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HEALTHLINE JOURNAL

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From the Desk of the Editor

Healthline journal is an initiative taken by Indian Association of Preventive and Social Medicine-Gujarat Chapter to promote and encourage research activities. Since the publication of first issue in 2010, Healthline has provided a stage to public health personnel to express their findings and opinions about various fields of Community Medicine. The "Community Medicine" is an ever advancing field and the newer researches and their disseminations provide thrusts to advance the knowledge and perspectives of the subject.

The responsibility of management and publication of Healthline journal has been given by IAPSM-GC to Community Medicine Department, GCS Medical College, Ahmedabad. I am glad and honoured to receive this responsibility as Editor in Chief for next three years. On behalf of entire editorial team of Healthline journal, I would like to assure that we will try our best to accomplish the objectives set and to take quality of journal to newer heights.

We are pleased to announce that from January 2015 onwards, Healthline journal has been registered to Scopemed- The Online Journal Management System. The authors can submit their manuscripts online through this system. I consider it as a step forward, towards advancement. We invite the suggestions and views from public health personnel, which can help in improving the quality of Healthline Journal in various facets. We also request all the members of association and the all readers to contribute by submitting their manuscripts for publication in the journal.

Herewith, I would like to dedicate current issue of the Healthline journal to late Dr. C. K. Purohit for his immense contribution to the subject of Community Medicine.

Dr. K. N. Sonaliya
Editor in Chief
Healthline Journal

Earthquake : Challenges for Public Health

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History of mankind is marked with some of the greatest natural disasters. Every time a challenge is put up by the nature, humans are able to stand up and fight their way out and survive the difficult times. As the definition of disaster states a disaster is "any occurrence that causes damage, ecological disruption, loss of human life or deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community or area".

Earthquakes are devastating disasters which have shaken many empires since ancient times. The morbidity and mortality caused by different events vary according to time, place and population density of the place. The world is divided into seismic zones based on the tectonic plates and the magnitude of earthquakes. Various impacts of earthquake are as given below.[1]

	Most common effect on Environmental Health	**Level of Damage**
Water supply and waste water disposal	Damage to civil engineering structures	1
	Broken mains	1
	Damage to water sources	1
	Power outages	1
	Contamination(biological or chemical)	2
	Transportation failures	1
	Personnel shortages	1
	System overload(due to population shifts)	3
	Equipment, parts and supply shortages	1
Solid waste handling	Damage to civil engineering structures	1
	Transportation failures	1
	Equipment shortages	1
	Personnel shortages	1
	Water, soil and air pollution	1
Food handling	Spoilage of refrigerated foods	1
	Damage to food preparation facilities	1
	Transportation failures	1
	Power outages	1
	Flooding of facilities	3
	Contamination/degradation of relief supplies	2
Vector control	Proliferation of vector breeding sites	1
	Increase in human/vector contacts	1
	Disruption of vector-borne disease control programmes	1
Home sanitation	Destruction or damage to structures	1
	Contamination of water and food	2
	Disruption of power, heating fuel, water supply or waste disposal services	1
	Overcrowding	3

1. Severe possible effect.

2. Less severe possible effect.

3. Least or no possible effect.

India comes amongst top ten earthquake prone countries of the world and at higher risk than most other countries. [2] According to the latest seismic zone map of India, about 59 percent of India's land area is vulnerable to moderate or severe seismic hazard. [3] Recent earthquake in Nepal has again given an opportunity for an insight for the public health experts worldwide. Earthquakes are capable of causing marked damage to local health system. The most common effects caused by earthquakes on environmental health are damage to civil engineering structures, broken mains, damage to water sources, power outages, transportation failures, personnel shortage, equipment, parts and supply shortages. [1] This may create many short term and long term public health problems. Current article is an effort to uncover special challenges posed by earthquakes to public health system. Some of them are discussed below.

Physical Injuries :

The utmost priority following an earthquake is to provide first aid and other emergency healthcare to the injured victims. An immediate search, rescue and first aid can prevent a lot of morbidity and disabilities. Disruptions of transportation facilities, as it was evident in recent earthquake of Nepal, can significantly delay the management of injured to and increase the death toll. Therefore it is important that the local government, community and health personnel are well equipped in first hand management of victims. Peripheral workers should be trained in first aid and triage. Inclusion of first aid in school curriculum can also help to build up capacity of community in first aid. However another observation showed that at the time of earthquake, local health personnel or their relatives are also victimized. Therefore it becomes even more important to establish communication and transportation, so that outside help can arrive as soon as possible. In a country like India, where population density is high, the morbidities and mortalities caused by a disaster can be too high for the tertiary

level health facilities to handle. The persons who are at higher risk of mortality due to an earthquake are females, elderly population, those with disabilities, hospitalized and those who remain indoors at the time of earthquake. [4] The majority of the injured are likely to have minor cuts and bruises; a smaller proportion will suffer from simple fractures, and a minority (but a significant number) will present with serious multiple fractures or internal injuries requiring surgery, blood transfusion and other intensive treatment. [5] In urban areas, special forms of injuries like burns and electrocution are also common. Appropriate triage can significantly reduce the burden on the tertiary level health institutes at the time of calamity. Medical care is particularly difficult in hospitals without reserve water supplies and backup electrical generators. Undamaged public schools and military quarters are transformed into make shift emergency health centers to accommodate the large number of injured. [6]

Water, Sanitation and Hygiene:

A large population gets displaced due to loss of their residences, following earthquakes. This population needs shelters, food, water and sanitary conditions. Temporary camps or shelters set up to accommodate this population can be epicenters for epidemics unless care is taken to maintain WASH (Water and Sanitation, Hygiene). Disruption of drainage lines and water lines may result in contamination of drinking water with drainage water. This may give rise to communicable diseases like diarrheal diseases, typhoid fever, hepatitis A and E. The risk gets multiplied as large population is sheltered in small area which makes it easy to transmit the disease. Temporary tents made from water resistant material and temporary closed latrines (separate for males and females) should be set up to accommodate the displaced community if safe buildings are not available. The safe water can be provided by effective chlorination of the available water along with frequent testing for water quality.

Management of Relief material :

The loss of communication leads to delay in the outside response to the disaster. It also interferes with the effective distribution of the resources

following the disaster. Once the communications are set up, the relief from outside areas starts pouring in inform of food supplies, cloths, medicines, vaccines etc. The management authorities have to be prepared to receive these resources. Large amount of food and medicines need appropriate storage facilities with low temperature. If storage facilities with low temperature like freezers are not available, dry ice can be used to keep the temperature low while storage. The managerial capabilities of a public health person comes under test, when he/she has to face political influences in distribution of relief material. It is quite important that the relief material received from outside reaches first to those who need the most. Excess resources from outside can also become liability. The humanitarian care in form of health personals, volunteers also requires food, water and other resources till their stay. It becomes difficult for the local health management to take care of excess burden caused by outside population. Therefore it is also important to limit the outside relief to "as required only". In the recent earthquake of Nepal, it was observed that government had put a ban on entry from outside for almost three months, for the same reason. In areas where nuclear power reactors are located, a special form of hazard looms on the population. Damage to such reactor can expose the people to radioactivity. Radioactive exposure of community and contamination of environment following earthquakes are a big public health issue in Japan.

Control of Communicable Diseases :

Failure to control communicable diseases can amplify the mortality manifolds if preventive measures are not taken. One of the examples is a major earthquake in Haiti (2010) which killed about 220,000 people during and immediately after the event. The outbreak of cholera (said to be introduced unintentionally during relief work) has caused nearly 750,000 cases of the disease in Haiti and neighboring Dominican Republic, killing 9,200 people in the two nations.[5] Earthquake is also responsible for breaking routine health services like immunization services. The vaccine preventable diseases like tetanus, diphtheria, pertusis may raise their heads following earthquakes. Overcrowding in temporary shelters

may also pose threats of acute respiratory infections. Earthquakes also disrupt routine vector control activities, which can predispose the community to vector born diseases like malaria and dengue.

Other Public Health Challenges :

There are chances of increase in skin infections and sexually transmitted diseases in the overcrowded shelters. Make shift set ups should be formed to tackle the issues regarding reproductive health like contraception, safe deliveries, clinical management of sexual violence etc. Disruption of routine health services also results in break in management of Non Communicable Diseases (NCDs) like hypertension, diabetes, stroke etc. Therefore there are chances of increase in the emergencies due to complications of such NCDs. Corpses do not pose any danger to health if death was due to initial impact of the earthquake. However deaths following communicable diseases are serious dangers to community if not managed properly. Due to loss of earning capacity or earning members, inadequate nutrition may pose danger of development of malnutrition. The psychological trauma caused by the disability, loss of relative or loss of property takes longer time to recover.

Since the predictive means are unavailable for earthquake, preparedness remains the only solution for the management of this disaster. National Disaster Management Authority (NDMA) of India is functioning in India. NDMA, as the apex body, is mandated to lay down the policies, plans and guidelines for Disaster Management to ensure timely and effective response to disasters. Towards this, it has the following responsibilities: [7]

- Lay down policies on disaster management;

- Approve the National Plan;

- Approve plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan;

- Lay down guidelines to be followed by the State Authorities in drawing up the State Plan;

- Lay down guidelines to be followed by the different Ministries or Departments of the Government of India for the Purpose of integrating

the measures for prevention of disaster or the mitigation of its effects in their development plans and projects;

- Coordinate the enforcement and implementation of the policy and plans for disaster management;

- Recommend provision of funds for the purpose of mitigation;

- Provide such support to other countries affected by major disasters as may be determined by the Central Government;

- Take such other measures for the prevention of disaster, or the mitigation, or preparedness and capacity building for dealing with threatening disaster situations or disasters as it may consider necessary;

- Lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management

    Apart from government organizations, many

NGOs (Non-governmental Organizations), medical associations have also played major role in recent earth quakes of India. However disaster management is not only the responsibility of government but also of general community.

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Road to Demedicalization- Need of Hour in Public Health

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Abstract :

Medicalization is the process whereby previously non-medical aspects of life are seen in medical terms, usually as disorders or illnesses. It is based on the biomedical model of disease, which sees behaviors, conditions or illnesses as a direct result of malfunctions within the human body. It is akin to 'a pill for every ill' concept. Even the normal life events like birth and death, biological processes like aging, childbirth, menstruation and common human problems like learning and sexual difficulties have been medicalized. This decreases innate coping ability of human beings. However, there is no evidence that there is any direct relation between health status of people and the so called progress of medicine. Health is conceptualized as a direct result of relation between mind and body. Demedicalization is the process by which things are organized or modified in a way that condition or life process under medical jurisdiction is considered as no longer a medical problem. It is the social process that normalizes sick behavior. It focuses on building internal locus of control and emphasizes more on prevention and non–medicinal approach. This concept needs to be revived. This approach will not only help patients, doctors but also the hospitals in the long run.

Key words : Medicalization, Demedicalization, Salutogenesis, Iatrogenesis

The health status of population is generally related with progress in medical care. The health status of an area is often equated to the number of doctors, nurses, hospital beds per 1000 population. However, there is no evidence that there is any direct relation between health status of people and the so called progress of medicine.[1] In fact, the study of disease patterns during last century provides evidence that illnesses are increasing despite medical advancement. Rather, the deaths caused by medication errors more than doubled between 1983 and 1993. [2]

This scenario had forced sociologists like Thomas Szasz (1963),Pitts (1968), Irving Zola (1972), Friedson(1970), to use the term 'medicalization' to describe a trend where, medicines dominate the daily lives. [3] Medicalization literally means "to make medical". Medicalization of life is akin to 'a pill for every ill' concept .For example, a normal headache due to exertion, which can be relieved through rest or sleep is sought to be relieved by analgesics. Medicalization may also be termed "pathologization" or "disease mongering". It is the process whereby previously non-medical aspects of life come to be seen in medical terms, usually as disorders or illnesses. The process of medicalization is based on the biomedical model of disease, which sees behaviors, conditions, or illnesses as a direct result of malfunctions within the human body. [4] It is intruding in experiences of everyday life.

Over the last 60-70 years, a wide range of phenomena has been medicalized, including normal life events (birth, death), biological processes (aging, childbirth, menstruation), common human problems (learning and sexual difficulties), and forms of deviance. The medicalization of deviance refers to the process whereby non-normative or morally condemned appearance (obesity, unattractiveness, shortness), belief (mental disorder, racism), and conduct (drinking, gambling, sexual practices) come under medical jurisdiction.

Medicalization occurs at three levels: the conceptual, the institutional and the interactional. At the conceptual level, a medical vocabulary is used to define the problem at hand. At the institutional level, organizations may adopt a medical approach to treat a problem. At the interactional level, physicians are most directly involved. Here, physician provides

medical diagnosis to a problem and treats a social problem with a medical treatment like giving anti depressants for unhappy married life.[5]

Medicalization has serious implications on social control, power, knowledge, authority and personal liberty. The medicalization encourages dependence of people on professional care and drugs. Patients are encouraged to become dependent on the medical system. Once dependent on the system, it is not possible for them to change the system. In general, there has been a gross medicalization in continuum of care of an individual. It starts from unborn (antenatal checkups) phase of life to childhood (immunization) to adulthood and old age (general medical checkups). The doctors' grasp over life starts with the monthly prenatal check-ups and ends with life. Normal biological processes like pregnancy and **c**hildbirth have been medicalized.Pregnant women are urged to seek care numerous times throughout pregnancy (as part of routine prenatal care), including scheduled blood tests and ultrasounds. However, despite medicalization and technologization of childbirth, there is no improvement in overall birth outcomes**.**[6,7]

The process of medicalization perpetuates itself by offering medical labels to life's events, phenomena and experiences. For example, shyness, has been recently categorized under "avoidant personality disorder," a label which may negatively affect self-perception. [8] Another example is children with ADHD (Attention Deficit Hyperactivity Disorder) which could have been simply seen as hyper, or as having trouble focusing, not as having a biological disorder requiring medications.

Furthermore, medicalization has become a form of social constructionism. Thus, certain social institutions and experts, rather than nature, determines what is a disease or health. [1] People are being spoon-fed with readily available medical solutions to every conceivable symptom. This has resulted into a belief of people that they cannot cope with illness without modern medicines. This reinforces and lays the ground for iatrogenesis by when people surrender themselves to the doctors. Ivan Illich had used a term *social iatrogenesis* to describe medicalization.[9] Iatrogenesis means

'doctor-generated'. The word is derived from Greek words '*iatros'* = physician and '*genesis*'= origin. The term refers to sickness produced by medical activity which could be due to unwanted side-effects of medications, ineffective and unsafe treatments and doctor's ignorance, neglect, or malpractice. As per this concept, medical interventions produce dependence on doctors and medicine. Such interventions tend to impoverish the self healing aspects of the social and physical environments and decrease the innate coping ability of human beings. They tend to seek help of doctors even for mild symptoms. Their tolerance and resistance is weakened and has led to the destruction of traditional ways of dealing with death, pain and sickness in modern society.

For instance, nowadays parents are seen to be overprotective. Due to their faulty child rearing practices, the tolerance power of children have been reduced. Even, in case of normal viral fever or minor bleed, pain or diarrhea, they give antibiotics to their children. As a result, their immunity threshold decreases and they develop antibiotic resistance. [10] A study has found that the antibiotic prescribing rate by physicians in US for children less than 14 years for acute respiratory infections was high at 229 antibiotic courses per 1,000 office visits.[11] This mindset of parents is being exploited by pharmaceutical companies for their profits. Even for diseases like chicken pox, in which lifelong immunity develops by itself after one episode of infection, vaccines are now available in markets and are being vigorously advertised. Doctors prescribe products like multi-vitamins, protein, calcium, iron supplements even when not required .All these trace elements and essential nutrients can be easily obtained through proper diet. It is a well known fact that more than 80% disorders can be alleviated to quite an extent without resorting to medicines / surgery. [12]

Modern medical industries consider people just as consumers. Health care institutions are minting money by performing unnecessary tests and prescribing medicines which are not required and causes more harm than good.[13] Most of these tests are costly as well. Doctors are now more concerned

about their profit share and reputation rather than the desire for service of the society.[14] As we see these days, these health care institutions are providing facilities to patients like a five star hotel. The activities like suffering, healing and dying, that cultures naturally taught mankind have now been overtaken by pharmaceutical Multi-National Companies (MNCs) and medical practitioners.

In 1970s, when the pendulum of medicalization had swung too far towards pharmaceutical industries, a counter movement of demedicalization emerged. 'Demedicalization' is the process by which things are organized or modified in a way that condition or life process under medical jurisdiction is considered as no longer a medical problem. [3] It is the social process that normalizes sick behaviour. It focuses on building internal locus of control and emphasizes more on prevention and non–medicinal approach. Literature has shown that many problems can be treated easily without non medicinal approach. For example, Randomized Controlled Trials (RCTs) has proven that behavioural therapy can effectively treat incontinence of urine in females. [15, 16] A study done at PGIMER, Chandigarh, India, found more than half (52.5%) of the women were continent after behavioural therapy as compared to 12.8% in the control group.[17] It has been found that dysmennorhea leads to school absenteeism and use of Over The Counter (OTC) analgesics in 15% and 30% of the cases respectively.[18] However a study done in Chandigarh found that non-pharmacological methods like use of ginger with exercises had significantly reduced menustral pain. [19] Pelvic floor muscle training with self-instruction manual lead to greater improvements in pelvic organ prolapsed symptoms. [20] Similarly, it has been proven that constipation can be easily taken care of by having pulpy-fibrous nutrient consumption, fluid intake, an exercise regime rather than resorting to laxatives. [21] The problem of cough can be reduced by steam inhalation. Dry eyes can be treated by warm compresses. Menopausal symptoms can be successfully alleviated by healthy lifestyle and yoga rather than going for hormone replacement therapy. [22] Many cases of infertility (up to 30%) can be

resolved by proper couple counseling rather than directly resorting to medicine or surgery. [23] Many chronic non communicable diseases like diabetes, hypertension are mainly due to ignorance on both, the physical level (diet, lifestyle) as well as on the mental level (stress, wrong understanding of purpose of life).So interventions like diet, yoga, physical exercise, behavior therapy etc. which are simple, cheap can be easily adopted are quite effective.

Demedicalization movement is further supported by the concept "Salutogenesis" given by Aaron Antonovsky in 1979.[24] It focuses on factors that help the man remain healthy despite disasters and terrible circumstances or even exposure to pathogenic factors. It also explores the sources of self-regeneration and self-healing power. The emphasis is on the healing resources and potential for active adaptation to new circumstances as well as for behavioural changes for risk reduction and development of resources. It has been documented that even in cancer patients counseling improves patient outcomes.[25, 26] Salutogenesis model also emphasizes on the strength of mind- body system and stresses on demedicalization of health problems. The "placebo effect" is a well documented phenomenon.

Hippocrates also said "For the sick, the least is best." This concept needs to be revived. The role of person's ability to heal without medications should be taken into consideration. It is the high time to focus more on the concept of demedicalization to cure or prevent majority of illnesses. Demedicalization would lead to empowerment of patients and will also save time of specialists as they can focus on complicated cases rather than attending to the routine problems. It will also help the existing hospitals to create health promoting environment through community participation, and developing skills to promote healthy lifestyle of staff and community members. Hence, this approach will not only help patients, doctors but also the hospitals in the long run. In this way, it might help to achieve health related targets and Millennium Development Goals well in time.

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A Study on Socio-demographic Profile and CD4 Count of HIV Infected Patients Attending ART Centre RIMS, Ranchi

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Abstract :

      Introduction : HIV infection is a global pandemic. It infects and destroys CD4 cells thus lowering the patient's immune response. Knowledge of CD4 count thus is important in management of HIV. The epidemiology of HIV should be understood especially with regard to various socio-demographic factors because the most effective approaches for its prevention and control are awareness and life style changes. **Objective :** 1) To describe socio-demographic profile of HIV-infected patients registered in ART centre RIMS, Ranchi. 2) To describe CD4 count in HIV-infected patients. **Method :** This was a cross sectional study conducted at ART centre, RIMS, Ranchi from July 2012 to October 2014. A total of 520 patients with age more than 15 years were selected by consecutive sampling method. **Statistical Analysis :** Template generated in MS excel sheet and analysis was done on SPSS software. **Results :** Out of total 520 HIV-infected patients, majority were male (56.0%, 291), married (78.5%, 408) and belonged to 31 to 45 years of age group (63.3%, 329). Majority (76.1%, 396) of the HIV-infected patients presented in WHO clinical stage I or II and less than half (46.2%, 240) were having CD4 count <200 cell/mm^3 when they were registered to the ART centre. **Conclusions :** HIV infection is more common in males in their most productive years of life. Increasing literacy alone can help in preventing the spread of HIV. Heterosexual route continues to be the most common mode of transmission of HIV. CD4 count is an important predictor in HIV cases.

Key words : HIV, CD4 count, ART centre.

Introduction :

      Human Immunodeficiency Virus **(**HIV) infection has been recognized as one of the major public health problem all over the world especially in Sub Sahara Africa and South East Asia. AIDS, the Acquired Immuno Deficiency Syndrome, also called as 'slim disease', is a life threatening illness caused by HIV. It infects and destroys leukocytes that express the CD4 surface receptors. As a result, depletes its host of CD4 cells. [1,2] The CD4 cells play a central role in regulation of immune response [3] and low CD4 cell counts are associated with a greater risk of patients living with HIV developing opportunistic infections, which may then progress to advanced diseases and death.[4] Therefore, obtaining accurate and reliable measures of CD4 T cells are essential to assess and manage persons infected with HIV.[1]

      HIV continues to be a major global public health issue, having claimed more than 39 million lives so far. In 2013, 1.5 million people died from HIV-related causes globally. It has been estimated that there were approximately 35.0 million people living with HIV at the end of 2013 with 2.1 million people becoming newly infected with HIV in 2013 globally.[5] Total number of HIV positive cases in India in 2011 was 2.09 million and death due to HIV was 1.47 lacs. The current HIV prevalence in India is 0.27%. [6]

      Although Jharkhand is a low prevalence state for HIV/AIDS, its prevalence is showing an increasing trend. Due to migration, bridge population, low literacy, high risk group and other reasons, there is ample chance of spread of this dreaded disease. Number of people living with HIV/AIDS in Jharkhand in 2011 was 47976. Its prevalence in the state for the same year was 0.25% as compared to 0.14% in 2007.[6]

      The epidemiology of the HIV infection in India is varied and depends on multitude of factors including geographic location, socio-demographic profile, behavioral profile etc. Epidemiological data on HIV with regards to socio-demographic factors as

well as risk behavior of the population in a specific region are important in providing vital information which may be used for effective control measures in that region. So there was a need to know the profile of HIV-infected patients who come to ART centre of RIMS.

