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National Programme for Prevention and Control of Diabetes, Cardiovascular Diseases (CVDs) and Stroke

Focus on: Integrated strategies for prevention and control of hypertension at the level of primary and secondary health care

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Abstract

Globally, Non-Communicable Diseases (NCDs) are increasingly recognized as a major cause of morbidity and mortality. NCDs are also assuming alarming proportions in the South-East Asia Region (SEAR). India too is experiencing a rapid epidemiological transition, with a large and rising burden of chronic diseases, which were estimated to account for 53% of all deaths and 44% of Disability Adjusted Life Years (DALYs) lost in 2005. From the estimates of Diabetes, CVDs and Stroke in India, it emerges that the highest number of cases in India are due to Diabetes, highest DALYs lost due to Ischaemic Heart Disease (IHD) and the highest number of Years of Life Lost (YLL) as well as deaths are due to Stroke. The burden of cardiovascular diseases is rising in India, besides the maximum number of cases, it may become the largest cause of death and disability by 2015. The advancing NCDs are propelled by demographic, economic and social factors. The common risk factors are physical inactivity, obesity, raised blood pressure, tobacco use, alcohol consumption, low fruit and vegetable intake, raised cholesterol and glucose and hence the population prevalence levels of these factors can predict the future disease burden. The NCDs do not have a linear causality but have a 'web of causation' with complex interrelationships among various factors. The risk factors and the

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interventions for the prevention and control of Diabetes, CVDs and Stroke are somewhat common and thus, concerted efforts for prevention and control are worth. The need is to institute priority interventions aimed at reducing the burden of NCDs through setting up a newer national non communicable diseases programme. This involves setting up surveillance systems based on risk factors; strategy for tobacco control, diet, physical activity and health; capacity building of health personnel; primary and secondary prevention of all risk factors and ensuring availability of cost effective investigations, medications/interventions and follow up. A National Programme for Prevention and Control of Diabetes, Cardiovascular Diseases and Stroke has already been launched on 4th January, 2008 on a pilot basis.

Key Words : Non communicable diseases, Disability adjusted life years, diabetes, cardiovascular diseases, stroke

Introduction

Globally, non communicable diseases (NCDs) are increasingly recognized as a major cause of morbidity and mortality. The World Health Report 2004 had indicated that NCDs account for almost 60% of deaths and 47% of the global burden of disease. Seventy-five per cent of the total deaths due to NCDs occur in developing countries (1).

NCDs are assuming alarming proportions in the South-East Asia Region (SEAR). They account for 51% of all deaths and 44% of the disease burden in the Region. Therefore, NCDs should no longer be regarded as a problem confined to the developed countries and affluent segments of society. In fact they are clearly emerging as a major public health challenge in developing countries where they create a double burden on top of the infectious diseases that still afflict these countries (1).

India is experiencing a rapid epidemiological transition, with a large and rising burden of chronic diseases, which were estimated to account for 53% of all deaths and 44% of Disability Adjusted life Years (DALYs) lost in 2005 (2). In India, non communicable diseases (NCDs), especially Diabetes Mellitus, cardiovascular diseases (CVDs), cancers, stroke and chronic lung diseases have emerged as major public health problems due to an

ageing population and environmentally-driven changes in behaviour (3). Though the term NCDs encompass a plethora of conditions (Table 1), hereon, the term 'Non communicable Diseases (NCDs)' in this paper has been used to refer to Diabetes, Cardiovascular Diseases and Stroke only.

Magnitude of the Problem in India

Estimates of DALYs, YLL, deaths and cases of IHD, stroke and diabetes in India have been shown in Figures 1-3. It emerges that the highest number of cases are due to diabetes, highest DALYs lost due to IHD and the highest number of YLL as well as deaths are due to stroke. The burden of cardiovascular diseases is rising in India, besides the maximum number of cases, it will be the largest cause of death and disability by 2015.

The prevalence of hypertension has been reported to range between 20–40% in urban adults and 12–17% among rural adults (4). High blood pressure has been shown as the leading cause of avoidable mortality and morbidity in all world regions. High blood pressure is a main risk factor for stroke, cardiac failure, renal failure and coronary heart disease (5). Figure 4 depicts the percentage attributable risk due to hypertension for diseases like stroke, myocardial infarction, PVD, cataract and IHD.

