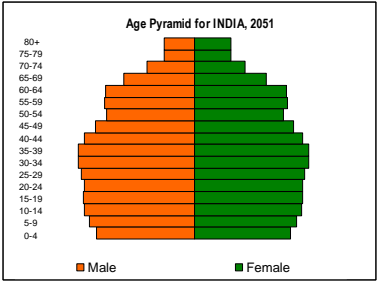
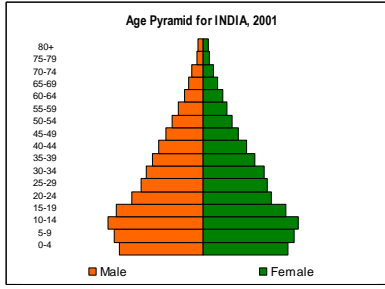
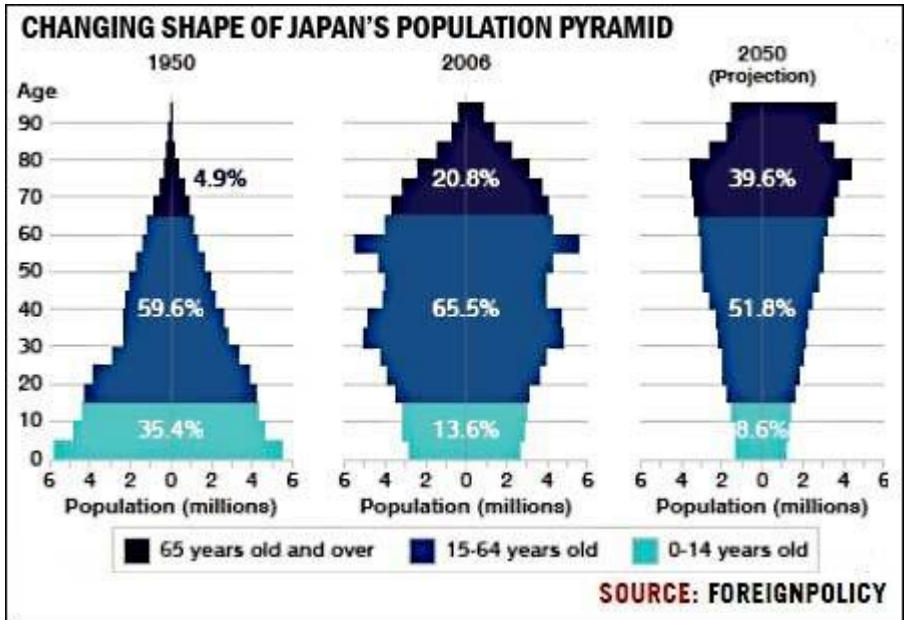


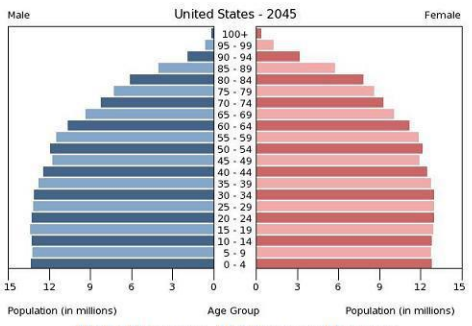
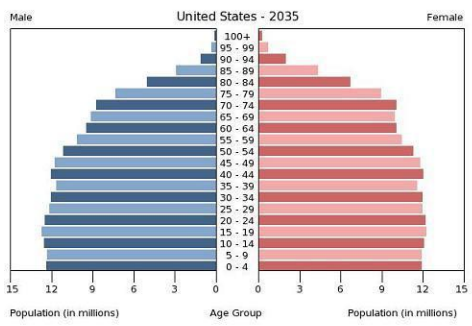
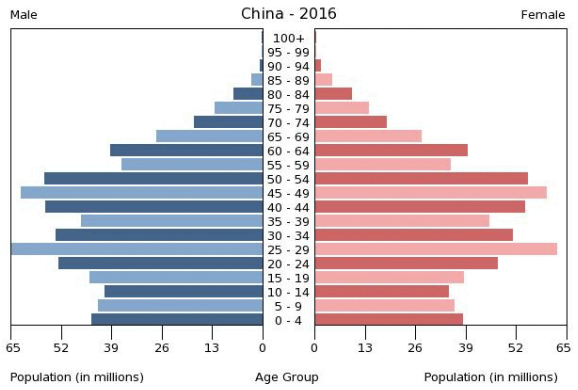
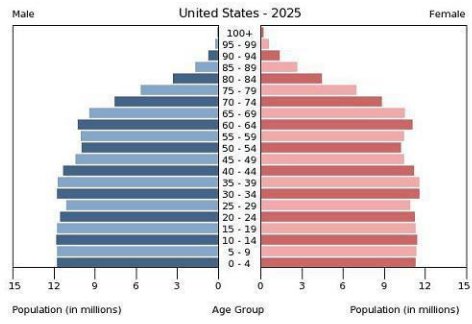
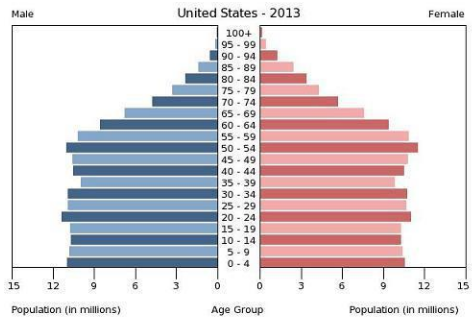
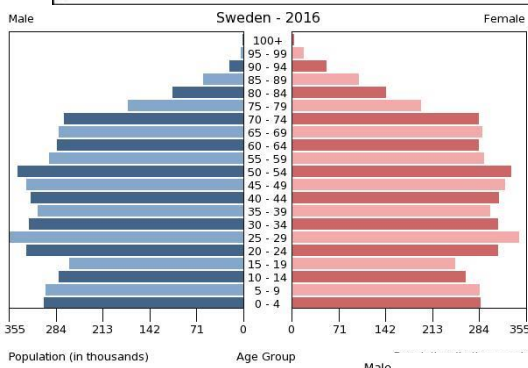
MIDLIFE FACTORS THAT AFFECT HEALTHY AGEING

**Dr Seema Puri
Associate Professor,
Institute of Home Economics,
University of Delhi**

DEMOGRAPHICS OF AGEING

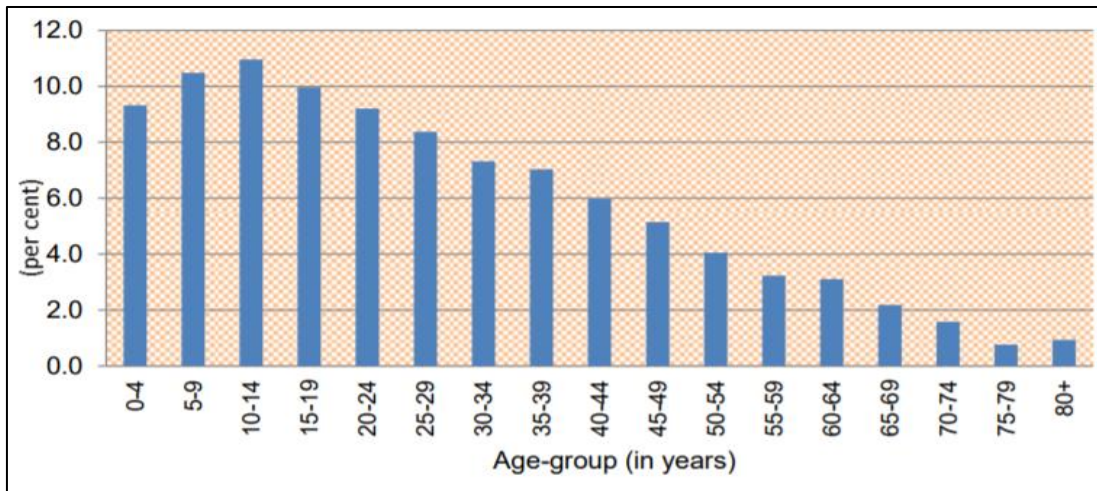


In 2050, UNDP forecasts adults (> 60y) to comprise 20.1% of a population of 1.53 billion in India