Method :

This was a cross sectional study done at ART centre, RIMS, Ranchi which is the premier tertiary care institute of the state. A total of 520 HIV-infected patients with age more than 15 years were interviewed. Interview was conducted by using a pre-tested semi-structured questionnaire containing variables related to socio-demographic profile, behavioral history, risk factors for HIV etc. Information regarding clinical stage of HIV, CD4 count levels etc., were collected from the "Patient Treatment Record Card." Total duration of study was 28 months, from July 2012 to October 2014. The period of data collection was 7 months, from July 2013 to January 2014. During the period of data collection i.e. seven months, three HIV infected patents were selected by consecutive sampling method every working day till the sample size is reached.

Templates were generated in MS excel sheet and analysis was done on SPSS software. Informed verbal consent was taken and 520 patients were selected and interviewed during above said period. P-value <0.05 was considered as statistically significant.

The ethical approval was obtained from the Institutional Ethics Committee of RIMS, Ranchi and also from nodal officer of ART centre. To keep the confidentiality of the data and personal identity, name and address of the patients were not asked. Registration numbers of the patients were noted to avoid any repetitions. Later registration number of the patients were recoded and then entered in MS Excel sheet.

The participants were instructed of the right to, without further explanation, refuse to answer any questions. The patients' medical treatment was not affected, regardless of whether the patient chose to take part in the study or not.

Results :

The study was conducted with 520 HIV/AIDS patients. HIV-infection was found to be higher among males (56.0%, 291) than in females (44.0%, 229) with a Male: Female ratio of 1.27. The mean age of all HIV-infected patients was 37.95 years (SD=8.454) with male having mean age 39.79 years and female 35.61 years. Majority of HIV patients were in the

Table 1: Socio-demographic profile of HIV-infected patients (n=520)

Variables	Category	Number	Percentage
Sex	Male	291	56.0
	Female	229	44.0
Age	16-30	97	18.7
	31-45	329	63.3
	46-60	90	17.3
	More than 60	4	0.8
Religion	Hindu	374	71.9
	Muslim	45	8.7
	Christian	25	4.8
	Sarna	69	13.3
	Sikh	7	1.3
Residence	Urban	182	35.0
	Rural	338	65.0
Education	Illiterate	141	27.1
	Primary	121	23.3
	Secondary	167	32.1
	College and above	91	17.5
Occupation	Job (Govt./Private)	73	14.0
	Farming	36	6.9
	Self employed	79	15.2
	Daily wages	53	10.2
	Driver	49	9.4
	Sex worker	2	0.4
	House wife	179	34.4
	Student	3	0.6
	Jobless	46	8.8
Marital status	Married	408	78.5
	Unmarried	30	5.8
	Divorced/ Widowed/Widower	82	15.8
Type of family	Nuclear	367	70.6
	Joint	153	29.4
Socio-economic class (SEC)	Class I	27	5.2
	Class II	57	11.0
	Class III	69	13.3
	Class IV	153	29.4
	Class V	214	41.2

sexually active age group of 31-45 years (63.3%, 329), Hindu (71.9%, 374) and from rural area (65.0%, 338). Nearly half (50.4%, 262) were having up to primary level of education. It was observed that out of 520 HIV-infected patients, 179 (34.4%) were house wives, 79 (15.2%) were self-employed having their own business, 49 (9.4%) were drives, 53 (10.2%) worked on daily basis and 46 (8.8%) were jobless. There were 2 (0.4%) sex workers and 3 (0.6%) students. Majority of the HIV-infected patients were married (78.5%, 408), from nuclear family (70.6%, 367) and belonging to lower SEC i.e class IV and V of Revised Prasad's classification for 2014 (70.6%, 367). (Table: 1)

The most common mode of transmission of HIV was heterosexual route [474, (91.1%)] followed by blood transfusion [14, (2.7%)) and probable unsafe injection [5, (1%)]. There were 5 (1.0%) cases of MSM (Men having Sex with Men), 3 (0.6%) cases of injecting drug users and 1 (0.2%) case having mother to child transmission. In 18 (3.5%) patients the mode of transmission was unknown. (Table: 2)

Table 2 : Mode of transmission of HIV (n=520)

Mode of transmission of HIV	Number	Percentage
Heterosexual	474	91.1
MSM	5	1.0
Injecting drug use	3	0.6
Blood transfusion	14	2.7
Probable unsafe injection	5	1.0
Unknown	18	3.5
Mother to child	1	0.2
Total	520	100

Majority (76.1%, 396) of the HIV-infected patients presented in WHO clinical stage I or II at the time of registration to the ART Centre. (Figure: 1)

Figure 1 : HIV clinical stage at the time of registration in ART centre (n=520)
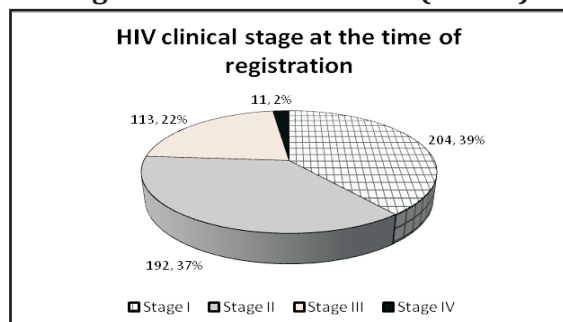
As far as CD4 count is concerned 240 (46.2%) patients were having CD4 count <200 cell/mm³ when they were registered to the ART centre. 228 (43.8%) patients had CD4 count between 200-500 cell/mm³ and only 52 (10%) presented with CD4 count >500 cell/mm³ at the time of registration to ART centre. The mean CD4 count was 251.31 ± 178.663 cell/mm³. (Figure: 2)

Figure 2 : CD4 count at the time of registration in ART centre (n=520)
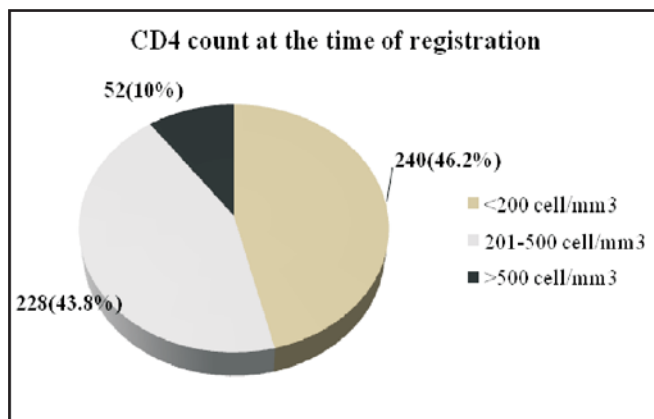
Mean CD4 count in female (293.03 cell/mm³) was significantly higher than that of male (218.24 cell/mm³) with p< 0.001. (Table: 3)

Table 3 : Comparison of CD4 count at the time of registration between male and female (n= 520)

Sex	Number	Mean CD4 count (cell/mm³)	SD	Mean rank
Male	291	218.24	158.708	229.33
Female	229	293.03	193.023	300.11
Mann-Whitney U= 2.425E4		Z= -5.333		p< 0.001

In this study, a significant association was found between CD4 count and WHO clinical stage. HIV-infected patients with lower CD4 count at the time of registration were found to be associated with higher WHO clinical stage. This association was statistically significant with p-value <0.05. (Table: 4)

Table 4 : Association of WHO clinical stage with CD4 count at the time of registration in ART centre (n=520)

WHO clinical stage	CD4 count (cell/mm3)			Total
	<200	**200-500**	**>500**	
Stage I	53 (26.0%)	111 (54.4%)	40 (19.6%)	204 (100%)
Stage II	92 (47.9%)	90 (46.9%)	10 (5.2%)	192 (100%)
Stage III	85 (75.2%)	26 (23.0%)	2 (1.8%)	113 (100%)
Stage IV	10 (90.9%)	1 (9.0%)	0 (0%)	11 (100%)
Total	240(46.1%)	228 (43.8%)	52 (10.0%)	520 (100%)
χ^2 = 95.387, df =6, p-value < 0.001				

A significant association was found between age and CD4 count, age more than 45 years being associated with CD4 count <200 cell/mm^3 (p-value=.014). Similarly males were found to be significantly associated with lower CD4 count when compared to females (p-value<.001). 56.4% of the males were having CD4 count <200 cell/mm^3. No any significant association with other socio-demographic factors was seen with CD4 count. (Table: 5)

Table 5 : Association between socio-demographic profile and CD4 count (n=520)

Variables	CD4 Count (cells/mm3)				Chi Square Test
	<200	**200-500**	**>500**		
Age	16-30	31	56	13	Chi square=12.472
	31-45	156	140	33	df=4
	>45	53	35	6	p-value=0.014
Sex	Male	164 (56.4%)	108 (37.1%)	19 (6.5%)	Chi square=29.697
	Female	76 (33.2%)	120 (52.4%)	33 (14.4%)	df=2
					p-value<0.001
Residence	Urban	78 (42.9%)	89 (48.9%)	15 (8.2%)	Chi square=3.157
	Rural	162 (47.9)	139 (41.1)	37 (10.9)	df=2
					p-value=0.206
Education	Illiterate	70 (49.6%)	56 (39.7%)	15 (10.6%)	Chi square=2.179
	Primary	52 (43.0%)	56 (46.3%)	13 (10.7%)	df=6
	Secondary	78 (46.7%)	75 (44.9%)	14 (8.4%)	p-value=0.903
	College and above	40 (44.0%)	41 (45.1%)	10 (11.0%)	
Marital Status	Married	186 (45.6%)	181 (44.4%)	41 (10.1%)	Chi square=5.433
	Unmarried	14 (46.7%)	16 (53.3%)	0	df=4
	Divorced/Widowed/ Widower	40 (48.8%)	31 (37.8%)	11 (13.4%)	p-value=0.246
Type of family	Nuclear	172 (46.9%)	156 (42.5%)	39 (10.6%)	Chi square=1.137
	Joint	68 (44.4%)	72 (47.1%)	13 (8.5%)	df=2
					p-value=.566
SEC	Class I	11 (40.7%)	16 (59.3%)	0	Chi square=8.447
	Class II	26 (45.6%)	28 (49.1%)	3 (5.3%)	df=8
	Class III	31 (44.9%)	31 (44.9%)	7 (10.1%)	p-value=0.391
	Class IV	70 (45.8%)	68 (44.4%)	15 (9.8%)	
	Class V	102 (47.7%)	85 (39.7%)	27 (12.6%)	

Discussion :

This study aimed at describing profile, WHO clinical stage, and CD4 count of all 520 HIV-infected patients registered in ART Centre, RIMS, Ranchi. The analysis of data of this study showed that male contributed to 56.0% of the case load in ART centre with 44.0% being the females. Figure for female is slightly higher than the national average of 39.07% [7] and study done by Kumar et al (38.5%).[8] Such a high proportion of infection rate in females is a cause for concern since this will lead to a proportionate increase in the children being infected due to transmission from mother to child. The male female ratio in our study is 1.27 which is lower than that found by study of Toshniwal et al [9], Kumar et al.[10]

In the present study, the predominant age group was 16-45 years, which is the sexually active and unfortunately also the economically most productive age group. The mean age of study subjects was 37.95±8.454 years. This is similar as reported from a study in Ahmedabad, India in 2010 wherein the mean age was 38.7 ± 10.3 years with the predominant age group being 15-44 years. [11] Vishal Chander also found mean age of HIV patients to be 37.22 years. [12] The educational status of HIV patients showed that the seropositivity was higher among the subjects with lesser education as almost half of the patients were found to be educated below primary level. These findings are similar to the study conducted by Jayant D in Maharashtra [13] and Jayaram et al. in Karnataka, India. [14] Low education status and less awareness regarding safe sex can be the reason for high prevalence among this group of people. However Cauldbeck et al observed no trends for education level with respect to the seropositivity. [15] Housewife comprised 34.4% of total HIV patients and 78.2% of total female patients. High percentage of housewives was found in other studies also. [16, 17] The reason for higher number of attendees being house wife can be gaining of infection by unsafe sex from their HIV positive husband or any other sexual partner.

Majority of the HIV patients in present study belonged to the lower socio-economic class i.e. class IV and V of Revised Prasad's Classification for 2014.

This is similar to the finding by Jayant D. [13] Upper SEC constituted only 5.2% of the total patients in the present study.

In this study the most common mode of acquiring HIV infection was found to be heterosexual route (91.9%). This is similar to the study by Jayant D. Deshpande (92.3%) and M.A.Khan (93.6%). [13, 18]

WHO clinical stage of the patients showed that more than $3/4^{th}$ of total number of patients got registered in the ART centre in WHO clinical stage I & II, which is a sign of quality referral from ICTC and might be due to impact of large scale IEC campaigning at state and national level. However around $1/4^{th}$ PLHIV (People Living with HIV) came late in the course of disease which could affect the effectiveness of ART drugs and treatment outcome. Another study by Hitenkumar P Sonani in Surat also found that maximum number of patients were in first or second stage when they first reported to ART centre. [19]

Analysis of CD4 count in this study revealed that mean CD4 count at the time of registration in ART centre was 251.31 cells/mm^3 (SD= 178.663). Less than half of the patients presented with CD4 count ≤ 200 cells/mm^3 which is lower than that found by Jayant D. Deshpande (61.99%). [13] Hitenkumar P Sonani in his study found that 55.8% patients were having CD4 cells count ≤ 250 cells/mm^3. [19]

In this study lower CD4 count was found to be significantly associated with higher WHO clinical stage (p-value <0.001). Bhandarkar et al reported similar results with a mean CD4+ count among HIV-infected patients being 270.63 cells. [20] It may be because lower CD4 count lowers the immunity further, which results in more clinical symptoms and thus higher WHO clinical stage.

Lower CD4 count was found to be significantly associated with higher age and male sex. Females tend to have higher CD4 count at the time of presentation to ART centre. This might be due to the fact that in a state like Jharkhand, females are generally infected with HIV by their husband. So there may be early reporting of female cases to ART centre if the husband is HIV positive.

Conclusion :

Most of the HIV affected population were in reproductive age group with male predominance indicating that this disease may cause a great loss to the nation's booming economy. Predominance of male cases may be due to their migration in search of work. Almost half of the HIV patients were found to be educated below primary level. Increasing literacy alone can help in better understanding about the disease, its mode of transmission, personal protective measures to be employed and societal responsibilities at the individual level, which will help to a great extent in preventing the spread of this pandemic. Marital life in female itself becomes a risk factor for those women who get infected by their HIV positive spouse. Most of the patients (91.9%) acquired HIV infection through heterosexual route. This is due to the fact that methods for protection from STI/HIV are not often used. It emphasizes the need to strengthen our Information Education & Communication (IEC) strategies to lower the burden of HIV/AIDS. More than $3/4^{th}$ of total number of patients got registered in the ART centre during the first and second stage of the disease which is a sign of quality referral from ICTC. Less than half of the patients presented with CD4 count $\leq$ 200 cells/mm^3. Significant association was found between CD4 count and WHO clinical stage (p-value <.005) indicating that lower CD4 count is associated with higher WHO clinical stage. Thus CD4 count continues to be an important indicator for HIV management. Higher age and male sex were found to be significantly associated with lower CD4 count.

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Prevalence and Profiles of Dyslipidemia in Apparently Healthy Adult Gujarati Population

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Abstract :

Introduction : Circulating lipids and lipoproteins are long being recognized as risk factors for developing cardiovascular diseases (CVD). **Objective :** To evaluate the prevalence and profiles of dyslipidemia in young and asymptomatic Gujarati population. **Method :** In this cross sectional study we had randomly selected 1440 individuals of the both the genders who were of 20- 40 years of age and disease free. Individuals having history of any medications for diabetes, hypertension and CVD were excluded from the study. The remaining healthy individuals underwent detained physical examinations and tests of lipid profiles. **Results :** In the overall population, the prevalence of low HDL-C (36.53%) and high lipoprotein (a) (32.15%) were most common lipid abnormalities found. We have observed that except for lipoprotein (a) (28.4% Vs35.66%),the males were more dyslipidemic than females (p<0.001). Age-wise distribution showed that younger individuals (20-29 years) were having superior lipid profile as compared to their older counterparts (30-40 years) (p<0.001). In population having lipoprotein (a) abnormality (32.15%), the low HDL-C (33.7%) was highly prevalent. **Conclusion :** Thus it is concluded that the young Gujarati population is highly susceptible to develop lipoprotein (a) and HDL-C abnormalities and this information could be used to design the preventive polices for future CVD events.

Key words : Dyslipidemia, Gujarati population, High-density lipoprotein cholesterol (HDL-C), Lipoprotein (a)

Introduction :

It is a well-established fact that the South Asians around the globe, especially of Indian sub-continent has higher risk and wider prevalence of cardiovascular diseases (CVD) as compared to rest of ethnic groups. [1]The rates of coronary artery diseases (CAD) in Indian population are 50% to 300% higher than other populations, with a higher risk at younger ages. [2] Deaths related to CAD occur 5 to 10 years earlier in Indian sub-continent than in western countries. [3] In spite of their proven greater susceptibility to CVDs, significant gaps in the knowledge of CVD epidemiology and associated risk factors in India exist. Reviews of epidemiological studies suggest that all the major cardiovascular risk factors such as tobacco consumption, obesity, hypertension and lipid abnormalities are increasing in India especially in young population. [4]A genetic tendency of CAD development, facilitated by high levels of serum lipids and lipoprotein (a) [Lp (a)],

evidently increases the adverse effects of traditional risk factors related to lifestyle and best explains the "South Asian Paradox".[5] Although dyslipidemias - the major modifiable risk factor does not fully explain the excess burden of CAD, it is doubly important and remain the foundation of preventive and therapeutic strategies in this population. A more aggressive approach to preventive therapy, at an earlier age and at a lower threshold is clearly needed.

Keeping in mind the prime role of dyslipidemia in CAD development in young, we aimed to investigate the prevalence of lipid and Lp (a) abnormalities in young and apparently healthy Gujarati population.

Method :

Design and Data Collection

This cross sectional study was conducted at U. N. Mehta Institute of Cardiology and Research Center in September 2013. We had randomly selected 1440

individuals of both the genders (697 males & 743 females), who were young (20 – 40 years), apparently healthy and disease free. The study protocol was approved and cleared by institutional ethics committee. The demographic details of the population such as age, sex and disease history were recorded for all the individuals. Race-ethnicity was determined by self-identification in response to a questionnaire.

The subjects taking any medications for hypertension, dyslipidemia, diabetes or any other disease were excluded from the study. Individuals having positive stress test were also excluded from the investigating protocol.

Laboratory tests

Subjects were advised to fast at least for twelve hours before blood investigations. Total cholesterol (TC), triglycerides, low density lipoprotein cholesterol (LDL-C), high density lipoprotein cholesterol (HDL-C), very low density lipoprotein (VLDL), and total lipid, were measured by International Federation of Clinical Chemistry (IFCC) approved enzymatic methods using commercially available kit on auto analyzer (ARCHITECH PLUS ci4100, Germany). Lipids levels were classified according to the classification recommended by National Cholesterol Education Program (NCEP) and Adult Treatment Panel III (ATP III) guidelines.

Statistical analysis

All collected data were analyzed by SPSS v 20 (Chicago, IL, USA). Distribution analysis showed that most of the parameters follow non-Gaussian distribution. Values of various lipids were expressed as mean ± SD. The categorical data obtained from standard cut offs were presented as proportions. Comparison between the groups was done using Mann-Whitney U test and the cut off value of $p<0.05$ was considered for the statistical significance.

Results :

The results of overall dyslipidemia prevalence and profile in young Gujarati population are presented in table 1 as mean ± SD as well as proportions. We have observed that out of 1440 individuals 36.53% (526)were suffering from low

levels of HDL-C. Whereas levels of Lp (a), LDL-C and total cholesterol were found to be elevated in 32.15% (463), 18.75% (270) and 17.77% (256) of the population respectively. The ratios of various lipids often provide more precise prognostic values in comparison to isolated lipid levels. In the current study, TC/HDL-C ratio was found to be increased in 482 (33.47%) and LDL-C/HDL-C ratio in 409 (28.4%) subjects. The abnormalities of total lipids, VLDL and triglycerides were observed in 12.57% (181), 8.61% (124) and 5.35% (77) of the population. The mean values obtained for Lp (a), total cholesterol, triglyceride, HDL-C, LDL-C, LDL-C/HDL-C ratio, TC/HDL-C ratio, VLDL and total lipids were 28.58 ± 26.17 mg/dl, 169.7 ± 34.4 mg/dl, 101.64 ± 59.31 mg/dl, 43.84 ± 9.98 mg/dl, 105.6 ± 29.1 mg/dl, 2.56 ± 1.14, 4.08 ± 1.5, 20.31 ± 11.8 mg/dl and 615.2 ± 81.69 mg/dl.

Table 1 : Demographic Details of the study population

Variables	Mean ± SD	N (%)
Age	28.779 ± 5.62	-
Lipoprotein (a)	28.579 ± 26.17	463 (32.15%)
Total Cholesterol	169.7 ± 34.4	256 (17.77%)
Triglyceride	101.64 ± 59.307	77 (5.35%)
HDL-C	43.84 ± 9.98	526 (36.53%)
LDL-C	105.599 ± 29.1	270 (18.75%)
LDL-C/HDL-C	2.563 ± 1.138	409 (28.4%)
TC/HDL-C	4.08 ± 1.5	482 (33.47%)
VLDL	20.31 ± 11.8	124 (8.61%)
Total Lipids	615.2 ± 81.69	181 (12.57%)

HDL-C: High Density Lipoprotein Cholesterol, LDL-C: Low Density Lipoprotein Cholesterol, TC: Total Cholesterol, VLDL: Very Low Density Lipoprotein

The influence of gender and age on dyslipidemias is tabulated as table 2 and table 3 respectively. The results stated that females are highly protected from dyslipidemia as all the lipids except Lp (a) were significantly ($p<0.01$) higher in males as compared to females. The abnormalities of various lipids such as Lp (a), total cholesterol, triglyceride, HDL-C, LDL-C, LDL-C/HDL-C, TC/HDL-C, VLDL and total lipids were 28.4%, 25.1%, 8.75%, 52.65%, 27.83%, 44.2%, 51.8%, 13.1% and 19.4% in

males whereas in females the prevalence were 35.66%, 10.9%, 2.15%, 21.4%, 10.2%, 13.6%, 16.3%, 4.04% and 6.2% respectively.

