

Technology Interventions for Elderly People

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ABSTRACT

The population is ageing worldwide. The demographic change accompanied with fast changing family structure due to forces like urbanization and migration necessitate that vast resources will be required towards support, care and treatment of older persons. With massive increase in older population and ageing people, unprecedented challenges are found in the field of health care, infrastructure support, quality of life, etc. The use of technology to support comfortable and dignified living of older persons is mentioned in recent Government policy documents (e.g. National Policy on Older Persons). There exists a vast scope of technology interventions for welfare of elderly people in the country so that the technologies are accessible, affordable and adaptable to the specific needs. This paper tries to capture some of these new initiatives and suggest a roadmap for future activities in the area based on technological developments in Indian context.

Keywords: Elderly, Technology interventions

I. INTRODUCTION

The demographic trend in India has been towards an increasing number of elderly people thanks to the medical triumph that has brought about greater life expectancy. The demographic change accompanied with fast changing family structure due to forces like urbanization and migration necessitate that vast resources will be required towards support, care and treatment of older persons. The present population of the elderly is estimated at 7.6 crore, which is likely to touch 10 crore in 2013 and to 19.8 crore in 2030. A large percentage (30%) of the elderly is below the poverty line, and about 80% of them are in the rural areas, thus making service delivery a challenge.

The National Policy for Older Persons (NPOP) was announced in January, 1999, with the primary objectives to: encourage individuals to make provision for their own as well as their spouse's old age; encourage families to take care of their older family members; enable and support voluntary and non-governmental organizations to supplement the care provided by the family; provide care and protection to the vulnerable elderly people; provide health care facility to the elderly; promote research and training facilities, train geriatric care givers and organizers of services for the elderly; and create awareness regarding elderly persons to develop themselves into fully independent citizens.

The National Institute of Social Defence (NISD) under Ministry of Social Justice & Empowerment (MoSJE) is engaged in the formulation and development of programmes in the field of old age care. Under a project called the 'National Initiative on Care for Elderly (NICE)', areas of interventions were identified with the objective of ensuring active, healthy and dignified life for older persons. These broad areas of intervention as outlined in the NICE project are:

Financial Security

- Food security for the needy elderly
- Income generating programmes through NGOs

Health Care & Nutrition

- Geriatric care facilities
- Expansion of medical care network
- Special health care facilities for disabled and destitute elderly

Shelter

- Provision of subsidized housing in public rural housing schemes
- Design & facilities sensitive to the needs of the older persons

Education

- Assistance to develop outreach programmes for interacting with older persons

Welfare

- Non-institutional services to strengthen coping capacity of older persons
- Catering the needs for social interaction, recreation & other activities

Protection of Life & Legal Safeguards

- Services to strengthen a sense of security & providing timely help
- Design of public transport for easy entry and exit

II. TECHNOLOGY INTERVENTIONS

The use of technology to support independent living and promote independence of older persons is mentioned in recent Government policy documents (e.g. National Policy on Older Persons). There are other Government (and some non-government) initiatives which, although not specifically targeted at technological interventions for older persons, could contribute towards supporting comfortable and dignified living for this section of the society. There exists a vast scope of technology interventions for welfare of elderly people in the country so that the technologies are accessible, affordable and adaptable to the specific needs. Technological interventions can greatly help in achieving the objectives of the NPOP by providing vital inputs and capabilities. This paper tries to capture some of these new initiatives and suggest a roadmap for future activities in the area based on technological developments.

Widespread application of technology interventions would require field trials of technologies which are available but not yet tried for commercial applications. Adaptive research is also required to explore technologies available outside country for applicability in Indian conditions. Market assessment for

determining potential demand of different technology products and services is urgently needed to catalyze involvement of industry. Awareness creation on utility of technology interventions and capacity building on use of technology by the elderly and/or care givers are integral component to draw optimal benefits.

Within the broad framework of the areas of intervention for care of elderly, as identified by the Ministry of Social Justice & Empowerment, S&T interventions could focus on selected areas where technological inputs would benefit the elderly persons. The caring philosophy for elderly should go beyond treating them as patients. The focus should be on the overall well being of older persons that include their social, emotional, psychological and physical well being. In order to tackle the issue of elderly care in a holistic manner, technology interventions are envisaged and categorized under the following themes:

- 1. Health and nutritious food,**
- 2. Designs,**
- 3. Networking, and**
- 4. Recreation & entertainment.**

1. Health and Nutrition

Older persons are naturally more prone to illnesses, although advances made in technology, medical care and nutrition have increased the average life expectancy of older persons today, making them physically stronger, more active and improving their all-round health. It is well recognized now that health care for older persons will be a key issue in the future, requiring significant budgetary commitments from the governments as well as the individuals and their families. The health care system can be effective through effective management of the available resources and competing needs of the society. Governments have also recognized the strong need for establishing a systematic programme of activities to educate the population on healthy ageing and raise awareness of the physiological changes that accompany old age.

