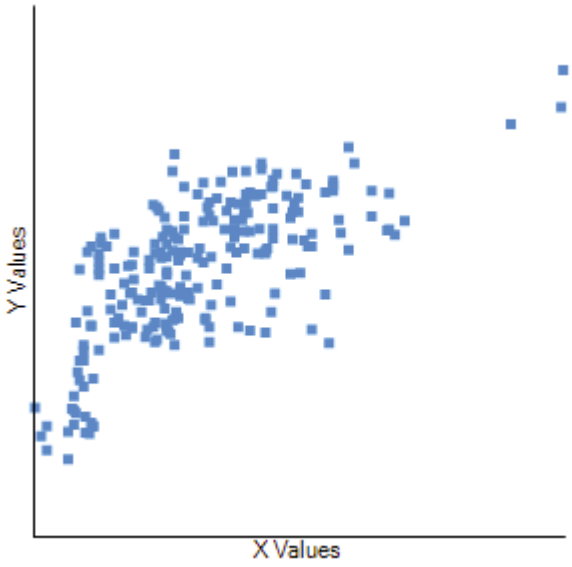
Variable	n (%)	BFP (Mean±SD)	F value/t-value	p-value
Generalized obesity (BMI)				
Underweight	33 (14.5)	18.1± 6.8	**F (one way ANOVA) =87.7**	**p<0.01**
Normal	89 (39.0)	28.9± 4.7		
Overweight	23 (10.1)	32.3± 5.4		
Obesity	83 (36.4)	35.8 ± 5.5		
Central obesity (WC)				
Obese	99 (43.4)	35.1±5.8	**t (independent t- test)=9.6**	**p<0.001**
Non-Obese	129 (56.6)	26.5±7.3		

Table 3: Gender distribution of generalised obesity, central obesity and body fat percentage

Variable		Male (n=83)				Female (n=146)			
		n	Mean+SD	t-value	p-value	N	Mean+SD	t-value	p-value
Generalized obesity	Present	70 (53.9)	34.0+ 5.2	**9.2**	**p< 0.001**	36 (36.7)	37.2+ 5.9	6.6	**p<0.001**
	Absent	60 (46.2)	24.5 + 6.5			62 (63.3)	27.5 + 7.5		
		Males (n= 130)				**Females (n= 98)**			
Central obesity	Present	71 (54.6)	34.1 + 5.1	**7.5**	**p<0.001**	58 (59.2)	36.5+ 6.4	6.3	**p<0.001**
	Absent	59 (45.4)	25.9+ 7.1			40 (40.8)	27.3+ 7.5		

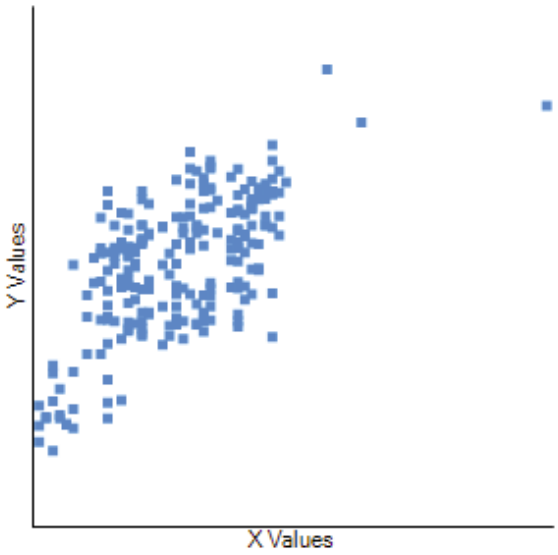


Graph 1: Correlation between BMI and Waist circumference (X axis - BMI and Y axis - Waist circumference)



Graph 2: Correlation between BMI and body fat percentage (X axis - BMI and Y axis - body fat percentage)

higher among subjects with central obesity compare to those without central obesity (t=9.6, p<0.001). (Table 2)



Graph 3: Correlation between Waist circumference and body fat percentage (X axis - Waist circumference and Y axis - body fat percentage)

Body fat percentage (BFP) was significantly higher among subjects with generalised obesity compared to normal subjects among males (t=9.2, P<0.001) and females (t=6.6, P<0.001). Similarly, BFP was significantly higher among subjects with central obesity compared to normal subjects among males (t=7.5, P<0.001) and females (t=6.3, P<0.001) (Table 3).

The present study observed moderate positive correlation of BMI with waist circumference (r=0.68, p<0.001), BMI with body fat percentage (r=0.69, P<0.001) and waist circumference with body fat percentage (r=0.64, P<0.001). All these were found to be statistically significant (Figures 1, 2 and 3).

Discussion:

Obesity is a serious concern due to its involvement in causing high cardiovascular morbidity and mortality among Indian adults. Hence, present study was aimed to investigate relationship between body fat percentage and obesity in Indian adults. So that obesity can be measured accurately by using body fat percentage.

The present study observed that the mean body fat percentage was significantly higher across the categories of BMI among adult subjects. This is consistent with previous study by Liang X in Chinese population.[11] This indicate that as BMI increases there is a proportional increase in the mean body fat percentage. Similarly, mean body fat percentage was significantly higher among subjects with central obesity. This could be due to more number of subjects having combined obesity (both generalised and central obesity) in the study which can increase the future risk of adverse metabolic and cardiovascular events. This need to be addressed in further studies.

In both sex, BFP was significantly higher in both generalised and central obesity. Particularly in women BFP was higher compared to men. Similar finding were noticed in study undertaken by Akindele MO and Amin F.[12,13] These observations support that BFP increases with increase in BMI and waist circumference in both sex. Hence, BFP can be used for the assessment of obesity.

In this study BMI, waist circumference and BFP were all shown positive correlation with each other. Similarly, Okafor I C et al and Ranasinghe C observed correlation of BMI with WC and BFP and, Kim H C observed correlation between WC and BFP. [14,1,15]All these evidences strengthen the relationship between body fat percentage and obesity. Hence, body fat percentage can be used to assess obesity in resource limited settings and epidemiological studies.

This study was limited by small sample size and lack of generalization of results. All the measurements were undertaken by trained medical professional and use of simple and reliable bioelectrical impudence analysis (BIA) for the measurement of BFP after taking required precautions are the potential strengths.

Conclusion:

In Indian adults, significant association of BFP and obesity was found across the categories and sex. Positive correlation was observed between body fat percentage with BMI and waist circumference at lower cut-off, thus indicating relationship between BFP and obesity. Hence, BFP is a reliable measure of obesity.

Recommendations:

The present study recommends that the body fat percentage is suitable for assessment of obesity among Indian adults and calls for similar research in different settings by involving large sample to confirm the study findings.

Declaration:
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Conflict of Interest: Nil

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Prevalence of Reproductive Tract Infections/Sexually Transmitted Infections among Rural Married Women – A Community Based Study Using Syndromic Approach

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Abstract:

Introduction: Reproductive Tract Infections (RTIs) and Sexually transmitted infections (STIs) continue to be a major public health problem and affecting women's health. **Objectives:** To estimate the prevalence of RTIs/STIs among married women aged 18-49 years in rural areas and to determine the factors associated with these conditions. **Method**: A community-based cross-sectional study was carried out among 308 eligible married women aged 18-49 years in rural areas in District Sonipat, Haryana using the WHO-Syndromic Approach for diagnosis of RTIs/STIs. **Results:** The mean age of study subjects in our study was 32.1 years (SD = ± 8.3 years) with a range from 18 to 49 years. The overall RTIs/STIs prevalence was 49.3%. The most frequent symptom was vaginal discharge (55.3%) followed by pain during micturition (34.2%), dyspareunia (26.9%), pain lower abdomen (24.3%) and vulval itching (16.4%). RTI/STI symptoms were found significantly more among women who had history of any chronic disease, who had irregular menstrual cycles, used cloths as sanitary pads and among those whose husbands were substance users. **Conclusion:** This study revealed a high prevalence (49.3%) of RTIs/STIs. Awareness about symptoms of RTIs, menstrual and personnel hygiene, raising literacy level of women, drive against use of addictive substances etc. by husbands is needed for control and prevention of RTIs. Primary health care services in respect of reproductive health should be strengthened and raising awareness among women about reproductive health issues through suitable communication strategies in order to bring about a positive behavior change for effective control of STIs.

Key Words: Reproductive Tract Infection, Risk Factor, Sexually Transmitted Infection.

Introduction:

Reproductive Tract Infections (RTIs) affecting the reproductive tract can be endogenous infections (resulting from the organisms normally existing in the vagina), iatrogenic infections (resulting from abortions, insertion of IUD, child birth, and so on), and sexually transmitted infections (STIs).[1] Despite the medical ability to cure RTIs/STIs, these continue to be a major health problem worldwide. The STIs spread from one person to another by sexual contact and can cause pain, infertility and even death if not treated timely and have a profound impact on sexual and reproductive health. More than one million STIs are acquired every day. In 2016, World Health Organization (WHO) estimated 376 million new infections with one of four STIs: chlamydia (127 million), gonorrhoea (87 million), syphilis (6.3 million) and trichomoniasis (156 million).[2,3]

In India, around 6% of the adult population has one or more STIs/RTIs which amounts to the occurrence of about 30–35 million episodes of STIs/RTIs every year.[4] The prevalence of self-reported RTI symptoms among Indian women has been found to be 11-18% in nationally representative studies.[5,6] The RTIs have become a silent epidemic that devastates women's lives. These include post-abortal and puerperal sepsis, ectopic pregnancy, fetal and perinatal death, and infertility; it also increases the risk of acquiring and transmitting human immunodeficiency virus (HIV) infection, chronic lower abdominal pain, emotional

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distress, social rejection of women. Some of the RTIs act as precursors for cancer cervix as reported in different studies, and thus may require prompt treatment.[7] The factors that contribute directly or indirectly to the high incidence of RTIs/STIs include urbanization, unemployment, poverty, illiteracy, no use of sanitary pad and large number of people in sexually active age group.[8]

The global STI strategy, endorsed by the World Health Assembly in 2016 aims to end STIs as a public health threat by 2030.[9] Thus, appropriate RTIs/STIs diagnosis and treatment is crucial to prevent the transmission and sequelae of untreated infection. In resource-constrained settings, etiological diagnosis of STIs remains difficult due to limited access to laboratory diagnostics to guide appropriate treatment.[10] To improve diagnosis and treatment, syndromic case management was introduced by WHO in 1984 and continues to be used as the standard of care by many countries, especially resource-constrained ones.[11] Syndromic management is based on the identification of consistent groups of symptoms and easily recognized signs and treatment that will deal with most, or the most serious, organisms responsible for producing the syndrome.[12] The aim of STI/RTI syndromic approach is to identify the syndrome correctly and manage them accordingly. This is important because mixed infections occur frequently in STI/RTI.[4] Besides, syndromic management of STI/RTI can effectively treat cases in settings with limited or no laboratory facilities.

More than 30 different bacteria, viruses and parasites are known to be transmitted through sexual contact.[13] But, such microbiological spectrum of STIs is not of much practical importance due to lack of facilities to establish the same in rural areas. Hence, syndromic approach is more feasible practically. Eventually, in this background, the present study was planned.

Objectives:

- To estimate the prevalence of RTIs/STIs among married women aged 18-49 years in rural areas of Sonipat District.
- To determine the factors associated with these conditions among the study subjects.

Method:

Study settings: This Community-based cross-sectional study was conducted from July to October 2019 in Khanpur Kalan village having 14 Anganwadi centres (AWCs) under Primary Health Centre (PHC), Khanpur Kalan, which is a rural field practice area of Department of Community Medicine, Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan. Health workers and Anganwadi workers supported this study in contacting and motivating the study population.

Study population: Married women of 18-49 years age group of the area were the participants. From all the Anganwadi centres, names and addresses of all eligible study participants were noted from the survey register maintained by respective health workers and Anganwadi workers. The population of Khanpur Kalan village is 10334 with 1722 Households.

Inclusion criteria- Married women of age group of 18-49 years resident of Khanpur village and were willing to participate in the study.

Exclusion criteria- Pregnant female, women of age less than 18 years, more than 49 years, women with severe diseases and mental illness were excluded from the study.

Sample size: Taking the prevalence (p) of STIs by 23% among women aged 18-49 years in Haryana (National Family Health Survey-4, 2015-16), 5% absolute precision (L), a 95% confidence level (Z) using the formula $n = [(Z^2 * p * q) / L^2]$, where q=1-p. The estimated sample size was 272. Expecting 10% non-response rate, the total number of study participants was 308.

Sampling Methodology: Stratified random sampling method was adopted. First of all, total enumeration and enlisting of married women aged 18 to 49 years was prepared for each of all 14 AWCs of village Khanpur Kalan. These lists served as sampling frame for each AWC. Then, by simple random sampling, 22 participants were selected from each of the sampling frame of each AWC and thus a total sample of 14 x 22 =308 was taken. If the selected participant came in exclusion criteria, then women preceding in sampling frame was selected. If that too came in exclusion, then succeeding women was selected for study.

Data collection: Before data collection, every respondent was explained about the objectives, procedures and confidentiality of the information obtained from them and informed consent was

obtained from all participants. A pretested semi-structured schedule was used to interview the women about their socio-demographic, irregularity of periods (if variation beyond normal range of 21-35 days), reproductive history, history of any chronic diseases like diabetes, cancer, cardiovascular diseases; substance use like alcohol, tobacco, psychoactive drugs; current and past RTI symptoms. The syndromes related to RTI as recommended by Government of India, Ministry of Health and Family Welfare, for management of RTIs/STDs were considered. Respondents were asked about their main occupation and categorized as housewife, skilled (jobs that required training), semi-skilled (jobs that required some training), and unskilled worker (jobs that did not require training). Respondent was also asked about their husband's occupation and categorized as above except the category as housewife. However, in husband occupation, extra groups were added for those who were professional (white collar), semi-professional (jobs required post-high school education) and unemployed irrespective of education level. Social class was determined using modified BG Prasad Socio-economic Classification according to the All India consumer price index (AICPI) of October 2019. [14]

Data management and analysis: Using statistical software R, version 3.6.2, the analyses were done. The descriptive statistics was computed and the results were described in terms of mean and standard deviation for continuous variables and for categorical variables data was presented in form of frequency and proportion. Chi Square test and Crude Odds Ratio (COR) with 95% Confidence Interval (CI) and P value were calculated. Next, bivariate logistic regression was performed and variables with $p < 0.25$ were transported to multivariable logistic regression to identify the significant factors associated with RTIs and STIs among participants. To conclude, Adjusted Odds Ratio (AOR) with 95% CI was calculated and P-value <0.05 was considered statistically significant.

Ethical consideration

Due permission was obtained from the institutional ethics committee. Informed verbal consent from the participants was obtained after explaining the purpose and procedure of the study.

Results:

A total of 308 women were interviewed for collection of data. The mean age of study subjects in our study was 32.1 years (SD = ± 8.3 years) with a range from 18 to 49 years. About half 152 (49.3%) of the study subjects had at least one or more symptoms of RTI/STI. The most frequent symptoms among them were vaginal discharge (55.3 %) followed by pain during micturition (34.2%), dyspareunia (26.9%), lower abdominal pain (24.3%) and vulval itching (16.4%). The least common symptoms were perianal pain (5.3%), inguinal swelling and genital ulcer (3.3%) each (Table 1).

Table 1: Symptom wise distribution of symptomatic study subjects (n = 152)

Symptoms*	Frequency	Percentage
Pain during urination	52	34.2
Vaginal discharge	84	55.3
Pain in lower abdomen	37	24.3
Inguinal swelling	5	3.3
Vulval itching	25	16.4
Perianal pain	8	5.3
Pain during sexual intercourse	41	26.9
Anal discharge	0	0
Genital ulcer	5	3.3

*Multiple response question (each percentage taken out of 152)

Table 2 shows the socio-demographic characteristics and their association with RTIs/STIs among the participants. The symptoms of RTIs/STIs were maximum in the extreme age groups, but the association of age with RTI/STI symptoms was statistically insignificant. The prevalence of RTIs/STIs symptoms was 54.2% in Schedule Caste (SC) which declined to 48.1% in Other Backward Class (OBC) and to 47.8% in Others category, but this decline was not significant. Almost half of the study subjects with two or more living children had symptoms of RTIs/STIs. The prevalence of RTIs/STIs in women with one child was 43.1% and in women with no living children was 42.3%. The unskilled workers and housewives had insignificantly more symptoms of RTIs/STIs as compared to semi-skilled and skilled workers. The

Table 2: Socio demographic characteristics and their association with RTIs/STIs among the study subjects

Characteristics	Symptoms of RTIs/STIs		Total(n=308)	Statistical tests
	Present (n=152)	Absent (n=156)		
	No. (%)	No. (%)		
Age group (years)				
<20	5 (62.5)	3 (37.5)	8 (2.6)	χ2=2.16,
20-29	64 (45.7)	76 (54.3)	140 (45.4)	df=3,
30-39	43 (49.4)	44 (50.6)	87 (28.3)	p=0.540
40-49	40 (54.8)	33 (45.2)	73 (23.7)	
Category				
Scheduled Caste	39 (54.2)	33 (45.8)	72 (23.4)	χ2=0.87,
Other Backward Class	25 (48.1)	27 (51.9)	52 (16.9)	df =2,
Others	88 (47.8)	96 (52.2)	184 (59.7)	p = 0.646
Parity				
Nil	11 (42.3)	15 (57.7)	26 (8.4)	χ2=2.43,
One	31 (43.1)	41 (56.9)	72 (23.4)	df=3
Two	70 (52.2)	64 (47.8)	134 (43.5)	p=0.488
Three or more	40 (52.6)	36 (47.4)	76 (24.7)	
Occupation				
Housewife	138 (50.4)	136 (49.6)	274 (88.9)	χ2=7.71,
Unskilled	8 (57.6)	6 (42.9)	14 (4.5)	df=3,
Semi-skilled	1 (16.7)	5 (83.3)	6 (1.9)	p=0.103
Skilled and others	5 (35.7)	9 (64.3)	14 (4.5)	
Socio-economic status				
Upper	2 (28.6)	5 (71.4)	7 (2.3)	χ2=2.42,
Upper middle	119 (48.6)	126 (51.4)	245 (79.5)	df=3,
Lower middle	27 (54.0)	23 (46.0)	50 (16.3)	p=0.490
Upper lower	4 (66.7)	2 (33.3)	6 (1.9)	
Literacy				
Illiterate	11 (52.4)	10 (47.6)	21 (6.8)	χ2=22.05,
Primary school	16 (76.2)	5 (23.8)	21 (6.8)	df=4,
Middle school	28 (68.3)	13 (31.7)	41 (13.3)	p=0.001
High school	80 (48.2)	86 (51.8)	166 (53.9)	
10+2 and above	17 (28.8)	42 (71.2)	59 (19.2)	
Type of family				χ2=2.47,
Nuclear	52 (43.7)	67 (56.3)	119 (38.6)	df=1,
Joint	100 (52.9)	89 (47.1)	189 (61.4)	p=0.115

symptoms of RTIs/STIs were more in subjects with primary and middle school education which decreased significantly as the educational status increased. More than half (52.9%) of the subjects of joint family were having RTIs/STIs, while it was in 43.7% subjects of nuclear family.