Table 2 : Prevalence of dyslipidemia according to gender

Variables	Males – 697 N (%)	Females - 743 N (%)	Significance (p value)
Lipoprotein(a)	198 (28.4%)	265 (35.66%)	0.0038
Total Cholesterol	175 (25.1%)	81 (10.9%)	<0.0001
Triglyceride	61 (8.75%)	16 (2.15%)	<0.0001
HDL-C	367 (52.65%)	159 (21.4%)	<0.0001
LDL-C	194 (27.83%)	76 (10.2%)	<0.0001
LDL-C/HDL-C	308 (44.2%)	101 (13.6%)	<0.0001
TC/HDL-C	361 (51.8%)	121 (16.3%)	<0.0001
VLDL	91 (13.1%)	30 (4.04%)	<0.0001
Total Lipids	135 (19.4%)	46 (6.2%)	<0.0001

HDL-C: High Density Lipoprotein Cholesterol, LDL-C: Low Density Lipoprotein Cholesterol, TC: Total Cholesterol, VLDL: Very Low Density Lipoprotein

The ageing trends of dyslipidemias presented in table 3 shows that in spite of 40 years of age being considered as young, the lipid profile of individuals in 4th decade of life is significantly poor as compared to individuals who are in 3rd decade of life.The study results demonstrated that the predominance of dyslipidemias in the population having age between 20-29 years was relatively lower (total cholesterol – 11.3%, triglyceride – 2.98%, HDL-C – 32.6%, LDL-C – 11.78%, LDL-C/HDL-C – 18.36%, TC/HDL-C – 22.3%, VLDL – 5.3% and total lipids – 8.1%). However the prevalence of Lp (a) abnormality was considerably high (29.65%) in this study group. In contrast to a decade younger population, individuals having age group of 30-40 years had significantly higher prevalence of various dyslipidemias. The elevation of Lp (a), total cholesterol, triglyceride, LDL-C, LDL/HDL, TC/HDL, VLDL and total lipids were found in 35.3%, 20.5%, 8.36%, 27.6%, 41.17%, 47.63%, 12.77%, and 18.3%, whereas low HDL-C had affected 41.5% of the population.

Table 3 : Prevalence of dyslipidemia according to age

Variables	Age (20-29 years) N= 806 N (%)	Age (30-40years) N = 634 N (%)	Significance (p value)
Lipoprotein(a)	239 (29.65%)	224 (35.3%)	0.0255
Cholesterol	91 (11.3%)	165 (20.5%)	<0.0001
Triglyceride	24 (2.98%)	53 (8.36%)	<0.0001
HDL-C	263 (32.6%)	263 (41.5%)	<0.0001
LDL-C	95 (11.78%)	175 (27.6%)	<0.0001
LDL-C/HDL-C	148 (18.36%)	261 (41.17%)	<0.0001
TC/HDL- C	180 (22.3%)	302 (47.63%)	<0.0001
VLDL	43 (5.3%)	81 (12.77%)	<0.0001
Total Lipids	65 (8.1%)	116 (18.3%)	<0.0001

HDL-C: High Density Lipoprotein Cholesterol, LDL-C: Low Density Lipoprotein Cholesterol, TC: Total Cholesterol, VLDL: Very Low Density Lipoprotein

The distribution of dyslipidemias in individuals suffering from abnormally high levels of Lp (a) are shown in figure 1. The results indicated association of low HDL-C (33.7%) and high LDL-C (22%) with high Lp (a) in the studied population.

Figure 1: Prevalence of dyslipidemia in the population having high lipoprotein (a) level
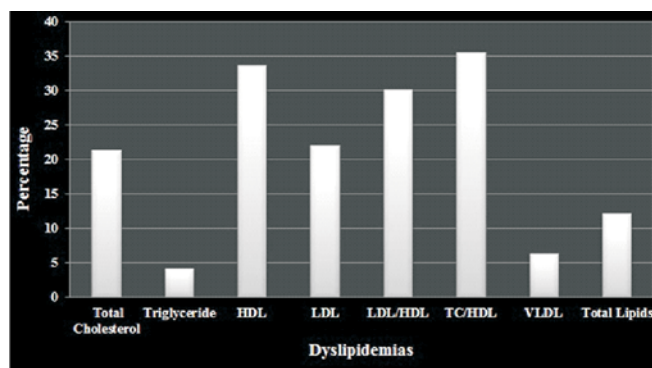
HDL: High Density Lipoprotein, LDL: Low Density Lipoprotein, TC: Total Cholesterol, VLDL: Very Low Density Lipoprotein

Discussion :

Dyslipidemia involves those individuals who have faulty life style including sedentary habits, increased consumption of fatty foods, smoking, hypertension and diabetes and atherosclerosis starts at an early age in these individuals. [6] These empirical observations have been confirmed by Framingham studies. [7] However, most of the information on the

contributions of various lipid fractions to CVD risk is derived from studies in the Caucasian population and limited information exists regarding the changing time-trends in lipid levels and the prevalence of dyslipidemia in Indian subjects.

Gujaratis are the community bearing high burden of CVD risk factors especially disturbed lipid profile. [8] There are emergence of evidence indicating alarming high prevalence of morbidity and mortality associated with CVD in Gujarati population. [9] Though the prevalence of CHD in young is difficult to establish accurately due to "silent" nature of the process. [10] The early detection of risk factors often contribute significantly in the prevention/delaying of the event as it could be managed by life style modification. It is known that even though CAD is a fatal disease with no known cure, it is also highly predictable, preventable, and treatable with the existing knowledge.To the best of our knowledge none of the study has systematically evaluated the trend of lipid abnormalities in young and healthy Gujarati adults.

We have assessed prevalence of various lipids and lipoproteins using current definitions in young adults (20-40 years of age) of both the gender from Gujarati populations.Our results indicated alarmingly high levels of Lp (a) (32.15%) accompanied by low levels of HDL-C cholesterol (36.35%) in overall population, which is first time reported in this population.

The community based epidemiological studies often provide insight in the ethnic variation in the risk profile involved in cardiac diseases. [11] The common pattern of dyslipidemia seen in Asian Indians is higher levels of triglycerides, lower HDL-C levels, and higher levels of Lp(a). [12] In current study, we have observed two of the above mentioned abnormalities of Lp (a) and HDL-C, however the only slight elevation (5.35%) in the triglyceride level was observed, re-emphasizing the need of regional and ethnic dyslipidemia trend evaluation. This early onset of high-risk status, along with the high atherogenicity (10 times higher than LDL) and high thrombogenicity of Lp (a), appears to explain its strong association with premature coronary artery disease in this ethnic group. [13]

Several cross-sectional studies have demonstrated that lipid profile abnormalities are associated with age and gender, where females get fairer protection due to well-known premenopausal phenomena. [14] There is a delayed onset of CVD events by 10-15 years in females as compared to male. [15] The similar phenomena was observed in this study also as prevalence of conventional lipid (total cholesterol, triglyceride, HDL-C and LDL-C) abnormalities were significantly lower in females as compared to their male counterparts. However Lp (a), the novel risk factor of CVD having genetic link was found to be more prevalent in Gujarati females (35.66%vs 28.4%; p=0.0038).The strong correlation of serum Lp (a) levels with CAD in premenopausal women as reported by Maher and Brown adds significantly to our growing understanding of the importance of Lp (a) as a powerful risk factor for premature coronary artery disease in both sexes.[16] Earlier epidemiological studies have documented that Lp (a) levels are governed almost exclusively by race, ethnicity, and genetics, unlike other lipids, where the levels are influenced by age, gender, diet, and other environmental factors. [17-20] The stable lifelong levels of Lp (a) are attained in infancy, the pathological processes associated with elevated Lp(a) also begin in infancy (20 years earlier than other risk factors such as hypertension, cigarette smoking, and diet-related dyslipidemias). [13] When high levels of Lp(a) were combined with other risk factors, such as hypertension, diabetes, cigarette smoking, hyperhomocystinemia, and/or a high ratio of TC/HDL-C, the relative odds for premature coronary artery disease (CAD) were increased by 3 to 122 fold depending on the number of risk factors present and their severity.[21, 22]

This global phenomenon of prematurity and severity suggests that CVD starts at an early age and has a malignant course. [13] In the present study also the age related changes in lipid profile are noted in Gujarati population. Our results indicates that natural ageing contributes significantly in the development of dyslipidemia and is being identified as one of the risk factor of CVD by various epidemiological studies. [23, 24] The positive relationship between conventional dyslipidemia in patients of CVD and their children

had been established earlier showing that lipid abnormalities in children indeed contribute to adult CVD. [25, 26]

Conclusion :

The genetic predisposition for CAD in Gujarati population could be partly explained by the early onset of several dyslipidemia and by high prevalence of Lp (a) abnormalities. This information could be used for designing of preventive strategies for dyslipidemias in this ethnic group of individuals.

Acknowledgement :

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An Assessment of Menstrual Hygiene Practices amongst Adolescent Females at Kheda District of Gujarat State, India

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Abstract :

Intoduction : In the developing country like India, females are facing many menstruation related health problems, which are significant causes of morbidity, hampering daily life. Improper menstrual hygiene practices predispose the females towards many communicable diseases. The knowledge, attitudes and practices regarding menstrual hygiene, which establish at adolescent age, are usually followed by them throughout life and also passed on to the next generation. **Objectives :** 1. To detect the menstrual health problems 2. To assess menstrual hygiene practices 3. To assess the restrictions in daily activities considered appropriate by the adolescents. **Method :** Current cross sectional study was conducted at Kheda district of Gujarat State, India. The sampling was done using multi stage sampling technique. The sample included 400 adolescent girls of 14 to 17 years of age. Considering the dropout rate, 30% sample was constituted by non school going subjects and 70 % by school going subjects. **Results :** 76(19%) participants had irregularity in menstruation. 103 (25.8%) participants had problem in doing daily activities whereas 112 (28%) participants had problem in doing specific activities like playing, exercise etc. 244 (61%) participants have used cloth while 156 (39%) used sanitary pad during last menstruation. **Conclusion :** As revealed by the study, the adolescent girls are facing various menstrual health problems like abdominal pain, menorrhagea, polymenorrhoea etc. They are unaware of proper disposal techniques of sanitary pad or other material used as absorbent.

Key words : Menstrual Problems, Menstrual Hygiene Practices

Introduction :

"Menstruation" is a physiological process that occurs throughout the reproductive years of every woman.[1,2]In many instances, this phenomenon is associated with various mental as well as physical morbidities like premenstrual syndrome. Menstruation can also predispose women to life threatening RTI (Reproductive Tract Infection), if hygiene is not maintained throughout menstruation.

Especially in Indian scenario where joint families are common in the society, the issues of menstrual hygiene practices are needed to be tackled at early age, as adolescence. The knowledge, attitudes and practices regarding menstrual hygiene, which establish at this age, are usually followed by them throughout life and also passed on to the next generation. Therefore faulty practices pertaining to menstruation will affect health of large number of women in reproductive age group. Usually adolescents are guided by their mother or other

female family members regarding menstrual hygiene practices. It is necessary to assess the practices of mother as well as other female family members regarding the menstrual hygiene. Menstrual hygiene practices also vary in rural and urban areas. In Indian culture, talking about reproductive function of body is considered taboo. Young females have poor knowledge and lack of awareness about physical and physiological changes associated with adolescence. They hardly get any chance to learn about menstruation. Various myths and social beliefs are also prevailing related to menstruation. Most girls are unaware about proper menstrual practices at the age of menarche.[3] Use of unhygienic cloths may lead to development of infection of reproductive tract which may seriously hamper the reproductive capacity or even life of female.

Several research studies have revealed gap between facts and beliefs of adolescent girls and showed that there is low level of awareness about

menstruation among girls when they first experience it.[4] Therefore there is a need for implementation of appropriate public health measures at various levels of prevention.

Following identification of need in this area, Government of Gujarat has started "Menstrual hygiene promotion scheme" under the umbrella of NRHM (National Rural Health Mission) as a pilot project. Sanitary napkins are provided at subsidized rates in the pilot areas. Kheda district is one of the areas where this scheme is started. Current study intends to provide details on menstrual hygiene practices prevalent in these areas and menstrual problems faced by adolescent girls.

Objectives :

- To detect the menstrual health problems

- To assess menstrual hygiene practices

- To assess the restrictions in daily activities considered appropriate by the adolescents.

Method :

Current cross sectional research study was conducted by Community Medicine Department, GCS Medical College, Ahmedabad, at the Kheda district of Gujarat State, India. The sampling was done using multi stage sampling technique.

First Stage : Random selection of 4 Talukas of Kheda District. (Matar, Balasinor, Kapadvanj and Nadiad Talukas were selected)

Second Stage : Random selection of single village and a school located in the same area, from each Taluka (Limbasi village from Matar Taluka, Balasinor village from Balasinor Taluka, Jaher village of Kapadvanj and Pij village of Nadiad Taluka were selected)

Third Stage : Random selection of 70 girls from secondary and higher secondary classes of the selected school and 30 non school going girls from the community of sampled village from each taluka.
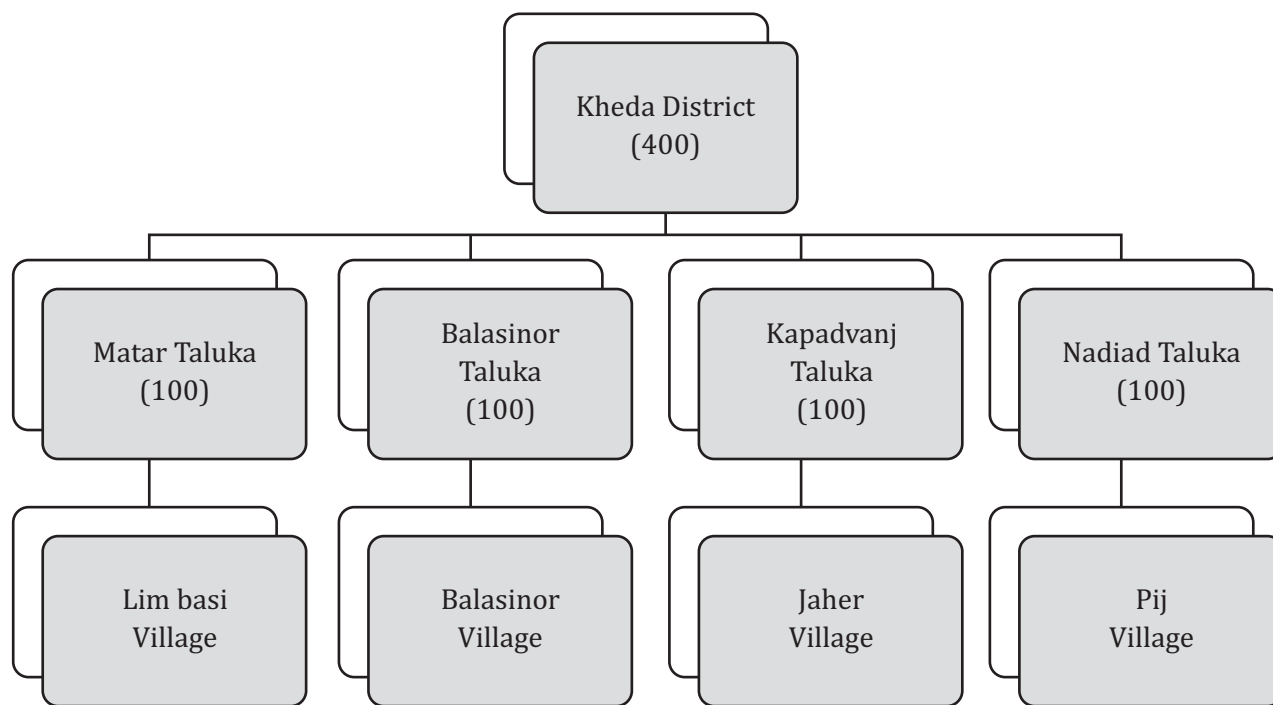
The sample size was decided as 400 by convenience. The sample included 400 adolescent girls of 14 to 17 years of age. Considering the dropout rate, 30% sample was constituted by non school going subjects and 70 % by school going subjects. Only those girls whose menstruation had already started were included in the study.

Ethical approval was received from institutional ethical committee before commencement of the study. Interview method was used for data collection. A pre formed and pre tested questionnaire was used for the interview following

informed consent of parents/teachers of the subjects. The data entry and data analysis was done using Epi info 7.

Results :

As shown in table 1, the study included school going (280) and non school going females (120) of 14-17 years age group. Mean age of participants was 15.05±1.14 years. Majority 171(61%) girls were in 9th standard. "Hinduism" was the most followed religion in the study area, followed by Muslim (42.5%). Majority of participants (60%) belonged to Nuclear family.

Table 1 : Socio-demographic profile of study participants

Socio-demographic variables	Frequency	Percentages
Age in years		
14	191	48
15	61	15
16	87	22
17	61	15
School going		
Yes	280	70
No	120	30
School Standard (n=280)		
9	171	61
10	17	6
11	81	29
12	11	4
Religion		
Hindu	227	57
Muslim	171	42.5
Christian	2	0.5
Caste		
General	77	19.25
OBC	212	53
SC	65	16.25
SEBC	12	3
ST	34	8.5
Type of Family		
Joint	136	34
Nuclear	240	60
Three Generation	24	6
Total	**400**	**100**

As per table 2, in last three menstrual cycles, 76(19%) participants had faced irregularity in menstruation. Out of 400, 304 (76%) participants had history of regular menstruation. 54 (13.5%)

participants were suffering from poly-menorrhea while 42(10.5%) had problem of oligo-menorrhea. 29 (7.3%) participants experienced problem of heavy bleeding. 187 (46.8%) participants suffered from abdominal pain during menstruation and 64(34.2%) out of them, had taken treatment for it. 80% of them received allopathic medicine from mother (50%) and doctors (30%). 103 (25.8%) participants had faced problems in doing daily activities whereas 112 (28%) participants had problem in doing specific activities like playing, exercise etc., due to menstruation related health problems. 74 (26.42%) school going participants remained absent at school for duration varying from 1 to 6 days.

Table 2 : Details of problems faced during menstruations

| Variables	Frequency	Percentages
Irregular menstruation (n=400)	76	19
Interval between menstruation (n=400)		
< 21 days	42	10.5
21-35 days	304	76
>35 days	54	13.5
Flow of bleeding (n=400)		
Heavy	29	7.3
Less	49	12.3
Medium	322	80.5
Suffering of abdominal pain (n=400)	187	46.8
Type of treatment taken for abdominal pain (n=64)		
Allopathic Medicine	51	79.7
Home remedy	10	15.6
Other	3	4.7
Source of treatment (n=64)		
Doctor	20	31.3
Friend	1	1.6
Mother	33	51.6
Pharmacist	2	3.1
Sister	8	12.5
Problem in doing daily routine activities (n=400)	103	25.8
School absenteeism due to menstruation (n=280)		
0	206	73.6
1-2 days	49	17.5
>2 days	25	8.9

244 (61%) participants have used cloth while 156 (39%) used sanitary pad during last menstruation. (Table 3) 380 (95%) participants had practiced cleaning genitals during menstruation. 54.7% of them cleaned with the water only followed by 152 (40%) by soap water. Only 11(2.9%) participants used antiseptic for cleaning genitals. The other method mainly included wiping the genitals by a cloth.

Table 3 : Details of practices followed regarding cleanliness during last menstruation

Variables	Frequency	Percentages
Material used (n=400)		
Cloth	244	61
Sanitary pad	156	39
Cleaning genitals (n=400)	380	95
Method of cleaning genitals (n=380)		
Soap water	152	40
Water	208	54.7
Antiseptic solution	11	2.9
Other	9	2.4

As depicted in figure 1, majority (53.2%) of participants have considered avoiding religious work during menstruation as appropriate. 111(27.8%) participants were comfortable to receive health education regarding menstruation from lady doctor. 90(22.5%) participants were interested to receive education from mother. Only few were interested to receive education from sister, teacher, ASHA (Accredited Social Health Activist), AWW (Anganwadi Worker), and friends.

Figure 1 : Types of restrictions followed by participants during menstruation (multiple responses possible)
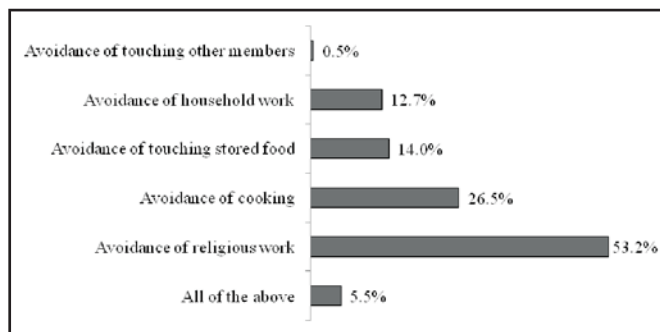
(Table 4)244(61%) participants used cloth and 156(39%) participants used sanitary pad during last menstruation. Those participants who used cloth,

148(60.7%) of them had changed it 12 hourly, and 34(13.9%) had changed 6 to 8 hourly. Among sanitary pad users, 82 (52.6%) had changed it 12 hourly and 61 (39%) had changed it 6 to 8 hourly. 168(68.9%) cloth users had changed it before going to sleep and 130(83.3%) sanitary pad users had changed it before going to sleep.

Table 4 : Comparison of materials used in last menstrual cycle

Require No. of material/day	Cloth		Sanitary pad	
	Frequency	Percentages	Frequency	Percentages
1	62	25.4	13	8.3
2	148	60.7	82	52.6
3	22	9.0	30	19.2
≥4	12	4.9	31	19.9
Total	244	100	156	100.0
Changing material before sleep	168	68.9	130	83.3
Participants facing problems due to material used	85	34.8	7	4.5
The type of problem faced				
Ill-fitting	20	23.5	0	0
Itching	1	1.2	3	42.9
Rash	61	71.8	4	57.1
Staining On Clothes	3	3.6	0	0
Total	85	100	7	100
Method of disposal				
Burning	26	10.7	42	26.9
Dustbin	74	30.3	98	62.8
Flush in toilet	0	0	2	1.3
Other*	144	59	14	9
Total	**244**	**100**	**156**	**100**

*Others included washing and burial for clothes and sanitary pad, respectively.

85(34.8%) had problem of ill fitting, itching, rash and staining with the use of cloth. In contrast 7(4.5%) users of sanitary pad had problem of itching and rash. 144(59%) participants had practice of washing the cloth for reuse. 74 (30.3%) disposed it into dustbin. In case of participants who used sanitary pad, majority 98(62.8%) disposed it into dustbin followed by 42(26.9%) disposed it by burning. Only 2(1.3%) participants flushed it into toilet.

Discussion :

The Government of India has launched a new, innovative scheme for the promotion of menstrual hygiene among adolescent girls in rural areas of the country. The programme is targeted at adolescent girls residing in rural areas to make sure that high quality safe sanitary napkins are made available to them and they are made aware of environmentally safe disposal practices. The main focus of the scheme is to increase awareness among adolescent girls on menstrual hygiene and increase access to and use of high quality sanitary napkins by adolescent girls in rural areas.[5]

In the current study, 19% girls reported irregularity in menstruation. This prevalence is higher than the previous study conducted in India by S. B. Salve et al (5%).[6] However current finding is comparable to another study conducted in the same state, Gujarat by Dr. P. B. Verma et al.[7] Present study showed that 46.8% females had menstruation associated with abdominal pain. While contradictory results (8.8%) were found by the study conducted by Shabnam Omidvar and Khyrunnisa Begum at South Indian state.[8] Another study conducted at West Bengal state of India revealed prevalence of abdominal pain during menstruation as high as 90.9%.[9] The age group of the sample studied in the compared study was 18 to 27 years, while present study included adolescent age group. As the medicine to relieve the abdominal pain is easily available in the rural areas through primary health centers and sub centers, 79.7% females were using medicines during menstruation for relieving the pain during menstruation. Only 15.6% were using home remedies for the same problem. 25.8% females reported that they faced problems in doing routine activities while menstruation. In a different study conducted by Shabnam Omidvar and Khyrunnisa, could reveal that 68.8% females had difficulties doing routine activities while menstruation. [8] Menstrual problems are a major cause of school absenteeism among adolescent girls. 8.9 % females had to miss more than 2 days due to menstruation during last cycle in the current study.