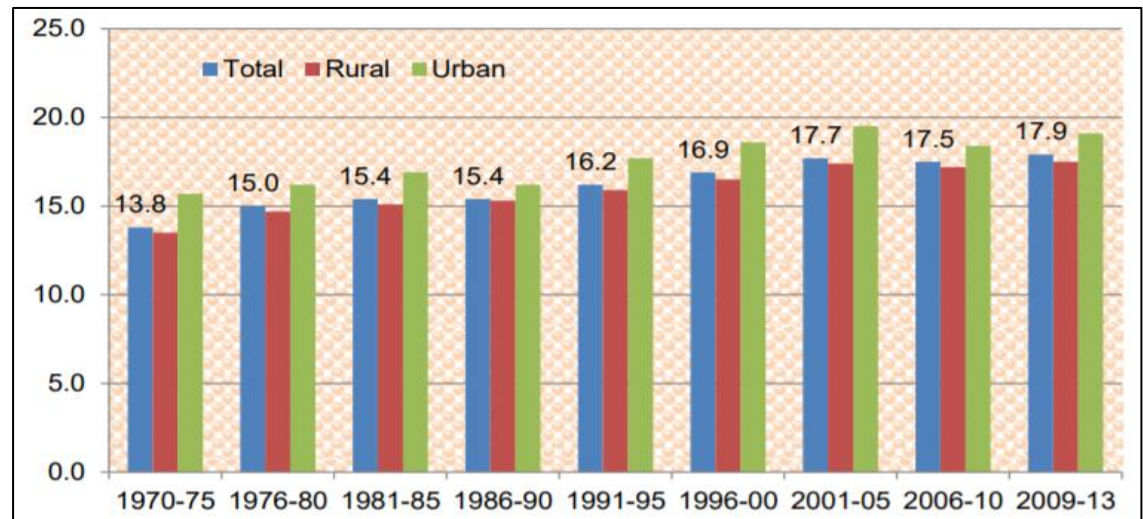
Data Source: US Census Bureau

DEMOGRAPHICS OF AGEING



India: Age-wise distribution of population
[MOSPI, 2016]

Life expectancy at the age of 60 years in India



CHARACTERISTICS OF INDIAN ELDERLY

- **Persons >60 years would increase from 8.9% of population to 19.4% by 2050**
- **Population of people above 80 is likely to increase from 0.9% to 2.8% by 2050**
- **Increase in no. of oldest-old (>80 yrs) - increase in dependency – increased need for care**

India will transform gradually from young to a 'greying' country and by 2050, every 5th Indian will be in 60s as against every 12th at present

SUCCESSFUL AGEING

“ Oh Lord, let me die young but live as long as possible”

- Greek Prayer

Modification of behaviour to achieve maximal longevity with the highest possible quality of life

3 aspects:

- **high cognitive & physical functional capacity**
- **low probability of disease & disability**
- **active engagement with life**





- Chronic degenerative diseases
- Multiple morbidities
- Clustering of diseases
- Polypharmacy
- Drug- nutrient interactions

Physiological

Ageing

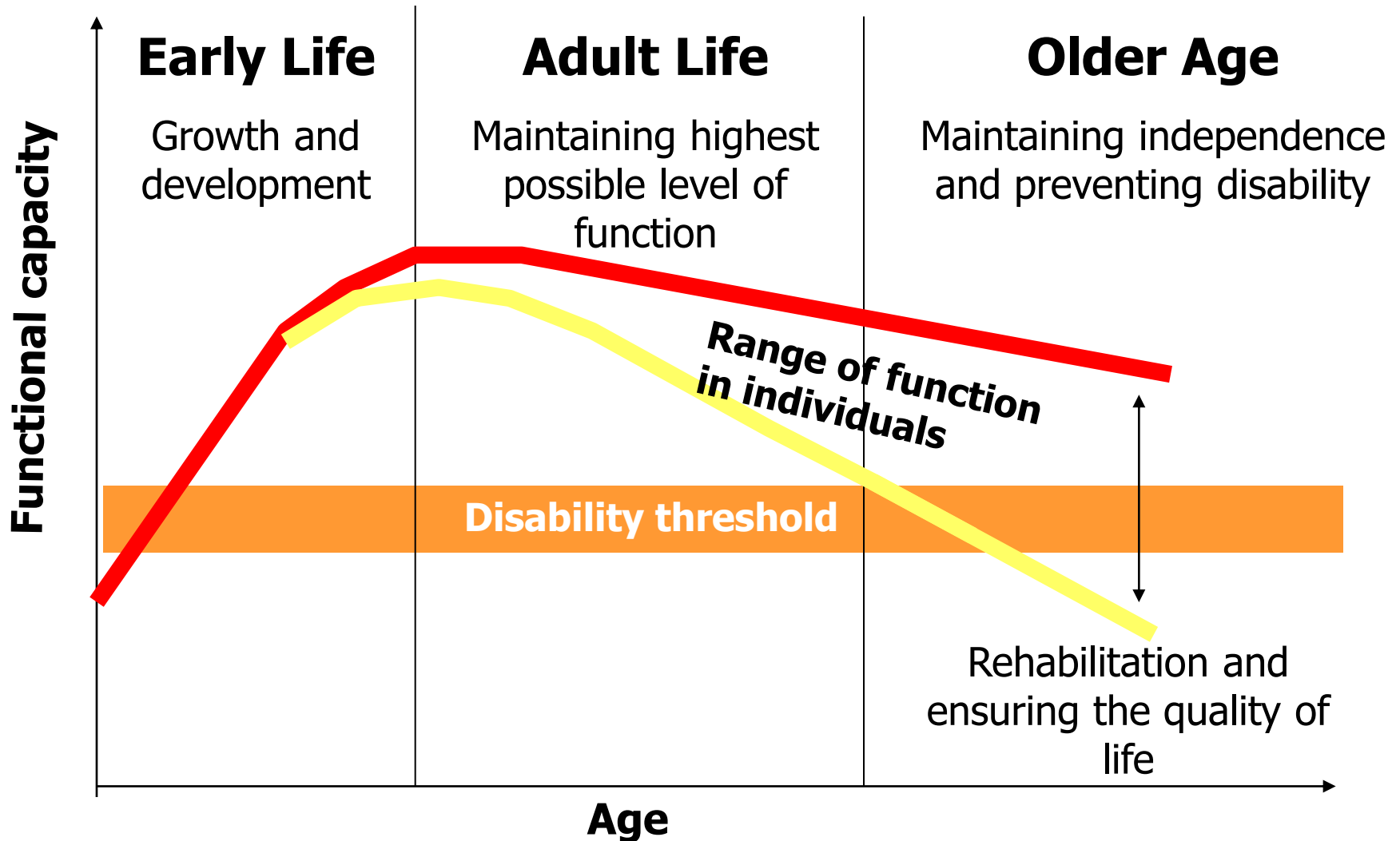
Pathological

- Changes in body composition
- Reduction in basal metabolic rate
- Changes in bone health
- Decline in functional ability
- Altered regulation of the immune system
- Changes in neurological and cognitive function
- Diminished taste and smell
- Difficulty in feeding
- Gastrointestinal tract changes