Gero-technology is a fast developing field in the area of health care that makes use of new tools and insights from biotechnology for geriatrics to effect interventions in human ageing and age-related diseases (Tyagi, 2006). Broad-based biotechnology and pharmaceutical research by companies is gradually leading to newer developments in gero-technology applications.

Special attention is required on interventions against specific age-related diseases, such as Alzheimer's disease, Parkinson's disease, diabetes, arthritis, osteoporosis, spinal cord injury, heart disease, neuro-degenerative diseases, vision and hearing-related disorders, nutritional deficiencies. Through better understanding of the basic biological mechanism of ageing, the recent trend has been to discover technologies for treating, delaying or even preventing a host of age-related health problems. Various diagnostic tools and therapeutic drugs have been developed, and the latest advancements are in the field of regenerative medicines and anti-ageing products.

Regular as well as regulated intake of sufficient and nutritious food is required for the aged to sustain their bodies. Development of culturally appropriate nutritional recipes and education material (guidebook, self help booklets, handouts) is required to enhance the knowledge and skills of older adults pertaining to nutritional care – promotive, preventive and curative.

2. Designs

Many older persons require specialized goods and services, making them a distinct and often disadvantaged group of consumers. This also requires special designs, catering to the special needs of the elderly. In some countries, this has given rise to well-defined markets for older persons. It has been recognized that the specialized market for older persons is likely to grow in size as demand is expected to increase with the ageing of populations. Government intervention will be needed in formulation of standards and protocols for specialized products in order to protect older people's rights as consumers.

ICT-based applications to support independent living take advantage of the developments in computing and telecommunications that have taken place over the past decade. These are enabling technologies and the challenge is to use them in ways that complement and extend existing service delivery.

ICT accessibility with the elderly is a new and fertile research area. Nowadays, age-related reductions in functional abilities (i.e. vision, hearing, mobility and cognition), lack of experience with computers and low levels of education are agreed as those factors which give rise to the special needs of the elderly. Several possibilities exist, ranging from e-mail systems to mobile phones. Aging is a very complex process and we therefore need to understand the technology, users and context in order to develop useful ICT applications for the elderly.

Enabling Devices

Age-related changes often negatively affect our health and independence, thus increasing the need for assistance. Due to the growing numbers of elderly who wish to stay independent in the community, strategies are being explored as “assistive technology/devices” that reaches beyond human assistance. Unfortunately, not many elderly are aware of enabling devices which are essential for their care and facility in daily living.

Assistive technology is defined as any equipment or system that assists people who have difficulties, due to age or disability, in carrying out everyday activities. It covers simple items such as walking sticks, bath seats and grab rails, as well as electro-mechanical equipment (e.g. powered wheelchairs), electronic aids (e.g. digital hearing aids and environmental controls), or equipment used by carers such as lifting aids.

Elderly need barrier-free environments, appropriate enabling devices and services that include need assessment, training, repair and maintenance of the enabling devices. Improved technology has increased the availability of devices and aids that improve considerably the quality of life of elderly and disabled persons. Further developments are needed on next generation assistive devices and systems that empower elderly persons and aging citizens to play a full role in society, increase their autonomy and realize their potential. India needs to look at the type of devices that are suitable in the regional and cultural context.

Home Designs

The quality of life of the older persons is often dependent on the adequacy of their living conditions. Resources should be made available to address the housing needs of older persons. The use of enabling devices and home modifications for eliminating barriers in the homes of older persons is becoming more commonplace as health care professionals and building contractors gain expertise in these areas. A minimum standard needs to be set for a reasonable and adequate living environment for older persons with barrier-free access throughout the community.

Textile/Clothing

Development of clothing for elderly is needed with a focus on its being aesthetically attractive, fashionable, in harmony with the personality and appropriate for the wear situation in order not to cause psychological feelings of discomfort. The clothes should be aesthetically attractive, comfortable, made of non-allergic textile fibres, and durable. Season-specific and need-specific materials and designs are especially required for elderly.

3. Networking

Older persons have a wealth of experience and knowledge which they have gathered in their lifetime. Their experience, skills and wisdom should be recognized and fully used in the community. The contribution that older persons offer and the needs they require from society are to be properly recognized.