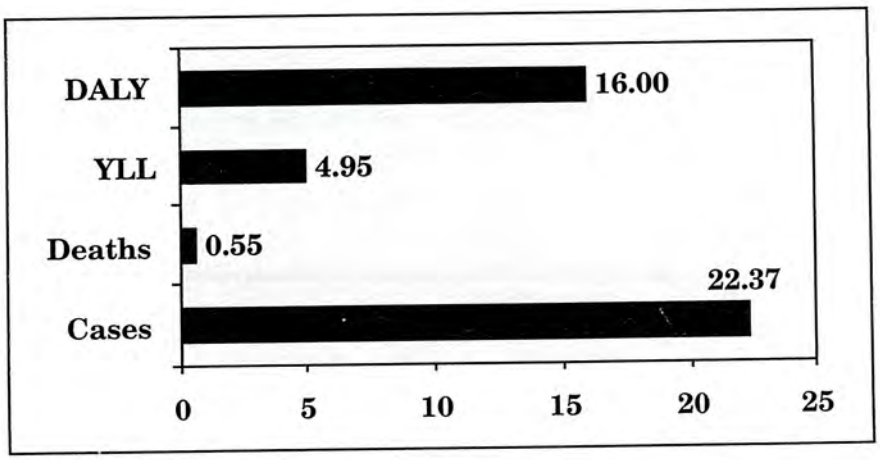
Table 1: Magnitude of Non-Communicable Diseases in India

	2005	2015
Total deaths in India	10,362,000	10,949,000
Deaths from NCDs	5,466,000 (53%)	6,458,000 (59%)
Deaths from major NCDs		
Cancers	826,000	1,069,000
Diabetes	175,000	236,000
Respiratory Diseases	674,000	864,000
Cardiovascular Diseases	2,989,000	3,465,000

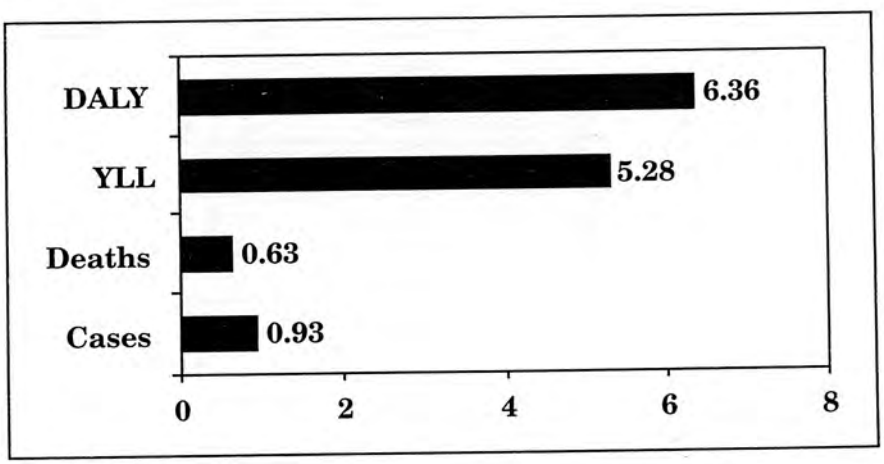
(Non-communicable diseases include neoplasms, endocrine disorders, neuropsychiatric conditions, sense organ diseases, cardiovascular diseases, respiratory diseases, digestive diseases, genitourinary diseases, skin diseases, musculoskeletal diseases, congenital anomalies and oral conditions)
Source: Min. of Health and Family Welfare, GoI

Risk Factors

These advancing epidemics are propelled by demographic, economic, and social factors. Urbanization and industrialization are changing the patterns of living in ways that increase