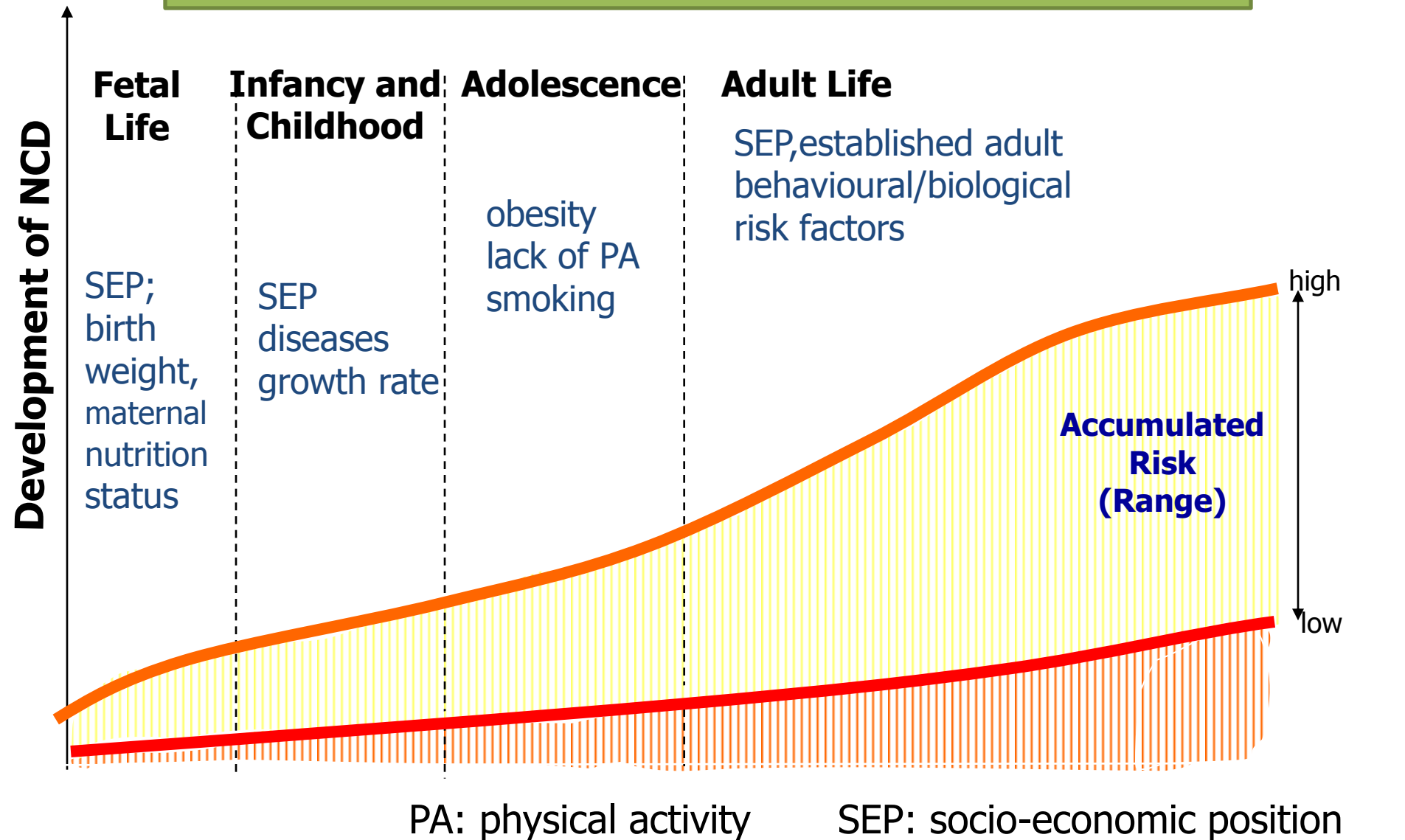
HEALTHY AGEING

- Health of an individual is the result of **interactions between genetics and a number of environmental factors** esp. nutrition
- Our genetic profile has not changed over the past 10,000 years, whereas major changes have taken place in our food supply and in energy expenditure and physical activity
- **A sharp rise in the prevalence of NCDs** like diabetes, hypertension, cardiovascular diseases and cancers is seen
- In order to live longer and healthier lives, it would be necessary to **delay the process of physiological aging** and **prevent/ delay the imposition of pathological aging** (in the form of NCDs)

A LIFE COURSE APPROACH TO ACTIVE AGEING



Scope for NCD Prevention



Developmental Origins of Health and Disease (DOHaD)

- DOHaD hypothesis suggests **that adverse environmental factors might induce changes in fetal growth and metabolism to match the environment; in environments that subsequently change, this process could become maladaptive and lead to disease in later life**
- Epidemiological and animal studies have shown that **LBW is associated with increased risk of NCDs later in life**, including diabetes, hypertension, cardiovascular disease, and neurological disorders
- The associations between LBW and NCDs can be **transmitted across generations**, even in the absence of further adverse exposures, such as maternal malnutrition
- Similar associations might reflect persistence of adverse extrinsic factors, such as malnutrition and poverty, across generations (Nyirenda & Byass, 2019)

Birthweight is a measure of newborn health and a key indicator of later disease

THE ASIAN INDIAN PHENOTYPE

**IN SPITE OF LOWER BMI
South Asians have...**

**More abdominal fat
(The “thin-fat” Indian)**

**More insulin resistance and
hyperinsulinemia**

**Higher levels of
C-reactive protein**

Lower levels of adiponectin

Characteristic dyslipidemia

- Low HDL levels
- High triglycerides
- High levels of small dense LDL

**Increased susceptibility to
type 2 diabetes and
coronary artery disease**

Hence, not only is the prevalence of NCDs greater among Indians but also the onset is at a much younger age

Physiological

Anorexia of aging
Loss of lean body mass and decreased BMR
Sensory decline in olfaction and taste

Pathological

Dentition, Dysphagia, GIT Disorders
Diseases (thyroid, CV, and pulmonary)
Chronic illnesses (diabetes, hypertension, congestive heart failure)

Factors

Financial constraints
Decline in functional status
Problems with shopping and food preparation
Inadequate social support networks and social isolation
Caregiver stress

Sociological

Loneliness
Emotionally stressful life events
Depression
Dementia

Psychological

Most of these factors start influencing in middle age

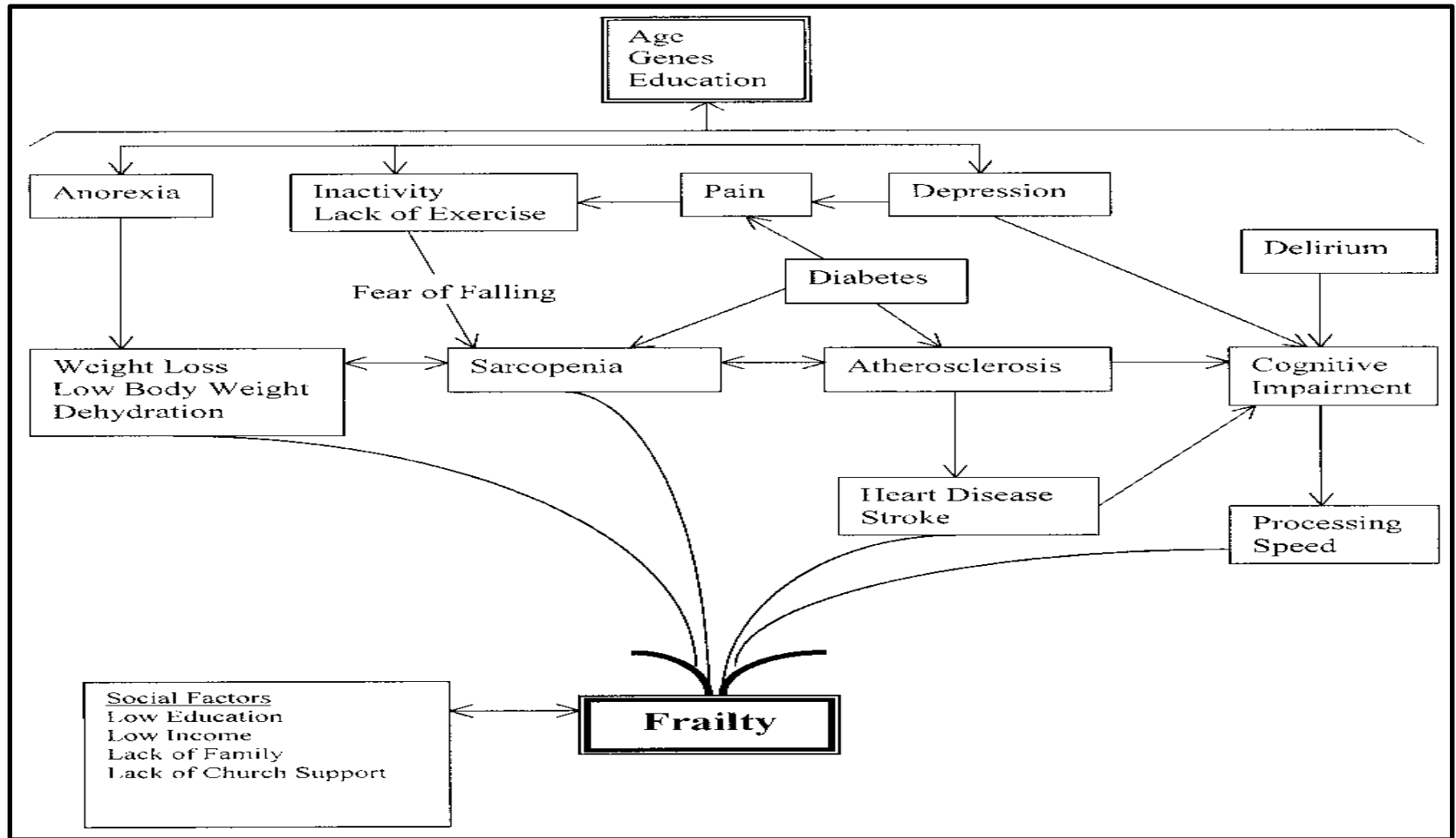
PHYSIOLOGICAL FACTORS

Physiological decline in food intake seen in people as they age regardless of chronic illness and disease