Elderly suffer loss of primary network of relations largely on account of abandonment by their children or on account of neglect by their family members. Networking assumes importance in such cases by which older persons can not only create recreational avenues for themselves but also organize pooling of skills and resources available at different places. Secondary social networking can be achieved through peer group interaction within the old persons' residential complexes or with neighbourhood groups, day care centres, senior citizens associations, etc. Tertiary network of relations, e.g. systems of governance and development programmes, can also be tried for constructive engagement (Bhatia, 2007). GIS based resource mapping provides a useful tool for pooling of information and resources useful to elderly.

The opening of avenues for older persons' participation in community activities not only allows older persons to involve themselves with their community but provides them with opportunities to pass on their knowledge and experience. Some countries have done this by inviting older persons to partake in the educational system on a community level as teachers and leaders while in others it is through membership in community clubs and residents associations.

4. Recreation & Entertainment

While laws can be enacted to mandate children's support to their parents to prevent conditions of destitutions and deprivation, positive coping strategies have to be evolved by the older persons themselves to sustaining life with dignity. Recreation is one of many meaningful strategies by which older persons have continued to sustain their zeal for life and quest for dignity as well. Recreation is used as a means to keeping physically fit and mentally alert, and as a key to enhancing one's self esteem. It covers a variety of activities covered under the broad categories of physical and mental exercises. Travel to tourist, cultural and pilgrimage places, attendance at cultural/leisure events and participation in clubs, groups and community causes are also included under these themes.

Community-based and recreation-oriented programmes for the elderly will help them to develop a sense of self-reliance and community responsibility and creative use of their time, keeping in view the therapeutic value of recreation. Some of the community-based and recreation-oriented programmes could be used for development of "Infotainment Package for Elderly", with features as:

- Music (classical/instrumental)
- Reading material (traditional books, magazines)
- Brain age games/amusement game systems
- Travel (shopping, social visits to friends or relatives, religious places, etc.)
- Songs, poems, folk dances, plays, stories, spiritual programs
- VCDs on traditions, historic movements, pilgrimage, tourist places, religious songs, fitness programmes, etc.
- Elderly Baristas/chaupals

5. Entrepreneurship and Income Generation

In spite of being frail and vulnerable, the elderly could contribute immensely to the growth of the community, provided that they are properly cared for. Participation of older persons in work and economic activities, in accordance with ability and expertise of persons, will not only be helpful in keeping elderly active but also satisfy their need to contribute to the community and benefit society. This may require methods and techniques to adapt conditions of work to older people. This would include developing or furnishing simple equipment and tools which would help those with limited physical strength.

III. ROAD MAP

Both government and private sector have recognized the emergence of a huge shift in demographics towards an ageing population as a major future driver in society and the economy. The long-term implications of demographic trends need to introduce radical reforms in order to address the growing need for, and cost of, caring for older people. This will also need involvement of the private sector in order to service the new market that has been created.

It is very clear that no entirely new research is needed to develop technologies useful for elderly care. The same technologies, which are developed for other applications, may be fine tuned or made tailor made for elderly application. What is lacking in the country is an integration of efforts whereby developments in different fields of technologies at various places are assimilated for use by elderly.

Recently, detailed deliberations were held involving organizations and subject experts dealing with issues related to elderly persons. These deliberations resulted in identification of certain areas and topics where technological inputs would benefit the elderly persons. It is felt that initiatives are required on:

1. Database on enabling devices for elderly persons.
2. Database of alternate good designs for homes and their parts such as kitchen, bathrooms, doors, etc. along with parameters important for arriving at good designs.
3. Development of culture-specific and affordable enabling devices and systems for elderly persons.
4. Extensive field testing of enabling devices with involvement of users.
5. Documentation of market potential for elderly-related devices and services, including prioritized list focusing on need and affordability.
6. Nation-wide knowledge and awareness campaign regarding access to and use of enabling devices.
7. Technology-Assimilation Workshops for manufacturers to introduce new low-cost enabling devices and to prepare ground for improvement in existing devices based on felt needs.
8. Web based Decision Support System (DSS) for medical aid to older people (location of medical centres & facilities available, contact details of doctors, physiotherapy centres, medical shops, old age homes & facilities, med & related equipment shops).
9. Emergency medical care system.
10. Nutritious food packages and awareness material.
11. Counseling material on preventive care.
12. Livelihood generation programmes for old age home occupants.

