AYUSHMAN BHARAT: CAPACITY BUILDING OF COMMUNITY HEALTH OFFICERS (CHOs) AND ASHA FACILITATORS FOR PROMOTING HEALTHY DIETS TO PREVENT NONCOMMUNICABLE DISEASES IN VADODARA DISTRICT

DEPARTMENT OF FOODS AND NUTRITION,
FACULTY OF FAMILY AND COMMUNITY SCIENCES,
THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA
VADODARA, GUJARAT

JUNE 2021

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B.Sc. (NUTRITON AND DIETETICS)

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTERS OF SCIENCE

(Faculty of Family and Community Sciences)

(PUBLIC HEALTH NUTRITION)

BY

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JUNE 2021

CERTIFICATE

This is to certify that the research work presented in this thesis has been carried out independently by

Ms. ***INDERDEEP KAUR BHAMRA***

under the guidance of Dr. Hemangini Gandhi in pursuit of a master's degree in science (Family and Community Sciences) with major in foods and nutrition (Public Health and Nutrition) and represents her original work.

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Guide

DEDICATION

My humble effort of M.Sc. dissertation work, I dedicate to my loving

Father and Mother (BHAMRA family)*,*

for nursing me with love and affection. Their dedicated partnerships for success in my life.

ACKNOWLEDGEMENT

As this dissertation comes to an end, I cannot stop myself from imagining all the twists and turns from day one that has made me reach an end. This journey would not have been possible without the great support and assistance I have received throughout. I would like to take this opportunity for acknowledging all who helped and supported me in their own decisive ways.

Foremost, I would like to extend my gratitude towards my guide Dr. Hemangini Gandhi, Department of Foods and Nutrition, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, for her precious guidance, scientific counseling, never-ending patience, optimistic approach and powerful words of encouragement. Her expertise was invaluable and her insightful feedback pushed me to sharpen my thinking and brought my work to a higher level. I am indebted to you ma'am for all the support and not just academic, during these testing times of COVID-19 pandemic. Your words have truly inspired me to be better.

My heartfelt gratitude goes to Prof. Meenakshi Mehan, Head of Foods and Nutrition Department, for her invaluable support and motivation and for providing necessary facilities to carry out the research work.

I want to express my gratitude to Dean Prof. Anjali Karolia, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, for providing necessary infrastructure and resources to accomplish my research work.

I thank the entire teaching and non-teaching staff of the Department of Foods and Nutrition for their valuable help during the entire study period.

I also thank Ms. Bhumika Thakur, for being selfless and supporting me throughout my research work. She has been the best research partner one could ask for. She helped me with the local language and travelled with me to places that were far for me to go alone. Her presence provided a great helping hand. Her constant support and encouragement have made me give my hundred percent.

I would like to express my gratitude towards my friends- Pranatusmi and Purva, who have supported me through thick and thin. Their presence was a pleasure for last 2 years and every memory with them will be cherished forever. They never fail to ligthen the mood and always encourage me to look at the positive side.

My biggest thanks to my parents and brother for their unflinching love, courage and support. Their blessings, encouragement, unconditional faith and love has always inspired

me to give in my all. I would particularly like to thank my mother for her wise counseling and sympathetic ear.

A full-hearted thanks to my friends- Shalini, Prachi, Karan and Ayushi who have always believed in me and have provided stimulating discussions as well as happy distractions to rest my mind outside of my research.

I would also like to extend massive, warm thanks to my seniors Taruna di and Komal di for their steadfast support and motivation.

I would like to sincerely thank the District authorities of Vadodara District for permitting us to work in the HWCs of the district.

I want to thank all the taluka health officers, community health officers and ASHA facilitators for their warm support and compliance.

Above all, I bow down to God!, who bestowed me with a healthy mind and body and the strength to stand up to the expectations of my parents, teachers, friends and family.

INDERDEEP KAUR BHAMRA

ABBREVIATIONS

AB	:	Ayushman Bharat
AB-HWCs	:	Ayushman Bharat - Health and Wellness Centers
ANC	:	Antenatal Care
ANM	:	Auxiliary Nurse Midwife
ASHA	:	Accredited Social Health Activist
AYUSH	:	Ayurvedic, Yoga and Naturopathy, Unani, Siddha and Homeopathy
BAMS	:	Bachelor of Ayurveda, Medicine and Surgery
BMI	:	Body Mass Index
BPCCHN	:	Bridge Programme (Certificate) in Community Health for Nurses
CBAC	:	Community Based Assessment Checklist
CCCH	:	Certificate Course in Community Health
CDHO	:	Chief District Health Officer
CHO	:	Community Health Officer
CHW	:	Community Health Worker
CMNNDs	:	Communicable, Maternal, Neonatal and Nutritional Diseases
COPD	:	Chronic Obstructive Pulmonary Disease
CPHC	:	Comprehensive Primary Health Care
CVD	:	Cardiovascular Disease
CVDRFs	:	Cardiovascular Disease Risk Factors
DALYs	:	Disability Adjusted Life Years
DASH	:	Dietary Approach to Stop Hypertension
DM	:	Diabetes Mellitus
DR-NCDs	:	Diet Related Non-Communicable Diseases
ENT	:	Ear, Nose and Throat
FANTA	:	Food and Nutrition Technical Assistance
FAO	:	Food and Agriculture Association
FHW	:	Female Health Worker

FSSAI	:	Food Safety and Standards Authority of India
GBD	:	Global Burden of Disease
GI	:	Glycemic Index
GNM	:	General Nursing and Midwifery
GNR	:	Global Nutrition Report
HbA1c	:	Glycated Heamoglobin
HBMF	:	Home Based Mixed Farming
HBNC	:	Home Based Newborn Care
HSC	:	Health Sub-Center
HTN	:	Hypertension
HWC-SHC	:	Health and Wellness Center- Sub Health Center
ICMR	:	Indian Council of Medical Research
IDF	:	International Diabetes Federation
IEC	:	Information Education Communication
IGNOU	:	Indira Gandhi National Open University
IHME	:	Institute of health Metrics and Evaluation
IIPH	:	Indian Institute of Public Health
MAS	:	Mahila Arogya Samiti
MLHP	:	Mid Level Health Provider
MO	:	Medical Officer
MPW	:	Multi-Purpose Worker
MUAC	:	Mid-Upper Arm Circumference
MUFA	:	Mono-Unsaturated Fatty Acid
NCDs	:	Non-Communicable Diseases
NFHS	:	National Family Health Survey
NHP	:	National Health Policy
NHPS	:	National Health Protection Scheme
NNMB	:	National Nutrition Monitoring Bureau

NPCDCS	:	National Programme for prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke
NRHM	:	National Rural Health Mission
NSSO	:	National Sample Survey Office
OBC	:	Other Backward Category
PHC	:	Primary Health Care
PMJAY	:	Pradhan Mantri Jan Arogya Yojana
PMRSSM	:	Pradhan Mantri Rashtriya Swasthya Suraksha Mission
PNC	:	Perinatal Care
PUFA	:	Poly-Unsaturated Fatty Acid
RDA	:	Recommended Dietary Allowance
SAM	:	Severe Acute Malnutrition
SATCOM	:	Satellite Communication
SC	:	Scheduled Cast
SC	:	Sub-Center
SDG	:	Sustainable Development Goal
SFA	:	Saturated Fatty Acid
SIHFW	:	State Institute of Health and Family Welfare
ST	:	Schedules Tribe
THO	:	Taluka Health Officer
VHSNC	:	Village Health Sanitation Nutrition Committee
VHSND	:	Village Health Sanitation & Nutrition Committee
WCRF	:	World Cancer Research Fund
WHO	:	World Health Organization

GLOSSARY

Balanced diet: A balanced diet is one which provides all the nutrients in required amounts from different food groups on regular basis.

Body Mass Index (BMI): It is a screening tool that can indicate whether a person is underweight or if they have healthy weight, are overweight or obese.

Community mobilization: Community mobilization engages all sectors of the population in a community-wide effort to address a health, social or environmental issue. It brings together policy makers and opinion leaders, local, state and federal governments, professional groups, religious groups, businesses and individual community members. Community mobilization empowers individuals and groups to take some kind of action to facilitate change.

DASH diet: It stands for ***D****ietary* ***A****pproach To* ***S****top* ***H****ypertension.* It is a lifelong approach to healthy eating that is designed to help treat or prevent high blood pressure (hypertension).

Dietary Diversity: Dietary diversity is a measure of the number of individual foods or food groups consumed in a given period. it reflects the concept that increasing the variety of foods and food groups in the diet helps to ensure adequate intake of essential nutrients.

Food Pyramid: It is a pictorial representation of different food groups and the quantity in which they should be consumed.

Food: Anything that can be eaten or drunk.

Functional foods: Functional foods have active compounds like vitamins, probiotics, antioxidants, fibers etc. that support health and help prevent various diseases.

Glycemic Index (GI): It is a value used to measure how much specific foods increase blood sugar levels.

Glycemic Load (GL): It is a numerical value that indicates the change in blood glucose levels when you eat a typical serving of the food

Healthy diet: A healthy diet helps to protect against malnutrition in all its forms, as well as noncommunicable diseases (NCDs) such as diabetes, heart disease, stroke and cancer.

Macro-nutrients: Nutrients required in larger amounts by the body. It includes carbohydrate, protein and fat.

Micro-nutrients: Nutrients required in smaller amounts by the body. It includes vitamins and minerals.

My Plate: 'My Plate for the day' represent proportions of different food groups for meeting 2000kcal. This concept is also used to keep a check on healthy intake and portion control of food

Non-Communicable Disease (NCDs): Noncommunicable Diseases (NCDs), also known as chronic diseases, are conditions which do not spread from person to person. NCDs tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors.

Nutrition: It is the process of ingestion, digestion, absorption, assimilation of nutrients and removal of waste products from the body.

Recommended Dietary Allowances (RDA): It estimates the nutrients to be consumed daily to meet the requirements of all individuals in a given population taking into account their physical activity.

Risk factor: Risk factor is an aspect of personal behaviour or lifestyle, an environmental exposure or a hereditary characteristic that is associated with an increase in the occurrence of a particular disease, injury or other health condition.

Unhealthy Diet: A Diet rich in sugar, salt, fat, foods such as red meat - mutton, liver; milk and milk products such as full cream milk, butter, ghee, but low in the amount of fruits and vegetables.

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Abstract

ABSTRACT

BACKGROUND: Dietary risks rank 2nd in disease burden profile of Gujarat highlighting the need of promoting healthy diets in the community. CHOs play a pro-active role in all the activities at community level. One of the major skills that this cadre of functionary should possess is knowledge and aptitude for promoting healthy diets at community level under eat right India campaign.

OBJECTIVE: The present study was planned with broad objective of capacity building of CHOs and ASHA facilitators for promoting healthy diets for NCD prevention under Ayushman Bharat.

METHODOLOGY: It was a cross-sectional study conducted in Vadodara district of Gujarat which was purposively selected for this research. All the HWC-SC in all the 8 talukas of the district were enrolled for the study. There were a total of 82 HWC-SC in these 8 talukas with a total of 79 CHOs appointed. All the available CHOs during data collection phase were enrolled for the study. A total of 69 CHOs and 58 ASHA facilitators were enrolled for the study. The study was divided into 3 phases.

Phase I consisted of base line data collection using standard tools and techniques on general information of HWC, profile of CHO, profile of ASHA facilitator and their knowledge on healthy diets.

Phase II focused on reviewing the available curriculum modules of CHOs for the gap in their knowledge regarding healthy diets. Following this a training module and an IEC material (flip book) was developed for counseling at community level. Training module and IEC material was circulated in CHOs group.

Phase III focused on collecting post data on knowledge retention of CHOs and ASHA facilitators and their preparedness to counsel at community level but due to their involvement in COVID-19 screening and vaccination drive it could not be conducted.

FINDINGS: The result revealed that 81.16% CHOs were females and 18.84% were males. 55.07% CHOs belonged to general category, 27.54% were from OBC, 13.04 were from SC and 4.35% were from ST. 73.91% CHOs had a degree in nursing (56.52% had a diploma and 17.39% had a bachelors degree) and 26.09% had a degree in ayurveda (BAMS). Majority of the CHOs were aware of the concepts like nutrition, food groups, balanced diets, calorie restricted diet, NCDs, ‘Aaj se thoda kam’ and

glycemic index.55.17% ASHA facilitators had completed their study upto higher secondary, 22.41% were graduate, 18.97% had completed their secondary level studies and 3.45% were post graduates. Majority of the ASHA facilitators were aware of the concepts like nutrition, food groups, balanced diets, calorie restricted diet, NCDs and use of millets. There was a need to strengthen their knowledge on concepts like FANTA classification, dietary diversity, RDA, food pyramid, My Plate, eat right campaign, functional foods, use of millets and indigenous foods and recommended daily intakes of foods like fruits and vegetables, fats, sugar and salt. There is a need of a uniform curriculum to be implemented at the course level to make them aware about healthy diets and implement it at field level.

A training module and IEC material (flip book) was developed for training of CHOs. Physical training was not conducted due to their involvement in covid 19 vaccination drive. However, a soft copy of training module and IEC material (flip book) was shared with the CHOs and discussions were held online in small groups.

CONCLUSION: It can be concluded that the current study is first of its kind in Gujarat focusing on capacity building of CHOs on healthy diets to prevent NCDs. It can be concluded that there are gaps in the curriculum of CHOs in regard to nutrition and healthy diets. Also a knowledge gap was observed on assessing their knowledge on healthy diets. There is a need to integrate concept of healthy diets for effective delivery and utilization of services related to non-communicable disease prevention at community level to facilitate SDG goal 3.

Introduction

INTRODUCTION

BACKGROUND

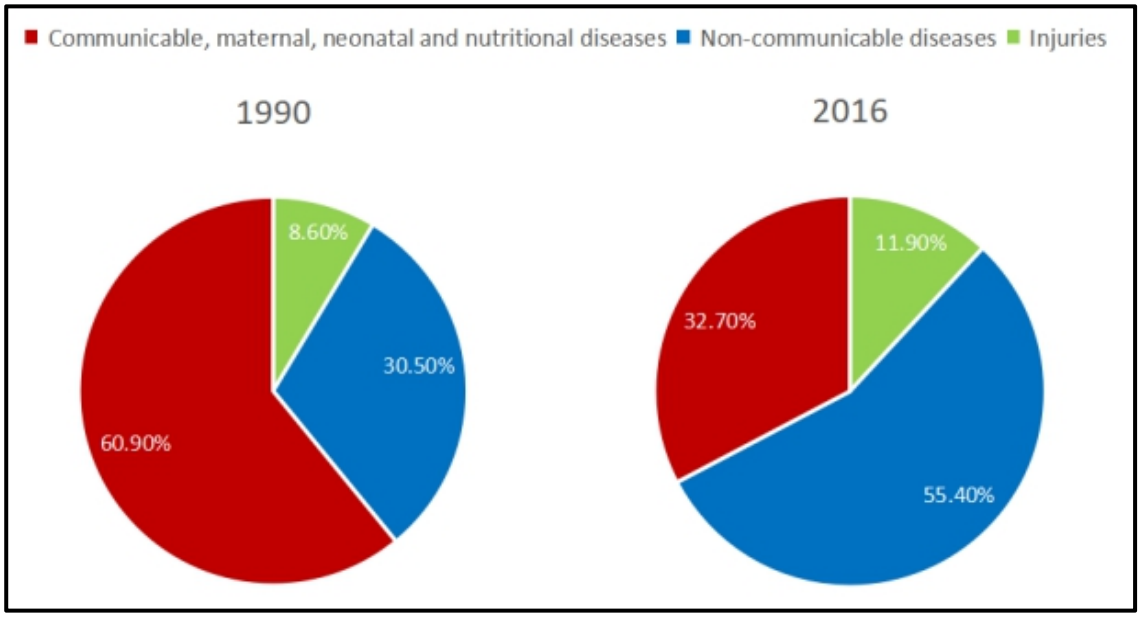
Non-communicable diseases (NCDs), an invisible epidemic, also known as chronic diseases are not transmissible directly from one person to another and tend to be of long duration. NCDs enclose a broad group of diseases like diabetes, cardiovascular diseases, chronic respiratory diseases and cancers which develop in result of combination of various factors like genetic, physiological, environmental and behavioural (WHO, 2018).

In the last decades, developing countries have undergone a major epidemiological transition, as a result of which deaths due to non-communicable diseases has risen in developing countries as compared to developed countries (Stranges, S. 2019). Disease patterns in India have changed over the last 26 years, where deaths due to communicable, maternal, neonatal and nutritional diseases (CMNNDs) declined significantly and non-communicable diseases along with injuries contributed progressively to overall disease burden (ICMR *et al*, 2017).

Disability-adjusted life years (DALYs) is a combined measure of pre-mature mortality and disability accounting for health loss burden. **Fig. 1.1** shows the contribution of major disease groups to total DALYs in India in 1990 and 2016.

Developing countries are also facing nutritional and dietary transition parallel to epidemiological transition as a result of rapid urbanization, industrialization, economic development and market globalization (WHO, 2003). With improvement in factors like education and living standards, population in developing countries have higher odds of overweight/ obesity in both urban and rural settings (Stranges, S. 2019). Concurrent to improved living standards, change in dietary patterns due to expanded food availability and sedentary lifestyle increased diet-related chronic diseases largely among poor population (WHO, 2003).

Fig. 1.1 Contribution of major disease groups to total DALYs in India, 1990 and 2016



Source: India: Health of the Nation's States, ICMR *et al*, 2017

PREVALENCE OF NON-COMMUNICABLE DISEASES

Globally, NCDs contribute to about 38 million of all deaths (68%) and around 5.87 million of deaths (60%) in India, sharing more than two-third of the NCD related deaths in South-East Asia Region. 82% of all NCD deaths are attributable to mainly four NCDs which are: diabetes, cardiovascular diseases, chronic respiratory diseases and cancer responsible for total NCD mortality and morbidity (World Health Organization - WHO, 2014).

Non-communicable diseases accounted for 63% of all deaths in India in 2016 (WHO, NCD Country Profiles, 2018).

The International Diabetes Federation noted that India accommodates the second largest number of diabetic adults worldwide with 1 in 6 diabetic adult in the world coming from India.

RISK FACTORS OF NON-COMMUNICABLE DISEASES

Developing countries like India accounts for majority of the NCD deaths. These countries are facing an epidemiological health transition due to rapid industrialization, urbanization, economic development and market globalization. This transition has contributed to overall rise in economy but has certain linked setbacks (risk factors) (Nethan *et al*, 2017).

Risk factor is defined as "An environmental factor, a characteristic of lifestyle or personal behaviour or a genetic characteristic which is related with the increase in incident of a specific injury, disease or other health conditions" (Nethan *et al*, 2017). The risk factors associated to NCDs can be grouped into modifiable behavioural risk factors and metabolic risk factors (Sarveswaran *et al*, 2020).

Modifiable behavioural risk factors include (Sarveswaran *et al*, 2020):

- Tobacco Use
- Unhealthy diet
- Harmful use of alcohol
- Physical Inactivity

Metabolic risk factors include (Sarveswaran *et al*, 2020):

- Raised blood pressure
- Overweight/ Obesity
- Hyperglycemia (high blood glucose levels)
- Hyperlipidemia (high levels of fat in the blood)

Around 7.2 million deaths are attributed to tobacco use every year (including exposure and second-hand smoke) and is estimated to increase sharply over the coming years. Excess intake of salt/sodium accounts for 4.1 million deaths each year. 3.3 million deaths each year are attributed to alcohol use and more than half of these are accountable to NCDs. Insufficient physical inactivity accounts for 1.6 million deaths per year. Raised blood pressure is the leading metabolic risk factor accounting for 19% of deaths globally. Overweight/ Obesity and raised blood glucose come just after these risk factors (Global Burden of Disease, 2015).

Emerging major risk factors for NCDs are unhealthy dietary practices, physically inactive lifestyle and obesity. Along with economic and demographic transition, India is also undergoing nutrition transition (Tripathy *et al*, 2016). The complete nutrition transition process in India has taken place in three stages (Misra *et al*, 2011).

Stage 1: "***Westernization***" - The traditional staples like whole/ coarse grains/ grams got replaced by refined foods where consumption of wheat in the form of cakes, breads and cookies increased tremendously (Misra *et al*, 2011; Krishnaswamy *et al*, 2016).

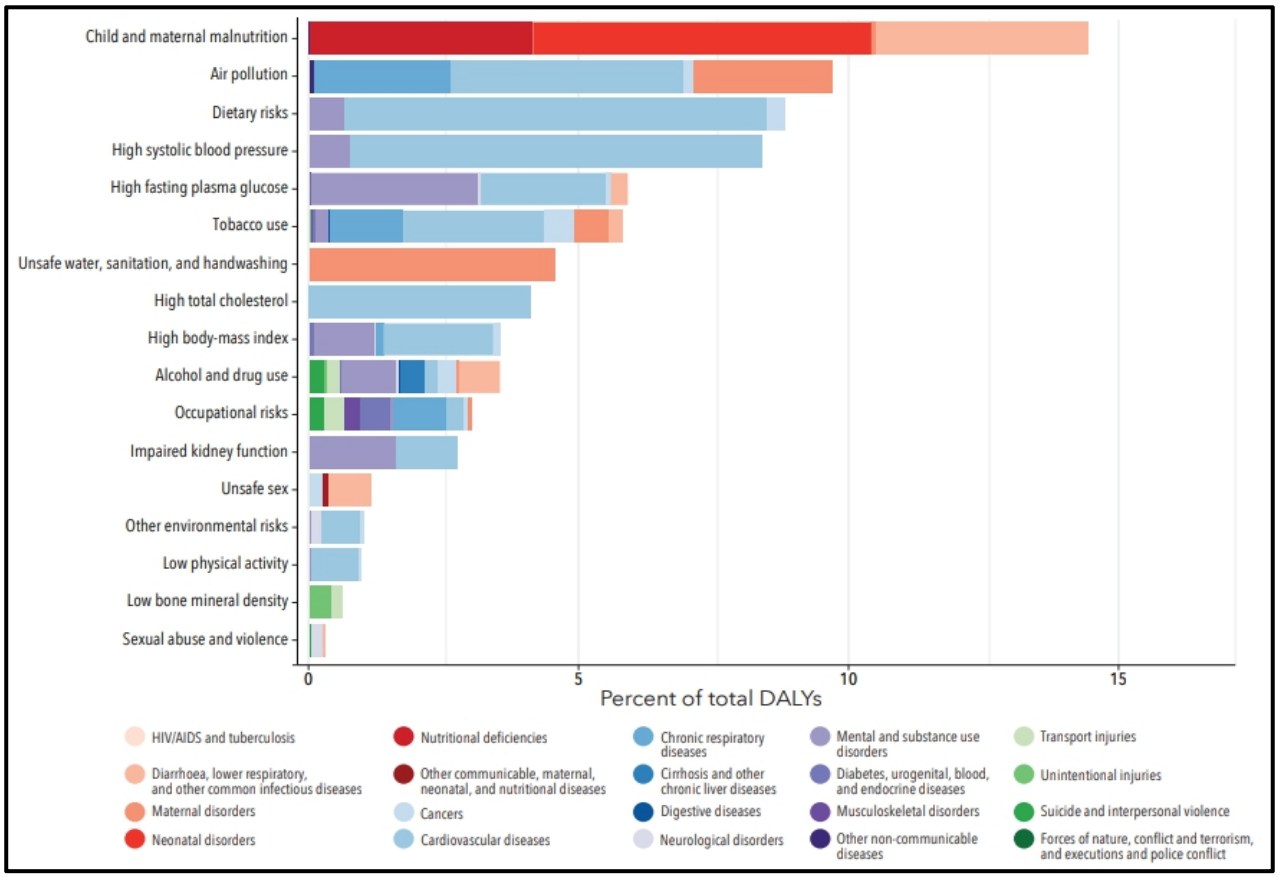
Stage 2: "***Globalization***" - Led to easy access to convenience foods like ready-to-eat foods, processed foods, foods with preservatives and fried foods. These foods are rich in unhealthy fats, salt and sugar contents (Misra *et al*, 2011; Krishnaswamy *et al*, 2016).

Stage 3: "***Adapting Healthy Lifestyle***" - This transition is generally seen in people of upper socioeconomic strata who have realized the adverse effects of their eating habits and have monetary sources to adapt a healthy lifestyle by availing costly foods that are healthy along with exercise facilities (Misra *et al*, 2011).

In a study on Global Burden of Disease, the DALYs attributable to 17 different risk factors were assessed in India in 2016 (**Fig. 1.2**). It was observed that 7 out of these 17 risk factors were related to diet and nutrition namely child and maternal malnutrition, dietary risks, high systolic blood pressure, high fasting plasma glucose, high total cholesterol, high body-mass index and impaired kidney functions (ICMR *et al*, 2017).

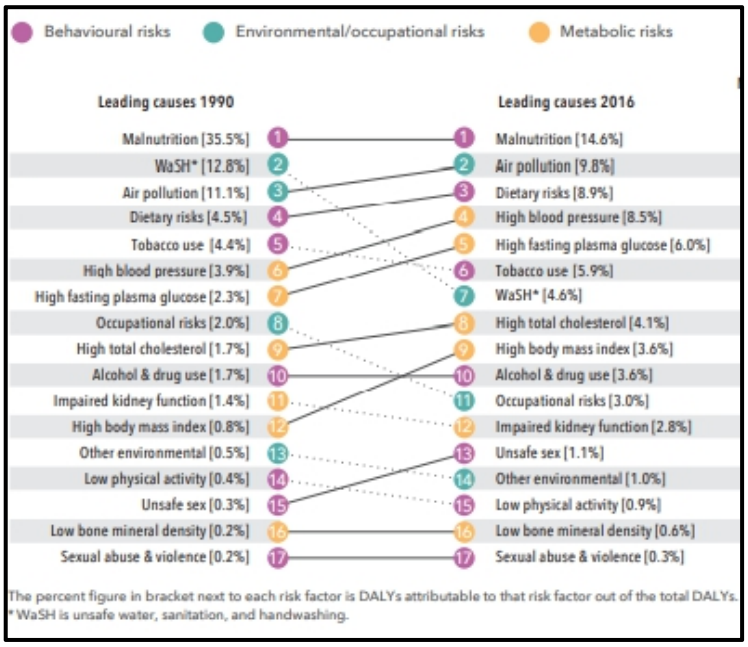
The Global Burden of Disease study indicates a large increase in the DALYs caused by the modifiable behavioural risk factors like dietary risks along with metabolic risk factors like high blood sugar, high blood pressure and high body mass-index from 1990 to 2016 (**Fig. 1.3**). The trends portray a dire need for implementation of some strong strategies for prevention and control of NCDs in India (ICMR *et al*, 2017).

Fig. 1.2 Percent DALYs attributable to risk factors in India, 2016



Source: India: Health of the Nation's States, ICMR *et al*, 2017

Fig. 1.3 Contribution of different risk factors to DALYs number, ranked by number of DALYs, 1990-2016



Source: India: Health of the Nation's States, ICMR *et al*, 2017

ICMR report on 'What India Eats' highlights that 97.1% population in rural region and 68.8% population in urban region is consuming cereals in an amount higher than recommended. Only 5% population among rural region and 18% among urban population consumed food groups like legumes, pulses, milk, nuts, flesh foods as good protein sources. The risk of diabetes is increased on low consumption of fruits and vegetables and the risk of hypertension increases on low intake of milk and its products. Risk of diabetes increased by nearly 30% on consumption of foods like ice-creams, sweets, fried snacks, carbonated beverages and packed foods (What India Eats, ICMR, 2020).

According to WHO, NCD country profile, 2018 report around 1,343,500 lives can be saved from premature deaths due to NCDs by 2025 by implementing all the WHO "Best Buys". The Best Buys are both cost effective and feasible for countries to implement. They cover six policy areas; tobacco use, harmful use of alcohol, unhealthy diets, physical inactivity, the management of cardiovascular disease and diabetes and the management of cancer (**Fig. 1.4**) (WHO, Saving lives, Spending less, 2018).

WHO suggests for an additional investment of up to US$1.27 per person per year between 2018 and 2030, so that substantial progress towards Sustainable Development Goal 3.4 can be achieved and millions of lives saved. Best Buys offer an excellent return on investment specially in the area of unhealthy diets. For every investment of US$1 on unhealthy diets a return of US$12.82 is promised. It highlights the importance of promoting healthy diets to prevent NCDs and premature deaths due to NCDs (WHO, Saving lives, Spending less, 2018).

Fig. 1.4 The six Best Buys, progress towards Sustainable Development Goal 3.4

Source: WHO, Saving lives, Spending less, 2018

Global Nutrition Report recommends preventive and curative nutrition care should be completely a part of national health-sector plans, that should be supported by a strong multisectoral approach. Standard package of healthcare services should include essential nutrition services, available universally to all (GNR, 2020).

A proactive preventive approach along with comprehensive policies that deal with various risk factors in a multisectoral manner is essential for overcoming this silent epidemic of non-communicable diseases (Krishnaswamy *et al*, 2016).

The National Health Policy (NHP) 2017, emphasizes strengthening of Primary Health Care. The NHP 2017 also envisages allocation of two-third of the health budget towards primary health care. Government has launched Ayushman Bharat Programme (also known as Pradhan Mantri Jan Arogya Yojana (PMJAY)) in 2018 in this direction. The programme is composed of two interconnected components:

1. Health and Wellness Centres (AB-HWCs): a platform for delivering Preventive, Promotive and Comprehensive Primary Health Care (CPHC) (**Fig. 1.5**).
2. Pradhan Mantri Rashtriya Swasthya Suraksha Mission (PMRSSM) or National Health Protection Scheme (NHPS), a health insurance cover of Rs. 5 lakh per household per year to more than 10.7 million poor and vulnerable families to reduce out of pocket expenditure (AB-HWCs Report 2018-19).

Fig. 1.5 Health and Wellness Center

Source: AB-HWCs Report 2018-19

This fundamental approach will help achieve the shared global vision of health related SDGs and Universal Health Coverage to ensure accessible, affordable and quality health care. AB-HWCs objective is to address through a paradigm shift from selective to comprehensive care, the rising burden of NCDs such as hypertension, diabetes and cancer along with primary prevention services. It also envisages to provide basic healthcare services for oral, mental, geriatric, palliative, ophthalmic and ENT. It also ensures continuum of care through well-established referral and back referral linkages with the secondary/ tertiary public health facilities, along with teleconsultation. The AB-HWCs promote 'healthy living' by laying emphasis on prevention by promoting healthy lifestyle and wellness (Pandey, S. and Biswas, B., 2019).

Expanded range of services at HWCs include:

- Care of pregnancy and child-birth.
- Neonatal and infant health care services.

- Childhood and adolescent health care services.
- Family planning, Contraceptive services and other Reproductive Health Care services.
- Management of Communicable Diseases including National Health Programmes.
- Management of Common Communicable Diseases and Outpatient care for acute simple illnesses and minor ailments.
- Screening, Prevention, Control and Management of Non-Communicable Diseases.
- Care for Common Ophthalmic and ENT problems.
- Basic Oral health care.
- Elderly and Palliative health care services.
- Emergency Medical Services.
- Screening and Basic management of Mental health ailments.

As envisioned in the policy, States should plan for a coordinated action on seven priority areas for improving the environment for health as part of CPHC:

- The Swachh Bharat Abhiyan.
- Balanced, healthy diets and regular exercises.
- Addressing tobacco, alcohol and substance abuse.
- Yatri Suraksha - preventing deaths due to rail and road traffic accidents.
- Nirbhaya Nari - action against gender violence.
- Reduced stress and improved safety in the work place.
- Reducing indoor and outdoor air pollution.

PROFILE OF CHOs

The National Policy, 2017 recommended strengthening the delivery of primary health care, through establishment of HWCs as the platform to deliver CPCH. HWCs mark a paradigm shift in Government of India's vision - from curative to preventive and promotive healthcare, with a strong focus on wellness of targeted communities through effective primary healthcare teams led by a Community Health Officer (CHO). A CHO can be a staff nurse or an Ayurveda practitioner trained in a six month Certificate Course in Community Health (CCCH) through Indira Gandhi National Open University (IGNOU) or any state led university. Under Ayushman Bharat, it is envisaged that CHOs will lead the primary healthcare teams for ensuring

effective delivery of quality CPCH closer to the homes of people (AB-HWCs Report 2018-19).

Roles and Responsibilities of Community Health Officer

CHO is an evolving concept in health care sector and their roles and responsibilities are purely population oriented in public health. They are expected to provide specific service delivery, leadership, supervision, management and take pro-active role in all the activities at community level, organize various health program and activity for health promotion according to the need. CHO helps to bridge the gap between health care facilities and population seeking health care. Other skills required by this cadre of functionary are: communication skills, interpersonal relationship skills, trans-cultural competence, assessment skills, training capability, professional advocacy, education and facilitation (**Fig. 1.6**) (Desai *et al*, 2020).

Fig. 1.6 Skills and training for Community Health Officers

Source: Desai *et al*, 2020

World Cancer Research Fund International provides a NOURISHMENT framework that highlights providing nutrition advice and counselling in health care settings and providing training and education to increase the skills along with targeted health literacy to health workers (WCRF, 2014).

The mid level health providers (MLHP)/ CHOs would be trained in a certificate programme in community health management accredited by IGNOU. The curriculum will enable the MLHP to attain a set of competencies related to public health and primary health care.

The curriculum for the certificate in community health course (BPCCHN) in IGNOU was reviewed thoroughly.

Therefore, in view of the above, this study has been planned with the following rationale:

RATIONALE OF THE STUDY

Curriculum of CHO's course does include topics to prevent or manage noncommunicable diseases but only as general tips. It's important to provide an in depth information on portion sizes as well. Also, insightful information on the concept and importance of dietary diversity in preventing NCDs is required to be provided. Use of locally available foods for dietary diversity and improving nutrition needs to be discussed with the functionaries. The training includes the importance of various foods but does not provide any information on recommended quantities. Moreover, they need to be sensitized regarding new RDA. It highlights the need of capacity building of CHO to promote healthy diets at community level to better manage and prevent the silent 'epidemic' of noncommunicable diseases in India.

The broad objective of the study is:

BROAD OBJECTIVE

Capacity building of CHOs and ASHA facilitators for promoting healthy diets for NCD prevention under Ayushman Bharat.

The specific objectives of the study are:

SPECIFIC OBJECTIVES

- To assess the profile of Community Health Officer (CHO) and ASHA facilitators.
- To assess their knowledge on healthy diets for prevention of NCDs.
- To develop a training module on healthy diets for prevention of NCDs.
- To develop IEC material (Flip Book).
- To impart and enhance knowledge of CHOs and ASH facilitators on healthy diets for prevention of NCDs.
- To assess their knowledge retention and preparedness to counsel on healthy diets for prevention of NCDs in the community.

Review of Literature

REVIEW OF LITERATURE

In India, non-communicable diseases (NCDs) striked a decade earlier. The food environment is impacted by changing economic scenario, emerging agricultural activities, rapid advances in industrialization migration, urbanization, globalization and trade liberalization. Whole/ coarse grains/ grams are replaced with refined foods as a part of the resulting nutritional transitions. Traditional diets have been replaced by energy dense foods having extra unhealthy fats, sugar, salt and animal foods due to easy availability, accessibility and affordability (**Fig. 2.1**). Healthy horticulture produce like vegetables, fruits, legumes/ pulses, nuts, seeds and fish are not consumed in adequate quantities. Dietary habits of a wide variety of foods and nutrients, produce healthier results. Tobacco and substance abuse add to the cause. Physical inactivity has spread across all demographic groups. Alterations in lifestyle has been observed due to these steering dynamics resulting in obesity and changing disease trends that have far-reaching implications for human resources and the health system. To get through the crisis, proactive mitigation with comprehensive policies that address several risk factors and garner consensus from all stakeholders, including the private sector is critical (**Krishnaswamy *et al*., 2016**).

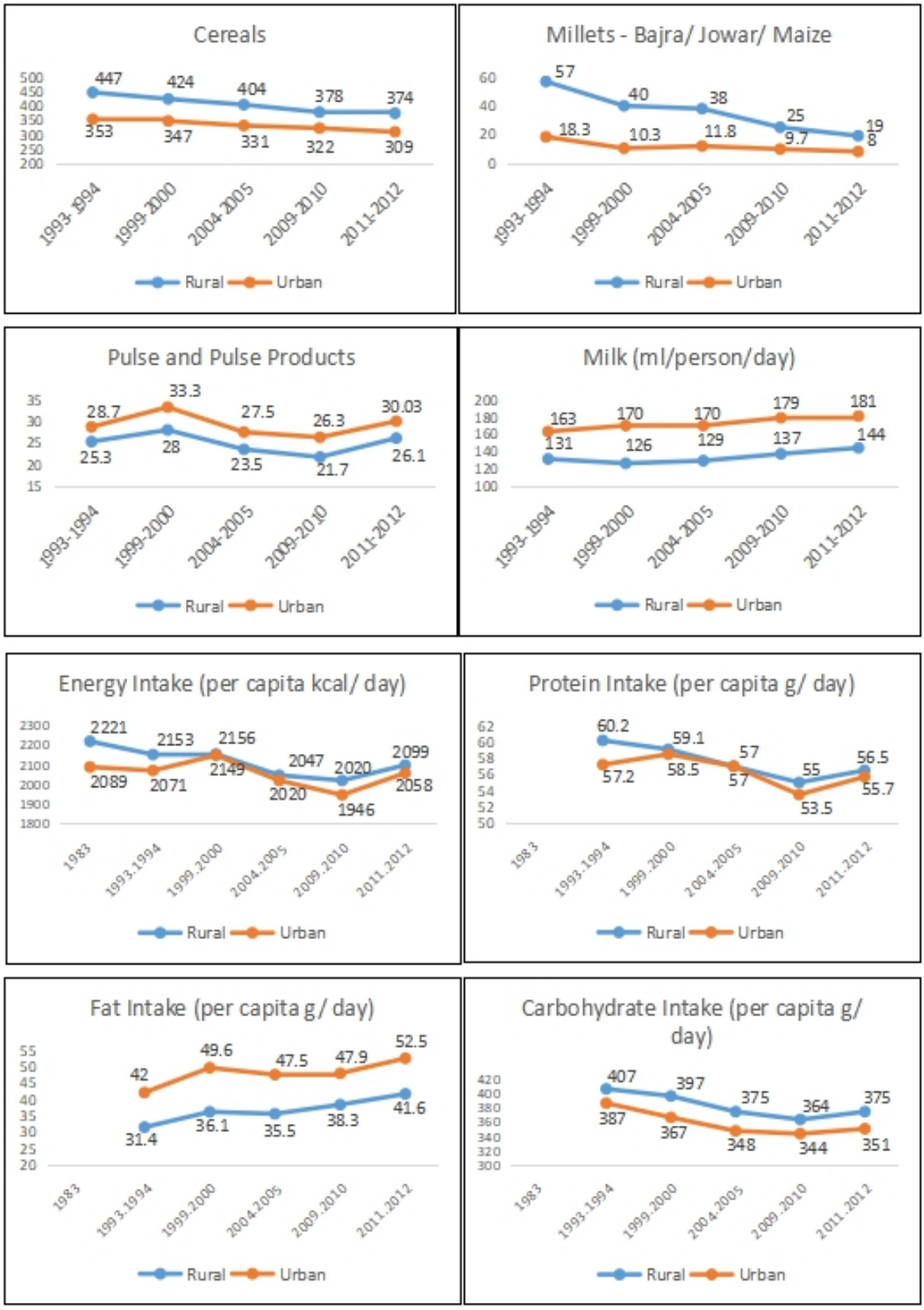
This chapter's focal point is on the available literature in relevance to the importance of healthy diet in preventing non-communicable diseases and need to build capacity of the frontline workers under Ayushman Bharat programme to promote healthy diets in the community of Vadodara district.

The current study is planned with the broad objective of capacity building of CHOs and ASHA facilitators for promoting healthy diets for NCD prevention under Ayushman Bharat.

The literature is compiled under the following subtitles:

- Prevalence of NCDs
- Risk factors of NCDs
- Role of healthy diets in preventing NCDs
- Program in action: Ayushman Bharat
- Knowledge of frontline workers and need for capacity building

Fig.2.1 Trends in foods and nutrient consumption in India



Source: Krishnaswamy *et al*., 2016 (NSSO 68th round, 2014)

A healthy diet is essential for preventing malnutrition in all forms along with a variety of diet-related non communicable diseases and conditions including diabetes, heart disease, stroke and cancer throughout the lifecycle. However, there has been a shift in dietary patterns of people as a result of increased intake of processed foods, growing urbanization along with shift in lifestyles. There has been an increase in intake of foods high in energy, fats, free sugars or salt/sodium and decrease in intake of fibre-rich fruits, vegetables and whole grains leading to global risk of NCDs (**WHO, 2019**).

A healthy diet should include (**WHO, 2019**):

1. ***Eating fruits, vegetables, legumes (eg. lentils, beans), nuts and whole grains (eg. unprocessed maize, millet, oats, wheat, brown rice) every day***. The recommended daily intake for an adult includes: 2 cups of fruit (4 servings), 2.5 cups of vegetables (5 servings), 180 g of grains and 160 g of meat and beans. Red meat can be eaten 1-2 times per week and poultry 2-3 times per week.

2. ***Eating at least 5 portions of fruit and vegetables a day (at least 400g)***. Potatoes, sweet potatoes, cassava and other starchy roots are not classified as fruit or vegetables.

3. ***Limiting total energy intake from free sugars to around 12 level teaspoons (which is equivalent to 50g)***, but ideally less than 5% of total energy intake for additional health benefits (equivalent to 25g). Most free sugars are added to foods or drinks by the manufacturer, cook or consumer and can also be found in sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates.

4. ***Limiting total energy intake from fats to less than 30%***. Unsaturated fats (e.g. found in fish, avocado, nuts, sunflower, canola and olive oils) are preferable to saturated fats (e.g. found in fatty meat, butter, palm and coconut oil, cream, cheese, ghee and lard). Industrially-produced trans fats (found in processed food, fast food, snack food, fried food, frozen pizza, pies, cookies, margarines and spreads) are not part of a healthy diet.

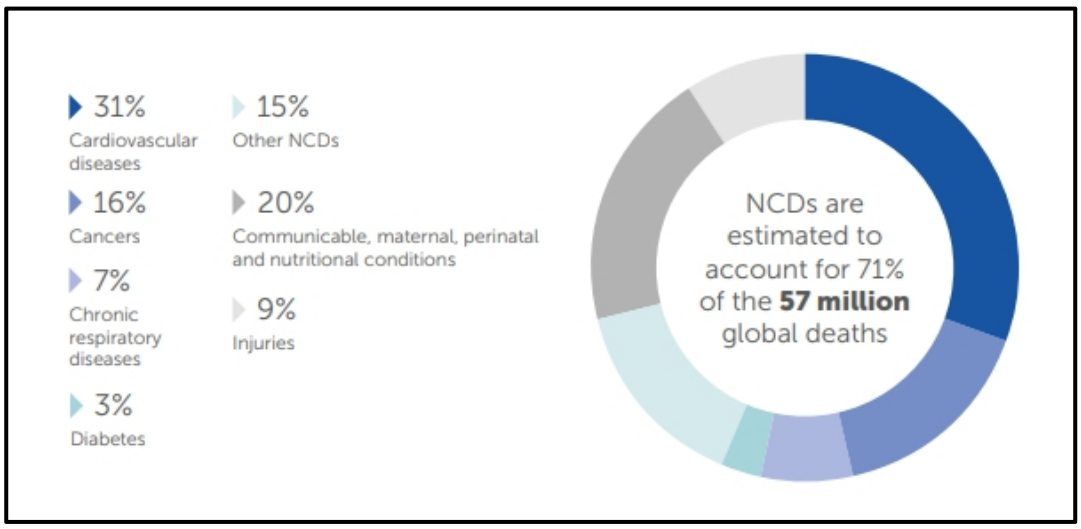
5. Limiting salt to less than 5g per day (equivalent to approximately 1 teaspoon) and use iodized salt.

PREVALENCE OF NON-COMMUNICABLE DISEASES

Global Scenario

Non-communicable diseases are the leading cause of deaths worldwide. They accounted for 71% (41 million) deaths of the total 57 million deaths in 2016 globally. NCDs that caused these deaths included cardiovascular diseases (17.9 million deaths; 44% of all NCD deaths), cancers (9 million deaths; 22% of all NCD deaths), chronic respiratory diseases (3.8 million deaths; 9% of all NCD deaths) and diabetes (1.6 million deaths; 4% of all NCD deaths) **(WHO, NCD Country Profiles, 2018)**. Percentage of total deaths of all ages and both sexes in 2016 is shown in **Fig. 2.2.**

Fig. 2.2 Global Mortality (% of total deaths), All Ages, Both Sexes, 2016

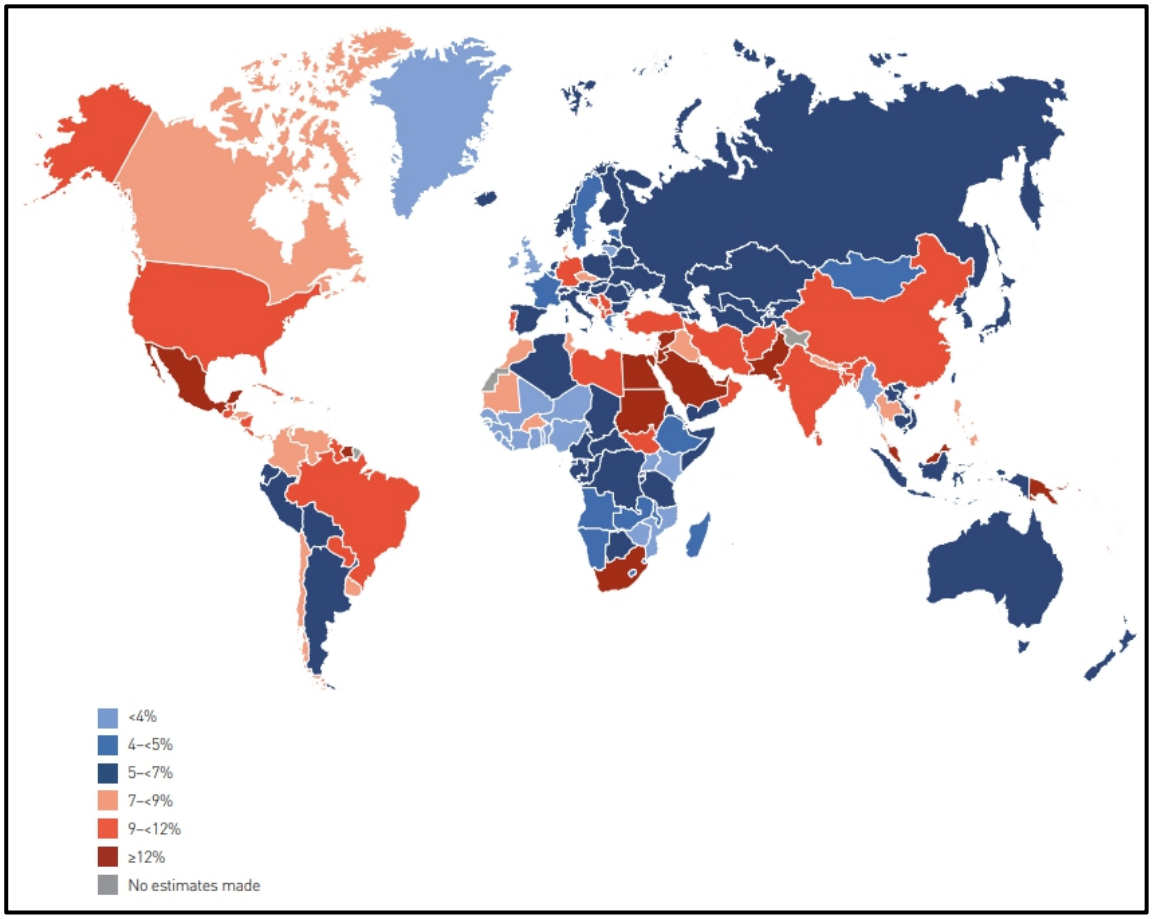


Source: Non-communicable diseases Country Profiles, 2018, WHO

NCDs accounted for 41 million deaths out of the 55 million global deaths in 2019 **(WHO, Global Health Observatory, Non-communicable diseases, 2019)**.