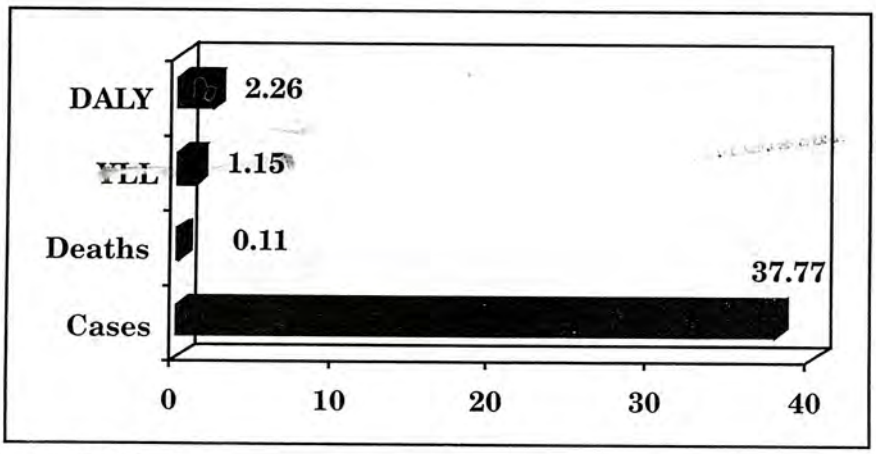


Numbers in Millions
DALY- Disability adjusted life years; YLL- Years of life lost
Source: Assessment of burden of non-communicable diseases in India, www.whoindia.org
Figure 1: Burden of IHD in India (2004)

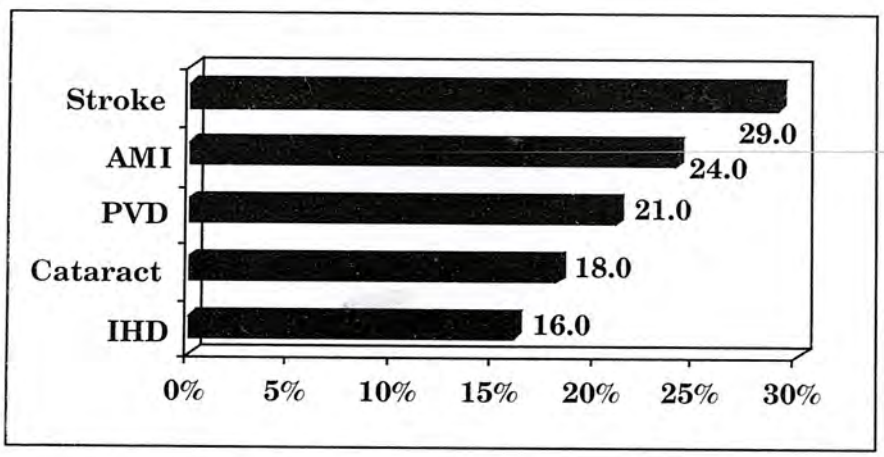


Numbers in Millions
DALY- Disability adjusted life years; YLL- Years of life lost
Source: Assessment of burden of non-communicable diseases in India, www.whoindia.org
Figure 2: Burden of Stroke in India (2004)

behavioural and biological risk factor levels in the population. Substantial variations exist between different States, but risk levels are rising across the country, most notably in urban areas of demographically and



Numbers in Millions
DALY- Disability adjusted life years; YLL- Years of life lost
Source: Assessment of burden of non-communicable diseases in India, www.whoindia.org
Figure 3: Burden of Diabetes in India (2004)



AMI – Acute myocardial infarction; PVD – Peripheral vascular disease; IHD – Ischaemic heart disease
Source: Assessment of burden of non-communicable diseases in India, www.whoindia.org
Figure 4: Percentage Attributable Risk due to Hypertension (2004)

economically more advanced States of India. Nationally representative distribution data are not available for all risk factors. Several community-based surveys, done in different parts of India at different times, have contributed to a patchwork profile of risk in segments of the population (3). Table 2 shows prevalence of some of the known risk factors.

The common risk factors are tobacco use, alcohol consumption, low fruit and vegetable intake, physical inactivity, obesity, raised blood pressure, raised cholesterol and glucose and hence the population prevalence levels of these factors can predict the future disease burden. The NCDs do not have a linear causality but have a 'web of causation' with complex interrelationships among various factors. To illustrate, web of causation for CVDs has been depicted in Figure 5.