In Table 3, findings show the risk factors and their associations with RTIs/STIs among the study subjects.

Table 3: Risk factors and their associations with RTIs/STIs among the study subjects

Characteristics	Symptoms of RTIs/STIs		Total (n=308)	Statistical tests
	Present (n=152)	Absent (n=156)		
	No (%)	No (%)		
History of chronic disease				
Present	27 (69.2)	12 (30.8)	39 (12.7)	χ2=7.06, df=1, p=0.008
Absent	125 (46.5)	144 (53.5)	269 (87.3)	
Regularity of periods				
Regular	106 (41.7)	148 (58.3)	254 (82.5)	χ2=33.63, df=1, p=0.001
Irregular	46 (85.2)	8 (14.8)	54 (17.5)	
Use of sanitary pad				
Yes	92 (41.6)	129 (58.9)	221 (71.8)	χ2=18.63, df=1, p=0.001
No (clothes)	60 (69.0)	27 (31.0)	87 (28.2)	
History of abortion				
Yes	25 (54.3)	21 (45.7)	46 (14.9)	χ2=0.54, df=1, p=0.462
No	127 (48.5)	135 (51.5)	262 (85.1)	
Place of delivery				
Institutional	80 (45.5)	96 (54.5)	176 (57.1)	χ2=4.4, df=2, p=0.1
Home	61 (57.5)	45 (42.5)	106 (34.4)	
No delivery	11 (42.3)	15 (57.7)	26 (8.5)	
Occupation of husband				
Unemployed	8 (72.7)	3 (27.3)	11 (3.6)	χ2=13.78, df=4, p=0.008
Unskilled worker	27 (54.0)	23 (46.0)	50 (16.2)	
Semi-skilled worker	82 (55.8)	65 (44.2)	147 (47.7)	
Skilled worker	24 (36.9)	41 (63.1)	65 (21.1)	
Semi-professional & professional	11 (31.4)	24 (66.6)	35 (11.4)	
Previous history of RTI				
Yes	31 (72.1)	12 (27.9)	43 (13.9)	χ2=10.34, df=1, p=0.001
No	121 (45.7)	144 (54.3)	265 (86.1)	
Substance use by husband				
Yes	91 (53.8)	75 (44.4)	169 (54.9)	χ2=5.89, df=1, p=0.01
No	61 (43.8)	81(58.3)	139 (45.1)	

There existed statistically significant higher symptoms (69.2%) of RTIs/STIs in women with history of any chronic disease as compared to 46.5% in those who had no history. There was higher prevalence (85.2%) of RTIs/STIs in women with irregular periods as compared to (41.7%) in those who had regular periods (p=0.001). It was observed that the practice of using ordinary cloth during menstruation significantly associated to higher prevalence of RTI among study subjects. Maximum prevalence of RTIs/STIs was seen in subject with history of abortion (54.3%). There was statistically insignificant difference in prevalence of RTIs/STIs among study subjects with history of home deliveries (57.5%) in comparison to institutional deliveries (45.5 %). Prevalence of RTIs/STIs was highest (72.75%) in those women whose husbands

Table 4: Determinants of RTI/STI among study subjects (n=308)

Characteristics	Symptoms of RTIs/STIs		Unadjusted OR (95%CI)	P value	Adjusted OR (95%CI)	P value
	Present (n=152)	Absent (n=156)				
	No (%)	No (%)				
Occupation						
Housewife	138 (50.4)	136 (49.6)	1.82 (0.59-5.59)	0.29	1.06 (0.28-3.89)	0.93
Unskilled	8 (57.6)	6 (42.9)	2.40 (0.52-10.9)	0.25	1.51 (0.23-9.74	0.65
Semi-skilled	1 (16.7)	5 (83.3)	0.36 (0.03-4.00)	0.40	0.26 (0.02-3.42)	0.30
Skilled and others	5 (35.7)	9 (64.3)	1		1	
Literacy						
Illiterate	11 (52.4)	10 (47.6)	2.71 (0.97-7.57)	0.056	1.58 (0.28-4.71)	0.83
Primary school	16 (76.2)	5 (23.8)	7.90 (2.50-25.0)	0.001	3.69 (0.88-15.42)	0.07
Middle school	28 (68,3)	13 (31.7)	5.32 (2.2312.6)	0.001	3.56 (1.17-10.87)	0.02
High school	80 (48.2)	86 (51.8)	2.29 (1.21-4.36)	0.01	1.99 (0.91-4.38)	0.08
10+2 and above	17 (28.8)	42 (71.2)	1		1	
Type of family						
Joint	100 (52.9)	89 (47.1)	1.44 (0.91-2.29)	0.11	1.59 (0.88-2.88)	0.12
Nuclear	52 (43.7)	67 (56.3)	1		1	
History of chronic disease						
Present	27(69.2)	12 (30.8)	2.59 (1.26-5.3)	0.01	1.02 (0.87-4.6)	0.10
Absent	125 (46.5)	144 (53.5)	1		1	
Regularity of periods						
Irregular	46 (85.2)	8 (14.8)	8.02 (3.63-17.71)	0.001	7.48 (3.24-17.26)	0.001
Use of sanitary pad						
No (clothes)	60 (69.0)	27 (31.0)	3.11 (1.83-5.27)	0.001	1.96 (0.98-3.92)	0.05
Yes	92 (41.6)	129 (58.9)	1		1	
Place of delivery						
Institutional	80 (45.5)	96 (54.5)	1.13 (0.49-2.61)	0.76	0.86 (0.29-2.55)	0.79
Home	61 (57.5)	45 (42.5)	1.84 (0.77-4.40)	0.16	0.87 (0.46-1.66)	0.68
No delivery	11 (42.3)	15 (57.7)	1		1	

Occupation of husband						
Unemployed	8 (72.7)	3 (27.3)	5.81 (1.29-26.2)	0.02	2.92 (0.52-16.14)	0.22
Unskilled worker	27 (54.0)	23 (46.0)	2.56 (1.03-6.33)	0.04	0.76 (0.23-2.49)	0.65
Semi-skilled worker	82 (55.8)	65 (44.2)	2.75 (1.25-6.03)	0.01	1.26 (0.48-3.32)	0.63
Skilled worker	24 (36.9)	41 (63.1)	1.27 (0.53-3.03)	0.58	0.97 (0.34-2.70)	0.95
Semi-professional /professional	11 (31.4)	24 (66.6)	1		1	
Previous history of RTI						
Yes	31 (72.1)	12 (27.9)	3.07 (1.51-6.24)	0.002	3.05 (1.36-684)	0.007
No	121 (45.7)	144 (54.3)	1		1	
Substance use by husband						
Yes	91 (53.8)	75 (44.4)	1.61 (1.03-2.53)	0.038	1.47 (0.85-2.54)	0.16
No	61 (438)	81 (58.3)	1		1	

were unemployed followed by semi-skilled (55.8%) and unskilled laborer (54.0%). More than one third women also suffered with RTIs/STIs whose husbands were skilled workers and lowest prevalence (31.4%) was in those who were semi-professional or professional. The differences were statistically significant. Women who had previous history of RTIs/STIs had a significantly higher prevalence of RTIs/STIs than those who did not (53.8%% vs. 45.7%). There was higher prevalence of (53.8%) RTIs/STIs among women whose husbands were substance users in comparison to 43.8% whose husbands were non-user (p=0.01).

Table 4 shows bivariable and multivariable logistic regression analyses. The Odds of RTIs/STIs was 1.06, 1.51 and 0.26 times among women who were housewife, unskilled, semi-skilled as compare to those who were skilled workers (AOR = 1.06, CI: 0.28 –3.89), (AOR = 1.51, CI: 0.23-9.74) and (AOR = 0.26, CI: 0.02–3.42) respectively. This was found insignificant. While comparing the subjects having education level of senior secondary school, the odds of RTIs/STIs was almost two times higher (AOR=1.99; CI=0.91-4.38) in high school subjects, almost 3.56 times higher (AOR=3.56; CI=3.304-12.763) in subjects having middle school education and 3.69 times higher (AOR=3.69; CI=3.304-12.763) in subjects having primary school education. The subjects belonging to joint family had 1.59 times higher odds (AOR=1.59; CI=0.88-2.88) of RTIs/STIs as compared to that of nuclear family. Subjects who were having irregular periods had about seven and half times higher odds (AOR=7.48; CI=3.24-17.26) for RTIs/STIs as compared to those having regular periods. The odds of RTIs/STIs in subjects using cloths as sanitary pads was two times greater (AOR=1.96; CI=0.98-3.92) of those who were practicing sanitary pads. The Odds of having RTIs/STIs in women who had place of delivery home were 0.87 times and 0.86 times lower than the odds of mothers who never delivered respectively (AOR = 0.87, CI: 0.46 -1.66) and (AOR = 0.86, CI: 0.29-2.55) respectively. Compared to subjects whose husbands were engaged in professional and semi-professional group, the odds of RTIs/STIs was 1.26 times in semi-skilled laborer group (AOR=1.26; CI=0.48-3.32) to 1.59 times higher in unemployed group (AOR=2.92; CI=0.52-16.14). The odds of having RTIs/STIs was 0.97 times and 0.76 times lower in subjects whose husband were skilled workers and unskilled worker (AOR=0.97; CI=0.34-2.70) and (AOR=0.76; CI=0.23-2.49) respectively. The Odds of RTIs/STIs in women who reported past history of RTI was 3.05 times greater than Odds of participants who did not report past history of RTI (AOR = 3.05, CI: 1.36-6.84).

Discussion:

The current study intended to find the prevalence

of self-reported RTIs/STIs and factor associated with RTI/STI among married females of reproductive age group in rural area of Haryana, India. In the present study the prevalence of symptoms suggestive of RTI/STI was found to be 49.3%. Comparative finding has been reported in studies conducted in North India (44%).[15] A study done in Himachal Pradesh reported nearly half of the women having RTI symptoms.[16] A lower prevalence of RTI symptoms has been reported in studies conducted in Punjab (17%) and Tamil Nadu (8.8%).[17,18] It is near about with the prevalence of country as a whole (40%).[19] High prevalence of RTI symptoms in our study can possibly be attributed to the low awareness about the disease symptoms, inadequate treatment-seeking behaviour, hiding symptoms from family members and friends; it might be due to difference in characteristics of study population and study area. Another probable cause may be because of over reporting based on syndromic approach. Previous literature has highlighted the importance of using the laboratory diagnosis for RTIs/STIs and found that the syndromic approach reported higher results than laboratory diagnosis approach.[20,21] However, self-reporting of RTI/STI symptoms is also important as it entails one to seek medical treatment early. Seeking early treatment for RTI/STI symptoms will increase women's chances of being diagnosed early and reduced complications.

This study revealed that distribution of symptoms suggestive of RTI/STI reported by married women were vaginal discharge (55.3 %), pain during micturition (34.2%), dyspareunia (26.9%), pain lower abdomen (24.3%) and vulval itching (16.4%). The least common symptoms were perineal pain, genital ulcers, inguinal swelling and no complain of anal discharge was there. Other Indian studies have reported the commonest symptom of RTIs/STIs to be vaginal discharge, followed by lower abdominal pain.[22-24] A study in Kaski district of Nepal has reported identical symptoms, that is, vaginal discharge, lower abdominal pain, low backache, vaginal itching and pain during urination, and painful intercourse.[25]

The symptoms of RTI/STI were maximum in the extreme age groups, but the association of age and RTI/STI symptoms was not statistically significant. Bhawsar et al. also found the prevalence of RTIs/STIs among women in Punjab highest in the 15-19 years old and lowest in those aged 30 and above.[26] In early age prevalence of RTI/STI symptoms may be high as early sexual activities can cause trauma which further prone to infection. The other reason for the higher prevalence of symptoms suggestive of STI/RTI found in those below 20 years in this study may be because of a small sample size, there being only 5 women in this category in the sample studied. In late age, high prevalence might be related to increase duration of sexual exposure. The higher prevalence of the symptoms found in those living in joint families are in line with the findings of Sri Devi and Swarnalatha[23] and may be because women in joint families generally have less privacy and decision-making power, affecting their treatment-seeking opportunities. In the present study housewives and unskilled workers were having more STI/RTI symptoms as compared to semi-skilled and skilled workers. The finding was consistent with the study done by Sri Devi and Swarnalatha.[23] The study showed that with increasing number of children prevalence of RTI/STI also increased and supported by other studies.[22] However, contrary to our study, Bhawsar et al[26] found the prevalence to be highest in those with no children. Significantly the present study revealed that RTI/STI symptoms were more in illiterate or literate up to primary as compared to literate up to 10+2 and above and supported by other studies.[22,25] Education accords the individual the opportunity to access health information and choice and also result in increased access to prompt and effective treatment for RTI/STI.

It was also observed in this study that the practice of using ordinary cloth during menstruation is significantly associated with higher prevalence of RTI/STI. Similar to this finding, a study has reported higher prevalence of the symptoms in those women using cloth during menstruation.[17,23,27,28] A probable cause may be the, use of dirty cloth, improper washing and non-drying of soaked clothes in sunlight due to privacy issues, or may not change the cloth timely. Most of the females in rural area have perception as observed during interaction with them that menstrual blood is dirty so they use any discarded cloth in house for this purpose. This practice may increase the chance of infection. In the present study, those with history of any chronic disease (Diabetes, cancer, cardiovascular disease) had more RTI/STI symptoms.

This might be due to poor or compromised immunity of the participants because of the chronic diseases. The respondents of the present study had higher prevalence of RTI/STI symptoms who had irregular menstrual cycles (statistically significant) and who had home delivery (statistically insignificant). The explanation for this may be that irregular menstrual cycles may be associated with other co-morbidities of reproductive tract or women may not be able to ensure menstrual hygiene because of irregularity of menstruation. For home deliveries, the reason may be failure to follow the practices of safe delivery to ensure sterile conditions. This study also indicated that study participants who had previous history of RTI/STI and those whose husband were using substance (alcohol, smoking, psychoactive drugs) were significantly associated to higher prevalence of RTI among them. This suggested that either because of lack of awareness or other such reasons, they were not able to maintain menstrual hygiene or their partners may be infected with STIs due to multiple risk behaviours. Active partner tracking is lacking especially in rural area. Individual using substances are at higher risk of contracting STDs/HIV as under the influence of drugs/alcohol are more likely to engage in high risk sexual behaviour and from them disease can be transmitted to their partners.

Conclusion:

In this study, a high prevalence of RTIs/STIs (49.3%) based on the syndromic approach, has been found. The most common symptoms reported by the women were vaginal discharge, pain during micturition, dyspareunia, pain lower abdomen and valval itching. In the present study the low literacy level, presence of chronic disease, irregular menstrual cycles, use of discarded cloth during menstruation, history of RTIs/STIs in the past and use of addictive substances by husband were significantly associated risk factors for high prevalence of RTIs.

Recommendations:

Literacy/education level of women needs to be raised to decrease the problem of RTI/STIs as the prevalence among educated participants was significantly less. Training and education session need to be carried out to identify the early symptoms of RTI. Awareness about marriage and pregnancy after 20 years of age, sex education, delivery at health institution by health personnel, menstrual and personnel hygiene, and use of the condom are needed for prevention of RTIs. Primary health care services need to be strengthened in respect of reproductive health, and awareness about reproductive health issues should be raised through suitable communication strategies in order to bring about a positive behavior change to control the problem of RTIs/STIs.

Declaration:

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Conflict of Interest: Nil

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Mapping of Immunization Coverage Using Geographic Information System (GIS) Technology in Urban Slums of Central Karnataka, India

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Abstract:

Introduction: Immunization is an essential component of public health programs and the most cost effective intervention. Despite having a robust and well-functioning health system in India some states face reduction in immunization coverage which needs to be improved. **Objectives:** In urban field practice area of a tertiary care teaching hospital - To assess the immunization coverage among children aged 6-23 months and To assess the use of Geographic Information system (GIS) technology as a tool for spatial mapping of the vaccine coverage **Method:** A cross sectional study was done among 6-23 months children residing in the urban slums in the field practice area of tertiary care teaching hospital. Data was collected by house to house visits with interview of mother/primary care giver using pre-tested semi structured questionnaire. QGIS software was used for spatial mapping of the immunization coverage. **Results:** A total of 374 children aged 6–23 months were part of the study. It was found that the completely immunized, partially immunized, and unimmunized children were 78.3%, 16.9%, and 4.8%, respectively. The most common cause for partial immunization and non-immunization was child being ill and the lack of information, respectively. Spatial mapping of immunization coverage helped us in identifying the urban areas with low immunization coverage. **Conclusion:** Vaccine coverage in the area needs to be improved more which can be done by educating the mothers/primary caregivers and motivating them for better health of their children. GIS can be used as a useful tool in mapping immunization coverage.

Key words: Immunization, Geographic Information System (GIS), Urban Slums.

Introduction:

Immunization is one of the most cost effective measures in public health to date, preventing at an approximately 2-3 million fatalities in young children every year.[1] The Government of India introduced in 1978 the Expanded Programme of Immunization (EPI). The program gained momentum in 1985 and was expanded as Universal Immunization Programme (UIP) to be implemented in a phased manner to cover all districts in the country by 1989-90. The main objective of the programme was covering 85% of the target infants with the vaccines against six most dangerous and life threatening infections by 1990. Vaccines included were BCG, 3 doses of DPT & OPV and measles.[2] In the National Family Health Survey NFHS 1 (1992-93) the coverage of all basic vaccines was about 65%, which drastically increased to 89% in NFHS 2 (1998-99). NFHS 3 (2005-06) saw a immunization coverage rate of 81%, a reduction over the coverage in NFHS 2 and the NFHS 4 (2015-16) saw a further reduction to 69%.[3-6] Despite having a robust and well-functioning health system some states face reduction in immunization coverage due to vaccine hesitancy.[7] The term vaccine hesitancy stands for the delay in acceptance or refusal of vaccines despite easy access to the vaccines. Several factors have been said to influence vaccine hesitancy including socio-cultural context, religious beliefs, misinformation spread through social media, historical influences and mistrust, beliefs and attitudes about vaccines and specific characteristics of the vaccines.[7]

The advent of new technology has revolutionized

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ways in which information on problems of health is collected and disseminated. Geographic Information System (GIS) and Google Earth are the tools that can be used to measure health events. The GIS is a conceptualized framework that provides the ability to capture and analyze spatial and geographic data. GIS applications are computer based tools that allow the user to create interactive queries, store and edit spatial and non-spatial data, analyse spatial information output and visually share the results of these operations by presenting them as maps. [8-10]

With this background we undertook a cross sectional study on Immunization coverage evaluation survey using GIS technology in urban slums of central Karnataka, India.