The International Diabetes Federation noted that there were 463 million people of age 20-79 years with diabetes in 2019. Estimated age-adjusted comparative prevalence of diabetes in adults (20-79 years) in 2019 is shown in **Fig 2.3**. The number of people with diabetes is anticipated to increase to 578.4 million by 2030 and to 700.2 million by 2045. The largest increase is expected to occur in regions shifting from low- to middle- income status. **Table 2.1** shows number of adults (20-79 years) with diabetes per World Bank income classification in 2019, 2030 and 2045.

Fig. 2.3 Estimated age-adjusted comparative prevalence of diabetes in adults (20-79 years) in 2019



Source: IDF Diabetes Atlas, 2019

Table 2.1 Number of adults (20-79 years) with diabetes per World Bank income classification in 2019, 2030 and 2045

	2019		2030		2045	
World Bank income classification	**Prevalence of diabetes (%)**	**Number of people with diabetes (millions)**	**Prevalence of diabetes (%)**	**Number of people with diabetes (millions)**	**Prevalence of diabetes (%)**	**Number of people with diabetes (millions)**
High-income countries	10.4 (8.6–13.3)[i]	95.2 (78.7–120.9)	11.4 (9.4–14.3)	107.0 (88.3–134.4)	11.9 (9.8–14.8)	112.4 (92.2–139.2)
Middle-income countries	9.5 (7.6–12.3)	353.3 (280.1–455.3)	10.7 (8.4–13.7)	449.6 (353.0–576.7)	11.8 (9.0–15.0)	551.2 (422.7–705.2)
Low-income countries	4.0 (2.8–6.7)	14.5 (10.0–24.3)	4.3 (3.0–7.1)	21.9 (15.2–36.4)	4.7 (3.3–7.8)	36.5 (25.8–60.2)

i 95% confidence intervals are reported in brackets.

Source: IDF Diabetes Atlas, 2019

National Scenario

NFHS-4 factsheet provides an insight on indicators like blood sugar levels, hypertension and nutritional status of adults from age 15-49 years **(Table 2.2)**. Blood sugar levels ranged from 6.9% to 2.3% in women and from 8.8% to 3.5% in men with slightly higher prevalence in urban settings. Similarly prevalence of hypertension among adults ranged from 7.3% to 0.7% in women and 11.4% to 0.8% in men with slightly higher prevalence in urban settings. Prevalence of overweight/ obesity ranged from 31.3% to 14.3% with higher prevalence in urban settings and among women. Rural population had higher prevalence of chronic energy deficiency with higher prevalence among women.

Non-communicable diseases accounted for 63% of all deaths in India in 2016. NCDs that accounted for these deaths included cardiovascular diseases (27% of all NCD deaths), cancers (9% of all NCD deaths), chronic respiratory diseases (11% of all NCD deaths) and diabetes (3% of all NCD deaths) **(WHO, NCD Country Profiles, 2018)**. Percentage of total deaths of all ages and both sexes in 2016 in India is shown in **Fig. 2.4.**

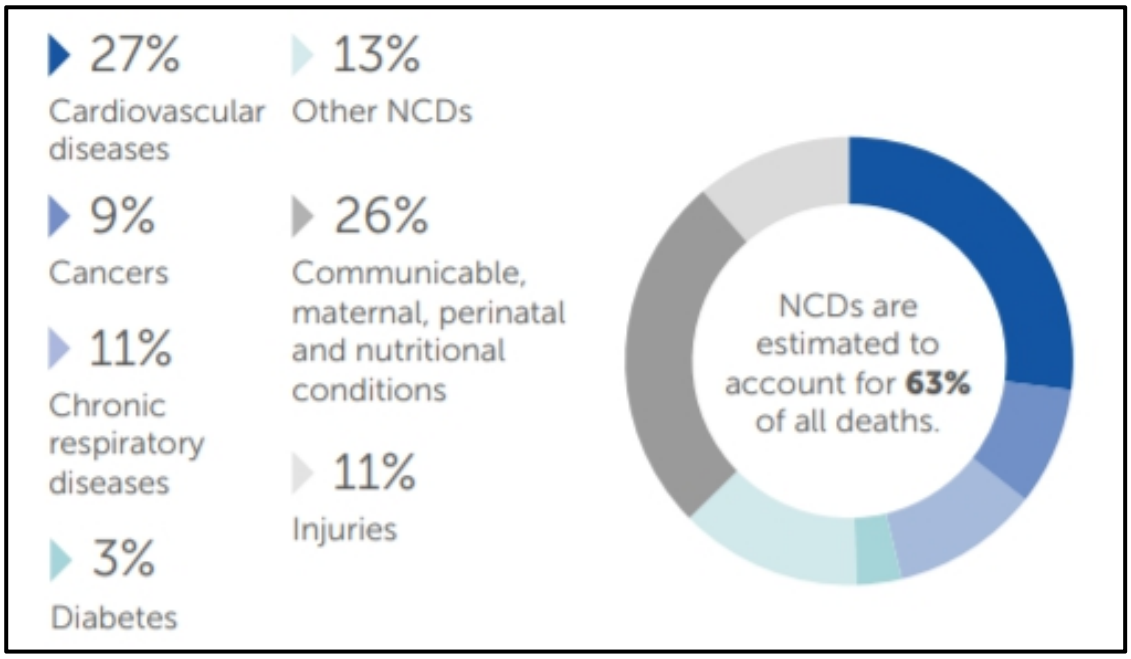
The International Diabetes Federation noted that India accommodates the second largest number of diabetic adults worldwide with 1 in 6 diabetic adult in the world coming from India. India tops the list of South-East Asia Countries with 77 million people in the age group of 20-79 years with diabetes. With the current situation, India is expected to reach 134.2 million people with diabetes by 2045. The age adjusted prevalence (%) of diabetes in adults (20-79 years) in India, 2019 is shown in **Fig. 2.5.**

Table 2.2 Prevalence of hypertension, high blood sugar levels, overweight/ obesity and chronic energy deficiency among adults (age 15-49 years) in India

Indicators	NFHS-4 (2015-16)	
	Urban	Rural
Blood Sugar Level among Adults (age 15-49 years)		
Women		
Blood sugar level - high (>140 mg/dl) (%)	6.9	5.2
Blood sugar level - very high (>160mg/dl) (%)	3.6	2.3
Men		
Blood sugar level - high (>140 mg/dl) (%)	8.8	7.4
Blood sugar level - very high (>160mg/dl) (%)	4.4	3.5
Hypertension among Adults (age 15-49 years)		
Women		
Slightly above normal (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	7.3	6.5
Moderately high (Systolic 160-179 mm of Hg and/or Diastolic 100-109 mm of Hg) (%)	1.6	1.3
Very high (Systolic ≥ 180 mm of Hg and/or Diastolic ≥ 110 mm of Hg) (%)	0.7	0.7
Men		
Slightly above normal (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	11.4	9.8
Moderately high (Systolic 160-179 mm of Hg and/or Diastolic 100-109 mm of Hg) (%)	2.7	2.0
Very high (Systolic ≥ 180 mm of Hg and/or Diastolic ≥ 110 mm of Hg) (%)	1.0	0.8
Nutritional Status of Adults (age 15-49 years)		
Women whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m^2) (%)	15.5	26.7
Men whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m^2) (%)	15.4	23.0
Women who are overweight or obese (BMI ≥ 25.0 kg/m^2) (%)	31.3	15.0
Men who are overweight or obese (BMI ≥ 25.0 kg/m^2) (%)	26.6	14.3

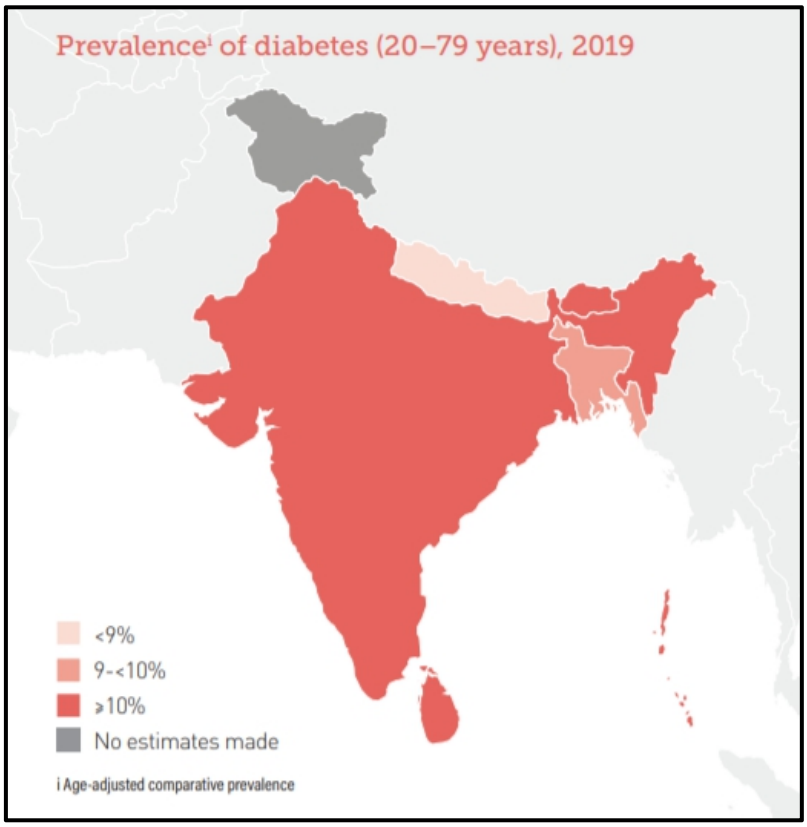
Source: NFHS - 4, 2015-16

Fig. 2.4 Proportional Mortality in India, All Ages, Both Sexes, 2016



Source: Non-communicable diseases Country Profiles, 2018, WHO

Fig. 2.5 Prevalence (age adjusted) of diabetes in adults (20-79 years) in India, 2019

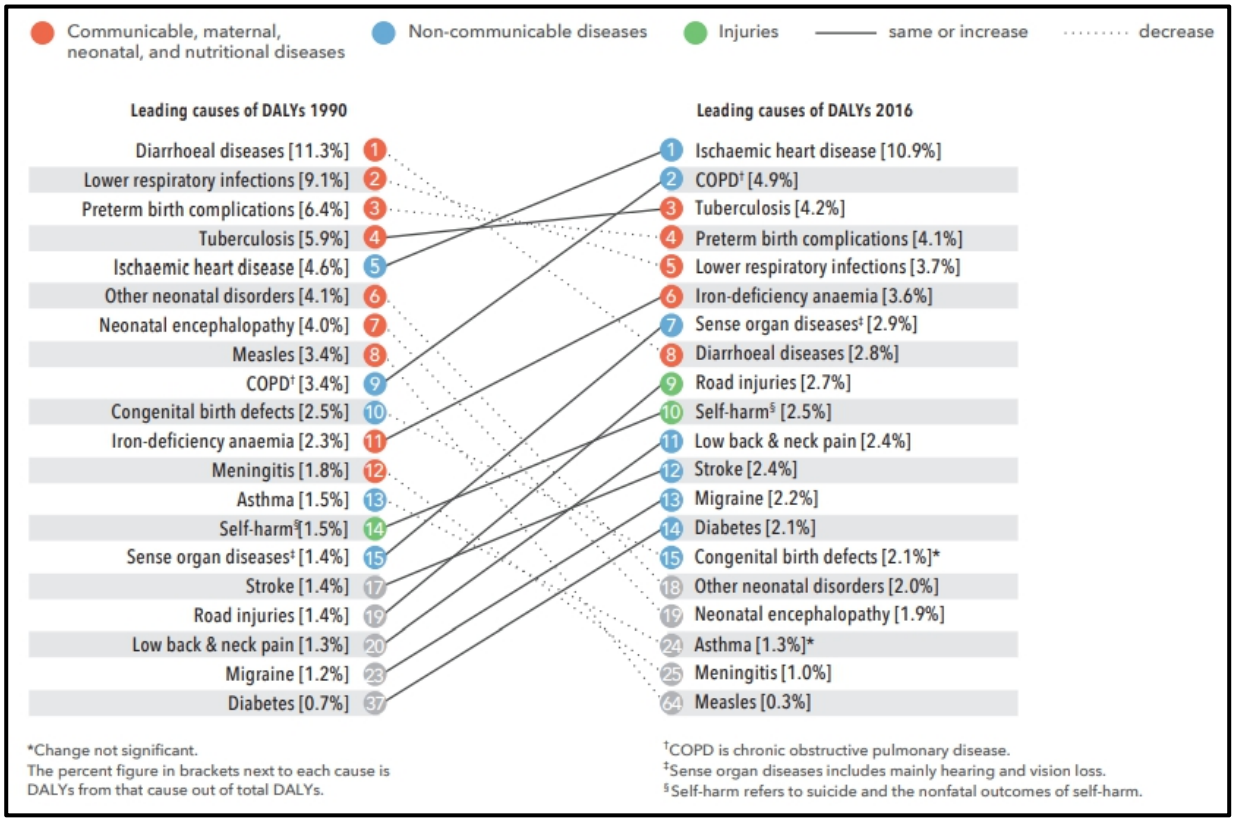


Source: IDF Diabetes Atlas, 2019

Regional Scenario

Disease Burden Profile of Gujarat noted that the proportion of NCDs in total disease burden of the state is 56.7%. It also highlights the shift in ranking of various causes that leads to DALYs (**Fig. 2.6**). There has been a drastic shift in non-communicable disease related causes of DALYs. Ischemic heart disease shifted to 1st position in 2016 from 5th position in 1990; stroke shifted from 17th position in 1990 to 12th position in 2016 and diabetes shifted from 37th position in 1990 to 14th position in 2016 **(ICMR *et al*, 2017)**.

Fig. 2.6 Change in top 15 causes of DALYs, both sexes, ranked by number of DALYs in Gujarat, 1990-2016



Source: India: Health of the Nation's States, ICMR *et al*, 2017

NFHS-4 and NFHS-5 factsheet provides an insight on indicators like blood sugar levels, hypertension and nutritional status of adults **(Table 2.3 and Table2.4)**. Prevalence of blood sugar levels, hypertension, overweight/ obesity and chronic energy deficiency have increased from 2015-16 to 20019-20. Prevalence of all the indicators are higher in urban settings than in rural settings in Gujarat.

Table 2.3 Prevalence of hypertension, high blood sugar levels, overweight/ obesity and chronic energy deficiency among adults in Gujarat

Indicators	NFHS-4 (2015-16)		NFHS-5 (2019-20)	
	Urban	Rural	Urban	Rural
Blood Sugar Level among Adults*				
Women				
Blood sugar level - high (>140 mg/dl) (%)	6.3	5.3	8.4	7.9
Blood sugar level - very high (>160mg/dl) (%)	3.0	2.5	7.6	6.1
Men				
Blood sugar level - high (>140 mg/dl) (%)	8.2	7.2	9.5	8.5
Blood sugar level - very high (>160mg/dl) (%)	3.8	3.4	7.3	6.9
Hypertension among Adults*				
Women				
Mildly elevated blood pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	8.2	6.7	11.4	12.0
Moderately or severely elevated blood pressure (Systolic ≥160 mm of Hg and/or Diastolic ≥100 mm of Hg) (%)	2.4	2.1	3.8	5.1
Men				
Mildly elevated blood pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	10.8	9.2	12.7	13.3
Moderately or severely elevated blood pressure (Systolic ≥160 mm of Hg and/or Diastolic ≥100 mm of Hg) (%)	2.6	3.4	3.9	4.8
Nutritional Status of Adults (age 15-49 years)				
Women whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m^2) (%)	18.1	34.3	17.2	30.9
Men whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m^2) (%)	19.0	29.6	16.0	24.7
Women who are overweight or obese (BMI ≥ 25.0 kg/m^2) (%)	34.5	15.3	30.4	17.0
Men who are overweight or obese (BMI ≥ 25.0 kg/m^2) (%)	25.9	14.4	25.6	15.6

Source: NFHS-4 (2015-16), NFHS-5 (2019-20)

*NFHS-4 factsheet provides data for adults aged 15-49 years; NFHS-5 factsheet provides data for adults aged 15 years and above.

Table 2.4 Prevalence of hypertension, high blood sugar levels, overweight/ obesity and chronic energy deficiency among adults in Vadodara

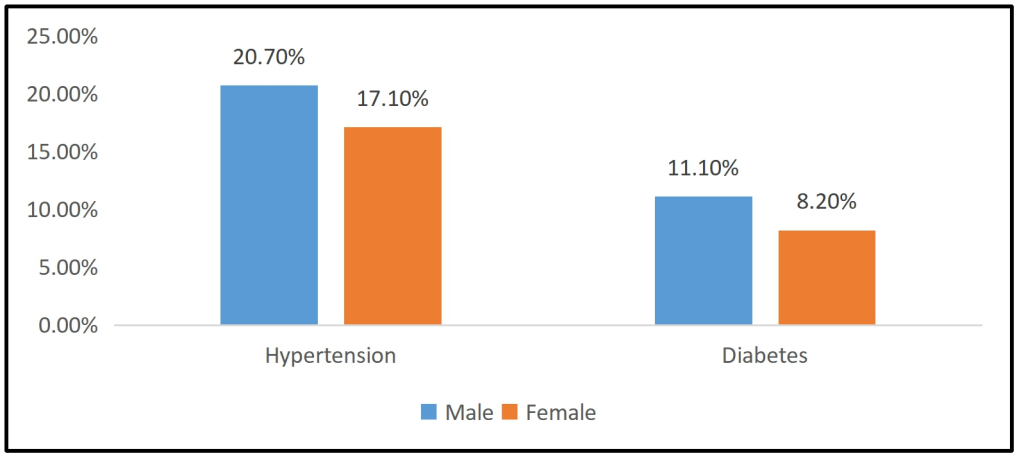
Indicators	NFHS-4 (2015-16)	NFHS-5 (2019-20)
Blood Sugar Level among Adults*		
Women		
Blood sugar level - high (>140 mg/dl) (%)	6.5	7.8
Blood sugar level - very high (>160mg/dl) (%)	3.3	7.4
Men		
Blood sugar level - high (>140 mg/dl) (%)	6.5	6.5
Blood sugar level - very high (>160mg/dl) (%)	2.9	7.4
Hypertension among Adults*		
Women		
Mildly elevated blood pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	11.8	13.8
Moderately or severely elevated blood pressure (Systolic ≥160 mm of Hg and/or Diastolic ≥100 mm of Hg) (%)	2.0	4.9
Men		
Mildly elevated blood pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	11.6	14.0
Moderately or severely elevated blood pressure (Systolic ≥160 mm of Hg and/or Diastolic ≥100 mm of Hg) (%)	3.8	5.5
Nutritional Status of Adults (age 15-49 years)		
Women whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m^2) (%)	29.1	20.9
Men whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m^2) (%)	25.6	-
Women who are overweight or obese (BMI ≥ 25.0 kg/m^2) (%)	22.0	27.6
Men who are overweight or obese (BMI ≥ 25.0 kg/m^2) (%)	20.7	-

Source: NFHS-4 (2015-16), NFHS-5 (2019-20)

*NFHS-4 factsheet provides data for adults aged 15-49 years; NFHS-5 factsheet provides data for adults aged 15 years and above; (- data not available)

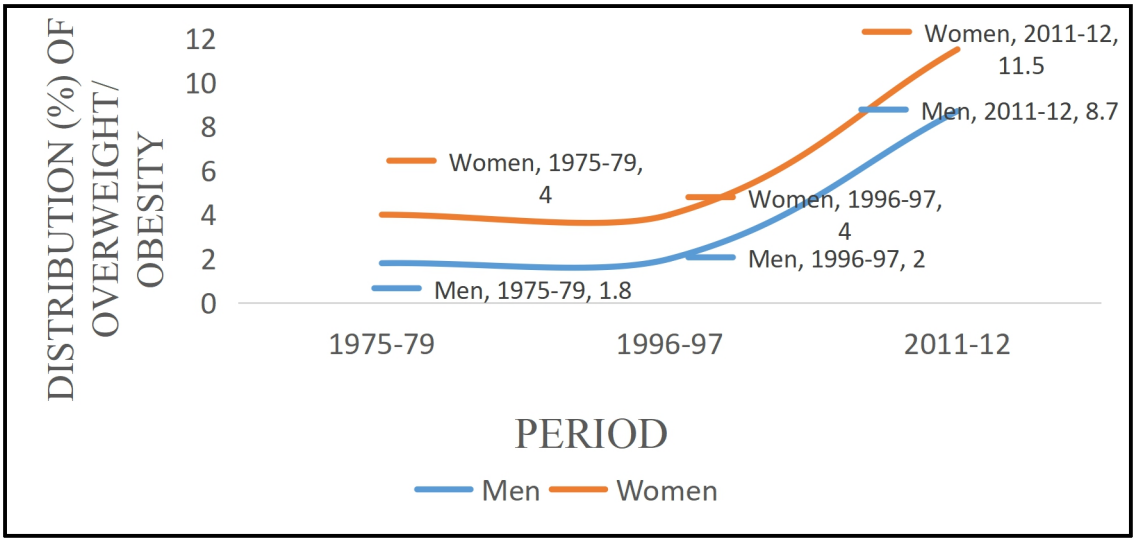
NNMB 2012 Report provides data on prevalence of hypertension and diabetes among adults (≥18 years) in rural Gujarat (**Fig. 2.7**). The prevalence of hypertension was found to be higher in males (20.7%; n=2687) than in females (17.1%; n=3021). similarly prevalence of diabetes was higher in males (11.1%; n=2122) than in females (8.2%; n=2503). The report also highlights the change in distribution (%) of adult men and women according to BMI grades in rural Gujarat (**Fig. 2.8**), which is observed to increase from 1975-79 to 2011-12.

Fig. 2.7 Prevalence (%) of hypertension and diabetes among adults (≥18 years) in rural Gujarat



Source: National Nutrition Monitoring Bureau Report, 2012

Fig. 2.8 Distribution (%) adult men and women according to BMI grades (who cut offs)in rural Gujarat: Time trends



Source: National Nutrition Monitoring Bureau Report, 2012

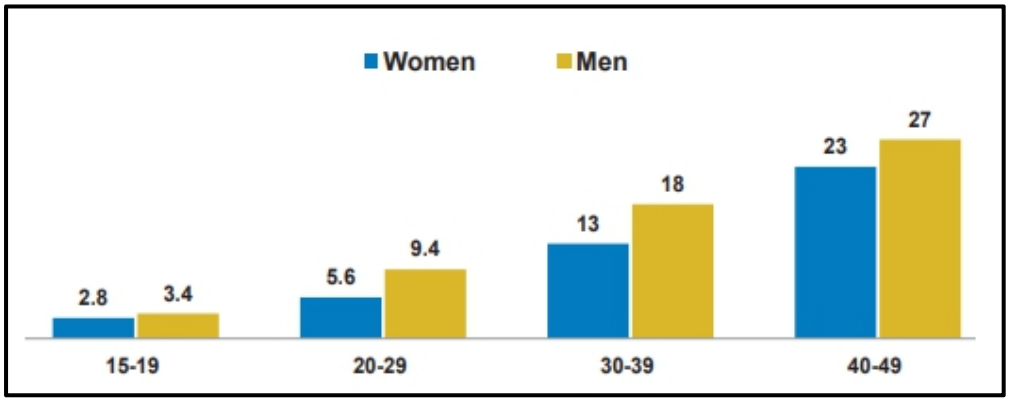
Which age group is at higher risk of non-communicable diseases?

Non-communicable diseases affect people of all age groups. Though these conditions are frequently linked to older age groups, evidence has shown that majority of all deaths accountable to NCDs occur between the age group of 30-69 years **(WHO, 2018)**.

NFHS-4 provides data on the prevalence of hypertension by age and sex in India **(Fig. 2.9)**. The data shows that the prevalence of this NCD increases drastically with age. The prevalence nearly doubled in both men and women from age 20-29 years to 30-39 years. The data also shows that around one-fourth of both men and women in the age group of 40-49 years have hypertension.At present, the probability of an Indian, between the age of 30-70 years dying due to NCDs is 23% **(WHO, NCD Country Profile, 2018)**.

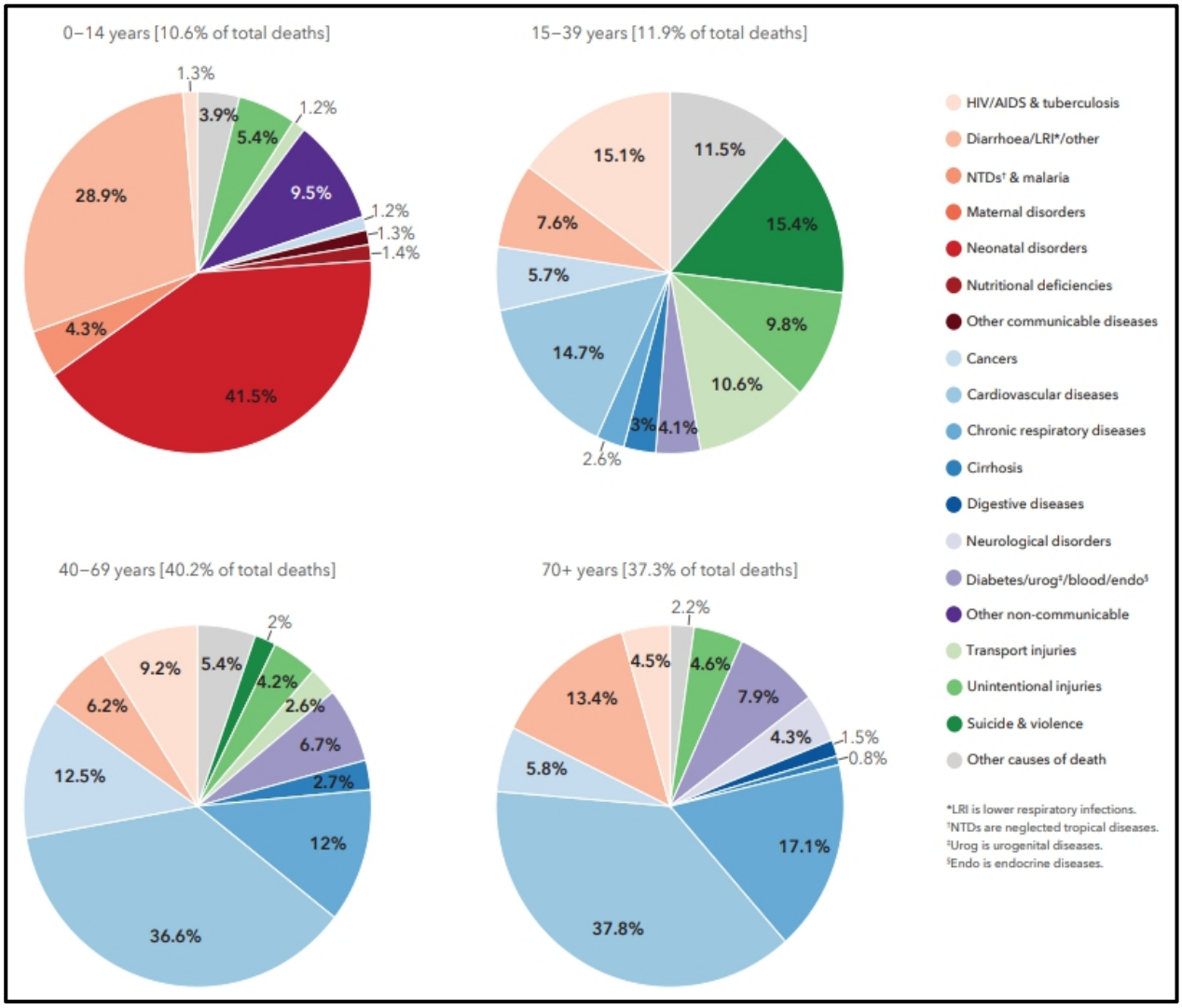
Disease Burden Profile of Gujarat provides an insight on the percent contribution of top 10 causes of death by age group for both the sexes (**Fig. 2.10**). It highlights the sharp increase in the contribution of NCDs like cardiovascular diseases, cancers, chronic respiratory diseases and diabetes in deaths with the increase in age from 15-39 years to 40-69 years **(ICMR *et al,* 2017).**

Fig. 2.9 Prevalence of Hypertension by Age and Sex in India



Source: NFHS-4, National Report, (2015-16)

Fig. 2.10 Percent contribution of top 10 causes of death by age group, both sexes, 2016

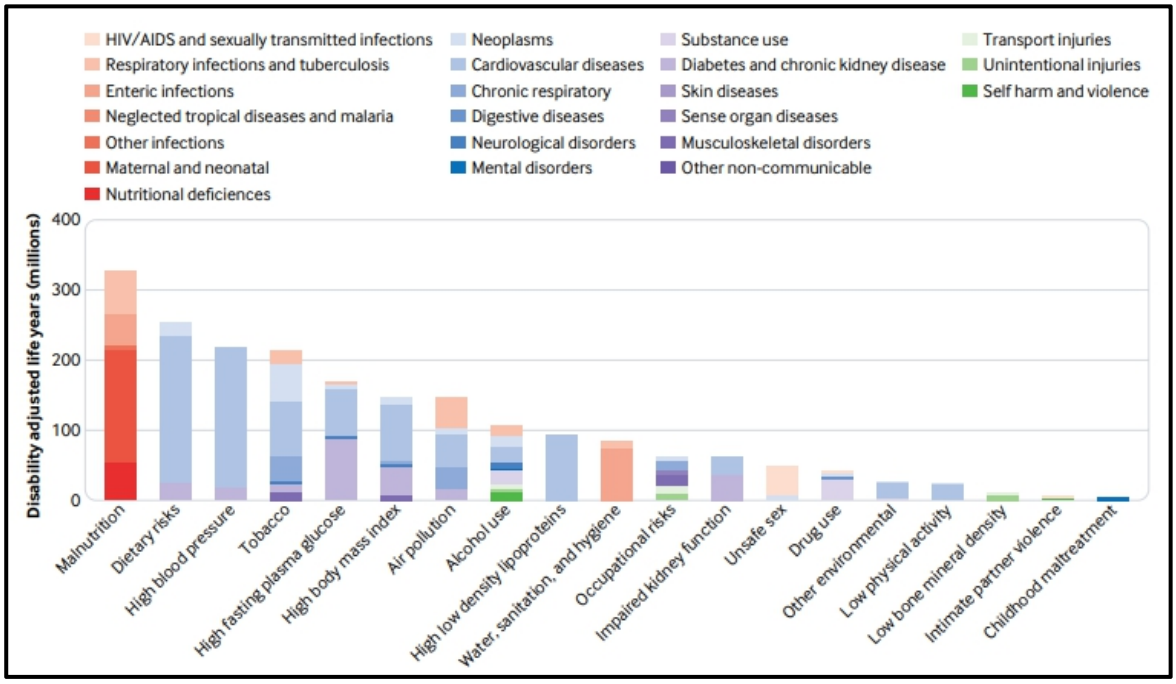


Source: India: Health of the Nation's States, ICMR *et al*, 2017

RISK FACTORS OF NON-COMMUNICABLE DISEASES

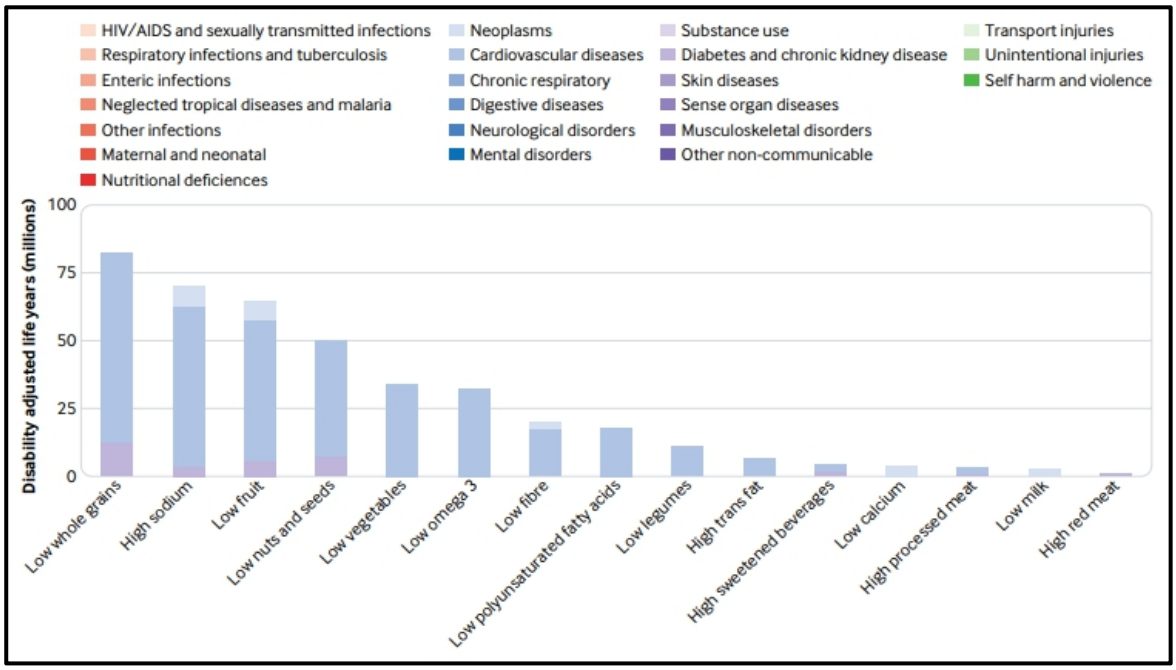
Institute of Health Metrics and Evaluation provides data on risk factors contributing to DALYs globally for all ages and both the sexes. Dietary risks are at the second position (**Fig. 2.11**) and the major contributors among them were low intake of whole grains, high sodium intake and low intake of fruits, nuts and seeds or vegetables (**Fig. 2.12**).

Fig. 2.11 Global total disability adjusted life years by risk factors for all ages, both sexes, 2017



Source: IHME, GBD data compare visualization, 2017.

Fig. 2.12 Total DALYs lost by dietary risk factor, global, all ages, both sexes, 2017



Source: IHME, GBD data compare visualization, 2017.

Malnutrition, unhealthy diets and non-communicable diseases are related closely. They are the outcomes of present food systems, among other factors which have evolved significantly over the last 50 years with more emphasis on efficiency, availability of low-cost and high calorie foods, majorly derived from staple cereal crops has increased, reducing people's hunger. However, this has often had detrimental effect on diversity, displacing local and often healthier diets. Improvement in access to a wide variety of micronutrient rich foods - like fresh fruits, vegetables, legumes, pulses and nuts has not been equal for all and unhealthy foods - high in salt, sugars, saturated fats and trans fat have become readily accessible and cheaper. Furthermore, the global demand and supply of meat, dairy products, sugar sweetened beverages, processed and ultra-processed foods have skyrocketed (**Branca *et al*., 2019**).

Lock *et al*., (2005) conducted a study to estimate the global burden of disease attributable to low consumption of fruits and vegetables and found that upto 2.635 million deaths per year are caused due to inadequate intake of fruits and vegetables worldwide. They also found that an individual daily intake of fruit and vegetables upto 600g could decrease global disease burden by 1.8%. It emphasizes the importance of dietary risk factors in public health policy in order to combat the global increase in non-communicable diseases and argues that the current WHO/FAO intersectoral fruit and vegetable promotion programme is a critical component in any global diet strategy.

Nguyen *et al.*, (2012) conducted a quasi-experimental intervention study in two Vietnamese rural communes on population aged ≥25 years to assess the impact of healthy lifestyle promotion campaigns on CVD risk factors (CVDRFs) including smoking, alcohol consumption, physical inactivity and salty diet. They concluded that health promotion decreased the intake of salty foods but had insignificant effect on the rate of daily smoking and heavy alcohol consumption over a relatively short period of time. Restricted impact on a context-bound CVDRF such as smoking highlights the need of a higher level of intervention, a supportive atmosphere or a gender sensitive approach to improve the efficacy and protect the wellbeing.

Diet-related non-communicable diseases (DR-NCDs) are on the rise in India, along with widespread undernutrition, posing a significant socioeconomic burden. **Misra *et al.*, (2011)** reviewed secular patterns in food groups and nutrient consumption in India, as well as their consequences for DR-NCDs, in order to better understand optimum diet option for DR-NCD prevention. He concluded that to avoid the escalation of DR-NCDs in India, a multisectoral preventive approach is needed to provide healthy diets to pregnant women, infants and adults as well as to maintain a normal body weight from childhood onwards.

Sarma *et al*., (2019) conducted a study to assess the prevalence of NCD related risk factors in 18-69 years aged people in Kerala, India. It was found that abdominal obesity in women (72.6%) was higher as compared to men (39.1%) along with higher prevalence in urban residents (67.4%) as compared to rural residents (58.6%). The prevalence of use of alcohol and tobacco was 28.9% and 20.3% in men respectively. Daily salt consumption was estimated to be 6.7 g/day. 30.4% of people were estimated to have raised blood pressure and 19.2% had high fasting blood glucose (FBG) levels. Men had a higher rate of elevated blood pressure (34.6%) than women (28%) with no significant difference between urban and rural residents. Not more than 12.4% of people with hypertension and 15.3% of people with diabetes were in control of their conditions. Prevalence of urban and rural residents not having any of the examined seven NCD risk factors was 13.8% and 18.4% respectively. They concluded that to counter the potential burden of NCDs, concerted primary and secondary intervention strategies are needed to address this high prevalence of hypertension and diabetes control.

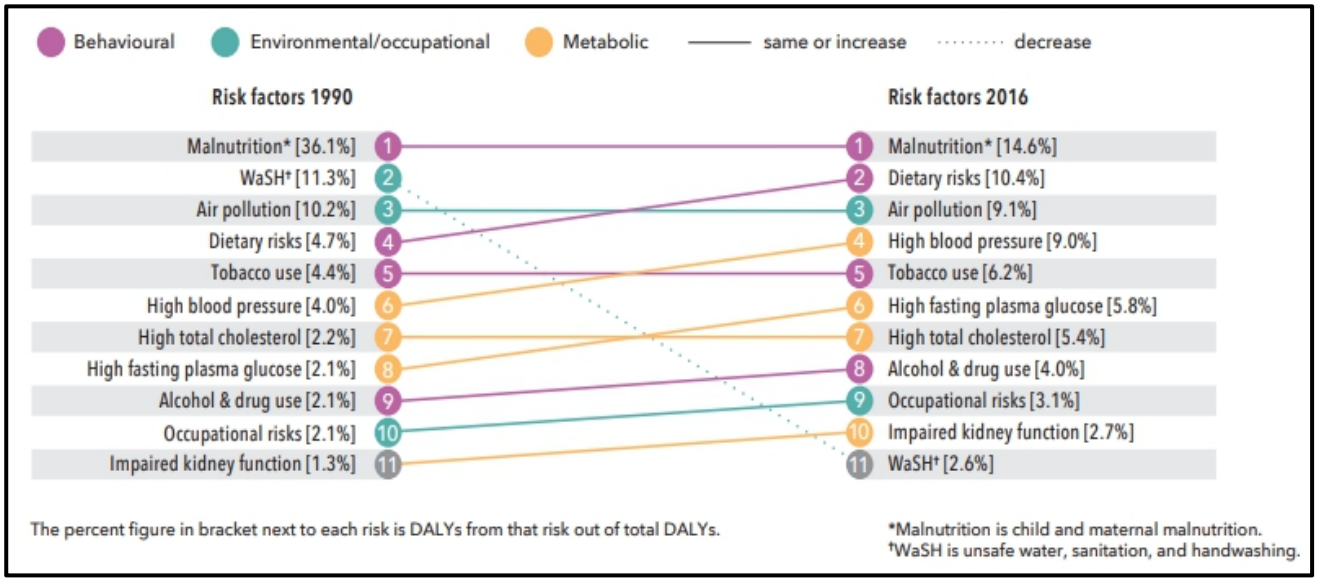
A research was conducted with the aim to compare the dietary intake of adults aged ≥ 20 years, in Kancheepuram district of Tamil Nadu state in southern India to existing dietary guidelines for NCD prevention. The findings reflected the unhealthy dietary choices of this rural south Indian population, with lower consumption of protective foods like fruits, vegetables, n-3 poly and monounsaturated fatty acids and higher intakes of refined cereals in the form of polished white rice, which could lead to an increase in the prevalence of NCDs such as diabetes, asthma and cardiovascular disease in these areas, necessitating immediate intervention (**Sowmya *et al*., 2016**).

Meshram *et al.*, (2016) conducted a study with an aim to look at the patterns in nutrient consumption and nutritional status among rural adult women (≥18-60 years) as well as the association of overweight/ obesity with sociodemographic factors. A significant decrease in the prevalence of chronic energy deficiency was observed but the prevalence of overweight/ obesity increased over the same time span. Increased consumption of fatty foods, sedentary lifestyle and improved socio-economic status may all contribute to the rise in overweight/ obesity. It was concluded that their is a need of educating community on the importance of regular physical activity, reduced consumption of fats and oils and a well-balanced diet.

Bhagyalaxmi et al., (2013) conducted a cross-sectional study on urban and rural population of Gujarat, India to look at the prevalence and distribution of risk factors non-communicable diseases in 15-64 years of age group. Common risk factors for non-communicable diseases includes tobacco-use, unhealthy diets, physical inactivity and obesity. It was observed that the percentage of rural men smoking (22.8%) and using smokeless tobacco (43.4%) was high in comparison to the urban men where 12.8% men smoked and 23.1% used smokeless tobacco. A significant difference was observed between the urban (2.18 ± 1.59 servings) and rural (1.78 ± 1.48 servings) regions in average consumption of fruits and vegetables. Urban men and women were observed to have higher prevalence of overweight and obesity as compared to men and women of rural area in all age groups. Prevalence of this risk factor (overweight and obesity) was found to increase with age in both urban and rural areas. A significant difference was found in the prevalence of hypertension among urban (29%) and rural (15.4%) residents. Risk factors for non-communicable diseases prevalent in urban population were overweight and obesity, hypertension and physical inactivity whereas risk factors prevalent in rural population involved smoking, consumption of smokeless tobacco and poor consumption of fruits and vegetables. The findings of the study highlight the requirement of intervention and strategies to prevent non-communicable disease related in risk factors in both urban and rural areas.

Disease Burden of Gujarat highlights the shift in modifiable behavioural risk factor of dietary risks from 4th position in 1990 to 2nd position in 2016. It also highlights the change in ranking of metabolic risk factors like high blood pressure and high fasting plasma glucose from 1990 to 2016 **(ICMR *et al*, 2017) (Fig. 2.13).**

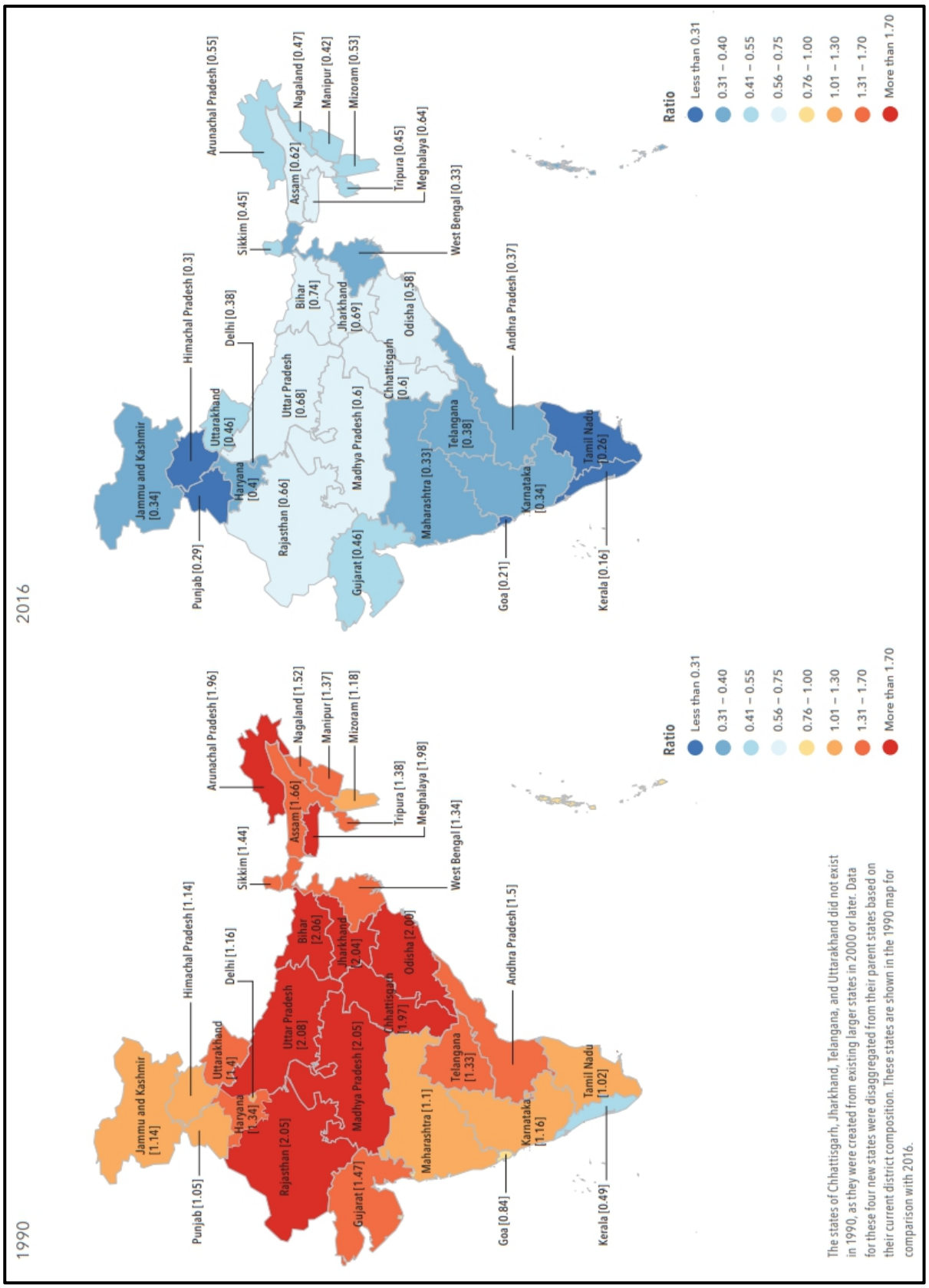
Fig. 2.13 Contribution of top 10 risks to DALYs number, both sexes, ranked by number of DALYs, 1990-2016



Source: India: Health of the Nation's States, ICMR *et al*, 2017

Epidemiological transition ratio is the ratio of DALYs caused by Communicable, Maternal, Neonatal and Nutritional Diseases (CMNNDs) to DALYS caused by NCDs and injuries. A ratio less than one suggests burden of NCDs and injuries is higher than that of CMNNDs, whereas a ratio greater than one suggests the opposite. As the ratio lowers, the contribution of NCDs and injuries to a state's overall disease burden increases. **Fig. 2.14** shows the epidemiological transition ratios of the states of India in 1990 and 2016. The epidemiological transition ratio of Gujarat shifted from 1.47 in 1990 to 0.46 in 2016 marking the increase in contribution of NCDs and injuries to a state's overall disease burden **(ICMR *et al*, 2017)**.

Fig. 2.14 Epidemiological transition ratios of the states of India, 1990 and 2016



Source: India: Health of the Nation's States, ICMR *et al*, 2017

ROLE OF HEALTHY DIETS IN PREVENTING NCDs

Gurwara and Pillai *et al*., (2014) conducted a study to determine the effectiveness of the DASH diet and lifestyle alterations on hypertensive patients in Bhilai city. They concluded that DASH diet and lifestyle modification have a greater effect on blood pressure, biochemical parameters and quality of life together than either DASH diet or lifestyle modification alone and both should be a part of the health education programmes organized by the health workers.