61% females were using cloth and 39% were using sanitary napkins as an absorbent for menstrual blood. The material used during menstruation, varies in the different parts of the country. Similar study conducted in the West Bengal state of India, showed that 92% and 8% females were using cloth and sanitary napkins respectively during menstruation. [9] Another study of country Lebanon showed that 100% subjects were using sanitary pad. [10] 95% participants were cleaning the genitals following menstruation regularly. Different methods were used by the participants for cleaning the genitals.

It was observed that 61% participants used cloth and 39% participants used sanitary pad during last menstruation. Those participants who used cloth, 60.7% of them had changed it 12 hourly, and 13.9% had changed 6 to 8 hourly. Among sanitary pad users, 52.6% had changed it 12 hourly and 39% had changed it 6 to 8 hourly. In similar study by Harinder Sekhon et al, 93.53%of the study population used company made branded sanitary napkins available in market which was quite higher than present study. Majority of the girls claimed to change the used pads as and when required. [11] In the another similar study by Anju Ade et al, 65% girls use only readymade sanitary pads during menses while 35% girls use only clothes.[12]

In the study conducted by Dipali Nemade et al, 15.74% girls used only clothes during menstruation, 40.61% used only sanitary pads while 43.65% girls used both sanitary pads and clothes during menses. [13] In a similar study, the median number of absorbents used during the last menstrual period was 8 (3.18) by each subject (range, 1- 18). [14]

In another study carried out in Nagpur by Patle RA et al., similar results were observed that43.40% in rural area were using sanitary pads. Use of old piece of cloth was higher among rural group (52.43%) with frequency of changing of the pads being 2-3 times per day. [15]In similar study in northwestern Nigeria, Most of them used sanitary pads as absorbent during their last menses; changed menstrual dressings about 1-5 times per day. [16] In study carried out by Adrija Datta, 45.9% rural respondents used only sanitary napkin during menstruation. Most of the respondents (90.8% in rural area) changed absorbent two to four times a day. [9]

In study carried out by Singh AJ et al, it was observed that only 0.4% women used sanitary napkins. Reuse of cloth pad was reported by 4% respondents. [17] The other studies in Nepal by Adhikari et al showed 94% use the pads during the period but only 11.3% dispose it[1]. In study by Dasgupta et al it was observed that only 11.25% girls used sanitary pads during menstruation. [19]

In similar study by GS Vidya in Bangalore, Only 44.62% were actually using sanitary napkin in practice and the rest were using cloth piece. [20] A study conducted by Baishakhi Pariaet al showed that 36% girls in the urban and 54.88% girls in the rural area were using cloth. 27.27% girls in urban and 30.45% girls in rural area had changed the pads only once per day. 31.27% of urban girls and 71.42% of rural girls reused pads during menstruation period. [21]

In present study 59% participants, who used cloth, had practice of washing the cloth for reuse while 30.3% disposed it into dustbin. Adolescent girls used sanitary pad, majority 62.8% disposed it into dustbin followed by disposal by burning (26.9%). Study carried out in North India showed 80.96% adolescent girls in study were disposed the used pads in dustbin followed by disposed by burning (13.74%). [11]

Small sample size and inability to involve private school students (due to disagreement for participation by school management) can be considered as a limitation of the current study. However the study is able to justify the objectives and reveal the currently prevalent Menstrual Hygiene Practices in rural areas of Gujarat.

Conclusion :

The adolescent girls are facing various menstrual health problems like abdominal pain, menorrhagea, polymenorrhoea etc. However, very few of them seek the treatment for the same. These untreated problems are also responsible for loss of schooling days. Majority adolescent females still follow the unhygienic practices like use of cloth as an absorbent for menstrual blood. They are unaware of proper disposal techniques of sanitary pad or other material used as absorbent, resulting in wrong

practice of disposal which may promote various communicable diseases among themselves as well as in the community. Stronger efforts are needed to promote the proper menstrual hygiene practices among rural females. This can be achieved by giving them proper training and health education (by involving teachers, family members, health worker/ASHA (Acredited Social Health Activist) worker/Anganwadi worker, and media).The findings of the study can be used for planning programs, making new policies for improving the level of information especially, for rural adolescent girls.

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Comparison of Compliance of Animal Bite Patients to Two Different Routes of Post-Exposure Prophylaxis against Rabies.

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Abstract :

Introduction : Rabies is a 100% fatal zoonotic disease affecting humans. Intramuscular Anti Rabies Vaccination (ARV) has been the mainstay of management of post-animal bites for rabies. This prospective study was conducted to know the compliance of patients treated at ARV Clinics of the District hospital (IM route) and tertiary care hospital of Vadodara (ID route) and the reasons for delay or missing the Scheduled dosage of the same. **Method :** Among the 500 enrolled patients (250 patients from each institution), those who missed the scheduled dosage of ARV and never returned to the ARV Clinic were followed and their reasons for delay or missing the scheduled dosage were recorded. **Results :** Compliance was 62.8% and 70% in patients managed by intramuscular and intradermal route of ARV respectively, but the difference was not statistically significant (p value 0.0883). Personal or official workload followed by patient's forgetfullness about the scheduled date of vaccination were some of the main reasons for not coming regularly to receive next scheduled dosage of ARV. **Conclusion :** The compliance among patients managed by intradermal as well as with intramuscular route of ARV was similar. Use of intradermal method of ARV can be recommended to reduce ARV clinic visits and cost related to transportation.

Keywords : Animal bite, Rabies, ARV, Compliance, PEP.

Introduction :

Rabies is an acute viral disease causing fatal encephalomyelitis in virtually all the warm blooded animals. However, it can be prevented by local wound management, administration of ARV and use of immunoglobulins after exposure to rabid animals. Modern Cell Culture Vaccines (CCV) are now being used for post-exposure prophylaxis. Higher cost of intra-muscular administration of CCV is a limiting factor for its wider use. To overcome this problem, WHO has recommended use of efficacious, safe and feasible intra-dermal (ID) route of inoculation of CCVs. [1]

In many institutes, patients of animal bite are managed by intramuscular (IM) and/or intradermal (ID) route of Antirabies vaccination, the compliance of which needs to be compared. We carried out study at two sites namely Jamnabai Hospital (District Hospital) and SSG hospital (Tertiary care Hospital), Vadodara employing two different routes of ARV, intramuscular and intradermal routes respectively. Both these hospitals are government hospitals employing staff as per same Government norms and by policy it has been decided to administer a particular route of ARV to an animal bite victim at these institutions. The patients catered by these hospitals resemble each other in terms of socioeconomic profile. ARV charges were also similar for each dose in these hospitals.

Method :

This was a prospective study at SSG Hospital and Jamnabai Hospital over a period of 8 months April 2011 to November 2011. Upon relevant retrospective data collection from the data register of the clinic over a period of 5 months, compliance was found to be 69%. Taking desired precision as 5%, alpha risk as 5 and 95% confidence interval, the sample size was estimated at 248. Therefore 250 patients were enrolled in each intradermal and intramuscular group in the current study. The patients were followed up to their last dosage of ARV schedule.

Informed verbal consent was taken from the participants prior to their enrolment into the study.

Pretested semi-structured questionnaire was used for the interview. This study instrument included socio-demographic details and the history of animal bite on the first visit. On subsequent visits, the patients were asked about adverse events experienced after ARV and reasons for delay in scheduled dosage of ARV or missing of the dose, if any. Those who missed the scheduled dosage of ARV and never returned to the ARV clinic were contacted through the telephone and their responses for delay or missing the scheduled dose were recorded.

The patients were given 5 doses of 0.5ml ARV in I.M. group, while 4 doses of 0.1ml ARV over two sites in I.D. group.

The privacy of the patients was ensured during the entire process of data collection and confidentiality of the records was maintained.

Statistics :

Data was entered into Epi Info version 3.5.3 [2] and analysis was carried out using Bivariate & Multiple Logistic Regression.

Dependent variable : Compliance of the patients.

The principal outcome variable was patients' ability to complete ARV schedule. The patients were categorized as either completely vaccinated or incompletely vaccinated. Those who had taken all scheduled doses of ARV as prescribed by the physician according to the category of bite were labeled as completely vaccinated. This also included the patients who had received the vaccine later than the prescribed date of vaccination, but had taken all the doses of ARV. Others were labeled as incompletely vaccinated.

Independent variables : Demographic characteristics, category of animal bite, adverse reactions after vaccination and delay in scheduled dosage of ARV.

Statistical tests applied :

For bivariate analysis-Odds Ratio, Chi square test, Chi square for linear trends

For multivariate analysis-Multiple Logistic Regression

Results :

Majority of the 500 patients attending ARV Clinics of SSGH and Jamnabai Hospital (cumulative) belonged to age group 20-49 years (42.6%). Animal bite was more common among males (71.60%) in both hospitals but difference among them was not statistically significant (Chi-square test-0.1574, P value-0.6916).Around one fourth of patients had completed secondary education (8-10) and high primary education (6-8).

Almost 70% of the patients were APL Card holders and they received the antirabies vaccine by paying 100 Rupees for each dose, while Below Poverty Line (BPL) Card holders were given the vaccine free of cost (Currently, ARV is provided free of cost regardless of having APL or BPL card). The distribution of patients according to their APL/BPL card status was statistically significant in I.M. and I.D. groups (Chi-square test-4.1841, P value-0.0408). Only 30% of the patients were residing within 3 to 4 kilometres distance from ARV Clinic.

Compliance :

The patients managed by intradermal route of ARV showed 70% compliance to the ARV schedule, while those who were administered the vaccine by intramuscular route showed 62.80% compliance (Chi-square test-2.9045, p value 0.0883). However default rate was more among I.M. group. There were 20 patients in I.D. and 17 patients in I.M. regimen group who did not come for further dosage of ARV after receiving 1st dose of ARV. Table I shows that majority of the patients didn't come to receive last dose of ARV (Day 28). (Table 1)

Table 1 : Distribution of patients who missed the scheduled dosage of ARV according to the number of missed doses

Defaulter of ARV	I.D.(n=250)	I.M.(n=250)
Defaulter after 1st dose	20	17
Defaulter after 2nd dose	13	19
Defaulter after 3rd dose	42	21
Defaulter after 4th dose	-	36
Total	75(30%)	93(37.2%)

(As per table 2) There were 20, 24, 61, 102 and 43 patients in 0-5 years, 6-9 years, 10-19 years, 20-50 years and more than 50 years age groups respectively

in I.D. group, out of which 12, 15, 43, 71 and 34 patients had completed the ARV schedule. Similarly in I.M. group, there were 26, 23, 57, 111 and 33 patients in 0-5 years, 6-9 years, 10-19 years, 20-50 years and more than 50 years age groups respectively, out of which 16, 16, 43, 66 and 16 patients had completed the ARV schedule. In I.D. group, maximum compliance was observed among the age groups of 10-19 years (70.49%) and 20-50 years (69.61%), while patients of less than 10 years were comparatively less compliant to ARV Schedule (less than 63%). The commitment and perception of parents or guardian as well as two simultaneous pricks at each visit may be the contributing factor for less compliance in case of children. In I.M. group, patients of 10-19 years were comparatively more compliant (75.43%) than patients of more than 50 years age group (48.50%).

Table 2 : Contributing Factors related to patients ability to complete vaccination schedule of ARV

Characteristics	Completely Vaccinated	Chi-square value	
	I D Group(N=250) n (%)	I M Group(N=250) n (%)	(P Value)
Age group			
0-5 years	12/20(60)	16/26(61.5)	
6-9 years	15/24(62.5)	16/23(69.6)	Chi-square(trend)-
10-19 years	43/61(70.5)	43/57(75.4)	4.265(0.0389)
20-50 years	71/102(69.6)	66/111(59.5)	DF-1
More than 50 years	34/43(79.1)	16/33(48.5)	
Sex			
Male	130/181(71.8)	115/177(65)	0.008(0.9286)
Female	45/69(65.2)	42/73(57.5)	
Education			
Illiterate	32/45(71.1)	8/29(27.6)	
Primary	30/46(65.2)	32/45(71.1)	
High primary	27/42(64.3)	42/56(75)	18.122(0.0012)
Secondary and above	49/65(75.4)	40/67(59.7)	
Graduate and above	16/18(88.9)	11/15(73.3)	
Economic status			
APL	126/185(68.1)	101/164(61.6)	1.91(0.1670)
BPL	49/65(75.4)	56/86(65.1)	
Residential distance from ARV Clinic in Kilometres			
Less than 5	56/76(73.7)	93/145(64.1)	
5 to 10	105/146(71.9)	52/87(59.8)	Chi-square(trend)-
11 to 20	7/14(50)	8/12(66.7)	15.559(<0.0001)
More than 20	7/14(50)	3/6(50)	DF-1
Type of Animal			
Street Dog	153/219(69.9)	144/226(63.7)	1.875(0.3916)
Pet Dog	17/20(85)	9/15(60)	
Others (cat, rat etc.)	5/11(45.5)	4/9(44.4)	
Category of Bite			
Category 1	16/19(84.2)	22/26(84.6)	4.654(0.0976)
Category 2	148/216(68.5)	118/197(59.9)	
Category 3	11/15(73.3)	17/27(63)	
Adverse event following ARV Vaccination (n=250)			
Yes	24/36(66.7)	23/42(54.8)	0.0075(0.9311)
No	151/214(70.6)	134/208(64.4)	

Out of 181 males in I.D. Group, 130 males completed ARV schedule (71.8%) and 177 males in I.M. Group, 115 males completed ARV schedule (65%). The compliance rate was less among females than males in both groups.

The compliance level showed an increase with the level of education in both groups, with highest compliance rate in patients who had completed their graduation (92.3% in I.D. group and 71.4% in I.M. Group)

The BPL (Below Poverty Line) card holders were more compliant to the Vaccination Schedule than APL (Above Poverty Line) card holders in both groups.

Patients who reside within 10 kilometers from ARV Clinic showed better compliance (92% in both groups)to the ARV Schedule and the compliance decreased in patients who lived far away (more than 10 Km) from ARV Clinic.

Maximum compliance was seen in Category I patients (84.2% in ID and 84.6% in IM) while least compliance was seen in Category II patients (68.5% in I.D. and 59.9% in I.M. group) in both IM and ID patients. This difference was statistically significant in IM group (Chi-square test-6.007, p value-0.0496).

Figure 1 shows that adverse events were more common among the patients managed by intramuscular route of vaccination (54%). Pain at injection site was most common ADR in intramuscular route (95.24%), while redness was most common ADR (Adverse Drug Reaction) in intradermal route (58.33%) among the patients following Intradermal ARV. Itching and redness at

Figure 1 : Adverse events following ARV in I.D. and I.M. groups:
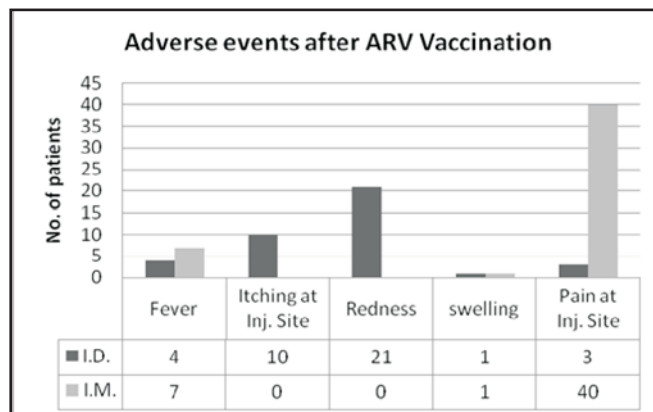
¥ Multiple responses are possible

On applying logistic regression, among different demographic characteristics of study population, we found age, educational status and residential distance in intradermal group while age and economic status in intramuscular group to be statistically significant factors for completely vaccinated patients as compared with incompletely vaccinated patients (Table 3).

Table 3: Multivariate analysis of factors affecting compliance among patients managed by Intradermal and Intramuscular routes of ARV

Parameter	Intradermal Group			Intramuscular Group		
	Odds Ratio	Confidence Interval	P value*	Odds Ratio	Confidence Interval	P value
Age less than 20 years	**2.7350**	**1.1059-6.7637**	**0.0294**	**0.2512**	**0.0744-0.8481**	**0.0261**
Male sex	3.5817	1.0067-12.7429	3.5817	0.3232	0.0677-1.5429	0.1567
Literate patients	**1.7793**	**1.2512-2.5303**	**0.0013**	**1.3530**	**0.9114-2.0084**	**0.1337**
BPL Card holders	0.9315	0.3280-2.6455	0.8940	**4.3547**	**1.3563-13.9811**	**0.0134**
Residential distance less than 10 Kms from ARV Clinic	**0.9420**	**0.8910-0.9959**	**0.0353**	1.0238	0.8978-1.1675	0.7254
Past History of Animal bite present	3.5354	0.9701-12.8837	0.0556	0.2225	0.0217-2.2779	0.2054
Category I animal bite	0.9087	0.2522-3.2736	0.8836	0.4210	0.1052-1.6839	0.2213
Not Experienced ADR	1.1168	0.3127-3.9882	0.8650	1.9458	0.4599-8.2323	0.3657

* p-value of less than 0.05 was considered to indicate statistical significance.

Figure 2 shows patients' perspective for missing the ARV dose. Personal or official workload, patients' forgetfullness about the scheduled date of vaccination and their migration outside the city and economical constrains were major reasons for not coming regularly to the ARV clinic to receive next scheduled dosage of ARV in both groups. These reasons were almost the same in both the groups. However, patients unawareness about ARV services being available at emergency department was a major reason in I.D. group.

Figure 2 : Reasons for delay or missing the scheduled dosage of ARV
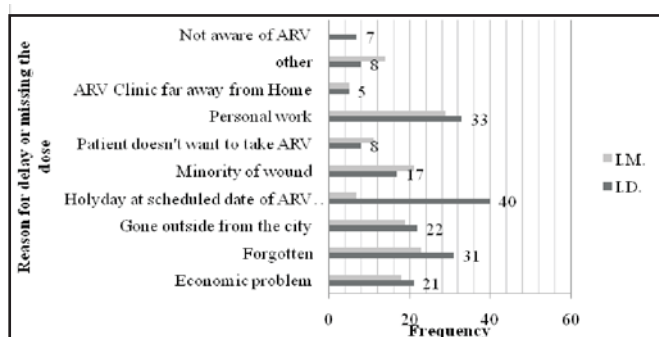
* Multiple responses are possible

Discussion :

Most of the factors affecting compliance in both the groups (IM and ID) were similar.The manner in which patients were segregated in the two groups was based on the way they approached the two institutions, by word of mouth, previous experience or nearness to their residential area.

Most common rabid animal to which patients exposed was the dog (96%) and among them 89% were due to stray dogs. Dog as a major biting animal was found in the present study and other studies also agree with this finding.[3-7]

Majority of the patients were of category 2 according to WHO classification. This was similar to the findings by Tiwari et al (2009) and Modi (2009).[6,8]

In the present study the compliance level towards ARV schedule was high among males, but difference between them was not statistically significant. On the contrarily, in a study by Rohi KR and Mankeshwar R compliance was seen more in female patients (68.7%) as compared to male patients (64.7%).[9]

In both groups, the patients were charged 100 rupees for each dose of ARV. The Patients with BPL card are given ARV free of charge. Compliance was less among non-BPL card holders due to the amount to be paid by them for the dose and 5% of them showed delay in taking scheduled dosage of ARV due to economical problems.

There was inverse relationship between residential distance from ARV Clinic and compliance to ARV schedule. The residential distance also adds to the travelling costs to the patients. Moreover ARV charges per dose and loss of daily wages also play a role in determining compliance to the ARV schedule. The least compliance level was observed among unskilled workers (66.67%) and loss of daily wages may be a contributing factor behind that.

In our study majority of the defaulter patients were for the last dose of ARV (4th dose in ID group and 5th dose in IM group). This may be due to complexity of ARV schedule or economical constraints or due to belief of the people that 3 or 4 doses are enough to protect them against rabies. The last dose (Day 28) of antirabies vaccination is 21 days after the 3rd dose of ARV (Day 7) in ID group and 14 days after the 4th dose of ARV (Day 14) in IM group. This huge gap may be an anticipating factor for missing the last dose of ARV schedule in both the regimens.

Preliminary economic assessments support the cost savings associated with a reduced schedule of vaccination.[10, 11] The ACIP (Advisory Committee on Immunization Practices) Rabies Workgroup has estimated that, assuming 100% compliance with a recommended vaccine regimen, a change in recommendation from a 5-dose schedule to a 4-dose schedule would save approximately $16.6 million in costs to the U.S. health-care system. Persons who receive rabies vaccination might see some savings related to deletion of the fifth recommended dose of vaccine, measured in both the cost of the vaccine and the costs associated with the additional medical visit.[12]

There is no specific recommendation for the re-initiation of the vaccine schedule when the intervals between vaccine doses are not followed, since this does not significantly affect antibody levels. [13]

Therefore, it was decided to perform an intention to treat analysis (without considering correct intervals). Not following the recommended time intervals between doses does not affect the immunological response, just as an interruption in the vaccination schedule does not require its re-initialization.[14] Hence, those who completed all the doses, irrespective of the duration, were considered compliant for the sake of this study. Whether the antibody titre levels vary in patients who are given ARV immediately after animal bite and in those who delay in taking ARV, gives scope for further research.

Conclusion :

The compliance among patients managed by intradermal as well as with intramuscular route of ARV was similar. The compliance level increased with increase in the level of education in both the groups. BPL card holders and patients residing near to ARV clinics were found to be more compliant.

Non-compliance was more common for the last dose of vaccination in both groups. Personal or official commitments, holiday on scheduled date of ARV, their migration outside the city and economical constraints were major reasons for non-compliance in both groups.

Intradermal route of ARV can be recommended as the compliance was similar to intramuscular regimen and it also reduces the ARV clinic visits and transportation costs associated with it.