- **Anorexia of aging** involves alterations in neurotransmitters and hormones that affect the central feeding drive and the peripheral satiation system
- **Loss of lean body mass and decreased BMR** may influence appetite and food intake
- **Sensory decline** in olfaction and taste decreases enjoyment of food, leads to decreased dietary variety, and promotes increased use of salt and sugar
- **Loss of smell promotes feelings of depression**

FRAILTY

➤ ... a state of high vulnerability for adverse health outcomes, including disability, dependency, falls, need for long-term care, and mortality (Fried et al, 2004)



(Morley et al, 2102)

Epidemiological research has led to the identification of several risk factors for frailty, including:

Risk Factors	Risk Factors
Advancing age (>80 yrs)	Poor functional capacity, low physical activity/slowness, and mobility impairment
Single or living alone	Underweight or overweight/obesity
Female gender	Psychosocial issues like negative self perception, reduced health perception
Lower education levels	Chronic diseases such as CVD, diabetes, CKD; comorbidities
Lower socio-economic status	Multiple medications (>5 a day)
Environment-related factors such as life space and neighborhood characteristics	Physiologic impairments, such as activation of inflammation, anemia, atherosclerosis, autonomic dysfunction, hormonal abnormalities, , hypovitaminosis D
Depression	Lower cognitive performance
Weight loss	Fatigue/exhaustion, weakness

(Pegorari &Tavares, 2014; Sanchez- Garcia et al, 2014; Moreira &Lourenco, 2013; Shamliyan et al, 2013, Shaheen & Puri, 2012)

MODIFIABLE RISK FACTORS

- ❑ The most studied is **physical activity**, particularly **resistance exercise**, which is beneficial for preventing and treating physical performance in frailty
- ❑ The evidence for **diet** is less extensive but a **suboptimal protein/total calorie intake and vitamin D insufficiency** have both been implicated
- ❑ There is emerging evidence that frailty increases in the presence of **obesity** particularly in the context of other unhealthy behaviours such as **inactivity, a poor diet and smoking**

(British Geriatrics Society, 2014)

PATHOLOGICAL AGEING



- **Chronic degenerative diseases** - CHD, stroke, hypertension, diabetes, osteoporosis, cancers, dementias
- **GIT Disorders** - poor intake and malabsorption
- **Diseases** - thyroid, CV, and pulmonary
- **Multiple morbidities:**
 - > 20% have at least 2 diseases; > 3% have at least 3 diseases
- **Clustering of diseases** towards terminal part of life
- **Polypharmacy**
- **Drug- nutrient interactions**
 - side effects e.g. anorexia, nausea, and altered taste perception; alteration of nutrient absorption, metabolism, and excretion

SOCIOLOGICAL FACTORS

- **Financial constraints**
- **Lifestyle related factors - death of a spouse, social isolation, living alone**
- **Decline in functional status leads to dependence on others**
- **Problems with shopping and food preparation**
- **Inadequate social support networks and social isolation**
- **Caregiver stress**

PSYCHOLOGICAL FACTORS

Mid and Late life can be a time of multiple losses - loss through retirement, disability and death of friends and family

- **Loneliness** - low desire to prepare and enjoy meals, can lead to malnutrition and weight loss
- **Depression**, often unrecognized, is a well-known cause of anorexia, malnutrition and weight loss
- Even transient depressed mood (in **bereavement**) can cause clinically significant weight loss
- **Dementia** usually produces malnutrition because the person forgets to eat

Prevention/Delay of Ageing Process

- **Prevent or delay functional decline**
- **Improve or maintain functional independence**
- **Minimize weight loss, loss of muscle mass and strength, reduce falls risk**
- **Exercise**
- **Nutritional maintenance / supplementation**
- **Environmental modifications**
- **Family and social engagement**
-



No definite models. Interventions based on nutrition and exercise for management of frailty

Maintain an active lifestyle with a diet providing a rich supply of fruit and vegetables and frequent oily fish

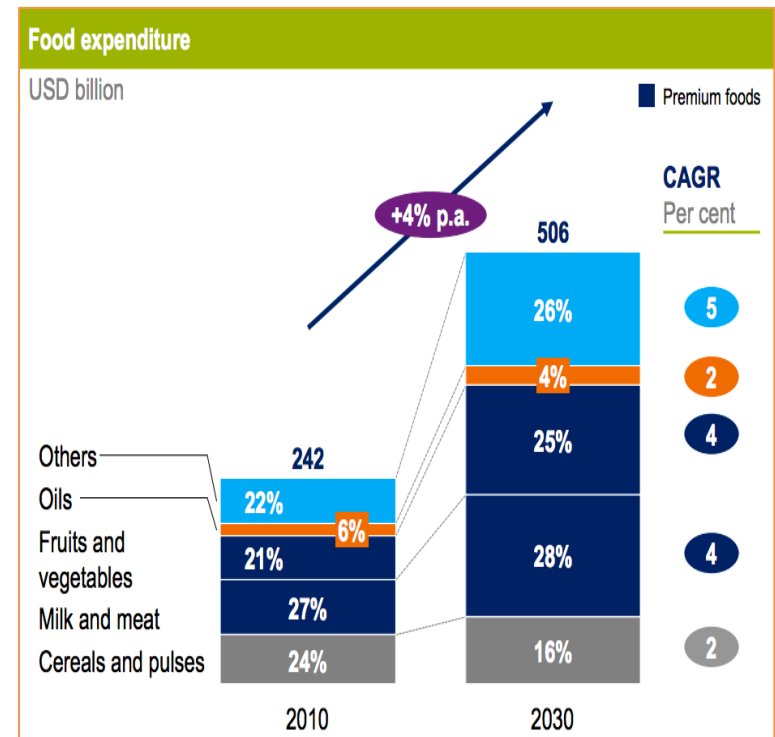
DIET AND AGEING



**“Everyone knows food is bad for you,
but I don’t know what else to eat!”**

Changing dietary patterns- how much is it responsible?

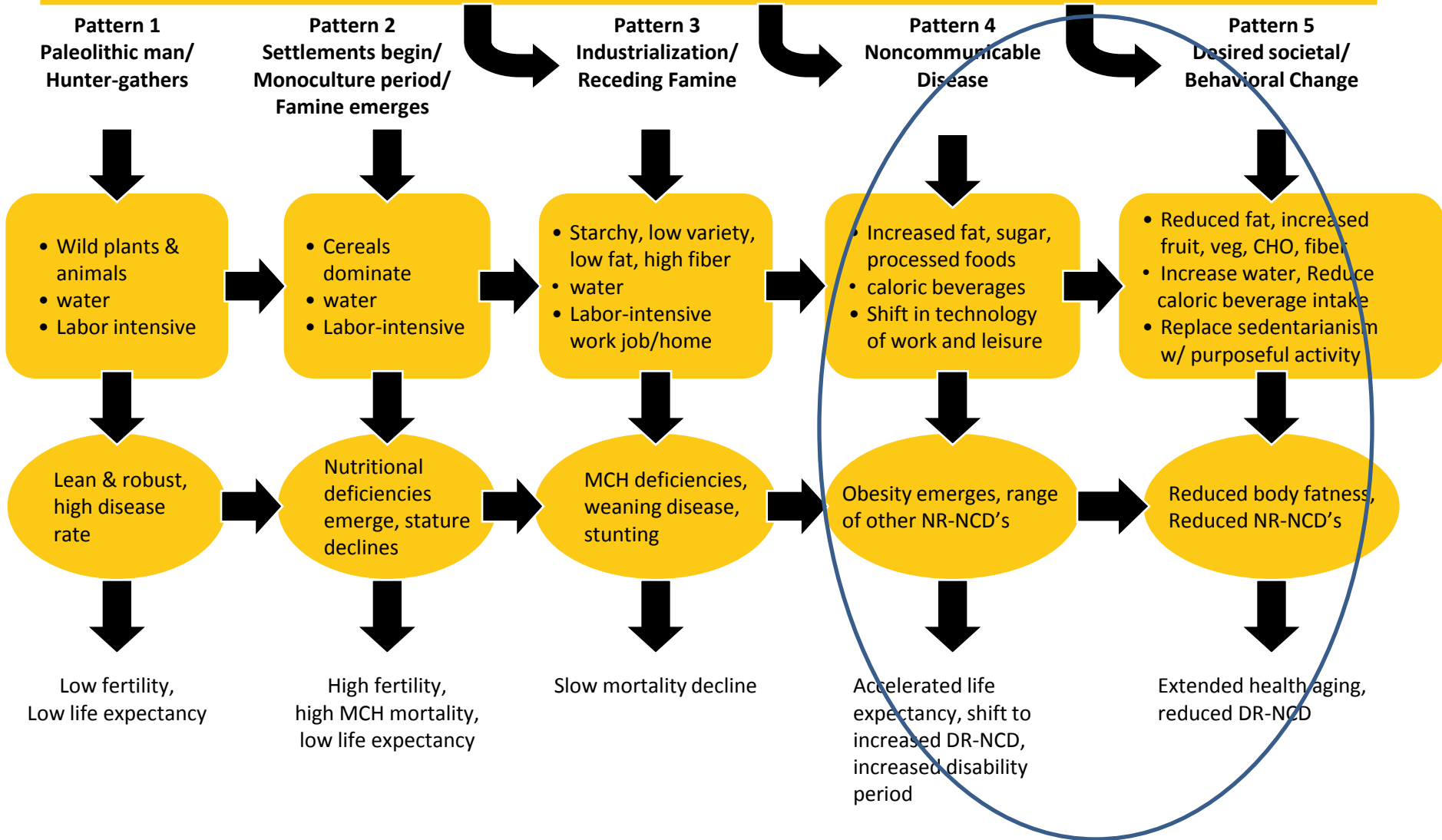
- The food consumption pattern in India has evolved over the past two decades
- Access to many **new 'empty' calorie foods and beverages** relates to the rising epidemic of overweight/obesity, and its consequent impact on the burden of NCDs
- The intake of cereals has declined in urban areas which indicates shift towards more **energy dense food (highly processed, deep-fried, unhealthy foods, devoid of adequate nutrients)** as a source of energy in the diets (NSSO,2012)