Siervo *et al*., (2015) conducted a systematic review and meta- analysis of randomized controlled trials to have a look at the effects of DASH diet on cardiovascular risk factors. They concluded that DASH diet helped in decreasing cardiovascular risk factors and appeared to be more beneficial in people with a higher cardiometabolic risk. DASH diet is effective in preventing cardiovascular disease.

Another systematic review and meta-analysis of randomized controlled trials was conducted among adults by **Saneei *et al*., (2014)** to determine the effect of DASH diet on blood pressure. The results showed that the DASH-like diet had a beneficial lowering effect on both systolic and diastolic blood pressure in adults, albeit the magnitude of the drop in blood pressure varied between the subgroups.

A massive increase is observed worldwide in the incidence of NCDs. Combining balanced diet with an active lifestyle can have a significant influence on health by lowering the risk of NCDs such as cardiovascular diseases, hypertension, strokes, diabetes, cancer and obesity. Excessive intake of energy dense foods, saturated fat rich foods along with unhealthy dietary behaviours are key contributors to the observed rise in lifestyle disorders **(Shrivastava *et al*., 2013)**.

The DASH diet has been investigated extensively in several clinical trials, with the majority of them indicating that it lowers blood pressure. Furthermore, the DASH diet has been shown to reduce the risk of adverse cardiac events, stroke, type 2 diabetes, and obesity (**Challa *et al*., 2020**).

Jenkins *et al*., (2012) conducted a randomized control trial to look at the effect of legumes on glycemic control and cardiovascular flipsides in type 2 diabetes mellitus as a part of low glycemic index diet. They concluded that including legumes like beans, chickpeas and lentils in a low GI diet improved glycemic control in type 2 diabetes and lowered the estimated coronary heart disease risk score.

Zafar *et al.*, (2019) in a systematic review concluded that in patients with prediabetes or diabetes, low-GI diets may help with glycemic management and weight loss.

Kumar *et al*., (2015) evaluated the effect of fenugreek seeds in type 2 diabetics with dyslipidemia as it is known to have both hypoglycemic and hypolipidemic effect. They concluded that fenugreek seeds have positive effect on glycemia and dyslipidemia in type 2 diabetic patients. Fenugreek seeds can be used as an alternative for managing diabetes along with its complications.

Gaddam *et al.*, (2015) studied the role of fenugreek seeds in the prevention of type 2 diabetes in prediabetics and concluded that supplementation of 10g fenugreek/ day reduced conversion of prediabetes patients to diabetes with no side effects and is helpful presumably due to its decreased insulin resistance.

Prasad and Dhar (2016) in their study on role of flax seeds in diabetes concluded that secoisolariciresinol diglucoside (SDG) appears to have high potential for lowering the incidence of type 1 diabetes and delaying the onset of type 2 diabetes in people due to its antioxidant, hypoglycemic and hypolipidemic properties.

Prajapati and Dave (2018) studied the nutritional and therapeutic importance of garden cress seeds and concluded that it can be used to treat a variety of health issues including hypertension, renal illness, cancer prevention and mild glycemia.

Millets are excellent source of proteins, minerals, flavonoids, polyphenols and vitamins and they may be utilized as a functional food to help prevent non communicable diseases **(Singh *et al.*, 2019)**.

A millet-based intervention diet may result in a substantial reduction in blood glucose, HbA1c, oxidative stress, blood pressures, blood lipoproteins, and proinflammatory cytokines while increasing antioxidant vitamins, magnesium, calcium, and haemoglobin levels **(Singh *et al*., 2020)**.

Millets are rich in antioxidants providing them nutraceutical properties that protect human health by lowering blood pressure, risk of heart disease, preventing cancer and cardiovascular diseases, diabetes, decreasing tumour instances etc. **(Sarita and Singh, 2016)**.

Reduced dietary salt consumption might prolong or avoid the onset of antihypertensive medication, assist blood pressure reduction in hypertension patients on medical therapy, and serve as a simple cost-cutting tool to minimize cardiovascular morbidity and mortality **(Frisoli *et al.*, 2012)**.

SFA and trans-fat diets were linked to a greater risk of CVD, whereas MUFA and PUFA intakes were linked to a decreased risk of CVD and mortality. SFA substitution with MUFAs and PUFAs, or trans fat substitution with MUFAs, was found to be inversely related to CVD (**Marta *et al*., 2015**).

PROGRAM IN ACTION : AYUSHMAN BHARAT

Pandey and Biswas (2019) explained how Ayushman Bharat Program is to be implemented. The program is intended to be carried out through Health and Wellness Centers (HWCs) that will be reinforced in Primary Health Center (PHC) and Health Sub-Center (HSC). Equipment for essential medical tests for hypertension, diabetes and cancer will be supplied at these centers along with advanced telemedical consultation to district hospital. PHC and HSC are visioned to have two different types of HWCs. The SC level HWC will be operated by a group of multipurpose workers (male and female) along with new cadre of functionary called Mid-level Healthcare Provider (MLHP), who can either be a Community Health Officer (BSc. Community health), a nurse (BSc. Or GNM) or an AYUSH practitioner. PHC level HWC will be operated by human resources as per the existing norms. Twelve expanded range of services will be provided at HWC including basic and necessary

services of PHC along with additional services like prevention, screening and management of non-communicable diseases, illness, mental problems, common ophthalmic and ENT problems, basic oral health care, geriatric care and palliative care.

Solanki *et al*., (2020) described the newer services at the HWCs, which are:

- Comprehensive primary health care to be provided at the HWC under twelve service domains (**Table 2.5**) including promotive, preventive and curative aspects of health care.
- Conduction of population enumeration and risk assessment of the community for common risk factors related to non-communicable diseases, environmental risk factors, selected mental and chronic respiratory conditions.
- Screening is conducted for common NCDs like hypertension (HTN) and diabetes (DM) along with certain cancers like oral, breast and cervical.
- Delivering continuum of care where patients are taken care of right from their homes to the primary care, followed by referral facilities and follow ups when the person is back home.
- Activities like yoga have been included in the system for disease prevention and health promotion.
- Addition of manpower in the form of mid level health provider or CHO has expanded the service package available to the community along with improved quality, better monitoring and improved supervision of the grass root level workers.
- Along with health promotion activities conducted through Village Health Sanitation Nutrition Committee (VHSNC), Mahila Aarogya Samiti (MAS); school children have been chosen as administrators of health promotion activities to enhance community participation and deliver messages not to just the present generation but future generation also.

Table 2.5 Basic service domains of HWCs

Service domains
1. Care during pregnancy and child birth.
2. Neonatal and infant health care services.
3. Childhood and adolescent health care services.
4. Family planning, contraceptive services and other reproductive health services.
5. Management of communicable diseases including national health programmes.
6. Management of common communicable diseases and outpatient care for simple illness and minor ailments.
7. Screening, prevention, control and management of NCDs.
8. Care of common ophthalmic and ENT problems.
9. Basic oral health care.
10. Elderly and palliative care.
11. Emergency medical services.
12. Screening and basic management of mental health problems.

Source: Solanki *et al*., 2020

SWOT analysis of HWCs performed by **Solanki *et al*.** in **2020** reported that one of the strengths of HWCs is the risk assessment of entire enlisted population. This helps in prevention of various chronic conditions along with screening that aids in early detection of NCDs like diabetes, hypertension and certain cancers. They also reported about the opportunities that came along with development of HWCs like deployment of new cadre of functionary - CHO in HWC-SHC that can be used to improve supervision of ASHA and MPW at the field level. Another opportunity that comes with the program is training health care providers at all the levels, building their capacity to carry out broad range of services.

Arasi, M. J. (2020) presented a paper on role and responsibilities of mid-level health providers (MLHP); increasingly being used to render services autonomously, particularly in rural and remote areas to make up for the gaps in health workers with higher qualifications. A key to the primary health team at the SC-HWC, is the Mid-level Health Provider (MLHP); Community health Officer (CHO) - a B.Sc. In Community Health or a Nurse (GNM or Post Basic B.Sc.) or an Ayurveda

practitioner, trained and certified through IGNOU/ other State Public Health/ Medical Universities for a set of competencies in delivering public health and primary health care services.

Desai *et al.* (2020) discussed the concept of mid-level health provider (community health officer) as new emerging workforce in healthcare sector as they have showed a remarkable change in indicators of many countries. Indian government has declared the new pivotal role of community health officer through National Health Mission (NHM) with their constructed roles and responsibilities to cover the huge gap in providing health care facilities.

Brown et al., (2011) presented a paper on mid level health providers as a promising resource particularly in low- and middle- income countries, as a strategy to overcome health workforce challenges and improve access to essential health services and achieve the health related targets. Improved education, supervision, management and regulation practices and integration in the health system have the potential to maximize the benefits from the use of these cadres.

KNOWLEDGE OF FRONTLINE WORKERS AND NEED FOR CAPACITY BUILDING

Reviewing the foundations of National Rural Health Mission (NRHM), it is of utmost importance that the upcoming plans and policies should focus more on capacity building and not just on technical and infrastructural aspects. Updating the health workforce is essential to sustain public health infrastructure for achieving universal health coverage (**Gopalakrishnan and Immanuel, 2018**).

Health promotion is an effective process in tackling the underlying determinants of NCDs by enabling people and communities to increase control over the determinants of health and thereby improve their health **(WHO, 2005).**

Nutbeam D. (1998) opined that health promotion is an inclusive process of social and political mobilization to facilitate action at various levels for achieving improved health outcomes. Intervention activities can focus on risk reduction through life skills

education, facilitating adoption of healthy lifestyles (creation of enabling and supportive environment to practice healthy behaviors through progressive policies, legislations and regulations) and availability of preventive health information and services.

WHO (2003) report calls for a shift in the conceptual framework for developing strategies for action, placing nutrition together with the other principal risk factors for chronic disease, namely, tobacco use and alcohol consumption at the forefront of public health policies and programmes for preventing NCDs.

The CHWs are involved in a variety of public health initiatives, as well as NCD-specific initiatives such as NCD screening, provisional diagnosis, primary care, health education and counselling, basic medication and referral, and so on. Low NCD training, heavy workload, poor system-level support, inadequate salary, and an insufficient supply of logistics and medications were cited as some of the obstacles and hurdles. Engaging CHWs has been identified as a critical component of delivering NCD-related services. For CHW capacity building, requisite supervising arrangements, logistics and drug supply, and setting up appropriate recording and reporting systems for NCD prevention and management, effective integration of CHWs within the primary care system is critical (**Rawal *et al*., 2020**).

Pati *et al.* (2020) reviewed gaps in the provision of integrated care for non communicable diseases in India and found that challenges in the identification of eligible beneficiaries, shortage and poor capacity of frontline health workers, functioning of community groups and poor community knowledge on NCD risk factors were key gaps at the community level.

The various responses of the ANMs on implementation of NPCDCS were recorded by **Kashyap and Shivaswami (2019)** across all the 36 subcenters under their study in Belagavi taluka. Eight of them said that they had no suggestions and the rest of 28 ANMs gave the following multiple suggestions:

- "Adequate supply of IEC materials must be ensured to educate the public and for health promotion"- opinion of five of the respondents.

- "Sensitization of the public toward NCDs is required and is essential"- opinion of four of the respondents.
- "Periodic training is necessary for the health-care staff to provide better health care to the community"- opinion given by three of the respondents.

Joshi *et al*., (2019) conducted a study on improving the capacity of nurses for NCD service delivery in India with an aim of comparing performances of doctors and nurses along with determining the skills to be focused on in future educational programmes. Baseline knowledge along with end-training knowledge data was collected to assess their long-term retention of the knowledge in varied domains of NCD training. They concluded that nurses though had a lower baseline knowledge, the decline in their knowledge on follow-up assessment was similar to doctors, highlighting that the capacity of nurses can be improved for providing primary care services for NCDs. They also concluded that there is a need to retrain both the functionaries - nurses and doctors.

Gandhi, Das and Mehta (2020) conducted a study to assess the dietary practices, nutritional status, knowledge and practices of tribal mothers of children (6-23 months) regarding healthy diets and nutrition and to promote diversity among mothers focusing on Livestock Rearing component by making an Agri-Nutri Smart Community using Home Based Mixed Farming (HBMF) approach as its crucial to improve the health and nutritional status of women of reproductive age (15-49 years) to eradicate malnutrition as mother's health is directly linked with the child's health. It was reported that proper sensitization of frontline workers with the use of IEC materials and supportive supervision would facilitate dietary diversity and nutritional status of the mothers of children (6-23 months).

ASHAs serve an important role in delivering comprehensive and culturally appropriate treatment to communities; nevertheless, they are underappreciated and overloaded, and want to be recognised as part of the health system. If properly supported by the health system, ASHAs have the ability to provide a wide range of services (**Abdel-All *et al*., 2019**).

Promoting healthy food environment that encourages a diverse, balanced and healthy diet necessitates collaboration of variety of industries and stakeholders; both government and private sector, while protecting public health from vested interests. Healthy environment can be created by educating children, adolescents and adults about healthy dietary practices along with providing nutritional and dietary counselling at primary health care centres (**WHO, 2019**).

An immediate, focused effort is required to enhance diet quality and stimulate physical activity, by implementing changes in policies in regard with food and build environments as well as enhance health systems to combat noncommunicable diseases like diabetes (**Mohan *et al.*, 2016**).

Need to include module for promoting healthy diets in CHOs trainings.

Training program for community health officers include:

- Certificate program of community health: 6 months duration
- Training program on new health policy: 5 to 7 days every year
- Digitalize application training program: 3 days
- Regular learning from ECHO program

The mid level health providers would be trained in a certificate programme in community health, managed and accredited by IGNOU. The curriculum will enable the MLHP to attain a set of competencies related to public health and primary health care. The curriculum for the certificate in community health course (BPCCHN) in IGNOU includes **(Table 2.6)**:

Table 2.6 Curriculum for the certificate in community health course (BPCCHN) in IGNOU

Course Code	Course Name		Credit
BNS-041	Foundation of Community Health		4
	Block-1	Introduction to Public Health and Epidemiology	
	Block-2	Nutrition	

		Unit-1: Introduction to Nutrition and Nutritional assessment Unit-2: Nutrition during Pregnancy and Lactation Unit-3: Nutrition for Infant, Child, Adolescent and Elderly. Unit-4: Nutritional Deficiencies Disorders and Malnutrition Unit-5: Food Borne Diseases, Food Toxin, Food Safety and Rehabilitation.	
	Block-3	Communicable Diseases and National Health Programme	
	Block-4	Non-Communicable Diseases and National Health Programme Unit-1: Epidemiology of specific Non-communicable diseases Unit-2: Non-communicable Diseases - 1 Unit-3: Non-communicable Diseases - 2 Unit-4: Occupational diseases: Medication Follow-up Care Unit-5: Screening, Management, Prevention and Referral for Mental Health Disorders Unit-6: Care for the elderly	
	Block-5	Communication Management and Supervision Unit-1: Behaviour Change Communication skills and other Soft skills Unit-2: Work management and administration Unit-3: Leadership, Supervision and Monitoring	

		Unit-4: Health Management Information System Unit-5: Financial Management Accounts and Computing Unit-6: Records and reports	
BNS-042	Primary Health Care in Common Conditions		4
	Block-1	Management of Common Conditions and Emergencies including First Aid	
	Block-2	Maternal Health	
	Block-3	Reproductive Health and Adolescent Health	
	Block-4	New Born and Child Health Care	
	Block-5	Overview of Common Surgical Conditions, Referral and follow up care	
	Block-6	Essential Drugs and Equipment	
BNSL-043	Public Health and Primary Health Care skills (Practical Course)		10

In Gujarat, Certificate Course in Community Health (CCCH) is offered by Indian Institute of Public Health Gandhinagar University in coordination with State Institute of Health and Family Welfare, Government of Gujarat. The course includes a module 2 (A) on primary health care in common conditions with following units **(Table 2.7)**;

Table 2.7 Course curriculum for CCCH offered by IIPH

Units	**Topic**
Unit 1	Community Health Nutrition
Unit 2	Communicable Diseases
Unit 3	Non communicable Diseases ● Recognize the burden of NCDs affecting the population ● Determinants of NCDs ● Understand the approaches to tackle this problem and prevention in non-communicable diseases ● Role of urban design and multi-sectoral approaches in

	noncommunicable diseases. ● Discussion on some specific NCD (hypertension, diabetes and cancers) ● Exposure to STEPS
Unit 4	Common Clinical Conditions at Primary Health Care
Unit 5	Essential Drugs

After the completion of 6 month certificate course in community health, CHO is placed in a HWC setting. After the placement, CHO in Gujarat undergoes a 21 days training called Arogya Samanvaya. The topics in the course material includes Ayurvedic Dietetics with following subtopics:

- Ayurvedic properties and actions of various food substances and role of diet in prevention of illness.
- Aahar Kalpana and their role in health and disease management
- Importance of Pathya and Apathya (therapeutic diet) in common diseases.
- Concept of Viruddha Aahar

Methodology

METHODOLOGY

Developing countries are facing nutritional and dietary transition parallel to epidemiological transition, as a result of rapid urbanization, industrialization, economic development and market globalization. With improvement in factors like education and living standards, population in developing countries have higher odds of overweight/ obesity in both urban and rural settings. Concurrent to improved living standards, change in dietary patterns due to expanded food availability and sedentary lifestyle increased diet-related chronic diseases largely among poor population. A proactive preventive approach along with comprehensive policies that deal with various risk factors in a multisectoral manner is essential for overcoming this silent epidemic of non-communicable diseases. Government has launched Ayushman Bharat Programme in 2018 in this direction. CHO, a new cadre introduced under the program is an evolving concept in health care sector and their roles and responsibilities are purely population oriented in public health. However, there is a gap in their curriculum in regard with promoting healthy diet to prevent NCDs at the community level. There are no studies conducted in this aspect and a need is felt to strengthen their curriculum.

Curriculum of CHO's course did include topics to prevent or manage noncommunicable diseases but only as general tips. It's important to provide an in depth information on portion sizes to them. Also, insightful information on the concept and importance of dietary diversity in preventing NCDs was required to be provided. Use of locally available foods for dietary diversity and improving nutrition needed to be discussed with the functionaries.The curriculum included the importance of various foods but did not provide any information on recommended quantities. Moreover, they needed to be sensitized regarding new RDA. It highlighted the need of capacity building of CHO to promote healthy diets at community level to better manage and prevent the silent 'epidemic' of noncommunicable diseases in India.

The present study was planned with broad objective of capacity building of CHOs and ASHA facilitators for promoting healthy diets for NCD prevention under Ayushman Bharat.

The specific objectives of the study were:

- To assess the profile of Community Health Officer (CHO) and ASHA facilitators.
- To assess their knowledge on healthy diets for prevention of NCDs.
- To develop a training module on healthy diets for prevention of NCDs.
- To develop IEC material (Flip Book).
- To impart and enhance knowledge of CHOs and ASHA facilitators on healthy diets for prevention of NCDs.
- To assess their knowledge retention and preparedness to counsel on healthy diets for prevention of NCDs in the community.

ETHICAL APPROVAL

The study was approved by the Department of Medical Ethics Committee (No.IECHR/FCSC/2020/57), The Maharaja Sayajirao University of Baroda, Vadodara.

SELECTION OF THE STUDY AREA

The study was conducted in the Vadodara district of Gujarat.

About the district-Vadodara

Vadodara District, also known as Baroda District, is a district in Gujarat, India. It is located in the eastern section of the state. The district is bordered on the north by Panchmahal district, on the west by Anand and Kheda districts, on the south by Bharuch and Narmada districts, and on the east by Chhota Udaipur. The area is bisected by the Mahi River. The district of Vadodara has a total area of 7,794 km^2. The district has a population of 4,165,626 people in 2011, with 49.6 percent living in cities, 50.4 percent in rural areas, 5.3 percent belonging to scheduled castes, and 27.6 percent belonging to scheduled tribes.

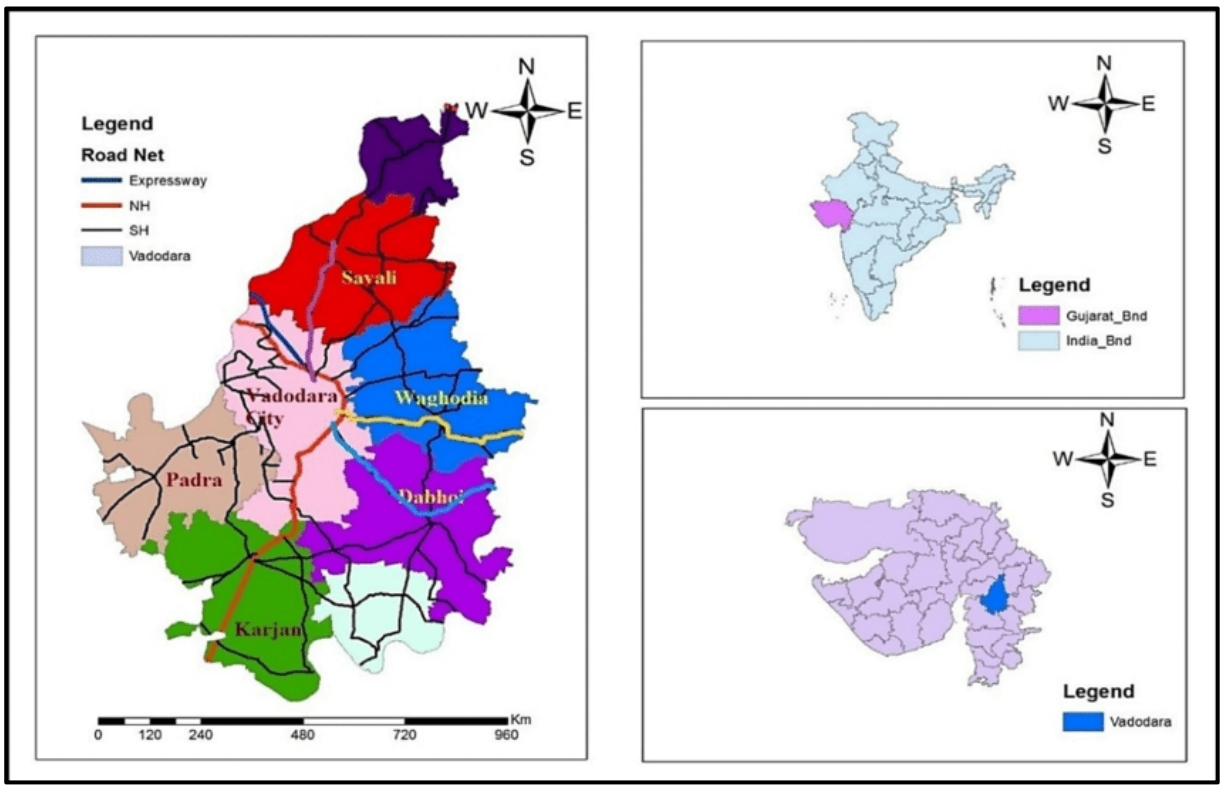
LOCATION OF THE STUDY

It was a cross-sectional study conducted in the Vadodara district of Gujarat. There are 8 talukas in the Vadaodara district namely Karjan, Padra, Dabhoi, Desar, Savli, Sinor, Vadodara and Waghodiya. All the HWCs in these 8 talukas were selected for the study.

Table: Taluka wise HWCs of Vadodara District

S.No.	Name of Taluka	No. Of HWCs functional as per Dec. 2020	No. Of CHOs in position	No. of CHOs position vacant
1	Karjan	9	9	0
2	Padra	10	9	1
3	Dabhoi	10	10	0
4	Desar	8	8	0
5	Savli	14	12	2
6	Sinor	7	7	0
7	Vadodara	17	17	0
8	Waghodiya	7	7	0
	Total	**82**	**79**	**3**

Figure: Location of the study



The study was divided into 3 phases. Detailed study design is presented in **Fig. 3.1**.

Phase I : Baseline data collection of CHOs and ASHA facilitators.

Phase II: Development of training module and IEC material (flip book) and capacity building of CHOs and ASHA facilitators

Phase III: Post data collection on knowledge retention and preparedness to counsel.

Phase I : Baseline data collection of CHOs and ASHA facilitators.

A study was conducted to assess the profile of CHOs and ASHA facilitators along with their knowledge on healthy diets.

Enrollment of CHOs and ASHA facilitators

All the HWC-SC from all the 8 talukas of the district were enrolled for the study. CHOs and ASHA facilitators available in these HWC-SC were enrolled for the study. Necessary permission was obtained from CDHO office to contact THOs and CHOs of the enrolled HWC-SC. A list of all HWC-SC along with appointed CHOs was obtained from the office. CHOs appointed at these HWC-SC who gave their consent and were available during this phase were enrolled for the study along with their respective ASHA facilitators.

Sample size

In this study, 82 HWC-SC with 79 appointed CHOs were enrolled. All the CHOs and ASHA facilitators appointed in these HWC were taken as the sample size. All the CHOs and ASHA facilitators available during the phase were enrolled for data collection.

Following the inclusion and exclusion criteria were followed.

INCLUSION CRITERIA

- All the functionaries (CHOs and ASHA facilitators) available during the data collection phase and ready to enrol for the study were included.

EXCLUSION CRITERIA

- All the functionaries (CHOs and ASHA facilitators) not available during the data collection phase and not ready to enrol for the study were excluded.

Tool for data collection

Data was collected on general information of HWC, CHO's and ASHA facilitator's profile along with their knowledge on healthy diets using a pre-tested semi-structured questionnaire. They were all interviewed by the investigator.

Data collection

All the CHOs and ASHA facilitators of a taluka were called to the taluka health office in batches with THO's permission and questionnaires were filled.

Information on HWC

Data on population covered under HWC, human resource present, infrastructure, wellness activities conducted, CBAC forms filled and population screened pre covid and during covid times, number of diagnosed cases for different NCDs in pre covid and during covid times, information on IT support, available diagnostic tests, registers maintained and available equipments was collected using a pre-tested semi-structured questionnaire. **(Appendix III**)

CHO Profile

A pre-tested semi-structured questionnaire was used to collect data on their educational qualification, category, sex, trainings undergone, health promotion activities conducted along with their job chart. (**Appendix IV**)

ASHA facilitator Profile

A pre-tested semi-structured questionnaire was used to collect data on their educational qualification, trainings undergone, health promotion activities conducted along with their job chart. (**Appendix VI**)

Knowledge of CHOs/ ASHA facilitators on healthy diet

Data on their knowledge on healthy diets was collected using a pre-tested semi-structured questionnaire. Information was collected on concepts like food, nutrition, food groups,balanced diet, healthy diets and its components, RDA, food pyramid, My Plate, dietary diversity, eat right campaign, Aaj se thoda kam, DASH diet and its components, functional foods, glycemic index, use of millets, NCDs and its risk factors, general guidelines to prevent NCDs, recommended daily intake of foods like fruits and vegetables, fats, sugar and salt, topics covered in counseling and available IEC material. (**Appendix V and VII**)

Phase II: Development of training module and IEC material (flip book) and capacity building of CHOs and ASHA facilitators

In this phase the gaps in the knowledge of functionaries were identified after reviewing all the available curriculum modules (IGNOU module and IIPH module). A training module was then developed along with an IEC material (flip book) to train the functionaries for better counseling of population at the community level.

Figure: Developed training module (Appendix VIII)

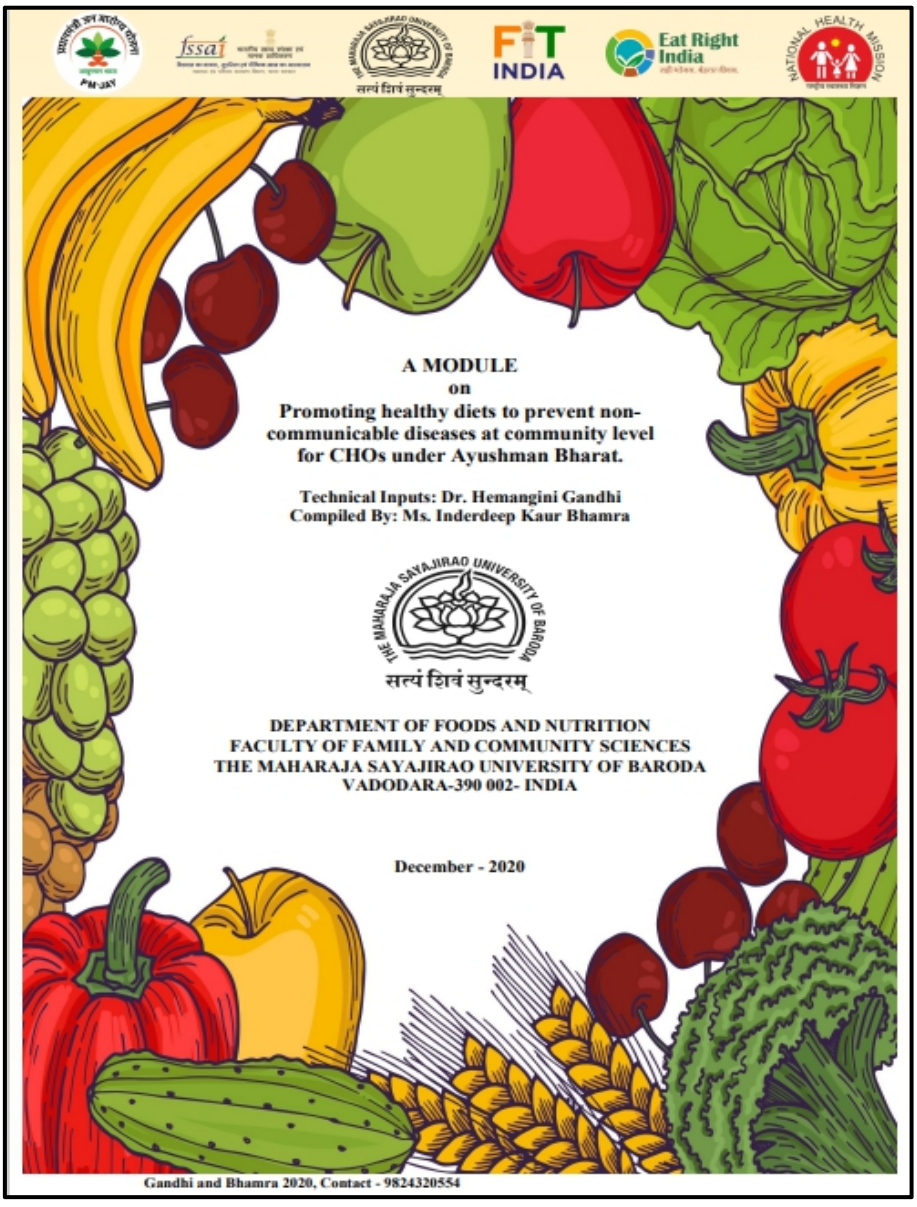


Figure: Developed IEC material (Flip book) (Appendix IX)

However, it was not possible to conduct a physical training due to the involvement of functionaries in screening process and later in the vaccination drive. A soft copy of training module and IEC material (flip book) was shared with the CHOs and discussions were held online in small groups.

Phase III: Post data collection on knowledge retention and preparedness to counsel.

Due to the extensive involvement of functionaries in the screening process and later in the vaccination drive due to the COVID-19 situation this phase could not be conducted.

Table 3.1: Tools and techniques used for the study

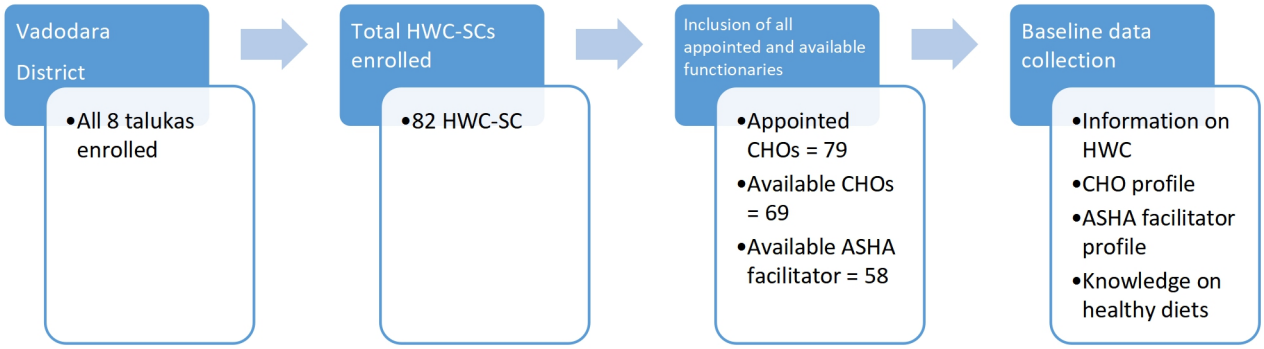
PARAMETERS	TOOLS
General Information on HWCs and existing activities for NCDs at HWCs	Pre-tested Semi-Structured Questionnaire
CHO/ ASHA facilitator's profile	Pre-tested Semi-Structured Questionnaire
Pre post Knowledge on healthy diets to prevent NCDs	Pre-tested Semi-Structured Questionnaire

STATISTICAL ANALYSIS

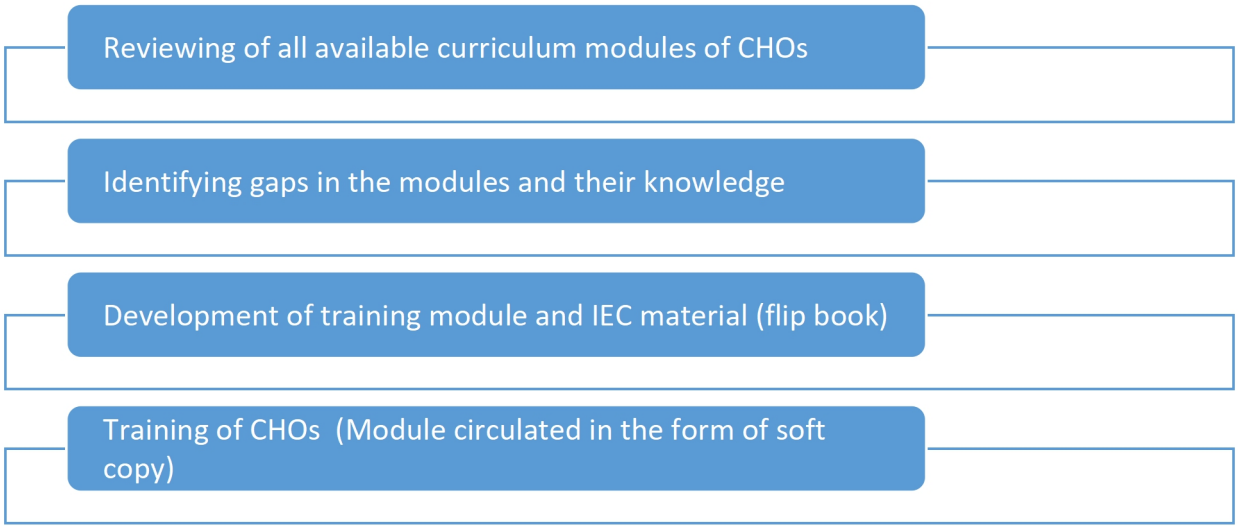
- The data collected was entered and cleaned using Microsoft Excel version 15.
- Data was analyzed using Excel.
- Frequency distribution and the percentage was calculated for all the parameters.

Fig. 3.1: EXPERIMENTAL DESIGN

Phase I : Baseline data collection of CHOs and ASHA facilitators.



Phase II: Development of training module and IEC material (flip book) and capacity building of CHOs and ASHA facilitators



Results and Discussion

RESULTS AND DISCUSSION

Developing countries like India have observed changes in diets and lifestyles over the past decade due to industrialization, urbanization, economic development and market globalization, posing a huge impact on health and nutritional status of populations, increasing the risk of NCDs like hypertension, diabetes and some types of cancer. Rapid expansion in the population based epidemiological evidence along with nutritional transition has clarified that diet plays an important role in preventing and controlling premature deaths due to NCDs. This calls for the proactive involvement of all the stakeholders to bring in the awareness regarding healthy diets and their role in preventing NCDs that is possible through capacity building.

The present study was planned, acknowledging the above fact with a broad objective of capacity building of CHOs and ASHA facilitators for promoting healthy diets for NCD prevention under Ayushman Bharat.

The specific objectives of the study were framed as:

- To assess the profile of Community Health Officer (CHO) and ASHA facilitators.
- To assess their knowledge on healthy diets for prevention of NCDs.
- To develop a training module on healthy diets for prevention of NCDs.
- To develop IEC material (flip book).
- To impart and enhance knowledge of CHOs and ASHA facilitators on healthy diets for prevention of NCDs.
- To assess their knowledge retention and preparedness to counsel on healthy diets for prevention of NCDs in the community.

The findings of the study are presented under the following categories:

- General information on HWCs
- Profile of CHOs
- Knowledge of CHOs on healthy diets to prevent NCDs
- Profile of ASHA facilitators
- Knowledge of ASHA facilitators on healthy diets to prevent NCDs
- Development of training module and IEC material on promoting healthy diet

GENERAL INFORMATION ON HWCs

All the 8 talukas of the Vadodara district were covered in the study. As per the district health office , Vadodara there were a total of 82 HWCs covered, the available CHOs and ASHA facilitators were enrolled and data on their profile and knowledge on healthy diets to prevent NCDs was composed. In total, 79 CHOs were appointed in these HWCs with few positions vacant as presented in **Table 4.1**. CHOs and ASHA facilitators present during the data collection phase were enrolled for the study (69 CHOs and 58 ASHA facilitators). This accounts to 10 CHOs not available during data collection. The availability rate of CHOs is presented in **Table 4.2**, taluka wise, it ranged from 66%-100%. The majority of CHOs not available were due to their duties in Covid centers. Other reasons were transfers to other cities and maternal leaves.

Table 4.1: Taluka wise HWCs of Vadodara District

S.No.	Name of Taluka	No. Of HWCs functional as per Dec. 2020	No. Of CHOs in position	No. of CHOs position vacant
1	Karjan	9	9	0
2	Padra	10	9	1
3	Dabhoi	10	10	0
4	Desar	8	8	0
5	Savli	14	12	2
6	Sinor	7	7	0
7	Vadodara	17	17	0
8	Waghodiya	7	7	0
	Total	**82**	**79**	**3**

Table 4.2: Taluka wise enrollment of the CHOs for the study

S.No.	Taluka	CHOs enrolled (N)	Availability rate (%)
1	Karjan	6	66.67
2	Padra	9	100.00
3	Dabhoi	9	90.00
4	Desar	7	87.5
5	Savli	10	83.33
6	Sinor	6	85.71
7	Vadodara	16	94.12
8	Waghodiya	6	85.71
	Total	**69**	**86.63% (Average)**

All the 69 enrolled HWCs for the study were of Sub-center type, 13 of which were designated as HWC in 2018-19 (18.84%), 31 were designated as HWC in 2019-20 (44.93%) and 25 were designated to be HWC in the year 2020-21 (36.23%). The average population covered per HWC in the Vadodara district is 5306. Infrastructure of a HWC comprised of coloured building, ayushman bharat written in gujarati, 6 logos, availability of signage, display board for 12 services, display of OPD time along with yoga time, an identified yoga space along with the availability of yoga mats, a geriatric opd, waiting area and displayed IEC material.

Wellness activities carried out at the HWC included yoga and meditation. 67 HWCs carried out regular yoga sessions before and during COVID (97.10%) and 56 HWCs conducted meditation sessions before and during COVID (81.16%).

The above information on health and wellness centers is presented in **Table 4.3**.

Table 4.3: Background Information of Health and Wellness Center

Particulars	% (N=69)	n
Type of Facility		
Sub Center	100.00	69
Year of designation as HWC		
2018-2019	18.84	13
2019-2020	44.93	31
2020-2021	36.23	25
Average population covered per HWC	5306	
Infrastructure Details		
Color work done	98.55	68
Ayushman Bharat in Gujarati	100.00	69
6 logos	100.00	69
Signage available	72.46	50
Display board of 12 services	55.07	38
OPD time displayed	56.52	39
Yoga space identified	85.51	59
Yoga time displayed	49.27	34
Yoga mats available	52.17	36
Geriatric OPD	97.10	67
Waiting area	92.75	64
IEC displayed	84.06	58
Wellness Activities carried out at HWCs		
Yoga	97.10	67
Meditation	81.16	56

CHOs from all these HWCs had started the population enumeration for their respective villages with the help of ASHA workers, who are also required to fill the Community Based Assessment Checklist (CBAC). CBAC aims to collect details of all individuals who are 30 years and above, on the risk factors pertaining to diseases like hypertension, diabetes, cancers like oral, breasts and cervical, tuberculosis etc. Individuals with a CBAC score of 4 and above are prioritized to be screened by CHOs.

Table 4.4 presents the average population assessed by all 8 talukas for identifying risk factors for NCDs through CBAC form per average taluka population. The average population assessed during pre COVID times (January-March 2020) was 381.75 whereas the average population assessed during COVID (October-December 2020) was 408.7.

The average population screened for NCDs in pre COVID times (January-March 2020) was 441.33 and the average population screened for NCDs during COVID (October-December 2020) was 617.54 presented per average taluka population, presented in **Table 4.5**.

The monthly performance of the HWC team can be assessed using an indicator of proportion of above 30 years individual screened for NCDs where the team is estimated to achieve 80% screening of individuals over 30 years over a period of one year. According to the census report 2011 any population comprises of 37% people who are of 30 years and above. This was used to estimate the monthly performance of all the CHOs in all the talukas and it was observed that Dabhoi performed the best during COVID times and Waghodiya performed the best during pre-Covid period.

The above information on monthly performance of HWC team is shown in **Table 4.6**.

Table 4.4: Average population assessed for identifying risk factors for NCDs through CBAC forms per average population of the taluka

S.No.	Taluka	January-March 2020	October-December 2020
1	Karjan	338.83	226.00
2	Padra	475.22	876.00
3	Dabhoi	460.00	480.67
4	Desar	567.43	353.43
5	Savli	490.80	210.10
6	Sinor	111.67	421.00
7	Vadodara	384.69	471.44
8	Waghodiya	225.33	215.00
	Mean	**381.75**	**408.70**

Table 4.5: Average population screened for NCDs per average population of the taluka

S.No.	Taluka	January-March 2020	October-December 2020
1	Karjan	154.17	316.67
2	Padra	196.11	686.22
3	Dabhoi	213.67	488.33
4	Desar	1486.00	1720.71
5	Savli	446.89	328.33
6	Sinor	133.50	273.67
7	Vadodara	434.63	574.88
8	Waghodiya	465.67	551.50
	Mean	**441.33**	**617.54**

Table 4.6: Information on monthly performance of HWC team for service utilization (Population screened for NCDs)

S.No.	Taluka	CHO meeting targets from Jan-March 2020		CHO meeting targets from Oct-Dec 2020	
		%	n	%	n
1	Karjan (N=6)	16.67	1	66.66	4
2	Padra (N=9)	11.11	1	11.11	1
3	Dabhoi (N=9)	33.33	3	77.77	7
4	Desar (N=7)	28.57	2	71.43	5
5	Savli (N=10)	20.00	2	20.00	2
6	Sinor (N=6)	16.67	1	16.67	1
7	Vadodara (N=16)	31.25	5	31.25	5
8	Waghodiya (N=6)	50.00	3	66.66	4

Table 4.7 presents information on average number of NCD cases in population 30 years and above in 8 talukas of Vadodara district. The highest number of hypertension cases were observed in Karjan while lowest number were observed in Sinor in pre-Covid times. The number of hypertension cases were the highest in Sinor and lowest in Dabhoi during the covid. Savli had the highest number of diabetes cases in pre-covid times while Sinor had the lowest. During covid the highest number of diabetes cases were observed in Karjan and Padra with the lowest number in Dabhoi and Vadodara. Number of oral cancer cases were observed to be highest in Padra and Desar during covid. Overweight/ Obesity cases were found to be highest in Vadodara in pre-covid times while it was the highest in Padra during covid.

Table 4.7: Information on average number of NCD cases in population 30 years and above

S No.	Taluka	Hypertension		Diabetes		Oral Cancer		Overweight/ Obesity	
		Pre-Covid	During Covid	Pre-Covid	During Covid	Pre-Covid	During Covid	Pre-Covid	During Covid
1	Karjan	70	68	41	39	0	0	14	14
2	Padra	12	54	7	39	0	1	10	23
3	Dabhoi	16	3	10	8	0	0	7	16
4	Desar	6	36	3	17	0	1	2	2
5	Savli	57	50	44	37	0	0	11	1
6	Sinor	2	78	1	34	0	0	9	1
7	Vadodara	24	9	15	8	0	0	17	7
8	Waghodiya	15	39	5	18	0	0	5	2

64 out of 69 HWCs had all the drugs available as per the essential drug list (92.75%). All the FHWs working in the HWC had smart phones whereas CHOs from 56 HWCs (81.16%) and ASHAs of 48 HWCs (69.56%) had smart phones with them. Internet connectivity was available only in 41 HWCs (59.42%) which is necessary as the data has to be entered online on Techo+ application. All the HWC had maintained their OPD, screening, attendance, gram sanjeevani meetings and wellness activities conducted registers.

Table 4.8 depicts that all 69 HWCs had 8 diagnostic tests available along with the urine pregnancy kit. It also shows how many HWCs had essential equipments like glucometer, BP instrument, autoclave, slide box, hemoglobinometer, stethoscope,

snells vission chart, dental probe, stadiometer, foetoscope, MUAC tape, watch, microscope, different weighing scales and semiautoanalyser available at the center.

Table 4.8: Percentage of HWCs where diagnostic tests and equipments are available

Particulars	% (N=69)	n
8 diagnostic tests available at HWC	100.00	69
Equipments available		
Glucometer	94.20	65
BP instrument		
Mercury	94.20	65
Digital	72.46	50
Autoclave/ Sterilizer	55.07	38
Slide box	79.71	55
Hemoglobinometer	91.30	63
Stethoscope	95.65	66
Snells Vision Chart	62.32	43
Dental Probe	49.28	34
Urine Pregnancy kit	100.00	69
Stadiometer	84.06	58
Foetoscope	89.86	62
MUAC tape	88.41	61
Watch	76.81	53
Microscope	27.54	19
Weighing scale		
Adult	94.20	65
Infant	94.20	65
Baby hanging type	84.06	58
Semiautoanalyser	17.39	12

HIGHLIGHTS

- All the HWCs enrolled were of Sub Center type.
- Average population covered per HWC was 5306.
- Majority of the HWC carried out wellness activities like yoga (97.1%) and meditation (81.16%).
- Average population screened for NCDs was 441.33 per average population in pre-covid times (January- March 2020) and 617.54 per average population during covid (October-December 2020).
- Karjan taluka had relatively the highest cases of NCDs including hypertension, diabetes and overweight/ obesity as reported by the CHOs.

PROFILE OF CHOs

Community Health Officers (CHOs) are a new cadre of functionary under Ayushman Bharat that lead an effective primary health care team in a sub center heath and wellness center. Out of 69 CHOs enrolled for the study 56 were females (81.16%) and 13 were males (18.84%). Majority of the CHOs belonged to general category (55.07%). 39 CHOs had a diploma in nursing (55.07%) followed by 18 CHOs who had completed BAMS (26.09%) and remaining 12 CHOs had a bachelor's of science degree in nursing (17.39%). 37 CHOs had a working experience of more than a year as a CHO (53.62%) whereas 32 CHOs had a working experience of less than a year as a CHO (46.38%).

This mid level health provider (CHO) have to be trained in a 6 months certificate course in community health and majority of them have completed their course from government medical colleges (62.32%), followed by SIHFW (24.64%). The module used by all the CHOs for their course was IIPH module.

66 of them have received a training for population based screening, prevention and management of NCDs (95.65%). The key aspects of the training included population screening, population enumeration, reviewing CBAC forms, referring patients for further treatment, CPHC care, yoga activities, supportive supervision, follow ups of NCD patients, risk factors of NCDs and role of nutrition and lifestyle modification in NCDs. 34 of them have received the arogya samanvaya training (49.28%) with key aspects like ayurvedic treatments and procedures, use of herbs to relief symptoms and boost immunity, yoga, meditation and concepts of nutrition like dincharya and rutucharya along with doshas.