Objective of the study was to assess the coverage of vaccine among children upto age 6-23 months and to assess the use of Geographic Information system (GIS) technology as a tool for spatial mapping the immunization coverage.

Method:

A cross sectional study was conducted for a period of 6 months from 1st October 2019 to 31st March 2020 in the urban field practice area of a tertiary care teaching hospital among the mothers or care givers of children of 6-23 months' age groups.

Exclusion criteria:

- Houses which were locked during three consecutive house visits.
- Mothers or care givers who did not give consent for the study.

Following criteria for full, partial and no immunization were used

- Full immunization - a child with one dose of Bacille Calmette Guerin (BCG), 3 doses of Pentavalent (Diphtheria Pertussis Tetanus plus Hepatitis B and Hemophilus Influenza Type B) vaccine and Oral Polio Vaccine (OPV) and one dose of Measles Rubella vaccine within the age of one year.
- Partial Immunization - A child who missed any one of above doses.
- No Immunization - A child who did not receive even a single dose of any vaccine

Study Method:

The urban field practice area of J.J.M. Medical College covers 5 urban slums with a population of around 19,860. Line list of all the households with children aged 6 – 23 months was prepared with the help of anganwadi teachers & verified with ASHAs. All the houses in the list were visited at least three times and the final sample of 374 children were identified and included in the study using universal sampling method.

Urban field practice area, JJM Medical College
↓
5 URABN SLUMS
Total population around 19,860
↓
All the households with children aged 6-23 months were included and individuals were interviewed using epicollect 5 softwere with semi structured pre tested questionnaire.
↓
A sample size of 374

Study tool: Data was collected using Epicollect 5 software.[11] It is a mobile & web application for free and easy data collection. It provides both the web and mobile application for the generation of forms (questionnaires) and freely hosted project websites for data collection. Projects are created by using the web application at five.epicollect.net then downloaded to the device to perform the data collection. Data was collected (including GPS and media) using smart phones and all data can be viewed on a central server (via map, tables and charts).

The mothers/primary caregivers were interviewed using a pre-tested semi-structured questionnaire on a pre-designed schedule and reviewing immunization cards of the children. In addition to the questions on socio-demographic characteristics of the family and immunization status related variables, the schedule comprised questions based on vaccine hesitancy and geo-coordinates of the house were captured. Confirmation of immunization coverage was done by immunization card/Mother and Child Health (MCH) card.

Spatial mapping of the households visited were spatially mapped using QGIS software v2.18.16.[12] The data collected was analysed using the SPSS Statistical Software version 17.

Results:

Among 374 children of 6- 23 months' age group included in the study, 54% (202) were male and 46%

(172) were females. Majority (34.2%) of the children belonged to the age group of 16-20 months. A total of 250 (67%) of the informants belonged to Class III according to modified B. G. Prasad classification updated for January 2019.[13] Muslims made a majority with 89.3% and Hindus occupied a minority of 10.7%. (Table 1)

Among all the children, 292(78.1%) were fully immunized as per their age group. Close to 63 (16.8%) children though have started immunization could not complete it. Rest 19 (5.0%) of the beneficiaries were completely left-out. (Figure 1)

Immunization coverage for each vaccine was assessed among the study participants who were fully immunised till date and those with partial immunization and it was found to be maximum for BCG which is 325 (91.6%) antigen and minimum for the measles rubella vaccine 223 (62.8%). (Table 2)

As far as immunization sessions were concerned, majority of the beneficiaries accessed immunization (88.4%) at public health care and only 11.6% utilized the private services for immunization. It demonstrates that the child caregivers are well driven toward public health facilities than that of private health delivery points.

Table 1: Demographic details of the study participants

Variables	Frequency (n= 374)	Percentage (%)
Gender		
Male	202	54
Female	172	46
Age Group (months)		
6-10	99	26.5
11-15	100	26.7
16-20	128	34.2
>20	47	12.6
Religion		
Hindu	40	10.7
Muslim	334	89.3
Socio-economic status as per modified B G Prasad classification		
Class I	30	8
Class II	41	11
Class III	250	67
Class VI	53	14

Table-2 Distribution of study participants according to the vaccines received (n=355)

Name of the vaccine	Frequency (n)	Percentage (%)
BCG	325	91.6
OPV 1	321	90.5
OPV 2	319	89.8
OPV 3	319	89.8
Pentavalent 1	321	90.5
Pentavalent 2	245	69.2
Pentavalent 3	241	68
Measles Rubella	223	62.8

The respondents were enquired about the reasons for partial or non- immunization using an open ended question and multiple responses were recorded. Among 82 study participants whose child was either partially immunized or non- immunized, 45 (54.8%) of them told sickness of the child on the day of immunization as the main reason. In 42 (51.2%) cases, lack of awareness among parents/caregivers regarding immunization, fear of adverse events following immunization 29 (35.3%), and forgetfulness about immunization session 33 (40.2%) were also cited as reasons of non- immunization.

Spatial mapping of immunization coverage was done using QGIS software (Figure 2) which clearly describes the spatial map of the study area and clusters surveyed. Black dots represent the households with fully immunized children, circle with dots represent the households with partially immunized children, and star shape dots represent households with unimmunized children. By zooming in, topography (plain area) of the urban field practice area and connectivity by the road of each cluster to the health care provider can be visualized.

Mapping was also helpful in describing the relationship between immunization status and

Figure 1: Distribution of study participants according to immunization status

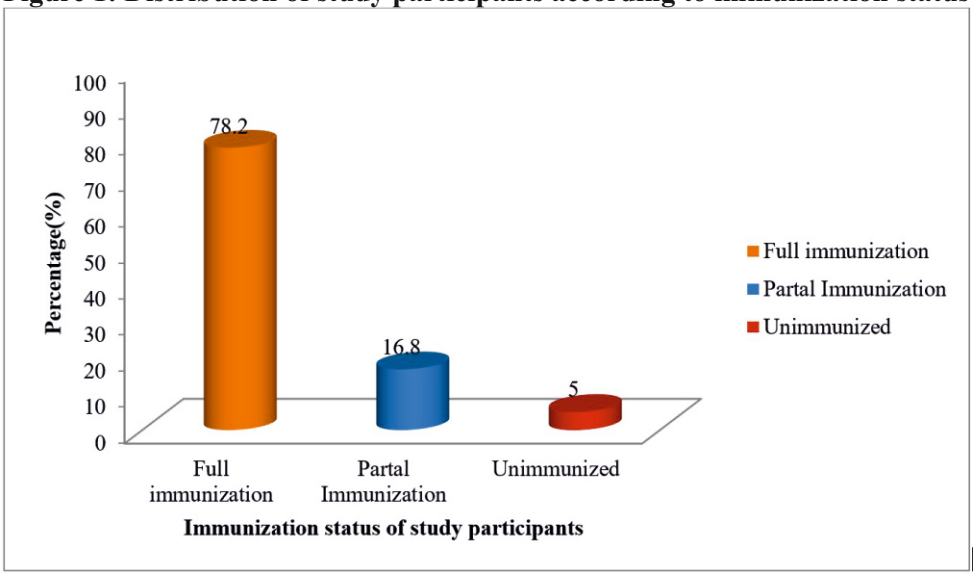
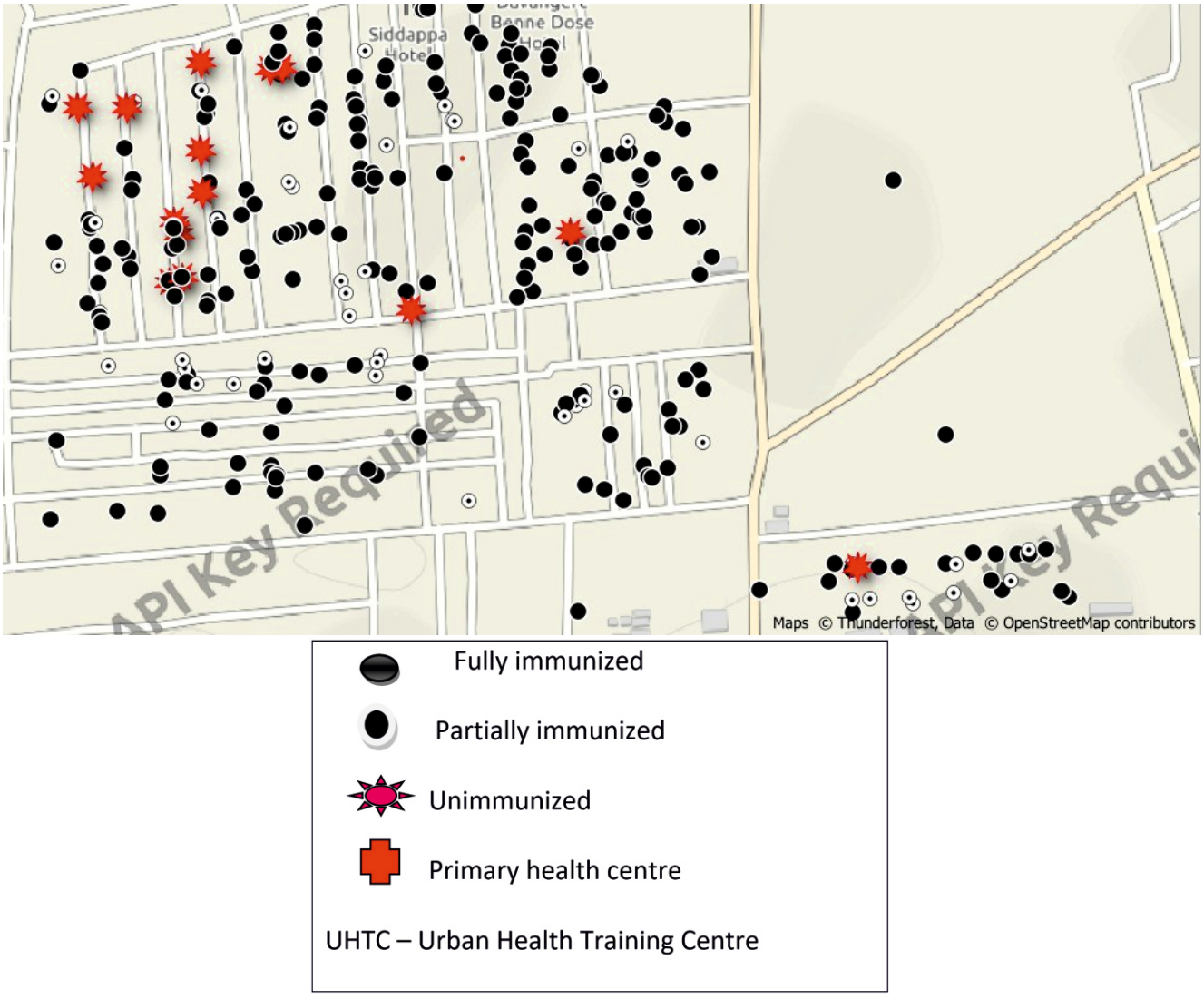


Figure 2: Spatial map showing distribution of clusters in the study area according to immunization status



proximity of households to the health care provider (urban health centre). It was observed from the spatial maps that the immunization status of the study subjects was neither dependent on the distance of cluster from the health care facility nor on the location of the household in the urban slum.

Discussion:

In this study, the percentage of full immunization as per age is found to be 78.2% (292). However, this coverage shows percent of beneficiaries who have taken all vaccines till the date of survey which is more than that of the NFHS-4 report of Karnataka which was found to be 63%.[14]

The full immunization coverage of children in other studies across the country reveals a similar pattern. Research conducted by Naveen et al. in tribal area of Parol, Thane district Maharashtra FIC was found to be 71.1%.[15] Datta et al. in rural area of Tripura had highlighted it as 91.67%.[16] Another focal study from Surajgarha Block, Lakhisarai district by Kumar et al. in Bihar was 55.2%,[17] and in rural Uttar Pradesh it was 50% as per Ahmad et al.[18]

In present study, the main reason for partial or non-immunization cited by most of the respondents was sickness of the child on the day of immunization followed by lack of awareness among parents and fear of AEFI. Madhvi et al. from Kakinada, Andhra Pradesh showed that the most common reasons for partial/no immunization are ill child (27.5%), lack of knowledge about immunization (25.12%), migration to other places with no knowledge of place and time of immunization (17.5%).[19] A study by Singhal et al. from rural area of district Tonk, Rajasthan showed the commonest reason for partial/non-immunized was sickness 22 (36.06%) of elder sibling as a result of the previous immunization followed by 20 (32.07%) of the sickness of beneficiary at the time of immunization.[20] In a study done by Kumar Saurabh et al in Mangalore, Commonest reason for child being unimmunized was that the respondents lacked information regarding the immunization followed by obstacles and lack of motivation, respectively.[21]

Spatial mapping gives the exact location of the household, and also the direction of the survey can be known by waypoints and routes saved in the GIS software and google earth. It also describes the distance of households located in the urban field practice area from the Urban health care centre. This helps in planning a better immunization session.

In a study done by Gammino M Victoria, GIS data were used to Track Polio Vaccination Team Performance in Northern Nigria under WHO pilot project.[22] In one study GIS was used for resources-constrained environment to assess the expanded program on immunization data.[23] A study done by Masthi et al used Global Positioning System technology and Google Earth to evaluate Coverage of the pentavalent vaccine in a rural area near Bangalore.[24]

There are many other studies in public health sector where GIS were used effectively. In one study GIS was used for measuring the nutritional status distribution of anemia in a rural area.[25] GIS was used for spatial mapping for the distribution of malaria vector mosquitoes and also for risk mapping in analysing the past and present trends in monitoring and evaluation of malaria.[26]

Conclusion:

This study was done to see the immunization coverage among the residents of urban field practice area. Out of 374 children, 292 (78.2%) were fully immunized, showing that the immunization status is still not upto the level as prescribed by the government which is coverage of 85 percentage.

There is a progressive decline in the immunization received from 325 (91.6%) children for BCG to 223 (62.8%) for measles rubella, which was the worst hit. There were multiple reasons for partial or non-immunization of the child among which most common were illness of the child during immunization sessions followed by lack of awareness regarding vaccines among parents and ignorance and/or casual approach of parent's/care givers towards timely immunization.

Recommendations:

Coverage of routine immunization can be improved by creating awareness among mothers or caregivers effectively. Majority of study participants were unaware of the complete dosages of the vaccine and when it has to be given. This can be overcome by creating awareness and health education.

GPS technology was effective in spatial mapping of the immunization coverage. It could also help in micro planning and implementing maximum immunization

coverage.

Declaration:

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Conflicts of interest: Nil

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Prevalence of internet addiction and its consequences among MBBS students of MP Shah Medical College, Jamnagar, Gujarat

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Abstract:

Introduction: Internet is one of the most essential elements in everyday life of everyone. Simultaneously, it's an emerging public health issue also, especially in our country. Excessive and undisciplined use of internet may lead to many physical, social, psychological and behavioral disorders. Medical students have not only lengthy syllabus but also hefty study hours and internet addiction may affect their scholastic pattern and learning. Therefore, this study was designed to assess prevalence and pattern of internet addiction and its consequences among them. **Objectives:** The aim of this cross-sectional study is to determine prevalence and pattern of internet addiction and its ill-effects among medical students of M P Shah Government Medical College, Jamnagar. **Method:** We included all medical students (n=600) of all semesters of MP Shah Medical College and collected data using Dr. Kimberly Young's Internet addiction scale from October 2019 to December 2019. Informed Consent was taken. Results: We observed that majority of students (82.67%) were average online users. The mean score of internet usage for male and female medical students was 44.22 and 38.48 respectively. Sleep disturbance, impulsiveness, anxiety, emotional liability, lack of interest in study were some of the major consequences of internet addiction among students observed in our study. The study also observed that students tried several methods like Yoga, meditation etc. to get rid of the internet addiction and concentrate on studies. **Conclusion:** Periodic screening of students should be carried out to identify internet addicts and a comprehensive program or strategies should be formed at institutional level for support and counselling of such students and to avert and cope up with ill effects of internet addiction.

Key words: Internet addiction, Medical students, Prevalence, Young's Scale

Introduction:

The internet has now become a significant tool for not only recreational purpose and social interaction, but also for teaching, training, communication and information sharing for the last few years especially in India. Easy access and relatively inexpensive data plans has led the community, particularly adolescents at risk of internet addiction. Internet addiction refers to individual's inability to control use of internet which eventually causes him or her marked distress and functional impairment in daily life.[1] Research studies in Western and Asian contexts suggests that the risk of internet addiction among young people is increasing.[2,3]

According to the last census data (in 2011), the Indian population is approximately 1.2 billion, and in this exponentially growing population, youth and young adults occupy a significant number.[4] It is estimated that in India, about 34.45% the general population are active Internet users and most are young adults.[5] Therefore, as the internet usage soars, its negative effects also increases, and there is increasing concern across the world with regard to the Internet addiction.

Internet addiction can have many negative consequences on people's health, especially young and adolescents. It may lead to poor scholastic performance, sleep disturbances, social problems, impulsiveness, psychological disturbances etc.[6] Surveys in US and Europe have also indicated alarming

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prevalence rates between 1.5% and 8.2% respectively.[7]

Method:

This cross-sectional study is aimed to determine prevalence and pattern of internet addiction and its ill-effects among medical students of M P Shah Government Medical College, Jamnagar. We included all medical students (n=600) of all the semesters of the college. The students aged between 17 and 20 years. We collected data from October 2019 to December 2019. Ethical Committee approval and written consent was obtained before enrolment of students.

Questionnaire was distributed to the participants in classroom settings at a predetermined time and was collected onsite. The questionnaires were unlinked, anonymous and self-administered. Teachers or supervisors left the classrooms just after distributing questionnaire sheet to avoid any bias, influence, or hesitancy.

The questionnaire contained brief socio-demographic information and Young's Internet Addiction Test (IAT).[8] Young's IAT, developed for screening and measuring levels of Internet addiction, has been the most widely used and well-tested for its psychometric properties.[9] It was applied to determine the prevalence of Internet addiction among students. It is a 20-item questionnaire measured on the five-point Likert Scale.

Average Online User (Score20-49)

Possible Internet Addict (Score 50-79)

Internet Addict (Score 80-100)

After all the questions have been answered, numbers for each response are added to obtain a final score. The higher the score range, the higher the level of addiction.