Levels of awareness, treatment, and adequate control are low for hypertension, diabetes, and dyslipidaemia, especially in rural areas (6). With advancing health transition, the poor are increasingly affected by chronic diseases and their risk factors. Low levels of education and income

Table 2 : Prevalence of Risk Factors in India

S.No.	Risk Factor	Prevalence
1.	Tobacco (all forms)	11 % (females), 57 % (males)*
2.	High Blood pressure	164.2 per 1000 (urban), 157.4 per 1000 (rural)#
3.	Veg and Fruit Intake	50 % daily (15-64 years)**
4.	Physical Inactivity	60-80 % Sedentary**
5.	Dyslipidaemia	37.5 % (15-64 yrs), 62 % (industrial workers)•
6.	Obesity	14.8 % (females), 12.1 % (males) *
7.	Alcohol	Range: 7 % (Gujarat) to 71 % (Arunachal Pradesh)##

* NFHS – 3, 2005-06, IIPS.

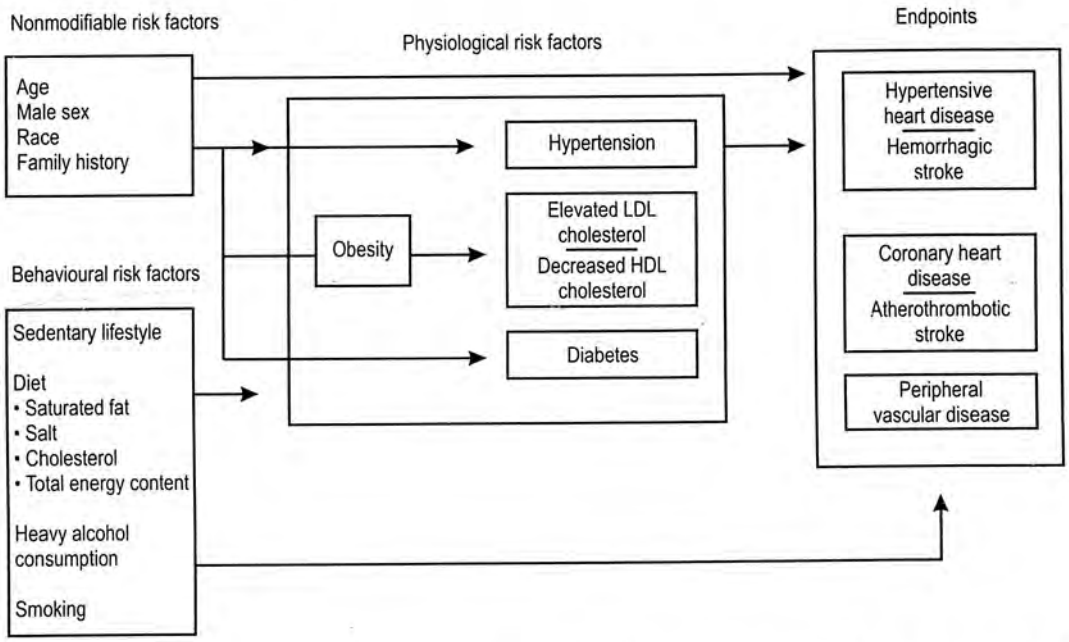
http://www.whoindia.org/LinkFiles/Assessment_of_Burden_of_NCD Updated.pdf.

** http://www.who.int/chp/steps/en/

• Reference 9.

##http://www.ias.org.uk/resources/publications/theglobe/globe200502/gl200502_p7.html

now predict not only higher levels of tobacco consumption, but also increased risk of coronary heart disease (7). Urban slums also have high rates of diabetes and dyslipidaemia (8).



Source: Wong ND, Black HR and Gardin JM, Preventive cardiology: a practical approach, Chicago, McGraw-Hill, 2005.

Figure 5: Web of Causation for Cardio Vascular Diseases (CVDs)

Are Concerted Efforts for Prevention and Control Really Worth?

Interventions for chronic disease prevention and health promotion have been tried and tested. Systematic reviews have evaluated the available evidence on the effectiveness of these interventions and a wide range of interventions at the community, population and macroeconomic level and have been found these to be effective (9).

There is evidence based information that NCDs are preventable through integrated and comprehensive interventions. The most successful ones have employed a range of population wide approaches combined with interventions for the individuals. WHO estimates that an additional 2% annual reduction in

chronic disease death rates in India over the next 10 years would result in an economic gain of 15 billion dollars for the country. At least 80% of premature heart disease, stroke and type 2 Diabetes and 40% of cancers could be prevented through avoidance of tobacco products and the adoption of healthy diets and regular physical activity (10).