Out of 69, 41 CHOs were aware about the Jan Arogya Samities at HWCs (59.42%) that serves as an institutional platform for community participation. 65 CHOs (94.20%) conducted health promotion activities that helps in promoting health and preventing diseases in larger groups without focusing only on the at risk population. The activities conducted by the CHOs include screening of NCDs, treating NCDs, mobile screening 'Dhanvantri Rath', yoga, meditation , follow ups of patients and

sensitizing community on different government schemes and programs along with educating them for lifestyle modifications and healthy eating habits.

The above information on the profile of CHOs is presented in **Table 4.9**.

Role and Responsibilities of CHOs at HWC

Table 4.10 highlights the roles and responsibilities of a CHO at HWC. Several activities are conducted by CHO at HWC and at community level throughout the week. OPD is conducted daily at all HWCs. Activities like geriatric group activities, mamta diwas, ANC clinic, ANC, PNC visits, adolescent group activities, anganwadi visits and HBNC visits are conducted weekly. 48 CHOs conduct NCD screening and NCD follow ups weekly (69.57%) while 21 CHOs conduct these activities twice a week (30.43%). 29 CHOs (42.03%) conduct yoga 3-4 times a week, 18 CHOs (26.09%) conduct yoga daily, 12 CHOs (17.39%) conducts it twice a week and 10 CHOs (14.19%) conduct it weekly. Focus group discussions (FGD) were also conducted by CHOs for more community participation. 35 CHOs conduct FGD 3-4 times a week (50.72%), 23 CHOs (33.33%) conduct this activity twice a week while 11 CHOs (15.94%) conduct FGD weekly.

It also highlights the meetings conducted by CHOs. Staff meeting is conducted weekly at HWC where all the tasks taken place through out the week are reviewed and activities for next week are planned. A review meeting is also held weekly at PHC level where all the issues are reviewed. A monthly gram sanjeevani meeting is also conducted by all the CHOs in all the villages that pertains community participation.

Table 4.9: Profile of CHOs

Particulars	% (N=69)	n
Sex		
Male	18.84	13
Female	81.16	56
Category		
SC	13.04	9
ST	5.35	3
OBC	27.54	19
General	55.07	38
Educational Qualification		
BAMS	26.09	18
BSc. Nursing	17.39	12
Diploma in Nursing (GNM)	56.52	39
Years of working experience as CHO		
< 1 year	46.38	32
≥ 1 year	53.62	37
Certificate course completed from		
Government Medical College	62.32	43
Private Medical College	5.79	4
SIHFW	24.64	17
Deepak Foundation	7.25	5
Training received for population based screening, prevention and management of NCDs		
Yes	95.65	66
No	4.35	3
Key aspects of the training **(N=66)**		
Job related	100.00	66
Yoga related	21.21	14
Arogya Samanvaya training received		
Yes	49.28	34
No	50.72	35
Aware about Jan Arogya Samitis at HWC		
Yes	59.42	41
No	40.58	28
Health promotion activities conducted by CHOs		
Yes	94.20	65
No	5.80	4
Activities conducted **(N=65)**		
Screening for NCDs	100.00	65
Treating NCDs	100.00	65
Sensitizing community	73.91	51
Mobile screening	100.00	65
Yoga and meditation	100.00	65
Follow ups	100.00	65

Table 4.10: Role and Responsibilities of CHOs at HWC

Particulars	Daily (N=69)		Weekly (N=69)		Twice a week (N=69)		3-4 times a week (N=69)		Monthly (N=69)	
	%	n	%	n	%	n	%	n	%	n
Activities conducted										
OPD	100.00	69	-	-	-	-	-	-	-	-
NCD screening	-	-	69.57	48	30.43	21	-	-	-	-
NCD follow ups	-	-	69.57	48	30.43	21	-	-	-	-
Yoga	26.09	18	14.49	10	17.39	12	-	-	-	-
Geriatric group activities	-	-	100.00	69	-	-	-	-	-	-
Mamta Diwas	-	-	100.00	69	-	-	-	-	-	-
ANC clinic	-	-	100.00	69	-	-	-	-	-	-
ANC, PNC visits	-	-	100.00	69	-	-	-	-	-	-
Adolescent group activities	-	-	100.00	69	-	-	-	-	-	-
FGD	-	-	15.94	11	33.33	23	50.72	35	-	-
Anganwadi visit	-	-	100.00	69	-	-	-	-	-	-
HBNC visit	-	-	100.00	69	-	-	-	-	-	-
Meetings Conducted										
Staff meeting	-	-	100.00	69	-	-	-	-	-	-
Review meeting	-	-	100.00	69	-	-	-	-	-	-
Gram Sanjeevani meeting	-	-	-	-	-	-	-	-	100.00	69

KNOWLEDGE OF CHOs ON HEALTHY DIETS TO PREVENT NCDs

Healthy diets play a very important role in preventing NCDs and therefore we assessed the knowledge of CHOs on healthy diets. 21 out of 69 CHOs answered correctly as to what is food i.e. anything that can be eaten or drunk (30.43%) while 3 of the CHOs responded they do not know. 29 CHOs (42.03%) responded that all the 5 nutrients - carbohydrates, proteins, fats, vitamins and minerals are the major nutrients required by our body, 16 CHOs (23.19%) responded that only macro nutrients - carbohydrates, proteins and fats are the major nutrients required by our body, 2 CHOs (2.90%) responded that micro nutrients - vitamins and minerals are the major nutrients required by our body while 22 CHOs (31.88%) responded randomly to any two or three nutrients categorized under any other. The majority of CHOs (94.20%) answered correctly to what is nutrition - 'a process of ingestion, digestion, absorption, assimilation of nutrients and removal of waste products from the body whereas 4 CHOs (5.80%) responded that they do not know.

67 CHOs (97.1%) were aware about the different food groups based on their functions and on the food items included. Out of these 67, 57 responded to energy giving foods (85.07%), 52 responded to body building foods (77.61%) and 46 responded to protective foods (68.66%) as food group categorized based on their function. Similarly, out of 67, 53 CHOs responded to cereal grain products (79.10%), 55 responded to pulses and legumes (82.09%), 50 responded to leafy vegetables (74.63%), 33 responded to other vegetables (49.25%), 47 responded to fruits (70.15%), 50 responded to milk and milk products (74.63%), 43 responded to meat, fish and poultry (64.18%), 36 responded to fats, nuts and oilseeds (53.73%), 32 responded sugar and jaggery (47.76%) while only 22 responded to other miscellaneous foods (32.83%) as a food group categorized under food groups based on the food items included.

Only 16 CHOs were aware about the FANTA classification of foods (23.19%). Out of these 16 CHOs, 15 responded to grains, roots and tubers (93.75%), 12 responded to pulses (75%), 14 responded to nuts and seeds (87.5%), 13 responded to dairy (81.25%), 15 responded to meat, poulty and fish (93.75%), 13 responded to eggs (81.25%), 12 responded to dark green leafy vegetables (75%), 13 responded to other

vitamin A rich fruits and vegetables (81.25%) and 11 responded to other vegetables and other fruits (68.75%) as a food group under FANTA classification.

The majority of CHOs were aware about healthy diets and balanced diets (92.75% and 94.20% respectively) although only 13 CHOs (18.84%) were able to correctly answer all the components of healthy diets; diet which includes fruits, vegetables, legumes, nuts and whole grains, at least 400g of fruits and vegetables per day, <5% of total energy intake from free sugars, <30% of total energy intake from fats and <5g of salt per day. 73.91% CHOs answered the components partially correct where they could only respond to one component that is a diet that includes fruits, vegetables, legumes, nuts and whole grains whereas 5 CHOs (7.25%) responded to the question as they do not know.

The above information on healthy diets in presented in **Table 4.11**.

Table 4.11: Knowledge of CHOs on healthy diets

Particulars	Pre knowledge	
	% (N=69)	n
Correct understanding of term food		
Correct answer	30.43	21
Don't know	4.35	3
Major nutrients required by our body		
All 5 nutrients	42.03	29
Only macro nutrients	23.19	16
Only micro nutrients	2.90	2
Any other	31.88	22
Correct understanding of term nutrition		
Correct answer	94.20	65
Don't know	5.80	4
Awareness about food groups		
Yes	97.10	67
No	2.90	2
Food groups based on their functions (N=67)		
Energy giving foods	85.07	57
Body building foods	77.61	52
Protective foods	68.66	46
Food groups based on food items included (N=67)		
Cereal grain products	79.10	53
Pulses and legumes	82.09	55
Leafy vegetables	74.63	50
Other vegetables	49.25	33
Fruits	70.15	47
Milk and milk products	74.63	50
Meat, fish and poultry	64.18	43
Fats, nuts and oilseeds	53.73	36
Sugar and jaggery	47.76	32
Other miscellaneous foods	32.83	22
Awareness about FANTA classification		
Yes	23.19	16
No	76.81	53
Food groups in FANTA classification (N=16)		
Grains, roots and tubers	93.75	15
Pulses	75.00	12
Nuts and seeds	87.50	14
Dairy	81.25	13
Meat, poultry and fish	93.75	15
Eggs	81.25	13
Dark green leafy vegetables	75.00	12
Other vitamin A rich fruits and vegetables	81.25	13
Other vegetables	68.75	11
Other fruits	68.75	11

Concept of healthy diets		
Yes	92.75	64
No	7.25	5
Concept of Balanced Diet		
Correct answer	94.20	65
Don't know	1.45	1
Components of healthy diets		
Correct answer	18.84	13
Partially correct answer	73.91	51
Don't know	7.25	5

Knowledge of CHOs on concepts related to healthy diets

Knowledge of CHOs on concepts related to healthy diets like RDA, food pyramid, my plate, energy provided by different macro nutrients, DASH diet and calorie restricted diet was assessed. 48 CHOs (69.57%) were not aware of the concept of RDA, and 21 CHOs were aware about the concept (30.43%). Although only 9 CHOs (13.04%) could correctly respond to what is RDA i.e. 'estimates of nutrients to be consumed daily to meet the requirements of all individuals in a given population taking into account their physical activity'. 48 CHOs responded to as do not know to what is RDA (69.57%) and rest answered that it stands for recommended dietary allowance but couldn't explain it. 10 CHOs responded that they were aware about the NIN dietary guidelines (14.49%) but none could answer what the guidelines were correctly.

The majority of CHOs (56.52%) were aware about the concept of food pyramid, though only 6 CHOs (8.69%) could correctly answer to what is food pyramid - 'pictorial representation of different food groups and the quantity in which they should be consumed'. 10 CHOs (14.49%) gave a partially correct answer where they were aware about food pyramid being a pictorial representation of different food groups but couldn't name all the levels according to their quantity to be consumed. 30 CHOs responded that they do not know (43.48%). The majority of CHOs (59.42%) were not aware about the concept of my plate. Only 4 CHOs (5.80%) could correctly answer to what is my plate - 'Plate representing proportions of different food groups for meeting calorie needs' whereas 41 CHOs (59.42%) responded that they do not know.

41 CHOs (59.42%) were aware about the amount of energy provided by 1 g of carbohydrate and fats whereas 37 CHOs (53.26%) correctly answer to the amount of energy provided by 1 g of protein.

All the CHOs were aware about the term NCDs. On asking if they are familiar with different NCD terms all 69 of them knew about hypertension and diabetes, 62 were aware about cancer (89.85%), 23 were aware of cardiovascular diseases (33.33%), 14 knew about stroke (20.29%), 4 were aware about thyroid, COPD, ischemic heart disease (5.80%) and 11 were aware of chronic kidney disease (15.94%).

66 CHOs (95.65%) were aware about the DASH diet but not all of them could answer all the components of DASH diet, 41 CHOs responded to reduced sodium intake (62.12%), 36 responded to encourages intake of whole grains, fruits and vegetables and encourages low-fat dairy products (54.54%) and 35 responded to restricted intake of red meat and fats (53.03%) as the components of DASH diet. 63 CHOs (91.30%) recommended DASH diet to their hypertensive patients as a dietary approach to stop hypertension.

65 CHOs recommended calorie restricted diet to their patients (94.20%) but only 32 CHOs (46.38%) could correctly answer to which patients should be recommended a calorie restricted diet - ‘overweight and obese patients’.

The above information on knowledge of CHOs on concepts related to healthy diets is presented in **Table 4.12**.

Table 4.12: Knowledge on concepts related to healthy diets

Particulars	Pre knowledge	
	% (N=69)	n
Aware about concept of RDA		
Yes	30.43	21
No	69.57	48
Knowledge on what is RDA		
Correct answer	13.04	9
Don't know	69.57	48
Aware about dietary guidelines by NIN		
Yes	14.49	10
No	85.51	59
Aware about concept of food pyramid		
Yes	56.52	39
No	43.48	30
Knowledge on what is food pyramid		
Correct answer	8.69	6
Partially correct answer	14.49	10
Don't know	43.48	30
Aware about concept of My Plate		
Yes	40.58	28
No	59.42	41
Knowledge on what is My Plate		
Correct answer	5.80	4
Don't know	59.42	41
Knowledge on how much energy is provided by 1 g of:		
Carbohydrate		
Correct answer	59.42	41
Don't know	30.43	21
Protein		
Correct answer	53.62	37
Don't know	28.99	20
Fats		
Correct answer	59.42	41
Don't know	26.09	18
Awareness about the term NCD		
Yes	100.00	69
No	0.00	0
Familiar with NCD terms		
Hypertension	100.00	69
Diabetes	100.00	69
Cancer	89.85	62
Cardiovascular Diseases	33.33	23
Stroke	20.29	14
Thyroid	5.80	4
COPD	5.80	4
Ischemic Heart Disease	5.80	4
Chronic Kidney Disease	15.94	11

Aware about DASH diet		
Yes	95.65	66
No	4.35	3
Components of DASH diet (N=66)		
Reduced sodium intake	62.12	41
Encourages intake of whole grains, fruits and vegetables	54.54	36
Encourages low-fat dairy products	54.54	36
Restricts intake of red meat and fats	53.03	35
Patients counseled regarding DASH diet		
Yes	91.30	63
No	8.70	6
Calorie restricted diet recommended to patients		
Yes	94.20	65
No	5.80	4
Which patients are recommended a calorie restricted diet		
Correct answer	46.38	32
Don't know	5.80	4

Knowledge on FSSAI concepts on healthy diets

Table 4.13 depicts the knowledge of CHOs on FSSAI concepts of healthy diets. 30 CHOs (43.48%) were aware about the concept of dietary diversity and recommended dietary diversity to their patients. However only 15 CHOs (21.74%) could correctly respond to what is dietary diversity - 'variety of foods and food groups in the diet ensuring adequate intake of essential nutrients'. 39 CHOs responded that they do not know (56.62%). 35 CHOs (50.72%) were aware about the eat right campaign but only 2 CHOs (2.90%) were able to respond to what is eat right campaign - 'ensures safe, healthy and sustainable food for all'. The majority of CHOs were aware about the tagline ' Aaj se thoda kam' (76.81%) but only 48 CHOs (90.57%) answered correctly that it emphases on reducing all fat, salt and sugar.

Table 4.13: Knowledge on FSSAI concepts on healthy diets

Particulars	Pre knowledge	
	% (N=69)	n
Aware about concept of dietary diversity		
Yes	43.48	30
No	56.52	39
Knowledge on what is dietary diversity		
Correct answer	21.74	15
Don't know	56.62	39
Dietary diversity recommended to patients		
Yes	43.48	30
No	56.52	39
Aware about the eat right campaign		
Yes	50.72	35
No	49.28	34
Knowledge on what is eat right campaign		
Correct answer	2.90	2
Don't know	49.28	34
Aware about the tagline 'Aaj se thoda kam'		
Yes	76.81	53
No	23.19	16
'Aaj se thoda kam' puts emphasis on reducing (N=53)		
Fat	1.89	1
Salt	3.77	2
Sugar	3.77	2
All	90.57	48

Knowledge of CHOs on functional foods, millets and glycemic index

Table 4.14 shows the data on knowledge of CHOs on functional foods, millets and glycemic index. 41 CHOs (59.42%) were aware of the term functional foods, though only 35 CHOs (50.72%) recommended them to their patients. Only 3 CHOs (4.35%) were able to correctly answer a few functional foods like fortified juices and fenugreek seeds. 45 CHOs (65.22%) counseled their patients to increase intake of millets in their diet, however only 33 CHOs (73.33%) of them knew about different millets. 50 CHOs (72.46%) were aware about the concept of glycemic index and 49 of them (98.00%) recommended their diabetic patients to take low glycemic index foods.

Table 4.14: Knowledge on functional foods, millets and glycemic index

Particulars	Pre knowledge	
	% (N=69)	n
Aware of the term functional foods		
Yes	59.42	41
No	40.58	28
Knowledge on different functional foods		
Correct answer	4.35	3
Don't know	49.28	34
Functional foods recommended to patients		
Yes	50.72	35
No	8.70	6
Are patients counseled to increase intake of millets in their diet		
Yes	65.22	45
No	34.78	24
Awareness about different millets (N=45)		
Yes	73.33	33
No	26.66	12
Aware of the concept of glycemic index		
Yes	72.46	50
No	27.54	19
Are diabetic patients recommended to take low glycemic index foods (N=50)		
Yes	98.00	49
No	2.00	1

Knowledge of CHOs on prevention of NCDs and healthy eating

Table 4.15 shows CHOs knowledge on various risk factors of NCDs and general guidelines for NCD prevention and dietary tips. All the CHOs considered tobacco use, unhealthy diets and physical inactivity as the risk factors of NCDs. However 68 CHOs (98.55%) considered alcohol consumption as a risk factor of NCD and 60 CHOs (86.96%) considered low consumption of fruits and vegetables as a risk factor of NCDs. All the CHOs considered that diet plays an important role in preventing NCDs. As a response to general guidelines to be followed to prevent NCDs, 66 CHOs (95.65%) responded to consumption of healthy diet, 65 CHOs (94.20%) responded to increase physical activity, 61 CHOs (88.41%) responded to avoid tobacco use, 59 CHOs (85.51%) responded to avoid alcohol consumption and 58 CHOs (84.06%) responded to stress management. As a response to general dietary guidelines to be followed by all NCD patients, highest number of CHOs (94.20%) responded to avoid

salty foods/ packed foods/ processed foods followed by 62 CHOs (89.86%) who responded to reduce consumption of sugar rich foods and the least number of CHOs responded to use of mixture of vegetable oils (66.66%) followed by eat whole fruits and restrict intake of red meat and consume lean meat (69.57%).

Table 4.15: Knowledge on prevention of NCDs and Healthy Eating

Particulars	Pre knowledge	
	% (N=69)	n
Risk factors of NCDs		
Alcohol consumption	98.55	68
Tobacco use	100.00	69
Unhealthy diets	100.00	69
Low consumption of fruits and vegetables	86.96	60
Physical inactivity	100.00	69
Diet plays an important role in preventing NCDs		
Yes	100.00	69
No	0.00	0
General guidelines for NCD prevention includes		
Avoid tobacco use	88.41	61
Avoid alcohol consumption	85.51	59
Increase physical activity	94.20	65
Consumption of healthy diets	95.65	66
Stress management	84.06	58
General dietary tips given to all NCD patients		
Consume a variety of fresh, seasonal and local fruits and vegetables	88.41	61
Eat whole grains and pulses	81.16	56
Avoid eating fried foods and bakery items.	84.06	58
Include foods from all food groups.	76.81	53
Eat whole fruits.	69.57	48
Avoid salty foods/ packed foods/ processed foods	94.20	65
Reduce consumption of sugar rich foods	89.86	62
Restrict intake of red meat and consume lean meat	69.57	48
Use mixture of vegetable oils	66.66	46
Drink plenty of water (8-10 glasses) daily.	85.51	59

Knowledge of CHOs on recommended daily intake of different foods

Table 4.16 presents the data on knowledge of CHOs on recommended daily intake of different foods. 60 CHOs (89.96%) said were aware of the recommended daily intake of fruits and vegetables but only 33 CHOs out of them (55.00%) responded correctly to the recommeneded fruit and vegetable intake i.e. 400g. 59 CHOs (85.51%) said were aware of the recommended daily intake of fat/oil but only 5 CHOs out of them (8.47%) responded correctly to the recommended fat/ oil intake which is 25-30g. 62 CHOs (89.86%) said were aware of the daily recommended intake of sugar but only 11 CHOs out of them (17.74%) were able to respond correctly to the recommended daily sugar intake which is 25 g. 65 CHOs (94.20%) said they were aware of the daily recommended intake of salt but only 39 of them (60.00%) could correctly respond to the recommended daily salt intake which is <5 g/day.

Information on counseling and IEC material

Table 4.17 presents that all the CHOs counsel their patients on how to prevent NCDs. Topics covered by CHOs during counseling were majorly increase physical activity (97.1%), low salt consumption (94.2%) and avoid tobacco consumption (89.86%). However only 53 CHOs (76.81%) covered topic of adequate consumption of fruits and vegetables during counseling. The patients are majorly counseled in both groups and individually (91.3%). Majority of CHOs (76.81%) had IEC material with them for counseling patients on topics majorly related to NCDs (symptoms, self assessment, risk factors) (71.01%), physical activity (40.58%) and diet (36.23%).

Table 4.16: Knowledge on recommended daily intake of different foods

Recommended daily intake of foods	Pre knowledge	
	% (=69)	n
Aware of recommended daily fruit and vegetable intake		
Yes	86.96	60
No	13.04	9
Recommended intake of fruits and vegetables (N=60)		
200g	25.00	15
300g	13.33	8
400g	55.00	33
500g	6.66	4
Aware of recommended daily fat/oil intake		
Yes	85.51	59
No	14.49	10
Recommended intake of fat/oils (N=59)		
<15g	32.20	19
15-20g	38.98	23
20-25g	20.34	12
25-30g	8.47	5
Aware of recommended daily sugar intake		
Yes	89.86	62
No	10.14	7
Recommended intake of sugar (N=62)		
15g	46.77	29
20g	29.03	18
25g	17.74	11
30g	6.45	4
Aware of recommended daily salt intake		
Yes	94.20	65
No	5.80	4
Recommended intake of salt (N=65)		
<5g/day	60.00	39
5g/day	38.46	25
>5g/day	1.54	1

Table 4.17: Information on counseling and IEC material

Particulars	Pre knowledge	
	% (N=69)	n
Is population counseled on how to prevent NCDs		
Yes	100.00	69
No	0.00	0
Topics covered during counseling		
Low salt consumption	94.20	65
Adequate consumption of fruits and vegetables	76.81	53
Avoid tobacco consumption	89.86	62
Increase physical activity	97.10	67
Reduction of alcohol consumption	84.06	58
Yoga	28.99	20
Meditation	13.04	9
How are patients counseled		
Individually	5.80	4
In groups	2.90	2
Both	91.30	63
Any IEC material available for counseling		
Yes	76.81	53
No	23.19	16
IEC material available on topics (N=53)		
NCD related	71.01	49
Diet related	36.23	25
Physical activity related	40.58	28
Traditional foods	1.45	1
Alcohol and tobacco related	8.70	6
Government scheme related	11.59	8
COVID related	4.35	3

Table 4.18 shows CHOs knowledge on the basis of their basic educational qualification. It was observed that there is a need of a uniform curriculum to be implemented at the course level to make them aware about healthy diets and implement it at field level.

Table 4.18: CHOs knowledge on the basis of basic Educational Qualification

Educational Qualification	Frequency of CHOs aware about terms and concepts related to healthy diet												
	Nutrition	Food groups based on their functions	Food groups based on the food items	Healthy Diet	Components of healthy diet	RDA	Food Pyramid	My Plate	Dietary Diversity	Full Form of DASH diet	Components of DASH diet	Functional Foods	Glycemic Index of foods
	%(n)	%(n)	%(n)	%(n)	%(n)	%(n)	%(n)	%(n)	%(n)	%(n)	%(n)	%(n)	%(n)
BAMS (N=18)	100 (18)	38.89 (7)	38.89 (7)	88.89 (16)	27.78 (5)	16.67 (3)	27.78 (5)	5.56 (1)	11.12 (2)	100 (18)	66.67 (12)	61.12 (11)	83.34 (15)
B.Sc. Nursing (N=12)	61.12 (11)	50 (6)	25 (3)	100 (12)	16.67 (2)	25 (3)	41.67 (5)	8.34 (1)	8.34 (1)	83.34 (10)	41.67 (5)	66.67 (8)	75 (9)
Diploma in Nursing (GNM) (N=39)	92.31 (36)	58.97 (23)	28.21 (11)	92.31 (36)	15.38 (6)	7.69 (3)	15.38 (6)	5.13 (2)	12.82 (5)	97.44 (38)	43.59 (17)	56.41 (22)	66.67 (26)

HIGHLIGHTS

- 81.16% CHOs were females and 18.84% were males.
- 55.07% CHOs belonged to general category, 27.54% were from OBC, 13.04 were from SC and 4.35% were from ST.
- 73.91% CHOs had a degree in nursing (56.52% had a diploma and 17.39% had a bachelors degree) and 26.09% had a degree in ayurveda (BAMS).
- 94.20% CHOs conducted health promotion activities including screening of NCDs, treating NCDs, sensitizing community, mobile screening, yoga, meditation and follow ups.
- Majority of the CHOs were aware of the concepts like nutrition, food groups, balanced diets, calorie restricted diet, NCDs, 'Aaj se thoda kam' and glycemic index.
- 92.75% CHOs were aware about the concept of healthy diets, however only 18.84% were aware about all the components of healthy diet.
- 95.65% CHOs were aware about the DASH diet, however only a few were aware about all its components.
- There was a need to strengthen their knowledge on concepts like FANTA classification, dietary diversity, RDA, food pyramid, My Plate, eat right campaign, functional foods, use of millets and indigenous foods and recommended daily intakes of foods like fruits and vegetables, fats, sugar and salt.
- All CHOs were aware about different risk factors of NCDs, however only 86.96% CHOs considered low consumption of fruits and vegetables as a risk factor.
- 76.81% CHOs counseled the community on adequate consumption of fruits and vegetables to prevent NCDs.
- There is a need of a uniform curriculum to be implemented at the course level to make them aware about healthy diets and implement it at field level.

PROFILE OF ASHA FACILITATOR

ASHA facilitator is an important cadre of functionary that needs to be trained on healthy diets as they work in near proximity with the community and ASHA workers. 32 ASHA facilitators enrolled for this study had completed their study upto higher secondary (55.17%), 13 ASHA facilitators were graduate (22.41%), 11 completed their study upto secondary level (18.97%) and 2 were post graduate (3.45%). Average number of ASHAs monitored by each ASHA facilitator is 13 and the average years of working experience with each ASHA facilitator is 6 years.

The majority of ASHA facilitators (86.21%) had received a training to work as ASHA facilitator and the aspects included in the training were knowledge on ASHA's work profile including ANC, PNC care, HBNC, HBYC care, immunization, nutrition for pregnant and lactating mothers, SAM and MAM child care and survey for anti-larvae activity and diseases like leprosy, HIV, TB etc. Along with supportive supervision. 12 ASHA facilitators (20.69%) had received training in population based screening, prevention and management of NCDs including aspects like knowledge on common NCDs, screening of population and filling of CBAC form.

The majority of ASHA facilitators (53.45%) had received training on counseling patients for healthy diets including aspects like healthy diets for pregnant and lactating mothers, infants, adolescents, balanced diet, including fruits, vegetables and legumes in diet and eating home cooked meals. 15 ASHA facilitators (25.86%) had a module on diet counselling including topics like diet in ANC and PNC care, diet for infants, diet for adolescents, diet for SAM child and including fruits, vegetables and legumes in diet.

The above information is presented as background information in **Table 4.19**.

Table 4.19: Background Information

Particular	% (N=58)	n
Educational Qualification		
Secondary	18.97	11
Higher secondary	55.17	32
Graduate	22.41	13
Post graduate	3.45	2
Average number of ASHAs to be monitored	13	
Training received to work as ASHA facilitator		
Yes	86.21	50
No	13.79	8
Topics included in the training (N=50)		
Supportive supervision	24.00	12
Knowledge on ASHA's work profile	86.00	43
Training received in population based screening, prevention and management of NCDs		
Yes	20.69	12
No	79.31	46
Key aspects of the training (N=12)		
Knowledge on common NCDs	100.00	12
Screening of population	33.33	4
CBAC form	33.33	4
Training received on counseling patients for healthy diets		
Yes	53.45	31
No	46.55	27
Key aspects of the training (N=31)		
Eat home cooked food	3.23	1
Include fruits, vegetables and legumes in diet	9.68	3
Balanced diet	22.58	7
Healthy diets for Pregnant and lactating mothers	74.19	23
Healthy diets for infants (complementary feeding)	74.19	23
Healthy diets for adolescents	48.39	15
Any module on diet counselling		
Yes	25.86	15
No	74.14	43
Topics included in the module (N=15)		
Include fruits, vegetables and legumes in diet	60.00	9
Diet in ANC and PNC	73.33	11
Diet for infants	73.33	11
Diet for SAM child	60.00	9
Diet for adolescents	60.00	9

Roles and responsibilities of ASHA facilitator at HWC

All the ASHA facilitators conduct activities like mamta diwas, immunization and field visit for SAM and MAM child weekly. Activities like anti-larvae survey and visit to TB, leprosy and malaria patients is also majorly conducted weekly. Other activities like ANC and PNC visits along with HBNC visits are majorly conducted twice a week.

Table 4.20 presents the meetings attended by ASHA facilitators. All the ASHA facilitators attend SATCOM program at primary healthcare center weekly on every Saturday. Other meetings like staff meeting at HWC-SC, review meetings at PHC, gram sanjeevani meetings in the community along with meeting with ASHAs are conducted monthly.

Table 4.20: Roles and Responsibilities of ASHA Facilitators at HWC

Particulars	Weekly		Monthly	
	% (N=58)	n	% (N=58)	n
Meetings Conducted				
Staff meeting	-	-	100.00	58
Review meeting	-	-	100.00	58
Gram Sanjeevani meeting	-	-	100.00	58
Meeting with ASHAs	-	-	100.00	58
SATCOM	100.00	58	-	-

KNOWLEDGE OF ASHA FACILITATORS ON HEALTHY DIETS TO PREVENT NCDs

Healthy diets play an important role in preventing NCDs and therefore we assessed the knowledge of ASHA facilitators on healthy diets as they work closely with community and ASHA workers. 22 out of 58 ASHA facilitators answered correctly as to what is food i.e. anything that can be eaten or drunk (37.93%) while 2 of the ASHA facilitators responded they do not know. 40 ASHA facilitators (68.97%) responded that all the 5 nutrients - carbohydrates, proteins, fats, vitamins and minerals are the major nutrients required by our body while 18 ASHA facilitators (31.03%) responded randomly to any two or three nutrients categorized under any other. The majority of ASHA facilitators (96.56%) answered correctly to what is nutrition - ‘a process of ingestion, digestion, absorption, assimilation of nutrients and removal of waste products from the body whereas 6 ASHA facilitators (10.34%) responded that they do not know.

52 ASHA facilitators (96.56%) were aware about the different food groups based on their functions and on the food items included. Out of these 52, 50 responded to energy giving foods (96.15%), 52 responded to body building foods (100.00%) and 50 responded to protective foods (96.15%) as food group categorized based on their function. Similarly, out of 52, 51 ASHA facilitators responded to cereal grain products (98.08%), 50 responded to pulses and legumes (96.15%), 50 responded to leafy vegetables (96.15%), 42 responded to other vegetables (80.77%), 48 responded to fruits (92.31%), 48 responded to milk and milk products (92.31%), 44 responded to meat, fish and poultry (84.62%), 44 responded to fats, nuts and oilseeds (84.62%), 41 responded sugar and jaggery (78.85%) while only 25 responded to other miscellaneous foods (48.08%) as a food group categorized under food groups based on the food items included.

The majority of ASHA facilitators were aware about healthy diets and balanced diets (86.21% and 89.66% respectively), although only 21 ASHA facilitators (36.21%) were able to correctly answer all the components of healthy diets; diet which includes fruits, vegetables, legumes, nuts and whole grains, at least 400g of fruits and vegetables per day, <5% of total energy intake from free sugars, <30% of total energy

intake from fats and <5g of salt per day. 29 ASHA facilitators (50.00%) answered the components partially correct where they could only respond to one component that is a diet that includes fruits, vegetables, legumes, nuts and whole grains whereas 8 ASHA facilitators (13.79%) responded to the question as they do not know.

The above information on healthy diets in presented in **Table 4.21**.

Knowledge on concepts related to healthy diets

The majority of ASHA facilitators (65.52%) responded as do not know about how much energy is provided by 1 g of each macro nutrient. 17 of them (29.31%) answered correctly as to energy provided by 1 g of carbohydrate, 15 of them (25.86%) responded correctly to the amount of energy provided by 1 g of protein and 16 of them (27.59%) responded correctly to the amount of energy provided by 1 g of fat.

46 ASHA facilitators (79.31%) were aware of the term NCDs. Out of these 46 ASHA facilitators all were aware about diabetes, 41 were aware about hypertension (89.13%), 38 were aware about cardiovascular diseases (82.61%) and 37 were aware about cancer (80.43%).

None of the ASHA facilitators were aware of the NIN dietary guidelines. 51 ASHA facilitators (87.93%) recommended calorie restricted diet to their patients but only 18 ASHA facilitators (31.03%) could correctly answer to which patients should be recommended a calorie restricted diet - ‘overweight and obese patients’.

The above information on knowledge on concepts related to healthy diets is presented in **Table 4.22.**

Table 4.21: Knowledge of ASHA facilitators on healthy diets

Particulars	Pre knowledge	
	% (N=58)	n
Correct understanding of term food		
Correct answer	37.93	22
Don't know	3.45	2
Major nutrients required by our body		
All 5 nutrients	68.97	40
Any other	31.03	18
Correct understanding of term nutrition		
Correct answer	96.56	52
Don't know	10.34	6
Awareness about food groups		
Yes	96.56	52
No	10.34	6
Food groups based on their functions (N=52)		
Energy giving foods	96.15	50
Body building foods	100.00	52
Protective foods	96.15	50
Food groups based on food items included		
Cereal grain products	98.08	51
Pulses and legumes	96.15	50
Leafy vegetables	96.15	50
Other vegetables	80.77	42
Fruits	92.31	48
Milk and milk products	92.31	48
Meat, fish and poultry	84.62	44
Fats, nuts and oilseeds	84.62	44
Sugar and jaggery	78.85	41
Other miscellaneous foods	48.08	25
Concept of healthy diets		
Yes	86.21	50
No	13.79	8
Concept of Balanced Diet		
Correct answer	89.66	52
Don't know	10.34	6
Components of healthy diets		
Correct answer	36.21	21
Partially correct answer	50.00	29
Don't know	13.79	8

Table 4.22: Knowledge on concepts related to healthy diets

Particulars	Pre knowledge	
	% (N=58)	n
Knowledge on how much energy is provided by 1 g of:		
Carbohydrate		
Correct answer	29.31	17
Don't know	65.52	38
Protein		
Correct answer	25.86	15
Don't know	65.52	38
Fats		
Correct answer	27.59	16
Don't know	65.52	38
Awareness about the term NCD		
Yes	79.31	46
No	20.69	12
Familiar with NCD terms (N=46)		
Diabetes	100.00	46
Cardiovascular Diseases	82.61	38
Hypertension	89.13	41
Cancer	80.43	37
Aware about dietary guidelines by NIN		
Yes	0.00	0
No	100.00	58
Calorie restricted diet recommended to patients		
Yes	87.93	51
No	12.07	7
Which patients are recommended a calorie restricted diet		
Correct answer	31.03	18
Don't know	12.07	7

Knowledge on FSSAI concepts on healthy diets

Table 4.23 depicts the knowledge of ASHA facilitators on FSSAI concepts of healthy diets. The majority of ASHA facilitators (82.76%) were not aware about the concept of food pyramid, only 10 ASHA facilitators (17.24%) were aware about this concept and only 7 out of them (12.07%) could correctly answer to what is food pyramid - 'pictorial representation of different food groups and the quantity in which they should be consumed'. 48 ASHA facilitators (82.76%) responded that they do not know. 27 ASHA facilitators (46.55%) were aware about the concept of dietary diversity and recommended dietary diversity to their patients. However only 14 ASHA facilitators (24.14%) could correctly respond to what is dietary diversity - 'variety of foods and food groups in the diet ensuring adequate intake of essential nutrients'. 31 ASHA facilitators (53.45%) responded that they do not know. 6 ASHA facilitators (10.34%) were aware about the eat right campaign but no one was able to respond to what is eat right campaign - 'ensures safe, healthy and sustainable food for all'. 27 ASHA facilitators (46.55%) were aware about the tagline ' Aaj se thoda kam' but only 23 ASHA facilitators out of them (85.18%) answered correctly that it emphases on reducing all fat, salt and sugar.

Knowledge of ASHA facilitators on functional foods and millets

Table 4.24 shows the data on knowledge of ASHA facilitators on functional foods and millets. 13 of ASHA facilitators (22.41%) were aware of the term functional foods and recommended them to their patients. Although none were able to correctly answer to what are different functional foods. 50 ASHA facilitators (86.21%) counseled their patients to increase intake of millets in their diet, however only 44 ASHA facilitators (88.00%) of them knew about different millets.

Table 4.23: Knowledge on FSSAI concepts on healthy diets

Particulars	Pre knowledge	
	% (N=58)	n
Aware about concept of food pyramid		
Yes	17.24	10
No	82.76	48
Knowledge on what is food pyramid		
Correct answer	12.07	7
Don't know	82.76	48
Aware about concept of dietary diversity		
Yes	46.55	27
No	53.45	31
Knowledge on what is dietary diversity		
Correct answer	24.14	14
Don't know	53.45	31
Dietary diversity recommended to patients		
Yes	46.55	27
No	53.45	31
Aware about the eat right campaign		
Yes	10.34	6
No	89.66	52
Knowledge on what is eat right campaign		
Correct answer	0.00	0
Don't know	89.66	52
Aware about the tagline 'Aaj se thoda kam'		
Yes	46.55	27
No	53.45	31
'Aaj se thoda kam' puts emphasis on reducing (N=27)		
Fat	7.41	2
Salt	7.41	2
Sugar	0.00	0
All	85.18	23

Table 4.24: Knowledge on functional foods and millets

Particulars	Pre knowledge	
	% (N=58)	n
Aware of the term functional foods		
Yes	22.41	13
No	77.59	45
Knowledge on different functional foods		
Correct answer	0.00	0
Don't know	77.59	45
Functional foods recommended to patients		
Yes	22.41	13
No	77.59	45
Are patients counseled to increase intake of millets in their diet		
Yes	86.21	50
No	13.79	8
Awareness about different millets (N=50)		
Yes	88.00	44
No	12.00	6

Knowledge of ASHA facilitators on prevention of NCDs and healthy eating

Table 4.25 shows ASHA facilitators knowledge on various risk factors of NCDs and general guidelines for NCD prevention and dietary tips. The majority of ASHA facilitators consider alcohol consumption (93.10%), tobacco use (91.38%) and unhealthy diets (87.93%) as the risk factors of NCDs. Low consumption of fruits and vegetable is considered a risk factor by the least number ASHA facilitators (82.76%). 53 ASHA facilitators (91.38%) considered that diet plays an important role in preventing NCDs. As a response to general guidelines to be followed to prevent NCDs, 52 ASHA facilitators (89.65%) responded to consumption of healthy diet, 50 ASHA facilitators (86.21%) responded to stress management, 49 ASHA facilitators (84.48%) responded to avoid tobacco use, 48 ASHA facilitators (82.76%) responded to both avoid alcohol consumption and increase physical activity. As a response to general dietary guidelines to be followed by all NCD patients, highest number of ASHA facilitators (75.86%) responded to consume a variety of fresh, seasonal and local fruits and vegetables, reduce consumption of sugar rich foods and drink plenty of water and the least number of ASHA facilitators responded to restrict intake of red meat and consume lean meat (43.10%).

Table 4.25: Knowledge on prevention of NCDs and Healthy Eating

Particulars	Pre knowledge	
	% (N=58)	n
Risk factors of NCDs		
Alcohol consumption	93.10	54
Tobacco use	91.38	53
Unhealthy diets	87.93	51
Low consumption of fruits and vegetables	82.76	48
Physical inactivity	84.48	49
Diet plays an important role in preventing NCDs		
Yes	91.38	53
No	8.62	5
General guidelines for NCD prevention includes		
Avoid tobacco use	84.48	49
Avoid alcohol consumption	82.76	48
Increase physical activity	82.76	48
Consumption of healthy diets	89.65	52
Stress management	86.21	50
General dietary tips given to all NCD patients		
Consume a variety of fresh, seasonal and local fruits and vegetables	75.86	44
Eat whole grains and pulses	68.97	40
Avoid eating fried foods and bakery items.	70.69	41
Include foods from all food groups.	72.41	42
Eat whole fruits.	74.14	43
Avoid salty foods/ packed foods/ processed foods	68.97	40
Reduce consumption of sugar rich foods	75.86	44
Restrict intake of red meat and consume lean meat	43.10	25
Use mixture of vegetable oils	58.62	34
Drink plenty of water (8-10 glasses) daily.	84.48	44

Knowledge of ASHA facilitators on recommended daily intake of different foods

Table 4.26 presents the data on knowledge of ASHA facilitators on recommended daily intake of different foods. The majority of ASHA facilitators (55.17%) said they were aware of the recommended daily intake of fruits and vegetables but only 17 ASHA facilitators out of them (53.12%) responded correctly to the recommended fruit and vegetable intake i.e. 400g. 31 ASHA facilitators (53.45%) said were aware of the recommended daily intake of fat/oil but only 2 ASHA facilitators (6.45%) out of them responded correctly to the recommended fat/ oil intake which is 25-30g. 29 ASHA facilitators (50.00%) said were aware of the daily recommended intake of sugar but only 2 ASHA facilitators (6.90%) out of them were able to respond correctly to the recommended daily sugar intake which is 25 g. The majority of ASHA facilitators (62.07%) said they were aware of the daily recommended intake of salt but only 20 of them (55.55%) could correctly respond to the recommended daily salt intake which is <5 g/day.

Information on counseling and IEC material

Table 4.27 presents that 82.76% ASHA facilitators counsel their patients on how to prevent NCDs. Topics covered by ASHA facilitators during counseling were majorly low salt consumption (79.31%), increase physical activity (75.86%), and reduction of alcohol consumption (75.86%). 42 ASHA facilitators (72.41%) covered topic of adequate consumption of fruits and vegetables during counseling. The patients are majorly counseled in both groups and individually (68.97%). Majority of ASHA facilitators (70.69%) didn't had IEC material with them for counseling patients. 17 ASHA facilitators (29.31%) had IEC material with them on topics majorly related to NCDs (symptoms, self assessment, risk factors) (29.31%), diet (24.14%) and physical activity (10.34%).

Table 4.26: Knowledge on recommended daily intake of different foods

Recommended daily intake of foods	Pre knowledge	
	%	n
Aware of recommended daily fruit and vegetable intake		
Yes	55.17	32
No	44.83	26
Recommended intake of fruits and vegetables (N=32)		
200g	28.12	9
300g	12.50	4
400g	53.12	17
500g	6.25	2
Aware of recommended daily fat/oil intake		
Yes	53.45	31
No	46.55	27
Recommended intake of fat/oils (N=31)		
<15g	22.58	7
15-20g	51.61	16
20-25g	19.35	6
25-30g	6.45	2
Aware of recommended daily sugar intake		
Yes	50.00	29
No	50.00	29
Recommended intake of sugar (N=29)		
15g	37.93	11
20g	31.03	9
25g	24.14	7
30g	6.90	2
Aware of recommended daily salt intake		
Yes	62.07	36
No	37.93	22
Recommended intake of salt (N=36)		
<5g/day	55.55	20
5g/day	33.33	12
>5g/day	11.11	4

Table 4.27: Information on counseling and IEC material

Particulars	Pre knowledge	
	%	n
Is population counseled on how to prevent NCDs		
Yes	82.76	48
No	17.24	10
Topics covered during counseling		
Low salt consumption	79.31	46
Adequate consumption of fruits and vegetables	72.41	42
Avoid tobacco consumption	74.14	43
Increase physical activity	75.86	44
Reduction of alcohol consumption	75.86	44
Yoga	8.62	5
How are patients counseled		
Individually	17.24	10
In groups	13.79	8
Both	68.97	40
Any IEC material available for counseling		
Yes	29.31	17
No	70.69	41
IEC material available on topics		
NCD related	29.31	17
Diet related	24.14	14
Physical activity related	10.34	6
Alcohol and tobacco related	1.72	1
Government scheme related	6.90	4
COVID related	3.45	2

HIGHLIGHTS

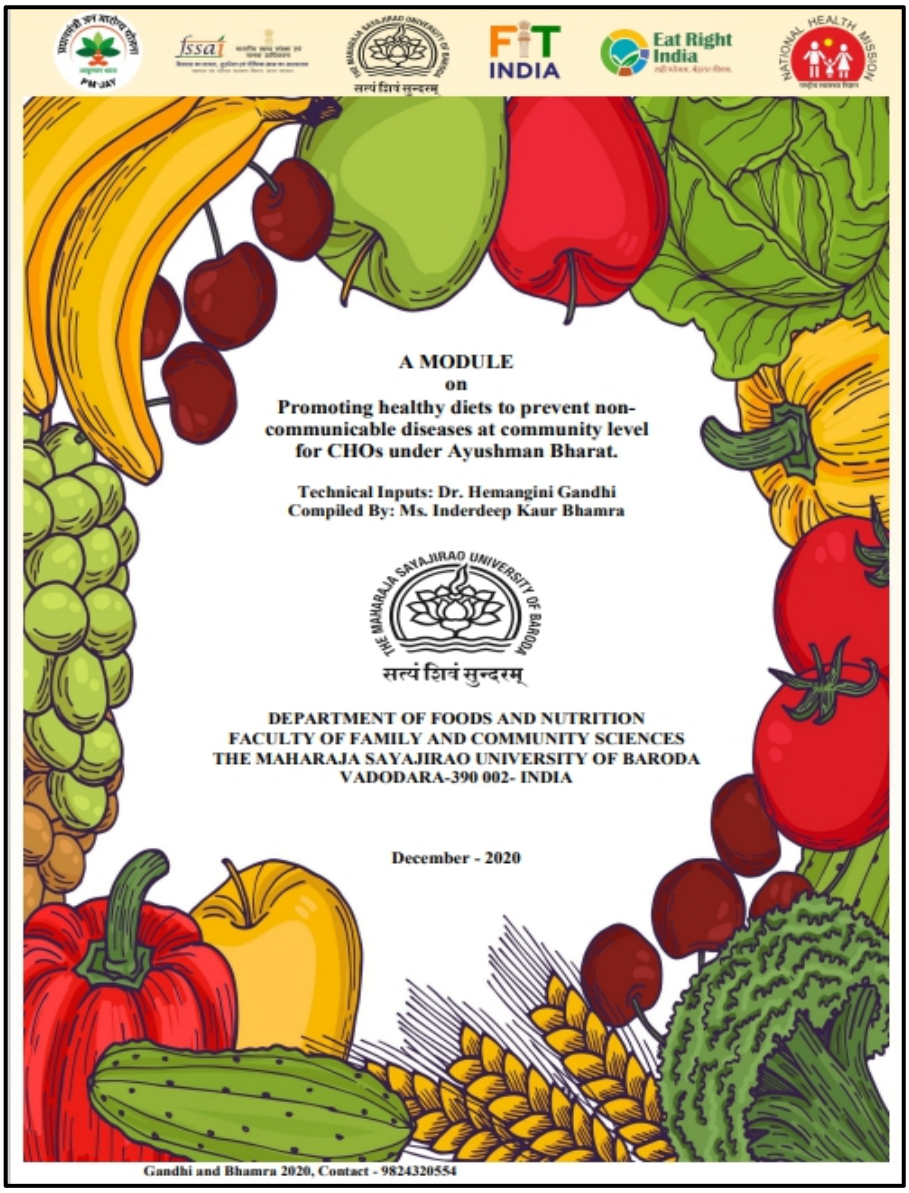
- 55.17% ASHA facilitators had completed their study upto higher secondary, 22.41% were graduate, 18.97% had completed their secondary level studies and 3.45% were post graduates.
- Majority of the ASHA facilitators were aware of the concepts like nutrition, food groups, balanced diets, calorie restricted diet, NCDs and use of millets.
- 86.21% ASHA facilitators were aware about the concept of healthy diets, however only 36.21% were aware about all the components of healthy diet.
- There was a need to strengthen their knowledge on concepts like dietary diversity, food pyramid, eat right campaign, Aaj se thoda kam, functional foods, use of indigenous foods and recommended daily intakes of foods like fruits and vegetables, fats, sugar and salt.
- All ASHA facilitators were aware about different risk factors of NCDs, however only 82.76% ASHA facilitators considered low consumption of fruits and vegetables as a risk factor.
- 72.41% ASHA facilitators counseled the community on adequate consumption of fruits and vegetables to prevent NCDs.