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Sero-Prevalence of Transfusion Transmitted Infections among Blood Donors at Blood Bank of Rajendra Institute of Medical Sciences, Ranchi

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Abstract :

Introduction : An unsafe blood transfusion is very costly from both human and economic points of view. There are several infectious as well as non-infectious risks associated with transfusion of blood. With every unit of blood transfused there is 1% chance of transfusion associated problems including transfusion transmitted infections. In India blood is screened for five diseases which could be transmitted through blood and produce serious illness- HIV, Hepatitis B, Hepatitis C, Syphilis, and Malaria. **Objectives :** (1) To assess the trend of transfusion transmitted infections (TTIs)among blood donors from the records (2008-2012) at blood bank, RIMS, Ranchi. (2) To study the sero-prevalence of TTIs among blood donors from the records. **Method :** A record based study was conducted from June 2013- August 2013. Data were collected from the records of blood bank which also included data of blood donation camps. Data regarding sex, screening test results and type of donors were collected from the records. **Results :** Out of 63803 donors, voluntary donors (56.34%) were more in comparison to replacement donors (43.66%). Out of all TTIs, prevalence of HBV (1.01%) was highest followed by Malaria (0.33%), HCV (0.14%), HIV (0.08%) and Syphilis (0.03%). **Conclusions :** TTIs were more prevalent in replacement donors than voluntary donors. The number of voluntary donors has risen from 2008 -2012, but there is male preponderance in both voluntary and replacement donors than females.

Keywords : TTI, Sero-prevalence, Voluntary donors, Replacement donors.

Introduction :

Blood transfusion saves lives and improves health, but many patients requiring transfusion do not have timely access to safe blood. Providing safe and adequate blood should be an integral part of every country's national health care policy and infrastructure.[1] Timely transfusion of blood saves millions of lives, but unsafe transfusion practices puts millions of people at risk of transfusion transmitted infections (TTIs).[2] Globally, more than 81 million units of blood are donated each year.[3] More than 18 million units of blood are not screened for transfusion transmissible infections.[4] With every unit of blood, there is a 1% chance of transfusion associated problems including transfusion transmitted diseases.[5]

The diseases transmitted through blood transfusion are - Human Immunodeficiency virus (HIV), Hepatitis B virus (HBV), Hepatitis C virus (HCV), syphilis, malaria and infrequently cytomegalovirus, Epstein Barr virus, brucellosis etc. Preventing transmission of these infectious diseases through blood transfusion presents one of the greatest challenges of transfusion medicine. [6] As per guidelines of the ministry of health and family welfare (Government of India) under The Drug and Cosmetic Act, 1945 (amended from time to time), all the blood donations are to be screened against the five major infections namely HIV I & II , HBsAg, HCV, syphilis and malaria.[7,8]

There are three types of blood donors: voluntary unpaid; family/replacement and paid. Voluntary unpaid blood donors are vital for ensuring a sufficient, stable blood supply. A well-established voluntary unpaid blood donor programme can contribute to a significant reduction in the risk for infections such as HIV, hepatitis B, hepatitis C and syphilis. India reports the greatest increase in the number of voluntary unpaid blood donations from 3.6 million in 2007 to 4.6 million in 2008.[9]

The magnitude of the TTIs varies from country to country depending on loads in that particular population. There is a risk of 1–2 per 1000 recipients receiving contaminated blood with viral, bacterial or parasitic agents. The Indian subcontinent is classified as an intermediate Hepatitis B Virus (HBV) endemic (HBsAg) zone and has the second largest global pool of chronic HBV infections. The risk of transfusion transmission of these viruses may be alarming due to high sero-prevalence of HIV, anti-HCV, and HBsAg among blood donors.[10]

It is important to note that the problem of TTIs is directly proportionate to the prevalence of infections in the blood donor community.Jharkhand is grouped as one of the low prevalence states for HIV but number of people living with HIV in the state is rising. The prevalence of HIV in the state was 0.18% in 2009, 0.21% in 2010 and then to 0.25% in 2011, recording alarming increase of 80% in just three years from 2009 to 2011.[11]Even after development of medical science to such an extent, still we do not have any substitute to blood for human body, thus making blood and blood transfusion one of the most crucial and basic components of health care and patients, critical care. Thus the present study was conducted with an aim to assess the trend and sero-prevalence of TTIs among blood donors at blood bank from 2008-2012 of Rajendra Institute of Medical Sciences, Ranchi.

Method :

The present study was conducted from June 2013 - August 2013 through records at blood bank of Rajendra Institute of Medical Sciences. In the blood bank each donor blood sample was screened for five infections - HIV, HBV, HCV, Syphilis and Malaria. Data were collected from the records of the blood bank for the duration of January 2008- December 2012. Data regarding all donors coming to donate blood at blood bank as well as various blood donation camps organized by the blood bank were analyzed. Data regarding sex of donors, type of donors and screening test results were collected from the records.Exclusion criteria for blood donation were age <18 years and >60 years, weight < 45kg, current history of medication, recent blood transfusion, any infection, anaemia and recent history of any surgical procedure.

After data collection, template was generated in MS excel sheet. Descriptive analysis and frequency distribution was done using SPSS software.

Results :

In the present study a total of 63,803 donors were screened during the five year period from January 2008- December 2012. Out of them, 35,946 (56.3%) were voluntary donors which included donors at the blood bank of RIMS, Ranchi and also donors at the blood camps organized by the blood bank. The remaining 27,857 (43.7%) were replacement donors (Fig. 1).

Fig 1: Percentage distribution of type of donors Total donors (Voluntary + Replacement donors) = 63803 (JAN 2008 – DEC 2012)
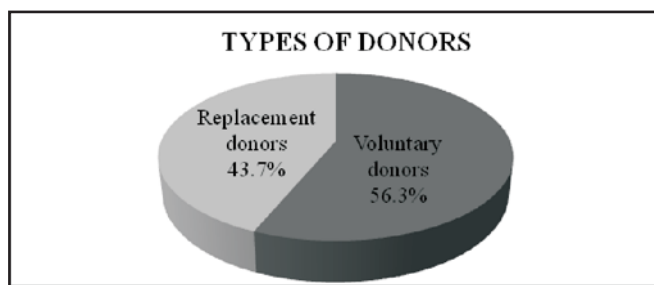
When gender wise distribution of the donors was studied it was found that majority of donors under voluntary and replacement group were males (>95%) and rest 2-4% only, were females. This shows the predominance of males as compared to females in blood donation for the studied years. (Table 1, Table 2).

Table 1 : Sex wise distribution of Voluntary Donors

Year	Voluntary Donors		Total Voluntary Donors No. (%)
	Male No. (%)	Female No. (%)	
2008	1157 (88.18%)	155 (11.81%)	1312 (100%)
2009	5616 (96.74%)	189 (3.26%)	5805 (100%)
2010	7997 (96.61%)	280 (3.39%)	8277 (100%)
2011	9102 (96.86%)	295 (3.14%)	9397 (100%)
2012	10542 (94.50%)	613 (5.50%)	11155 (100%)
Total	34414 (95.73%)	1532 (4.27%)	35946 (100%)

Table 2 : Sex wise distribution of Replacement Donors

Year	Replacement Donors		Total Replacement Donors No. (%)
	Male No. (%)	Female No. (%)	
2008	10149 (97.81%)	227 (2.19%)	10376 (100%)
2009	5038 (97.56%)	126 (2.44%)	5164 (100%)
2010	3507 (99.40%)	21 (0.6%)	3528 (100%)
2011	3870 (96.84%)	126 (3.26%)	3996 (100%)
2012	4620 (96.39%)	173 (3.61%)	4793 (100%)
TOTAL	27184 (97.58%)	673 (2.42%)	27857 (100%)

The year wise proportion (in percentages) of different TTIs among blood donors has been depicted in Table 3. With respect to individual TTIs, it was observed that out of total 63803 donors screened, the maximum number of donors 643 were found positive for HBV infection followed by 210 donors positive for malaria, 88 donors for HCV, 53 donors for HIV and 19 donors positive for syphilis. Thus the proportion (in percentages) of TTIs among blood donors at blood bank during five year period was the maximum for HBV (1.01%) followed by malaria (0.33%), HCV (0.14%), HIV (0.08%) and least for syphilis (0.03%).

Table 3 : Year wise trend of sero-prevalence of TTIs from 2008-2012

Year	Number of donors	HIV	HBV	HCV	Syphilis	Malaria
2008	11688	3 (0.03%)	110 (0.94%)	16 (0.14%)	2 (0.02%)	50 (0.43%)
2009	10969	11 (0.10%)	133 (1.21%)	8 (0.73%)	0	10 (0.09%)
2010	11805	12 (0.10%)	106 (0.89%)	11 (0.09%)	0	23 (0.19%)
2011	13393	11 (0.08%)	121 (0.90%)	34 (0.25%)	12 (0.09%)	64 (0.48%)
2012	15948	16 (0.10%)	173 (1.08%)	19 (0.12%)	5 (0.03%)	63 (0.39%)
Total	63803	53	643	88	19	210
Percentage of individual infection		0.08%	1.01%	0.14%	0.03%	0.33%

When year wise trend of individual TTIs was plotted, it was found that for HIV infection there was a peak in prevalence during the year 2009 which was followed by a steady pattern and then again an upsurge during 2012. There was a rising trend for HBV infection from 0.94% in 2008 to 1.08% in 2012 with a decline in percentage only in 2010. HCV positivity in donors is showing two peaks in the year 2009 and 2011. The pattern of trend of syphilis shows an upsurge of infection in donors in the year 2011 followed by a decline in 2012. The prevalence of malaria infection in donors has been seen as a rise from 0.09% in 2009 to 0.39% in 2012 (Fig. 2).

Figure 2 : Trend of sero-prevalence of TTIs from 2008-2012
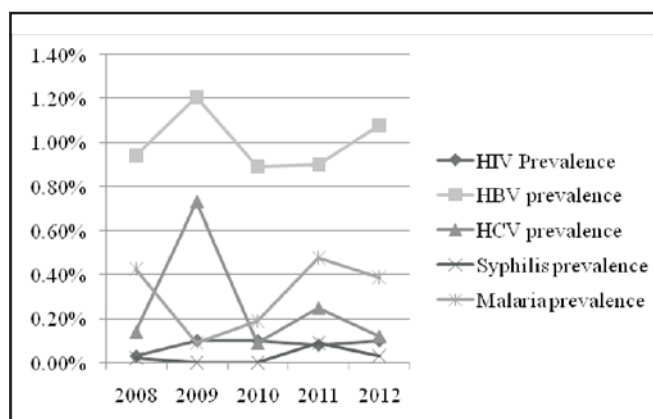
The pattern of TTIs with respect to donors depicted high prevalence of TTIs in replacement donors as compared to voluntary donors. Out of 53 positive HIV cases (Replacement Donors=43, Voluntary Donors=10); 643 HBV cases (RD=495, VD=148); 88 HCV cases (RD=78, VD=10); 19 Syphilis cases (RD=13, VD=6); 210 Malaria cases (RD=156, VD=54)(Table 4).

Table 4 : Distribution of seropositive cases in Voluntary donors (VD) and Replacement donors (RD)

Year	HIV		HBV		HCV		Syphilis		Malaria	
	VD	RD	VD	RD	VD	RD	VD	RD	VD	RD
2008	0	3	0	110	0	16	0	2	0	50
2009	0	11	10	123	1	7	0	0	0	10
2010	4	8	47	59	3	8	0	0	10	13
2011	3	8	49	72	5	29	5	7	19	45
2012	3	13	42	131	1	18	1	4	25	38
Total	10	43	148	495	10	78	6	13	54	156
Grand Total	HIV= 53		HBV= 643		HCV= 88		Syphilis= 19		Malaria= 210	

Discussion :

Blood being a scarce and expensive human resource, should be prescribed judiciously and appropriately. Prescribing decisions should be based on national guidelines on the clinical usage of blood; taking the individual patient's needs into consideration, with minimum cost and wastage, optimum safety and efficacy.[12]Despite of pre-donation counseling and medical fitness test, the presence of TTIs is inevitable in blood donations. Since a person can transmit infection during its asymptomatic phase (window period), transfusions can contribute to an ever widening pool of infection in the population.[13] Only continuous improvement and implementation of donor selection, sensitive screening tests, and effective inactivation procedures can ensure the elimination, or at least reduction, of the risk of acquiring TTIs.[14]

In the present study out of total donors, voluntary donors constituted 56.3% and replacement donors 43.7%. Similar predominance of voluntary donors was noted by Bhattacharya et al.[15] and Shah et al.[16] in their study. This reflects presence of awareness about blood donation in general population. The proportion was found to be low as compared to study conducted by Singh et al.[17], Kakkar et al.[18] and Pahuja et al.[19] where replacement donors were the predominant group as 82.4%, 94.7% and 99.48% respectively. The present study revealed that TTIs were more prevalent in replacement donors than voluntary donors. Similar observations with high sero-positivity in replacement donors was observed by Singh et al.[17] and Pahuja et al.[19]. On the other hand Chandra et al.[20] have found almost negligible infectivity rate in voluntary donors and also no voluntary donor was found to be positive for HIV by Arora D et al.[21]

The sero-prevalence of TTIs in the present study was highest for HBV infection (1.01%). This finding was similar to study conducted by Chandra et al.[20], Sawke et al.[22] and Bhawani etal.[23] who have also found HBV to be the commonest TTI among the donors in different percentages being 1.96%, 2.90% and 1.41% respectively. The prevalence of malaria infection in donors was next to HBV infection being 0.33% in the present study. The third highest prevalence of TTI in the present study was HCV being 0.14%. Other studies reported HCV prevalence as 0.34%, 0.57%, 0.84% and 1.09%.[20,22-24] For HIV, India is second only to South Africa in terms of overall number of people living with HIV.[19] The prevalence of HIV in various parts of India is different with high rate in western and southern parts.[17] In the present study the prevalence of HIV in donors was found to be 0.08%. Other studies conducted in various parts of

India reported HIV prevalence in donors as 0.23%, 0.51%, 0.39% and 0.08%. [20,22-24] A WHO report states that the viral dose in HIV transmission through blood is so large that one HIV positive transfusion leads to death, on an average, after 2 years in children and after three to 5 years in adults.[21] The least prevalence of TTI in the present study was for syphilis being 0.03%. Other studies reported syphilis prevalence in donors as 0.01%, 0.23%, 0.08%, 0.85% and 0.90%. [20, 22- 25]

Conclusion :

Out of 63803 donors, voluntary donors (56.3%) were more, in comparison to replacement donors (43.7%). TTIs were more prevalent in replacement donors than voluntary donors. The number of voluntary donors have increased from 2008 -2012, there was an increasing trend for both males and females but there was male preponderance in both voluntary and replacement donors. Out of all TTIs, prevalence of HBV (1.01%) was highest in the donors followed by Malaria (0.33%), HCV (0.14%), HIV (0.08%) and Syphilis (0.03%). The pattern of TTIs among blood donors from 2008-2012 has shown a rising trend for HIV and HBV infections. Therefore it is concluded that voluntary donation should be encouraged for the prevention of transfusion transmitted infections. Replacement and voluntary donors should be screened thoroughly before blood donation and professional donors should be out rightly rejected. Public awareness and counseling could also help in curbing these infections and increase blood safety.

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Evaluation of Temperature Monitoring System of Cold Chain at all Urban Health Centres (UHCs) of Ahmedabad Municipal Corporation (AMC) area.

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Abstract :

Introduction : Temperature monitoring system is an important element of cold chain. **Objectives :** 1) To evaluate the temperature monitoring system of cold chain at UHC level.2) To take necessary corrective measures whenever required and give relevant advices to handlers for improving the system. **Method :** A cross sectional study was conducted at all the 56 UHCs of AMC area during May 2012 to January 2013. Pretested check list was used having details of various cold chain elements. **Results & Discussion :** Significant difference was found regarding the placement of alcohol & dial thermometer in ILR & DF respectively (P: 0.028). Documentation of temperature in temperature logbook twice daily on regular basis was satisfactory. Poor documentation was noted for power failure (12.5%) and for defrosting status (41%) in record book. ILR (Ice Lined Refrigerator) breakdown was noted significantly in temperature logbook (P: 0.004). **Conclusion :** Temperature logbook was regularly updated still there was scope for improvement regarding documentation of power failure and defrosting status.

Key words : Temperature record,cold chain, UHC

Introduction :

Cold chain is a system of storing and transporting vaccine at the recommended temperature range from the point of manufacture to point of use. [1-3]Cold Chain and vaccine management are the left and right hands of immunization programme. [4] Temperature monitoring system was very important component to avoid cold chain failure. Deep Freeze (DF) and Ice Lined Refrigerator (ILR) are to electrical equipment available at UHC level. A break in the cold chain is indicated if temperature rises above +8°C or falls below +2°C in the ILR; and above -15°C in the Deep Freezer. [5, 6] The ILR and Deep freezers each should have separate thermometer and temperature record book and temperature must be recorded twice daily (morning and evening). [3,7]After recording the temperature, cold chain handlers should sign on the temperature record book. Every week Medical Officer (MO) in-charge should record the temperature and sign on the record book. [8]such records should be checked during supervisory visits. The thermometer should be kept in between the freeze sensitive vaccine inside the basket of the ILR. [2,9]There are mainly three types of thermometer.[1]

Dial thermometer: It has dial with moving needle to show the temperature of vaccine within the range of -50°C to +50°C.(2) Alcohol Stem thermometer: It is much sensitive and accurate than dial thermometers.[5, 10] They can record temperatures from -50°C to +50°C and can be used for ILRs and deep freezers. As it is very sensitive, it should not be taken out from the ILR and reading must be noted immediately.(3) Electronic / Digital thermometer: It is also known as control panel.

Every vaccination is not immunization so potency of all vaccines needs to be well maintained. One of important component of cold chain is maintaining each vaccine in recommended temperature for vaccine potency. Dealing with larger number of vaccine stocks in major cities, is also increases the chance of cold chain failure. The Ahmedabad Municipal Corporation (AMC) is an urban area with many challenges, as far as maintenance of cold chain is concerned. Thus, looking in details of cold chain system in an urban area is very much required. So study was conducted at all UHCs of AMC with following objectives.

Objectives :

1) To evaluate the temperature monitoring system of cold chain at UHC level.

2) To take necessary corrective measures whenever required and give relevant advices to handlers for improving the system.

Method :

Ahmedabad Corporation is divided in 6 zones and has total 57 wards with a city population of 5,570,585.[11] Zone wise distribution of fifty seven UHCs shows that West Zone (WZ), New west Zone (Nwz), East Zone (Ez) and North Zone (Nz) have 10 UHCs each. While Central Zone (Cz) is having 09 UHCs and South Zone (Sz) is having 08 UHCs.The present cross sectional study was conducted at all 56 UHCs of AMC area during May 2012 to January 2013.As far as the cold chain system of UHC is concern, there are fifty six UHCs, because two UHCs of East zones (Rajpur and Rakhiyal) are working as a single unit for immunization coverage and there is single set of all cold chain equipments for both UHCs. In AMC area responsibility of cold chain and vaccine management at all UHCs is under Registrar of Birth & Death department (RBD department). Due permission was taken from RBD department, Health sector, AMC. Institutional Review Board (IRB) of Smt. N.H.L. Municipal Medical College, Ahmedabad approved the study and gave ethical clearance. Fully structured checklist, which was specially designed and pre-

tested, was used for data collection purpose at all UHCs. The check list contains details of various components of cold chain. Among them one of the important components is temperature monitoring system. Which contents (1) Evaluation of temperature logbook records (2) Availability, placement and functional status different types of thermometer. At each UHC this check list was filled and corrective measures were taken wherever necessary. Data entry was carried out and data analysis was done by using appropriate statistical software and applying suitable statistical tests.

Results :

Among all UHCs, 54 DFs and 53 ILRs were found in working condition. digital (electronic) thermometer was present in many of electrical equipments but was not in working condition, in all of them. Majority of DF & ILR had internal thermometer. Significant findings were noted regarding availability of alcohol thermometer in ILR and dial thermometer in DF (Table-1). As compare to digital (electronic) thermometer, temperature of internal thermometer was noted in temperature record book at majority of UHCs. Complete temperature record of last 1 year was available only at 21 (37.5%) of the UHCs. There were significant breakdowns in ILR as compare to DF. At 4 UHCs a total of 6 DF breakdowns were reported (At 1 UHC 3times DF breakdown in 1 year). For ILR, a total of 20 breakdowns were reported at 17 UHCs (With 2 & 3 breakdown at one UHC each) (Table-1).

Table 1 : Status of temperature monitoring system of Electrical equipments at UHC level.

Sr. No.	Points to be observed Internally for DF (N=54) and ILR (N=53) Equipment	DF (N=54)		ILR (N=53)		Chi-square value	P value
		Yes	No	Yes	No		
1.a	Digital Thermometer (Electronic) present	46	08	41	12	1.08	0.30
1.b	Digital Display in Working condition	29	17	27	14	0.075	0.78
1.c	Digital Display in visible condition	29	17	27	14	0.075	0.78
2.a	Separate internal thermometer present	49	05	51	02	0.57	0.45
2.b	Alcohol thermometer present	21	28	33	18	4.80	0.028
2.c	Dial thermometer present	28	21	18	33	4.80	0.028
2.d	Functional thermometer properly placed	46	03	44	07	0.87	0.35
3.a	Alcohol thermometer temp. in record book	18	36	31	22	6.82	0.009
3.b	Dial thermometer temp. in record book	28	26	16	37	5.18	0.023
3.c	Digital thermometer temp. in record book	08	46	06	47	0.29	0.59
3.d	Complete data records of temperature in temp. books of last 1 year	21	35	21	35	0.00	1.0
3.e	Equipments breakdown noted in temp. books at UHCs (last 1 year data)	04	52	17	39	8.44	0.004

All the UHC had temperature record book/logbook. Majority (83.9%) had placed it nearer to DF/ILR. Monitoring of temperature of electrical cold chain equipments on daily basis was satisfactory (92.9%) but poor documentation of power failure/cut (12.5%) and defrosting status (41.1%) was observed (Table-2). Cross check by MO of UHC was done on regular basis. As per health staffs, external supervision by AMC was satisfactory with a mean 3.1 supervisory visit per year. However documentation in temperature record book was not supporting this fact with an average 1.2 supervisory signature per year. Technical / mechanical services of DF/ILR were on call and not regularly basis. Not considering the routine inspection and maintenance visit by the technician, and only considering the 26 breakdowns, signature of technician was found at only 2 UHCs (Table-2).

Table 2 : Evaluation of Temperature record book at UHC level.

Sr. No.	Details of temperature record book (N=56 UHCs)	Yes (No.)	Percentage (%)
1	Temperature record book available	56	100.0
2	Temperature record book put nearer to DF / ILR	47	83.9
3	Temperature record book up to date till now	52	92.9
4	Documentation on power failure/cut done in temperature book (last 1 year data/record)	07	12.5
5	Documentation on defrosting status done in temperature book (last 3 months data/record)	23	41.1
6	Cross check by MO (see signature). (last month data)	50	89.3
7	Records of external checking by AMC available in temperature book (last 1 year data)	42	75
8	Signature of technician done in temperature book (last 1 year data/record)	02	3.6

Temperature detail of different types of thermometer and Temperature record data for ILR and DF according to their availability was mentioned in Table-3 & Table-4. Majority of internal thermometer findings shows normal temperature range for both DF & ILR (Table-5). Summary measures of temperature details of cold chain equipments were as per Table-6.