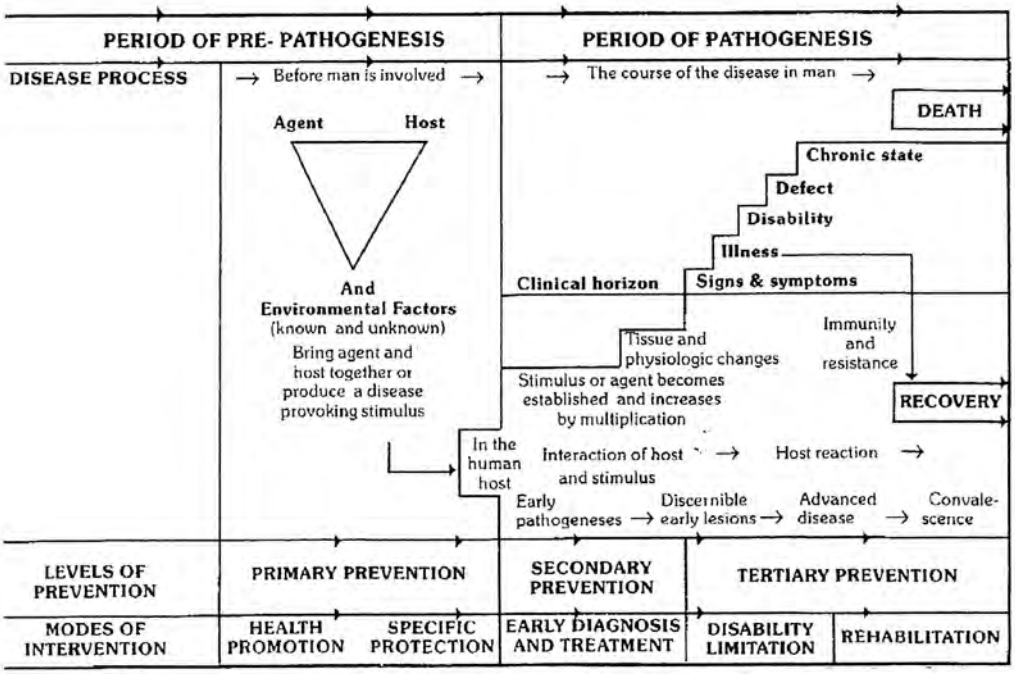
Way Forward

The population-wide application of existing knowledge has the potential to make a major, rapid and cost-effective contribution to their prevention and control and to benefit all segments of the population. The main issue for policy-makers, at all levels of public health in India, is how to deal with the growing burden of non communicable diseases in the presence of persisting communicable diseases. Furthermore, this challenge must be faced even when health system resources are already inadequate. Although considerable policy gains can be made very cheaply, especially inter-sectoral, extra provision must be found. This requires a greater share of national resources for health care, better use of existing resources, and new sources of funding.

One of the most exciting possibilities to emerge in public health in recent years is the integration of communicable and non communicable diseases prevention and control into comprehensive health systems led by primary care. Bringing this to fruition will mean reshaping the future of primary health care in response to a changing world. It would see all patients being offered – across their lifespan – prevention, treatment and long-term management of both sides of the double burden. Achieving such integration will not be easy, but efforts need to be done in this direction. A continuum of care for all diseases should be available to the community (Figure 6).

Priority interventions aimed at reducing the burden of NCDs include setting up national non communicable diseases programmes which include: setting up surveillance systems based on risk factors; capacity building of health personnel; ensuring availability of cost effective medications; implementing the Framework Convention for Tobacco Control and the Global Strategy on Diet, Physical Activity and Health; and incorporating both primary and secondary prevention of all risk factors.

The recognition of behavioral risk factors like tobacco, physical inactivity, and unhealthy diets can no longer be ignored and the realization that



Source: Leavell H R, Clark E G (1965). Preventive Medicine for the Doctor in his Community. McGraw-Hill, New York.

Figure 6: Natural History of Disease and Levels of Prevention

biological risk factors like blood pressure, diabetes, and dyslipidemia need to be appropriately and adequately controlled have at last opened the strategic pathways for CHD prevention and control in India (11). The Government of India had been planning for a national programme for quite some time and a pilot programme was formally launched on 4th Jan 2008 (12).