DEVELOPMENT OF TRAINING MODULE AND IEC MATERIAL ON PROMOTING HEALTHY DIET

The main focus of the present study was on capacity building of CHOs on promoting healthy diets. Various available CHO's curriculum were reviewed thoroughly. Curriculum of CHO's course did include topics to prevent or manage noncommunicable diseases but only as general tips. It's important to provide an in depth information on portion sizes to them. Also, insightful information on the concept and importance of dietary diversity in preventing NCDs was required to be provided. Use of locally available foods for dietary diversity and improving nutrition needed to be discussed with the functionaries.The curriculum included the importance of various foods but did not provide any information on recommended quantities. Moreover, they needed to be sensitized regarding new RDA. It highlighted the need

of capacity building of CHO to promote healthy diets at community level to better manage and prevent the silent 'epidemic' of noncommunicable diseases in India.

Therefore, an attempt was made to develop training module and IEC material for counseling on healthy diet at community level.



The content of the training module included:

- **CHAPTER 1: HEALTHY DIETS**
  - What is food and nutrition?
  - Concept of balanced diet and dietary diversity

- Introduction to different food groups
- Concept of food pyramid
- Concept of My Plate (NIN guidelines)
- Concept of RDA
- What is healthy diets?
- Practical advice on maintaining a healthy diet
- Consequences of consuming unhealthy diets

- **CHAPTER 2: INTRODUCTION TO NON-COMMUNICABLE DISEASES**
  - Definition of NCDs
  - Types of NCDs and its risk factors
  - Burden of NCDs in India
  - Voluntary NCD targets (WHO)

- **CHAPTER 3: DIETS IN NON-COMMUNICABLE DISEASES**
  - Diet, Nutrition and Hypertension
  - Diet, Nutrition and Diabetes
  - Concept of 'Aaj Se Thoda Kam'
  - Role of functional foods in preventing NCDs
  - Use of local and seasonal foods to improve dietary diversity
  - Use of fortified foods

- **CHAPTER 4: NUTRITION IN COVID-19**
  - Covid-19 precautions
  - Role of specific nutrients and foods to maintain optimal immune function and good health
  - Traditional spices, condiments and herbs as immunity boosters

- **CHAPTER 5: NUTRITION COUNSELING**
  - What is counseling?
  - Basic counseling skills and tips for effective counseling
  - Approach to counseling
  - Role of CHO in promoting healthy dietary practices

- **CHAPTER 6: COMMUNITY MOBILIZATION**
  - What is community mobilization?
  - Why mobilize the community?
  - Community participation, its importance for promoting healthy diets

IEC material was developed in vernacular language.

Flip book on various aspects on healthy diets was developed to facilitate counselling of the community by CHOs / ASHAs .

The content of the IEC material (flip book) included:

- What are non-communicable diseases?
- What are the risk factors for non-communicable diseases?
- How to know if a person is overweight or obese?
- What is a balanced diet and how to achieve it?
- What is the concept of ‘food pyramid’?
- What is dietary diversity?
- What is the role of millets in NCDs?
- What is a healthy diet?
- What dietary tips should be followed for different NCDs?

- What is ‘Aaj Se Thoda Kam’?
- What is the role of functional foods in NCDs?

As per the proposal we were supposed to train CHOs for this newly developed training module on healthy diet and provide IEC material (flip book) to them. However they were extensively involved in covid 19 vaccination training and surveys since January due to which we were unable to conduct a physical training. Although a soft copy of training module and IEC material (flip book) was shared with the CHOs and discussions were held online in small groups.

HIGHLIGHTS

- Training module and IEC material (flip book) was developed for training of CHOs.
- Physical training was not conducted due to their involvement in covid vaccination drive.
- However, a soft copy of training module and IEC material (flip book) was shared with the CHOs and discussions were held online in small groups.

DISCUSSION

Health promotion is the process of empowering people to gain control over their health and enable them to improve the health outcome. In the present study, an attempt was made to understand role of CHOs, their knowledge about healthy diets and activities conducted by them for NCDs.

Fig. 4.1 depicts how many CHOs were conducting health promotion activities at their HWC. It shows that 65 CHOs (94.20%) were conducting health promotion activities at their HWC whereas 4 CHOs (5.80%) did not.

The activities conducted by these 65 CHOs has been presented in **Fig. 4.2**. All the 65 CHOs conducted health promotion activities like screening for NCDs, treating NCDs, mobile screening (Dhanvantri Rath), yoga, meditation and follow up for patients with NCDs. 51 CHOs (73.91%) included sensitizing community under health promotion activities. It can be seen that counselling on dietary diversity or various concepts on healthy diets was not reported by the CHOs.

Although sensitizing community is a major part of the health promotion process to empower the population **(WHO 2003)**.

Fig. 4.1: Health Promotion activities conducted by CHOs

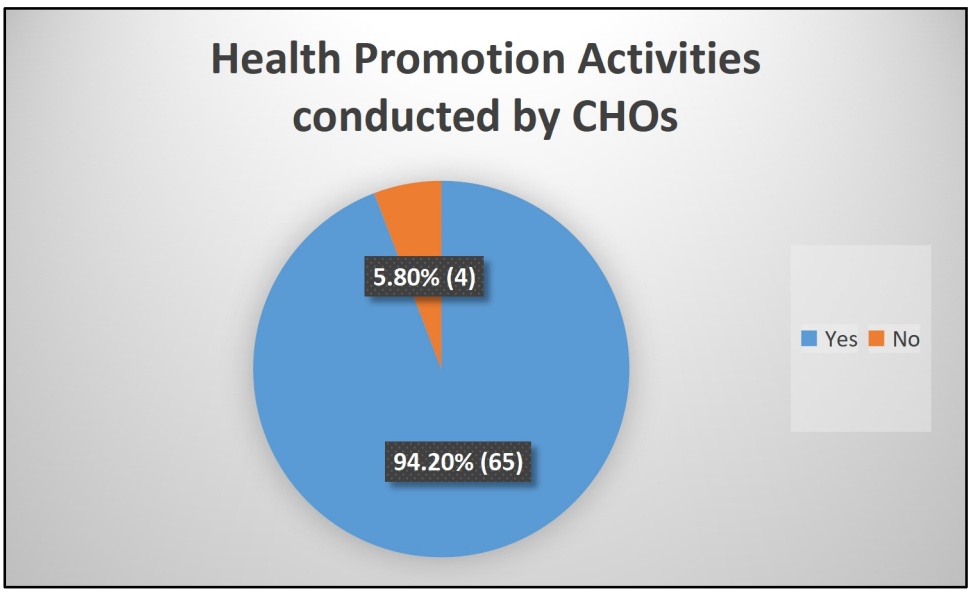


Fig. 4.2: Health Promotion activities conducted at HWC

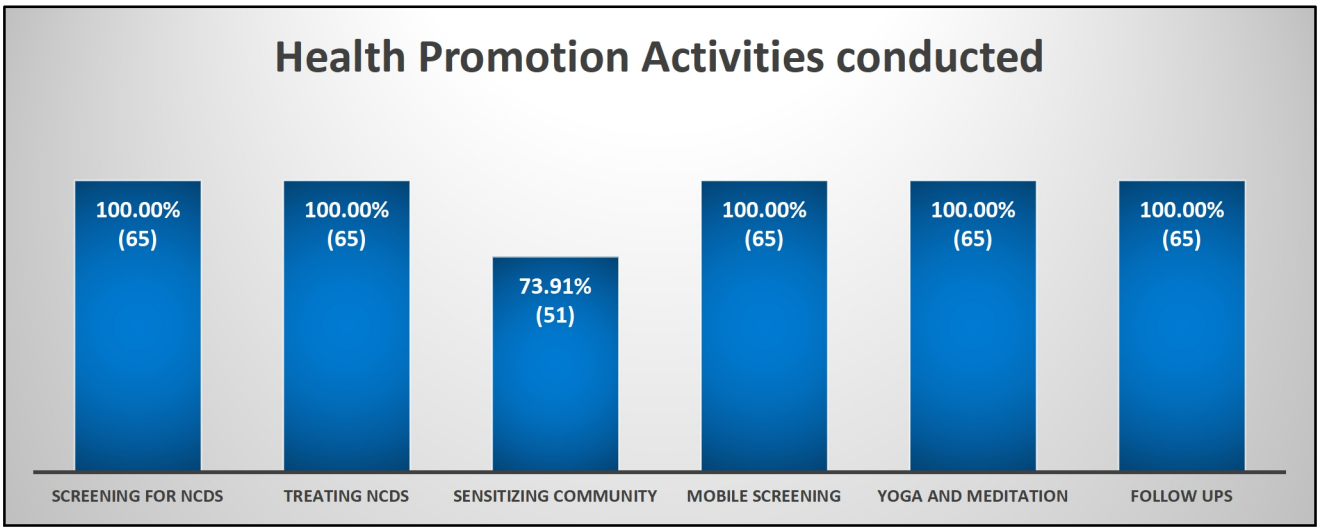


Fig. 4.3 depicts the percentage of CHOs who were aware about the concept of healthy diets (92.75%). However, when asked about all the components of healthy diets only 13 CHOs (18.84%) could answer all the components correctly, 51 CHOs (73.91%) answered only one or two components of healthy diet mainly adequate consumption of fruits, vegetables and legumes along with low consumption of salt and 5 CHOs (7.25%) were not aware about the healthy diets or its components (**Fig. 4.4**).

Fig. 4.3: Awareness on concept of healthy diets

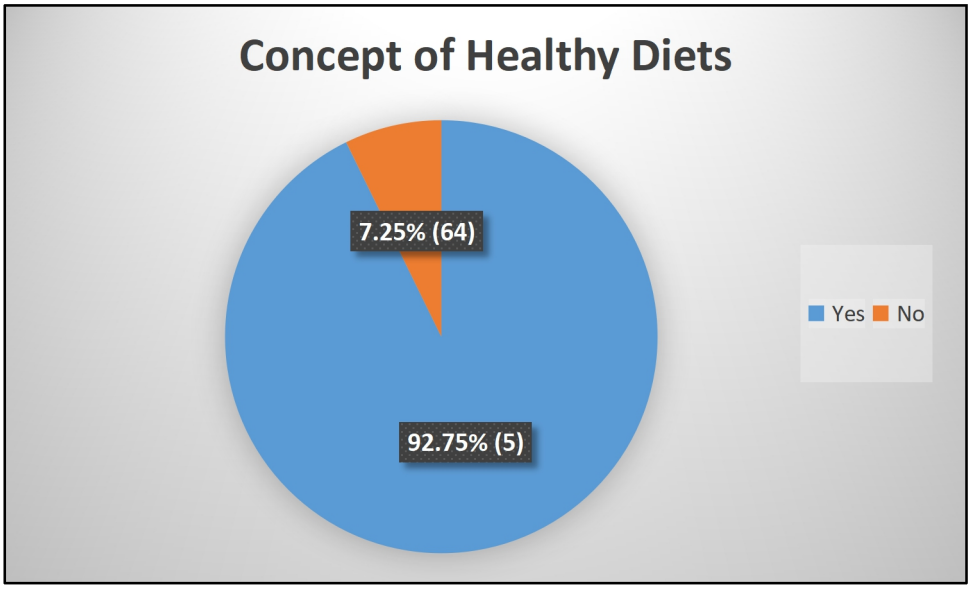


Fig. 4.4: Awareness on components of healthy diets

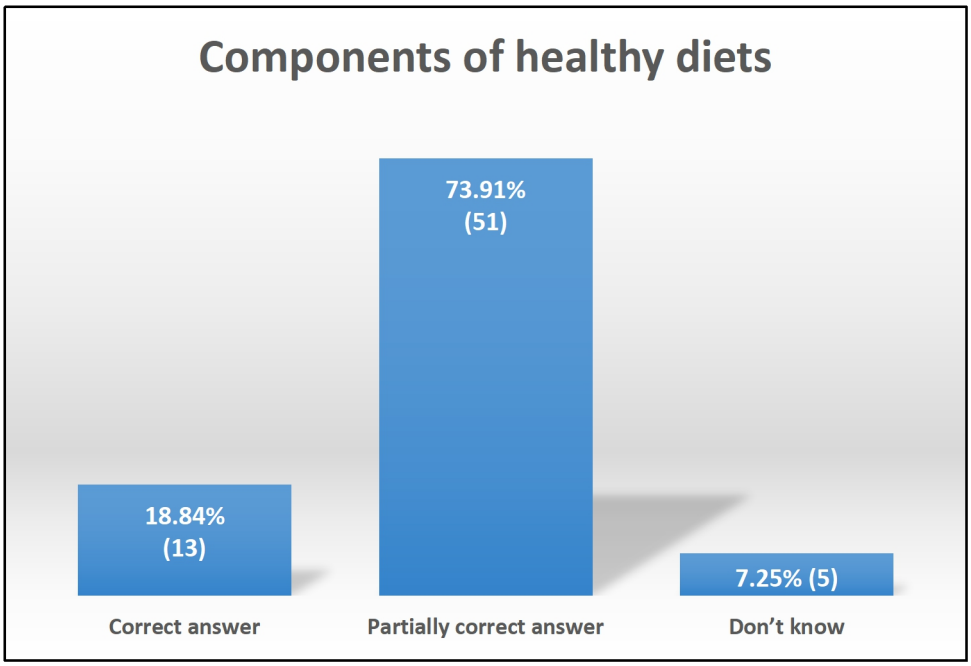
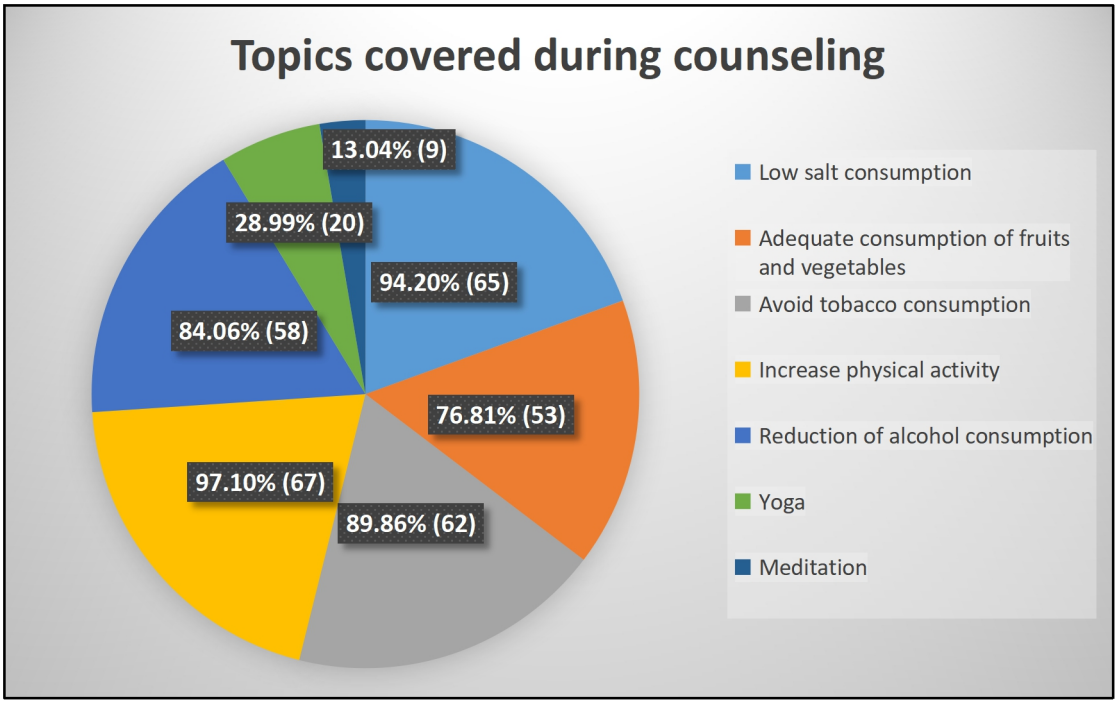


Fig. 4.5 presents the topics that are covered by CHOs during counseling patients on how to prevent NCDs. Majority of CHOs counseled on low salt consumption, avoiding tobacco consumption, increase physical activity and reduction of alcohol consumption. Only a few CHOs included topics like adequate consumption of fruits and vegetables, yoga and meditation.

Fig. 4.5: Topics covered during counseling on how to prevent NCDs



During review of literature, we did not come across any similar study. We are planning to disseminate our findings with MOHFW , SIHFW and various experts at policy level working for AYUSHMAN BHARAT and involved with developing curriculum for the CHOs for HWCs.

The findings of this study were presented in International Conference of Public Health (ICPH) held on 24th-26th March 2021. It was a virtual conference conducted by Navrachana University and The University of Arizona, Mel & Enid Zuckerman College of Public Health. Copy of the abstract is presented in **Appendix XI.**

Summary and Conclusion

SUMMARY AND CONCLUSION

India is facing the silent ‘epidemic’ of Non-communicable diseases. The biological and behavioral risk factors, having predisposition to development of NCDs include, tobacco and alcohol use, sedentary lifestyle, overweight and obesity, high fat and sodium intake, low vegetable and fruit intake, raised blood pressure, blood glucose and cholesterol levels.

During the past decade, rapid expansion in the amount of population based epidemiological evidence has clarified that diet plays an important role in preventing and controlling premature deaths due to NCDs. Over the past decade, industrialization, urbanization, economic development and market globalization have increased changes in diets and lifestyles, posing a huge impact on health and nutritional status of populations. World food economy has observed changes that is reflected in shift in dietary patterns like increased consumption of energy-dense diet high in fat, particularly saturated fat, foods rich in sodium and refined carbohydrates. These patterns are aligned with a sedentary lifestyle and together increase the risk of NCDs like hypertension, diabetes and some types of cancer. Therefore diet, nutrition and physical activity play a major role in preventing chronic diseases.

Health promotion is an effective process in tackling the underlying determinants of NCDs by enabling people and communities to increase control over the determinants of health and thereby improve their health.

The study was approved by the Department of Medical Ethics Committee (No.IECHR/FCSC/2020/57), The Maharaja Sayajirao University of Baroda, Vadodara.

The present study was planned with broad objective of capacity building of CHOs and ASHA facilitators for promoting healthy diets for NCD prevention under Ayushman Bharat.

The specific objectives of the study were:

- To assess the profile of Community Health Officer (CHO) and ASHA facilitators.
- To assess their knowledge on healthy diets for prevention of NCDs.
- To develop a training module on healthy diets for prevention of NCDs.
- To develop IEC material (Flip Book).
- To impart and enhance knowledge of CHOs and ASH facilitators on healthy diets for prevention of NCDs.
- To assess their knowledge retention and preparedness to counsel on healthy diets for prevention of NCDs in the community.

The study was divided into 3 phases:

Phase I : Baseline data collection of CHOs and ASHA facilitators.

Phase II: Development of training module and IEC material (flip book) and capacity building of CHOs and ASHA facilitators

Phase III: Post data collection on knowledge retention and preparedness to counsel.

Phase I : **Baseline data collection of CHOs and ASHA facilitators.**

Vadodara district of Gujarat was purposively selected for this research. All the HWC-SC in all the 8 talukas of the district were enrolled for the study. There were a total of 82 HWC-SC in these 8 talukas with a total of 79 CHOs appointed. All the available CHOs available during data collection phase were enrolled for the study. A total of 69 CHOs and 58 ASHA facilitators were enrolled for the study.

Data on the following aspects were collected using standard tools and techniques.

- Information on HWCs (N=69)
- CHO profile (N=69)
- Knowledge of CHOs on healthy diets (N=69)
- ASHA facilitator profile (N=58)
- Knowledge of ASHA facilitator on healthy diets (N=58)

Highlights of the Phase I findings are:

- *Information on HWCs*
  - All the HWCs enrolled were of Sub Center type.
  - Average population covered per HWC was 5306.
  - Majority of the HWC carried out wellness activities like yoga (97.1%) and meditation (81.16%).
  - Average population screened for NCDs was 441.33 per average population in pre-covid times (January- March 2020) and 617.54 per average population during covid (October-December 2020).
  - Karjan taluka had relatively the highest cases of NCDs including hypertension, diabetes and overweight/ obesity as reported by the CHOs.

- *CHO profile and Knowledge on healthy diets*
  - 81.16% CHOs were females and 18.84% were males.
  - 55.07% CHOs belonged to general category, 27.54% were from OBC, 13.04 were from SC and 4.35% were from ST.
  - 73.91% CHOs had a degree in nursing (56.52% had a diploma and 17.39% had a bachelors degree) and 26.09% had a degree in ayurveda (BAMS).
  - 94.20% CHOs conducted health promotion activities including screening of NCDs, treating NCDs, sensitizing community, mobile screening, yoga, meditation and follow ups.
  - Majority of the CHOs were aware of the concepts like nutrition, food groups, balanced diets, calorie restricted diet, NCDs, 'Aaj se thoda kam' and glycemic index.
  - 92.75% CHOs were aware about the concept of healthy diets, however only 18.84% were aware about all the components of healthy diet.
  - 95.65% CHOs were aware about the DASH diet, however only a few were aware about all its components.
  - There was a need to strengthen their knowledge on concepts like FANTA classification, dietary diversity, RDA, food pyramid, My Plate, eat right campaign, functional foods, use of millets and indigenous foods and recommended daily intakes of foods like fruits and vegetables, fats, sugar and salt.

- All CHOs were aware about different risk factors of NCDs, however only 86.96% CHOs considered low consumption of fruits and vegetables as a risk factor.
- 76.81% CHOs counseled the community on adequate consumption of fruits and vegetables to prevent NCDs.
- There is a need of a uniform curriculum to be implemented at the course level to make them aware about healthy diets and implement it at field level.

- *ASHA facilitator profile and Knowledge on healthy diets*
  - 55.17% ASHA facilitators had completed their study upto higher secondary, 22.41% were graduate, 18.97% had completed their secondary level studies and 3.45% were post graduates.
  - Majority of the ASHA facilitators were aware of the concepts like nutrition, food groups, balanced diets, calorie restricted diet, NCDs and use of millets.
  - 86.21% ASHA facilitators were aware about the concept of healthy diets, however only 36.21% were aware about all the components of healthy diet.
  - There was a need to strengthen their knowledge on concepts like dietary diversity, food pyramid, eat right campaign, Aaj se thoda kam, functional foods, use of indigenous foods and recommended daily intakes of foods like fruits and vegetables, fats, sugar and salt.
  - All ASHA facilitators were aware about different risk factors of NCDs, however only 82.76% ASHA facilitators considered low consumption of fruits and vegetables as a risk factor.
  - 72.41% ASHA facilitators counseled the community on adequate consumption of fruits and vegetables to prevent NCDs.

Phase II: Development of training module and IEC material (flip book) and capacity building of CHOs and ASHA facilitators

In this phase the gaps in the knowledge of functionaries were identified after reviewing all the available curriculum modules (IGNOU module and IIPH module). A

training module was then developed along with an IEC material (flip book) to train the functionaries for better counseling of population at the community level.

Highlights of Phase II are:

- Training module and IEC material (flip book) was developed for training of CHOs.
- Physical training was not conducted due to their involvement in covid 19-vaccination drive.
- However, a soft copy of training module and IEC material (flip book) was shared with the CHOs and discussions were held online in small groups.

Phase III: Post data collection on knowledge retention and preparedness to counsel.

Due to the extensive involvement of functionaries in the screening process and later in the vaccination drive due to the COVID-19 situation this phase could not be conducted.

CONCLUSION

- It can be concluded that the current study is first of its kind in Gujarat focusing on capacity building of CHOs on healthy diets to prevent NCDs.
- It can be concluded that there are gaps in the curriculum of CHOs in regard to nutrition and healthy diets.
- Also a knowledge gap was observed on assessing their knowledge on healthy diets.
- There is a need to integrate concept of healthy diets for effective delivery and utilization of services related to non-communicable disease prevention at community level to facilitate SDG goal 3.

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Appendices

APPENDIX I
ETHICAL CERTIFICATE

Institutional Ethics Committee for Human Research (IECHR)

FACULTY OF FAMILY AND COMMUNITY SCIENCES
THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

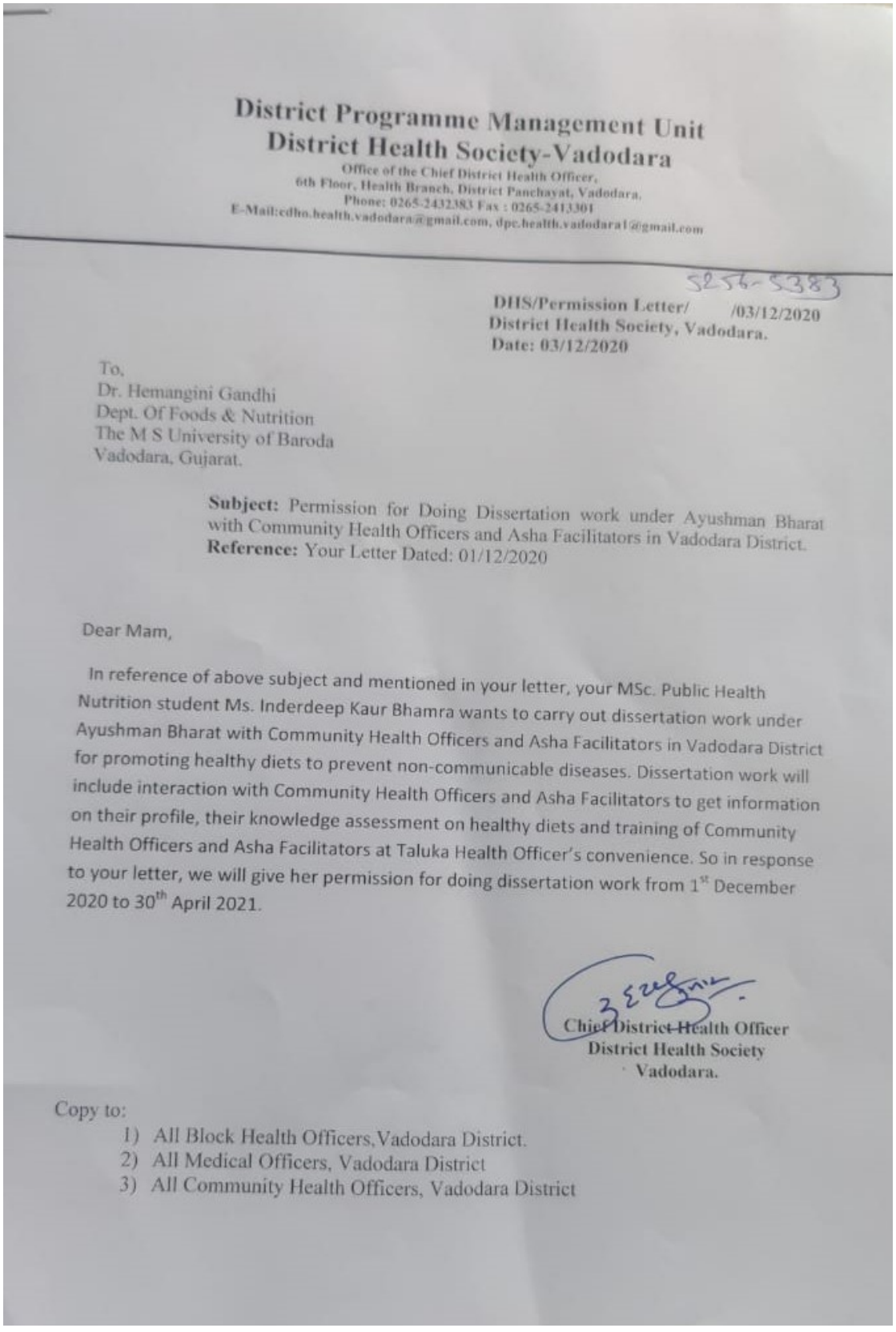
Ethical Compliance Certificate 2020 – 2021

This is to certify that **Ms. Inderdeep K Bhamra**'s study titled, **"Ayushman Bharat: Capacity Building of Community Health Officers (CHOs) and Asha Facilitators for promoting Healthy Diets to prevent noncommunicable diseases in Vadodara District"** has been approved by the Institutional Ethics Committee for Human Research (IECHR), Faculty of Family and Community Science, The Maharaja Sayajirao University of Baroda. The study has been allotted the ethical approval number **IECHR/FCSc/2020/57.**

Prof Mini Sheth
Member Secretary
IECHR

Prof Shagufa Kapadia
Chairperson
IECHR

APPENDIX II
PERMISSION LETTER FROM CDHO



District Programme Management Unit
District Health Society-Vadodara

Office of the Chief District Health Officer,
6th Floor, Health Branch, District Panchayat, Vadodara.
Phone: 0265-2432383 Fax : 0265-2413301
E-Mail:cdho.health.vadodara@gmail.com, dpc.health.vadodara1@gmail.com

5256-5383

DHS/Permission Letter/ /03/12/2020
District Health Society, Vadodara.
Date: 03/12/2020

To,
Dr. Hemangini Gandhi
Dept. Of Foods & Nutrition
The M S University of Baroda
Vadodara, Gujarat.

Subject: Permission for Doing Dissertation work under Ayushman Bharat with Community Health Officers and Asha Facilitators in Vadodara District.
Reference: Your Letter Dated: 01/12/2020

Dear Mam,

In reference of above subject and mentioned in your letter, your MSc. Public Health Nutrition student Ms. Inderdeep Kaur Bhamra wants to carry out dissertation work under Ayushman Bharat with Community Health Officers and Asha Facilitators in Vadodara District for promoting healthy diets to prevent non-communicable diseases. Dissertation work will include interaction with Community Health Officers and Asha Facilitators to get information on their profile, their knowledge assessment on healthy diets and training of Community Health Officers and Asha Facilitators at Taluka Health Officer's convenience. So in response to your letter, we will give her permission for doing dissertation work from 1st December 2020 to 30th April 2021.

Chief District Health Officer
District Health Society
Vadodara.

Copy to:
1) All Block Health Officers,Vadodara District.
2) All Medical Officers, Vadodara District
3) All Community Health Officers, Vadodara District

APPENDIX III
CONSENT LETTER

DEPARTMENT OF FOODS AND NUTRITION
FACULTY OF FAMILY AND COMMUNITY SCIENCES
THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA
VADODARA-390 002- INDIA

Tele. } Phone :0265-2795526
} 0265-2795522
Grams :"HOME SCIENCE"

Date / /

સહમતિ પત્ર

માનનીય શ્રી/ શ્રીમતી,

ડિપાર્ટમેન્ટ ઓફ ફૂડ એન્ડ ન્યુટ્રીશન, ફેકલ્ટી ઓફ ફેમિલી એન્ડ કમ્યુનીટી સાયન્સીસ, ધ મહારાજા સયાજીરાવ યુનિવર્સિટી ઓફ વડોદરા કમ્યુનિટી હેલ્થ ઓફિસર અને આશા કાર્યકર્તાઓ ગૈર સંયારી રોગોં ની રોકથામ કરવા માટે પૌષ્ટિક આહાર ના પ્રમોશન ની ક્ષમતા વધારવા માટે એક અભ્યાસ કાર્ય નું આયોજન કરવા માંગે છે। કમ્યુનિટી હેલ્થ ઓફિસર અને આશા કાર્યકર્તાઓ થી વાતચીત કરવા ઓથોરિટી થી અનુમતિ મળેલ છે। આ અભ્યાસ કાર્ય માં કમ્યુનિટી હેલ્થ ઓફિસર અને આશા કાર્યકર્તાઓ થી અમની જોબ પ્રોફાઈલ અને પૌષ્ટિક ખોરાક વિશેનું જ્ઞાન અને ગૈર સંયારી રોગોં ની રોકથામ માં તેમની ભૂમિકા ની જાણકારી એકત્રિત કરાશે। આ જાણકારી પૌષ્ટિક ખોરાક ના સામુદાયિક સ્તરે પ્રમોશન માટે ટ્રેનિંગ સામગ્રી એકત્રિત કરવી જરુરી છે।

આમાં ઉપયોગમાં આવતી પ્રશનાવલી ને પૂરી કરવામાં 25 થી 30 મિનિટ લાગશે। આ અભ્યાસ કાર્ય માં ભાગ લેવું સ્વૈચ્છિક છે। તમે અભ્યાસ કાર્ય માં ભાગ લેવાનું ના કહી શકો છો અથવા કોઈ પણ સમયે અભ્યાસ કાર્ય માં થી નીકળી શકો છો। જો તમારી પાસે અભ્યાસ કાર્ય અથવા એની પ્રક્રિયા માટે, ક્યારે પણ કોઈ પ્રશ્ન હોય તો તમે નીચે આપેલ ટીમ ના સદસ્યો ના નમ્બર ઉપર સંપર્ક કરી શકો છો। તમારી સહમતિ આ અભ્યાસ કાર્ય માટે જરુરી છે।

સંશોધન માર્ગદર્શકઃ
વિધાર્થી
ડૉ. હેમાંગિની ગાંધી
9824320554
મેમ્બર સેક્રેટરી
એથિકલ કમિટી હ્યુમન રીસર્ચ
(ડિપાર્ટમેન્ટ ઓફ ફૂડ એન્ડ ન્યુટ્રીશન)

સંશોધન માટે
ઈન્દરદીપ કૌર-
9617156338

હું કમ્યુનિટી હેલ્થ ઓફિસર/ આશા કાર્યકર્તા ..... આ અભ્યાસ કાર્ય માં ભાગ લેવા મારી સહમતિ આપું છું અને આને લગતી બધી વિગતો પ્રદાન કરીશ।

તારીખ સહી

સ્થાન

APPENDIX IV
INFORMATION ON HWC

GENERAL INFORMATION		
1	Name of HWC	
2	Taluka	
3	Designation of the respondent	
4	Contact Number	
5	Type of facility	1. PHC 2. SC
6	Year of approval of working in HWC	1. 2018-19 2. 2019-20 3. 2020-21
7	Operational Status	1. Yes 2. No
8	Timings of HWC	
9	Total population covered under HWC	

HUMAN RESOURCE AT PRESENT (As on Dec 2020)

10

Number of Staff	At PHC level	At SubCenter level
Medical Officer		
Staff Nurse		
Pharmacist		
Lab Technician		
Data Entry Operator		
CHOs		
MPHWs		
FHWs		
ASHAs		
ASHA Facilitators		

BRANDING/ INFRASTRUCTURE

11

Branding/ Infrastructure	Yes	No
Color work done		
Ayushman Bharat in Gujarati		
6 logos		
Signage Available		
Display board of 12 services		
OPD time displayed		
Yoga space identified		
Yoga time displayed		
Yoga mats available		
Geriatric OPD		
Waiting area		
IEC displayed		

DETAILS OF WELLNESS ACTIVITIES		
12	Yoga started	1. Yes 2. No
13	If yes, no. of sessions conducted before lockdown (Jan-March 2020)	
14	Laughing Club available	1. Yes 2. No
15	If yes, no. of sessions conducted before lockdown (Jan-March 2020)	
16	Music therapy practiced	1. Yes 2. No
17	If yes, no. of sessions conducted before lockdown (Jan-March 2020)	

18	Reiki	1. Yes 2. No
19	If yes, no. of sessions conducted before lockdown (Jan-March 2020)	
20	Meditation	1. Yes 2. No
21	If yes, no. of sessions conducted before lockdown (Jan-March 2020)	
22	Are any other wellness activities carries out in the HWC?	1. Yes 2. No
23	If yes, specify	
24	Any IEC/ counseling material available at HWC?	1. Yes 2. No
25	If yes, specify	
26	Any IEC/ counseling material available on healthy diets?	1. Yes 2. No
27	If yes, specify	
28	What activities are carried out at HWC for community now during COVID 19 epidemic?	1. Yoga 2. Laughing Club 3. Music therapy 4. Reiki 5. Meditation 6. Screening 7. Treating NCD patients 8. Counseling on lifestyle modification 9. Any other, specify
DETAILS ON ENUMERATION AND SCREENING		
29	CBAC form available	1. Yes 2. No
30	If no, mention the reason	
31	Population enumeration started	1. Yes 2. No
32	CBAC form filled by ASHA	1. Yes 2. No
33	Total no of CBAC formed filled 1. Last 3 months (Oct-Dec 2020) 2. Jan-March 2020	
34	Population screening done by FHW	1. Yes 2. No
35	Total no of screening done 1. Last 3 months (Oct-Dec 2020) 2. Jan-March 2020	

36

Diagnosis Cases	Total Diagnosis (Number)	
	January-March 2020	**Last 3 months (October-December 2020)**
Hypertension		
Diabetes		
Oral cancer		
Breast cancer		
Cervical cancer		
Any other: Overweight Obese		

37	Who analyses the CBAC forms?	
IT SUPPORT AND INTERNET CONNECTIVITY		
38	Asha: Smart phone	1. Yes 2. No
39	FHW: Smart phone	1. Yes 2. No
40	CHO: Smart phone	1. Yes 2. No
41	Internet connectivity	1. Yes 2. No
42	Daily entry done on portal	1. Yes 2. No
43	Last month portal entry submitted	1. Yes 2. No
44	If No, reason	
DRUGS AS PER ESSENTIAL DRUG LIST		
45	Stock out	1. Yes 2. No
DIAGNOSTIC TESTS		
46	19 tests available at PHC level	1. Yes 2. No
47	8 tests available at SC level	1. Yes 2. No
48	If not available mention the reason	
49	Where do you refer if you don't have that?	1. Yes 2. No
MAINTENANCE REGISTER		
50	OPD register	1. Yes 2. No
51	Screening register	1. Yes 2. No
52	Referral register	1. Yes 2. No
53	Attendance register	1. Yes 2. No
54	Any other, specify	

EQUIPMENT AVAILABLE

55

Equipments	Yes	No
Glucometer		
BP instrument ● Mercury ● Digital		
Autoclave/ Sterilizer		
Slide Box		
Hemoglobinometer		
Stethoscope		

Snells Vision chart		
Dental Probe		
Urine pregnancy kit		
Stadiometer		
Foetoscope		
MUAC tape		
Watch		
Microscope		
Weighing Scale ● Adult ● Infant ● Baby hanging type		
Semiautoanalyzer		

DETAILS ON MEETINGS AND ACTIVITIES		
56	As CHO do you conduct any activities regarding NCDs?	1. Yes 2. No
57	If yes, what activities are conducted?	1. Screening 2. Testing 3. Counseling 4. Follow ups
58	On what day/days are these activities conducted?	

APPENDIX V
CHO PROFILE

1	Name of CHO	
2	Contact Number	
3	Category	1. SC 2. ST 3. OBC 4. General
4	Educational Qualification	1. BAMS 2. BSc. Nursing 3. MSc. Nursing 4. Diploma in Nursing (GNM) 5. Any other _____
5	From where did you completed the 6 month certificate course?	1. SIFHW 2. IGNOU 3. IIPH 4. Any other institute, specify _____
6	Where was the course carried out?	
7	Years of working experience in HWC as CHO	
8	Any training received in population based screening, prevention and management of NCDs?	1. Yes 2. No
9	If yes, total number of trainings received?	
10	Where was the training conducted and by whom?	
11	What were the key learnings of the training?	
12	Did you receive Arogya Samanvaya training?	1. Yes 2. No
13	If yes; Where was the training conducted and by whom?	
14	What were the key learnings of the training?	
15	Are you aware of Jan Arogya Samiti (JAS)?	1. Yes 2. No
16	Do you have regular meetings with the Gram Sanjeevani Samiti (VHSNC)?	1. Yes 2. No
17	How many meetings were conducted with Gram sanjeevvani Samiti before lockdown (Jan-March 2020)?	
18	As CHO, do you conduct any health promotion activities?	1. Yes 2. No

19	If yes, what are these activities?	

20 Job Chart

Job	Mon	Tues	Wed	Thurs	Fri	Sat
Activities to be conducted each day						
Meetings to be conducted						

APPENDIX VI
KNOWLEDGE OF CHOs ON HEALTHY DIETS

1	What do you understand by the term food?	1. Anything which can be eaten or drunk 2. Which nourishes body 3. Gives energy to body 4. Any other, specify _____
2	What are the major nutrients required by our body?	1. Carbohydrate 2. Protein 3. Fats 4. Vitamins 5. Minerals
3	What do you understand by the term nutrition?	1. It is a process of ingestion, digestion, absorption, assimilation of nutrients and removal of waste products from the body. 2. Any other, specify _____ _____
4	Are you aware of different food groups?	1. Yes 2. No
5	If yes, what are the different food groups based on their functions in the body?	1. Energy giving foods 2. Body building foods 3. Protective foods
6	What are the different food groups based on food items included?	1. Cereal grain products 2. Pulses and legumes 3. Leafy vegetables 4. Other vegetables 5. Fruits 6. Milk and milk products 7. Meat, fish and poultry 8. Fats, nuts and oilseeds 9. Sugar and jaggery
7	Are you aware of the FANTA classification of food groups?	1. Yes 2. No
8	If yes, what are the different food groups in this classification?	1. Grains, roots and tubers 2. Pulses 3. Nuts and seeds 4. Dairy 5. Meat, poultry and fish 6. Eggs 7. Dark green leafy vegetables 8. Other vitamin A rich fruits and vegetables 9. Other vegetables 10. Other fruits
9	Are you aware of the NOVA classification of foods?	1. Yes 2. No
10	If yes, what are the different groups under the classification?	1. Unprocessed or minimally processed 2. Processed culinary ingredients 3. Processed foods 4. Ultra-processed foods (UPFs)

11	What do you understand by a balanced diet?	1. A diet which provides all the nutrients in required amounts on daily basis 2. Makes you healthy 3. Any other, specify _____
12	Do you know the concept of healthy diets?	1. Yes 2. No
13	If yes, what are the components of healthy diets?	1. Diet which includes fruits, vegetables, legumes, nuts and whole grains 2. At least 400g of fruits and vegetables per day 3. <5% of total energy intake from free sugars 4. <30% of total energy intake from fats 5. <5g of salt per day
14	Are you aware of the concept of RDA?	1. Yes 2. No
15	If yes, what do you understand by recommended dietary allowances?	
16	Are you aware about the dietary guidelines given by NIN?	1. Yes 2. No
17	If yes, please specify.	
18	Are you aware of the food pyramid concept?	1. Yes 2. No
19	If yes, please specify.	
20	Are you aware about the concept of My Plate?	1. Yes 2. No
21	If yes, please specify.	
22	How much energy is provided by 1 g of the following nutrients-	1. Carbohydrate _____ 2. Protein _____ 3. Fat _____
23	Are you aware of the concept of dietary diversity?	1. Yes 2. No
24	If yes, what is it?	

25	Are you aware of the eat right campaign?	1. Yes 2. No
26	If yes, specify	
27	Are you aware of the tagline “Aaj se thoda kam”?	1. Yes 2. No
28	If yes, what does it emphasis on reducing?	1. Fat 2. Salt 3. Sugar 4. All
29	Are you aware of the term NCDs?	1. Yes 2. No
30	If yes, name the Non Communicable Diseases?	
31	Do you know about DASH diet?	1. Yes 2. No
32	If yes, what is DASH diet?	1. Dietary Approach to Stop Hypertension 2. Reduced sodium intake 3. Encourages intake of whole grains, fruits and vegetables 4. Encourages low-fat dairy products 5. Restricts intake of red meat and fats. 6. All of the above
33	If yes, do you counsel patients regarding it?	1. Yes 2. No
34	Do you recommend dietary diversity to your patients?	1. Yes 2. No
35	Do you advice calorie restricted diet to your patients?	1. Yes 2. No
36	If yes, who do you recommend it?	1. Patient with normal weight 2. Overweight patient 3. Obese patient
37	Are you aware of the term functional foods?	1. Yes 2. No
38	If yes, do you recommend it to your patients?	1. Yes 2. No
39	If yes, which functional foods do you recommend? Specify.	
40	Do you counsel your patients to increase the intake of millets in their diet?	1. Yes 2. No
41	If yes, which millets do you recommend?	
42	Are you aware of the concept of glycemic index of foods?	1. Yes 2. No
43	If yes, do you recommend low glycemic index foods to diabetic patients?	1. Yes 2. No

RISK FACTORS OF NCDs		
44	Risk factors for NCDs include	1. Alcohol Consumption 2. Tobacco Use 3. Unhealthy Diets 4. Low consumption of fruits and vegetables 5. Physical Inactivity 6. All of the Above
PREVENTION OF NCDs AND HEALTHY EATING		
45	Do you think diet plays an important role in preventing NCDs?	1. Yes 2. No
46	What are the general guidelines for NCD prevention?	1. Avoid tobacco use 2. Avoid alcohol consumption 3. Increase physical activity 4. Consumption of healthy diets 5. Stress management
47	What are the general dietary tips that you give to all NCD patients?	1. Consume a variety of fresh, seasonal and local fruits and vegetables 2. Eat whole grains and pulses 3. Avoid eating fried foods and bakery items. 4. Include foods from all food groups. 5. Eat whole fruits. 6. Avoid salty foods/ packed foods/ processed foods 7. Reduce consumption of sugar rich foods 8. Restrict intake of red meat and consume lean meat 9. Use mixture of vegetable oils 10. Drink plenty of water (8-10 glasses) daily. 11. Any other _____
48	Are you aware of the recommended daily fruits and vegetables intake?	1. Yes 2. No
49	If yes, what is the recommended intake?	1. 200g 2. 300g 3. 400g 4. 500g
50	Are you aware of the recommended daily fat/oil intake?	1. Yes 2. No
51	If yes, what is the recommended intake?	1. <15g 2. 15-20g 3. 20-25g 4. 25-30g
52	Are you aware of the recommended sugar intake per day?	1. Yes 2. No
53	If yes, how much sugar is recommended per day?	1. 15g 2. 20g 3. 25g 4. 30g
54	Do you know what is the daily salt intake recommended?	1. Yes 2. No
55	If yes, how much?	1. <5g/day 2. 5g/day 3. >5g/day
56	Do you counsel the population on how to prevent NCDs?	1. Yes 2. No

57	If yes, what topics are covered during counselling?	1. Low salt consumption 2. Adequate consumption of fruits and vegetables 3. Avoid tobacco consumption 4. Increase physical activity 5. Reduction of alcohol consumption 6. Any other, specify _____
58	How do you counsel the patients?	1. Individually 2. In groups 3. Both
59	Do you have any IEC material for counselling?	1. Yes 2. No
60	If yes, on what topics?	

APPENDIX VII
ASHA FACILITATOR PROFILE

1	આશા ફેસિલિટરનું નામ:	
2	હેલ્થ અન્ડ વેલનેસ કેન્દ્ર નું નામ:	
3	તમે કુલ કેટલી આશા કાર્યકરો ની દેખરેખ કરો છો?	
4	મોબાઈલ નંબર	
5	શિક્ષણ સ્તર	1. માધ્યમિક(૯ અને ૧૦ ધોરણ) 2. ઉચ્ચતર માધ્યમિક (૧૧ અને ૧૨ ધોરણ) 3. સ્નાતક (ગ્રેજુએટ) 4. અનુસ્નાતક (પોસ્ટ ગ્રેજુએટ) 5. અન્ય જણાવો _____
6	આશા ફેસિલિટર તરીકે કામ નો અનુભવ (વર્ષોમાં)	
7	શું તમે આશા ફેસિલિટર તરીકે કામ કરવા માટે કોઈ તાલીમ લીધી છે?	1. હા 2. ના
8	જો હા, તાલીમ ક્યાં અને કોના દ્વારા લેવામાં આવી હતી?	
9	તાલીમનો સમયગાળો કેટલો હતો?	
10	તાલીમમાં કયા કયા મુદ્દાઓ આવરી લેવા માં આવ્યા હતા?	
11	વસ્તી આધારિત સ્ક્રીનીંગ, બિન સંક્રમિત રોગોના (એનસીડી) નિવારણ અને સારવાર માટે કોઈ તાલીમ મળે છે?	1. હા 2. ના

12	જો હા, કેટલી તાલીમ મળેલ છે?	
13	તાલીમ ક્યાં અને કોના દ્વારા આપવામાં આવી હતી?	
14	તાલીમમાં શું સિખ્યા હતા?	
15	પોષ્ટિક આહાર માટે કાઉન્સેલીગ આપવા માટે તમે કોઈ તાલીમ મેળવી છે?	1. હા 2. ના
16	જો હા, તાલીમ ક્યાં અને કોના દ્વારા લેવામાં આવી હતી?	
17	તાલીમમાં શું સિખ્યા હતા?	
18	શું તમારી પાસે ખોરાક વિષે પરામર્શ આપવા માટે કોઈ IEC મટિરિયલ છે?	1. હા 2. ના
19	જો હા, તો IEC મટિરિયલ કયા કયા મુદ્દાવો આવરી લેવા માં આવેલ છે?	