Table 3 : Comparison among temperature related data from different sources for Ice Lined Refrigerator (ILR) equipment.

Sr. No.	Temperature details for ILR	Seen on Digital thermometer of ILR (N=27)	Internal thermometer (Alcohol/Dial) Temperature (N=51)	In Temperature record book (N=49)
1	-2 .C	00	02	01
2	-1 .C	00	00	01
3	0 .C	01	01	00
4	1 .C	00	01	00
5	2 to 8 .C	26	47	47

Table 4 : Comparison among temperature related data from different sources for Deep Freeze (DF) equipment.

Sr. No.	Temperature details for DF	Seen on Digital thermometer of DF (N=29)	Internal thermometer (Alcohol/Dial) Temperature (N=49)	In Temperature record book (N=50)
1	-30 to -26 .C	00	00	01
2	-15 to -25 .C	23	43	47
3	-14 to -11 .C	02	04	02
4	-10 to -06 .C	04	01	00
5	-05 to 0 .C	00	01	00

Table 5 : Comparison of internal thermometer (Alcohol / Dial) temperature range between DF & ILR equipments.

Sr. No.	Internal thermometer Temperature details for DF and ILR	DF (N=49) (T= -15 to -25 °C)	ILR (N=51) (T= 02 to 08 °C)	Chi-square value	P value
1	Above Normal	06	00	4.65	0.03
2	Normal	43	47	0.16	0.69
3	Below Normal	00	04	2.22	0.14

Table 6 : Summary measures of temperature details of cold chain equipments.

Sr. No.	Details of cold chain equipment	Mean	SD	Min.	Max.	Median
1	**Details of DF**					
1.a	Display Temperature	-17.9	4.2	-25	-8.5	-17.8
1.b	Internal Thermometer Temperature	-18.1	4.5	-27	00	-19
1.c	Record book Temperature	-19.8	3.3	-28	-11	-20
2	**Details of ILR**					
2.a	Display Temperature	4.0	1.4	00	07	4.1
2.b	Internal Thermometer Temperature	3.9	1.9	-2	8	4
2.c	Record book Temperature	3.7	1.7	-2	8	4

Discussion :

As discussed, majority of DF & ILR had separate internal thermometers. As alcohol thermometer is more sensitive, it is preferred over dial thermometer for ILR. [3] The present study shows the significant findings regarding availability of alcohol thermometer in ILR and dial thermometer in DF (Table-1). The outer digital temperature indicator should not be recorded but was used at 8/54 & 6/53 UHCs for ILR & DF respectively. Temperature monitoring system is one of the important systems of cold chain maintenance. Temperature record book is key component for monitoring the temperature regulation.[1,2] At all UHCs documentation of temperature twice daily on regular basis was satisfactory. But documentation record of power failure, defrosting of DF, Technical / mechanical service of DF/ILR etc. was poorly maintained.

Temperature record book was satisfactorily cross checked by Medical Officers (89.3%) but external cross checking by AMC (75%) need some improvement. This may equally be attributed to laxity on part of external supervisors who fail to sign in spite of supervising the system. In the study, data for the temperature monitoring system were collected from different sources, e.g. Digital thermometer temperature, internal thermometer temperature (Alcohol/Dial) and from Temperature record book data. The comparison was done among temperature related data from different sources as shown in Table-3 and Table-4 for ILR and DF respectively. Majority of the temperature were within normal range for the equipment. The recorded temperature was almost similar to the internal temperature measured. As from the above tables (Table-3 & 4) temperature range of internal thermometer of DF and ILR was compared with each other which showed that there was significant difference between DF and ILR for temperature range above normal level (Table-5). But majority of internal thermometer findings shows normal temperature range for both DF & ILR. Overall mean temperature of record book, internal thermometer (Alcohol/Dial) and of digital thermometer was similar (Table-6).

Conclusion and Recommendations :

Although not uniform, significantly higher number of alcohol thermometer is used in ILR whereas dial thermometer in DF. At all UHCs documentation of temperature twice daily on regular basis was satisfactory but other documentation e.g. defrosting status, power failure / cut, technical / mechanical services etc. was poor. Majority of internal thermometer findings shows normal temperature range for both DF & ILR. Regular cold chain training for handlers at UHC level should be organized by the health authority of the AMC area.

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Socio-demographic Factors Affecting the Nutritional Status of the Under Three Children in Chandigarh, UT

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Abstract :

Introduction : The prevention of malnutrition is crucial for improving our human resources. Child under-nutrition is the major public health issue in many developing countries such as India. Out of 167 million underweight under-five-year old children in the world, 90 million live in South Asia. Despite global efforts for improving nutritional status of children, desired outcomes could not be achieved. Malnutrition is regarded as a silent emergency in India, seriously affecting human development and economy of the country. **Method :** It is a community based cross-sectional study, undertaken in Rural, Urban and Slum population of UT Chandigarh. Nutritional status of children was assessed using WHO classifications. **Results:** Out of the total 424 children surveyed, 262 (61.8%) were found to be underweight. Underweight prevalence was maximum among 25-36 months (75%) of age. There were 24.6% females of normal weight as compared to 40.6% in males. Normal weight was highest for birth order one (37.7%).

Key Words : WHO, Birth order, Malnutrition, Under Three children

Introduction :

Malnutrition is regarded as a silent emergency in India, seriously affecting human development and economy of the country. Proper nutrition of children leading to adequate growth and good health is the essential foundation of human development. Child malnutrition tremendously affects development outcomes. The prevention of malnutrition is crucial for improving our human resources. [1] Child under-nutrition is the major public health issue in many developing countries such as India. Out of 167 million underweight under-five-year old children in the world, 90 million live in South Asia. [1] Despite global efforts for improving nutritional status of children, desired outcomes could not be achieved. India has the highest proportion of undernourished children in the world. [2] World Health Organization (WHO) has estimated that 60.0 % of the 10.9 million deaths that occur annually among children aged less than five years in the developing countries are associated with under-nutrition [3], about 25% of the deaths in under-five occur in India alone, often associated with inappropriate feeding practices.

Nutritional status of children is conventionally determined by comparing standard indices: stunting, wasting, and underweight derived from anthropometric measurements, with National Centre For Health Statistics (NCHS) standards. On this basis of indices derived from anthropometric data, World Health Organization (WHO) classifies children in terms of underweight, stunted, and wasted. The prevalence of stunting, underweight and wasting are reported to be 45%, 47% and 16% respectively in India by UNICEF (2003). [4] NFHS-3 survey reports these proportions to be 48%, 43%, and 20% respectively.[5]

Present study attempts to find the prevalence of malnutrition in under three children and their relations with socio-demographic factors.

Method :

It is a community based cross-sectional study undertaken in Rural, Urban and Slum population of Union Territory (UT) Chandigarh.

Mothers of infants willing to participate in the study and satisfying the inclusion criteria and also children below three years of age within selected clusters served as study units.

Sample Design :

A stratified two-stage random sample design was adopted. At the first stage, from the sampling frame available, a sample of primary stage units (PSU), was selected randomly with probability proportional to size (PPS) in rural and urban and slum strata. A sample of ten clusters as PSU including six urban sectors, two slums and two villages was covered. At the second stage, a sample of households as second stage units was selected within each selected PSU of an optimum size with proportional allocation. All study units within selected households were interviewed to obtain the desired information.

Optimum Sample Size :

Power analysis was done to calculateoptimum sample size for the baseline survey of the study. Following formula with approximation for large population was used:

$$N_{opt.} = \frac{Z^2_{1-\epsilon/2}\,(1\text{-}P)}{\epsilon^2\,P}$$

Where,

P = Anticipated population proportion

1 - α = Confidence Coefficient

ϵ = Relative precision, and

Z is the value of standard normal variate.

Optimum sample size of mothers was calculated on the basis of various key parameters of breastfeeding behaviour of mothers. In the pilot survey, key parameters of breastfeeding behaviour of mothers were observed as 58% initiating breastfeeding within 6 hours, 57% giving colostrum, 60% not giving prelacteal feed and only about 55% exclusive breast feeding rate for six months. Maximum sample size for mothers calculated on the basis of these key parameters, assuming 5% relative precision and 95% confidence coefficient was obtained to be 726. Accordingly, a sample of an optimum size of 726 mothers was selected in the baseline survey. Sample for children below three years of age comprised of children (below three years of age) of mothers included in the survey.

Inclusion criteria : Mothers having children below three years and willing to participate in the study. Their children below 3 years of age were study subjects of the present study.

Nutritional status of children was assessed using WHO classifications. Children who were not available for anthropometric measurements in spite of repeated efforts or whose parents were not willing to participate in the study were excluded from the study after making efforts for replacing non-respondents to minimize non-responses. Mothers of selected children who were willing to participate in the study were interviewed for collecting information on selected socio-demographic characteristics: age of children, caste, religion, socio-economic status (SES), educational status etc. Weight, one of important anthropometric parameters was recorded for children ensuring reliability as far as possible. Height could not be measured due to various field problems.

Non-respondents due to any reason in the baseline survey were replaced by new participants selected at random. Respondents were interviewed in privacy to collect the desired information using pre-designed, pre-tested interview schedules for different groups of respondents. House-to-house survey was conducted for this purpose. Field problems faced during data collection were solved time to time.

Modified Prasad's Classification [6]adjusted with current income levels was used for assessing socio-economic status (SES) and categories were pooled into Low, Middle and High status.

Assessment of Nutritional Status : The prevalence of under-nutrition was evaluated in terms of nutritional status assessed by WHO criterion. [7] According to WHO criterion, based on standard deviation (SD) units (termed as Z-scores), children who were more than two standard deviations below the reference median on the basis of weight-for-age, were considered to be underweight and children who were below three Z- score values of the reference median (<-3Z-score) were considered to be severely underweight.

The data was entered and analysed using SPSS and statistical tests like Chi square, Student's t test were applied.

Ethical Guidelines for biomedical research on human participants issued by ICMR (2006) were followed and confidentiality of responses was ensured. In case of children, consent was taken preferably from mothers or from any other elderly members. Approval by Institutional Research Committee and Institutional Ethics Committee (IEC) was also taken.

Results :

There were 262(61.8%) underweight children among total 424 children. Also 18(4.3%) were found overweight. Mean age of underweight children was

Observations :

Table 1 : Nutritional status of children by who classification

WHO grade	No	Percent	Age of Children	
			Mean	SD
Normal	144	33.9	9.35	8.587
Underweight	131	30.9	12.76	8.812
Severely Underweight	131	30.9	14.63	9.382
Overweight	12	2.8	13.00	6.592
Severely Overweight/Obese	6	1.4	5.67	6.282
Overall	**424**	**100.0**	**12.08**	**9.095**

comparatively higher as compared to that for other children with an overall mean age of 12.08±9.09 years. (Table 1)

Table 2 : Nutritional status of children by who classification according to socio-demographic characteristics

Age in months	WHO grade			
	Normal	Underweight	Overweight	Total
1	5(35.7)	7(50.0)	2(14.3)	**14(100.0)**
2-6	74(54.8)	57(42.2)	4(3.0)	**135(100.0)**
7-12	27(24.3)	79(71.2)	5(4.5)	**111(100.0)**
13-24	27(22.5)	86(71.1)	7(5.8)	**120(100.0)**
25-36	11(25.0)	33(75.0)	0(.0)	**44(100.0)**
Total	144(34.0)	262(61.8)	18(4.2)	**424(100.0)**
Mean± SD	9.35±8.56	13.69±9.13	10.56±7.24	**12.08±9.09**
Gender				
Male	101(40.6)	135(54.2)	13(5.2)	**249(100.0)**
Female	43(24.6)	127(72.6)	5(2.9)	**175(100.0)**
Total	144(34.0)	262 (61.8)	18 (4.2)	**424(100.0)**
Birth Order				
1	93 (37.7)	141(57.1)	13(5.3)	247(100.0)
2	41(31.3)	86(65.6)	4(3.1)	131(100.0)
3& above	10(21.7)	35(76.1)	1(2.2)	46(100.0)
Total	144(34.0)	262(61.8)	18(4.2)	424
Birth Spacing				
Not applicable/ No Response	94(36.9)	149(58.4)	12(4.7)	255(100.0)
12-24	11(25.0)	31(70.5)	2(4.5)	44(100.0)
25-36	27(27.6)	69(70.4)	2(2.0)	98(100.0)
37-48	11(47.8)	10(43.5)	2(8.7)	23(100.0)
48 and above	1(25.0)	3(75.0)	0(.0)	4(100.0)
Total	**144(34.0)**	**262(61.8)**	**18(4.2)**	**424(100.0)**
Duration since Marriage				
No Response	40(32.5)	75(61.0)	8(6.5)	123(100.0)
Upto 1	62(34.1)	115(63.2)	5(2.7)	182(100.0)
2-5	34(33.3)	63(61.8)	5(4.9)	102(100.0)

6-9	6(42.9)	8(57.1)	0(.0)	14(100.0)
10 and above	2(66.7)	1(33.3)	0(.0)	3(100.0)
Total	**144(34.0)**	**262(61.8)**	**18(4.2)**	**424(100.0)**
Type of family				
Joint	105(34.4)	185(60.7)	15(4.9)	305(100.0)
Nuclear	39(32.8)	77(64.7)	3(2.5)	119(100.0)
Total	**144(34.0)**	**262(61.8)**	**18(4.2)**	**424(100.0)**
SES				
Low	44(24.2)	132(72.5)	06(3.3)	182(100.0)
Middle	34(31.8)	71(66.4)	02(1.9)	107(100.0)
High	66(48.9)	59(43.7)	10(7.4)	135(100.0)
Total	144(48.9)	262(61.8)	18(4.2)	424(100.0)

(Table 2) Prevalence of Normal weight was found maximum in age group of 2-6 months children. Maximum underweight prevalence was among 25-36 months age group recorded as 75.0%. There were 24.6% females of normal weight as compared to 40.6% such males. Among male children, prevalence of underweight was found less (54.2%) as compared to that among girls (72.6%). Normal weight was highest among for birth order one (37.7%). Underweight percentage was highest in case of birth order 3 and above (76.1%) and minimum for birth order one (57.1%). Classification of Children according to Age of Mothers, prevalence of underweight children was 65.8% for mother's age between 18- 21 yrs. Normal weight children was maximum 35.6% among 22-25 years of mothers. It was found that highest prevalence of underweight among children is 70.4% for Birth spacing of 25-36 months. According to "duration of since marriage", prevalence of underweight among children, was highest (63.2%) for duration since marriage up to one year for mothers.

Normal weight children were more in case of joint family (34.4%) as compared to that in nuclear families (32.8%) and underweight children were more in nuclear families 64.7%. Prevalence of underweight was found to be maximum (72.5%) in case of low SES as compared to those for middle (66.4%) and high (43.7%) SES categories.

Table 3 : Bivariate analysis of correlates of undernutrition

Gender of Child	WHO grade		Total	
	Normal	**underweight**		
Male	101(42.8)	135(57.2)	236(100.0)	X^2 = 13.4
Female	43(25.3)	127(74.7)	170 (100.0)	P<0.001
Total	144(35.5)	262(64.5)	406(100.0)	
Prelacteal feed				
Not Given	61(34.9)	114(65.1)	175(100.0)	X^2 =0.05
Given	83(35.9)	148(64.1)	231(100.0)	P=0.83
Total	144(35.5)	262(64.5)	406(100.0)	
Colostrum Feeding				
Yes	127(36.1)	225(63.9)	352(100.0)	X^2 =0.43
No	17(31.5)	37(68.5)	54(100.0)	P=0.54
Total	144(35.5)	262(64.5)	406(100.0)	

Age at complementary feeding in months				
Proper	54(27.1)	145(72.9)	199(100.0)	$X^2 =$ 11.83
Improper	90(43.5)	117(56.5)	207(100.0)	P<0.001
Total	144(35.5)	262(64.5)	406(100.0)	
EBF with no water				
No	75(39.1)	117(60.9)	192(100.0)	$X^2 =$ 2.05
Yes	69(32.2)	145(67.8)	214(100.0)	P= 0.18
Total	144(35.5)	262(64.5)	406(100.0)	

As per Table 3 On the bases of bivariate analysis, correlates of being under weight were investigated. The percentage of underweight children among all surveyed children was found to be 64.5%. Based on this analysis, females were more likely to be underweight (74.7%) as compare to males (57.2%) Gender of baby was found to be significantly associated (P<0.001) with WHO grade. Age at start of complementary feeding was also found to be significantly associated with being underweight. Children of low socio economic status were more likely to be underweight as compare to their counterparts (P<0.001) Similarly birth order was also found to be significantly associated with being underweight (P=0.03) and children of birth order were less likely (60.3%) to be underweight as compare to children of higher birth order (70.3%). Age at previous delivery also came out to be a significant correlate of being underweight (P=0.04). Children were more likely to be under weight (68.7%) in case of being delivered up to 21 years of age of their mothers as compare to rest of the children (59.2%) rest of the variables were not found to be significant correlates of on the basis of bivariate analysis.

Discussion :

Studies on nutritional assessment among children in India remain a very challenging task. Under-nutrition, a type of malnutrition, occurs due to inadequate intake of nutrients required for proper growth, maintenance and development of the body. Chronic under-nutrition in childhood is linked to slower cognitive development and serious health impairments later in life that reduce the quality of life and also the economic productivity of people. [9]

Under-nutrition is hence not only a consequence of poverty but also a cause. Child under-nutrition continues to be one of the principal causes of ill-health and premature mortality and morbidity among children in developing countries. [10-12]

According to WHO criterion 61.8 % underweight were found in this survey, which is quite high as compared to findings of NFHS-3 survey [5] (43%). National Family Health Survey (NFHS -2) found that 47 percent of all children under age three were underweight. Data from NFHS-3 shows only a very small decline, with under-nutrition level remaining around 45 percent for children below three. The prevalence of underweight was reported to be 47% in India by UNICEF (2003). [4]

In a recent study by Kumar Mittal and Sharma (2010), Proportion of underweight was found to be 49.1%. [13] Children belonging to low standard of living index were at significantly higher risk of being underweight in the study by Kumar Mittal and Sharma. In our study also the prevalence of under-weight was more in children from lower socio-economic strata.

In a study by Sen, Dey and Mondal (2011) [14], the prevalence of under-nutrition (under-weight) was found to be 47.0%. Maximum prevalence of underweight was among 25-36 months recorded as 75.0%. According to the recently developed child growth standards of World Health Organization (WHO) Standards, 39% of the children below six

months of age are underweight (Dongra et al , 2010).[15]

In the present study, female children were more likely to be underweight (72.6%) as compared to males (54.2%) showing gender discrimination still prevalent in the community.

Proportions of underweight children, was found maximum among children aged 25-36 months, unlike in 13-24 months found earlier by Kumar et al (2006). [14] This study shows that as the birth order increases, the prevalence of malnourishment also increases. Percentage of underweight is highest with the birth order 3 and above i.e 75%. Lesser the age of the mother, more are the chances of child being under-weight. This finding supports the fact that the body of the female of young age is not ready to bear the baby.

Results of studies [6, 17-20] on IYCF have indicated that inappropriate feeding practices can have profound consequences for the growth, development, and survival of infants and children, particularly in developing countries. Delayed initiation of breastfeeding, deprivation from colostrums, and improper complementary feeding came out to be significant risk factors of underweight in the present survey. Several studies [21, 22] have recognized the link between malnutrition and child feeding practices. The study by Kumar et al (2006) [22] also discussed influence of Infant-feeding Practices on Nutritional Status of Under-five Children. The initiation of breast-feeding after six hours of birth, deprivation of colostrum and improper complementary feeding were found significant (P<0.05) risk factors for underweight in that study. In the present survey also, delayed initiation of breastfeeding, deprivation from colostrum, and improper complementary feeding came out to be significant risk factors of underweight. Risk of being underweight was more in case of late initiation of breastfeeding and deprivation from colostrum. There were 54.3% children found to be of normal grade in case of no pre lacteal feed as compared to (57.9%) in case of receiving prelacteal feeds.

Conclusion :

The study was undertaken to know the prevalence of malnutrition in children and to identify important factors leading to malnutrition. According to WHO criterion the overall prevalence of underweight was found to be 61.8%. Prevalence of underweight was more among girls (72.6%) as compared to boys (54.2%). Underweight prevalence was maximum (75.0%) among children aged 25-36 months. Prevalence of underweight was found to be maximum (72.5%) in case of low SES. EBF, Prelecteal feed, colostrums feeding etc all are significantly related to underweight. It is suggested to promote optimal Infant and Young Child Feeding Practices (IYCF) to reduce malnutrition in terms of being underweight among children under three years of age.

Acknowledgment :

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Candida Infection in Intensive Care Unit Patients at Tertiary Care Hospital

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Abstract :

Introduction: Candidiasis is an opportunistic infection, an important cause of morbidity and mortality among the critically illIntensive Care Unit (ICU)patients. **Objective :** The main aim of this study is to examine the trend of *Candida* infection in Intensive Care Unit (ICU) patients and to compare it with co-morbidities. All the patients admitted to Intensive Care Unit (ICU)were included in this study. **Method :** A clinical and laboratory study of critically ill patients admitted at adult ICU, Civil hospital, Ahmedabad from August-October 2014 was done. Laboratory findings of cultures including the infecting *Candida* species, resistance to antifungals and clinical profile along with associated risk factors were analyzed. Overall 45 patients with positive blood culture and 116 patients with positive urine culture were included in the study. **Results :** Total 32 cases of candidiasis were identified over the study period which includes 4 cases of candidemia and 28 cases of candiduria. The most common co-morbidities were prolonged ICU stay [for more than 4 days (100%)], multiple antibiotics [more than two (100%)], urinary catheterization (100%), diabetes (25%), mechanical ventilator support (31.25%) and central venous catheterization (9.3%). *C. kruseiwas* the most common species identified in blood and *C. tropicalis* in urine. The rates of susceptibility to antifungal agents were found as Amphotericin B (100%), Voriconazole (97%), Fluconazole (81%), Itraconazole (75%) and Miconazole (47%). **Conclusions :** Prevalence of candidiasis in ICU is significantly high than general wards (p<0.0001). Most patients had one or more co-morbidities at the time of the diagnosis of candidemia. Prolonged ICU stay, multiple antibiotics, prolonged indwelling devices and diabetes mellitus were the common underlying conditions documented prior to candidemia.