India's consumption basket expected to move towards premium foods (CII and McKinsey, 2013)

STAGES OF THE NUTRITION TRANSITION

Urbanization, economic growth, technological changes for work, leisure, & food processing, mass media growth



Source: Popkin 2002 revised 2006.

NUTRITION TRANSITION IN INDIA

The nutrition transition in India has occurred in 3 stages:

In stage 1, consumers moved away from traditional staple items to food products more prevalent in “westernized” diets, such as the increased consumption of wheat in the form of bread, cakes, and cookies

In stage 2, the influences of globalization were much more marked and the consumers had access to a variety of convenience foods (processed, ready-to-eat, deep-fried, and with added preservatives). Most Indians are currently in the second stage of nutrition transition.

In stage 3, some people (esp. those belonging to HSES) tend to realize adverse eating habits and try to adapt a healthy lifestyle. These people also have economic resources to buy costly healthy foods, and also avail themselves of exercise facilities, including expensive equipment and gymnasium visits

(Misra et al, 2011)

NUTRITION TRANSITION IN INDIA

Implications

Nutrition transition over the past 30 years, has resulted in

- a 7% decrease in energy from carbohydrates
- a 6% increase in energy from fats
- a decreasing intake of coarse cereals, pulses, fruits and vegetables
- an increasing intake of meat products and salt
- declining levels of physical activity due to rapid urbanization
- escalating levels of obesity, atherogenic dyslipidemia, subclinical inflammation, metabolic syndrome, type 2 diabetes mellitus, and coronary heart disease

(Misra et al, 2011)

Studies also suggest that adverse perinatal events due to maternal nutritional deprivation may cause LBW infants, which, coupled with early childhood “catch-up growth”, leads to obesity in early childhood, thus predisposing to NCDs later in life

Longevity and Energy Restriction

Obesity is a definite health risk in old age

- Animals fed calorie restricted diets live 40% longer. Chronic diseases appear at a later age
- Reduction of food intake without malnourishment extends life span in many different organisms
- Evidence has limited applicability to humans - unlikely that such diets can be maintained long-term (Charlton, 2002)

A prescription that may extend your life

Low-Calorie Diets Extend Life Of A Variety Of Animal Species

Michael Mason



How depressing, how utterly unjust, to be the one in your social circle who is aging least gracefully.

In a laboratory at the Wisconsin National Primate Research Center, Matthias is learning about time's caprice the hard way. At 23, getting on for a rhesus monkey, Matthias is losing his hair, lugging a paunch and getting a face full of wrinkles.

Yet in the cage next to his, gleefully hooting at strangers, one of Matthias's lab mates, Rudy, is the picture of monkey vitality, although he is slightly older. Thin and feisty, Rudy stops grooming his smooth coat just long enough to pirouette toward a proffered piece of fruit.

Tempted with the same treat, Matthias rises warily and extends a frail hand. "You can really see the difference," said Dr. Richi Colman. What a visitor cannot see may be even more interesting. As a result of a simple lifestyle intervention, Rudy and primates like him seem poised to live very long, very vital lives.

This approach, called calorie restriction, involves eating about 30 percent fewer calories than normal while still getting adequate amounts of vitamins, minerals and other nutrients. Aside from direct genetic manipulation, calorie restriction is the only strategy known to extend life consistently in a variety of animal species. How this drastic diet affects the body has been the subject of intense research. Recently the effort has begun to bear fruit, producing a steady stream of studies indicating that the rate of aging is plastic, not fixed, and that it can be manipulated.

In the last year, calorie-restricted diets have been shown in various animals to affect molecular pathways likely to be involved in the progression of Alzheimer's disease, diabetes, heart disease, Parkinson's disease and cancer. Earlier this year, researchers studying dietary effects on humans went so far as to claim that calorie restriction may be more effective than exercise at preventing age-related diseases.

Monkeys like Rudy seem to be proving the thesis. Recent tests show the animals on restricted diets, including Canto and Eyoire, two other rhesus monkeys, are in indisputably better health as they near old age than Matthias and other normally fed lab mates like Owen and Johann.

NYT NEWS SERVICE

CALORIE RESTRICTION DIET
CANTO, 25
Although a senior citizen — the average rhesus monkey lifespan in captivity is 27 — Canto, above, is aging fairly well. Outwardly, he has a nice coat, elastic skin, a smooth gait, upright posture and an energetic demeanor. His bloodwork shows he is as healthy as he looks.

HUMAN EQUIVALENT (Meals by Mike Umlauf, 36)
Breakfast: fermented soybeans, garlic
Lunch: tofu, konyakku and carrots
Dinner: vegan sausage, kale, sauce and salad

MONKEY MENU:
445885 calories a day + an apple

NORMAL DIET
OWEN, 26
He gets more food, but Owen, above, isn't aging as well. His posture has been affected by arthritis. His skin is wrinkled and his hair is falling out. Owen is frail and moves slowly. His bloodwork shows unhealthy levels of glucose and triglycerides.

DIET OF AN AVERAGE ACTIVE HUMAN MALE OF 36
Human Menu: 2,000,000 calories a day; Beverages, snacks, deserts not shown, diet varies according to body, gender and activity level

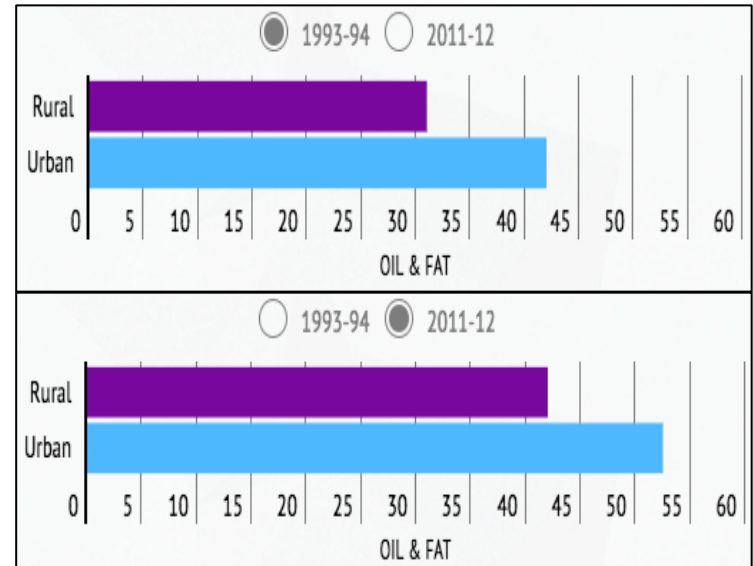
CARBOHYDRATE INTAKES

- Energy intake from CHOs (particularly cereals) is higher in Asian Indians as compared to other ethnic groups (Misra and Vikram, 2004)
- As per the NIN report (2011), the intake is higher in the rural (404 g/day) compared to the urban areas (331 g/day). Contributes approximately 70% of energy intake in Indians
- The decreasing consumption of cereals may indicate a shift towards (more) energy-dense “fast” foods (highly processed, deep-fried, unhealthy foods, devoid of adequate nutrients)
- A high intake of CHO (>55% of energy), even with a low fat intake, may lead to high serum TG levels, hyperinsulinemia, and low levels of HDL-C (Misra et al, 2005)