The Intervention / Programme

General Principles regarding strategies and approaches at various levels of prevention have been shown in Table 3.

Design of the Programme

It is necessary to integrate the interventions with the existing programmes for communicable and non communicable diseases without creating any new vertical structures below the district level.

Objectives

- Primary prevention of major NCDs through health promotion

Table 3: Strategies, Approaches and Target Population at various levels of Prevention

Level of Prevention	Target Population	Strategy	Approach
Primordial	General Population	Avoiding the development of 'risk factors' (*Preventing hypertension by measures aimed at reducing the blood pressure levels in the population as a whole)*	Avoid 'risk behaviour'; Policy measures for preventing exposure to 'risk factors'
Primary	Healthy individuals 'at risk'	Reducing the 'risk factors' with or without interventions to prevent clinically manifest disease (*Early identification and effective management of individuals who are 'at risk' of hypertension, e.g. individuals with obesity, genetic* predisposition, stressful life styles).	Modify established risk behaviour and risk factors; Specific interventions
Secondary	Individuals with disease (diagnosed / undiagnosed)	Early detection and appropriate management; Modifying the 'risk factors' (*Identification and management of hypertensive individuals, with / without manifestation of end organ disease, to reduce the morbidity and mortality)*	Use of drugs and/ or changes in lifestyle
Tertiary	Individuals with diagnosed disease	Modifying the 'risk factors'; Appropriate management and follow up (Disability limitation and rehabilitation of those already suffered from any of the consequences of hypertension like stroke, etc)	Use of drugs and/ or changes in lifestyle; Rehabilitation

- Surveillance of NCDs and their risk factors in the population
- Capacity enhancement of health professionals and health systems for diagnosis and appropriate management of NCDs and their risk factors
- Reduction of risk factors in the population
- Establishment of National guidelines for management of NCDs
- Development of strategies and policies for prevention by inter-sectoral coordination
- Community empowerment for prevention of NCDs

Strategies

An integrated programme will provide screening and targeted interventions so as to reduce the mortality and morbidity due to NCDs. The programme interventions have to be a judicious mix of targeting those at high risk as well as the general population.

1. Health Promotion/ Health Education (targeting general population)

It is well proven that the risk of developing NCDs may be prevented by adopting healthy life styles, healthy diet and physical activity. This could only be achieved through sustained IEC Campaign targeting healthy risk free populations through development of an effective communication strategy, organizing awareness and sensitization camps, using electronic, print and various other methods so that individual, group and community behaviour can be modified. Therefore emphasis needs to be laid on IEC at all levels.

The IEC should be strengthened for community awareness. This has to go hand in hand with interventions at specific settings like worksites, schools, rural, urban and peri-urban areas. The health education also needs to be targeted, which means it should be specifically designed for and delivered to well- defined target groups such as children, women and industrial employees. This should be carried out in the true spirit of community participation involving civil society partners and others (NGOs, school health committees, RWAs, VHSCs, ASHAs, SHGs, employees unions, etc.) to enable the early initiation and effective implementation of such programmes. The IEC campaigns could use iconic figures from various fields and also utilise TV sitcoms. Few of the interventions are:

i. Community Based Interventions

In addition to IEC, the focus of the interventions would be on behaviour change through: (a) changing dietary habits viz. improving intake of fresh fruits and vegetables, whole grain and pulses, avoidance of refined, processed and preserved food, control intake of salt and sugar, restrict fat to 15-20% of the calories consumed, avoid hydrogenated oils/ vanaspati, increase intake of fibers in the diet, etc.; (b) increasing physical activity through walking, sports, exercise, etc.; (c) avoidance of tobacco and alcohol; (d) stress management, etc.

ii. Targeted Interventions

(a) Workplace Interventions

To promote healthy workplaces through informal / formal sessions involving health talks, facilitation for lifestyle change, health check-ups and screenings for those at risk with follow up counseling.

(b) School Based Interventions

To promote healthy habits, proper diet, physical activity and bring health promotion as a defined agenda in the school curriculum.

2. Reorienting Public Health Delivery system and Professional Education

The public health system has to be reoriented and strengthened at the primary and secondary level by strengthening, mobilizing and training health care providers to involve in risk detection and screening viz. blood pressure checks, recommending lifestyle modifications, dissemination of information and referring for further management. These activities need to be carried out at the time of joining as well as periodically by Continuing Medical Education.