Keywords : candidiasis, intensive care unit, risk factors

Introduction :

During the past two decades, the incidence of candidemia has increased and *Candida* species currently ranks as fourth most common bloodstream pathogen in North American studies. [1]Prolonged ICU admission, diabetes, administration of broad spectrum antibiotics, corticoids and widespread use of invasive therapeutic equipment increases the risk of fungal colonization and infection. [2] Candidemia is the most common manifestation of invasive candidiasis and requires antifungal treatment. Patients with candiduria are frequently colonized at other body sites, increasing the risk of developing candidemia. Candiduria should be considered as a marker of severity.[3]*Candida* colonization of the urinary tract is common in patients who are catheterized for prolonged period. The discovery of pyuria and high *Candida* colony counts along with

clinical symptoms can differentiate infection from colonization. [4, 5]*C.albicans* is the most common cause of candidemia worldwide. However, in recent years, some studies have reported an increase of candidemia due to non-*albicans Candida* species. [6-9] The intrinsic and emerging resistance to azoles represents a major challenge for therapeutic strategies. [10]

Method :

In the present study, a three month analysis (August-October 2014) was conducted to evaluate the frequency, species distribution, associated resistance patterns of *Candida* species for the antifungal agents used and clinical profile with other risk factors of patients admitted at adult ICU [Medicine, Trauma, Neurosurgery, General surgery] at Civil hospital, Ahmedabad. Data such as sex, age, and variables such as possible predisposing factors,

including antibiotics, underlying diseases or comorbid conditions and stay in the hospital, were collected from the patient record files.

Inclusion Criteria : All the patients admitted in the ICU ≥ 18 years of age.

Exclusion Criteria : Patients who had less than 18 years of age and an ICU stay of less than 4 days were excluded from the study.

An episode of candidemia was defined as an isolation of non-commensal *Candida* species from blood culture in a patient with clinical signs and symptoms, such as fever, leukocytosis etc. and candiduria was defined in patients who had pyuria and at least one positive urine culture by semi-quantitative culture method. Associated risk factors were diabetes mellitus, indwelling central vascular catheter, long duration stay at intensive care unit during hospitalization, mechanical ventilation, urinary catheterization, use of broad spectrum antibiotics, acute renal failure, etc.

Organism identification : All blood samples were received in BacT/ALERT aerobic blood culture bottle (Biomerieux) and after being signal positive, were sub cultured. All urine samples were received in sterile universal container and cultured on blood agar (Himedia) by semi-quantitative plating method using the calibrated loop technique (0.001 ml). Isolated colonies were identified considering their macroscopic and microscopic appearance, germ tube test, biochemical properties on CHROM agar (CHROMagar Company, Paris France), carbohydrate fermentation and assimilation, morphology on corn meal agar, etc.

Anti-fungal susceptibility : All isolates were tested for antifungal susceptibility by disc diffusion method (recommended by CLSI) on Mueller-Hinton agar + Glucose (2%) and 0.5mg/ml Methylene blue dye by loan culture of 0.5 Mcfarland standards and incubated at 37°C for 24 hours. Sensitivity testing is a standardized agar diffusion method which includes antifungal agents (Hi-Media) as Amphotericin B (100unit), Voriconazole (1μg), Fluconazole (10μg), Itraconazole (30 μg), Miconazole (30 μg). Additional incubation was done for 24hours, if confluent growth was not obtained. Zones of Inhibition were measured and interpreted by referring CLSI M44-A2.

Statistical Analysis :

The data is analyzed using Chi-Square test to determine the level of significance. Qualitative data was expressed in terms of frequencies.

Results :

Out of 45 positive blood culture, 4(8.88%) of the isolates were *Candida* speciesand out of 116 positive urine cultures, 28(24.1%) were positive for *Candida* species. occurrence of *Candida* infection was high in males than females, though not statistically significant, mainly in patients of >35 years of age [*Figure 1*].

Figure 1 : Incidence of candidiasis by age and gender
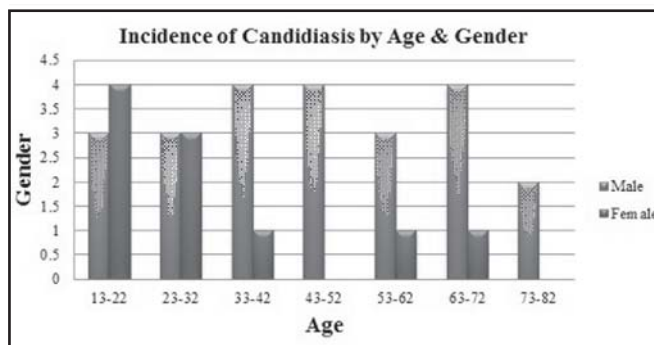
Most common conditions associated with candidiasis among patients with ICU stay of more than 4 days or 96 hours were broad multiple antibiotic treatment (more than two)(n=32, (100%)) and indwelling urinary catheterization (n=32, (100%)). Whereas, mechanical ventilator support (n=10 (31.25%)), diabetes mellitus (n=8, (25%)), altered renal function (n=7, (21.8%)), central venous catheterization (n=3, (9.3%))were less common risk factors [*Figure 2*].

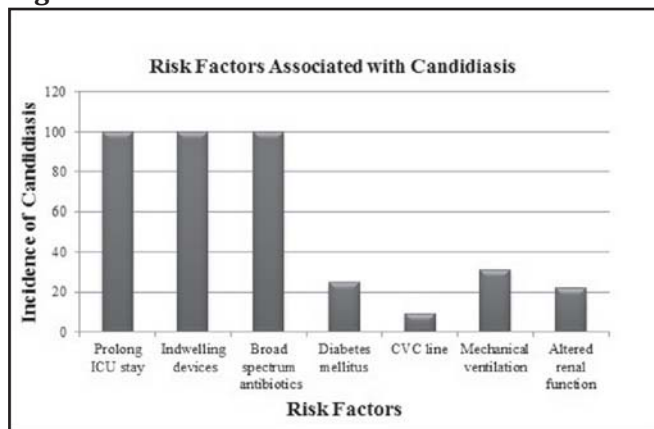**Figure 2 : Risk factors associated with candidiasis**

Table 1 : The most common isolates from Blood and Urine Samples

Isolates from Urine		Isolates from Blood	
Candida Sp.	No (%)	Candida Sp.	No (%)
C. tropicalis	59 (51)	*C. krusei*	16 (35)
C. albicans	29 (25)	*C. albicans*	13 (28)
C. krusei	14 (12)	*C. glabrata*	8 (17)
Others	14 (12)	*Others*	9 (20)

Table 1 describes the three most commonly occurring *Candida* species. Blood isolated *Candida* speciesincluded *C.krusei*(n=16 (35%)) as most occurring followed by *C. albicans* (n=13 (28%)), *C. glabrata*(n=8 (17%)). Other infections (n=9 (20%)) obtained from blood accounted 20% of the total infections. Isolated obtained from urine were *C. tropicalis*(n=59,(51%)), *C. albicans*(n=29 (25%)) and *C.krusei* (n=14 (12%)) in common, whereas the other infecting micro-organisms (n=14 (12%)) accounted only for 12% of the total infection considered in the study. Amphotericin B (100%) had the maximum rate of susceptibility amongst all the antifungal agents, which was found to be 100%. It was followed by Voriconazole with 97% susceptibility. Fluconazole and Itraconazole were 81% and 75% susceptible respectively. Infecting *Candida* specieswere least vulnerable to Miconazole withonly 47% susceptibility.

Discussion :

Hospital acquired infections is a frequent complication among patients admitted to tertiary hospitals. Patients with conditions as critically ill or weakened immune systems are at most risk. Infections with fungal pathogens, of which *Candida* species predominate, are an important cause of morbidity and mortality among the critically ill. [2] In particular, the incidence of candidiasis has been increasing during the past years. Our study revealed males encountered more frequent infections than females, but this difference remains statistically insignificant and the main reason for this can be considered small sample size of the study population.In our study, *C. tropicalis* is more prevalent, as compared to other *non albican candida* species. *C. albicans* was found second in line of infecting agents in our study which was also found the

most common infecting agent of hospital acquired infections of different studies around the world. [11]Although prophylactic treatments with fluconazole causes a decrease in the frequency of candidias is caused by *C. tropicalis* but it is increasingly showing a moderate level offluconazole resistance. [12]The antifungal susceptibility patterns revealed that Amphotericin B and Voriconazole has excellent in vitro activity overall against *Candida* species with 100 and 97% susceptibility respectively.We observed a significant predominance of *non-albicans Candida* species (75%), with *C. tropicalis*(51%) being the most common isolate in urine and*C. krusei* (35%) in blood. In our study, *C. tropicalis* surpassed other *Candida* species and was most common contributors of infections to ICU admitted patients. The majority of *Candida* isolates were susceptible to azoles, with the exception of those belonging to the intrinsically less susceptible or resistant species, like *C. glabrata* and *C. krusei.*[13].Some studies showed that Voriconazole may be a suitable agent for salvage therapy of invasive candidiasis among all azoles, even with *C. krusei* infection. [14]In our study, Amphotericin B was found to be the best option available to treat hospital acquired infections in general, *Candida* infections which was followed by Voriconazole. This was also demonstrated in other studies too, as shown by Voriconazole activity which was better than other azoles demonstrating poor activity against *C. krusei*, whereas amphotericin showed good activity. [15]*C. krusei* is intrinsically resistant to fluconazole due to an altered cytochrome P450 isoenzyme. [16]Use of higher doses too cannot overcome this resistance. Hence, we would like to suggest improving prevention strategies as simple as infection control which are always better.

Conclusion :

Candidiasis is an important risk factor in case of ICU patients in form of hospital acquired infections both in terms of morbidity and mortality. Prolonged ICU stay, multiple antibiotics (>2) and prolonged use of catheterization devices were found the most common co-morbid conditions. One or more co-morbidities were frequently observed at the time of the diagnosis of candidemia in ICU patients. Prevalence of candidiasis in ICU was also significantly

higher than general wards (p<0.0001).Hence, developing and implementation of prevention strategies would provide us better control of *Candida* infections in ICUpatients.

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Prevalence and Risk Factors of Diabetes Mellitus among Adults residing in Field Practice Area of a Teaching Hospital in Punjab

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Abstract :

  Introduction : The worldwide prevalence of Diabetes Mellitus (DM) has risen dramatically in the developing countries over the past two decades.Diabetes Mellitus is emerging as a major health-care challenge for India. **Objectives :** 1.To determines the prevalence of Diabetes Mellitus among the adult population > 20 years of age. 2. To assess the risk factors of Diabetes Mellitus. **Method :** This was a population-based cross-sectional study carried out in the Rural and Urban field practice area of tertiary care medical teaching institute in Patiala, Punjab. Simple random sampling technique was used for the selection of 950 adults 20 years of age and above. Main outcome measures were the assessment of the prevalence of Diabetes Mellitus and correlates of Diabetes Mellitus. A Predesigned and pretested questionnaire was used to elicit the information on family and individual socio-demographic variables. Height, weight, waist circumference, hip circumference, blood pressure were measured and venous blood was also collected to measure fasting and postprandial blood glucose. **Results :** Overall the prevalence of DM was 10.0% (7.4% in Rural & 12.6% in Urban Area) with known DM being 6.9% of study population and undiagnosed DM being 3.1% subjects. Significant association was seen between prevalence of DM and age, Obesity and Hypertension. **Conclusions :** It was observed that the prevalence of DM is higher in urban area as compared to Rural Area. Adults with age >40 years, Obesity and Hypertension are more likely to develop Diabetes Mellitus. Control of DM mandates lifestyle modification and control of risk factors.

Keywords : Diabetes Mellitus, Fasting glucose level, Obesity, Hypertension.

Introduction :

Diabetes Mellitus (DM) is a global epidemic in this millennium. Colagiuri et al [1] reported that the highest increase in Diabetes Mellitus prevalence is amongst low and middle-income countries, predominantly within the 40-59 years age group, although a tendency is seen for onset at a younger age. According to WHO[2], 80% of Diabetes deaths occur in low and middle income countries.

Danaei et al [3] reported that globally, as of 2013, an estimated 347 million people had Diabetes Mellitus. Diabetes Mellitus occurs throughout the world, but is more common (especially Type 2) in the more developed countries. According to Wild S et al [4] the greatest increase in prevalence is, however, expected to occur in Asia and Africa, where most patients will probably be found by 2030.The increase in incidence in developing countries follows the trend of urbanization and lifestyle changes, perhaps most importantly a "Western-style" diet.

Diabetes Mellitus is emerging as a major health-care challenge for India. According to the International Diabetes Federation (IDF) estimates, India had 62 million diabetic subjects in the year 2013 which is more than 7.1% of India's adult population. An estimate shows that nearly 1 million Indians die due to Diabetes Mellitus every year. Gale J et al [5] reported that the average age of onset is 42.5 years.

The early identification of at-risk individuals and appropriate intervention to increase physical activity & changes in dietary habits could to a great extent help in preventing/ delay the onset of Diabetes Mellitus and thus reduce the burden due to its associated complications in India. There is also a need to improve knowledge and awareness about Diabetes

Mellitus in Rural as well as Urban areas through various IEC activities.

The present study was undertaken to determine the prevalence and the risk factors of Type-2 Diabetes Mellitus among the adult population residing in the Urban and Rural field practice area of this tertiary care medical teaching institute in Patiala, Punjab.

Objectives :

1. To determine the prevalence of Diabetes Mellitus among the adult population > 20 years of age.

2. To assess the risk factors of Diabetes Mellitus.

Method :

Study design

Population based cross sectional study was carried out in the Urban and Rural field practice area of a tertiary care medical teaching institute in Patiala, Punjab from August 2013 to March 2014 among 950 adults 20 years of age and above.

Sampling design

The prevalence of Diabetes Mellitus among adults in India varies from 9.0% to 16.9%. Thus considering a prevalence of Diabetes Mellitus as 11.0%, a sample size of 809 was calculated. This sample size was increased to 950 in order to make it more representative and to compensate for the design effect.

A complete list of all individuals more than 20 years of age in field practice area was obtained with their addresses. 475 subjects were selected from urban area and 475 subjects were selected from rural area by simple random sampling using random number tables.

Study instrument

The data collection tool used for the study was an interview schedule that was developed at the institute with the assistance of faculty members. This questionnaire was tested for appropriateness by conducting a pilot study and modifications were made. Questionnaire included information regarding age, sex, education, occupation, diet, smoking, alcoholism and family history of the disease.

Ethical clearance

Ethical committee approval was obtained prior to start of study from institutional ethical committee and an informed consent was obtained from all the study subjects.

Data collection

All the participants were explained about the nature and purpose of the study and were ensured strict confidentiality. Written informed consent was taken from each of them before the total procedure. No non-response was reported. Anthropometric measurements of every study subject were taken i.e. weight, height, waist circumference & hip circumference. Blood pressure reading of all the subjects was also recorded. The participants were then requested to remain fasting (for at least 8 hrs) on next morning for venous blood sample collection. After collection of fasting blood in fluoride vial they were given 75 Gms. of oral glucose and post-prandial blood sample was collected in fluoride vial after 2 hrs. The blood samples were transported to Rural / Urban health centre lab for blood glucose estimation (glucose-oxidase-peroxidase method). If a known case of Diabetes Mellitus on treatment came to be selected it was subjected to only fasting blood sugar estimation to see if blood glucose levels were controlled. Repeat testing was done on a different day for those study subjects whose FBS levels were in diabetic range and pre-diabetic range. Newly diagnosed cases of Diabetes Mellitus were referred to respective health centers and started on treatment. For pre-diabetes, suggestions were given regarding physical activity, weight reduction, control of blood pressure and repeat FBS levels once a year.

Criteria for diagnosis of Diabetes Mellitus.

1. Symptoms of Diabetes plus casual plasma glucose concentration ≥ 200mg/dl (11.1mmol/l). Casual is defined as any time of day without regard to time since last meal. The classic symptoms of Diabetes include polyuria, polydipsia and unexplained weight loss.

   OR

2. FPG ≥ 126 mg/dl (7.0mmol/l). Fasting is defined as no calorie intake for at least 8 hours.

OR

3. 2-h post load glucose ≥ 200 mg/dl (11.1 mmol/l) during an OGTT. The test should be performed as described by W.H.O., using a glucose load containing an equivalent of 75 gm. anhydrous glucose dissolved in water.

Method of data analysis :

Collected data was thoroughly checked and a database was created in MS Excel spreadsheets and analysis was carried out. Data was presented as percentage. Prevalence ratio (PR), Chi-square value and 95% confidence interval was calculated for each categorical risk factor.

Results :

The study population included 487 (51.3%) study subjects in 20-39 years of age group and 463 (48.7%) of study subjects in ≥40 years of age group. 425 (44.7%) were males and 525 (55.3%) were females. As regards marital status, majority i.e. 758 (79.8%) of study subjects were married. By religion, 548 (57.7%) were Sikh. 58.8% study subjects were unemployed (including housewives) and 30.9% were professionals or skilled. Regarding the education status, 276 (29.1%) were matric pass while only 88 (9.3%) were illiterate. Regarding SES, 310 (32.6%) of the study subjects were belonging to class IV and only 49 (5.2%) belonged to class I (modified BG Prasad classification of socioeconomic status) (Table 1).

Table 1 : Distribution of study subjects according to socio-demographic profile

Characteristics	Category	Rural (N=475) n(%)	Urban (N=475) n(%)	Total (N=950) n(%)	Statistical analysis
Age distribution	20-39 years	260 (54.7)	227 (47.8)	487 (51.3)	χ^2=4.6
	≥40 years	215 (45.3)	248 (52.2)	463 (48.7)	p<0.05
Sex distribution	Male	223 (47.0)	202 (42.5)	425 (44.7)	χ^2=1.9
	Female	252 (53.0)	273 (57.5)	525 (55.3)	p>0.05
Marital Status	Unmarried	74 (15.6)	56 (11.8)	130 (13.7)	χ^2=3.0
	Married	370 (77.9)	388 (81.7)	758 (79.8)	p>0.05
	Separated / Widowed	31 (6.5)	31 (6.5)	61 (6.5)	
Religion	Hindu	156 (32.8)	237 (49.9)	393 (41.4)	χ^2=29
	Sikh	313 (65.9)	235 (49.5)	548 (57.7)	p<0.001
	Muslim	06 (1.3)	03 (0.6)	09 (0.9)	
Occupation	Professional/ Skilled	159 (33.5)	135 (28.4)	294 (30.9)	χ^2=5.4
	Semi- Skilled/ Unskilled	54 (11.4)	43 (9.1)	97 (10.2)	p>0.05
	Unemployed	262 (55.2)	297 (62.5)	559 (58.8)	
Education	Illiterate	71 (14.9)	17 (3.6)	88 (9.3)	χ^2=50.8
	Primary	77 (16.2)	84 (17.7)	161 (16.9)	p<0.001
	Middle	83 (17.5)	84 (17.7)	167 (17.6)	
	Matric	143 (30.1)	133 (28)	276 (29.1)	
	Higher Secondary	61 (12.8)	79 (16.6)	140 (14.7)	
	Graduate	34 (7.2)	56 (11.8)	90 (9.5)	
	Postgraduate & Above	06 (1.3)	22 (4.6)	28 (2.9)	
Socio- Economic Status (Modified BG Prasad Classification)	Class I	18 (3.8)	31 (6.5)	49 (5.2)	χ^2=39.2
	Class II	59 (12.4)	114 (24)	173 (18.2)	p<0.001
	Class III	137 (28.8)	134 (28.2)	271 (28.5)	
	Class IV	162 (34.1)	148 (31.2)	310 (32.6)	
	Class V	99 (20.8)	48 (10.1)	147 (15.5)	

In the present study it was observed that out of total 950 study subjects, 95 (10.0%) study subjects were found to be Diabetic. Among these 95 diabetic cases, 66 (6.9%) were known/ old cases of Diabetes Mellitus and 29 (3.1%) were newly diagnosed Diabetes Mellitus cases (Table 2).

Table 2 : Prevalence of Diabetes Mellitus among study subjects

Status	Rural	Urban	Total n (%)
Diabetics			
Old cases	23	43	66(6.9)
New cases	12	17	29(3.1)
Total Diabetics	35	60	95(10.0)
Non- Diabetics	440	415	855 (90.0)
Total subjects	475	475	950 (100)

The prevalence of Diabetes Mellitus was higher (81.1%) in persons aged $\geq$ 40 years than in persons aged between 20 and 39 years (18.9%). Diabetes was seen to be more prevalent among females (54.7%), middle/ high SES (61.1%), having sedentary occupation (77.9%), vegetarians (82.1%), non-alcoholic (86.3%), nonsmokers (97.9%), having no family history of diabetes mellitus (69.5%), obesity (83.2%), with higher waist–hip ratio (65.3%). Diabetes was associated with 72.6% of hypertensive participants. Prevalence of Diabetes was significantly associated with age, Obesity and Hypertension. Overall, 95 (10.0%) study subjects had fasting venous blood glucose level $\geq$ 126 mg/dl. Proportion of persons with fasting venous blood glucose level $\geq$ 126 mg/dl was higher in urban (12.6%) than in rural (7.4%) area. (Table 3)

Table 3 : Prevalence of DM and association between DM and each risk factor (P.R. and C.I.) among study subjects.

S. No.	Risk Factors	Category	Total	Diabetes (N =95) N (%)	Prevalence Ratio	Confidence Interval	Chi Sq/ p-value
1.	**Age**	21-40	487	18(18.9)	0.22	3.072-8.877	44.414 /
		> 40	463	77(81.1)			p<0.05
2.	**Sex**	Male	425	43(45.3)	1.01	0.669-1.568	0.012 /
		Female	525	52 (54.7)			p>0.05
3.	**SES**	Low	457	37 (38.9)	0.66	0.981-2.335	3.546/
		Middle/high	493	58 (61.1)			p>0.05
4.	**Diet**	Veg	766	78 (82.1)	1.1	0.525-1.582	0.109 /
		Non veg / mixed	184	17 (17.9)			p>0.05
5.	**Smoking**	Current user	09	02 (2.1)	2.27	0.533-12.724	1.508 /
		Non user/ex user	941	93 (97.9)			p>0.05
6.	**Alcohol**	Current user	92	12 (12.6)	1.46	0.830-2.922	1.931 /
		Non user/ex user	858	83 (87.4)			p>0.05
7.	**Family history**	No	761	66 (69.5)	1.7	1.194-3.052	7.486/
		Yes	189	29 (30.5)			p<0.05
8.	**Obesity**	Non obese	329	16 (16.8)	0.38	1.437-4.162	11.470/
		Obese	621	79 (83.2)			p<0.05
9.	**WHR** (Waist Hip Ratio)	Normal	431	33 (34.7)	0.61	0.557-1.321	0.488/
		>Normal	489	62 (65.3)			p>0.05
10.	**WC** (Waist Circumference)	Normal	492	37 (38.9)	0.59	0.915-2.148	2.428/
		>Normal	458	58 (61.1)			p>0.05
11.	**Physical Activity**	Sedentary	708	74 (77.9)	1.21	0.739-2.042	0.631/
		Moderate/ Heavy	242	21 (22.1)			p>0.05
12.	**Blood pressure**	Normotensive	631	26 (27.4)	1.89	3.790-9.692	68.340/
		Hypertensive	319	69 (72.6)			p<0.05

Discussion :

Our study reflects the correlates of Diabetes Mellitus among 950 adults 20 years of age and above in Urban and Rural field practice area of this tertiary care medical teaching institute in Patiala, Punjab.