Results:

We observed that out of total 600 students 56.8% were male whereas 43.16% were female. (Table 1)

Mean score for internet addiction of those 56.8% male was 44.2 and of those 43.16% female was 38.48. Mean Score of Internet Addiction was maximum (47.37%) among males of second year whereas maximum (40.77%) among females of first year. (Figure 1)

Majority (82.66%) of the MBBS students were average online users with a score ranging from 20-49 and remaining fall in possible internet addiction and internet addiction category.(Figure 1)

Sleep disturbances, Social withdrawal, Study Negligence, Impulsiveness, Emotional liability, Anxiety, Depression were some of the major consequences of internet addiction among students observed in our study. Sleep disturbances was the major psychological consequence among students clinically but it is not statistically significant whereas all the other factors were statistically significant. (Table 3)

The study also observed that students (Possible Internet addicts & Internet addicts) tried several methods like Yoga, meditation etc. to cope up with internet addiction and concentrate on studies and majority of students (46.83%) didn't use any method while 29.83% students were using some sort of phone application to monitor their daily internet activity.(Figure 2)

Figure 1: Mean score of internet addiction among medical students

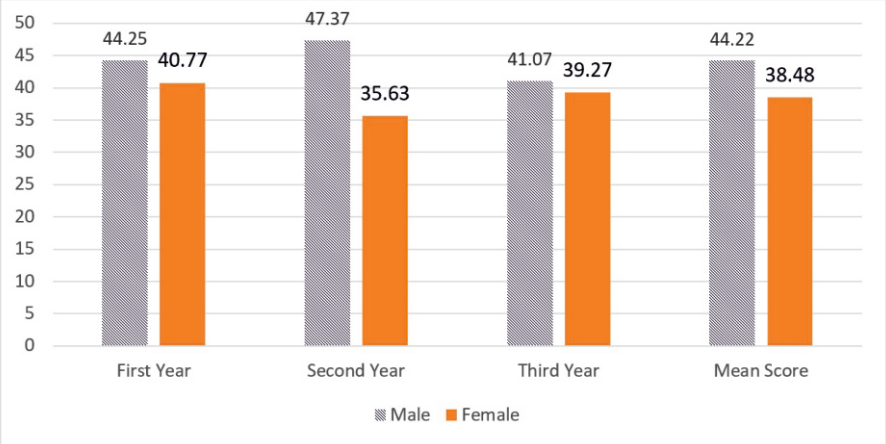


Table 1: Gender and batch wise distribution of Medical students

MBBS batch (Year)	Male No. (%)	Female No. (%)	Total Numbers No. (%)
First MBBS	133 (60.4)	87 (39.5)	220
Second MBBS	108 (54.0)	92 (46.0)	200
Third MBBS	100 (55.55)	80 (44.4)	180
Total	341 (56.8)	259 (43.16)	600

Discussion:

The young's Internet addiction scale classifies subjects into three categories - average online users (score 20-49), possible internet addiction (score 50-79) and internet addict (score 80-100). Our study finds that majority of students (82.66%) were average online users, whereas 16.16% students has been classified as possible internet addicts. 1.16% students had severe internet addiction. So majority of students are average online user and their purpose of using internet were for academic purpose. Several studies have estimated the prevalence of Internet addiction with varying results (0.9-38%) depending on the criteria used and the sample studied.[10,11] A study

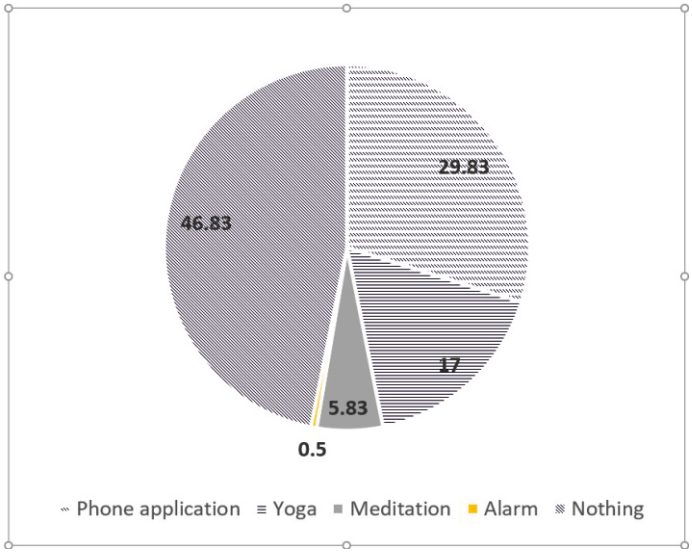
Table 2: Assessment of severity of internet addiction among medical students (n=600) as per Young's internet addiction scale.

Score	Scale of internet addiction	First Year		Second Year		Third Year		Total Score
		Male No. (%)	Female No. (%)	Male No. (%)	Female No. (%)	Male No. (%)	Female No. (%)	
20-49	Average Online user	101 (75.93)	75 (86.2)	70 (64.81)	87 (94.56)	88 (88.0)	75 (93.75)	496 (82.66)
50-79	Possible Internet addict	31 (21.67)	12 (13.79)	32 (29.62)	5 (5.43)	12 (12.0)	5 (6.25)	97 (16.16)
80-100	Internet addict	01 (0.6)	0 (0)	6 (5.55)	0 (0)	0 (0)	0 (0)	7 (1.16)

Table 3: Association between internet addiction and psychological factors among students

Psychological factors	Average online users	Possible addicts and internet addicts	p-value
Anxiety	122 (24.59)	49 (47.11)	<0.01
Depression	98 (19.75)	41 (39.42)	<0.01
Emotional liability	188 (37.9)	67 (64.42)	<0.01
Sleep disturbances	328 (66.12)	81 (77.88)	0.19
Social withdrawal	76 (15.32)	72 (69.23)	<0.01
Impulsiveness	139 (28.02)	69 (66.34)	<0.01
Study Negligence	177 (35.68)	70 (67.3)	<0.01

Figure 2: Methods adopted by students (Possible Internet addicts & Internet addicts) to cope up with internet addiction



conducted in Western Maharashtra, who also used Young's Scale, estimated that mild internet addiction was present in 51.4% students, whereas moderate addiction (Young Score 50-79) was present in 7.4%.In a study conducted by Arvind Sharma et al who also used Young's internet addiction scale, 57.3% students were normal users, 35.0% as having mild internet addiction, 7.4% moderate internet addiction and 0.3% having severe Internet addiction.[12]

This study revealed that male students had higher average score of 44.22 compared to female students having average score of 38.48. Available data from some of the community and online surveys as well as clinical samples also suggest that Internet addiction appears to have a male preponderance.[12-17] A study by Lam LT about Internet addiction among adolescents revealed 50% increased odds for males to be addicted to the Internet (OR=1.5, 95% CI=1.1–2.2) when compared with females.[18]

The mean age of students in this study is 18.44 years (+1.38). A study by Arvind Sharma in Jabalpur also had mean age of 19.02 (±1.450) years and there was no significant difference in internet addiction between different age groups.[12] Mashhor Al-hantoushi et al. reported mean age 17 years and also reported no significant difference in internet addiction between different ages.[19] Several Studies have found that the Internet addiction usually manifests itself in the late 20s or early 30s.[20,21]

Our study observed that majority of students (77.88%) had a problem of sleep disturbance. Other common problems are impulsiveness, study negligence, emotional liability, anxiety, depression, social withdrawal etc. A study from India too reported that those who were dependent on Internet would delay their work to spend time online, lose sleep due to logging in till late night, feel lonelier, and feel life would be boring without the Internet as compared with non-dependent subjects.[22] In a study carried out by Yadav et al, among high school students in Ahmadabad India, there was a strong positive correlation between internet addiction and depression, anxiety and stress.[23]

Our study showed that majority of students (around 60%) were using internet for educational purpose, while one fifth were using for social networking. A study in Guntur, Andhra Pradesh showed that medical students used the internet mostly for social networking (59.7%), downloading media files (18.9%), online gaming (12.3%), and academic purposes (0.1%). About 63% of the medical students were using mobile phones to access the internet.[6]

Conclusion:

Majority of the students fall in the category of average users and also majority of them were using it for academic purpose. Excessive and undisciplined internet usage particularly for non-academic purpose mainly in young adolescents is an alarming public health problem in India. Periodic and regular screening and supervision of students regarding internet usages should be carried out to identify internet addicts and a comprehensive program or strategies should be formed at institutional level for support and counselling of such students and to avert and cope up with ill effects of internet addiction.

Recommendation:

Comprehensive Program for students (who fall in possible internet addict and internet addict category) should be prepared to increase the awareness of ill-effect of over usage of Internet and also to detect students at risk before it becomes problematic.

Limitation

As study was carried out only among 1st, 2nd and 3rd yr of medical students, caution needs to be applied before generalizing the results to entire students of college. Due to the use of self measurement scales, individual's response may be exaggerated by their interest in self presentation or self expression. It might be affected by their opinions.

Declaration:

Funding: Nil

Conflict of Interest: Nil

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Mass Drug Administration for Lymphatic Filariasis Elimination in Two Districts of North Karnataka: Coverage and Compliance Assessment

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Abstract:

Introduction: Lymphatic filariasis or elephantiasis is the most debilitating and disfiguring scourge among all diseases which imposes severe social and economic burden. Currently an estimated 63 crores people are at a risk of filariasis in 256 endemic districts across 16 states and 5 union territories in India. National filarial control programme is operational since 1955 in India and the current goal is achieving elimination of filariasis by 2020 through Mass Drug Administration (MDA). **Objective:** To assess the coverage, compliance and causes for noncompliance of MDA in the study districts. **Method:** A cross sectional descriptive study was conducted between October 2019 and January 2020 in Koppal and Bidar districts respectively. Randomly four clusters were selected with three from rural area and one from urban area. All the residents of a cluster were included except subjects aged below 2 years and pregnant women. Data collection was done by household survey using a standard questionnaire. **Results:** Total populations of 2043 subjects residing in 480 houses were included. The coverage rate was 95.44 & 94.73% with compliance rate of 91.61% & 93.12% in Koppal & Bidar districts, respectively. The effective coverage rate was 87.44 % & 88.2% in Koppal & Bidar districts respectively. Drug consumption by DOT was 95.1% in Koppal & 85.8% in Bidar district. **Conclusions:** The coverage& compliance of MDA was found to be satisfactory as it was >65%.Consumption of MDA by DOT to be more emphasized to reduce coverage compliance gap and increase the effective coverage rate.

Key words: Coverage, Compliance, Evaluation, Filariasis, Mass drug administration.

Introduction:

Lymphatic filariasis or elephantiasis is one of the most debilitating and disfiguring disease causing significant morbidity & imposes severe social and economic burden to the affected individuals, their families and the endemic communities.[1]

Filariasis is caused by nematodes of the family Filariodea belonging to three species namely Wuchereria bancrofti, Brugia Malayi and Brugia Timori and transmitted through the vector female Culex quinquefasciatus mosquito.[2]

The lymphatic filariasis disease is largely asymptomatic. However, there can be chronic damage to the lymphatic, immune and secretory system of the body without any manifestation. The disease is associated with peculiar morphological manifestations and disfigurations resulting in severe social stigma and severe economic and mental stress of the affected.[3]

Globally an estimated 89.3 crores people living in 49 countries remain threatened by lymphatic filariasis and require preventive chemotherapy to stop the spread of this parasitic infection. It is one of the leading causes of global disability, accounting for at least 28lacs Disability Associated Life Years (DALYs). Most of the endemic countries for lymphatic filariasis around the world are situated in south East Asian region of World Health Organization (WHO) and account for nearly 50% of the lymphatic filariasis cases. 9 out of the 11 member countries of the South

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East Asia Region (SEAR) including India are endemic for Filariasis.[2] In India around 63 crores people residing across the rural and urban areas of 256 districts in 16 states and 5 union territories are at risk of the disease. Karnataka is one of the endemic states with the disease being endemic in 9 districts of Karnataka.[2,4]

In the year 1997 lymphatic filariasis (LF)was classified as one of six infectious diseases considered to be "eradicable" or "potentially eradicable". Consequently, World Health Assembly adopted a resolution calling for elimination of the disease as a global public health problem. In 2000, the World Health Organization (WHO) established the Global Programme to Eliminate Lymphatic Filariasis (GPELF), which had the goal of eliminating lymphatic filariasis as a public health problem by the year 2020.In addition the International Task Force for Disease Eradication has identified lymphatic filariasis as one of the few diseases that could potentially be eradicated.[5-7]

Mass Drug Administration was launched as National Filaria Day (NFD) on 5th June, 2004 by Government of India to eliminate filariasis. The strategy included Mass Drug Administration (MDA) of anti-filarial drugs (Diethylcarbamazine + Albendazole) by approaching every individual annually in the target community of 250 endemic districts in India, thus interrupting the transmission.[1]

The National Health Policy 2002 set a goal to achieve the elimination of Lymphatic filariasis by the year 2015 which couldn't be achieved. The National health Policy 2017 also aimed at elimination of lymphatic filariasis by the end 2017 but this aim was also not achieved. Subsequently in the year 2018 an "Accelerated plan for elimination of lymphatic filariasis" was launched with a goal to achieve lymphatic filariasis elimination by the year 2020 in accordance with WHO NTD goals.[1,6,8-10]

As of 2018 a total of 15 rounds of MDA have been completed in the State.Bidar being one of the endemic districts for lymphatic filariasis the 16th round of MDA was conducted in 2019-20. Koppal though being a non-endemic district, the state technical committee advised focal round of MDA to be done as the Microfilaria rate in focal 13 villages was found to be more than 1 during the night blood survey.[11]

On request of the Regional Office for Health and Family Welfare, Government of India, to evaluate MDA in Koppal and Bidar districts, a team of investigators visited these districts with the objective of assessing the coverage, compliance and coverage compliance gap of MDA in these districts.

Method:

This was a Cross sectional Epidemological study conducted in Koppal and Bidar districts by a team of investigators from a medical college during second week of October 2019 and second week of January 2020, respectively. The investigators team were informally trained at the Regional Office for Health and Family Welfare, Bangalore in all aspects of the coverage survey.

All the sampled eligible population residing in the study area minimum for a period of six months and consenting for the study were included. The pregnant women and children aged less than two years were excluded from the survey.

As per the guidelines provided in MDA evaluation template, total of four clusters were selected in each district which included one cluster in the urban and three in the rural areas. All the primary health centers in the district were line listed based on the reported MDA coverage. Subsequently one PHC with high coverage, one PHC with medium coverage & one PHC with low coverage were chosen randomly by lottery method. Subsequently from each of these PHCs line listing of all the villages under its field practice area was done and one village with high coverage, one village with medium coverage and one village with low coverage were chosen by lottery method. For selection of urban cluster all the urban PHC's with low coverage were line listed and one of the wards was chosen randomly.[12]

The team of investigators visited each of the above village/ ward which were identified and interacted with the drug distributors and supervisors regarding their knowledge of MDA, adverse events following MDA, adequacy of training and suggestions for improvement.

For population based data collection, center of the village was identified by taking the help of a resident of the village; from there the four directions were identified and numbered. One direction was chosen randomly using the last digit printed on the currency

Table 1: Socio demographic profile of the study subjects:

Variables	Koppal District n = 1075	Bidar District n = 968
Age (Years)		
2 – 15 years	207(19.25)	262(27.06)
>15 years	868(80.75)	706(72.94)
Sex		
Males	581(54.05)	501(51.75)
Females	494(45.95)	467(48.25)
Houses visited	240	240

*Figures in parenthesis indicate percentage

Table 2: Distribution of study subjects based on the tablet consumption:

Variables	Koppal District n = 1075	Bidar District n = 968
MDA coverage	1026(95.44)	917(94.73)
MDA compliance	940(91.61)	854(93.12)
Effective coverage rate	87.44	88.22
Coverage compliance gap	8.38	6.87
Drug consumption by DOT	894(95.1)	772(85.8)
Divided dose	-	133(13.74)
Incomplete dose	Nil	74(7.64)

# Indicates more than one response
*Figures in parenthesis indicate percentage

note and a walk through survey was done to note the average number of houses in the street. Subsequently using a currency note, investigators selected the first house randomly and the data regarding socio-demographic characteristics, which included details of the family composition information regarding distribution of MDA tablets, consumption of MDA tablets if received, if consumed [Directly Observed Treatment] DOT or non DOT, whether taken full course

Table 3: Reasons for non-consumption of tablets:

Reasons#	Koppal District n = 1075	Bidar District n = 968
Drug distributor not visited	24 (2.23)	51(5.26)
Out of station	28(2.6)	05(0.51)
Suffering from chronic disease other than filaria	12(1.11)	18(1.85)
Not aware	14(1.3)	-
Fear of drugs	15(1.39)	-
Beneficiaries on empty stomach at the time of drug distributor visit	15 (1.39)	18(1.85)
No specific reason	16 (1.48)	10(1.03)

# Indicates more than one response
*Figures in parenthesis indicate percentage

Table 4: Adverse effects experienced following consumption of tablets:

Side reactions	Koppal District n = 1075	Bidar District n = 968
Headache	15 (1.39)	-
Nausea / Vomiting	89 (8.27)	07(0.72)
Others#	21 (1.95)	-

* Figures in parenthesis indicate percentage
# others included syncope, diarrhoea, pain abdomen, Headache etc.

or not and if full course was taken was it a divided dose or all tablets taken at once were collected using a semi-structured survey proforma by interview technique after obtaining the consent. Prior to the interview the purpose of the survey was explained with showing of flashcard containing a picture of elephantiasis case, Diethylcarbamazine (DEC) and

albendazole tablets. Data was also collected regarding history of adverse drug reactions experienced following MDA consumption. Reasons for not consuming MDA were ascertained from subjects who had not consumed MDA. Subsequently the direction to choose the next house was decided by tossing a coin and the data collection was continued till 60 houses was covered in that particular cluster.

The data was entered in Microsoft Excel-10 and analyzed with SPSS 16. Descriptive statistics like frequencies & percentages where used wherever applicable.

Definitions of various indices used:[11]

Drug coverage: It is the number of eligible persons who received DEC during MDA campaign. It is calculated as the total number of persons who received drug divided by eligible population expressed as percentage.

Drug compliance: It is the number of persons who ingested DEC in presence of a Drug Distributor (DD) during MDA campaign. It is calculated as the total number of persons who ingested drug divided by total number of persons who received the drug expressed as percentage.

Coverage–Compliance Gap: It refers to the people who got the drug but did not consume due to various reasons.

Effective coverage rate: It is the end product of coverage by the health system and compliance by community. The percentage for effective coverage was calculated after taking total number of people who were eligible for receiving DEC tablets as denominator (Effective coverage = No. of people who had ingested sufficient dose of DEC tablets/Total people eligible for receiving the DEC tablets × 100).