Keeping in view the above consultations and deliberations, some suggested technology interventions in the field of elderly care are mentioned in the following table:

Table 1. Technology Interventions for Elderly People

Requirements	Interventions
Health care & nutrition	
Nutritious & easily digestible food	<ul style="list-style-type: none"> • Awareness programmes on nutritious diet, fitness activities and traditional medicines • Compilation & propagation of recipes of appropriate food for elderly people and suitable for different regions
Medicare units	<ul style="list-style-type: none"> • Simple medical kits for in-house check-ups • Mobile units with Indian system of medicines, physiotherapy and alternative therapies, gadgets, counselors, etc.
Assistive devices	<ul style="list-style-type: none"> • Vision aids, hearing aids, respiratory aids, fracture implants, fall detectors, bed alerts, door monitors, hip protectors, talking washing machines, wearable monitoring technologies
Rehabilitation	<ul style="list-style-type: none"> • Low-cost wheel chair, walker • Commode pots, chairs, beds • Robot to aid care-givers to lift elderly people with weak muscles
Designs	
Community living	<ul style="list-style-type: none"> • Community old age homes/day care centres with centralized facilities for dining, dish washing, cloth washing, fitness, recreation • Communication facilities for conversation with family members, relatives, friends, etc. through phone, email, internet • Special designs for kitchens, utensils, bathrooms, lofts, stairs, doors & windows, furniture, electric fittings • Facility for solar-based heating/cooling & lighting • Provision of nutritious food, herbal products/medicines
Barrier-free and low-stress accommodation	<ul style="list-style-type: none"> • Special designs for kitchens, utensils, bathrooms, lofts, stairs, doors & windows, furniture
Simple and easy to operate appliances	<ul style="list-style-type: none"> • Special designs for gas stove, utensils, telephones, geyser, water filters, washing machine, food warmer, desert cooler/blower, etc.
Clothing	<ul style="list-style-type: none"> • Weather-proof, skin friendly, comfortable and aesthetically attractive clothes • Wipes, diapers, sanitary and incontinence products • Bed linen, absorbent underpads, supportive braces • Stockings, transfer lifts and belts
Footwear	<ul style="list-style-type: none"> • User-friendly, functional, clinically effective & efficient (wide fittings, soft leather uppers, lightweight shoes, velcro fastenings, stretchy uppers, washable shoes & slippers) • Athletic and canvas shoes
Transportation & mobility	<ul style="list-style-type: none"> • Mobility aids, spinal braces
Recreation, Entertainment & Welfare	
Recreation/ entertainment	<ul style="list-style-type: none"> • Audio/video CDs on traditions, historic movements, pilgrimage & tourist places, religious songs
Day-to-day functions	<ul style="list-style-type: none"> • Simple device for bank/post office transactions, IT return filing, travel bookings, contact with doctor, complaints with police/legal cells/security services
Security against misplacement	<ul style="list-style-type: none"> • Walking stick with on-board GPS & facility for SOS alarms
Security against invasion	<ul style="list-style-type: none"> • Security alarms • Device for raising alarms in case of emergencies
Financial security	<ul style="list-style-type: none"> • Entrepreneurship and income generation programmes, e.g. <ul style="list-style-type: none"> ○ Textile design, furniture design, interior design ○ Toy making, candle making, weaving, knitting

	<ul style="list-style-type: none"> ○ Food processing, bakery ○ Nursery raising, floriculture, organic food from kitchen gardens ○ Publishing, pottery, hand made paper ○ Repair centres for assistive devices
Networking	
Compilation and networking of resources	<ul style="list-style-type: none"> ● Development of portal on elderly issues ● Mapping of resources and sharing among user groups ● Creation and management of effective helplines for elderly

IV. CONCLUSION

Modern scientific and technological advancements have opened up new possibilities for elderly care to support comfortable and dignified living of older persons. Capabilities of modern technologies coupled with traditional knowledge systems play a vital role in utilizing vast available resources for benefit of elderly at affordable costs. Many health care enterprises are organizing themselves for developing therapeutics by modifying the process of ageing and age-related diseases. Community living concept is gaining acceptance in India, at least in urban areas where affordability is improving. Technologies can play vital role in such community living places. Even existing old age homes, day care centres, etc. can be retrofitted or remodeled with technology products. Technology application in the field of recreation and entertainment is seen as an emerging field which has utility both in urban and rural areas.

The success of technology applications for elderly depends on policies and programmes that promote healthy ageing. The humane benefits that these technologies promise will certainly be promoted by an elderly-care system which accepts new technologies meant to comfort them. Some of the technologies mentioned in this paper can easily be implemented through combined efforts of government, voluntary or non-government organizations and industry. Associations and Federations of elderly peoples can be important vehicle for propagation of such technology interventions. Already a beginning has been made at the 7th National Conference of All India Senior Citizens' Confederation, held at Jaipur in October 2007.

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