The present study revealed that the total prevalence of Diabetes Mellitus was 10.0% (12.6% in urban field practice area and 7.4% in rural field practice area). Similar results were obtained by ICMR-INDIAB study (phase I) [6], a population based study conducted in three states i.e. Maharashtra, Tamilnadu, Jharkhand and one union territory-Chandigarh. The prevalence of Diabetes Mellitus was 10.4% in Tamilnadu (13.7% in urban area and 7.8% in rural area), 8.4% in Maharashtra (10.9% in urban area and 6.5% in rural area) and 13.6% in Chandigarh (14.2% in urban area and 8.3% in rural area). National Urban Diabetes Survey [7] reported the prevalence of Diabetes Mellitus in urban population as 12.1%.

Out of 95 diabetic subjects, 77(81.1%) diabetics were in the age group of ≥40 years and only 18 (18.9%) diabetics were in the age group of 20 – 39 years. Mohan et al [8] reported that prevalence of Diabetes Mellitus increased with increase in age until 70 years.

The present study revealed that the prevalence of Diabetes Mellitus was more in females than males. Krentz et al [9] reported that the prevalence was higher in females.

In the present study, according to modified BG Prasad classification of socio-economic status, higher prevalence (61.1%) of Diabetes Mellitus was reported from middle/ high class as compared to low class (38.9%). This is supported by study of Bhatti et al [10] which reported that the prevalence of Diabetes Mellitus among higher, middle and lower SES group was 21.49%, 66.7% and 12.25% respectively.

The present study revealed that the prevalence of Diabetes Mellitus was high among vegetarians (82.1%) as compared to those having mixed diet (17.9%). In contrast to this, Liu S et al [11] found that high intake of green leafy or dark yellow vegetables were associated with reduced risk of Diabetes Mellitus.

The present study found that 02 (2.1%) diabetic subjects were smokers and 93 (97.9%) diabetic subjects were ex-users/ non-users. In contrast to this, Solberg L et al [12] in his study had linked smoking with increasing insulin resistance which later on induces full blown Diabetes Mellitus.

12 (12.6%) diabetic subjects were current users of alcohol and 83 (87.3%) diabetic subjects were ex-users/non-users of alcohol. In contrast to this, Kao et al [13] found that high alcohol intake increases Diabetes Mellitus risk (OR=1.5, 95% C.I.=1.02,2.2) among men who drank >21 drinks / week when compared with men who drank ≤1 drink / week.

The present study revealed that out of total 95 diabetics, 66 (69.5%) diabetic subjects were having no family history of Diabetes and 29 (30.5%) were having family history of Diabetes. In contrast to this, Scott AR et al [14] found that the greatest risk of Diabetes Mellitus was observed in those with a biparental history of Type 2 Diabetes Mellitus (HR=5.14, 95% C.I. 3.74, 7.07) and those whose parents have been diagnosed with Diabetes Mellitus at a younger age (<50 YRS; HR=4.69, 95% C.I. 3.35, 6.58).

The present study showed significant association (p<0.05) betweenObesity and Diabetes Mellitus in populations with BMI more than normal i.e. ≥25 kg/m^2. Out of 95 diabetic subjects, 79 (83.2%) diabetics were having raised BMI i.e. ≥25 kg/m^2 and 16 (16.8%) diabetics were having with BMI in normal range i.e. 18.5-24.9 kg/m^2.The Chennai urban population study [15] reported that prevalence of Diabetes Mellitus in subjects with abdominal Obesity was high (27.8%) as compared to those without abdominal Obesity (9.0%).

Out of 95 diabetic subjects, 58 (61.1%) diabetics were having waist circumference more than normal (>102 cms in males and >88 cms in females) and 37 (38.9%) diabetics were having normal waist circumference. Similarly, 62 (65.3%) diabetics were having waist-hip ratio more than normal (>1.0 in males and >0.85 in females) and 33 (34.7%) diabetics were having normal waist-hip ratio. Bhatti JS et al [10] had observed that the North

Indian diabetic patients had pronounced abdominal adiposity as evident by their significant higher waist circumferences (37.01±4.3 in patients vs. 35.2±4.3 in controls; p=0.000) and higher waist-hip ratio (0.97±0.07 in patients vs. 0.94±0.08 in controls; p=0.000).

Physical inactivity is an independent factor in triggering the epidemic of Diabetes Mellitus. Out of 95 diabetic subjects, 74 (77.9%) diabetics were having sedentary lifestyle and only 21 (22.1%) diabetics were having moderate physical activity. Xu f et al [16] in his study found that compared to those participants with insufficient physical activity and who were hypertensive those with sufficient physical activity and who were normotensives were at lower risk (OR=0.37, 95%C.I.= 0.28, 0.50) to develop Diabetes Mellitus.

The present study found a positive association between high BP and Diabetes Mellitus (p<0.001). Out of 95 diabetic subjects, 69 (72.6%) diabetics were hypertensives and 26 (27.4%) diabetics were normotensives. Similar results were found in a study done by Mengesha YA [17], which concluded that most of Diabetes Mellitus patients (61.2%) suffer from co-existing hypertension and related cardiovascular risk factors.

The strength of the study was that it was a population based cross-sectional study to find the prevalence of T2DM among adults in both urban and rural area. Bias was taken care of by random sampling. Further, the Oral Glucose Tolerance Test was included in our methods.

It can be concluded that prevalence of DM is higher in urban area as compared to rural area. Although age is a non-modifiable risk factor, Diabetes Mellitus can be prevented by adopting healthy lifestyle, regular exercise and maintaining normal body weight.

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Kala-azar elimination efforts in India: A chronicle and challenges

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Abstract :

Kala-azar (KA), the dreadly visceral form of Leishmaniasis is fatal if untreated. India alone accounts for 50% of the global burden. Though India's endeavours against KA date back to 1991, KA control and elimination has eluded us so far. Considering the high KA burden and its health and socioeconomic implications, India has accelerated its efforts to achieve KA elimination by 2015, which has been summarised in this paper.

Key words : Kala-azar; elimination; India

Dear Editor-in-Chief,

Kala-azar (KA), meaning "black sickness" or "deadly disease" in Assamese, [1] is the most severe visceral form of Leishmaniasis and one among the world's neglected tropical diseases (NTD). [1] It affects the poorest, most vulnerable and remote population, with a high degree of fatality if untreated. [1] The disease is endemic in 98 countries; with approximately 500000 people suffering from KA. [2] KA is the second major parasitic killer after malaria [1,3]. Five countries namely India, Bangladesh, Nepal, Brazil and Sudan share 90% of global KA burden. [2] Three of above countries are in South-East Asian Region (SEAR) where an estimated 200 million are at risk. [2] India alone accounts for 50% of the global burden of KA. [3]

Early KA control efforts in India dates back to 1991. [3] Kala-azar control programme was launched in 1992. [3] Various factors favour KA elimination in India: Man is the only reservoir (anthroponotic) unlike the zoonotic form of KA in Mediterranean and Middle East regions; Phlebotomus argentipes is the only vector; KA is localised in 54 endemic districts across 4 states and effective field-based diagnostic kit and safe drugs are available. [3,4] But review of past efforts reveal that the burden of KA and the control efforts are complicated by various social factors such as poverty, poor nutritional status, increased population movements, civil conflicts and warfare, ecological changes that increase human contact with sand fly vector, prevalence of HIV infection, parasite resistance to antileishmanial drugs, inadequate access to healthcare and treatment. [1,3,4]

National Health Policy (2002) deadline for KA elimination was extended from 2010 to 2015. [3] The tripartite (India, Bangladesh, Nepal) Memorandum of Understanding (MoU) in 2005, called for aggressive action to reduce KA incidence to less than 1 per 10000 inhabitants per year in endemic areas at sub-district level by 2015. [4] Between 2008 and 2014, India has recorded 72.5% reduction in the number of cases and 92.7% reduction in the number of deaths. [5] With the reporting of sporadic cases in Bhutan and Thailand, these countries have joined India, Bangladesh and Nepal in signing another MoU in September 2014 for collaborated efforts to eliminate KA in the respective countries. [6] Following strategies were recommended: improving access to early diagnosis and treatment; stronger disease and vector surveillance and integrated vector management with strong emphasis on environmental improvement, social mobilization, research and networking. [6]

Following the MoU, the Government of India released a National Roadmap for KA elimination (NRKE) by 2015 with specific emphasis on coordinated active and passive case search, notification of all cases of KA, use of low-cost indigenous diagnostic kit developed by Indian Council for Medical Research (ICMR), supply of synthetic pyrethroid for house-spraying in endemic areas and administration of single dose liposomal Amphotericin B (LAmB) for all positive patients. [3,7]

All these activities are being implemented through the comprehensive programme- the National Vector-Borne Disease Control Programme (NVBDCP). [3]

Table 1 summarises the recommendations by NRKE, proposed under classified strategies to eliminate KA by 2015.

Table 1 : Proposed Strategies and recommendations under NRKE to eliminate KA by 2015[3]

Strategies and recommendations
Improving access to early diagnosis and treatment[6]
A standard case definition and uniform diagnostic and management protocol has been recommended [3]
Training health workers and utilizing their services in fever case screening
LAmB is the drug of choice; but depending on availability of drugs and administering personnel, the following drugs could be used in order of preference: single dose LAmB, Miltefosine+Paromomycin, Amphotericin B emulsion, Miltefosine, Amphotericin B deoxycholate in multiple doses [1,4,5]
All probable cases of Post-KA Dermal Leishmaniasis (PKDL) to be identified, tested and treated
Specific guidelines prescribed for PKDL, special conditions like relapse and HIV-KA co-infection
Strengthening drug stock monitoring and cold chain maintenance
Strengthening of referral systems
All children, adults and pregnant women with KA covered under appropriate available health schemes and treatment services provided free of cost
All hospitals instructed to strictly adhere to National Pharmacovigilance protocol
Stronger disease and vector surveillance[6]
Line listing of cases to identify 'hot-spot' areas (villages reporting 5 or more cases in current or previous year)
House-house search in hotspot villages
Screening of neighbourhood houses and contacts of index case
House-house search as part of other national campaigns
Regular refresher orientation programmes for doctors and health personnel to maintain high degree of suspicion
Securing information from private sector
Utilization of immunization, anganwadi and school health services to identify KA cases among children
Surveillance of KA-HIV cases
Long term follow-up of KA (6 months) and PKDL (12 months) patients
Integrated vector management with emphasis on environmental improvement[6]
Indoor Residual Spraying (IRS) to limit sand fly population for all houses and cattle sheds in villages with KA cases in previous 3 years; twice a year in rounds of two months each depending on the entomological surveillance data [4]
Housing schemes targeting underprivileged families to provide assistance to construct pucca (concrete) houses in endemic villages to reduce sand-fly population and thereby interrupt KA transmission (e.g. Indira Awaas Yojana) [7]
Involving health and all related sectors in maintaining sanitation, hygiene and healthy environment in and around KA affected villages
Social mobilization[6]
Intensive awareness campaigns among the at-risk population, about the disease, the fatality if untreated, prevention and treatment options, existing schemes and incentives

Observing KA fortnight (an awareness drive in endemic areas once a year) [4]
Community voucher scheme
Training of ASHAs and village health nurses to impart awareness, case-identification and mobilization to health care with appropriate incentives [4]
Engaging private sector in providing awareness, diagnostic and treatment facilities under public-private partnership
Research and networking[6]
Involvement of National and International partners such as for situational analysis, training human resources, policy advice, operational research activities, monitoring of IRS activities, cross-border monitoring and surveillance
Research into clinical drug trials

The path to achieve the goal of improving health status of vulnerable population in endemic areas by elimination of KA is not without roadblocks. KA affects remote, hard-to-reach population making community-based surveillance and follow-up efforts difficult. [1, 4] The main challenges are poverty and ignorance about the disease, its etiology and complications, inadequate health education and community participation, poor health-seeking behaviour among patients with PKDL, who may not be seriously ill and therefore not seek treatment but serve as a significant reservoir for human transmission.[1,3,4]

A multi-pronged approach is needed to rise above these challenges. An updated epidemiological information system is necessary to monitor progress towards elimination. Kala-azar has been made a notifiable disease in India. [7] All doctors in public and private sector should be sensitized to the notification process. [7] Strong political commitment is required to raise the funding for KA research and control activities. [8] Multi-stakeholder engagement should be sought with involvement of national and international agencies. [4,8] Successful elimination requires active community participation. [1,4] Coordinated activities should be implemented at community level to promote preventive measures such as elimination of breeding places of sand-flies, locating cattle shelters at fair distance from residences, construction of improved pucca houses, use of fine-mesh, insecticide-treated bed nets and maintaining general sanitation. [1, 3, 4] Community health education activities should focus on prevention of stigma and discrimination among people to improve health-seeking behaviour. [8] Concluding, the targeted efforts against KA in India has substantially reduced KA burden through the years and with appropriate implementation could potentiate progress to elimination by 2015 and thereby mitigate poverty and strengthen national health.

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Performance of Special Immunization week in Gujarat state in an imprecise way

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Abstract :

   Introduction : Vaccination has been established as an important specific protective measure against a few fatal or disabling diseases of childhood. It requires regular field work and record keeping at health worker level and data processing and decision making at higher level to organize routine vaccination activities in a manner which optimally covers beneficiaries, takes in to account vaccine wastages and reduces workloads of all kinds of health functionaries and hence allowing them to take care of other aspects of primary health care.   **Objective :** To assess the appropriateness of SIWA(Special Immunization Week Activities) in Navsari district of south Gujarat. **Method :** Participant observation method, cross- sectional study in Tribal blocks of Navsari District in Pre monsoon Period (first week of June 2013) **Result :** 20 SIWA booths were attended and observed 5 hours/day for 6 days.30 house to house activities visited. Eligible children benefited -5.Total supervisory staffs deployed were 20.Moreover, no health worker could give a list of expected eligible children for that session. A few sites did not have either a Measles / BCG vaccine vial. There was no person to person contact or local publicity for information regarding SIWA and was not conducted over conventional sites or newer appropriate locations. **Conclusion :** Demographic events reflected as population movements, immigration and accumulation of labourers must be taken in account before execution of SIWA in any region. This state is in position to relook for need assessment, rescheduling of SIWA and thinking over cost effectiveness and impact on Vaccine Preventable Diseases (VPDs).

Key Words : Immunization, SIWA, Vaccine.

Introduction :

   Vaccination has been established as an important specific protective measure against a few fatal or disabling diseases of childhood. After introduction of EPI (Expanded Program on Immunization-1960) and successful adaptation in to UIP (Universal Immunization Programme) since 1985, childhood mortality and morbidity have reduced to a great extent in all countries including India. [1]

   It requires regular field work and record keeping at health worker level and data processing and decision making at higher level to organize routine vaccination activities in a manner which optimally covers beneficiaries, takes in to account vaccine wastages and reduces workloads of all kinds of health functionaries and hence allowing them to take care of other aspects of primary health care. Advanced tour programmes, estimation of eligible and organization of vaccination sessions in varied geographical area were major components of training and retraining different cadres of health care functionaries. This communication highlights the underestimation of basic demographic, managerial and public health administration related issues while conducting Special Immunization Week Activities in a state having an excellent infrastructure as well as good ownership of state in Primary Health Care Services.

   SIWA has been in process of execution since two years and the next three rounds are in pipeline. This state is in position to relook for need assessment, rescheduling of SIWA and thinking over cost effectiveness and impact on Vaccine Preventable Diseases(VPDs).

Material and Method :

   Prescribed format of NPSP (National Polio surveillance Programme)

Secondary data from the District health office. Participant observation method

Setting : Tribal blocks of Navsari District

Month of Activity : Pre monsoon period(first week of June 2013)

Results :

Table 1 suggests failure of consideration of many important operational aspects for arranging an Immunization session in absence of list of beneficiaries, Preparation for vaccination session have resulted into poor output. SIWA also give rise to non-productive (to & Fro) movements for workers, vehicles & even vaccines for the duration of 6 days. Lack of Mass publicity, retraining of workers, updatation of information about vaccination policy has worsen performance of SIWA.

Table 1 : Reflections of Various 20 booths & home visits during Special Immunization week activity.

Sr. No	Activity	Observations
1	Total SIWA booths attended	20
2	Timings of observations	5 hours a day X 6 days
3	Vaccinations sessions visited	20
4	Sites for house to house activity visited	30
5	No. of eligibles benefited	05
6	Total supervisory staff deployed	20
7	Total health worker hours spared for SIWA	4/session
8	Readily available list of expected eligible children	None
9	Sessions backed up with any local mass publicity	Not known
10	Additional Training for SIWA to Health Workers	none
11	Logistics for vaccination	Not adequate
12	Knowledge about open vial policy[2]	Not adequately known

Table 2 District profile to be reviewed before SIWA operationalization[3]

Sr. No	Indicator	Existing status
1	Total rural population of the District	921599 district(2011)
2	Crude Birth Rate (reported for 2011-12)	16.5/1000 population per year
3	Estimated eligible population for vaccination (0-1 year age group (2012-13) for BCG	24545
4	Total live birth(2010)	18615
5	Total achievement(BCG)	27049
6	Proportion of migrant infant population estimated from vaccine target and achievement(2010)	45%
7	Usual months when migrants are available in this region	Sugarcane cutting session and post-Diwali session
8	Reported average coverage for vaccination(2011-12)	91%(Measles)-145%(BCG)
9	Reported usual average frequency of vaccination session in this region	4 Session/month
10	Well known priorities for health functionaries in this region during pre-monsoon & monsoon	Water borne disease surveillance Vector borne disease surveillance Leptospirosis and other endemic disease conditions
11	SIWA proposed and planned	First week of August 13 and September 13 in the same region

Discussion :

Taking in to consideration the objectives of SIWA, it appears that the sessions sites and timings did not match. Sessions could enroll only 5 beneficiaries because of a number of possible reasons, The region do not have migrants during this time period who may avail such services. Other set up like brick kiln and construction sites do not function in these days which are the pockets of interest for improving the vaccination coverage. The region where SIWA has been executed, every year reports cases of acute diarrheal diseases, Malaria, Leptospirosis and similar kind of conditions forcing the health manpower to be on toes for surveillance and even chemoprophylaxis rounds. (IDSP)

This district has been consistentlyreporting lower Crude Birth Rate (CBR) in addition of regular fixed day immunization sessions in form of health and nutrition day(Mamtadiwas).Official reports of previous years shows91%(Measles)-145%(BCG) achievements as against targets for vaccination. It means that all infants born in this region are usually covered with all vaccines under UIP in time.It highly becomes unlikely to have uncovered children for vaccination under this SIWA. Reports from IDSP (Integrated Disease Control Programme) have not shown cases of VPDs to a triggering extent. It might corroborate with reported less number of eligible and high vaccination coverage.

Moreover, no health worker could give a list of expected eligible for that session. Even the logistics like vaccine vials and syringes and needles were meager in quantity and collected arbitrarily. As per guidelines each site must have at least one vial of each vaccine. A few site in this study did not have either a Measles vial or a BCG vaccine vial. There was no information about the local publicity for SIWA, nor was any person to person contacts made for this purpose.Although Operational guidelines tells about" fixed session fixed site"[4] SIWA were not over conventional sites or newer appropriate locations. A microplan was prepared from provider side merely suggesting health workers to reach to their site and stay there. Any kind of additional training was not organized for current SIWA for any health worker and only a few workers were aware of the open vial policy of UIP.

Conclusion and Recommendation :

In absence of potential beneficiaries and under preparedness, SIWA may end up as futile exercise in a good performing region. Regular planning, execution and monitoring of vaccination sessions would result in to readily available statistics which substitutes need assessment part for the district authority. Demographic events reflected as population movements, immigration and accumulation of laborers must be taken in to account before execution of SIWA in any region. In fact, district like this need not organize SIWA for the objectives like improving the coverage.

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OBITUARY
Dr. C. K. Purohit
(28th November 1941-18th April 2015)

The fraternity of Community Medicine suffered a great loss upon demise of Dr. Chirantan Kumar Purohit on 18th April 2015. Dr. C. K. Purohit was a humble man with large identity. Dr. C. K. Purohit, MD (PSM), FIAPSM, FIPHA did his MBBS and MD (PSM) from SMS Medical College, Jaipur. After serving for a brief period at S.N. Medical College, Jodhpur, he moved to Gujarat and joined Government Medical College, Surat, as an Assistant Professor where later on he was promoted to Associate Professor. He joined B. J. Medical College, Ahmedabad in 1980, as Professor and Head of Community Medicine Department. He also served as Medical Superintendent of New Civil Hospital Ahmedabad, attached to B.J.Medical College, Ahmedabad,Deputy Director (Medical Education) at Gujarat Government and he retired in 1998 as Director of PG studies& Research from B. J. Medical College, Ahmedabad.   Apart from being an efficient teacher, he was also instrumental in drafting the curriculum for the new course of undergraduate students as per the MCI guidelines, which is being still followed by all 6 medical colleges under Gujarat University. Dr.C. K. Purohit was the first president of Indian Association of Preventive and Social Medicine-Gujarat Chapter (IAPSM-GC) and also the first recipient of prestigious NINAD Oration. A special prize named after him "Dr. CK Purohit Best paper Award" has been instituted by the state chapter which is given every year to the best work published by a young scientist from Gujarat during the annual conference of IAPSM-GC.

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BENEFITS & SCHEME FEATURES

- An health assurance of Rs.2,00,000/- per family per annum on a family floater basis.

- Every eligible beneficiary gets "MA" & "MA Vatsalya" card.

- Rs. 300/- is paid to the beneficiary as transportation charges.

- Total 65 Network Hospitals (46 Private & 19 Government/ Corporation/ Grant in aid Hospitals) are empanelled across the State.

- To avail Scheme benefits every beneficiary has to produce card before hospitalization.

- In the case if the card is damage or any changes are required in card, Taluka/Civic Center Kiosks are established.

- "MA Vatsalya" card needs to be renewed every year.
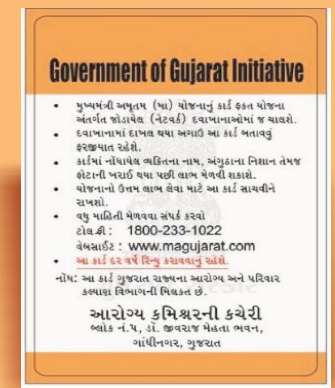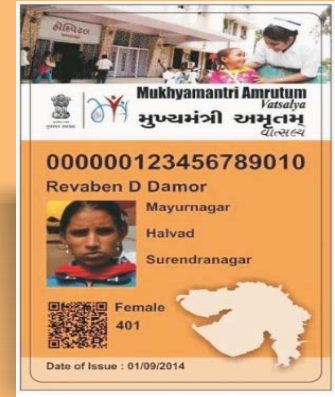
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