DIETARY FATS

- **Increasing total fat intake, esp SFA and trans- fats** with decreasing physical activity due to rapid urbanization are important contributors to the **increasing prevalence of obesity and related NCDs** (Misra et al, 2011)
- The fat intake was high due to increased consumption of out-of-home food, processed and fried foods etc. (FSSAI,2017).
- The daily intake of oil and fat has increased from 31g to 42g in rural areas and from 42g to 52.5 g in urban areas (FICCI,2015)



FICCI Nutrition Committee,2015

Saturated fatty acids

- Mainly from butter, ghee and coconut oil (Misra et al, 2011). Coconut fat accounts for 80% of the fat intake in south India
- Kerala has not only the highest level of blood cholesterol, but also the highest rate of CHD in India (Mohan et al, 2001)

DIETARY FATS

Polyunsaturated fatty acids

- Intake of n-3 PUFAs is low, particularly among vegetarians (Misra et al, 2011)
- Optimum ratio of n-6: n-3 PUFAs (between 5 and 10) may have a beneficial role in the prevention of diet related NCDs (Ghafoorunisa and Krishnaswamy, 1994)
- Longitudinal cohort studies are needed to assess whether the ratio of n-6: n-3 or their absolute amounts play a role for the prevention and management of atherosclerosis (Misra, 2011)

Monounsaturated fatty acids

- MUFA-rich diets have beneficial effects on DBP and lipid metabolism (Rivellese et al, 2003)
- The favorable effect of MUFA intake disappeared at a total fat intake above the median (>37en%) indicating that the beneficial effect is negated by a high intake of fat in the diet (Rasmussen et al, 2006)
- Rastogi et al (2004) compared persons consuming sunflower oil with those using mustard oil (70% MUFA, 10% ALNA and 12% LA) and found that the latter had a significant lower risk for CVD after adjustment for age, sex, and smoking

DIETARY FATS

Trans-fatty acids

- **Controlled trials and observational studies provide conclusive evidence that consumption of TFAs adversely affect multiple CVD risk factors and contributes significantly to increased risk of CVD (FSSAI, 2017)**
- **Indian diets mostly derive TFAs from vanaspati, used in the preparation of commercially fried, processed, baked, ready-to eat foods, and foods made by street vendors in India**
- **A TFA intake of 1.13 and 1.11% amongst adolescent and young adults in north India, respectively, has been reported (Misra et al, 2009)**
- **According to recommendations, TFAs should be limited to <1% of total daily energy**
- **Studies have observed adverse effects of dietary TFAs at intakes as low as 1–3% energy (2–7 g / person / day), and have led to advocacy of <0.5% energy from TFAs to minimize health risks (Mozaffarian et al, 2006)**

The HFSS SAGA

- National surveys show highly significant association between **per capita consumption of sugar, salt and fat with occurrence of overweight and obesity, as also with hypertension and diabetes to a lesser extent**
- Data from NHANES Survey (2011-2016) of 13,446 adults, 20 years of age and older, revealed that **for every 5% increase in calories from ultra-processed foods a person ate, there was a corresponding decrease in overall cardiovascular health (CDC, 2019)**
- Consumption of HFSS products is increasing rapidly with our diets becoming more westernized, which is broadly defined by high intake of refined carbs, added sugars, fats and animal-source foods

SALT AND SUGAR

SALT

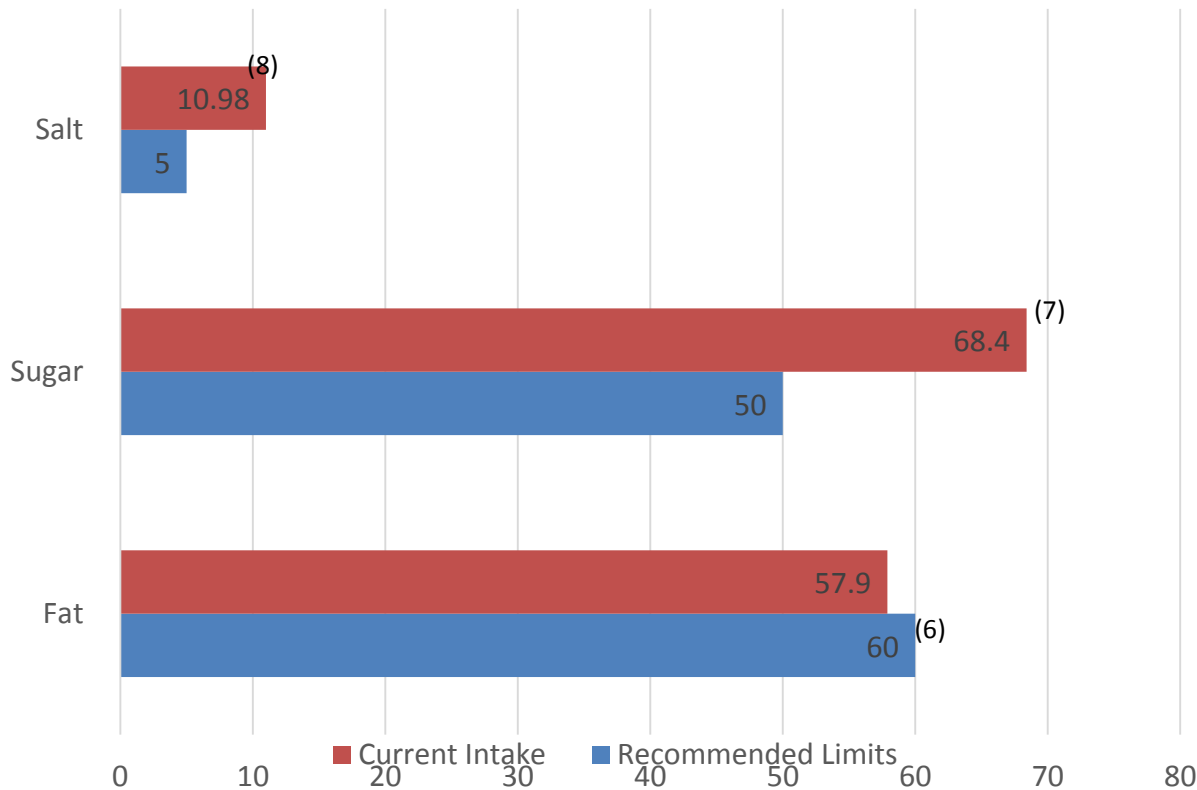
- Salt consumption is a significant predictor of hypertension
- **SBP rises by 2-86mmHg per 1gm increase Na intake in people who had >5 g sodium/day**
- Average intake between 9-12g/day
- WHO recommended intake is 5g/day and NIN recommends 6g/day
- With proliferation of food outlets/fast food centers, increasing availability of prepared foods, and increasing frequency of eating out of home, besides cooking/table salt, processed foods are a major source of salt intake (Mohan, 2011)

SUGAR

- Excessive consumption has been linked to several metabolic health conditions including diabetes and CVD
- **Consistent association between a high intake of SSBs and obesity and increased risk of type II diabetes**
- In India, while intake of “traditional sugars” has declined, an increase in the intake of sugar from sugar sweetened beverages has been recorded

India, has become the world's biggest sugar consumer today

How much are we meeting the GUIDELINES



Average Indian consumes 119% more salt per day than the WHO's limit of less than 5g/day

When intake of "traditional sugars" and SSBs are added to that of white sugar, the 'total' sugar intake in Indians exceeded the average global per capita consumption

The mean intake of saturated fat among average urban Indian is 7.2% E

DIETARY FIBER, FRUITS AND VEGETABLES

- People who eat 3 or more servings of high-fiber cereals are less likely to develop insulin resistance and metabolic syndrome (Misra et al, 2009)
- National surveys in India indicate a very low per capita fruits and vegetables consumption among rural and urban adults (NIN, 2011)
- In a study in south India, a higher intake of fruits and vegetables explained 48% of the protective effect against CVD risk factors (Radhika et al, 2008)
- Those consuming a median of 3.5 servings / week had a 67% lower relative risk (RR: 0.33; $P < 0.0001$) than did those consuming 0.5 servings / week (Rastogi et al, 2004)
- A nationwide study showed that overweight was positively associated with dietary intake of fats, sugars and jaggery, and negatively associated with fruit and vegetable intake (Gupta, 2006)