3. Diagnosis and Management (targeting those at high risk)

Targeting people who suffer from elevated risks demonstrated through hypertension, overweight/obesity, low levels of physical activity, high blood lipid and glucose levels and those who have suffered from a previous cerebral or coronary event and are at the highest risk is possible through:

i. Opportunistic screening of persons at the point of primary contact with any health care provider would involve simple clinical examination comprising relevant questions and easily conducted physical measurements (such as history of tobacco

consumption and measurement of blood pressure, etc). To begin with, this could be started in the organised sector, CGHS and Railways. This experience can then be used to upscale efforts in the public health system. For this, context specific training needs to be imparted to health care providers including non-physician health care providers like nurses and multi-purpose workers, which will enhance their knowledge, skills and motivation for conducting such opportunistic screening regularly.

ii. **Targeted screening** should be planned by development of context-specific algorithms for risk detection, stratification and management, in persons who are considered to be at high risk during the initial opportunistic screening. This needs to be complemented by provision of appropriate investigation services at primary/secondary levels of care.

The programme should integrate essential elements of acute as well as chronic health care for NCDs at primary and secondary health care levels, along with strengthening of referral mechanisms. This would require strengthening of health infrastructure for NCD care facilities including equipment and drugs at all levels of health care.

Interventions aimed are early diagnosis and appropriate management through following:

i. Setting up special clinics

Special clinics for NCDs should be established at the District Hospital. The clinic should do the screening, provide management (based on standard treatment guidelines) and appropriate referral to tertiary care centre or the nearby Medical College.

ii. Appropriate technology use

The high cost, low yield technologies need to be replaced with cost effective interventions, both in public as well as private sector.

iii. Specific interventions at tertiary level

Referral centres need to be identified. Medical colleges can be upgraded to serve as tertiary care referral centres providing quality services in NCD care (prevention, control, management) in general and Diabetes, CVDs, Stroke in particular. In addition, they can also be used for developing human resources in the concerned specialty.

4. Social Mobilization and Community Participation

The community based organizations (CBOs), local leaders and opinion influencers, local NGOs need to be involved along with the District administration for promotion of healthy lifestyles and prevention of NCDs. Involvement of local health workers for IEC, prevention, early detection and appropriate referral has to be ensured. Strengthening the capacity for care by self, family, community, paramedic, or traditional healer obviates the need for frequent revisits to secondary and tertiary care providers, and may ensure a sustainable system (13).

5. Research and Assessment

The research areas could include qualitative and quantitative research to study risk factors and their determinants, effectiveness/ cost-effectiveness of community based programmes to promote health behaviours, and feasibility of integration into National Rural Health Mission, to name a few.

Population based studies are required to assess the prevalence of risk factors in order to study the distribution of risk factors for non communicable diseases especially diabetes, CVD and stroke. This will include assessment of: demographic and socio-economic characteristics; tobacco/alcohol use; physical activity; dietary patterns; BMI and waist circumference measurements; blood pressure; and blood glucose and lipids, to list a few. This information will also be helpful in monitoring, evaluation and feedback.

6. Policy Issues

At the National level, planning of the programme should be such that it is integrated in the existing efforts and is a part of the health system without creation of new structures. The existing IEC efforts need to be bolstered and made comprehensive. Policy guidelines and regulation need to be enforced regarding salt content in processed foods, tobacco and alcohol as well as junk food advertisements, etc.

7. Programme Delivery

The programme should be integrated as part of District Health Society set up under the NRHM. A nodal officer can coordinate the implementation of various activities for the programme and report to the District Health Society. At the State level, a nodal officer could be earmarked as a part of the State

Health Society. A NCD Cell at the Centre should be established to plan, coordinate, and monitor the activities at National and State level. It should obtain database from the integrated HMIS for effective monitoring, evaluation and feedback. It should also be involved in policy decisions like regulation of quantity of salt in processed foods, strategies to reduce tobacco and alcohol consumption, etc.

Hypertension Prevention and Control Activities at Primary And Secondary Levels

High blood pressure is a major risk factor for CHD and stroke and its control has been shown to be a major determinant of improved survival in diabetics. Hypertension control programme should be a part of a comprehensive strategy for the reduction of total cardiac risk. It should include control of other major risk factors like smoking, hypercholesterolemia, diabetes, obesity, etc. Interventions specific to hypertension have been listed below.