Inputs for the study were also obtained from the previous MDA evaluation done in the year 2018 at two endemic districts of Karnataka by the same principal investigator.[12]

Ethical issues:

Ethical clearance was obtained from the institutional ethics committee and informed consent was taken from all the subjects.

Results:

The study team visited 240 houses in 4 clusters (1 in urban + 3 in rural area) in each district i.e., a total of 480 houses and surveyed 2149 (1132 + 1017) people of which 2043 (1075 + 968) were eligible and were included as subjects [Table 1]. The coverage, compliance rate, effective coverage rate & coverage compliance rate is satisfactory as mentioned in the below tables [Table 2]. The most common reason for non-consumption was that the drug distributor had not visited apart from other reasons cited [Table 3]. Majority of the side effects following drug consumption were mild & self-limiting [Table 4].

Discussion:

Lymphatic filariasis though is one of the potentially eradicable disease continues to be an important public health problem. Various targets were fixed by the government in the past to achieve elimination but targets could not be achieved. Annual Mass Drug Administration with coverage of more than 85% is the established and recommended strategy to achieve the filariasis elimination.[1]

In the present study, the coverage in both the study districts was more than 85% (95.4% in Koppal district & 94.73% in Bidar district) which is satisfactory. On comparing with previous studies there is good improvement in the coverage and compliance rates over the years. Evaluation conducted in the year 2008 by Ranganath et al found the coverage rate in Bidar was 78% with a compliance of 68%.[13] This may be due to improved training activities for drug distributors along with better acceptance of MDA by the beneficiaries.

The coverage evaluation conducted in the year 2014 by Ravish et al found a coverage of 83.5%, compliance of 75.9%, effective coverage rate of 63.4% & coverage compliance gap of 24.14%.[14] There is an improvement in effective coverage rate the final end product over the years which may be due to better program implementation as in our present study the effective coverage rate was 88.2% in Bidar district.

A similar coverage evaluation conducted in the year 2015 by Ravindranath A Bhovi et al in Bidar district found a coverage rate of 82.5%, compliance of 82.5% & effective coverage rate of 59.6%.[15]

The coverage evaluation conducted in the year 2016 by Mane VP et al in Bidar district it was found thatthe coverage, compliance and effective coverage to MDA were 82.1%, 72.3% and 59.4% respectively.[16]

The coverage evaluation of MDA conducted in the year 2018 in Kalaburagi & Yadgir districts revealed that coverage was 83.17% & 86.71% respectively, which is much lower compared to the present study which may

be due to the different district administrations & lack of proper training among the drug distributors.[12]

Hence it is evident that the coverage and compliance in Bidar district is improved over the years. Mere coverage of MDA is not sufficient for filarial control & elimination but compliance to drugs is also important to eliminate Lymphatic Filariasis.

Consumption of MDA by DOT is an important component to ensure complete & adequate treatment but only 95.1% of the subjects in Koppal district & 85.8% in Bidar district had consumed MDA by DOT. The commonest answer by beneficiaries was "not taken food" at the time of distribution. Consumption of MDA by DOT is to be more emphasized.

The main reason for non-compliance was that the subjects being out of station in Koppal district and drug distributor not visited in Bidar district. Other reasons were lack of awareness about the disease, fear of side effects of drugs, not suffering from the filariasis disease etc. In studies conducted in Yadgiri and Gulbarga districts, the most common reasons given for non-consumption were fear of side effects and forgetting. Even though people are aware of the disease of elephantiasis, seen people living with the condition in their vicinity, they are not willing to consume tablets because of various reasons. This shows the lack of motivation, mobilization, and misconception about regimen and community participation.[12]

The other reasons for non consumption were that patients were suffering from other chronic diseases like diabetes & hypertension, fear of drugs and beneficiaries on empty stomach at the time of visit by the drug distributor.

Around 11.3% subjects in Koppal district & 0.72% subjects in Bidar district had adverse reactions of which the most were self limiting. The percentage of subjects who had reported adverse reactions in Koppalwere higher compared to similar studies done in Raichur district(1.1%) in 2014 and Gulbarga district(1.22%) in 2018.Thus its evident that the side reactions occurring are mostly mild &self limiting.[12,17]

Conclusion:

The coverage & effective coverage rate of MDA in both the districts is more than 65% which is the recommended standards for achieving filariasis elimination.[18]

The proportion of consumption of MDA by DOT needs improvement in Bidar district. Thus by ensuring consumption of MDA by DOT the effective coverage rate, compliance rate can be improved and the proportion of subjects consuming divided dose & incomplete dose can be reduced along with reduction of coverage compliance gap. The most common reason for non-consumption of MDA was that the drug distributor had not visited. Most of the side effects experienced during MDA were mild & self limiting with nausea & vomiting being most common. Overall the MDA campaign in both the districts is satisfactory. Thus with continued efforts the ultimate aim of achieving the lymphatic filariasis elimination can be achieved.

Declaration:

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Conflict of Interest: Nil

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A Study on Prevalence and Seasonal Distribution of Dengue at a Tertiary Care Centre of North India

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Abstract:

Introduction: Dengue virus infection is a major public health issue prevalent in tropical and sub-tropical countries all over the world mostly in urban and semi-urban areas. Over 2.5 billion people (40%) of the world's total population are at a risk. The present study is aimed to study the prevalence and seasonal distribution of dengue disease during three consecutive years from 2016-2018 at a tertiary care centre of North India. **Method:** This is an observational retrospective study conducted on total 6,481 (Six thousand four hundred and eighty one) clinical suspected cases referred from indoor and outdoor departments of Medicine and Pediatrics of Sarojini Naidu Medical College, Agra during the period from 1st January 2016 to 31st December 2018. Serum samples collected from suspected cases were collected and subjected to ELISA for detection of Non Structural Protein1 (NS1 antigen) and Immunoglobulin M (IgM) Antibodies. **Results:** From the analysis, this study reflects that the numbers of dengue cases in 2016 are maximum and outnumbered the dengue cases among three consecutive years from 2016 to 2018. Most of the cases were in the age group 0-30 years with a male preponderance. The outbreak occurred during the months of August to November indicating vector transmission in the monsoon and post-monsoon season. In 2016 overall prevalence rate of dengue was found to be 16.66% with prevalence rate of 12.92% for Dengue NS1 antigen and 20.94% for Dengue IgM antibodies. In 2017 overall prevalence rate of dengue was found to be 14.77% with prevalence rate of 11.77% for Dengue NS1 antigen and 16.29% for Dengue antibodies. In 2018 overall prevalence rate of dengue was found to be 13.56% with prevalence rate of 12.92% for Dengue NS1 antigen and 11% for Dengue antibodies. The maximum positivity was recorded in the year 2016 (16.66%), followed by 2017 (14.07%) and 2018(13.56%).Our study shows male preponderance with maximum cases in the year 2018 was recorded in the month of October (22.75%) whereas the lowest in the month of May (1.96%). **Conclusion:** In our study both NS1 Antigen and IgM ELISA tests were useful for the laboratory diagnosis and confirmation of dengue cases. NS1 in combination with IgM ELISA offers most sensitive diagnosis for dengue. As this disease affects the population in the monsoon and post monsoon months therefore continuous monitoring of dengue infection is important during the post-monsoon season. The peak in dengue positivity was observed during September to October.

Keywords: Dengue, WHO, NS1, IgM, ELISA

Introduction:

Dengue virus infection is a major public health issue prevalent in tropical and sub-tropical countries all over the world mostly in urban and semi-urban areas.

Dengue virus is a positive-strand RNA virus of the Flaviviridae family with 4 distinct serotypes (DEN-1, DEN-2, DEN-3 and DEN-4) and it is transmitted to humans by several species of Aedes mosquito. Over 2.5 billion people (40%) of the world's total population are at a risk. WHO estimates that about 50-100 million dengue infections occur worldwide every year.

WHO had classified the symptomatic dengue virus infection into Dengue Fever (DF), Dengue

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Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS).[1] In 2009, WHO has categorized the dengue patients according to clinical manifestations such as dengue without warning signs, dengue with warning signs (abdominal pain, vomiting, mucosal bleeding, fluid accumulation, lethargy, liver enlargement, increased hematocrit with decreasing platelets) and severe dengue.[2,3]

In India an estimated 33 million cases had occurred in 2010.[4,5] In 2016 more than 100,000 laboratory confirmed cases of dengue were reported by NVBDCP.[6] Dengue in India has been drastically growing over the last few decades with rapidly changing epidemiology.[7-9] It has become more frequent, especially in urban parts.[10-11]

In the early 2000s, dengue was endemic in a few southern (Maharashtra, Karnataka, Tamil Nadu and Pondicherry) and northern states (Delhi, Rajasthan, Haryana, Punjab and Chandigarh). The total number of dengue cases has significantly increased in India since 2001. It has recently spread to many states, including the union territories.[12] From 2010 onwards, the states of Assam, Bihar, Jharkhand, Orissa and Uttarakhand and some union territories including Andaman and Nicobar Islands, Dadra and Nagar Haveli, and Daman and Diu have become endemic for dengue. India experienced the highest dengue incidence in 2012 (about 41 per million population), 2013 (61 per million population) and 2014 (32 per million population).Since 1998-2014, the highest dengue incidence was reported in Pondicherry (372.92 per million population), followed by Dadra Nagar Haveli (176.31 per million population) and Delhi (102.15 per million population). Similarly, a high dengue incidence ranging between 21 and 50 per million, was reported from the states of Punjab, Gujarat, Karnataka, Kerala, Tamil Nadu and Orissa.

The disease shows seasonal pattern as the cases peak after monsoon. India receives 75% of its rainfall during the southwest monsoon period from June to September.[13] The disease is transmitted by the bite of several species of mosquitoes within the aedes genus, primarily being *Aedes aegypti*. According to various studies, both *Aedes aegyptia* and Aedes albopictus are the competent vectors for dengue virus in India.[14] Indian monsoon rainfall provides ample breeding habitats for Ae. aegypti, thus leading to high vector densities.[14] The infection causes flu-like illness and occasionally develops into a potentially lethal complication called dengue hemorrhagic fever (DHF) and Dengue shock syndrome (DSS).

In the present scenario all the 4 serotypes are prevalent in almost every state of India.[8,10,15] One serotype of dengue produces lifelong immunity against re-infection but for other serotypes, only partial or temporary immunity is produced.On the basis of the endemicity of dengue, World Health Organization (WHO) has kept India under category A, considering dengue as an epidemic where outbreaks occur every year and attributes to the leading cause of hospitalization and deaths among children, hyper-endemicity with all the four serotypes circulating in urban areas and spread to rural areas.[16]

Diagnosis of dengue virus infection at an early stage is important and is performed by serological based ELISA test. NS1 antigen detection test is conducted for suspected cases having 0-5 days of fever history and IgM antibody test is conducted for suspected cases having more than 5 days of fever history. This study is conducted at a tertiary care centre in northern part of India among clinically suspected dengue patients to report the sero-prevalence of dengue for a period of three consecutive years and to study the seasonal epidemiology and demographic profile of the disease.

Method:

This is an observational retrospective study conducted in Sarojini Naidu Medical College, Agra a tertiary care centre of North India. Blood samples from the clinically suspected cases of dengue were collected in serology laboratory of Department of Microbiology from Out-patient Departments of Medicine, Pediatrics as well as patients admitted in various wards over a period of 3 years from 1st January 2016 to 31st December 2018. Around 2-3 ml of blood samples was collected from the patients having clinical signs and symptoms consistent with dengue and samples were centrifuged at 4000 rpm for 5 minutes. Serum was separated aseptically using standard methods and transported to the virology laboratory for further processing if not tested within 3 days, the serum was transferred to a sterile vial and stored frozen at −20°C. A Performa was filled for each patient that includes personal as well as clinical history. The suspected cases having a fever history of 0-5 days were considered for Dengue NS1 Antigen

ELISA (as per Dengue NS1 Ag MICROLISA J.Mitra & Co. Pvt.Ltd., Recombilisa Dengue Ag Kit M/S CTK Biotech Inc.) Whereas, those having a fever history of more than 05 days were screened and tested for IgM antibodies (as per National Institute of Virology-DEN-IgM Capture ELISA kit, NIV, Pune) as per NVBDCP (National Vector- Borne Disease Control Programme) guidelines. ELISA test for detection of NS1 antigen and IgM antibodies was conducted as per the manufacturer's instructions. Ethical clearance for the study was not required as samples were referred to the laboratory for routine diagnostic purposes and not for research purpose.

Results:

Out of total 6,481 samples collected over a period of 3 years from 1st January 2016 to 31st December 2018 in Sarojini Naidu Medical College, Agra a tertiary care centre situated in north India, 973(15%) had confirmed dengue.

Figure 1 shows the distribution of dengue data from 2016-18 and it depicts that in 2016 out of total 2827 cases 471 (16.66%) were found positive for dengue. Based on the history of days of fever days, 1509 were categorized for testing for NS1 ELISA and 1318 for IgM ELISA, out of which 195(12.92%) cases were found positive for NS1 and 276(20.94%) were found positive for IgM. In 2017, total 1229 cases were tested out of which 173(14.07%) were found positive. Out of these, 603 were NS1 cases, out of which 71 (11.77%) cases were found positive, whereas, out of 626 cases, 102(16.29%) were positive for IgM antibodies. In the same order, in the year 2018, a total 2425 cases were enrolled, out of which 329(13.56%) were dengue positive. A total of 195(12.92%) out of 1509 were detected positive for NS1 antigen and 101 (11%) out of 910 IgM cases, were found positive. The maximum positivity was recorded in the year 2016 (16.66%), followed by 2017 (14.07%) and 2018(13.56%).

Figure 2 shows gender-wise distribution of dengue positive cases. In 2016, 297(63 %) were males and 174 (37 %) were females. In 2017, 91 (53 %) were males and 82 (47 %) were females. In 2018, 203 (62 %) were males and 126 (38 %) were females. Our study shows male preponderance.

Figure 3 shows the age-wise distribution of dengue cases, we observed maximum cases in the age group 11-20 years (31.21%) in the year 2016. In the year 2017, the maximum case of dengue falls in the age group 21-30 (25.43%). In 2018, however, the maximum positivity was found in the age group 0-10 years (39.51%). Confining the data for the least positive cases, we observed that it lied in the age group 61-above in all the three years included in the study: 2017 (2.89%) followed by 2016 (2.12%) and 2018 (1.51%) in chronological order.

Figure 1: Distribution of Dengue data from 2016-2018

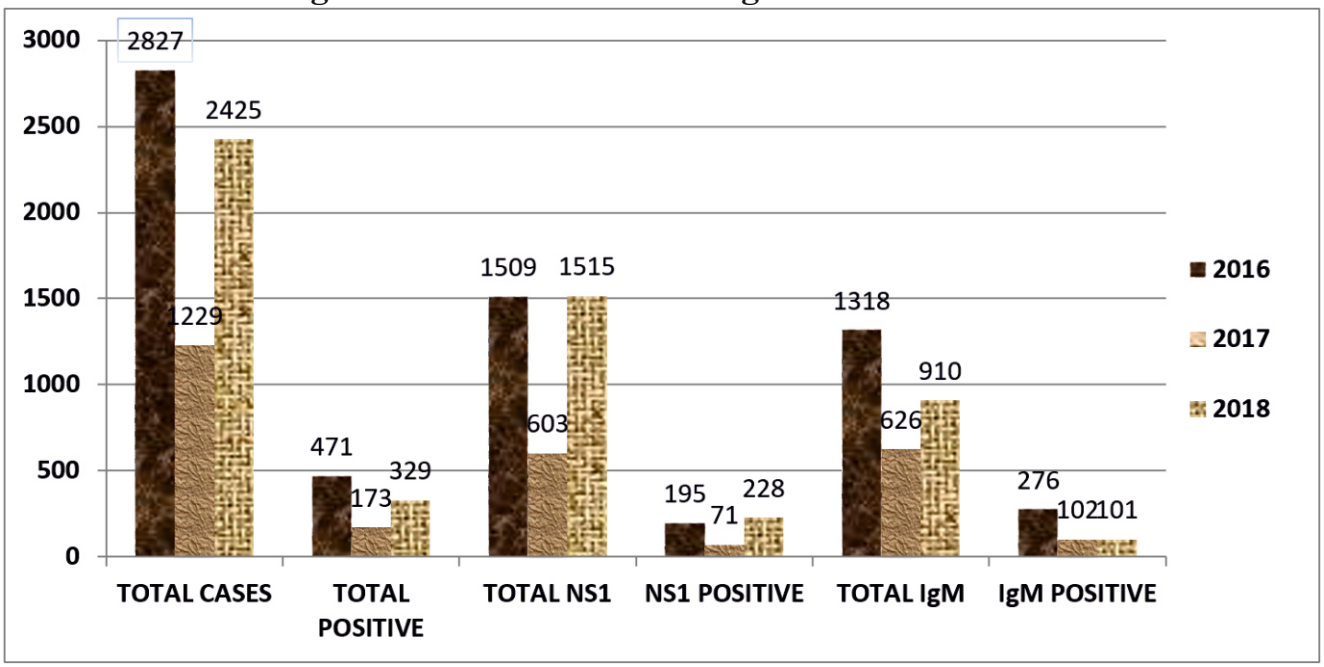


Figure 4 depicts monthly distribution of total suspected Dengue cases received during 2016-2018 and *Figure 5* shows monthly distribution of Dengue Positive cases reported during 2016-2018. According to monthly analysis, it was found that in the year 2016, the highest dengue load was found to be in the month of October (19.92%) and lowest in the month of December (06%) In the year 2017, the highest dengue positive cases were recorded in the month of November (21.33%) and lowest in July (2.38%).The maximum cases in the year 2018 was recorded in the month of October (22.75%) whereas the lowest in the month of May (1.96%).