20 **જોબ ચાર્ટ**

જોબ	સોમ	મગળ	બુધ	ગુરુ	શુક	શનિ
દરરોજ કઈ કઈ પ્રવૃત્તિઓ હાથ ધરવામાં આવે છે?						
મીટિંગ નું આયોજન						

APPENDIX VIII
KNOWLEDGE OF ASHA FACILITATOR ON HEALTHY DIET

1	તમે ખોરાક શબ્દ થી શું સમજો છો?	1. જે કંઈપણ ખાઈ શકાય અથવા પી શકાય 2. જે શરીરને પોષણ આપે છે 3. શરીરને શક્તિ આપે છે 4. અન્ય(જણાવો)_____
2	આપણા શરીર માટે જરૂરી મુખ્ય પોષક તત્વો કયા છે?	1. કાર્બોહાઇડ્રેટ 2. પ્રોટીન 3. ચરબી 4. વિટામિન્સ 5. ખનિજો
3	તમે પોષણ શબ્દ દ્વારા શું સમજો છો?	1. ખોરાક ને ખાવાની, પચાવાની, શોષણ અને પોષક તત્વોનું શોષણ પછી શરીરમાંથી કચરો દૂર કરવાની પ્રક્રિયા 2. અન્ય(જણાવો)_____
4	શું તમે ખોરાક ના જુદા જુદા જુથ વિશે ખબર છે?	1. હા 2. ના
5	જો હા, તો શરીરમાં તેમના કાર્યોને આધારે જુદા જુદા ખોરાક ના જૂથો કયા કયા છે?	1. શક્તિ આપવાનું 2. વૃધ્દિ અને વિકાસ માટે 3. રોગપ્રતિકારક શક્તિ વધારવા માટે
6	ખોરાક ના આધારે ખોરાક ના કયા કયા જૂથો છે?	1. અનાજ અને કંદમૂળ 2. દાળ અને કઠોળ 3. પાંદડાવાળા શાકભાજી 4. અન્ય શાકભાજી

		5. ફળો 6. દૂધ અને દૂધના ઉત્પાદનો 7. માંસ, માછલી અને મરઘાં 8. ચરબી, સૂકો મેવો અને તેલીબિયાં 9. ખાંડ અને ગોળ 10. અન્ય રેડી ટુ ઈટ ખોરાક
7	સંતુલિત આહાર દ્વારા તમે શું સમજો છો?	1. આહાર જે દરરોજ જરૂરી માત્રામાં બધા પોષક તત્વો પૂરા પાડે છે 2. તમને સ્વસ્થ રાખે છે 3. અન્ય (જણાવો)_____
8	શું તમે **હેલ્ધી ડાયટ** વિષે જાણો છો?	1. હા 2. ના
9	જો હા, તો **હેલ્ધી ડાયટ કોને કેહવાય** ?	1. આહાર જેમાં ફળો, શાકભાજી, કઠોળ , સૂકો મેવો અને આખા અનાજ શામેલ હોય 2. દિવસમાં ઓછામાં ઓછા 400 ગ્રામ ફળો અને શાકભાજી 3. <5% શર્કરામાંથી કુલ વપરાશના 4. ચરબીમાંથી કુલ <30%વપરાશના 5. દરરોજ <5 ગ્રામ મીઠું
10	શું તમે ભારતીય પોષણ સંસ્થા (એન.આઈ.એન) દ્વારા અપાયેલી આહાર માર્ગદર્શિકા વિશે જાણો છો?	1. હા 2. ના
11	શું તમે ફૂડ પિરામિડ વિશે ખબર છે ?	1. હા 2. ના
12	જો હા, તો જણાવો	
13	નીચેના પોષક તત્વોમાંથી 1 ગ્રામ દીઠ કેટલી ઉર્જા મળે છે?	1. કાર્બોહાઇડ્રેટ _____ 2. પ્રોટીન _____ 3. ચરબી _____
14	શું તમે આહાર વિવિધતા વિશે ખબર છે ?	1. હા 2. ના
15	જો હા, તો જણાવો	

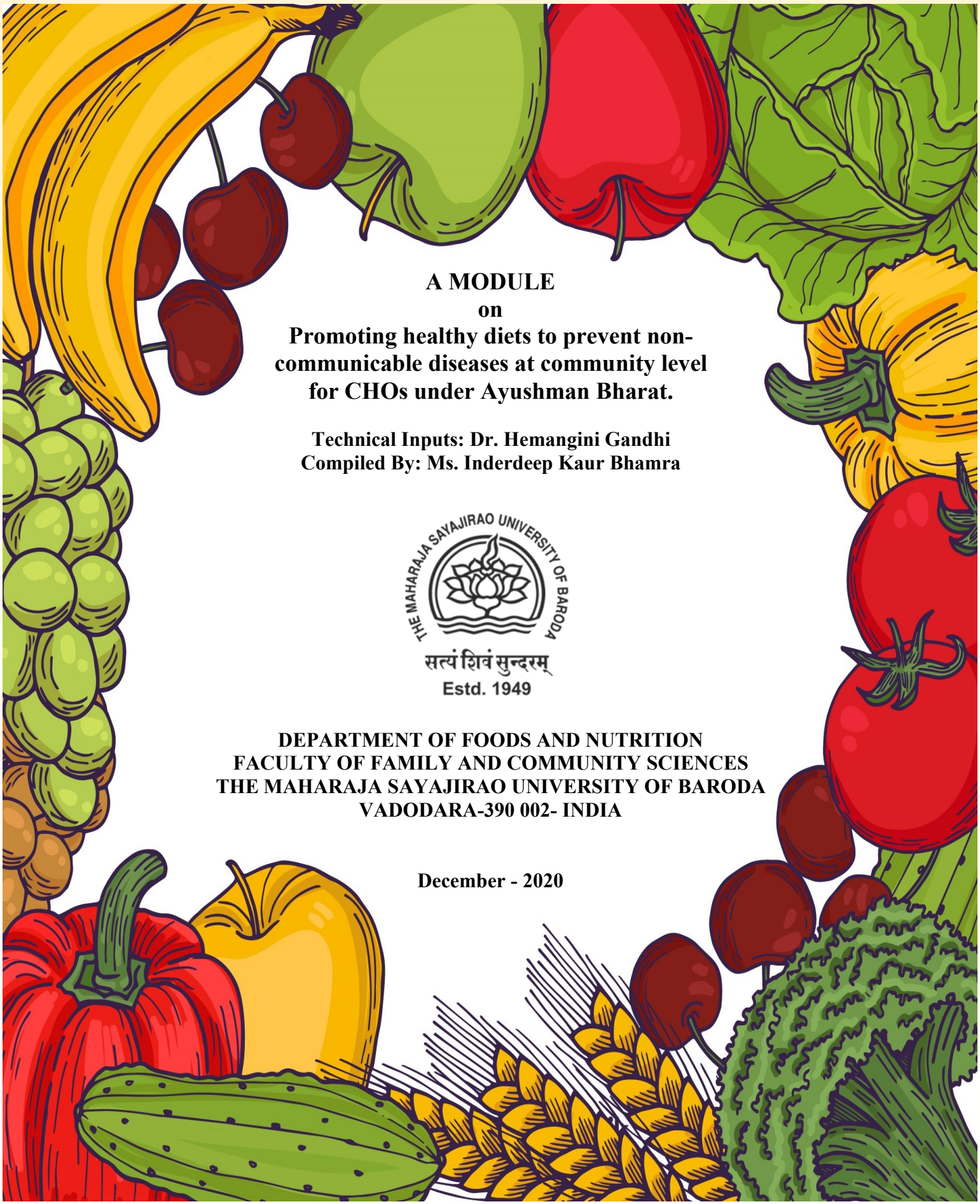
16	શું તમે ઈટ રાઇટ અભિયાન વિશે ખબર છે ?	1. હા 2. ના
17	જો હા, તો જણાવો	
18	શું તમે **'આજ સે થોડા કમ'** ટેગલાઇનથી વિશે ખબર છે ?	1. હા 2. ના
19	જો હા, તો તે શું ઘટાડવા પર ભાર મૂકે છે?	1. ચરબી 2. મીઠું 3. ખાંડ 4. બધા
20	શું તમે એન.સી.ડી શબ્દથી પરિચિત છો?	1. હા 2. ના
21	જો હા, એન.સી.ડી ના નામ જણાવો	1.ડાયબીટીસ 2. હૃદયરોગ 3.બ્લડ પ્રેશર 4. કેન્સર 5. અન્ય જણાવો_____
22	શું તમે દર્દીઓ ને આહાર માં વિવિધતાની માટે સલાહ આપો છો?	1. હા 2. ના
23	શું તમે તમારા દર્દીઓ માટે ઓછી કેલરી વાળો ખોરાક ખાવાની સલાહ આપો છો?	1. હા 2. ના
24	જો હા, તો તમે કોને સલાહ આપો છો?	1. સામાન્ય વજનવાળા દર્દી 2. વધુ વજનવાળા દર્દી 3. મેદસ્વી દર્દી
25	શું તમે ફંક્શનલ ફૂડ શબ્દથી પરિચિત છો?	1. હા 2. ના
26	જો હા, તો તમે તેને તમારા દર્દીઓ માટે ભલામણ કરો છો?	1. હા 2. ના
27	જો હા, તો તમે કયા ફંક્શનલ ફૂડ ભલામણ કરો છો? સ્પષ્ટ કરો.	
28	શું તમે તમારા દર્દીઓના આહારમાં જવાર, બાજરા, કોધરી જેવા હલકા ધાન્ય એનયુ સેવન વધારવા માટે સલાહ આપે છે ?.	1. હા 2. ના
29	જો હા, તો તમે કયા ધાન્ય ખાવાની સલાહ આપો છો?	

એન સી ડી થવાં માટે ના જવાબદાર પરિબળો		
30	બિન સંક્રમિત રોગો માટેના જોખમ પરિબળોમાં કયા કયા છે?	1. દારૂ નું સેવન 2. તમાકુનો ઉપયોગ 3. પોષ્ટિક આહાર નો અભાવ 4. ફળો અને શાકભાજીનો ઓછો વપરાશ 5. શારીરિક નિષ્ક્રિયતા 6. ઉપરના બધાજ
એન. સી. ડી નું નિવારણ અને હેલ્ધી ઇટિંગ		
31	શું તમને લાગે છે કે બિન સંક્રમિત રોગો (એન.સી.ડી.) ને રોકવા માટે આહાર મહત્વપૂર્ણ ભૂમિકા ભજવે છે?	1. હા 2. ના
32	બિનસંક્રમિત રોગો (એન.સી.ડી.)નિવારણમાટેની સામાન્ય માર્ગદર્શિકા કઈ છે?	1. તમાકુનો ઉપયોગ ટાળો 2. દારૂ ના સેવન ને ટાળો 3. શારીરિક પ્રવૃત્તિમાં વધારો 4. પોષ્ટિક ખોરાક નું સેવન 5. તણાવ ઓછો કરવો
33	તમે બધા બિનસંક્રમિત રોગો ના (એનસીડી) દર્દીઓ માટે સામાન્ય આહાર માટે શું સલાહ આપો છો ?	1. વિવિધ તાજા, મોસમી અને સ્થાનિક ફળો અને શાકભાજીનો વપરાશ કરો 2. આખા અનાજ અને કઠોળ ખાઓ 3. તળેલા ખોરાક અને બેકરી ની વસ્તુઓ ખાવાનું ટાળો. 4. બધા ખાદ્ય જૂથોમાંથી ખોરાક શામેલ કરો. 5. આખા ફળો ખાઓ. 6. વધું મીઠાવડા ખોરાક / પેક્ડ ખોરાક / પ્રોસેસ્ડ ખોરાક ટાળો 7. ખાંડવાળા ખોરાકનો વપરાશ ઓછો કરો 8. લાલ માંસના સેવનને પ્રતિબંધિત કરો અને દુર્બળ માંસનું સેવન કરો 9. વનસ્પતિ તેલોના મિશ્રણનો ઉપયોગ કરો 10. દરરોજ પુષ્કળ પાણી (8-10 ગ્લાસ) પીવો. 11. અન્ય જણાવો_____
34	તમને ખબર છે કે દર રોજે કેટલી માત્રા માં ફળો અને શાકભાજીના સેવન કરવું જોઇયે?	1. હા 2. ના

35	જો હા, તો કેટલું સેવન કરવું જોઇયે?	1.૨૦૦ગ્રામ 2. ૩૦૦ગ્રામ 3. ૪૦૦ગ્રામ 4. ૫૦૦ગ્રામ
36	શું તમને ખબર છે કે રોજ ચરબી / તેલના સેવન કેટલું કરવું જોઇયે ?	1. હા 2. ના
37	જો હા, તો દરરોજ કેટલું લેવું જોઇયે?	1. <૧૫ગ્રામ 2. ૧૫-૨૦ગ્રામ 3. ૨૦-૨૫ગ્રામ 4. ૨૫-૩૦ગ્રામ
38	શું તમને ખબર છે? રોજે ખાંડ નું સેવન કેટલું કરવું જોઇયે ?	1. હા 2. ના
39	જો હા, તો દરરોજ કેટલી ખાંડ લેવી જોઇયે?	1. ૧૫ગ્રામ 2. ૨૦ગ્રામ 3. ૨૫ગ્રામ 4. ૩૦ ગ્રામ
40	શું તમને ખબર છે? રોજનું મીઠું (સોલ્ટ) કેટલું ખાવુ જોઇયે?	1. હા 2. ના
41	જો હા, તો રોજે કેટલું મીઠું લેવું જોઇયે?	1. <૫ગ્રામ /દરરોજ 2. ૫ગ્રામ /દરરોજ 3. > ૫ગ્રામ /દરરોજ
42	શું તમે બિનસંક્રમિત રોગો ને કેવી રીતે અટકાવવી સકીએ તે અંગેની લોકો ને સલાહ આપો છો?	1. હા 2. ના
43	જો હા, તો પરામર્શ દરમિયાન કયા મુદ્દાઓ આવરી લેવામાં આવે છે?	1. મીઠાનું ઓછું વપરાશ 2. ફળો અને શાકભાજીનો પૂરતો વપરાશ 3. તમાકુનું સેવન ટાળો 4. શારીરિક પ્રવૃત્તિમાં વધારો 5. દારૂના વપરાશમાં ઘટાડો 6. અન્ય જણાવો _____
44	તમે દર્દીઓને સલાહ કેવી રીતે આપો છો?	1. વ્યક્તિગત રીતે 2. જૂથોમાં 3. બંને
45	કાઉસીલિંગ માટે તમારી પાસે કોઈ આઈ.ઇ.સી. સામગ્રી છે?	1. હા 2. ના
46	જો હા, તો કયા વિષયો પર?	

APPENDIX IX

TRAINING MODULE



A MODULE
on
Promoting healthy diets to prevent non-communicable diseases at community level for CHOs under Ayushman Bharat.

Technical Inputs: Dr. Hemangini Gandhi
Compiled By: Ms. Inderdeep Kaur Bhamra

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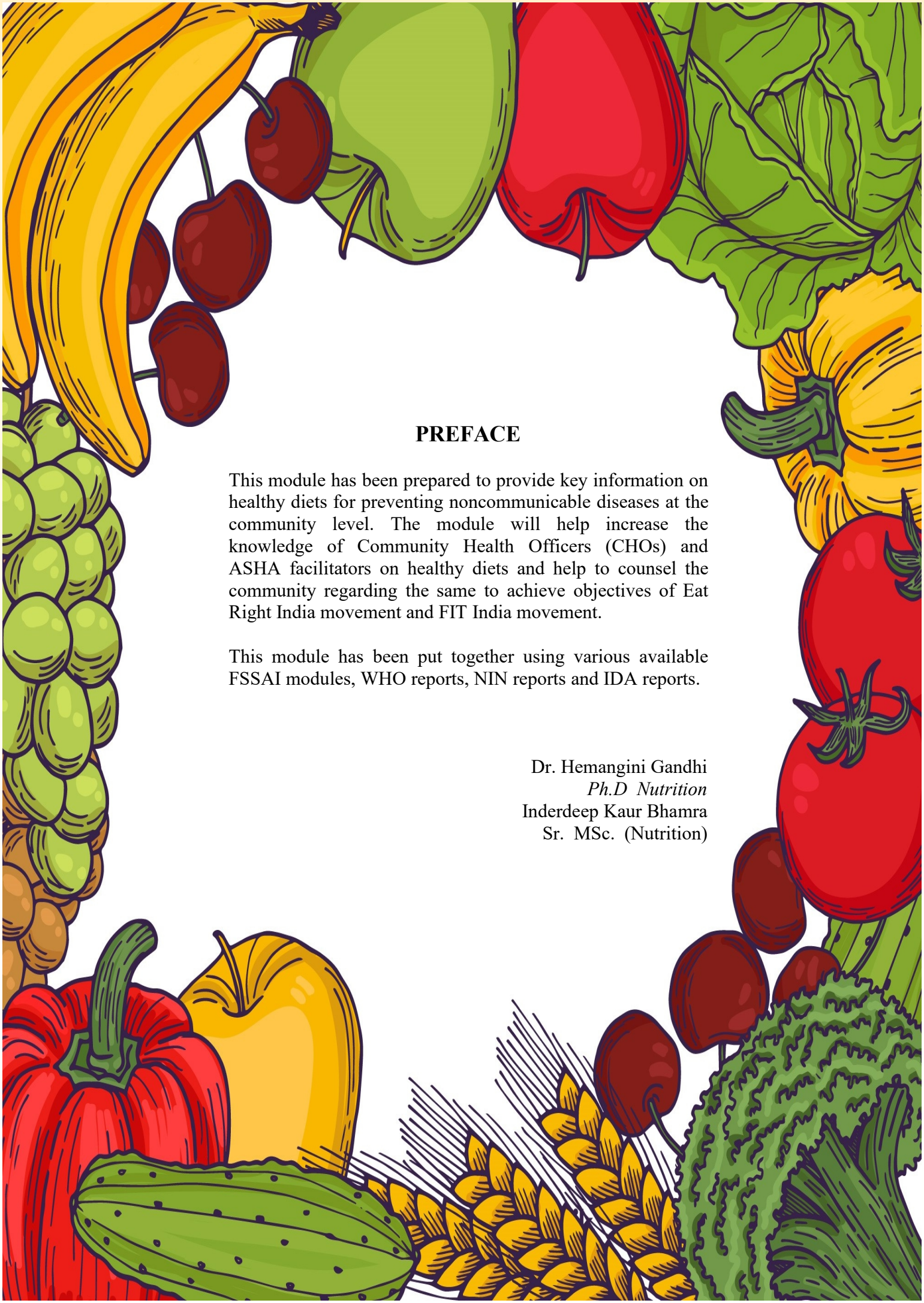
VADODARA-390 002- INDIA

December - 2020

CHOOSE A HEALTHY DIET

Source: WHO



PREFACE

This module has been prepared to provide key information on healthy diets for preventing noncommunicable diseases at the community level. The module will help increase the knowledge of Community Health Officers (CHOs) and ASHA facilitators on healthy diets and help to counsel the community regarding the same to achieve objectives of Eat Right India movement and FIT India movement.

This module has been put together using various available FSSAI modules, WHO reports, NIN reports and IDA reports.

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Sr. MSc. (Nutrition)

OUTLINE FOR TRAINING MODULE

CHAPTER 1: HEALTHY DIETS

- *What is Food and Nutrition?*
- *Concept of balanced diet and dietary diversity*
- *Introduction to different food groups*
- *Concept of Food Pyramid*
- *Concept of My Plate (NIN Guidelines)*
- *Concept of RDA*
- *What are healthy diets?*
- *Practical advice on maintaining a healthy diet*
- *Consequences of consuming unhealthy diets*

CHAPTER 2: INTRODUCTION TO NON-COMMUNICABLE DISEASES

- *Definition of NCDs*
- *Types of NCDs and its risk factors*
- *Burden of NCDs in India*
- *Voluntary NCD targets (WHO)*

CHAPTER 3: DIETS IN NON-COMMUNICABLE DISEASES

- *Diet, Nutrition and Hypertension*
- *Diet, Nutrition and Diabetes*
- *Concept of 'Aaj Se Thoda Kam'*
- *Role of functional foods in preventing NCDs*
- *Use of local and seasonal foods to improve dietary diversity*
- *Use of fortified foods*

CHAPTER 4: NUTRITION IN COVID-19

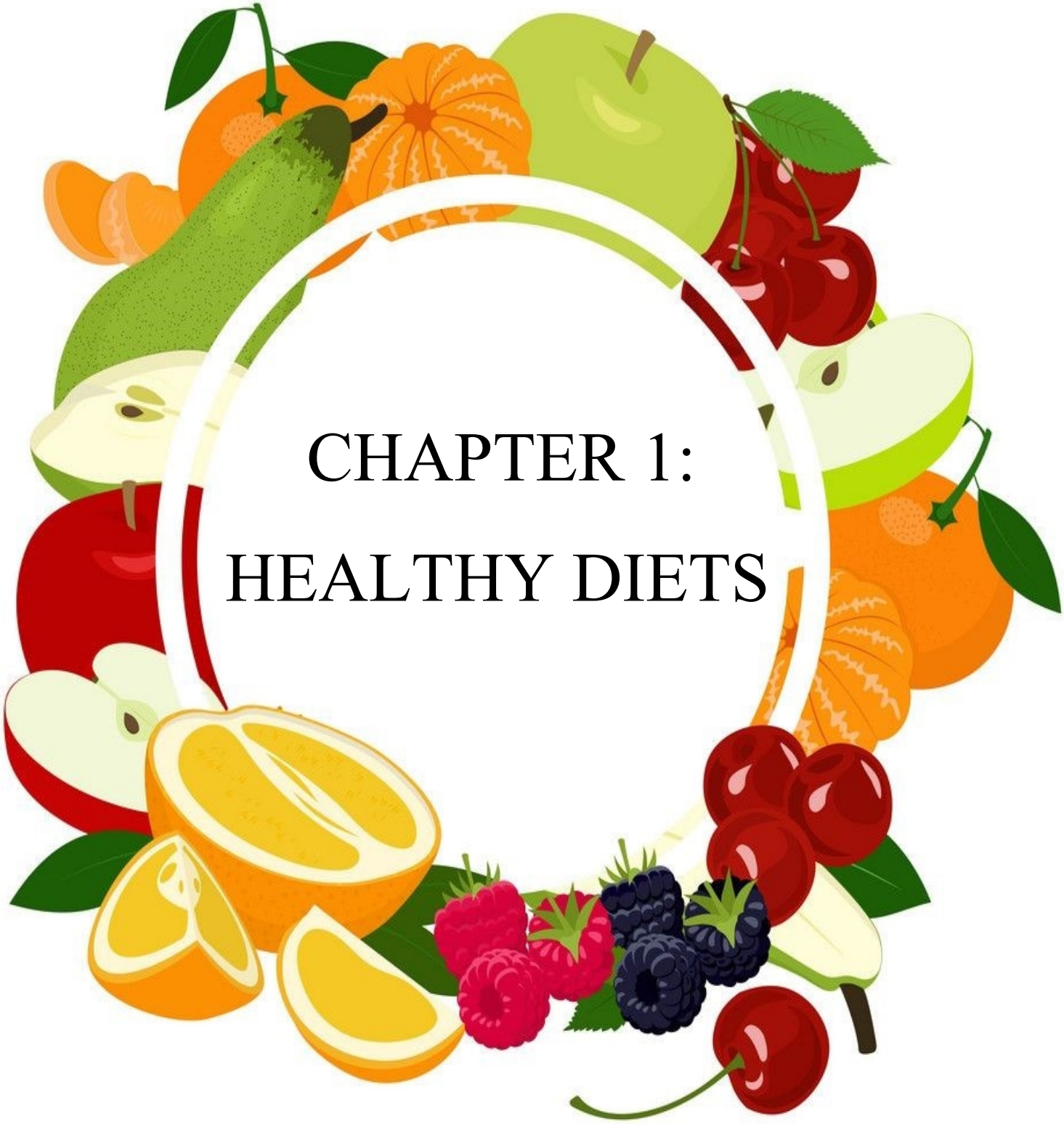
- *Covid-19 Precautions*
- *Role of specific nutrients and foods to maintain optimal immune function and good health.*
- *Traditional spices, condiments and herbs as immunity boosters.*

CHAPTER 5: NUTRITIONAL COUNSELLING

- *What is counselling?*
- *Basic counselling skills and tips for effective counselling*
- *Approach of counselling*
- *Role of CHO in promoting healthy dietary practices*

CHAPTER 6: COMMUNITY MOBILIZATION

- *What is community mobilization?*
- *Why mobilize the community?*
- *Community participation, its importance for promoting healthy diets.*



CHAPTER 1:

HEALTHY DIETS

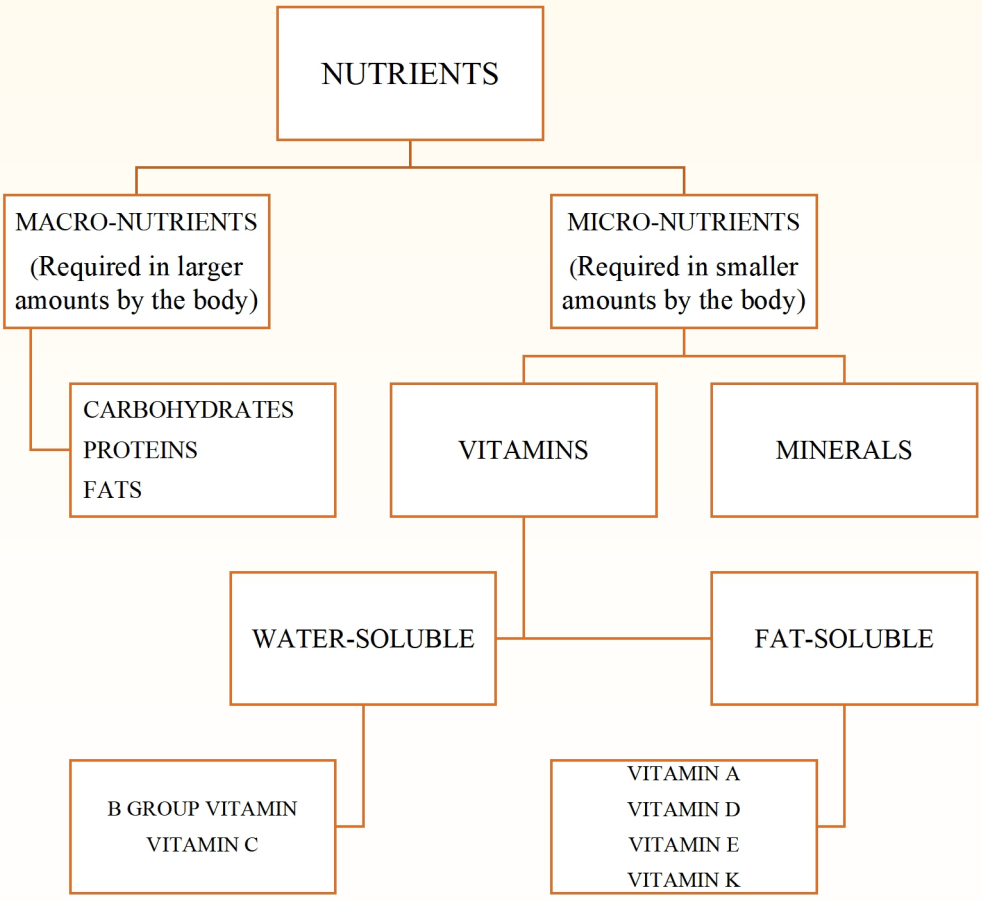
WHAT IS FOOD?

- Any substance which nourishes the body and is fit to eat.
- It is the source of energy and nutrients in our body.
- Food contains chemical components similar to those that make up the body called nutrients.

WHAT IS NUTRITION?

It is the process of ingestion, digestion, absorption, assimilation of nutrients and removal of waste products from the body.

TYPES OF NUTRIENTS



CARBOHYDRATES

- They are the body's main source of energy and fulfil the need of dietary fiber.
- 1 gram carbohydrate provides 4kcal.

Food Source	Types
• Cereals - wheat, rice, millets (ragi, jowar, bajra etc.), pulses, fruits, sugar, jaggery, sweets and preserves	• Sugars or simple carbohydrates • Starch or complex carbohydrates

PROTEIN

- Protein is essential for growth and repair and keeping cells healthy.
- 1 gram of protein provides 4kcal.

Sources of Protein	
Animal Sources: Meat, Fish, Eggs, Milk, Cheese 	**Plant Sources**: Pulses, lentils, beans, nuts and seeds, soyabean products. 

FATS

- Considered as calorie dense foods.
- 1 gram of fat provides 9kcal.
- **Food Sources**: Butter, ghee, vegetable oil, salad dressings, nuts and oil seeds, dairy products made with whole milk or cream and

VITAMINS

Food Sources: Fruits, vegetables, whole grains, dark green leafy vegetables, nuts and oilseeds, fortified food products.

	Vitamins	Functions
Fat-Soluble Vitamins	Vitamin A	Keeps skin and hair healthy, aids in night vision and plays a role in developing strong bones and teeth
	Vitamin D	Helps build strong bones and teeth and helps body use calcium and phosphorus.
	Vitamin E	Helps form red blood cells, muscles and other tissues.
	Vitamin K	Helps in clotting of blood.
Water-Soluble Vitamins	Vitamin B group	Helps body to use the energy from foods we eat and helps in brain, nerves and muscle function.
	Vitamin C	Helps in healing of wounds, maintaining healthy bones, teeth, blood vessels and helps body fight infection.

MINERALS

- Important macro minerals required by our body includes calcium, phosphorus, magnesium, sodium, potassium and iron.
- While zinc, copper, iodine, sulfur, chloride etc. are the micro minerals required by our body.

Iron

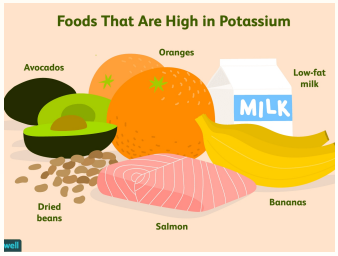
Function: Helps make hemoglobin in red blood cells and helps cells use oxygen.
Food Sources: Liver, kidney, heart, meat, egg yolk, dried beans and peas, spinach, dried fruit, whole-grain and enriched breads and cereals, nuts.

Iodine

Function: Needed for thyroid gland function.
Food Sources:Seafood, iodized salt and drinking water (in regions with iodine-rich soil, which are usually regions near an ocean).

Sodium

Function: Helps maintain the right balance of fluids in body, transmit nerve impulses and influence contraction and relaxation of muscles.
Food Sources: Processed and packed foods: canned vegetables, soups, pickles, meats, frozen foods, chips and namkeens. Condiments: table salt, soy sauce, ketchup, mustard etc. And natural sources like some meats, poultry, dairy products (like cheeses) and vegetables.



Potassium

Function: Helps in normal nerve and muscle function and maintaining the right amounts of water in the different parts of your body.
Food Sources: Milk, bananas, tomatoes, oranges, melons, potatoes, sweet potatoes, raisins, spinach, turnip greens, peas and beans.

Calcium and Phosphorus

Function: Helps build and maintain healthy bones and teeth. Also helps heart, nerves and muscles work properly.
Food Sources: Dairy products: milk, cheese, ice cream, green leafy vegetables, canned sardines and other processed fish eaten with bones.

WHAT IS BALANCED DIET?

A balanced diet is one which provides all the nutrients in required amounts from different food groups on regular basis.

HOW TO ACHIEVE A BALANCED DIET?

- Consume a variety of fresh, colourful and locally available fruits and vegetables.
- Eat whole grains, cereals and pulses (with outer covering) and their products.
- Eat whole fruits as they are rich in natural fiber.
- Limit the consumption of refined grains, including foods made with maida.
- Try including foods from each food group in your diet..
- Choose vegetable oils like mustard oil, groundnut oil, soybean oil etc. For cooking/frying. It is better to use different oils in rotation.
- Ensure moderate use of edible oils and animal foods.
- Limit the use of butter/ghee and avoid vanaspati and use of re-heated fats and oils.
- Drink plenty of water daily. Beverages like water, buttermilk, lassi, coconut water, lemon water/ nimbu paani, aam paana, kokum, sattu etc should be consumed instead of cold drinks and fruit juices.

CLASSIFICATION OF FOODS

There are various ways in which foods can be classified:

By Origin

- Plant Foods
- Animal Foods

By Nutritive Value

- Cereals and millets
- Pulses and legumes
- Leafy vegetables
- Other vegetables
- Fruits
- Milk and milk products
- Meat, fish and poultry
- Fats, nuts and oilseeds
- Sugar and jaggery
- Other miscellaneous foods

By Function

- Energy giving foods
- Body-Building foods
- Protective foods

Source: The 'Eat Right' Handbook, FSSAI

DIETARY DIVERSITY

- Dietary diversity is defined as a number of food groups consumed over a reference period.
- It reflects the concept that increasing the variety of foods and food groups in the diet helps to ensure adequate intake of essential nutrients.

FANTA (Food and Nutrition Technical Assistance) project has classified foods in 10 food groups to assess the dietary diversity score of population (Individual Dietary Diversity Score).

1.	Grains, roots and tubers
2.	Pulses (beans, peas and lentils)
3.	Nuts and seeds
4.	dairy
5.	Meat, poultry and fish
6.	Eggs
7.	Dark green leafy vegetables
8.	Other vitamin A-rich fruits and vegetables
9.	Other vegetables
10.	Other fruits

MDD-W (Minimum Dietary Diversity for women) is an indicator of whether women of 15-49 years of age have consumed atleast five out of ten food groups the previous day or night. It is an indicator to reflect micronutrient adequacy in the diet.

The Household Dietary Diversity (HDD) is meant to reflect the economic ability of a household to access a variety of foods.

Individual Dietary Diversity (IDD) aims to reflect nutrient adequacy. An individual consuming foods from five or more food groups have a greater possibility of meeting their micro-nutrient requirements than those consuming foods from fewer food groups.

FOOD PYRAMID

- The Food Pyramid is a guide to be used by the healthy population for the amount and types of foods to be included in the daily diet in order to stay healthy.
- It is a pictorial representation of different food groups and the quantity in which they should be consumed.

Source: The 'Eat Right' Handbook, FSSAI

MY PLATE (NIN Concept)

- 'My Plate for the day' represent proportions of different food groups for meeting 2000kcal.
- This concept is also used to keep a check on healthy intake and portion control of food.

Source: My Plate, National Institute of Nutrition.

Benefits of consuming food as per the model plate:

● Improves immunity and resistance to infections.
● Maintains good microbial flora (beneficial bacteria in the intestine).
● Prevents Diabetes Mellitus, Cardiovascular Diseases (CVDs) such as heart attack, stroke and many other diseases.
● Maintains appropriate alkalinity and thereby reduces inflammation and decreases chances of kidney stone formation.
● Prevents insulin resistance and maintains appropriate insulin sensitivity and glycemic index.
● Ensures adequate intake of fiber and therefore prevents constipation.
● Prevents adverse effects of environmental pollution and toxins such as heavy metals and pesticides by working as a detoxifying diet.

RECOMMEMDED DIETARY ALLOWANCES (RDA)

The recommended dietary allowances (RDA) are estimates of nutrients to be consumed daily to meet the requirements of all individuals in a given population.

The RDAs are suggested for physiological groups such as infants, pre-schoolers, children, adolescents, pregnant women, lactating mothers, and adult men and women, taking into account their physical activity.

SUMMARY OF RECOMMENDED INTAKES FOR OTHER MINERALS AND TRACE ELEMENTS

SNo.	Minerals/ Trace Element	Recommended intake (per day)
1	Phosphorous	1000 mg
2	Sodium	2000 mg
3	Potassium	3500 mg
4	Copper	2 mg
5	Manganese	4 mg
6	Chromium	50 µg
7	Selenium	40 µg

Source: Nutrient Requirements of Indians, 2020

The recent RDA, 2020 given by ICMR, NIN is summarized in *Table 1* : Summary of RDA for Indians, 2020 on Page 12.

Table 1: SUMMARY OF RDA FOR INDIANS – 2020

Age Group	Category of work	Body Wt	Protein	CHO	Calcium	Magnesium	Iron	Zinc	Iodine	Thiamine	Riboflavin	Niacin	Vit B6	Folate	Vit B12	Vit C	Vit A	Vit D
		(kg)	(g/d)	(g/d)	(mg/d)	(mg/d)	(mg/d)	(mg/d)	(µg/day)	(mg/d)	(mg/d)	(mg/d)	(mg/d)	(µg/d)	(µg/d)	(mg/d)	(µg/d)	(IU/d)
Men	Sedentary	65	54.0	130	1000	385	19	17	150	1.4	2.0	14	1.9	300	2.5	80	1000	600
	Moderate									1.8	2.5	18	2.4					
	Heavy									2.3	3.2	23	3.1					
Women	Sedentary	55	45.7	130	1000	325	29	13.2	150	1.4	1.9	11	1.9	220	2.5	65	840	600
	Moderate									1.7	2.4	14	1.9					
	Heavy									2.2	3.1	18	2.4					
	Pregnant woman	55 + 10	+9.5 (2^{nd} trimester) +22.0 (3^{rd} trimester)	175	1000	385	40	14.5	250	2.0	2.7	+2.5	2.3	570	+0.25	+15	900	600
	Lactation 0-6m		+16.9	200	1200	325	23	14	280	2.1	3.0	+5	+0.26	330	+1.0	+50	950	600
	7-12m		+13.2	200						2.1	2.9	+5	+0.17	330				
Infants	0-6 m*	5.8	8.1	55	300	30	-	-	100	0.2	0.4	2	0.1	25	1.2	20	350	400
	6-12m	8.5	10.5	95	300	75	3	2.5	130	0.4	0.6	5	0.6	85	1.2	27	350	400
Children	1-3y	11.7	11.3	130	500	135	8	3.0	90	0.7	0.9	7	0.9	110	1.2	27	390	600
	4-6y	18.3	15.9	130	550	155	11	4.5	120	0.9	1.3	9	1.2	135	1.2	32	510	
	7-9 y	25.3	23.3	130	650	215	15	5.9	120	1.1	1.6	11	1.5	170	2.5	43	630	
Boys	10-12y	34.9	31.8	130	850	270	16	8.5	150	1.5	2.1	15	2.0	220	2.5	54	770	600
Girls	10-12y	36.4	32.8	130	850	255	28	8.5	150	1.4	1.9	14	1.9	225	2.5	52	790	600
Boys	13-15y	50.5	44.9	130	1000	355	22	14.3	150	1.9	2.7	19	2.6	285	2.5	72	930	600
Girls	13-15y	49.6	43.2	130	1000	325	30	12.8	150	1.6	2.2	16	2.2	245	2.5	66	890	600
Boys	16-18y	64.4	55.4	130	1050	405	26	17.6	150	2.2	3.1	22	3.0	340	2.5	82	1000	600
Girls	16-18y	55.7	46.2	130	1050	335	32	14.2	150	1.7	2.3	17	2.3	270	2.5	68	860	600

* AI

Source: Nutrient Requirements of Indians, 2020, ICMR-NIN

HEALTHY DIETS

A healthy diet helps to protect against malnutrition in all its forms, as well as noncommunicable diseases (NCDs) such as diabetes, heart disease, stroke and cancer.

WHO GUIDELINES FOR HEALTHY DIETS

A healthy diet includes the following:

- Fruit, vegetables, legumes (e.g. lentils and beans), nuts and whole grains (e.g. unprocessed maize, millet, oats, wheat and brown rice).
- At least 400 g (i.e. five portions) of fruit and vegetables per day, excluding potatoes, sweet potatoes, cassava and other starchy roots.
- Less than 5% of total energy intake from free sugars, which is equivalent to 25g (about 6 teaspoons).
- Less than 30% of total energy intake from fats, which is equivalent to 30g.
- Less than 5 g of salt (equivalent to about one teaspoon) intake per day.

PRACTICAL ADVICE ON MAINTAINING A HEALTHY DIET

Fruit and vegetables

Eating at least 400g, or five portions, of fruit and vegetables per day reduces the risk of NCDs and helps to ensure an adequate daily intake of dietary fibre.

Fruit and vegetable intake can be improved by:

- always including vegetables in meals
- eating fresh fruit and raw vegetables as snacks
- eating fresh fruit and vegetables that are in season
- eating a variety of fruit and vegetables.
- promoting Nutri kitchen garden at household level.

Fats

Reducing the amount of total fat intake to less than 30% of total energy intake helps to prevent unhealthy weight gain in the adult population.

The risk of developing NCDs is lowered by:
● reducing saturated fats to less than 10% of total energy intake
● reducing trans-fats to less than 1% of total energy intake
● replacing both saturated fats and trans-fats with unsaturated fats

Fat intake can be reduced by:
● steaming or boiling instead of frying when cooking
● replacing butter, lard and ghee with oils rich in polyunsaturated fats, such as soybean, canola (rapeseed), corn, safflower and sunflower oils
● eating reduced-fat dairy foods and lean meats, or trimming visible fat from meat
● limiting the consumption of baked and fried foods, and pre-packaged snacks and foods that contain trans-fats.

Salt, sodium and potassium

Most people consume too much sodium through salt (consuming an average of 9–12 g of salt per day) and not enough potassium (less than 3.5 g). High sodium intake and insufficient potassium intake contribute to high blood pressure, which in turn increases the risk of heart disease and stroke.

Salt intake can be reduced by:
● limiting the amount of salt and high-sodium condiments (e.g. soy sauce) when cooking and preparing foods
● not having salt or high-sodium sauces on the table
● limiting the consumption of salty snacks
● choosing products with lower sodium content

Potassium can mitigate the negative effects of elevated sodium consumption on blood pressure. Intake of potassium can be increased by consuming fresh fruit and vegetables. At least 1 banana a day will help in improving potassium intake.

Sugar

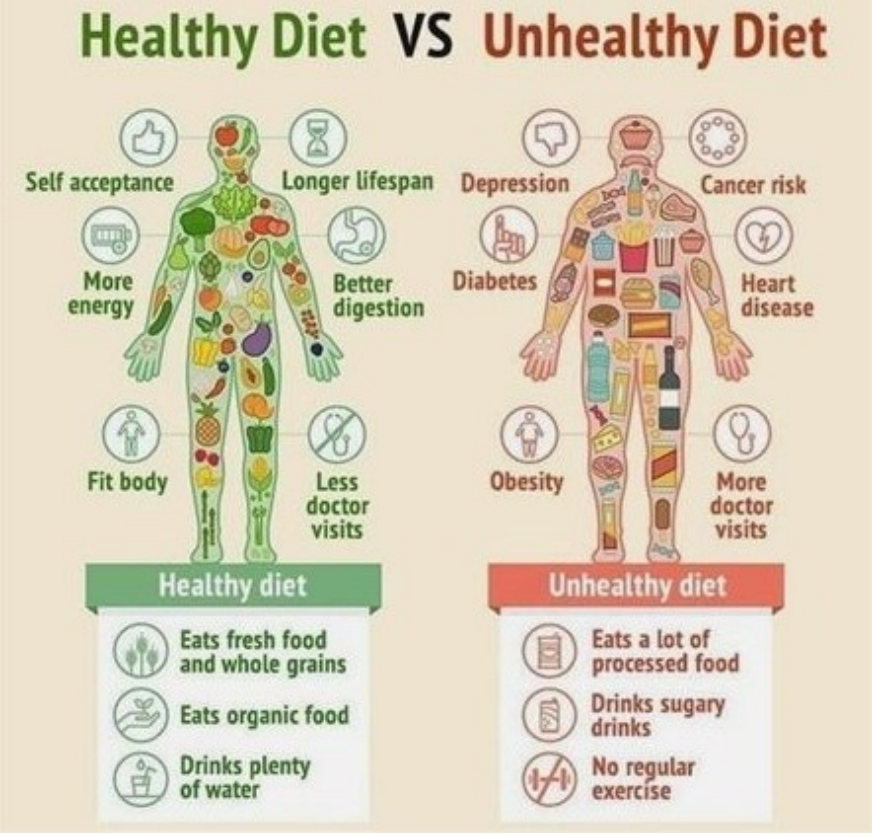
A reduction to less than 5% of total energy intake from free sugars reduces risk factors for cardiovascular diseases.

Sugars intake can be reduced by:
● limiting the consumption of foods and soft drinks containing high amounts of sugars, such as sugary snacks, candies and sugar-sweetened beverages
● eating fresh fruit and raw vegetables as snacks instead of sugary snacks.

UNHEALTHY DIET

A Diet rich in sugar, salt, fat, foods such as red meat - mutton, liver; milk and milk products such as full cream milk, butter, ghee, but low in the amount of fruits and vegetables is called an Unhealthy Diet.

Advantages of Healthy Diet:



Source: nhm.gov.in

CHAPTER 2:

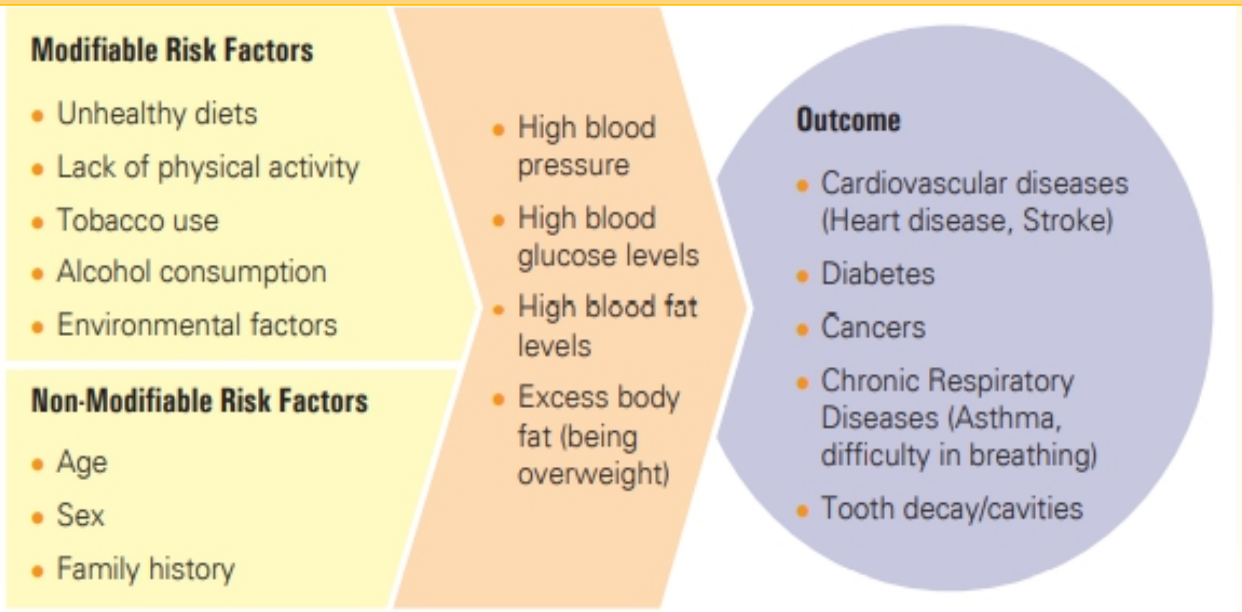
INTRODUCTION TO NON-COMMUNICABLE DISEASES

- Noncommunicable Diseases (NCDs), also known as chronic diseases, are conditions which do not spread from person to person. NCDs tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors.
- One of the most serious concerns about NCDs is that they affect people in the productive years of their life. They also cause "premature deaths" - that is, a death occurring before the average life expectancy.