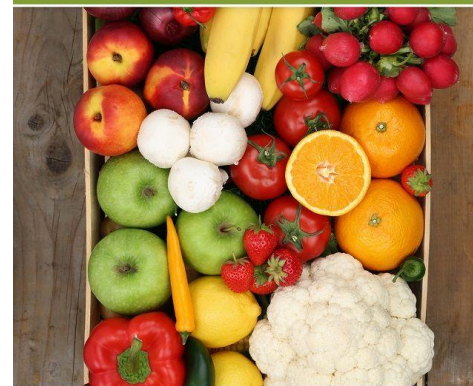


DIETS RICH IN FRUITS AND VEGETABLES

- Eating a diet rich in fruits, vegetables, and whole grains and low in animal products such as meat and dairy lowers the risk of cognitive decline in later life
- Researchers examined data available from the Singapore Chinese Health Study, a population cohort study of 63,257 Chinese people living in Singapore, 45-74 years old
- People who had strongly adhered to the five dietary patterns during midlife - Alternative Mediterranean Diet, Dietary Approaches to Stop Hypertension (DASH) , Alternative Healthy Eating Index, Plant Based Diet Index and Healthful Plant-Based Diet Index- were less likely to develop cognitive impairment later (Puay, 2019)



EVERYTHING YOU NEED
TO KNOW ABOUT
THE DASH DIET



INDIAN SPICES AND HERBS

- Consumption of 25 g **fenugreek seed** powder daily shown to decrease blood glucose levels and has potential as an adjunctive therapy in the management of diabetes (Krishnaswamy, 2008)
- **Garlic, ginger, cloves and mustard** also have some antioxidant, antimicrobial, anti-thrombotic, anti-inflammatory, and anti-cancer activities (Tapsell, 2006)
- Consumption of 1, 3, or 6 g of **cinnamon**/day shown to reduce blood glucose (18– 29%), triglycerides(23– 30%), LDL-C (7–27%), and total cholesterol (12–26%) levels in patients with T2DM (Khan et al, 2003)

Spices have been an integral part of the Indian diets since ancient times. Some Indian spices have been reported to possess antioxidant and antimicrobial properties

NUTS AND OILSEEDS

- Nuts and oilseeds are not only rich sources of unsaturated fat but also contain several non-fat constituents, such as protein, fiber, micronutrients (e.g. copper and magnesium), plant sterols, and phytochemicals
- Nut consumption has been found to be inversely related to CHD and all-cause mortality. **Long-term nut consumption has been associated with lower body weight and lower risk of obesity** (Sabate and Ang, 2009)
- There is a need to encourage consumption of nuts (e.g. pistachio nuts, almonds and walnuts) in Indian diets (Misra et al, 2011)

OTHER DIETARY COMPONENTS

- **Vitamin B¹²** levels were significantly lower in CAD patients than in controls
- Vegetarians had significantly lower vitamin B¹² concentrations and higher incidence of CAD
- Interestingly, elevated homocysteine levels, a hallmark of vitamin B¹² deficiency, was not associated with CAD (Vijayakumar et al,2009)
- There is widespread of **Vitamin D deficiency** with low dietary calcium intake in Indian population
- While vitamin D deficiency has been implicated in several other diseases like hypertension, CVD and even certain cancers, more definitive evidence is needed to establish such relationships.

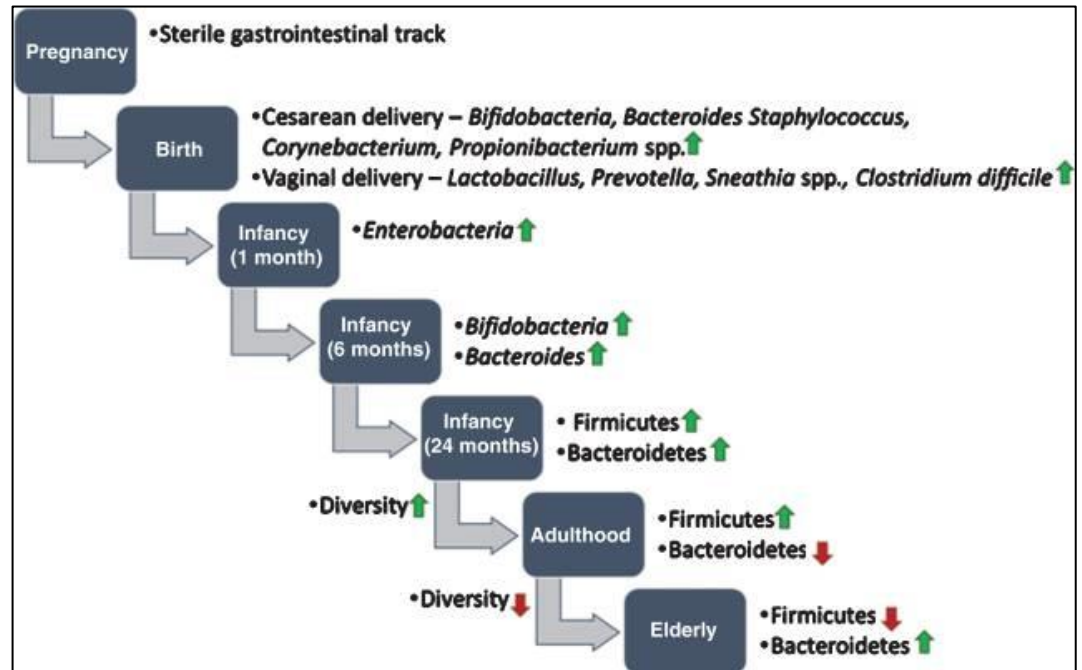
GUT MICROBIOTA AND AGEING

➤ Microbes start colonizing in the gut from the time of birth and reaches maturation within the first two years

➤ The gut microbiota shows a stable form throughout the adulthood, but it acclimates changes during the aging process

➤ The impact of aging on the gut microbiota is influenced by specific diets and lifestyles

➤ The diet is one of the most important factors, which can modulate the gut microbiota



➤ Factors which influence composition and functionality of the gut microbiota are vital because of beneficial roles of these microbes towards maintaining health and preventing certain diseases in elderly people

GUT MICROBIOTA AND AGEING

- Some studies has postulated that **vitamin D deficiency** also alters the gut microbiota, which leads to irregularity in the immune system.
- **Low fibre diets** have a negative impact on gut microbiota diversity. Fibre act as prebiotics for developing a beneficial gut microbiota
- Consumption of **prebiotics/probiotics** along with a nutritious diet stimulates the growth and functionality of bacteria in the gut for health benefits during the old age.
- Most common examples of prebiotics are manooligosaccharides (MOS), galactooligosaccharides (GOS, inulin, lactulose , fructo-oligosaccharides (FOS), pectic-oligosaccharides (POS)
- **Probiotics** illustrate the potential for promoting the growth of beneficial species e.g. *Bifidobacteria* in an aging gut microbiota. Results demonstrated beneficial changes in terms of increasing stool frequency and preventing inflammation (Kumar et al, 2016)

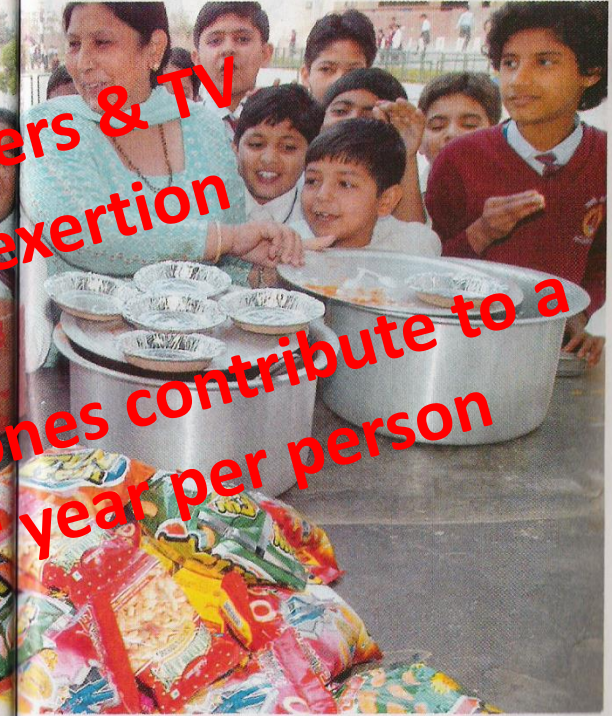
PHYSICAL ACTIVITY

- **Maintaining levels of activity or becoming more active is important for reducing the risks of heart attack and stroke**
- **Participants who reduced their levels of exercise over time had a 27% greater likelihood of developing heart and blood vessel issues**
- **Those who increased their levels of activity from continuously inactive to moderately or vigorously active three to four times a week had lowered their risk of heart attack and stroke by 11%**
- **People with disabilities also benefited from increasing their activity levels, reducing their risk of cardiovascular events by 16%**
- **Participants with chronic conditions such as hypertension or diabetes saw a 4–7% reduction in their chances of experiencing a heart problem or stroke (Kim, 2019)**

A family of four gains up to 8 kilos for every mechanical gadget acquired, says a Mumbai obesity research group. Have a TV, AC and car? That's 24 kilos of extra weight.