Discussion:

Dengue is a globally emerging major public health problem in the tropical and sub-tropical since the last decade. Dengue has been appearing repeatedly with regular periodic surges.[17]

The present study was conducted at a tertiary care centre of north region involving total 16.6% serologically confirmed cases in 2016, 14% in 2017 and 13.5% in 2018. Total Dengue NS1 positive cases

Figure 2: Gender-wise distribution of Dengue Positive cases

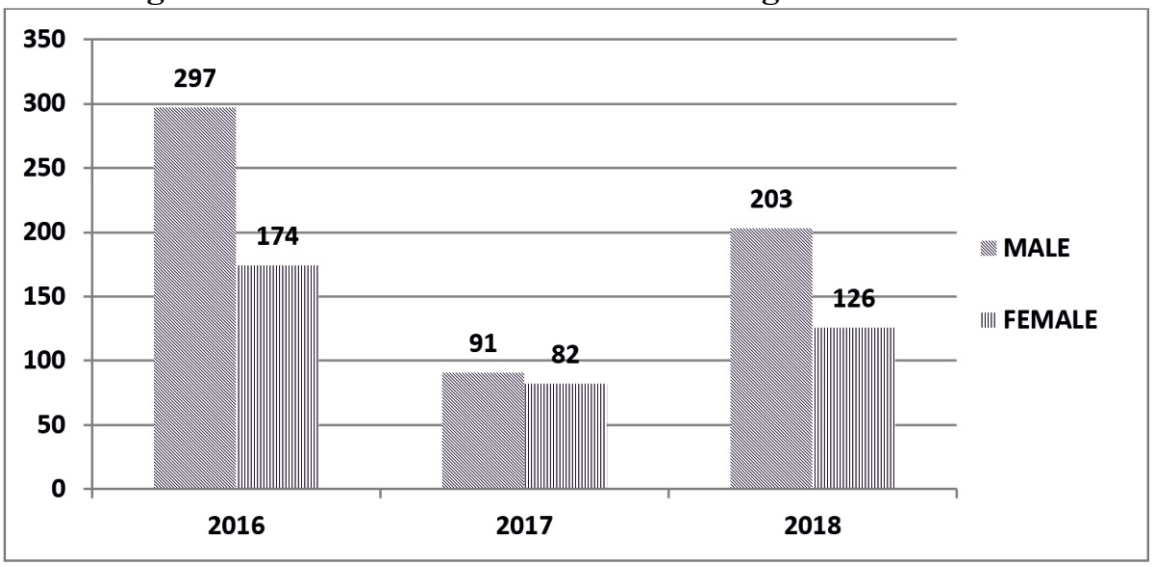
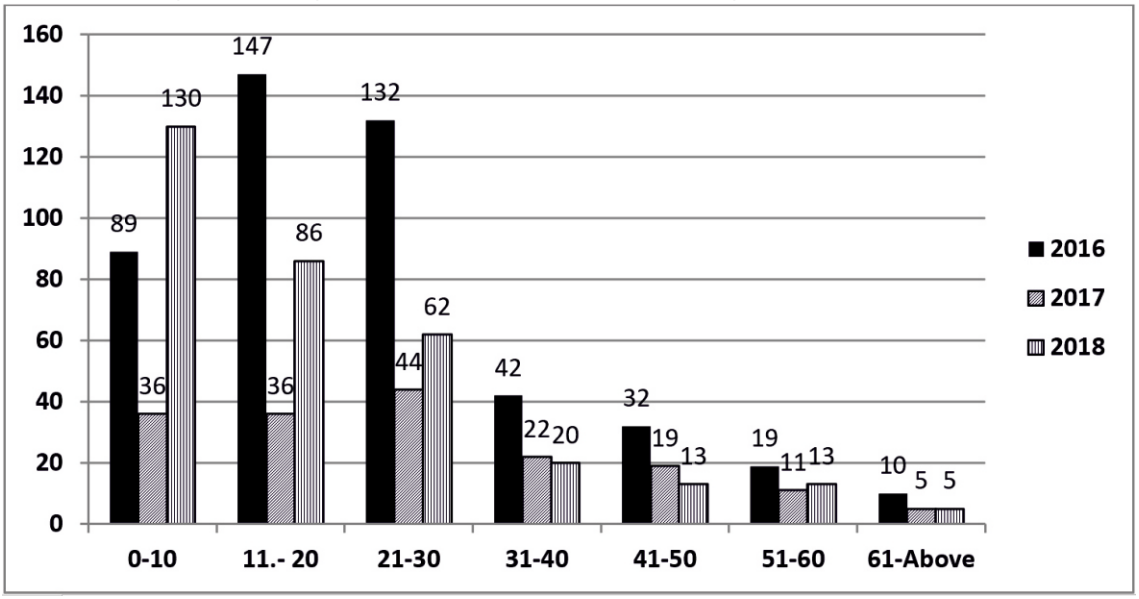


Figure 3: Age-wise distribution of Dengue Positive cases



were 12.9% in 2016, 11.7% in 2017 and 15% in 2018. Total Dengue IgM positive cases were 20.9% in 2016, 16.2% in 2017, and 11% in 2018. On an average, more NS1 cases (494) were reported as compared to IgM cases (479) by ELISA from the serum samples of the suspected patients. In our study more cases were diagnosed by NS1 ELISA test as compared to IgM ELISA as it detects both primary and secondary dengue infections before the appearance of IgM antibodies.[2,18-21] This is due to awareness of patients and clinicians for testing of dengue during febrile phase of infection.

Initially, dengue was considered an urban disease because of rapid development of urban areas resulted in unplanned colonization, improper proper supply and wastewater management system create ideal conditions for the proliferation of the vector.[10,22,23] The outbreak of dengue is reported continuously from the large cities of India like Delhi, Lucknow, Bangalore, Gwalior, Vellore, Calcutta, and Pondicherry.[10,24-30]

Figure 4: Monthly distribution of total suspected Dengue cases received during 2016-2018

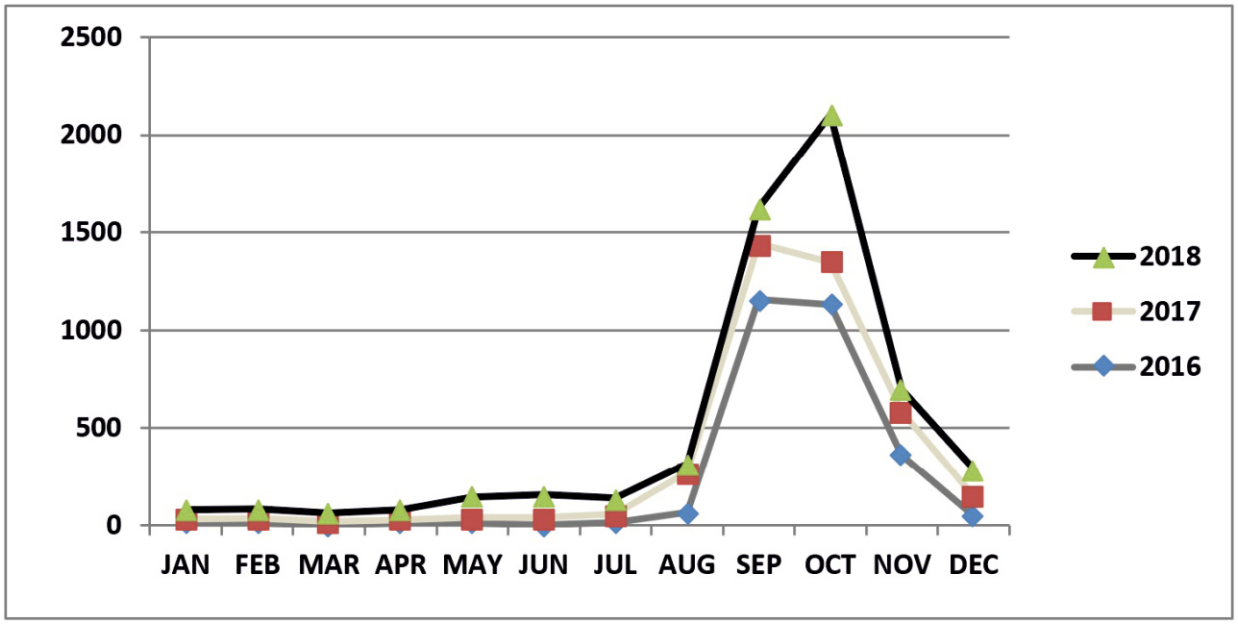
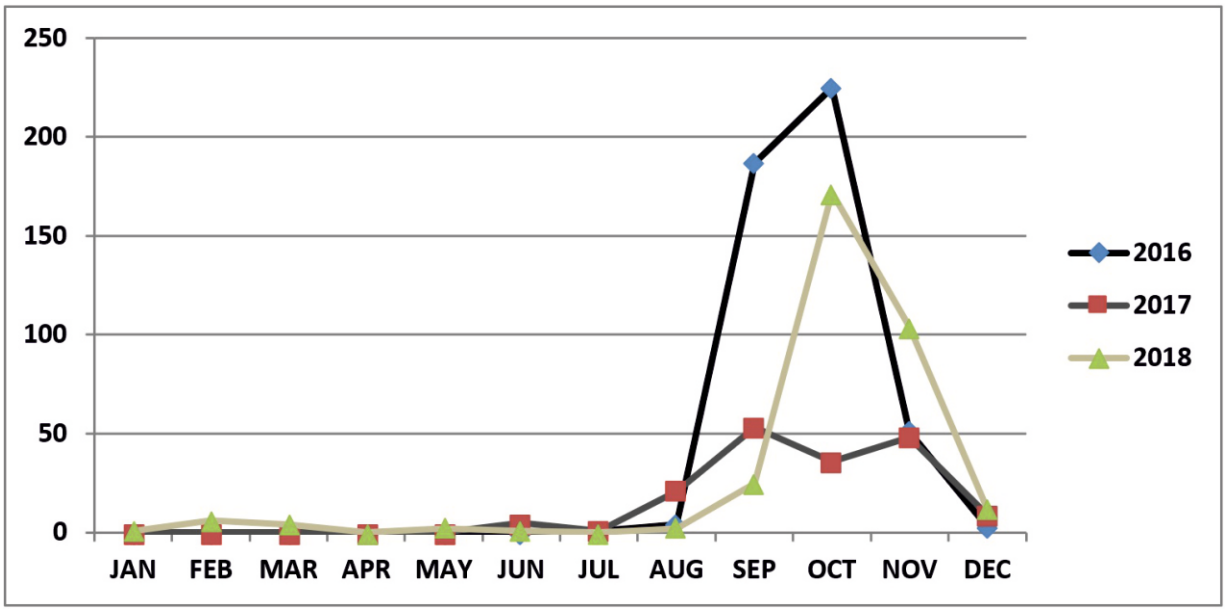


Figure 5: Monthly distribution of Dengue Positive cases reported during 2016-2018



In our study, on a comparison of the data obtained from three consecutive years of dengue recurrence at a tertiary care hospital situated in north India we found that there was a gradual decrease in the number of cases reported positive from the year 2016-2018. According to the study, 16.66% were positive in 2016 whereas 13.56% were found positive in the year 2018. While in the year 2017 the positive cases were reported as 14.07%. These findings are consistent with other studies from India. [13,16]

The role of environmental factors in infectious diseases is well known. Most of the countries reported dengue epidemics during warm, humid and rainy seasons, which favor abundant mosquito growth and shorten the extrinsic incubation period as well.[31-32] To identify the seasonal variation of the disease analysis of the data on monthly basis were done. As a tertiary care centre, the samples of suspected dengue cases were received throughout the year and therefore present study reports the continuous occurrence of dengue cases with variability. Number of positive cases was low from January to June. As rainy season starts by end of June and our study reported the maximum cases in the month of August to November during all three consecutive years of the study with a positivity varying around 19.92% to 22.75%. The correlation with occurrence of dengue infection and monsoon season is clearly evident in this study and it is further supported by similar findings from previous studies.[33-35] As Agra is situated on the bank of Yamuna river, therefore there are lots of marshy places which provide excellent mosquito breeding places, due to rapid urbanization. Aedes aegypti mosquito is the primary vector and lives in proximity to human habitations in urban areas and breeds mostly in man-made containers. The vector of this disease is a day time feeder and it bites in the morning. The transmission of dengue with increased activity in monsoon and post-monsoon season was evident in the present study, in accordance with the reported patterns of dengue transmission.[36]

Significant numbers of dengue positive cases were reported in different age groups. In 2016 majority of cases were reported in 11-20 years (31.2%) followed by 21-30 years (28.0%) age group. In 2017 majority of cases were reported in 21-30 years (25.4%) followed by 01-10 years (20.8 %) and 11-20 years (20.8%) age group. In 2018 majority of cases were reported in 01-10 years (39.5%) followed by 11-20 years (26 %) and 21-30 years (18.8%) age group. Overall the maximum dengue cases were from the age group 0-30 years. The shift from pediatric/adolescent population to young adults getting affected reflects the presence of non-immune adult population falling prey to the circulating serotype of dengue virus. The age group of 0-10 years was highly affected with dengue and these findings are not consistent with other Indian studies, as most of the Indian studies have reported 15 to 45 years as the most affected age group.[35,37-38] In some international studies dengue has been reported to mainly a pediatric public health problem.[39-40] Whereas the age group 20-30 years in the year 2017 which is consistent with other Indian studies.[7,37,41]

The higher prevalence of dengue infection was noted among males than females. The male female ratio was noted to be 1.7:1, 1.10:1 and 1.61:1 in the year 2016, 2017 and 2018 respectively. The prevalence of the disease in males could be higher as a result of their indulgence in more outdoor activities as compared to females resulting in more exposure to the daytime biting of Aedes. The lower case positivity rates in females may be attributed to lower reporting rate and as they remain at home and are less exposed to risk of vector borne infection.[22,29,42,43] Dengue is thus being spread irrespective gender or age group and emerging as a global challenge over the years.

Huge amount of infrastructure development have made growth environment favorable for breeding of mosquitoes and secondly due to improvement in the diagnostic facilities in the health care settings the reporting of cases is increased.

The present study has the limitations that clinical and mortality data is not available for the cases and the cases were not distinguished in to primary and secondary infection. Serotyping for dengue virus was not performed due to resource limitations.

Conclusion:

In 2016 overall prevalence rate of dengue was found to be 16.66% with prevalence rate of 12.92% for Dengue NS1 antigen and 20.94% for Dengue IgM antibodies. In 2017 overall prevalence rate of dengue was found to be 14.77% with prevalence rate of 11.77% for Dengue NS1 antigen and 16.29% for Dengue IgM antibodies. In 2018 overall prevalence rate of dengue was found to be 13.56% with prevalence rate of 12.92% for Dengue NS1 antigen and

11% for Dengue IgM antibodies. The maximum positivity was recorded in the year 2016 (16.66%), followed by 2017 (14.77%) and 2018(13.56%). Our study shows male preponderance with maximum cases in the year 2018 was recorded in the month of October (22.75%) whereas the lowest in the month of May (1.96%). The peak in dengue positivity was observed during September to October. The males as well as the pediatric population were most affected probably due to their more exposure during the predominant biting hours of the mosquitoes. Thus in the absence of specific antiviral therapy and protective vaccine for dengue fever effective measures must be taken to control the transmitting vectors to prevent dengue outbreaks. Mortality from dengue fever can also be prevented by its early diagnosis and timely management, therefore this study emphasizes the need of epidemiological and entomological surveillance to monitor trends in distribution and seasonal patterns of dengue.

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Declaration:

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Conflict of Interest: Nil

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Knowledge and Practice of Emergency Contraceptives among Married Women: A Community Based Cross Sectional Study

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Abstract:

Introduction: Emergency contraception (EC) serves as a backup in case regular contraception fails, can remarkablybring down the risk of a consequent unintended pregnancy and further complications. **Objectives:** To assess the knowledge and practice regarding EC among married women. To determine the association between knowledge regarding EC and socio-demographic variables of married women. **Method:** A cross-sectional study was conducted among urban slum areas of Jamnagar City with use of 30 cluster sampling technique in the year 2012-13. From each cluster 15 women of reproductive age group(15-49years) were taken as study participants and total 450 married women were enrolled in the study. Statistical analysis was done by using appropriate statistical tests. **Results:** Out of total 450 study population,30.22% women ever heard of emergency contraception (EC) among them all were aware about E-pills, Majority considered EC safe(80.88%). Very few women got knowledge from doctor (1.47%) and health workers (10.29%) only 31.23% women had ever used it. Women who were<30 years age old, well-educated and from upper socioeconomic status were more aware regarding EC. Nearly 50% women took E-pills because of timing was miscalculated (25.81%) or they were not using any contraceptives (22.58%). All the women who had practiced EC, revealed that it is 100% effective method for prevention of unwanted pregnancy in case of emergency. **Conclusion:** In this study, knowledge and usage rate of EC was found limited. Strategies to promote EC use should be focused on spreading accurate knowledge about it through information education and communication by health care providers and other audio-visualmedia.

Key Words: Emergency contraception, urban slum, married women, knowledge

Introduction:

A single highest intimidation to India's health, political, economic and social development is the flourishing population growth.[1] pregnancy is a valuable happening in the life of any women. Unfortunately, all pregnancies are not greeted. Ideally a child should be born because it is wanted, not because it cannot be prevented.

In India, about 210 million pregnancies that occur every year 80 million are unintended, resulting in 30 million unplanned births, 40 million abortions and 10 million miscarriages. Two fifth of the total abortions done in unsafe conditions.[2,3] As stated by the consortium on national consensus for medical abortion in India (2008), around 20,000 women lose one's life every year due to abortion related complications. Most abortion-related maternal deaths are attributable to illegal abortions hence contributing 8% to the cause of maternal mortality ratio in India.[4,5] Reasons for unplanned pregnancies are either woman's failure to use a contraceptive method or failure to use a method correctly.[6]

Emergency contraception (EC), otherwise known as postcoital contraception serves as a backup in case

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regular contraception fails, can markedly reduce the risk of a resultant unintended pregnancy and further complications.[7]

Even though, department of health and family welfare introduced EC in the form of emergency contraceptive pills (E-pills) in the national family welfare programme since the year 2002-03, the knowledge and use regarding EC remains still very low and that may be due to very less educational programmes were given to the community parallel to the introduction of it.[2]

Keeping in view the above points the study was undertaken to assess the knowledge and practice regarding emergency contraceptives among married women of reproductive age group.

Method:

A cross-sectional study was conducted during the year 2012-13 in a municipal corporation area, Jamnagar, Gujarat consist of 19 wards, 64 slum areas and 5, 29,308 total population as per census 2011.[8]Sample size was calculated by using the formula $n= 4pq/l^2$[9],where p= 56.5% (proportion of 15-49 years currently married women using any family planning method)[10],q=100-p, allowable error (l)=10% and non-response rate was considered 20%. Thus total sample size calculated was 370 and cluster sampling technique was used for the study.[9] Total 30 clusters were identified from urban slum areas of the city and from each cluster 15 women in the reproductive age group (15-49years) was included in the study. First house was selected by simple random method and then study subjects were interviewed by house to house visit till 15 women were enrolled from each cluster. Total 450 women were enrolled in this study. Data was collected by using pre-designed, pre-tested Proforma. Verbal consent was taken from each study participant prior to data collection. The Study was approved by the ethical committee of the institute. The community was very cooperative, actively participated and provided full support throughout the study. Socioeconomic class determined on the basis of modified Prasad's classification (1961) which take into consideration average consumer price index (CPI) of the year 2012 which was 969.[11] Data were entered in MS Excel spread sheet and was analysed using SPSS ver 20.

Chi square test and fisher exact test were used to find out the association between variables. A p value of less than 0.05 was considered as statistically significant difference.