MAJOR TYPES OF NCDs

RISK FACTORS FOR NCDs

Risk factor is an aspect of personal behaviour or lifestyle, an environmental exposure or a hereditary characteristic that is associated with an increase in the occurrence of a particular disease, injury or other health condition.



Source: WHO STEPwise approach to NCD surveillance, WHO 2003

Noncommunicable Diseases
4 Diseases, 4 Modifiable Shared Risk Factors

	Tobacco Use	Unhealthy diets	Physical Inactivity	Harmful Use of Alcohol
Cardio-vascular	✓	✓	✓	✓
Diabetes	✓	✓	✓	✓
Cancer	✓	✓	✓	✓
Chronic Respiratory	✓			

Source: WHO

Body Mass Index (BMI) is a screening tool that can indicate whether a person is underweight or if they have healthy weight, are overweight or obese.

Being overweight or obese can lead to a variety of health conditions, such as diabetes, high blood pressure and cardiovascular problems.

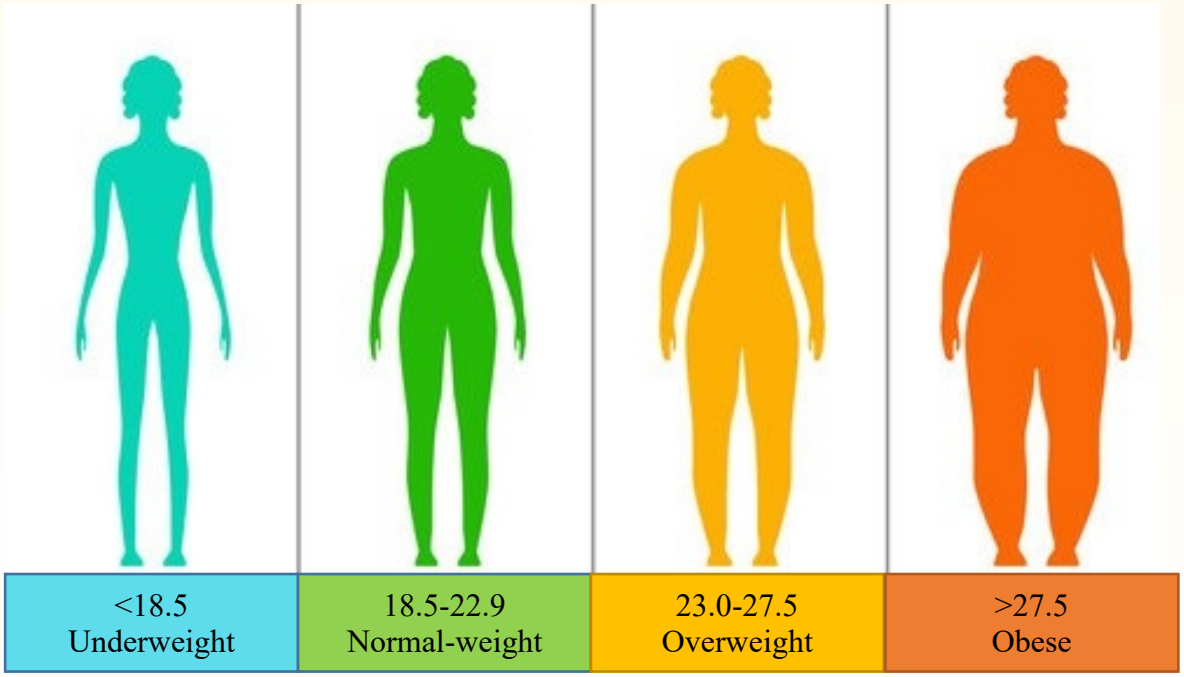
If a person's BMI is outside of the healthy range, their health risks may increase significantly.

Calculating BMI involves measuring a person's height and body weight and applying the given formula;

$$\textbf{BMI} = \textbf{Weight in Kg}/(\textbf{Height in m})^2$$

The following table shows Asian standard weight status categories associated with BMI ranges for adults.

BMI	Weight Status
Below 18.5	Underweight
18.5-22.9	Normal-weight
23.0-27.5	Overweight
27.5 and above	Obese



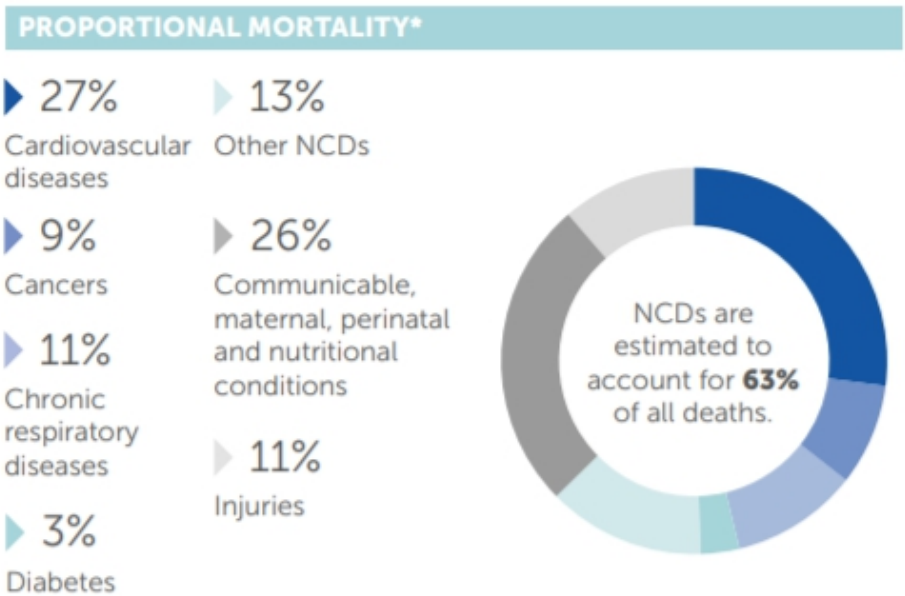
A calorie restricted diet is recommended to overweight and obese people along with 45-60 minutes physical activity everyday to get to a healthy weight.

- Non-alcoholic fatty liver diseases (NAFLD),is emerging as an important cause of liver disease in India.
- Studies suggest the prevalence of NAFLD is around 9% to 32% of the general population in India with a higher prevalence in those with overweight or obesity and those with diabetes or pre-diabetes.
- NAFLD is an independent predictor of future risk of cardiovascular diseases, diabetes and other metabolic syndromes like hypertension, abdominal obesity, dyslipidemia, glucose intolerance and can be prevented through lifestyle changes, early diagnosis and management of associated NCDs.
- Now NAFLD has become a part of the programme NPCDCS (National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke since 22nd February 2021.

BURDEN OF NCDs IN GUJARAT

Indicators	NFHS 5	
	Urban	Rural
Blood Sugar Level among Adults (age 15 years and above)		
Women		
Blood sugar level - high (141-160 mg/dl) (%)	8.4	7.9
Blood sugar level - very high (>160 mg/dl) (%)	7.6	6.1
Men		
Blood sugar level - high (141-160 mg/dl) (%)	9.5	8.5
Blood sugar level - very high (>160 mg/dl) (%)	7.3	6.9
Hypertension among Adults (age 15 years and above)		
Women		
Mildly elevated blood pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	11.4	12.0
Moderately or severely elevated blood pressure (Systolic ≥160 mm of Hg and/or Diastolic ≥100 mm of Hg) (%)	3.8	5.1
Men		
Mildly elevated blood pressure (Systolic 140-159 mm of Hg and/or Diastolic 90-99 mm of Hg) (%)	12.7	13.3
Moderately or severely elevated blood pressure (Systolic ≥160 mm of Hg and/or Diastolic ≥100 mm of Hg) (%)	3.9	4.8
Nutritional Status in Adults (age 15-49 years)		
Women whose BMI is below normal (BMI<18.5 kg/m^2) (%)	17.2	30.9
Men whose BMI is below normal (BMI<18.5 kg/m^2) (%)	16.0	24.7
Women who are overweight or obese (BMI ≥ 25.0 kg/m^2) (%)	30.4	17.0
Men who are overweight or obese (BMI ≥ 25.0 kg/m^2) (%)	25.6	15.6

Source: NFHS 5



Source: WHO, Noncommunicable disease country profile (India), 2016

Over the past decade, industrialization, urbanization, economic development and market globalization have observed changes that is reflected in shift in dietary patterns like increased consumption of energy-dense diet high in fat, particularly saturated fat, foods rich in sodium and refined carbohydrates along with a sedentary lifestyle increasing the risk of NCDs like hypertension, diabetes and some types of cancer. Therefore diet, nutrition and physical activity play a major role in preventing chronic diseases.

VOLUNTARY NCD TARGETS (WHO)

Source: WHO

LEVELS OF PREVENTION OF NCDs

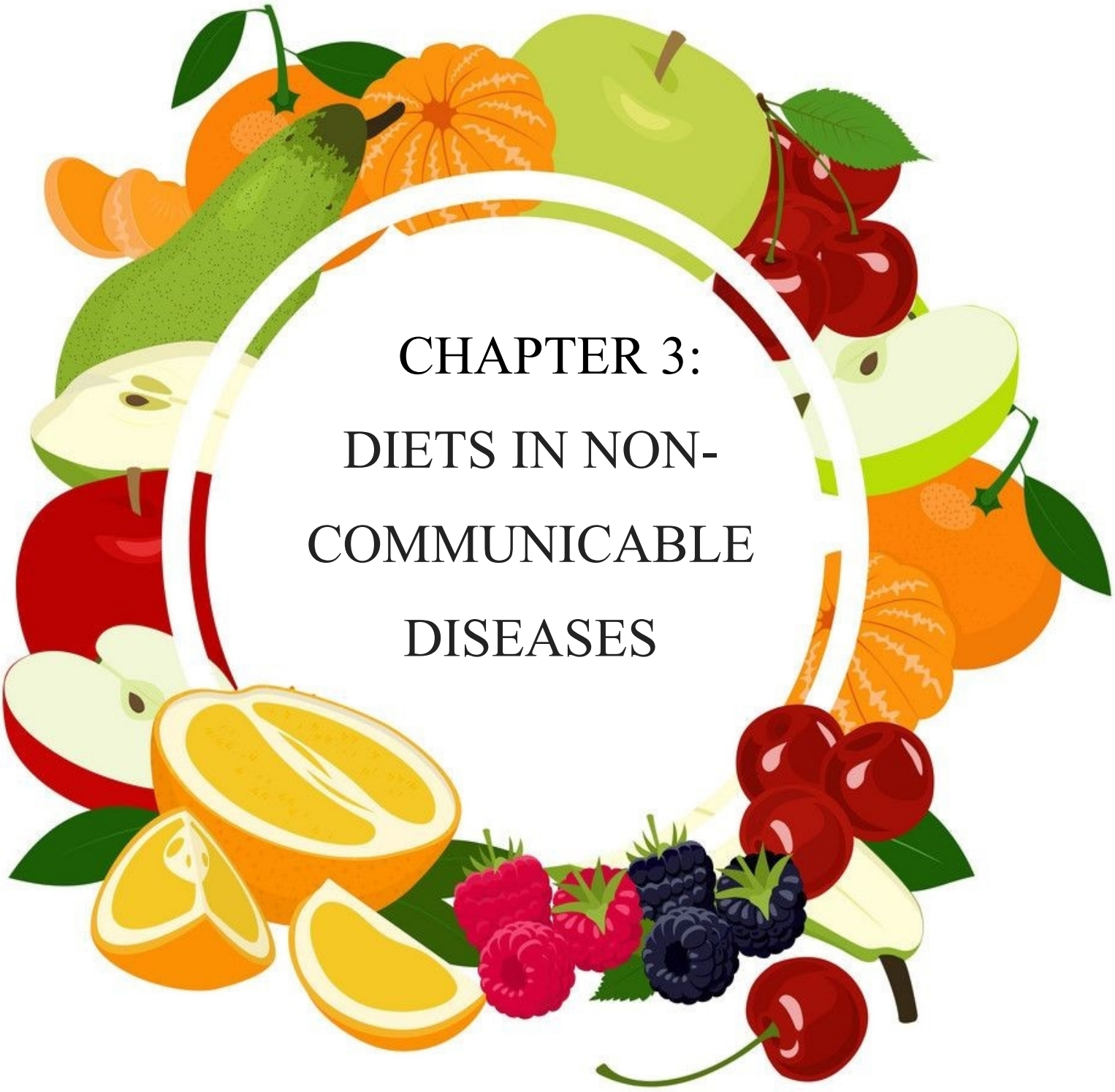
Primordial Prevention: Primordial prevention consists of a set of interventions targeted at preventing the emergence of risk factors in population groups in which they have not appeared. It includes healthy, risk-free populations. Interventions involve various settings such as community-based interventions, workplace interventions and school-based interventions.

Primary Prevention: When action is taken before the onset of risk factors i.e. through education activities in the community (in schools, self-help groups, women's groups, farmers, youth groups, factory workers etc.). Prevention involves the development of an effective communication strategy to modify individual, group and community behaviour. It focuses on community mobilization and participation and mainstreaming the health promotion agenda to reach till the village level.

Secondary Prevention: Screening, medical examination and referrals for early intervention for high blood pressure or excess weight helps to reduce risk factors from becoming complicated and developing into NCDs.

Tertiary Prevention: It is used when the disease process has advanced beyond its early stages. Interventions involved in this stage includes disability, limitation and rehabilitation. Counselor has a limited role in tertiary prevention.

Primary and Secondary Prevention are included as components under Ayushman Bharat-Health and Wellness Center (AB-HWC).



CHAPTER 3: DIETS IN NON-COMMUNICABLE DISEASES

DIET, NUTRITION AND HYPERTENSION

- It is best to follow a balanced diet with an emphasis on whole grains, fruits and vegetables for controlling blood pressure levels.
- DASH diet is recommended in management of hypertension to maintain blood pressure levels in the desired range.

DASH DIET

DASH stands for ***D**ietary **A**pproach To **S**top **H**ypertension*.

- It is a lifelong approach to healthy eating that is designed to help treat or prevent high blood pressure (hypertension).
- It encourages you to reduce the sodium, fat and alcohol in your diet and eat a variety of foods rich in nutrients like potassium, calcium and magnesium that help lower blood pressure.
- The regular DASH diet recommends no more than 1 teaspoon (2,300 mg) of sodium per day.
- The lower salt version recommends no more than 3/4th teaspoon (1,500 mg) of sodium per day.
- Other health benefits of DASH diet includes preventing osteoporosis, cancer, heart disease, stroke and diabetes.

Source: National Heart, Lung and Blood Institute, US

HOW TO MAKE YOUR DIET MORE DASH DIET?

- Eat more vegetables and fruits
- Swap refined grains with whole grains
- Choose fat-free or low-fat dairy products
- Choose lean protein sources like fish, poultry and beans
- Cook with vegetable oils
- Limit your intake of foods high in added sugars, like soda and candy.
- Limit intake of foods high in saturated fats like fatty meats, full-fat dairy and oils like coconut and palm oil.

Foods to be excluded:

- Extra salt, salt shaker on dining table, pickles, papad, canned foods, preserved food, sauces, jams, jellies, ketchup, instant soups, soup cubes, packaged foods.
- Salted nuts, chips, bread, popcorn etc.
- Bakery products such as biscuits, cookies, bread, cakes, donuts, waffles, puffs, khari etc. Fried snacks and savouries.
- Smoked, processed or cured meats, pork, beef, red meat, egg yolk and salted and dried fish.
- Avoid use of margarine, vanaspati and butter.
- Avoid reheating and reusing of oil.

DIET, NUTRITION AND DIABETES

The glycemic index (GI) is a value used to measure how much specific foods increase blood sugar levels.

Foods are classified as low, medium, or high glycemic foods and ranked on a scale of 0–100.

Low GI - 0-55

Medium GI - 55-69

High GI - 70-100

The lower the GI of a specific food, the less it may affect your blood sugar levels.

- Foods high in refined carbs and sugar are digested more quickly and often have a high GI, while foods high in protein, fat, or fiber typically have a low GI.
- Foods that contain no carbs are not assigned a GI and include meat, fish, poultry, nuts, seeds, herbs, spices, and oils.

One limitation of GI values is that they don't reflect the likely quantity you would eat of a particular food.

To address this problem, researchers have developed the idea of glycemic load (GL), a numerical value that indicates the change in blood glucose levels when you eat a typical serving of the food.

The values are generally grouped in the following manner:
● Low GL: 1 to 10
● Medium GL: 11 to 19
● High GL: 20 or more

A GI diet prescribes meals primarily of foods that have low values. Examples of foods with low, middle and high GI values include the following:

- **Low GI:** Green vegetables, most fruits, raw carrots, kidney beans, chickpeas, lentils and bran breakfast cereals
- **Medium GI:** Sweet corn, bananas, raw pineapple, raisins, oat breakfast cereals, and multigrain, oat bran or rye bread
- **High GI:** White rice, white bread and potatoes

Foods to include:
● Whole grain cereals and millets like sorghum (jowar), pearl millet (bajra), finger millet (ragi), foxtail millet etc.
● Dal and pulses like kidney beans, chickpea, green gram etc.
● Low-fat milk and milk products like curd, buttermilk and cottage cheese (paneer)
● Egg white, fish such as mackerel (bangada), hilsa, katla, rawas (Indian salmon), halwa (black pomfret), tarle (sardines) and chicken (without skin).
● Choose low GI and low GL fruits and vegetables greens and other vegetables (4-5 portions)
● Seasonal fruits in moderation (1-2 portions based on glycemic load)
● Handful of mixed nuts (almonds, walnuts, pistachios) replacing one cereal exchange
● Oil 500ml/ month per person
Foods to be excluded:
● Refined flour, bakery products-biscuits, cookies, rusk, bread, cakes, donuts, waffles
● Whole milk and milk products, cream
● Smoked, processed or cured meats, pork, beef, red meat, fried chicken and fried fish
● Fruit juices, dates, raisins
● Palm oil, margarine, vanaspati, butter. Avoid reheating and recycling of oil.
● Carbonated beverages, sweets, ice cream and chocolates.
● Fried snacks and savouries such as vadas, samosas, pakoras, chivda, farsan, wafers etc.

Diet and physical activity guidelines:
● Include all food groups in the diet. Maintain diet diversity.
● Macronutrient distribution should be based on individualized assessment of current eating patterns and metabolic goals.
● The carbohydrate foods selected should be rich in soluble and insoluble dietary fibre, vitamins and minerals but low in added sugars, fats and sodium. Choose on food sources low in glycemic index and low glycemic load. Choose on complex carbohydrates, consume a variety of whole grains. Avoid simple carbohydrates such as refined grains, sugar, sweets and sweetened beverages. Reducing overall carbohydrate intake aids in improved glycemic control.
● For protein, choose from skimmed milk and its products, pulses, beans, fish, lean meat and nuts. Limit red meat, processed meat and cheese.
● Limit total fat intake to less than 25% and saturated fat intake less than 7% of total calorie intake from fats. Avoid trans fats. Use healthy oils for cooking; be mindful of the quantity. Roast, broil, grill, steam or bake instead of deep-frying or pan-frying.
● Consume timely, nutritionally balanced meals in specified quantities as advised by the dietitian.
● Prior to the main course, consume a salad or sprouted whole gram or unstrained vegetable soup.
● Include fibre rich sources such as whole grains, legumes, pulses and vegetables in all the meals.
● Restrict the consumption of visible sugars- palm sugar, jaggery and honey.
● Can include fenugreek seeds in daily diet in the form of powder or sprouted seeds before major meals.
● Aim for less than 1 level teaspoon of salt per day. Instead use lemon, kokum, amchur powder, vinegar or herbs to add flavour to the food.
● Ensure to include 2-2.5 l of water to meet daily requirement unless advised by your doctor.
● Consume alcohol in moderation.
● Regular moderate intensity exercise will help to improve physical and mental wellbeing.

THE EAT RIGHT MOVEMENT - 'AAJ SE THODA KAM'

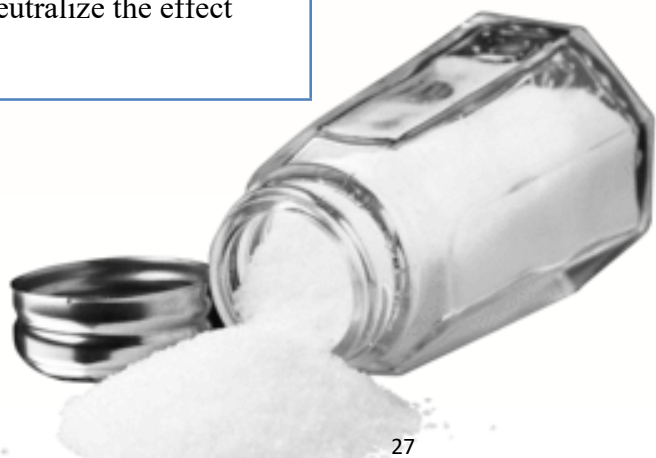
- Food Safety and Standards Authority of India launched 'Aaj Se Thoda Kam' campaign as a preventive healthcare measure to address various lifestyle related non-communicable diseases.
- The campaign aims to promote reduction of salt, sugar and fat intake by delivering the message very effectively, and educating people through communication material and TVCs.

fssai
भारतीय खाद्य संरक्षा एवं मानक प्राधिकरण
विश्वास का वायदा, सुरक्षित एवं पौष्टिक खाद्य का आश्वासन
स्वास्थ्य एंव परिवार कल्याण विभाग, भारत सरकार

NAMAK KAM

- Salt is the main source of sodium in our diet.
- High sodium is a risk factor for high blood pressure, which leads to heart problems.
- The average Indian consumes nearly double the recommended amount of salt everyday.

Simple tips to reduce salt consumption:
● Gradually reduce the use of salt in your daily diet.
● Track and monitor the consumption of salt at home - buy and use only a fixed quantity every month.
● Do not add salt to rice or to atta while cooking chapattis.
● Avoid sprinkling salt on salad, cut fruits, curd and even cooked food.
● Enjoy, in moderate quantities, foods such as papads, pickles, sauces, ketchups, salted biscuits, etc. that are high in sodium.
● Limit intake of foods described as pickled, brined, barbecued, cured or smoked as they tend to be high in sodium.
● Switch from salted namkeens and snacks to fresh fruits and vegetables.
● Drink plenty of water everyday to flush out toxins and excess of sodium from the body.
● Eat fruits and vegetables, which are rich in potassium, to neutralize the effect of sodium in the body.



CHEENI KAM

High intake of sugar is a risk factor for obesity and can lead to diabetes and other diet-related non-communicable diseases.

Simple tips to reduce sugar consumption:
● Gradually reduce the use of sugar in your daily diet.
● Track and monitor the consumption of sugar at home - buy and use only a fixed quantity every month.
● Use naturally sweet ingredients rather than refined sugars. For example, in fruit-based desserts add more fruits for natural sweetness.
● Limit the intake of cakes, pastries, confectionery and sweets prepared with refined cereals containing high amounts of sugar.
● Limit the consumption of sugar-sweetened beverages and sugary snacks.
● Instead of drinking fruit juice, eat fresh whole fruits. It provides fiber, which gives a feeling of fullness and fewer calories.
● Moderate the intake of sugar-preserved foods like jams, jellies, marmalades and sugary snacks.
● Prevent children from overindulging in chocolates and candies that may put them at risk of obesity and other non-communicable diseases later in life.
● Limit the amount of desserts you eat and use less sugar in preparing them.

GHEE - TEL KAM

Excess of fat intake is a risk factor for obesity and non-communicable diseases like diabetes and heart diseases.

Simple tips to reduce fat consumption:
● Gradually reduce the use of oil in your daily diet.
● Track and monitor the consumption of oil at home - buy and use only a fixed quantity every month and try reducing its quantity further.
● Measure cooking oil with a small spoon rather than pouring freely from the bottle.
● Change the type of oil every three month and use two different types of oils at a time..
● Do not repeatedly reheat oil or re-use the same oil for frying or cooking.
● Avoid frying as much as possible. Instead boil, steam, roast or grill food.
● Moderate the use of butter, ghee and vanaspati that re rich in saturated or trans-fats.
● Moderate the consumption of bakery products or processed foods high in fat.
● Choose lean meat sources like chicken or fish over red meat or organ meat, if you are non-vegetarian.

ROLE OF FUNCTIONAL FOODS IN PREVENTING NCDs

Functional foods have active compounds like vitamins, probiotics, antioxidants, fibers etc. that support health and help prevent various diseases.

Functional foods are generally classified into two groups:	
Conventional Foods	Natural, whole-food ingredients that are rich in active compounds. **Example**: Pears, apples, oranges, bananas, cauliflower, spinach, almonds, cashews, flax seeds, barley, ragi etc.
Modified Foods	Foods fortified with additional ingredients, such as vitamins, minerals, probiotics or fiber to increase a food's health benefits. **Example**: Fortified juices, fortified milk, fortified grain flours etc.

A variety, from each food group of a balanced diet, everyday, is the prescription of functional foods for reducing risk of NCDs.

Advantages of functional foods:
● Can be consumed three or more times a day as needed.
● Available locally & seasonally and is priced reasonably.
● Causes no unhealthy side effects when consumed according to guidelines.
● Tastes good and is proven effective throughout a long history of use.
● Is suitable for all ages and needs no prescription

Aahaar Aoj Ausadh		
Herb/ Spice	**Gujarati Name**	**Health Benefit**
Fenugreek seeds	Methi	Improves blood sugar levels, reduces cholesterol, has anti-inflammatory effects and controls appetite.
Garlic	Lasun	Keeps blood vessels flexible, helps reduce cholesterol and triglyceride levels.
Turmeric	Haldi	Helps reduce inflammation and improve heart health.
Cumin	Jeeru	Aids in digestion, lowers blood sugar levels, increases insulin sensitivity, protect against heart diseases.
Coriander	Dhnna	Helps lower blood pressure, blood sugar levels and cholesterol levels.
Cinnamon	Dalchini	Helps reduce cholesterol level and lower blood sugar levels.
Cardamom	Elaichi	Lowers blood pressure, improves breathing and helps heal stomach ulcers.
Basil	Tulsi	Protects against cancers, regulates blood sugar levels, lower your cholesterol and triglycerides.
Ashwagandha	Ashwagandha	Lowers blood sugar levels, manages stress, lowers anxiety.
Cloves	Laung	High in antioxidants, protects against cancers, helps in regulating blood sugar and promotes good bone health.
Dry Ginger	Sonth	Helps in weight loss and indigestion, lowers blood sugar levels and cholesterol and improves metabolism.
Flax Seeds	Alsi	Improves digestion, reduces risk of heart disease, diabetes and cancer.
Garden Cress Seeds	Asadiyo	Rich in iron and fiber, helps in weight loss, lowers blood sugar levels and boosts immunity.
Chia Seeds	Chia seeds	Rich in antioxidants and fiber, lowers blood sugar levels and risk of heart diseases, helps with weight loss and is good for bone health.

USE OF LOCAL AND SEASONAL FOODS

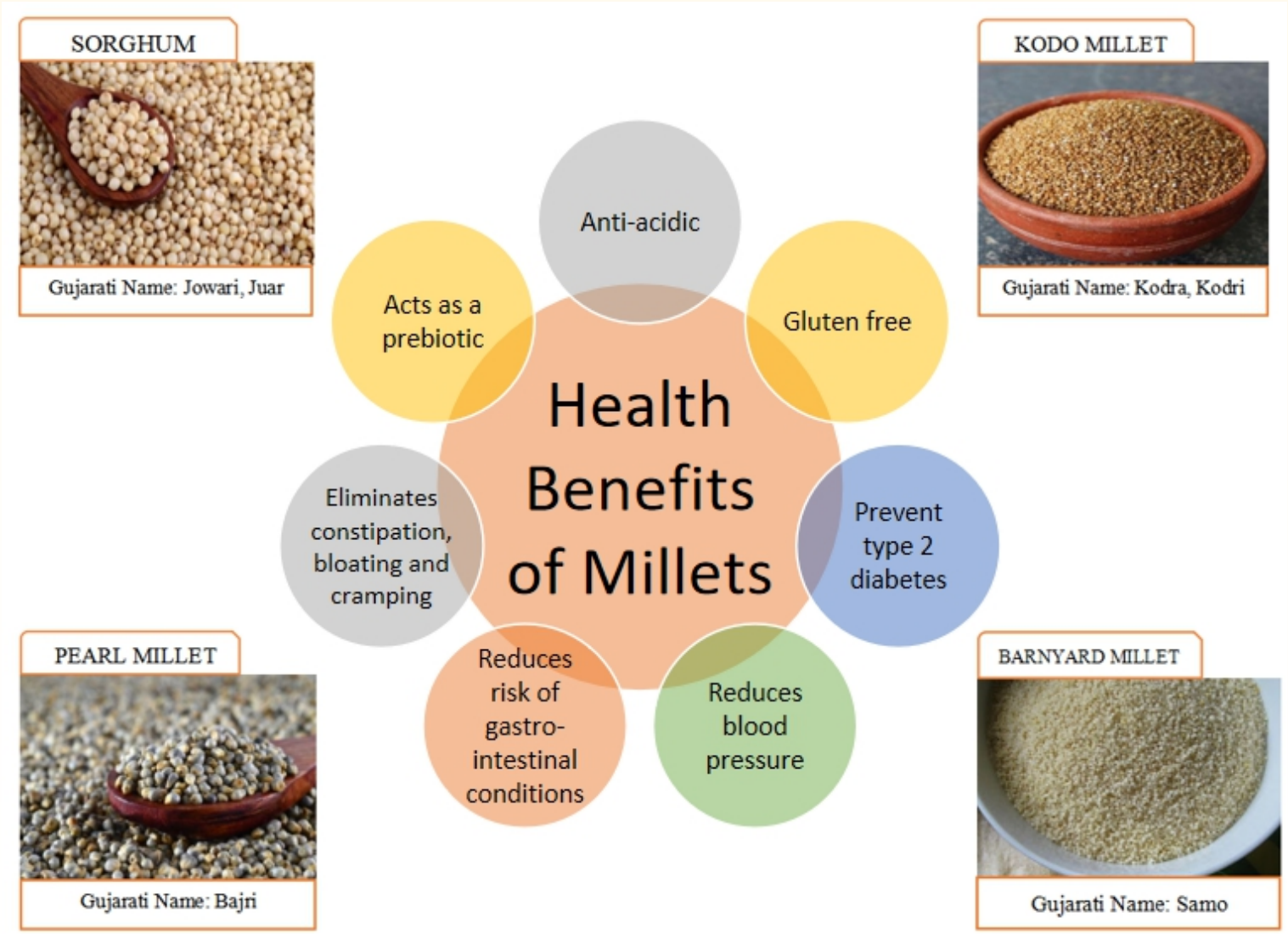
Seasonal fruits and vegetables are fresher, taste better and have the highest amount of nutrition, antioxidants and phytonutrients.

Source: FSSAI

Advantages of using local and seasonal foods:

- They are cheaper and easily available.
- It adds diversity to your diet.
- They taste better as they are unprocessed.
- Supports body's natural nutritional needs

MILLETS AND NCDs



USE OF FORTIFIED FOODS

Food fortification is the addition of key vitamins and minerals (micronutrients) such as iron, iodine, zinc, vitamin A and vitamin D to certain staple foods such as wheat flour, rice, salt, milk and oil to improve their nutritional content.

Micronutrients such as vitamins and minerals are required for the normal functioning of the human body which we usually get through our daily diet. However we may not get all the nutrients in the required quantity through our daily diet. There are several ways to fulfil this need. One such method is dietary diversification, which means eating a variety of foods, from all food groups. Another simple method is to eat fortified staple foods.

Source: FSSAI

BENEFITS OF FORTIFIED FOODS

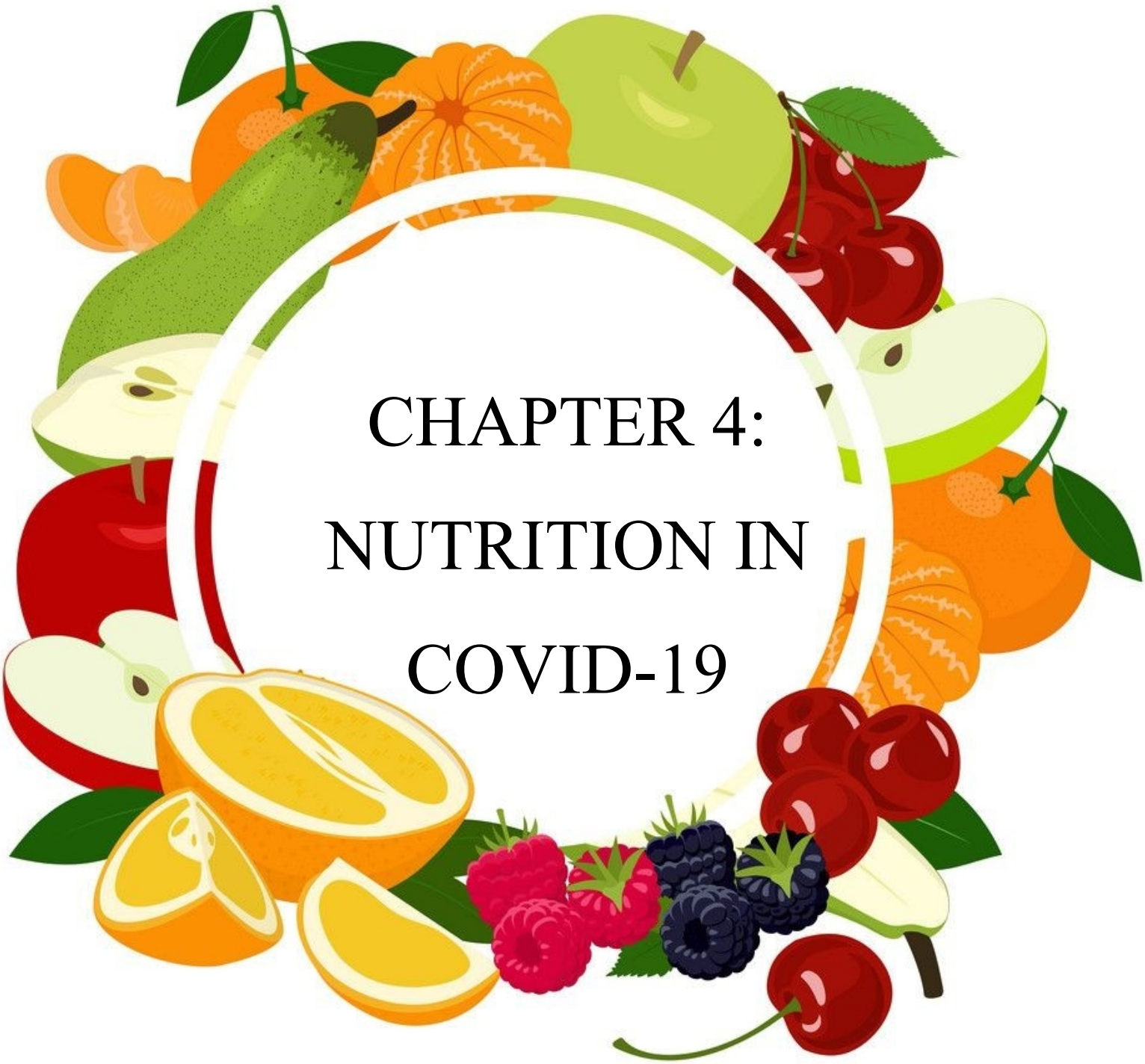
- Fortified foods provide essential vitamins and minerals that may be missing in the diet.
- Fortified foods are safe to eat and do not pose any health risk. The amount of vitamins and minerals added is very small and standardized. So, the chance of an overdose or harmful effect is unlikely.
- Fortified foods look, taste, smell and feel the same as non-fortified foods.
- Fortified foods do not require any change in food habits and dietary patterns.
- Fortified foods are cooked and stored in the same manner as non-fortified foods.

IDENTIFICATION OF FORTIFIED FOOD PRODUCTS

FORTIFIED
SAMPOORNA POSHAN
SWASTH JEEVAN

Fortified foods can be identified by the blue +F logo on the packet. This logo has been released by FSSAI, Government of India. The micro-nutrients added are mentioned below the logo.

Source: FSSAI



CHAPTER 4: NUTRITION IN COVID-19

COVID-19 PRECAUTIONS

Source: MoHFW

Source:
Ministry of Ayush, GOI

ROLE OF SPECIFIC NUTRIENTS AND FOODS TO MAINTAIN OPTIMAL IMMUNE FUNCTION AND GOOD HEALTH

Optimal nutrition helps to strengthen the immune system (both innate and adaptive immunity) and promote early recovery.

Vitamins A, B, C, D, E, minerals such as zinc, selenium, iron, copper, phyto nutrients, amino acids and omega 3 fatty acids are important nutrients for optimal immune function.

It is important to obtain these nutrients through a good balanced diet, since

- Deficiency of one or more of these nutrients can increase the frequency and severity of infections, supplementation of nutrients among healthy (not deficient) population does not provide any additional benefit.
- Some of these nutrients in excess can increase susceptibility to infections.

Therefore, a balanced diet is the key! Eat Healthy, Eat Local, Eat Seasonal!

TRADITIONAL SPICES, CONDIMENTS AND HERBS AS IMMUNITY BOOSTERS

Some traditional spices and condiments possess antiviral/ antimicrobial activity which helps to fight infections. Spices are an essential part of human diet, not only for flavour and taste but also for the medicinal properties that they contain. In spite of several health benefits they should not be consumed in excess of acceptable daily intake as they may increase acid secretion and may cause damage to the inner layer of the stomach.

Source: www.idaindia.com/covid-tool-kit

- Special care is required for people above 65 years of age with comorbidities, pregnant women and children below the age of 10 years and are advised to stay at home, except for essential and health purposes.
- People with diabetes, patients with chronic kidney disease and hypertension are more vulnerable and should strictly follow social distancing and hand hygiene.

CHAPTER 5:

NUTRITIONAL COUNSELING

WHAT IS COUNSELING?

Counseli[redacted]s a process of helping people cope with problems. The duration of counseling sessions can vary [redacted] the nature of the people.

WHAT IS NUTRITIONAL COUNSELING?

Nutritional counseling is a two-way interaction through which a client and a trained counselor interpret the results of nutrition assessment, identify individual nutrition needs and goals, discuss ways to meet those goals and agree on next steps. Nutrition counseling aims to help clients understand important information about their health and focuses on practical actions to address nutrition needs, as well as the benefits of behaviour change.

BASIC COUNSELING SKILLS

Skill	Tips on how to communicate
Active listening	Maintain eye contact; Have a kind tone to your voice; Express interest by leaning forward, nodding
Questioning	Use more open-ended questions
Encouraging	Through verbal ways like saying 'hmm', 'go ahead' and non-verbal like nodding
Paraphrasing	Conveying what you understand from what the individual has said.
Reflecting feeling	Identifying the underlying emotions behind the individual's story
Summarising	Putting together briefly the main points

GATHER APPROACH TO COUNSELING

G - GREET the caregivers (establish rapport)

A - ASK caregivers (gather information)

T - TELL (provide information)

H - HELP the individual

E - EXPLAIN to the individual

R - RETURN/ REFER (follow up)

TIPS FOR EFFECTIVE COUNSELING

- Do more listening than talking.
- Ask open-ended questions, not just questions clients can answer with “yes” or “no”.
- Repeat what clients say to make sure you understood them correctly.
- Show interest in and empathy for clients’ problems and situations.
- Avoid judging clients.
- Listen to what clients think and respect their feelings, even if information may need correction.
- Recognize and praise what clients are doing correctly.
- Suggest actions that are possible for clients given their situations.
- Give only a little bit of information at a time.
- Use simple language.
- Give suggestions, not commands.

ROLE OF CHO IN PROMOTING HEALTHY DIETARY PRACTICES

At Health and Wellness Center

CHOs should ask all individuals who report with health problems about their dietary habits. After building rapport, they should proceed by asking questions about his/her routine diet and assess their unhealthy dietary habits. They should educate them about the health effects of unhealthy diets, other risk factors and NCDs.

At Community Level

- CHOs should use days like Mamta Diwas, NCD day and camps to inform the public about the importance of a healthy diet, as well as to create awareness on the linkage between unhealthy dietary practices and NCDs.
- Provide posters conveying relevant healthy diet messages which can be put up in public places at HWC, in the schools, at AWC and Gram Panchayat office.
- IEC material on NCDs can be used during home visits by ASHAs.

CHAPTER 6: COMMUNITY MOBILIZATION

WHAT IS COMMUNITY MOBILIZATION?

Community mobilization engages all sectors of the population in a community-wide effort to address a health, social or environmental issue. It brings together policy makers and opinion leaders, local, state and federal governments, professional groups, religious groups, businesses and individual community members. Community mobilization empowers individuals and groups to take some kind of action to facilitate change.

WHY MOBILIZE THE COMMUNITY?

It can:

- Infuse new energy into an issue through community buy-in and support.
- Expand the base of community support for an issue or organization.
- Help a community overcome denial of a health issue.
- Promote local ownership and decision making about a health issue.
- Encourage collaboration between individuals and organizations.
- Limit competition and redundancy of services and outreach efforts.
- Provide a focus for prevention planning and implementation efforts.
- Create public presence and pressure to change laws, policies and practices - progress that could not be made by just one individual or organization.
- Bring new community volunteers together (because of increased visibility).
- Increase cross-sector collaboration and shared resources.
- Increase access to funding opportunities for organizations and promote long-term, organizational commitment to social and health-related issues.

COMMUNITY PARTICIPATION, ITS IMPORTANCE IN PROMOTING HEALTHY DIETS

Communities should participate in promoting healthy diets as:

- Communities can and should determine their own priorities in dealing with the problems that they face.
- The collective experience and knowledge in a community can be built on to bring about change and improvements.
- When people understand a problem, they will more readily act to solve it.
- People solve their own problems best in a participatory group process.

EVIDENCE BASED STUDIES ON HEALTHY EATING

હેલ્થ અપડેટ

દિવસમાં એક સફરજન આરોગો અને અલ્ઝાઈમરને દૂર રાખો

સફરજન આરોગવાથી પ્રાપ્ત થતાં કુદરતી દ્રવ્યો અલ્ઝાઈમર કે સ્મૃતિ દોષ જેવા રોગોના જોખમોને ટાળે છે. એપલ અને ફાયટોન્યુટ્રિઅન્ટ્સ કુળના અન્ય ફળફળાદિમાં રહેલા કુદરતી રસાયણો નવા ન્યુરોન્સના સર્જનની પ્રક્રિયાને વેગીલી બનાવે છે. તેને ન્યુરોજેનેસિસ પ્રક્રિયા કહેવામાં આવે છે. ન્યૂરોન્સ તે ખૂબ સક્રિય કોષ છે. વીજ સંકેતોની મદદથી ન્યુરોન્સ શરીરના ભાગો સુધી માહિતીનું ટ્રાન્સમિશન કરે છે. તેને કારણે સ્મૃતિ અને અભ્યાસશક્તિ વધે છે. પ્રયોગશાળામાં ઉંદર પર થયેલા પ્રયોગમાં ધ્યાને આવ્યું હતું કે સફરજનમાંથી મળતા બે કુદરતી રસાયણો ક્યુરોસેટિઅન અને ડાયહાઈડ્રોક્સિબેઝોઈક એસિડને કારણે ઉંદરના મગજમાં ન્યુરોન્સનો જન્મ થતો હતો. રસપ્રદ વાત એ છે કે એપલ જ્યુસ પીવાથી આ પ્રક્રિયા હાથ નથી ધરાતી. આખું સફરજન દાંતથી આરોગવાથી જ આ રસાયણો શરીર સુધી પહોંચે છે અને ન્યુરોન્સ જન્મે છે. જર્મનીના બોન ખાતેના સેન્ટર ફોર ન્યુરોડિજનરેટિવ ડિસીઝના નિષ્ણાતોએ કરેલા સંશોધનોમાં આ હકીકત સામે આવી છે. સ્ટેમ સેલ રિપોર્ટ્સમાં આ અંગેનું સંશોધનપત્ર પ્રકાશિત થયું છે. તે અભ્યાસપત્ર કહે છે કે દિવસનું એક સફરજન ડોકટરને તમારાથી દૂર રાખે છે. અભ્યાસના તારણ કહે છે કે પુખ્ત ઉંદરના મગજમાંથી લીધેલા સ્ટેમ સેલ્સના પ્રયોગશાળામાં ઉછેર દરમ્યાન તેના કલ્ચરમાં ક્યુરોસેટિઅન અને ડાયહાઈડ્રોક્સિબેઝોઈક એસિડ સામેલ થતાં તે વધુ સંખ્યામાં ન્યુરોન્સ જન્માવે છે અને કોષનું રક્ષણ થાય છે. ન્યુરોજેનેસિસને પ્રોત્સાહન મળ્યા પછી શરીર પર થતી અસરોની તુલના પણ થઈ શકે છે. સંશોધકોએ તે પછી સફરજનના જ્યુસની મદદથી પણ પ્રયોગશાળામાં રહેલા ઉંદરો પર પ્રયોગ કર્યા હતા.

હેલ્થ અપડેટ

ફણગાવેલા મગ વજન ઘટાડવાની સાથે પાચનને પણ દુરસ્ત રાખે છે

ફણગાવેલા મગને ખૂબ જ આરોગ્યપ્રદ ખોરાક માનવામાં આવે છે. તેના સેવન થકી તમારા શરીરને ઘણા બધા પોષક તત્ત્વ મળી રહે છે. ફણગાવેલા મગમાંથી પ્રોટીન, ફાઈબર, મેગ્નેશિયમ, ફોસ્ફોરસ, પોટેશિયમ, ઝિંક, આયર્ન, મિનરલ, એન્ટિઓક્સિડેન્ટ, કોપર, કેલરી, વિટામિન એ-બી-બી૨- બીપ-બીટ-સી -ઈ મળી રહે છે. તેમાં ચરબીની માત્રા ખૂબ સાધારણ હોય છે. તેથી ફણગાવેલા મગને તમારા આહારમાં જરૂરથી સામેલ કરો. તમારા આરોગ્યને તે ખૂબ લાભ પહોંચાડશે. નાસ્તામાં રોજ એક વાટકી ફણગાવેલા મગ ખાવા જોઈએ. તેમ કરવાથી તમને પોષક તત્ત્વ મળી રહે છે. તેને આરોગવાથી પેટ ઝડપથી ભરાઈ જતું હોવાથી ભૂખનો અહેસાસ નથી થતો. કાંઈ બીજું ખાવાની ઈચ્છા નથી થતી. ફણગાવેલા મગ આરોગતા તમારા શરીરને ભરચક પોષક તત્ત્વ મળી જાય છે. બીજું કાંઈ બિનઆરોગ્યપ્રદ ના ખાધું હોવાથી વજન ઘટાડવામાં પણ મદદ મળે છે. ફણગાવેલા મગમાં ખૂબ માત્રામાં ફાઈબર હોય છે. તેથી તમારું પાચનતંત્ર સારી રીતે કામ કરે છે. પેટસંબંધી દર્દો નથી થતા અને કબજિયાત પણ નથી રહેતી. ફણગાવેલા મગમાં વિટામિન એ હોવાથી આંખની રોશની વધારવામાં મદદ મળે છે. રતાંધળાપણાને રોકે છે. સમય પહેલાં ઘડપણ રોકવામાં ફણગાવેલા મગ ઉપયોગી રહે છે. ત્વચાને ચુસ્ત કરે છે. વિટામિન ઈ અને સક્રિય એન્ટિઓક્સિડેન્ટ હોય છે. રોગપ્રતિકારક શક્તિ વધારવા માટે ફણગાવેલા મગનું સેવન ખૂબ જરૂરી છે. લોહીમાં શ્વેતકણ વધારે છે, તેના કારણે રોગપ્રતિકારક શક્તિ વધે છે. ફણગાવેલા મગ આરોગવાથી એસીડીટીની સમસ્યાનું પણ શમન થાય છે. તમારા શરીરના પીએચ લેવલને નિયમિત કરવામાં મહત્ત્વની ભૂમિકા નિભાવે છે.