Primordial Prevention

Community or population-based strategies for prevention of hypertension include the following:

(i) Awareness that high blood pressure is a health problem and as such yearly measurement of blood pressure starting from the age of 30 years should become a standard procedure.

(ii) Modify diet to reduce the salt intake as much as possible and increase food intake of items rich in potassium.

(iii) Cultivate the habit of regular physical exercise, which helps in keeping the blood pressure low.

(iv) Control of dietary fat intake-especially saturated fats – and exercise to maintain normal weight, avoid obesity and hypercholesterolemia.

(v) Avoid excess alcohol since it promotes hypertension.

(vi) Use relaxation techniques like yoga, meditation, getting involved in hobbies like gardening or music, which help in relaxation.

(vii) Avoiding or abstaining from the use of tobacco and stimulants including caffeine, which increase blood pressure.

Primary Prevention

The goal of primary prevention is specially applicable to individuals with a family history of hypertension which may be present in one or both parents.

Essential hypertension has a strong genetic background. In such a setting, it is necessary that the parents should be made aware of the possibility of their children having systemic hypertension. Since good or bad habits are formed in background of hypertension, special attention is directed to prevention right from childhood. Every effort should be made to make children aware of the advantages of good eating habits, regular exercise, abstaining from use of tobacco, avoiding overweight, and getting involved in hobbies with can help in relaxation.

Secondary Prevention

The requirements of secondary prevention consist of:

(i) Identifying hypertensive individuals.

(ii) Instituting non-pharmacological management of hypertension in all.

(iii) Use of appropriate drugs to control the blood pressure.

(iv) Regular follow-up to ensure control of blood pressure and compliance of management.

(v) Evaluation of other cardiovascular risk factors which may co-exist and magnify risk of cardiovascular disease, with appropriate measures for their effective control.

Thus, health care facilities at primary and secondary level, in rural as well as urban areas, need to be strengthened to be able to carry out these activities in addition to other work.

Summary

The expanded mandate of health care, which involves the addition of chronic care to pre-existing services (such as maternal and child, health, population control, and control of infectious diseases), can be delivered only when health care providers of all categories are adequately mobilized and involved at each level of health care and NCD services are integrated into various levels of care (13).

The development of evidence-based, context-specific, and resource-sensitive clinical practice guidelines and their integration into various levels of health care will facilitate greater use of low cost-high impact interventions.

Education and training of health care providers, of diverse categories, would need to be modified in order to enhance the levels of their learning and skills as relevant to chronic

disease prevention, surveillance, and management. Moreover, currently deployed primary health care providers, of different categories, need to be retrained, along with restructuring of their work schedules, and supported by guidelines to deliver essential chronic care at that level.

The use of trained public health nurses, community health workers, and practitioners of complementary systems of medicine to deliver some of the services currently assigned to physician care providers in primary health care will extend outreach at a lower cost.

Efficient systems for referred care, linking primary care to other levels of provider services (secondary and tertiary) and effective systems for subsequent follow-up care (by primary and secondary care providers) need to be established to ensure cost-effective bidirectional movement of patients across the health care chain.

Empowerment of the community, through effectively communicated health information and support of enabling social environments will allow individuals to perform many tasks related to chronic care in NCDs. This will also help overcome, to some extent, the constraints of limited health care provider resources.

The programme must ensure the availability of essential drugs at affordable prices and meet the technology needs of managing a variety of NCDs.

Estimates of existing and required capacity for NCDs must guide the process of planning. Qualitative and quantitative research methods will help to identify key indicators for such a situational analysis.

As the magnitude of different NCDs varies across social classes, gender and age groups, within the broad framework of integrated chronic care, these varied needs have to be addressed through an appropriate mix of relevant and cost-effective interventions. A mix of public sector provision of free health promotion and health care, social insurance, and private insurance would have to be evolved to enable universal access to NCD interventions.

Concerted efforts must be made to enhance the knowledge of policy-makers and health system managers, at various levels, about the potential impact of cost-effective chronic care interventions and the high costs of 'missed opportunities' so that they become motivated agents for improving the delivery of chronic care.

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