Results:

Out of total 450 study population, 57.56% were in the age group of 25-34 years, majority were Hindu (88%). Nearly 40% women were educated up to primary while very few were graduated (2.88%). More than two third of women were housewives (76.66%)

Figure 1: Distribution of women regarding knowledge of emergency contraceptives (n=450)

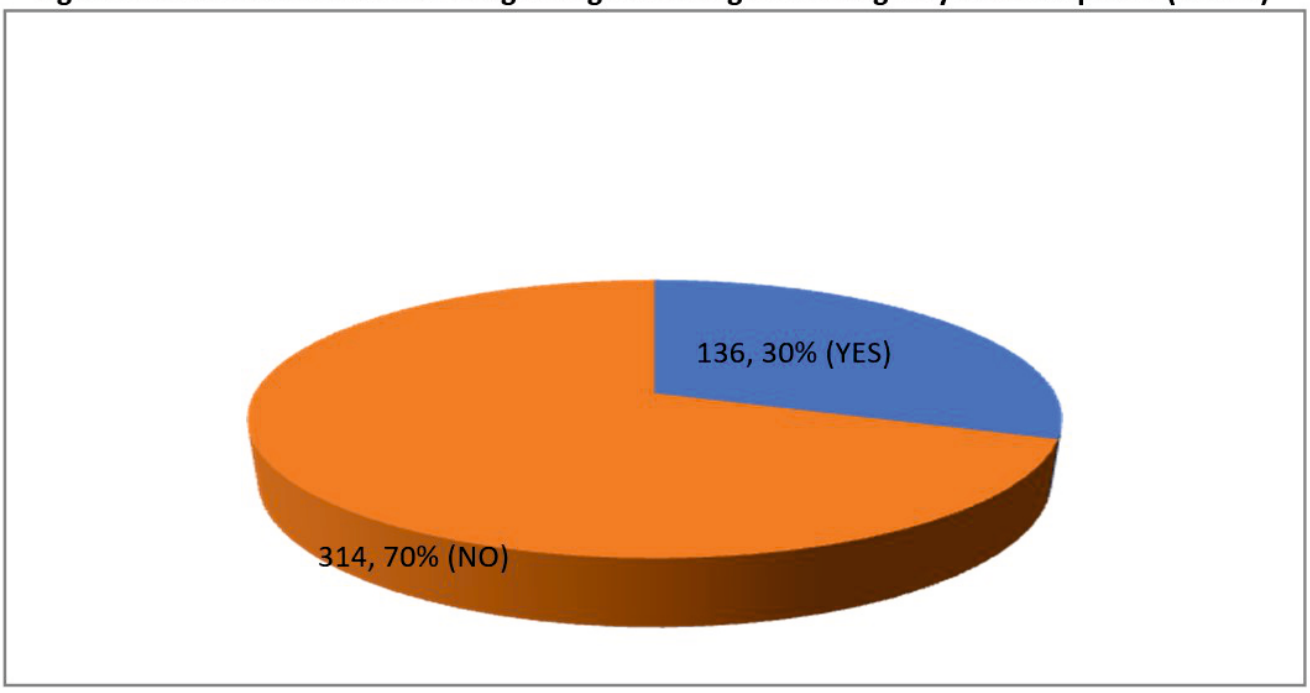
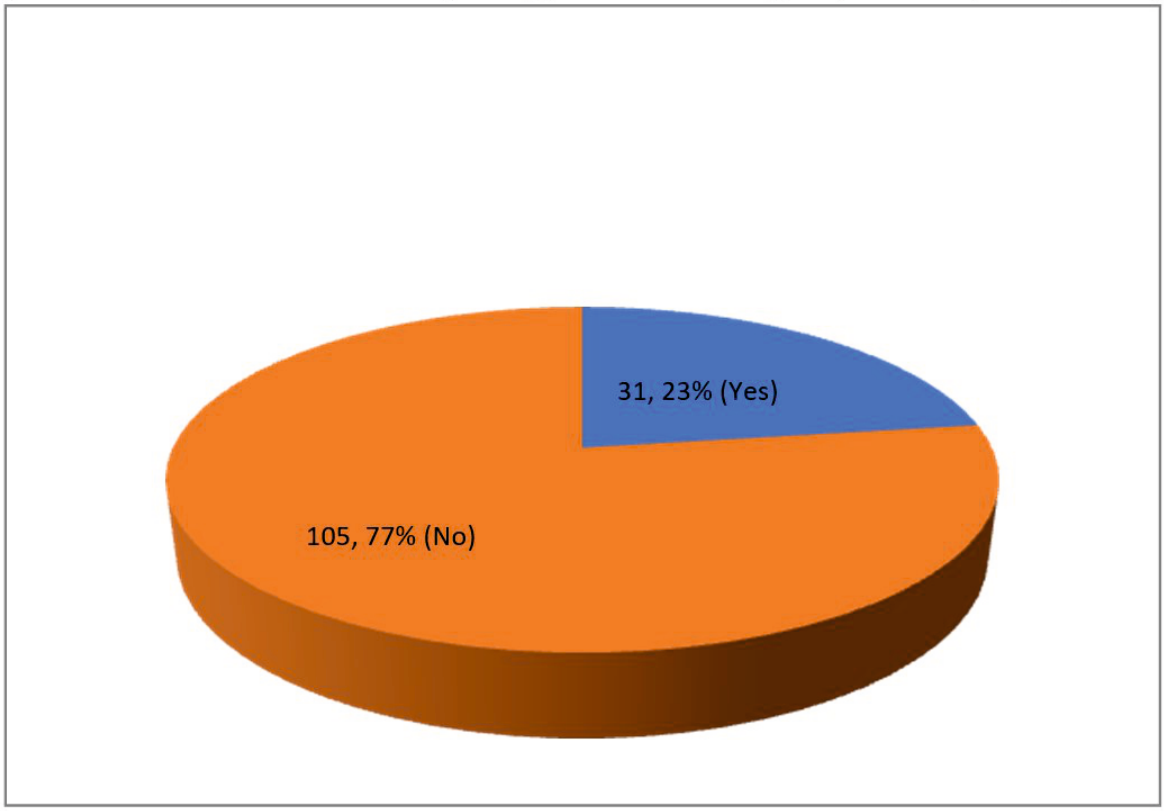


Figure 2: Distribution of women regarding practice of emergency contraceptives (n=136)



and 82.22% were belonged to middle socioeconomic class. Figure 1 depicts that 30.22% women ever heard of emergency contraception (EC).

Table 1 shows association between awareness of women about emergency contraceptives and their socio-demographic characteristics. It was found that awareness is significantly more among those women who were less than 30 years old, better educated, living in nuclear family and occupationally independent than others. These differences found statistically significant. The difference between religion of study population with awareness about EC was not found statistically significant.

Table 2 shows the knowledge of women who ever heard of EC. Those women who ever heard of EC, all were aware about E-pills (I pill/pill72/unwanted72) but only 2.20% women were aware about IUCD (Intra-Uterine Contraceptive Devices). Not a single woman knew that OCPs (Oral Contraceptive Pills) can also be used as EC. Majority of women considered EC safe (80.88%).Irregular menses as a common adverse effect of E pills mentioned by majority of women (81.61%) followed by nausea/vomiting (37.50%), heavy bleeding (19.12) and infertility (1.47%). Though E pills is available as over the counter drug but still majority of women replied that it can't be obtained without prescription. However nearly 85% women had correct knowledge that EC can't be used as regular method of contraception. Almost 75% women got knowledge about emergency contraceptives through audio-visual media like television/radio. Very few women got knowledge from doctor (1.47%) and health workers (10.29%). Almost all women knew that it can be available at medical store (97.05%).

Figure 2 depicts distribution of women regarding practice of emergency contraceptives. Among those women who have heard of EC, only 31.23% women had ever used it.

Table 3 shows the experience of women who had used Emergency Contraceptives. Nearly 50% women had taken directly from medical store by taking self-decision while only 16.13% women had consulted doctor or health worker before taking it. Nearly 50% women took E-pills because of timing was miscalculated (25.81%) or they were not using any contraceptives (22.58%). Other reasons given by the study population were missed pills (19.35%) and condom torn or slipped (12.90%). Irregular menses

Table 1: Association between awareness of women about emergency contraceptives and their socio demographic characteristics

Socio- demographic Characteristic	Aware (%) n=136(30.22)	Not aware(%) n=314(69.78)	Total (%) n=450(100.00)	p-value	Chi square value/ Fisher's exact test value,d.f.
Age group in years					
15 – 19	02(50.00)	02(50.00)	4(100.00)	<0.05	Fisher's exact test value= 40.237 d.f.=5
20 – 24	28(32.18)	59(67.82)	87(100.00)		
25 – 29	55(38.46)	88(61.54)	143(100.00)		
30 – 34	44(37.93)	72(62.07)	116(100.00)		
35– 39	04(5.80)	65(94.20)	69(100.00)		
≥40	03(9.68)	28(90.32)	31(100.00)		
Religion					
Hindu	125(31.57)	271(68.43)	396(100.00)	>0.05	χ^2= 2.82 d.f.=1
Muslim	11(20.37)	43(79.63)	54(100.00)		
Literacy status of women					
Illiterate	05(4.07)	118(95.93)	123(100.00)	<0.05	Fisher's exact test value= 116.103 d.f.=4
Primary	44(24.58)	135(75.42)	179(100.00)		
Secondary	41(49.40)	42(50.60)	83(100.00)		
Higher Secondary	35(67.30)	17(32.70)	52(100.00)		
Graduate and above	11(84.62)	02(15.38)	13(100.00)		
Occupation of wife					
Housewife	96(27.83)	249(72.17)	345(100.00)	<0.05	Fisher's exact test value= 77.883 d.f.=4
Farmer	07(77.78)	02(22.22)	9(100.00)		
Service	27(81.82)	06(18.18)	33(100.00)		
Business	04(80.00)	01(20.00)	5(100.00)		
Labourer	02(3.45)	56(96.55)	58(100.00)		
Type of family					
Nuclear	72(35.12)	133(64.88)	205(100.00)	<0.05	χ^2= 4.28 d.f.=1
Joint	64(26.12)	181(73.88)	245(100.00)		
Socio-economic class					

I	30(78.95)	8(21.05)	38(100.00)	<0.05	Fisher's exact test value= 197.136 d.f.=4
II	72(72.00)	28(28.00)	100(100.00)		
III	22(23.40)	72(76.60)	94(100.00)		
IV	08(4.55)	168(95.45)	176(100.00)		
V	04(9.52)	38(90.48)	42(100.00)		

Table 2: Knowledge of women about emergency contraceptives (EC) who had ever heard of EC (n=136)

Variables	Numbers	Percentage
Which of these can be used as EC*		
I pill/pill 72/unwanted 72	136	100.00
IUCD	03	2.20
OCPs	00	00.00
Safety		
Safe	110	80.88
Unsafe	26	4.41
Adverse effects of ECPs*		
Infertility	02	1.47
Irregular menses	111	81.61
Heavy bleeding	26	19.12
Nausea vomiting	51	37.50
Don't know	04	2.94
Can you get ECPs without prescription		
Yes	20	14.70
No	116	85.30
Don't know	00	00.00
Can it be used as regular method of family planning		
Yes	12	8.82
No	114	83.82
Don't know	10	7.35
Source of knowledge about EC*		
TV/RADIO	101	74.26
News paper	21	15.44

Husband	51	37.5
Family member	51	37.5
Doctor	02	1.47
Health workers	14	10.29
Knowledge about availability of ervices*familyplanning services*		
Hospital	30	22.05
Health worker	12	8.82
Doctor	41	30.14
Medical store	132	97.05
Don't know	00	00

*multiple answers

Table 3: Practice of women who had ever used of emergency contraceptives (EC) in their reproductive life span (n=31)

Variables	Numbers	Percentage
No. of women who have used EC		
ECPs	31	100.00
IUCD	00	00
OCPs	00	00
Source of advice regarding use of ECPs		
By self decision	15	48.39
doctor/health worker	05	16.13
Friends/relatives	05	16.13
Husband	06	19.35
Reason for use		
Was not using any contraception	07	22.58
Timing was miscalculated	08	25.81
Condom torn or slipped	04	12.90
Missed pills	06	19.35
Don't remember	06	19.35
Side effects experienced after use*		
Abdominal pain	14	45.16

Irregular menses	19	61.29
Heavy bleeding	16	51.61
Nausea vomiting	02	6.45
No side effect	07	22.58
Is it effective in preventing unwanted pregnancy?		
Yes	31	100.00
No	00	00

*multiple answers

(61.29%), heavy bleeding (51.61%) and abdominal pain(45.16%) were major side effects experienced by study population after use of E-pills. All the women who had ever used of EC, revealed that it is 100% effective method for prevention of unwanted pregnancy in case of emergency.

Discussion:

In present study, 30.22% study participants were aware about EC. Similar result was found by Awasthi S et al[6] in their study (29.31%). While awareness was noted higher (54.3%) in the study done by Lakshmi devi M et al[7]and lower (12%) in the study done by Raikar VR et al[12]

Women who were<30 years age old, well-educated and from upper socioeconomic status were more aware regarding EC as compared to others and this difference was found statistically significant. Similar results were noted by Wakankar et al[13] and Raikar VR et al[12] in their studies. We found statistically significant association between type of family and awareness regarding EC which was also found significant by Horne P et al[14] (2014) in a study done in north west district of Delhi.

When inquired about different types of EC, all women were aware about E-pills, only 2.2% women knew regarding IUCD and nobody was aware about OCPs. Similar study conducted by Singh V et al[2] in Raipur noted that only 43.5% study participants were aware about E-pills, 2.4% knew regarding OCPs and no one was aware about IUCD. In the study 88% women replied that EC is safe method of preventing unwanted pregnancy in case of emergency, while Kumar R et al[15] mentioned in their study that almost half of the study population considers EC safe and Singh V et al[2] noted very few women (8.9%) considers it safe. E-pills can be available without prescription known by only 14.7% women in our study, and this finding is lower as compared to findings noted by Singh V et al[2] (39.9%) and Kumar R et al[11] (48.5%). Major source of information regarding emergency contraceptives was audio-visual media TV/radio found in this study (97.05%)which was similar to other studies.[2,15,16] When inquired regarding other sources of information, present study shows that only 11.76% women got information through health care providers. This result was almost similar to the study done by Lakde et al[16] while it is lower when compared to the study done by Kumar R et al[11] (41.9%). All study participants in this study knew that E-pills can be available at medical store. Similar results were noted by Singh V et al[2] (94.04%) and Kumar R et al[15] in their study (61.0%) but very few women in this study knew that E-pills are also available through doctor (30.14%) or health worker (8.82%). These findings were almost comparable to study findings done by Kumar R et al[15] (25.7%) and Lakde et al[16](20.6%).

Ever used of emergency contraceptives rate found in this study was 6.88%,which is higher when compared with DLHS-3 (2007-08) data of Gujarat (0.9%)[17]. Among those women who ever heard of EC very few have used it. Majority of them took E-pill by making self-decision while very few women seek advice of health care providers before its use. Similar results were noted by Singh V et al[2] in their study while Kumar R et al[15] found that almost one third of women had consulted health care providers before its use. Most of the women had experienced irregular menses as side effect, similar finding noted in the

study done at Raipur.[2]

In this study, those who had ever used EC, among them only 22.58% were not using any regular contraceptives while Kumar R et al[15] and Singh V et al[2] noted in their studies that almost half and three fourth study population were not using any regular contraceptives respectively. EC was found effective in preventing unwanted pregnancies by our study population which was similar to other study findings.[2,15]

Conclusion:

Emergency Contraception has the potential to achieve the goal of "all pregnancies should be wanted" and it is handy tool to protect women from unwanted pregnancy and its unfortunate subsequent consequences. Though E-pills was introduced in the national family welfare programme by department of health and family welfare since long back and is easily available without prescription but in spite of that knowledge regarding it was found limited among women residing in urban slum area, which is one of the vulnerable sections of the community. Further very limited usage rate was found among those who ever heard of it. There is no active involvement of health care providers in providing knowledge regarding EC among study population.

Recommendation:

Strategies to promote emergency contraceptive use should be focused on spreading accurate knowledge about it through information education and communication by health care providers and other audio-visual media. Active involvement of health care providers is needed to increase knowledge about emergency contraception among women of reproductive age.

Limitation of study:

Continuous research in the same topic is desirable as the data are old and the same can be compared with the latest data.

Declaration:

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Conflict of Interest: Nil

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"New Normal"- Corona era

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Word "Normal" according to Cambridge dictionary means usual or the same as would be expected. So, when the things change from what is usually expected in a day to day life and the change is going to stay for long it becomes the 'New Normal'. This has been experienced globally after the COVID-19 Pandemic. Things which were very usual and considered normal like travelling in a public transport, greeting people with handshakes or hugs, eating out in a crowded restaurant and roaming in markets or malls suddenly became a threat for the spread of the coronavirus. Terms like quarantine, isolation, lockdown, physical distancing etc. were now used more commonly.

The novel coronavirus is also called SARS CoV-2 which causes infectious disease known as COVID- 19. Initial outbreak was seen in Wuhan [China] and was announced as a pandemic later by the World Health Organization on 30 January 2020.[1] On the same day, the first case of COVID-19 was reported in India from the state of Kerala.[2]

Most common symptoms are Fever, dry cough and tiredness. But some patients even experienced aches, nasal congestion, runny nose, diarrhea and sore throat. Most people [80%] despite being infected do not experience any symptoms. In symptomatic cases symptoms can range from very mild to severe acute respiratory illness.[3] In a recent study in which laboratory surveillance data of India from January 22 to April 30 was analyzed, it was reported that '25.3% cases were asymptomatic family contacts, 10.6% were symptomatic contacts and 10.5 per cent were Severe Acute respiratory illness patients out of the total 40,184 positives case'.Among the symptomatic cases, cough [64.5%] and fever [60%] were the most common symptoms reported at the time of sample collection. Less than 5% cases reported gastrointestinal symptoms like nausea, vomiting, abdominal pain and diarrhea.[4]

Person to person transmission occurs through droplets from mouth or nose and contact routes. Droplets being heavy cannot travel far [within 1 metre] after expulsion and quickly settle on a surface. Incubation period on an average is 5-6 days but it can be up to 14 days. Elderly and people with existing co-morbidities are more likely to experience severe illness.[3]

To control the spread of disease many measures were taken by the Indian government and the major one was the implementation of Lockdown. Lockdown was announced by Prime Minister of India on 24 March 2020. Citizens were not allowed to go out of their houses except to buy essentials commodities or for health emergencies.[5] Concept of "Work from Home" has been adopted by many public and private organizations, students are taught with the help of virtual technology by online classes, essentials are delivered at the door steps but with contact less methods and awareness campaigns through mass media have been started by different state governments. This was done at the national level but at an individual level, certain measures are recommended like hand washing by using soap and water for at least 40 seconds or cleaning hands with an alcohol-based hand rub for at least 20 seconds as coronavirus can be transmitted through contact routes. While sneezing or coughing it is advised to practice cough etiquette in which nose and mouth are covered with a bent elbow or tissue.[3]

As droplet transmission is reported so it is advised to wear a mask while stepping outside the home. Medical masks are for the health workers, infected and at risk individuals when required and is a critical

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resource. Non medical masks can be used for the daily use. According to WHO the fabric mask should contain three layers-the internal layer should be made of a hydrophilic material for example cotton, middle layer should be hydrophobic made up of non-woven material [synthetic] like polypropylene and the outermost layer should be able to limit the external penetration to the wearer's nose and mouth suitably made of a hydrophobic material like polypropylene, polyester, or their blends.[6] Homemade mask or fabric mask should not be shared and guidelines given by the Government of India for its wash and maintenance should be followed.[7] One cannot imagine going out without wearing a mask as it has become the 'New Normal' accessory.