હેલ્થ અપડેટ

ફળ આરોગવાથી જ નહીં, તેને સમયસર આરોગવાથી લાભ થાય છે : શોધ

આધુનિક જીવનશૈલીમાં લોકો એટલા વ્યસ્ત હોય છે કે તંદુરસ્તી વિષે વિચારવાનો સમય જ નથી હોતો. કેટલીકવાર લોકો ભોજન કરવાને સમયે કામ કરતા રહેતા હોય છે. આવી આદત આપણીને તંદુરસ્તીને ગંભીર નુકસાન પહોંચાડે છે. આપણને તે ધ્યાન જ નથી રહેતું કે કઈ વસ્તુને આરોગવાનો કયો યોગ્ય સમય છે. બસ આપણે પેટ ભરવા માટે કાંઈપણ, ગમે ત્યારે આરોગી લઈએ છીએ. તેવામાં ફળોને યોગ્ય સમયે આરોગવાનો સમય શું છે તેની જાણકારી મેળવવી ખૂબ જરૂરી છે. પોષક તત્ત્વોથી ભરપૂર ફળ આપણી પાસે ગમે તેટલા હોય પરંતુ યોગ્ય સમયે આરોગવામાં ના આવે તો લાભ કરવાને બદલે તે નુકસાન પહોંચાડે છે. વાસ્તવમાં ફળ આપણા શરીરને ફકટોજ આપે છે. તે સરળતાથી ચરબીમાં પરિવર્તીત થઈ જાય છે. તેથી ફળોને સવારે નરણા કોઠે આરોગવામાં આવે તો ખૂબ લાભ થતો હોય છે. તમે ફળ નાસ્તામાં પણ લઈ શકો છો. સાંજે પાંચ વાગ્યા પછી ફળ આરોગવાથી પાચનતંત્ર પર વિપરીત અસર પડે છે. સંતરાને ભૂલીને પણ નાસ્તા પહેલાં ખાલી પેટ ના ખાવા જોઈએ. ખાલી પેટ સંતરા ખાવાથી એસિડિટી થઈ શકે છે. બપોરે ચાર વાગ્યા પછીનો સમય સંતરા ખાવાનો સૌથી સારો સમય છે. દ્રાક્ષને ખાલી પેટ ખાવાથી લાભ થાય છે. દ્રાક્ષ શરીરમાં પાણીની માત્રાને બેલેન્સ કરે છે. બપોરે ભોજન પછી કેળા આરોગવાથી સૌથી વધુ લાભ થાય છે. કેળામાંથી મળતા પોષ્ટિક તત્ત્વો રોગપ્રતિકારક શક્તિ વધારે છે. દાડમને નાસ્તાને સમયે આરોગવું સૌથી બહેતર રહે છે. સવારે દાડમ આરોગવાથી ઊર્જા જળવાય છે. પપૈયાની વાત કરીએ તો સવારે નાસ્તા પછી અને બપોરે લંચ પછી આરોગવું જોઈએ.

હેલ્થ અપડેટ

વિટામિન-સી કેન્સર રોકવામાં મદદ કરવા સાથે ઘણા લાભ કરે છે

નેચર કોમ્યુનિકેશન જર્નલમાં પ્રકાશિત એક સંશોધનની વિગત કહે છે કે વિટામિન-સી શરીરમાં ઝડપથી ફેલાઈ રહેલા કેન્સરને નિયંત્રણમાં લેવામાં મદદ કરે છે. વિટામિન-સીના કારણે દર્દીને કીમો અને રેડિએશન થેરપીની જરૂર ઓછી પડે છે. વિટામિન-સીમાં હાજર એન્ટિઓક્સિડેન્ટ્સ કેન્સરને કારણે તૈયાર થતા ફ્રી-રેડિકલ્સને ખતમ કરવા પ્રયાસ કરે છે. તે ફ્રી-રેડિકલ્સ હાર્ટ ડિસીઝ અને આર્થરાઈટિસનો ખતરો વધારે છે. કેટલાંક ફળ અને શાકભાજીમાં વિટામિન-સી પ્રચૂર માત્રામાં મળે છે. વિટામિન-સીનો પ્રભાવ શરીરની અંદર અને બહાર બંને સ્થાને દેખાય છે. તેમાં હયાત એન્ટિઓક્સિડેન્ટ્સ વધતી ઉંમરની અસરને ઘટાડે છે. આંખની આસપાસ થતા કુંડાળા ઘટે છે. શરીર અને વાળની પ્રાયનેસ ઘટાડે છે. તે ઉપરાંત સૂર્યની ગરમીને કારણે ચામડીને થતું નુકસાન પણ રોકી શકાય છે. અમેરિકી વિજ્ઞાનીઓના સંશોધન મુજબ ભોજનમાં વિટામિન-સી લેવાથી હૃદયરોગના હુમલાનો ખતરો ૪૨ ટકા ઘટી જાય છે. વિટામિન-સી લોહીનાં દબાણને રોકવામાં પણ મદદ કરે છે. વિશ્વમાં હૃદયરોગને કારણે મોટેપાયે લોકો મૃત્યુ પામતાં હોય છે. વિટામિન-સી આ પ્રમાણ ઘટાડી શકે છે. વિટામિન-સી રોગપ્રતિકારકશક્તિ માટે પણ જરૂરી છે. તેમાં રહેલા એન્ટિઓક્સિડેન્ટ તત્ત્વો લોહીમાં રહેલા શ્વેતકણોને અસરકારક બનાવે છે. તેને કારણે રોગ સામે લડવાની તાકાત વધે છે. તમારા શરીરમાં નબળાઈ આવી ગઈ હોય, મસૂડામાં લોહી પડતું હોય, દાંત નબળા પડ્યા હોય, ચામડી અને વાળ સુકાઈ ગયા હોય, સાંધામાં દુખાવો રહેતો હોય કે ઘા ભરાવામાં વિલંબ થતો હોય તો વિટામિન-સીની ઊણપ છે તેમ માની લેવું. સંતરા, ભોકવી, ટામેટાં, કીવી, લાલ મરચાં તમને સારા પ્રમાણમાં વિટામિન-સી પૂરું પાડી શકે છે.

હેલ્થ અપડેટ

કાળી દ્રાક્ષ આયુષ્યવર્ધક તથા અનેક બીમારીઓમાં રાહત આપે છે : અભ્યાસ

તે વાતે શંકાને કોઈ સ્થાન નથી કે ફળફળાદિ અને લીલા શાકભાજી આરોગ્ય માટે ખૂબ ફાયદાકારક છે. બીમારીઓથી બચાવ કરીને તે લાંબું આયુષ્ય જીવવામાં મદદ કરે છે. સંશોધકોએ પુરાવાસહ એવો દાવો કરી રહ્યા છે કે કાળી દ્રાક્ષ (બ્લ્યૂબેરી) ઉંમર ઘટાડનારી બીમારીની સમસ્યાને દૂર કરીને આયુષ્ય લંબાવે છે. કાળી દ્રાક્ષમાં રહેલા વિશેષ ફ્લેવોનોઈડ અણુ ડીએનએને થતા નુકસાનને રોકે છે. મગજના કોષમાં થતી ક્ષતિને પણ મંદ કરે છે. કેટલાક અભ્યાસમાં તો એવો દાવો થાય છે કે કાળી દ્રાક્ષ મગજમાં સ્મૃતિ જાળવવાની ક્રામગીરી કરી રહેલા ભાગને ઓક્સિડન્ટ અને ઈનફ્લેમેટરી ડેમેજથી બચાવે છે. કાળી દ્રાક્ષ પોલીફેનલ્સ તત્ત્વથી ભરપૂર હોય છે. તેમાં એન્થોસાયનિન સામેલ હોય છે. તે પોષક તત્ત્વને કારણે જ કાળી દ્રાક્ષને પોતાનો રંગ મળે છે. એંથોસાયનિન મગજ માટેની શક્તિશાળી દવા છે. અરે કાળી દ્રાક્ષના સંપર્કમાં આવતી માખીનું આયુષ્ય પણ સામાન્ય કરતાં ૧૦ ટકા વધી જાય છે. તે દરમિયાન તેમના આયુષ્યમાં જ વધારો નથી થતો પરંતુ ફિઝિકલ પ્રવૃત્તિમાં પણ સુધારો થાય છે. કાળી દ્રાક્ષનો પૂરક ખોરાક મળતાં જીવનકાળમાં ૨૮ ટકા વધારો થાય છે. મોટાભાગના કિસ્સામાં ૧૪ ટકા વધારો નોંધાયો છે. નિષ્ણાતોનું કહેવું છે કે કાળી દ્રાક્ષમાં રહેલાં તત્ત્વો વજન ઘટાડવામાં પણ મદદરૂપ બને છે. પેટ અને લિવરની આસપાસ ચરબી ઘટતાં મેદસ્વિતાનો ખતરો પણ ટળે છે. શરીરના આ ભાગમાં જમા થયેલી ચરબી હૃદયરોગ સંબંધી ખતરો વધારે છે. કાળી દ્રાક્ષની ખાસિયત એ છે કે શરીરમાં જનારી બિનજરૂરી સુગરને સ્નાયુ કોષમાં તબદીલ કરી દે છે. તેનો ઉપયોગ ઊર્જાના રૂપમાં થવા લાગે છે. તેને કારણે સુગર ચરબીના રૂપમાં એકઠી નથી થતી.

હેલ્થ અપડેટ

રાતના સમયે ભરપૂર કેળાં આરોગ્ય માટે અત્યંત ફાયદાકારક : સ્ટડી

પોટેશિયમ વિટામિન બી ૬, વિટામિન સી, મેગ્નેશિયમ, કોપર, ફાઈબરથી ભરપૂર કેળાં આરોગ્ય માટે અત્યંત ફાયદાકારક છે. કેળાંથી પાચનતંત્ર સારું થાય છે તથા હાર્ટ પણ તંદુરસ્ત રહે છે. હવે એક નવા સંશોધનમાં એવું માલૂમ પડ્યું છે કે રાતના સમયે કેળાં ખાવાના અનેક લાભ છે. આયુર્વેદ અનુસાર પણ રાતે કેળાં ખાવાથી અનેક લાભ થાય છે. પરંતુ જો શરદી-ખાંસી, અસ્થમા હોય તો કેળાં ન ખાવા જોઈએ. રાતે કેળાં ખાવાથી એસિડિટી અને છાતીમાં બળતરામાંથી પણ રાહત મળે છે તે ઉપરાંત કેળાં સારી ઊંઘ લાવવામાં પણ મદદગાર છે. પૌષ્ટિક આહાર મગજ અને માનસિક આરોગ્ય માટે સર્વશ્રેષ્ઠ છે. વિવિધ ભોજન પરના અભ્યાસની સમીક્ષામાં એવું માલૂમ પડ્યું કે પૌષ્ટિક આહાર અને સ્ટ્રેસ, માનસિક આરોગ્ય અને મગજના કામકાજ વચ્ચે સીધો સંબંધ છે. જે લોકોને ગળ્યું ખાવાની વધારે ઈચ્છા થતી હોય તેઓ કેળાંના ઓપ્શનની પસંદગી કરી શકે છે. રાતના સમયે કેલેરી અને સુગરથી ભરપૂર મીઠાઈ ખાવા કરતાં કેળાં ખાવા વધારે સારાં છે. કેળાં ખાવાથી સ્વીટ કેવિંગ્સ પણ ઓછી થાય છે. કેળાં બ્લડ પ્રેશરને પણ ઓછું કરવામાં મદદગાર હોવાનું સંશોધકોએ જણાવ્યું છે. હાઈબ્લડ પ્રેશરવાળા દર્દીઓ તેમના ભોજનમાં કેળાંને સામેલ કરી શકે છે. રાતે કેળાં ખાવાથી શરીરને ડાયટી પોટેશિયમ પણ મળી રહે છે.

હેલ્થ અપડેટ

મેદા - બ્રેડ જેવા રિફાઈન્ડ ફૂડ લેવાથી મૃત્યુનો ખતરો ૨૭ ટકા વધી જાય છે

રિફાઈન્ડ ગ્રેન પર થયેલા નવા સંશોધનો ચોંકાવનારા છે. રિસર્ચ કહે છે કે મેંદો અને બ્રેડ જેવી રિફાઈન્ડ ગ્રેન સામગ્રીને આહારમાં લેવાથી હૃદયરોગ થવાની સંભાવના વધી જાય છે અને મૃત્યુનો ખતરો ૨૭ ટકા વધી જાય છે. રોજ ડાઈટમાં આવું ભોજન લેવામાં આવે તો હૃદયરોગનો ખતરો ૩૩ ટકા અને હૃદયરોગના હુમલાનો ખતરો ૪૭ ટકા વધી જાય છે. કેનેડા યુનિવર્સિટીના વિજ્ઞાનીઓએ આ દાવો કર્યો છે. ૧૬ વર્ષ સુધી ૧.૩૭ લાખ લોકો પર થયેલા અભ્યાસના તારણમાં રિફાઈન્ડ ગ્રેનને કારણે કેટલું નુકસાન પહોંચે છે તેના વિશે કહેવામાં આવ્યું છે. સંશોધન માટે અનાજને ત્રણ ભાગમાં વર્ગેવવામાં આવ્યું હતું. રિફાઈન્ડ ગ્રેન, હોલ ગ્રેન અને વ્હાઈટ રાઈસ. અભ્યાસ દરમિયાન વ્હાઈટ રાઈસ અને હોલ ગ્રેન (આખું અનાજ)થી લોકોને નુકસાન થતું હોવાનું સામે નહોતું આવ્યું. પરંતુ રિફાઈન્ડ ગ્રેનથી નુકસાન થતું હોવાનું સામે આવે છે. તેથી આહારમાં રિફાઈન્ડ ગ્રેનની માત્રા ઘટાડીને બીમારીઓનો ખતરો ઘટાડી શકાય છે. સંશોધનો કહે છે કે પ્રોસેસ થઈને તૈયાર થયેલી વસ્તુ આહારમાં લેવાથી શરીરમાં પોષક દ્રવ્યો નથી પહોંચતા. વિવિધ વાનગી તૈયાર કરવામાં તેનો ઉપયોગ છૂટથી થતો હોય છે. રિફાઈન્ડ ગ્રેનમાં ફાઈબરની માત્રા ખૂબ ઓછી હોવાથી ઝડપથી પચી જાય છે. તેને કારણે વ્યક્તિ વધુ પડતું ખાઈ જાય છે. તેને કારણે મેદસ્વિતા અને બ્લડસુગર વધી શકે છે. અનાજની પ્રોડક્ટ તૈયાર કરવા માટે તેને પ્રોસેસમાંથી પસાર કરવામાં આવે છે. તેને કારણે તેના ફાઈબર અને પોષક તત્ત્વ ખતમ થઈ જાય છે. તેવા ઉત્પાદનોને જ રિફાઈન્ડ ગ્રેન કહે છે. જેમ કે મેંદો, તેમાંથી તૈયાર થતી બ્રેડ, પાસ્તા અરેરે સુગર વગેરે રિફાઈન્ડ ગ્રેન છે.

હેલ્થ અપડેટ

વિટામિન-ડીનું સેવન મહિલાઓમાં ફેટ ઘટાડીને ડાયાબિટીસ કાબૂ કરે છે

ભારતીય મહિલાઓમાં વધતા વજન અને તેના પગલે વધતા ડાયાબિટીસની સમસ્યાનું નિવારણ લાવવા એક સંશોધન કરવામાં આવ્યું છે. એમ્સ અને ડાયાબિટીસ ફાઉન્ડેશન ઓફ ઈન્ડિયા દ્વારા મહિલાઓમાં ફેટ અને ડાયાબિટીસને કન્ટ્રોલ કરવા માટે વિવિધ અભ્યાસ કરવામાં આવ્યા છે. સંશોધકોએ જણાવ્યું કે, હાલમાં ભારતમાં પ્રી-ડાયાબિટિક મહિલાઓનું પ્રમાણ વધારે છે. તેમને આગામી સમયમાં ડાયાબિટીસ થવાની શક્યતાઓ પૂરેપૂરી હોય છે. મહિલાઓમાં આ સ્થિતિ નિવારવા માટે તેમના શરીરનું ફેટ ઓછું કરીને વજન ઓછું કરવા ઉપર ધ્યાન આપવું જોઈએ. આ દિશામાં કરેલા સંશોધન બાદ તેમણે જણાવ્યું કે, પ્રી-ડાયાબિટિક મહિલાઓ દ્વારા વિટામિન ડીનું યોગ્ય પ્રમાણમાં સેવન કરવામાં આવે તો આ સ્થિતિને નિવારી શકાય તેમ છે. તેણે આ માટે દરરોજ યોગ્ય સમયે સૂર્યપ્રકાશમાં બેસવું જોઈએ અને શરીરને સીધી રીતે વિટામિન ડી મળે તે દિશામાં કામ કરવું જોઈએ. સંશોધકોએ જણાવ્યું કે, તેમણે ૨૦થી ૬૦ વર્ષની સ્ત્રીઓનો અભ્યાસમાં સમાવેશ કર્યો હતો. આ તમામ મહિલાઓ પ્રી ડાયાબિટિક હતી. તેમનું વજન પણ યોગ્ય પ્રમાણ કરતા વધારે હતું. આ તમામ મહિલાઓને રેગ્યુલર ટ્રીટમેન્ટ સાથે વિટામિન ડીના સપ્લિમનેન્ટ્સ પણ આપવામાં આવ્યા હતા. સંશોધકોએ જણાવ્યું કે, વિટામિન ડીને કારણે આ મહિલાઓના ફેટમાં અને સુગર લેવલમાં ઘટાડો જોવા મળ્યો હતો. તેના કારણે તેમનો ડાયાબિટીસ પણ યોગ્ય સ્તરે જળવાઈ રહ્યો હતો.

Remember, Every time you eat or drink, you are either feeding disease or fighting it.

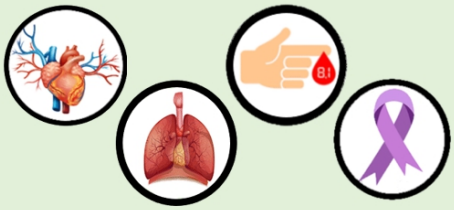
Roles and Responsibilities of CHO

Important days to celebrate at community level	
Date	**Day**
4th February	World Cancer Day
28th February	Vigyan Divas
2nd Wednesday of March	No Smoking Day
2nd Thursday of March	World Kidney Day
24th March	World TB Day
7th April	World Health Day
19th April	World Liver Day
31st May	World No Tobacco Day
21st June	International Day of Yoga
September Month	Poshan Maah
29th September	World Heart Day
1st October	Geriatric Day
16th October	World Food Day
14th November	World Diabetes Day
1st December	World AIDS Day

APPENDIX X
IEC MATERIAL (FLIP BOOK)

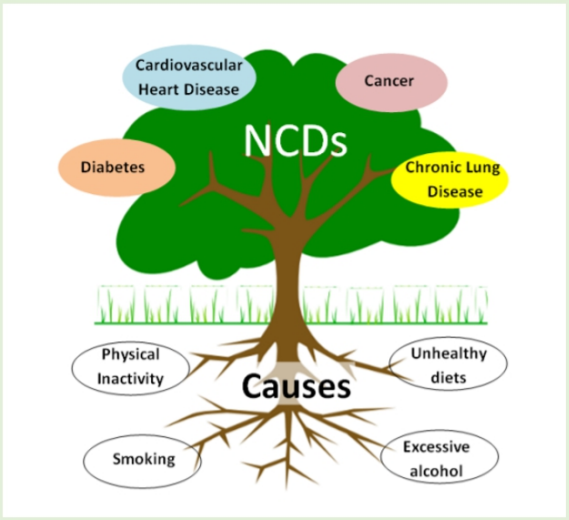
બિન-સંક્રમિત રોગો (એનસીડી), જેને ક્રોનિક રોગો તરીકે પણ ઓળખવામાં આવે છે, તે એવી પરિસ્થિતિઓ છે જે એક વ્યક્તિથી બીજા વ્યક્તિમાં ફેલાતા નથી. બિન-સંક્રમિત રોગો (એનસીડી) લાંબા સમયગાળાના હોય છે અને તે આનુવંશિક, શારીરિક, પર્યાવરણીય અને વર્તણૂકીય પરિબળોના સંયોજનનું પરિણામ છે.

બિન-સંક્રમિત રોગ વિશેની સૌથી ગંભીર ચિંતા એ છે કે તેઓ તેમના જીવનનાં ઉત્પાદક વર્ષોમાં લોકોને અસર કરે છે. તેઓ " અકાળ મૃત્યુ" ને પણ વધારો આપે છે - એટલે કે સરેરાશ આયુષ્ય પહેલાં મૃત્યુ થાય છે.

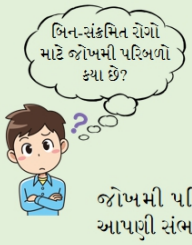


બિન-સંક્રમિત રોગોના મુખ્ય પ્રકારો:

- હૃદય રોગો
- શ્વાસના રોગો
- ડાયાબિટીસ
- કેન્સર



ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪



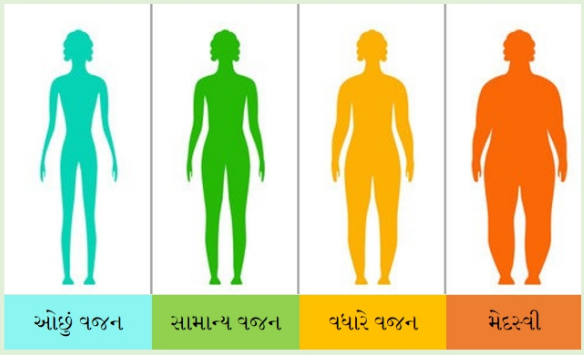
જોખમી પરિબળો એવા પરિબળો છે જે કોઈ રોગ થવાની આપણી સંભાવનામાં વધારો કરે છે.

જોખમી પરિબળો ૨ પ્રકાર ના હોય છે:

- **ફેરફાર ન કરી શકાય તેવા જોખમી પરિબળો**: આ જોખમી પરિબળો વ્યક્તિ માટે જન્મજાત હોય છે જેમ કે પારિવારિક ઇતિહાસ, લિંગ અને ઉંમર જે બદલી શકાતા નથી.
- **ફેરફાર કરી શકાય તેવા જોખમી પરિબળો**: આ પરિબળો આપણે જે રીતે જીવીએ છીએ તે રીતે આપણે જે પસંદગીઓ કરીએ છીએ તેની સાથે જોડાયેલા છે અને ક્રિયા સાથે ફેરફારો થઈ શકે છે.

ફેરફાર કરી શકાય તેવા જોખમી પરિબળો નો ઉમેરો:

- તમાકુ અને આલ્કોહોલનો ઉપયોગ
- અસ્વસ્થ આહાર
- ફળ અને શાકભાજી નો ઓછો ઉપયોગ
- વધારે માત્રા માં મીઠું, સાકર અને ચરબી વાળા ખોરાક નો ઉપયોગ
- શારીરિક નિષ્ક્રિયતા
- સ્થૂળતા
- તણાવ



ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪

બોડી માસ ઈન્ડેક્સ (BMI) એ એક સ્ક્રીનિંગ ટૂલ છે જે સૂચવી શકે છે કે વ્યક્તિનું વજન ઓછું છે કે પછી જો વ્યક્તિનું વજન સ્વસ્થ હોય, વજન વધારે હોય અથવા મેદસ્વી હોય.

વધુ વજન અથવા મેદસ્વી હોવાને કારણે ડાયાબિટીસ, હાઈ બ્લડ પ્રેશર અને હૃદય રોગો જેવી અનેક પ્રકારની અસ્વસ્થ સ્થિતિ સર્જાઈ શકે છે.

બીએમઆઈની(BMI) ગણતરી કરવા વ્યક્તિની ઊંચાઈ અને શરીરનું વજન માપવું અને આપેલ ફોર્મ્યુલા લાગુ કરવો;

BMI = વજન (કિલોગ્રામ)/ઉંચાઈ (મીટર)^2

નીચેના કોષ્ટકમાં પુખ્ત વયના લોકો માટે બીએમઆઈ (BMI) રેન્જ સાથે એશિયન સ્ટાન્ડર્ડ વજનની સ્થિતિ શ્રેણીઓ બતાવવામાં આવી છે.

BMI	Weight Status
<૧૮.૫	ઓછું વજન
૧૮.૫-૨૨.૯	સામાન્ય વજન
૨૩-૨૭.૫	વધારે વજન
≥૨૭.૫	મેદસ્વી

ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪

સંતુલિત આહાર એ છે જે નિયમિત રીતે વિવિધ ખાદ્ય જૂથોમાંથી જરૂરી માત્રામાં તમામ પોષક તત્વો પ્રદાન કરે છે.

સંતુલિત આહાર કેવી રીતે પ્રાપ્ત કરી શકાય?

- વિવિધ પ્રકારના તાજા, રંગીન અને સ્થાનિક રીતે ઉપલબ્ધ ફળો અને શાકભાજીનું સેવન કરો.
- આખા અનાજ, દાળ અને કઠોળ (બાહ્ય આવરણ સાથે) અને તેમના ઉત્પાદનો ખાઓ.
- આખા ફળો ખાઓ કારણ કે તે કુદરતી ફાઇબરથી ભરપૂર હોય છે.
- મેદા સાથે બનાવવામાં આવેલા ખોરાક સહિત શુદ્ધ અનાજના વપરાશને મર્યાદિત કરો.
- તમારા આહારમાં દરેક ખાદ્ય જૂથના ખોરાકને શામેલ કરવાનો પ્રયાસ કરો..
- વનસ્પતિ તેલ જેવા કે સરસવનું તેલ, મગફળીનું તેલ, સોયાબીન તેલ વગેરે પસંદ કરો. રાંધવા/તળવા માટે. પરિભ્રમણમાં વિવિધ તેલનો ઉપયોગ કરવો વધુ સારું છે.
- ખાદ્યતેલો અને પ્રાણીઓના ખોરાકનો મધ્યમ ઉપયોગ સુનિશ્ચિત કરો.
- માખણ/ઘીનો ઉપયોગ મર્યાદિત કરો અને વનસ્પતિ ટાળો અને ફરીથી ગરમ ચરબી અને તેલનો ઉપયોગ કરો.
- દરરોજ પુષ્કળ પાણી પીવો. ઠંડા પીણાં અને ફળોના રસને બદલે પાણી, છાશ, લસ્સી, નાળિયેર પાણી, લીંબુ પાણી/ નિમ્બુ પાની, આમ પાન, કોકમ, સટ્ટુ વગેરે પીણાં નું સેવન કરવું જોઈએ.

ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪

- ફૂડ પિરામિડ તંદુરસ્ત રહેવા માટે દૈનિક આહારમાં સમાવિષ્ટ ખોરાકની માત્રા અને પ્રકારો માટે તંદુરસ્ત વસ્તી દ્વારા ઉપયોગમાં લેવા માટેએક માર્ગદર્શિકા છે.
- તે વિવિધ ખાદ્ય જૂથો અને તે જથ્થામાં તેનું સેવન કરવું જોઈએ તેનું ચિત્રાત્મક પ્રતિનિધિત્વ છે.

1. **બહુ ઓછી માત્રામાં ઉપયોગ કરો**
   - ખાંડવાળા (ગળપણવાળા) પદાર્થો, પ્રક્રિયા કરેલા આહાર.
   તેમાં વધારે પ્રમાળમાં ચરબી, શર્કરા અને ક્ષાર રહેલાં છે.
2. **વાજબી માત્રામાં આખો**
   - માંસ, માછલી, ચીકન, ઈંડા, દૂધ અને દુધની બનાવટો
   આ જૂથના આહારમાંથી પ્રોટીન મળે છે.
3. **વાજબી માત્રામાં આખો**
   - ચરબીયુક્ત અને તેલી પદાર્થો: વનસ્પતિ તેલ, માખણ, ઘી વગેરે
   આ જૂથના આહારમાં ઉચ્ચ માત્રામાં ઉર્જા કેલરી રહેલ છે
4. **છુટથી ખાઓ**
   - ફળો: નારંગી, કેરી, પપૈયું, આમળા, લીંબુ વગેરે
   - લીલા પાદડાવાળા શાકભાજી: પાલક, મેથી
   - અન્ય શાકભાજી: ગાજર, ટુંગળી, રીંગણ, કાકડી, ફ્લાવર, ટામેટા, કેપ્સીકમ, કોબીચ વગેરે
   આ જૂથના આહારમાંથી વિટામિન અને ખનીજતત્વો મળે છે
5. **પૂરતા પ્રમાણમાં ખાઓ**
   - ધાન્ય: ચોખા, ઘઉં, મકાઈ, રાગી વગેરે.
   - ડાળ-કઠોળ: સૂકા મગ, મઠ, વટાણા, ચણા વગેરે
   આ જૂથના આહારમાંથી કાર્બોહાઇડ્રેટ અને પ્રોટીન મળે છે

ખાદ્ય જૂથોનું FANTA વર્ગીકરણ
• અનાજ, મૂળ અને કંદ
• કઠોળ અને ડાળ
• સુખો મેવો અને બીજ
• દૂધ અને દુધના ઉત્પાદનો
• માંસ, મરઘાં અને માછલી
• ઈંડા
• કાળા લીલા પાંદડાવાળા શાકભાજી
• અન્ય વિટામિન એ સમૃદ્ધ ફળો અને શાકભાજી
• અન્ય શાકભાજી
• અન્ય ફળો

ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪

- ખોરાકમાં વિવિધતાને સંદર્ભ સમયગાળા દરમિયાન ઉપયોગમાં લેવાતા સંખ્યાબંધ ખાદ્ય જૂથો તરીકે વ્યાખ્યાયિત કરવામાં આવે છે.
- આ પ્રતિબિંબિત કરે છે કે આહારમાં વિવિધ પ્રકારના ખોરાક અને ખોરાક જૂથોમાં વધારો આવશ્યક પોષક તત્વોનું પૂરતું સેવન સુનિશ્ચિત કરવામાં મદદ કરે છે.

FANTA (ફૂડ એન્ડ ન્યુટ્રિશન ટેકનિકલ આસિસ્ટન્સ) પ્રોજેક્ટમાં વરતીના આહાર વિવિધતા સ્કોરનું મૂલ્યાંકન કરવા માટે 10 ખાદ્ય જૂથોમાં ખોરાકનું વર્ગીકરણ કરવામાં આવ્યું છે.

- અનાજ, મૂળ અને કંદ
- કઠોળ અને ડાળ
- સુખો મેવો અને બીજ
- દૂધ અને દુધના ઉત્પાદનો
- માંસ, મરઘાં અને માછલી
- ઈંડા
- કાળા લીલા પાંદડાવાળા શાકભાજી
- અન્ય વિટામિન એ સમૃદ્ધ ફળો અને શાકભાજી
- અન્ય શાકભાજી
- અન્ય ફળો

MDD-W (મહિલાઓ માટે ન્યૂનતમ આહાર વિવિધતા) એ સૂચક છે કે શું 15-49 વર્ષની મહિલાઓએ અગાઉના દિવસે કે રાત્રે દસમાંથી ઓછામાં ઓછા પાંચ ખાદ્ય જૂથોનું સેવન કર્યું છે કે નહીં. તે આહારમાં સૂક્ષ્મ પોષક તત્વોની પર્યાપ્તતા પ્રતિબિંબિત કરવાનું સૂચક છે.

ઘરગથ્થુ આહાર વિવિધતા (HDD) એ ઘરના વિવિધ પ્રકારના ખોરાકનો સેવન કરવાની આર્થિક ક્ષમતાને પ્રતિબિંબિત કરવા માટે છે.

વ્યક્તિગત આહાર વિવિધતા (IDD)નો ઉદ્દેશ પોષક તત્વોની અપૂરકતાને પ્રતિબિંબિત કરવાનો છે. પાંચ કે તેથી વધુ ખાદ્ય જૂથોના ખોરાકનું સેવન કરતી વ્યક્તિ ઓછા ખાદ્ય જૂથોના ખોરાકનું સેવન કરતા લોકો કરતાં તેમની સૂક્ષ્મ પોષક જરૂરિયાતોને પૂર્ણ કરવાની વધુ સંભાવના ધરાવે છે.

બિન-સંક્રમિત રોગોમાં મીલેટનિ ભૂમિકા શું છે?

મીલેટ ગ્લુટેન મુક્ત, ખૂબ પૌષ્ટિક અને ફાઇબરથી ભરપૂર હોય છે. બાજરી હૃદય રોગને રોકવામાં મદદ કરે છે. તેમાં કેલ્શિયમ, આયર્ન, ફોસ્ફરસ વગેરે સહિત સૂક્ષ્મ પોષક તત્વો ભરપૂર માત્રામાં હોય છે. તેમાં ગ્લાસેમિક ઈન્ડેક્સ (GI)નું પ્રમાણ ઓછું હોય છે અને બ્લડ સુગરમાં મોટો ચઢાવો કરતા નથી. બાજરી આદર્શ રીને આપણા દૈનિક આહારનો અભિન્ન ભાગ હોવો જોઈએ.

વિવિધ મીલેટની પોષકતત્વો ની માત્રા (પ્રતિ 100 ગ્રામ):

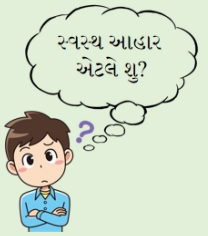
મીલેટ	એનર્જી (કિલોકેલોરી)	કાર્બોહાઈડ્રેટ (ગ્રામ)	પ્રોટીન (ગ્રામ)	ફેટ (ગ્રામ)	ફાઇબર (ગ્રામ)	કેલ્શિયમ (મિલીગ્રામ)	ફોસ્ફરસ (મિલીગ્રામ)	આયર્ન (મિલીગ્રામ)
જોવારી	૩૪૯	૭૨.૬	૧૦.૪	૧.૯	૧.૬	૨૫	૨૨૨	૪.૧
બાજરી	૩૬૧	૬૭.૫	૧૧.૬	૫.૦	૧.૨	૪૨	૨૯૬	૮.૦
કોધરી	૩૦૯	૬૫.૯	૮.૩	૧.૪	૯.૦	૨૭	૧૮૮	૦.૫
સામો	૩૦૭	૬૫.૫	૬.૨	૨.૨	૯.૮	૨૦	૨૮૦	૫.૦

મીલેટના આરોગ્ય લાભો:

- બ્લડ પ્રેશર ઘટાડે છે.
- ડાયાબિટીસથી બચાવો.
- આંતરડાની સ્થિતિનું જોખમ ઘટાડે છે.
- કબજિયાત, પેટ ફૂલવું અને ખેંચાણને દૂર કરે છે.
- પૂર્વજીવન તરીકે કાર્ય કરે છે.
- એન્ટિ-એસિડિક.
- ગ્લુટેન-ફ્રી.

ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪

ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪



- સ્વસ્થ આહાર તેના તમામ સ્વરૂપોમાં કુપોષણ સામે રક્ષણ આપવામાં મદદ કરે છે, તેમજ ડાયાબિટીસ, હૃદયરોગ, સ્ટ્રોક અને કેન્સર જેવા બિન-સંક્રમિત રોગો (એનસીડી) સામે રક્ષણ આપવામાં મદદ કરે છે.

- ખાંડ, મીઠું, ચરબી, લાલ માંસ - મટન, યકૃત જેવા ખોરાકથી ભરપૂર આહાર; દૂધ અને દૂધની બનાવટો જેવી કે ફુલ ક્રીમ દૂધ, માખણ, ઘી, પરંતુ ફળો અને શાકભાજીની માત્રા ઓછી હોય તેને અસ્વસ્થ આહાર કહેવામાં આવે છે.

તંદુરસ્ત આહાર માટે WHO માર્ગદર્શિકા

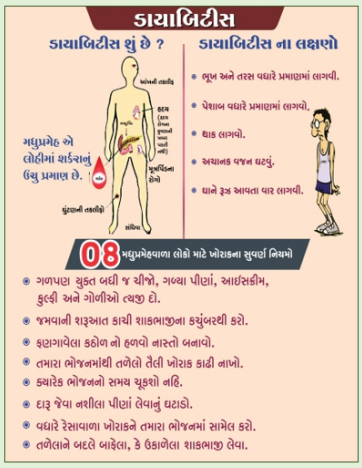
તંદુરસ્ત આહારમાં નીચે આપેલ મુદ્દાઓ નો સમાવેશ થાય છે:

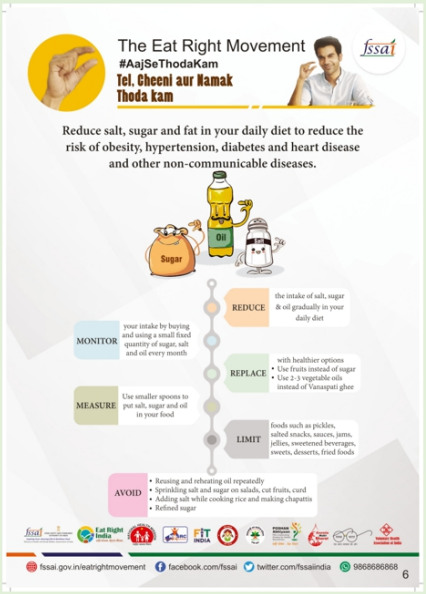
- ફળ, શાકભાજી, દાળ અને કઠોળ, સુખો મેવો અને આખા અનાજ (મકાઈ, બાજરી, ઓટ્સ, ઘઉં અને બ્રાઉન રાઈસ).
- બટાકા, શક્કરિયા, કસાવા અને અન્ય સ્ટાર્ચવાળા મૂળને બાદ કરતા દરરોજ ઓછામાં ઓછા 400 ગ્રામ (એટલે કે પાંચ ભાગ) ફળ અને શાકભાજી.
- ખાંડમાંથી કુલ એનેર્જી 5 ટકાથી ઓછા, જે 25 ગ્રામ (લગભગ 6 ચમચી) બરાબર છે.
- ચરબીમાંથી કુલ એનેર્જી 30 ટકાથી ઓછા પ્રમાણ, જે 30 ગ્રામ બરાબર છે.
- દરરોજ 5 ગ્રામથી ઓછું મીઠું (લગભગ એક ચમચી ની બરાબર) સેવન કરવું.

Noncommunicable Diseases
4 Diseases, 4 Modifiable Shared Risk Factors

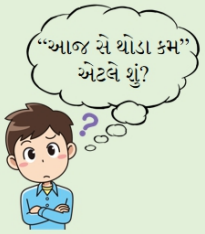
	Tobacco Use	Unhealthy diets	Physical Inactivity	Harmful Use of Alcohol
Cardio-vascular	✓	✓	✓	✓
Diabetes	✓	✓	✓	✓
Cancer	✓	✓	✓	✓
Chronic Respiratory	✓			

ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪





ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪



'आज से थोडा कम' સ્થૂળતા, હાયપરટેન્શન, ડાયાબિટીસ, હૃદયરોગ અને અન્ય બિન-સંક્રમિત રોગોનું જોખમ ઘટાડવા માટે તમારા દૈનિક આહારમાં મીઠું, ખાંડ અને તેલ ઘટાડવા પર ભાર મૂકે છે.

- તમારા દૈનિક આહારમાં ધીમે ધીમે મીઠું, ખાંડ અને તેલનું સેવન ઓછું કરો.
- દર મહિને ખાંડ, મીઠું અને તેલની ઓછી નિશ્ચિત માત્રાખરીદી અને ઉપયોગ કરીને તમારા સેવન પર નજર રાખવી.
- તંદુરસ્ત વિકલ્પો ઉમેરો.
  - ➢ ખાંડને બદલે ફળોનો ઉપયોગ કરો.
  - ➢ વનસ્પતિ ઘીને બદલે 2-3 પ્રકારના તેલનો ઉપયોગ કરો.
- તમારા ખોરાકમાં મીઠું, ખાંડ અને તેલ મૂકવા માટે નાની ચમચીનો ઉપયોગ કરો.
- અથાણાં, મીઠાવાળા નાસ્તા, સોસ, જેમ, જેલી, મીઠાવાળા પીણાં, મીઠાઈ, તળેલા ખોરાક ને મર્યાદિત કરો.
- નીચે આપેલ ઉપદેશો નો પાલન કરો:
  - ➢ વારંવાર તેલનો ફરીથી ઉપયોગ અને ફરીથી ગરમ કરવો ટાળો.
  - ➢ સલાડ, કાપેલા ફળો, દહીં પર મીઠું અને ખાંડ છાંટવું ટાળો.
  - ➢ ચોખા રાંધતી વખતે અને રોટલી બનાવતા સમયે મીઠું ઉમેરવું ટાળો.
  - ➢ રિફાઈન્ડ ખાંડ ટાળો.

ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪

- ફન્કશનલ ફુડસ માં વિટામિન્સ, પ્રોબાયોટિક્સ, એન્ટિઓક્સિડન્ટ્સ, ફાઇબર્સ વગેરે જેવા સક્રિય સંયોજનો હોય છે જે સ્વાસ્થ્યને ટેકો આપે છે અને વિવિધ રોગોને રોકવામાં મદદ કરે છે.
- સંતુલિત આહારના દરેક ખાદ્ય જૂથમાંથી, દરરોજ, એનસીડીનું જોખમ ઘટાડવા માટે ફન્કશનલ ફુડસ નો ઉમેરો કરવા નિ સલાહ આપવા માં આવે છે.

આહાર ઔંજ ઔંષધ		
હર્બ/ સ્પાઈસ	ગુજરાતી નામ	સ્વાસ્થ્ય લાભ
Fenugreek seeds	મેથી	બ્લડ શુગર સ્તર સુધારે છે, કોલેસ્ટરોલ ઘટાડે છે, બળતરા વિરોધી અસરો કરે છે અને ભૂખને નિયંત્રિત કરે છે.
Garlic	લસન	રક્તવાહિનીઓને બરાબર રાખે છે, કોલેસ્ટરોલ અને ટ્રાઇગ્લિસરાઇડના સ્તરને ઘટાડવામાં મદદ કરે છે.
Turmeric	હળદળ	બળતરા ઘટાડવામાં અને હૃદયના સ્વાસ્થ્યને સુધારવામાં મદદ કરે છે.
Cumin	જીરું	પાચનમાં મદદ કરે છે, બ્લડ શુગર સ્તર ઘટાડે છે, ઇન્સ્યુલિનની સંવેદનશીલતા વધારે છે, હૃદયના રોગો સામે રક્ષણ આપે છે.
Coriander	ધાણા	બ્લડ પ્રેશર, બ્લડ શુગરનું સ્તર અને કોલેસ્ટરોલનું સ્તર ઘટાડવામાં મદદ કરે છે.
Cinnamon	તજ	કોલેસ્ટરોલનું સ્તર અને બ્લડ શુગરનું સ્તર ઘટાડવામાં મદદ કરે છે.
Cardamom	એલચી	બ્લડ પ્રેશર ને ઓછું કરે છે, શ્વાસ સુધારે છે અને પેટના અલ્સરને મટાડવામાં મદદ કરે છે.
Basil	તુલસી	કેન્સર સામે રક્ષણ આપે છે, બ્લડ શુગરના સ્તરને નિયંત્રિત કરે છે, તમારા કોલેસ્ટરોલ અને ટ્રાઇગ્લિસરાઇડને ઘટાડે છે.
Ashwagandha	અશ્વગંધા	બ્લડ શુગરનું સ્તર ઘટાડે છે, તણાવનું સંચાલન કરે છે, ચિંતા ઘટાડે છે.
Cloves	લવિંગ	એન્ટિઓક્સિડન્ટ્સનું પ્રમાણ વધારે છે, કેન્સર સામે રક્ષણ આપે છે, બ્લડ શુગરને નિયંત્રિત કરવામાં મદદ કરે છે અને હાડકાના સારા સ્વાસ્થ્યને પ્રોત્સાહન આપે છે.
Dry Ginger	સુંઠ	વજન ઘટાડવા માં અને અપચો રોકવામાં મદદ કરે છે, બ્લડ શુગરનું સ્તર અને કોલેસ્ટરોલ ઘટાડે છે
Flax Seeds	અળસી	પાચનસુધારે છે, હૃદયરોગ, ડાયાબિટીસ અને કેન્સરનું જોખમ ઘટાડે છે.
Garden Cress Seeds	અસાળીયો	આયર્ન અને ફાઇબરથી ભરપૂર, વજન ઘટાડવામાં મદદ કરે છે, બ્લડ શુગરનું સ્તર ઘટાડે છે અને રોગપ્રતિકારક શક્તિ વધારે છે.
Chia Seeds	ચિયા બીજ	એન્ટીઓક્સિડન્ટો અને ફાઇબરથી ભરપૂર, બ્લડ શુગરનું સ્તર અને હૃદયના રોગોનું જોખમ ઘટાડે છે, વજન ઘટાડવામાં મદદ કરે છે અને હાડકાના સ્વાસ્થ્ય માટે સારું છે.

સ્વસ્થ રહેવા માટે.....

કસરત.....

સ્વસ્થ જીવન તરફનો માર્ગ

કસરત કરવાની સરળ અને સાદી રીતો

૧) ચાલવું
૨) સાયકલ ચલાવવી
૩) જોગીંગ
૪) તરવું
૫) નૃત્ય કરવું
૬) બહારની રમતો રમવી.
૭) બાગકામ જાતે કરવું.
૮) ઘરકામ જાતે કરવું.

કસરત શા માટે ?

૧) કોલેસ્ટેરોલનું પ્રમાણ ઘટાડે છે.
૨) શરીરના વજનને નિયંત્રિત રાખે છે.
૩) ચિંતાને હળવી બનાવવામાં મદદ કરે છે.
૪) રોગ સામેની પ્રતિકારક શક્તિમાં વધારો કરે છે.
૫) બિન-ચેપી રોગોનું જોખમ ઘટાડે છે.

નિયમિત કસરત વ્યકિતને નીરોગી, સુખી અને સમજદાર રાખે છે.

ગાંધી અને ભમરા ૨૦૨૦, ૯૮૨૪૩૨૦૫૫૪

APPENDIX XI
PHOTO GALLERY

Interaction with Taluka Health Officers of various talukas.

THO - PADRA

THOs - SAVLI & DESAR

THO - VADODARA

THO - SINOR

Interaction with CHOs and ASHA facilitators at different Taluka Health Offices

APPENDIC XII
ABSTRACT

INTERNATIONAL CONFERENCE ON PUBLIC HEALTH
24th - 26th March, 2021

Managed by
SAVITRIBAI PHULE PUNE UNIVERSITY
Centre for Public Health

Oral Presentation - 15

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Title : Need for integrating concepts of promoting healthy diets for prevention of non-communicable diseases in training curriculum of Community Health Officers (CHOs) under Ayushman Bharat

Background: Dietary risks rank 2nd in disease burden profile of Gujarat highlighting the need of promoting healthy diets in the community. CHOs playing a pro-active role at the community level should possess knowledge and aptitude for promoting healthy diets at community level under eats right India campaign.

Methodology: All the CHOs from 6 blocks of Vadodara district, available for the study were enrolled (n=50). Data on their knowledge regarding healthy diets in preventing non communicable diseases was assessed using pre-tested semi-structured questionnaire.

Results: Knowledge assessment showed almost all CHOs were aware of concepts like nutrition and balanced diet whereas only 50% answered correctly about functions of food. Only a few knew about the major nutrients and different food groups based on nutritive value. Majority of them were aware of the terms healthy diets and Dash diet, however, knowledge on their components needs to be strengthened. Majority knew about 'aaj se thodakam' and glycemic index whereas knowledge on the concepts like RDA, food pyramid, My Plate, dietary diversity, FANTA classification, functional foods, Eat Right India and indigenous foods for health promotion needs to be strengthened along with the knowledge on daily intake of fruits and vegetables, sugar, fats and salt.

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Conclusion: There is a need to integrate concept of healthy diets for effective delivery and utilization of services related to non-communicable disease prevention at community level.

Keywords: Ayushman Bharat, Community health officers. Healthy diets, Eat right India