Doctors say childhood obesity is increasing even faster (see *We Do Need Food Control*). Just recently, Maharashtra's Food and Drug Administration, concerned about the rising rate of childhood obesity, has suggested a statewide ban on the sale of colas and junk food in school canteens. A timely intervention, for studies now pouring in show that Indians have a strong genetic predisposition to becoming overweight and obese (see *When Fat Turns Fatal*).

LIKE it or not, we are ensnared in lifestyles that make it easier than ever before to accumulate those extra kilos. The way we eat, drink, work and live today is reflected in drastic changes in our health and nutrition patterns. Post-globalisation, we are still the world's largest vegetarian nation, but the quantity of vegetables a child eats today is negligible and dwindling. Medical and marketing data shows another disturbing connect—eating out, which now commands 10 per cent of our wallet share, is causing a lipid build-up in our blood and bodies. Occupationally, as the outsourcing industry develops, so does the BPO belly. And while



Photographs by SANJOY GHOSH

drought might stalk our rural landscape, our city fridges are in permanent harvest. Urbanites are consuming 80 per cent of all edible oil in India. Within homes, sedentariness is on the rise. Even as TVs are getting slimline, our viewing hours are getting longer and viewers fatter. Mirroring this extreme shift, there are now hospitals in most metros offering bariatric surgery, considered a life-saving procedure for the extremely obese (see *A Little Tummy Tucking*).

Urban India is now in a state of calorie excess, say all obesity experts. "Even the rural classes are inching towards obesity, while the urban middle class, particularly children, are a cause of extreme worry," asserts Dr Anoop Misra, presen-

Calorific excess Junk food may be banned in Delhi schools, but oily, processed chips are available freely in the canteen

is measured by dividing your weight (in kilos) by your height² (metres squared). Internationally, BMI 30 is considered obese. But experts have recently lowered obesity definitions for us. This is since one-fourth of adult urban Indians show metabolic disorders at lower BMIs than other racial populations, which predisposes us to diabetes, hypertension and cardiac disease.

Today, a BMI up to 22.9 is normal, 23-25.9 is overweight, 25 and above is considered obese. This means Raman, who weighs 75 kilos and is 5 feet 10 inches (1.75 metres) tall, is

Labour saving devices, computers & TV
Few demands for physical exertion
Use of remote controls & mobile phones contribute to a
saving of 25 hours of walking per year per person

PHYSICAL ACTIVITY

- A positive association was seen **between non-work sedentary activity and CHD risk**; people with >3.6 hours per day of sedentary activity (e.g. TV viewing) had an elevated risk of 1.88 (95% CI: 1.09, 3.20) compared with <70 minutes per day (Rastogi, 2004)
- Leisure-time exercise, including as much as 35-40 minutes per day of **brisk walking, was protective for CHD risk** and sedentary lifestyles were positively associated with risk of CHD
- Given the rapid urbanization, increased motorization, mechanization and sedentarism at workplaces, further decreases in physical activity are likely, particularly among the working age groups, thus predisposing this segment of society to premature NCDs (Mohan et al, 2011)

Earlier, we were paid to be active, now we pay to be active

KEEPING MENTALLY ACTIVE

- **Playing board games, solving puzzles may help middle aged and elderly people keep their memories sharp**
- **Those who regularly play games such as chess and bingo are more likely to have maintained their thinking skills (Deary, 2019)**

OVERWEIGHT/OBESITY

- **Increase in body weight, even within the 'normal' range of BMI, confers a higher risk of CVD and diabetes among Indians**
- **At equivalent BMI, they also have significantly higher levels of visceral obesity and higher percent of body fat than Caucasians (Mohan, 2011)**
- **Increased propensity of Indians for **central obesity**, a cardio metabolic risk factor**
- **The highest rates of overweight and obesity have been observed in the epidemiologically and nutritionally advanced states of Punjab, Kerala and Delhi, which, incidentally, also have higher rates of NCD risk and disease burden (Mohan et al, 2011)**
- **Besides, prevalence of obesity is high not only in urban, affluent groups but also in urban slums**

DYSLIPIDEMIA

- **High serum lipid levels are major risk factors of coronary heart disease that are influenced by lifestyle transition and urbanization**
- **Prevalence of dyslipidemia: 13.9% hypercholesterolemia, 29.5% hypertriglyceridemia, 72.3% low HDL-C, 11.8% high LDL-C levels and 79% had abnormalities in one of the lipid parameters**
- **Regional disparity exists with the highest rates of hypercholesterolemia observed in Tamilnadu (18.3%), highest rates of hypertriglyceridemia in Chandigarh (38.6%), highest rates of low HDL-C in Jharkhand (76.8%) and highest rates of high LDL-C in Tamilnadu (15.8%)**
- **Low HDL-C was the most common lipid abnormality (72.3%) in all the regions studied**
- **In 44.9% of subjects, it was present as an isolated abnormality.**
- **Common significant risk factors for dyslipidemia included obesity, diabetes, and dysglycemia (ICMR-INDIA-B, 2014)**

TOBACCO USE

- Tobacco use is also a leading risk factor for premature NCD associated death and disability and accounts for more than two-third of all new cases of NCDs
- **Tobacco use alone accounts for one in six of all deaths resulting from NCDs.** 50% of cancers among men, 20% of cancers among women and 90% of oral cancers are attributable to tobacco use
- Over 80% of **COPD** among men, 60% of **heart diseases** in those less than 40 years of age and 53% of **myocardial infarctions** among urban men are also attributed to tobacco use. In addition, smoking contributes to nearly half of **tuberculosis** deaths among men (Global Adult Tobacco Survey, GATS India 2009-10; Jha et al, 2008; Rastogi et al, 2005)

ALCOHOLISM

- Alcohol consumption has both health and social consequences via intoxication and alcohol dependence
- Overall there is a causal relationship between alcohol consumption and more than 60 types of diseases and injury. Alcohol is a risk factor for oesophageal cancer, liver cancer, cirrhosis of the liver, homicide, stroke, psychiatric illness and motor vehicle accidents worldwide (Gutjahr et al, 2001)
- **Although moderate consumption of alcohol appears to be protective for heart attacks in western populations it appears to be either neutral or conferring higher risk among South Asians (Joshi et al, 2007)**
- The results from a large sentinel surveillance study on CVD risk factors in the Industrial population also shows higher risk associated with alcohol consumption and this is possibly related to the **binge drinking practices in India**

POLLUTION

Fine particle pollution is associated with asthma, cardiovascular disease, lung disease and premature death (Petkus,2019)

- **In elderly, exposure to higher levels of fine air pollutants may cause decline in memory which leads to Alzheimer's-disease like brain damage**
- **Researchers found that fine particles i.e. PM2.5 which come from traffic exhaust, smoke and dust remain airborne for long periods, get inside buildings, be inhaled easily, and reach and accumulate in the brain**
- **With an increase of 2.81 ug/m³ of PM2.5, the annual memory decline rate was accelerated by 19.3 %**

CONCLUSIONS

- **The exposure to various environmental factors can contribute to accelerating the aging process**
- **The Asian Indian phenotype makes Indians highly susceptible to NCDs and at a much younger age. Maternal nutritional deprivation may cause low-birth weight infants, which leads to obesity in early childhood, thus predisposing to NCDs later in life**
- **The nutrition transition in India has resulted in a decreasing intake of coarse cereals, pulses, fruits and vegetables, an increasing intake of meat products and salt, coupled with declining levels of physical activity due to rapid urbanization**
- **This has resulted in escalating levels of obesity, atherogenic dyslipidemia, subclinical inflammation, metabolic syndrome, type 2 diabetes mellitus, and coronary heart disease in Indians**
- **Most NCDs have shared risk factors (tobacco use, unhealthy diet, physical inactivity, alcohol use) and integrated interventions targeting these risks from middle age will not only help to prevent and control NCDs, but also ensure a good quality of life in advancing years**

The “elderly of tomorrow” need to adopt healthy lifestyles to be able to maintain a good quality of life in their advancing years

Remember – to start young!

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