If someone is wearing the correct mask that doesn't guarantee complete safety from coronavirus, along with-it proper practice of hand-washing, physical distancing and cough etiquette is equally important.

Physical Distancing as described by CDC "keeping space between yourself and other people outside of your home".[8] The guidelines of Government of India advice citizens to maintain a distance of 6 feet from other people when going out to the market, restaurant or a religious place. At the time of unlock phase 1 it will be wise to Avoid gathering/crowd if possible, in case of any event organization the invitees should be kept to the minimum. Rather than going to restaurants and dine-in, take outs should be preferred to minimize prolonged contact with other people.[9,10] Take away parcels, no jammed or stuffed gatherings/parties and no hugs/handshakes are the "New Normal" of social life.

Certain people believe that wearing multiple mask, smoking and taking antibiotics without any prescription will save them from getting infected but this is not effective against COVID-19.[3]

It is very important to be vigilant regarding own health, district and state authorities should be reported at the earliest in case of any illness so that proper management can be done. For any guidance regarding the concerns and issues on Covid-19, 1075 is the national helpline.[9]

In the summer season it is very common to have Air conditioners in the offices and restaurants. But now it should be kept in mind to set the temperature in the range of 24-30oC with 40-70% relative humidity as per the government guidelines. Cross Ventilation should be maintained and intake fresh air as much as possible. In offices and restaurants, the surfaces which are regularly touched should be disinfected with 1% sodium hypochlorite.[9,10]

In lockdown with restrictions and curfews, staying indoors and working from home can take a toll not only on physical health but also on mental health. For boosting immunity and self care certain guidelines are given by Ministry of AYUSH which includes drinking warm water, practicing yoga, Pranayama and meditation for minimum 30 minutes. It also suggests consumption of 'Chyavanprash', 'Golden Milk' and some other measures that can be practiced as per the convenience of an individual. These suggestions can be incorporated into routine for good health.[11] Practicing self-care by incorporating exercise and nutritious diet should become a "New Normal" to be able to maintain good health.

Listening to the news updates regarding COVID-19 and not being able to meet friends and family can cause anxiety and fear. At our end, it becomes pertinent that we should ensure that the news we listen and share are from reliable sources only. It's advisable not to follow the sensational social media posts that can have an impact on one's mental status. "Work from Home" can also be taxing on one's mental health with no proper time limit for the work hours. So, whenever feeling anxious, slow down your mind by thinking of something soothing and calm. Don't cut yourself socially try to stay connected with your friends and family with the help of phone and social media. Do not discriminate against people who are infected or got recovered from COVID-19.[12] In the time of pandemic stress, anxiety, fear and panic had become the "New Normal" but one should try to remain calm and if these emotions prevail contact a specialist.

Government of India launched an application "Arogya Setu" which helps a person to assess risk of catching coronavirus by detecting the proximity of any contacts that are positive. In case a person doesn't have access to Smart phone the alternative is "Aarogya Setu Interactive Voice Response System [IVRS]" where the person is asked to give a missed call on 1921 which is a toll-free number and inputs regarding his/her health will be recorded in a return call. Further SMS alerts will also be provided regarding the same.[13,14]

It is a very useful app in case of going out of your home for various activities like travelling, shopping, visiting religious places and also for workers in different workplaces. This application will alert people regarding any contact with an infected person. This mobile application has become the "New Normal" with more than 100 million downloads.

The government is providing relaxation in the lockdown and restrictions, various non-essential services, business, schools and colleges will begin again. Relaxation does not mean that we are not at risk of getting infected from coronavirus and can go back to the way of living before the pandemic. As lockdown cannot be extended until we are free from coronavirus, the current lifestyle should be considered as a new normal. Physical distancing, hand washing and wearing mask are the preventive aspects that we have to follow so that we win this battle against coronavirus till we get a cure. We all have heard that prevention is better than cure; it's time to follow this saying by preventing the spread of coronavirus.

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A compendium of evidence related to 'social distancing'measure in view of the spread of COVID-19 pandemic.

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Abstract:

With no definitive treatment in place to date for the COVID-19 pandemic, reliance on public health measures is of utmost importance. Social distancing requires maintaining a physical distance of at least one meter between people and reducing the number of times people come into close contact with each other. Modeling evidence from past influenza pandemics and current experiences with COVID-19 indicates the role of SD in delaying the spread of the virus by reducing the probability that uninfected person will come into physical contact with an infected person.

Introduction:

The world is currently reeling under the COVID-19 pandemic which began as an outbreak in Wuhan, Hubei Province, China in December 2019 and has spread across 212 countries and territories around the world.[1] With no vaccine and definitive treatment in place to date, reliance on public health measures is of utmost importance.

Social distancing (SD), is an intervention that requires maintaining a physical distance of at least onemeter between people and reducing the number of timespeople come into close contact with each other thereby reducing transmission of disease.[2] China imposed lockdown/containment measures from 27-30 January onwards on various scales.[3] Since then many countries have implemented SD measures. Though implementation of any public health intervention should be purely evidence-based, it is not the case always as evidence may be evolving and many social and political considerations need to be accounted for. Mathematical modeling and lessons from previous influenza pandemics can help in decision making.

SD is a community mobilization effort and the effectiveness solely rely on compliance by the public. Factors that affect compliance are awareness regarding the reason, provisions, penalties for defaulting, economic implications, and trust towards the authorities.[4]

The basic principle behind SD is to decrease the R_0 i.e. basic reproduction number. When the R_0 value is below one for a long time, containment can be achieved and infections will decrease. This will also reduce the burden on health care systems and health workers, explained as "flattening the curve" by experts.[5] SD is useful when linkages between cases are not clear and community transmission is occurring.[6]

SD measures at the individual level include isolation of cases, quarantine of contacts/suspects, and stay at home recommendations. This helps in separating the sick from the healthy even if they are asymptomatic. Voluntary SD, especially in high risk groups, reduces morbidity by reducing the transmission. Other measures like the closure of schools, colleges, and workplaces, cancellation of mass gatherings, and Cordon sanitaire' (mandatory quarantine of buildings or residential areas) affect at the community level.[5]

Case for social distancing

Modelling evidence from past influenza pandemics[7][8] and current experiences with COVID-19

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indicates the role of SD in delaying the spread of the virusby reducing the probability that uninfected person will come into physical contact with an infected person. However, SD along with other non-pharmaceutical measures like good respiratory hygiene, hand washing, and use of face masks can lead to a significant reduction in number of cases.[9] It has been estimated that if non-pharmaceutical measures including SD had been implemented one week, two weeks, or three weeks earlier in China, the number of COVID-19 cases could have been reduced by 66%, 86%, and 95%, respectively, also limiting the areas to which the virus had spread.[10]

A study by Glass R J et al, for Asian Flu, showed that closing schools and colleges reduced the attack rate by >than 90% as children and teenagers stayed at home. Their simulations also suggest that all young and adults must also be targeted as there is enhanced transmission by them.[6] Reluga TC reported that SD is most beneficial to individuals for diseases with R0 2.They also highlighted that in the absence of any definitive treatment/vaccination, optimal SD never recovers more than 30% of the cost of infection. The benefit is limited to creating a longer window of opportunity for vaccine development.[11] A systematic review modelling paper by Rashid et al on measures for response to an influenza pandemic that suggested that mass gatherings shortly before the peak of the epidemic could led to 10% higher peak.[12]

Several studies have reported the benefits of SD for the ongoing COVID-19 pandemic. Katie Pierce suggests that SD can reduce the chance of infection among high-risk populations, but stresses that individual behavior changes are more important.[13] A scoping review by Adhikari SP et al studied many preventive measures such as mask, hand hygiene and SD ass ways to reduce transmission.[14] Kiesha Prem et al also reported a positive effect of control strategies to reduce social mixing.[15] Chen W et al reported that SD was implemented as an early containment strategy in China and helped reduced the transmission.[3] Similar findings were also reported by a modelling study by Peng Shao et al, where they found that early case isolation and increased interpersonal distance were effective in controlling the spread of the epidemic.[16] Another study by ICMR estimated that the Covid-19 cases can be reduced by up to 62 % and the peak number of cases by 89% if social distancing and quarantines are strictly observed.[17] Koo et al reported that combined intervention (quarantine, school closure, and workplace distancing) in Singapore was the most effective and reduced the estimated median number of infections of SARS CoV-2 by 99·3%, when R_o was 1·5, by 93·0% when R0 was 2·0, and by 78·2% when R0 was 2·5.[18] A mathematical modelling study, by Choi et al for South Korea also suggested that SD was crucial to reduce the spread of the virus, among a variety of other measures.[19] A systematic review by Fong et al found limited evidence but, suggested that mass gatherings may be beneficial, but ambiguity on the size of gathering remains. They reported that the ban on public gatherings and other preventive interventions reduced the weekly death rates and positive correlation between duration of ban and reduced death rates.[20] Goerge Milne et al found that isolation of cases, closure of schools and workplaces, and reducing contact in the community were effective in 'flattening of the curve'. These were found to be effective even after 10 weeks delay from the day of index case arrivals. Ferguson et al predicted that stopping mass gatherings have relatively little impact as contact time is relatively smaller compared to school, colleges, workplaces or bars, and restaurants. They highlighted that these measures should remain in place until a vaccine is available.[21] Additionally, all layers of SD i.e. closure of schools, colleges, and workplaces, cancellation of mass gatherings should be implemented at once rather than one by one for a better outcome.[5]

The scientific basis for SD alone is not enough. The SD policies have to be enacted without any bias against any population group. Cases of extreme forms of SD can increase the transmission in the households leading to increased clustering of household cases.[15] The potential effects of SD on mental health also need to be considered.[22] It should also be noted that in the absence of any vaccine, 'herd immunity' is the only way to decrease transmission in the community. Once 'herd immunity' is sufficient, SD measures will become obsolete.[5]

SWOT analysis of social distancing:

A strengths, weaknesses, opportunities, and threats (SWOT) analysis of SD is represented in Box 1. Points that were directly linked to the SD were classified as strengths or weaknesses; points that

were not directly linked to the SD but (potentially) affecting the SD were categorized as opportunities or threats. It can be seen that even though SD is a good strategy, lack of strict implementation and apathy of the public towards it can negate the expected results.

economic impact of SD measures should be closely monitored. After lifting of these measures, evaluation in each of these domains is necessary to generate evidence to inform future practices in times of resurgence or new epidemics.

Table 1: SWOT analysis of Social Distancing

STRENGTHS	WEAKNESSES
• Decreased transmission of the virus and delayed spread of illness • Decreased chance of infection among high-risk individuals • Behavioral changes (protective behavior) • Buy time for vaccine development, improved diagnostics, and treatment • Time to equip the health system at the national, state, and local level • Time to understand the epidemiology of COVID-19 and effectiveness of control measures from global experience	• Depends on compliance by the public • Depends on the credibility of public • health authorities and politicians • Depends on strict implementation • Behavioral changes - psychological changes, heightened anxiety, depression, disproportional damage to elderly, kids, and those living alone. • Parents overwhelmed due to work from home as well as taking care of kids due to the closure of schools • Co-occurrence with an outbreak • Ongoing prevention programs (e.g. routine immunization) may be affected
OPPORTUNITIES	**THREATS**
• Implementation with travel restrictions, quarantine facilities, and increased case detection and isolation • Implementation with other preventive measures like handwashing, wearing a mask, etc. • Development of candidate vaccine • Digital technology – for socializing and work • Mindfulness, physical exercises • Data from China is available • Seasonal variation (? Decline in summer)	• Religious and festival congregations • Migrant and other vulnerable population • Slums / overcrowded households • Ethical challenges/ Human rights • Socio-politico-economic disruption

Conclusion:

Even though there is only limited evidence, it supports SD measures as means of reducing the transmission and delaying the spread of COVID-19. Simultaneous implementation in multiple layers is most effective. It is critical to identify the right time for implementation and maintain it for adequate duration.

Scope for further research:

The epidemiological, social, psychological, and

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Forgotten Enemies in the Shadow of COVID19

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The fight against the corona pandemic is important from the point of its direct impact in terms of high morbidity and moderate mortality but it also could indirectly result in many more victims by disrupting the architecture of our existing health system. So far, It has been seen that due to unprecedented nature of covid19 pandemic and high transmissibility forced the health authorities to give their almost 100% attention toward covid19 pandemic management and we have either reduced or stopped to pay attention to our known enemies like TB, HIV etc. These are very dangerous infectious diseases that have been known to affect us badly since years with high morbidity and mortality. If we tend to continue forget these known enemies while fighting against the corona, there is a risk of having even greater impact of existing disaster in the coming days.

Official statistics suggest that there were 1.7 million cases of TB in 2017, and it killed 56,277 people, these numbers suggest that TB had a case fatality rate of 3.2% in 2017, meaning it was relatively more fatal than covid-19. Where the difference is in the number of cases (multiple times more than covid-19 cases detected so far in the country) and in its treatment (TB has a known cure and treatment regimen unlike covid-19).

Table 1: WHO Health Statistics Report Data (INDIA)

	Cause		Total Deaths (Estimated)
	Communicable, maternal, perinatal and nutritional conditions		2490052
A.	Infectious and parasitic diseases		1199348
	1.	Tuberculosis	421437
	2.	STDs excluding HIV	3914
	3.	HIV/AIDS	62104
	4.	Diarrhoeal diseases	409652
	5.	Childhood-cluster diseases	38066
	6.	Meningitis	34324
	7.	Encephalitis	33546
	8.	Hepatitis	77304
		Acute hepatitis A	2420
		Acute hepatitis B	52971
		Acute hepatitis C	1081
		Acute hepatitis E	20832
	9.	Parasitic and vector diseases	63244
	10.	Intestinal nematode infections	529
	11.	Leprosy	7274
	12.	Other infectious diseases	47954

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B.	Respiratory Infectious				617245
C.	Maternal conditions				40799
D.	Neonatal conditions				549737
	1.	Preterm birth complications			302277
	2	Birth asphyxia and birth trauma			126372
	3	Neonatal sepsis and infections			87045
	4	Other neonatal conditions			34042
E.	Nutritional deficiencies				82923
	Non-communicable diseases				5995333
A.Malignant neoplasms					815148
	1.Mouth and oropharynx cancers				101108
		a.	Lip and oral cavity		58983
		b.	Nasopharynx		3277
		c.	Other pharynx		38848
	2. Oesophagus cancer				44432
	3. Stomach cancer				62626
	4. Colon and rectum cancers				56168
	5.Liver cancer				31273
	6.Pancreas cancer				16818
	7.Trachea, bronchus, lung cancers				89288
	8.Melanoma and other skin cancers				4498
	9.Breast cancer				80724
	10.Cervix uteri cancer				72661
	11.Corpus uteri cancer				5308
	12.Ovary cancer				22651
	13.Prostate cancer				14371
	14.Testicular cancer				1472
	15.Kidney cancer				7014
	16.Bladder cancer				11004
	17.Brain and nervous system cancers				17216
	18.Gallbladder and biliary tract cancer				38136
	19. Larynx cancer				19904
	20.Thyroid cancer				3673
	21.Mesothelioma				500
	22.Lymphomas, multiple myeloma				30397
	23.Leukaemia				27864
	24.Other malignant neoplasms				56043
B.	Other neoplasms				14344
C.	Diabetes mellitus				308985
D.	Endocrine, blood, immune disorders				21130
E.	Mental and substance use disorders				31099
F.	Neurological conditions				208999
G.	Cardiovascular diseases				2590089
H.	Respiratory diseases				1017179
I.	Digestive diseases				509871
J	Genitourinary diseases				304702

K	Skin diseases		13236
L.	Musculoskeletal diseases		49210
M.	Congenital anomalies		105119
N.	Oral conditions		479
O.	Sudden infant death syndrome		5743
A.	Injuries		1083234
	Unintentional injuries		811815
	1.	Road injury	299091
	2.	Poisonings	31310
	3.	Falls	206345
	4.	Fire, heat and hot substances	45197
	5.	Drowning	63969
	6.	Exposure to mechanical forces	18983
	7.	Other unintentional injuries	146920
B.	Intentional injuries		271420
	1.	Self-harm	215872
	2.	Interpersonal violence	54858
	3.	Collective violence and legal intervention	689

Table 2: Comparison of contribution of covid19 with other diseases in terms of deaths due to different group of diseases

Sr. No.	Cause	Total deaths in year	Midyear Estimated Total deaths	Contribution of disease in midyear total estimated death		
				Covid19 (%)	Tuberculosis (%)	Mouth and Oropharynx cancers (%)
1.	Infectious and parasitic diseases	1199348	599674	28084 (4.68)	210719# (35.14)	—
2.	Respiratory Infectious	617245	308623	9.10	68.28	—
3.	Total deaths	9568619	4784310	0.59	4.40	1.06

Increase in morbidity and mortality due to preventable and treatable diseases may occur if the focus shifts injudiciously from combating these diseases to COVID-19.

In line of above discussion more detailed statistics and inference is explained in the tables given below:

- As on 21st July, 1155191 cases and 28084 deaths due to covid19 have been reported across the country.
- As per the latest available report we can analyze the situation as mentioned in table 2

As we can interpret from these both tables that covid19 as disease is much less lethal than tuberculosis or common cancer like Mouth and oropharynx cancers as overall contribution of covid19 is much less than these two health issues as only 0.6% of estimated midyear deaths are due to covid19 while due to TB and oral cancer are 4.4% and 1.1% respectively.

It doesn't mean that we should relax our all the preventive and curative efforts against covid19 but at the same time other very important and much dangerous and more lethal diseases shouldn't be ignored during this unusual pandemic scenario.

References:

1. Global Health Estimates 2016: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2016. Geneva, World Health Organization; 2018.
2. Covidindiaupdates.in. 2020. COVID-19 India Updates. [online] Available at: <http://covidindiaupdates.in/> [Accessed 25 July 2020].