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## **TECHNOLOGY FOR SAFETY AND PROTECTION OF ELDERLY**

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### **INTRODUCTION**

Age-related changes often negatively affect our health and independence, thus increasing the need for assistance. The social security system in India is witnessing a change since the traditional Indian family system, which was earlier considered to be a safety net for the elders, is gradually breaking up and the elderly are a group prone to special fears and abuse. One of the many challenges is to provide appropriate living environments for older persons which enable them to participate fully in the community.

There are two types of situations which demand protection for elderly people- one related to their health (including wellbeing) and the other related to their property and belongings. Requirements are more demanding for elderly people with some kind of disability or chronic ailments like Dementia, Alzheimer's, Parkinson's.

The use of technology to support independent living and promote independence of older persons is mentioned in the National Policy on Older Persons (NPOP). Safety is the concern both of the elderly person and of those responsible for the elder's health care. Therefore effective vigilance is needed to safeguard the elderly both at home and outdoor conditions. There exists a vast scope of technology interventions for welfare of elderly people in the country so that these technologies contribute towards supporting comfortable and dignified living for this section of the society. Technology-based interventions can greatly help in achieving the objectives of the NPOP by providing vital inputs and capabilities.

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. This paper tries to capture potential of such technologies for safety and protection of elderly people.

## **TECHNOLOGY SUPPORT**

Elderly may be vulnerable when they:

- Live alone
- Walk alone
- Go out for shopping
- Do their banking
- Travel alone

Some of these situations can be handled by taking precautions and simple measures like going out in groups, taking services of care givers, avoiding contacts (dealings) with strangers, safeguarding personal information (e.g. bank account number, ATM/credit card details) installing home security systems, locks, alarms, chains, making use of elder helplines, etc. Simple precautions like making sure someone always knows about your location and about your activity would help. Elders will benefit a lot if they can spend some time (and money) learning useful tips from the experts, and attend seminars or workshops on home security, self-defense, or lessons on possible abuses.

Clearly, a major requirement of safety emanates from the home environment. House needs necessary provisions of safety measures. The role of assistive technologies is vital in this particular application. Improved housing with barrier-free and age-friendly designs needs to be constructed, thereby enabling families to take care of older persons effectively. In the Indian context, access and safety needs have not caught the attention of policy makers. However, development in the field of information and communications technology has paved the way for new means of home security that elderly needs.

### **Assistive/Enabling Devices (AEDs)**

With advancements in science & technology, many devices are now available to provide the needed safety and security to the elders and to restore and maintain the highest possible level of their functional independence. Such devices are categorized as assistive/enabling devices (AEDs). The simplest AED could be an elderly-friendly mobile phone which provides a means of emergency contact. Another very useful safety device is a walking stick (available with varied features), which not only facilitates mobility but also provides a sense of security to the user. Properly designed telephone instrument (with enlarged buttons and numbers, speaker phone and cordless facility) are also considered useful as an alarm as it enables the user to summon help in an emergency. Some advanced AEDs for safety purposes include GPS-enabled walking stick with alarm, pendant-type surveillance devices for dementia patients, wearable devices with telecommunication facilities to monitor inconsistencies in pulse (and/or other

critical parameters). Some typical AEDs for safety and protection of elderly people are listed in Table-1.

Security alarm systems (in various forms) are available in the country for a long time. Generally, these systems work the user presses a button or sends a signal from his/her side. Alarms have also been developed where the system sends signal to the user and an alarm is raised if the user doesn't respond, for example in the event of paralysis or unconsciousness.

Table-1: Types of security/safety devices for use by elderly

S.N.	Device	Function
1.	Kitchen finger protector	Protects fingers from sharp knives and blades
2.	Medicine dispenser	Reminds medication schedule
3.	Blood sugar or blood pressure monitor	Monitor critical health parameters and help avoid emergencies
4.	Reminder systems	Useful for people with cognitive impairments, e.g. for reminding medication, therapy schedules
5.	Stair glide, handrails	Facilitates climbing stairs
6.	Walking stick, walkers	Facilitates walking
7.	Bed rail	Facilitates getting in/out of bed
8.	Raised seat, grab bars	Facilitates getting on/off toilet
9.	Large print or talking control for ACs/heaters	Ensures a comfortable room temperature
10.	Pepper sprays	Are easy and safe to use for personal safety and protection
11.	Safcon Security Seal	Security seal designed to ensure that once sealed it cannot be opened, used to secure luggage, linen, cutlery, cash boxes etc.
12.	Floodlighting system	Provides illumination during emergency situations
13.	Smoke detector	Detects smoke and alerts an alarm
14.	Fire alarm	Detects fire and alerts an alarm
15.	Wander alarms	Useful for people with Dementia
16.	Position activated alarms	Activation occurs if the user is prone or supine for more than a specified time period
17.	Video intercom	Gives details of visitors on the door
18.	Motion detection alarm with telephone dialler	Dial out prefixed number(s) if an intruder enters the premises
19.	Distress alarm	Enables cellular calls to pre-defined numbers (such as to relatives or family doctor), and distress alarm in case of need
20.	Dialer security system	Voice activated and can be programmed to dial the law enforcing authorities
21.	Hidden security camera system	Detects moving objects and takes photos for monitoring (e.g. in home, in a garage area, driveway)
22.	Secufone with GPS and personal alarm system	Mobile phone with a provision of one touch' call to family members, friends, care associations, doctors, security staff, suppliers etc.
23.	Electronic Travel Aids	Can help detect objects in the walking path (like a radar) and produces a sound or vibration warning signal

### Daily Activities at Home

Starting from simple safety devices in kitchen (e.g. finger protectors, gas leakage detectors, tin openers), use of technology in safety devices can be noticed in, for example, shock prevention in electrical/electronic gadgets, fire

alarms, door security intercoms, skid-free floors, ramps, unobtrusive entrances and exits, fall protection devices, diapers for elders with health problems, etc.

### **Home Monitoring Systems**

A “Smart Home” is a residence equipped with technologies that enhances safety of elders at home and monitors their daily activities. The features in the home are automated, where enabling devices can communicate with each other through a communication network. For example, devices and sensors control lighting, smoke detectors, door entry systems, locks, water outlets, as well as visual and tactile signaling devices.

Wireless networks, fast internet connections, smart digital sensors and gadgets have provided the necessary capabilities for round-the-clock monitoring of “smart homes”. Through a network of such smart sensors and data collection plus transmission electronics, it is possible to collect environmental, behavioral and biological data for elderly inmates. With use of such sensors (e.g. motion sensors), it is possible to watch for abnormal behavior, sleeping patterns, use of toilet, kitchen, etc. The system establishes the person’s normal routine so that it can quickly detect when there are changes to these routines. When something abnormal happens, alerts are automatically sent via phone or email to the predefined addresses caregivers. It is also possible to monitor activities like if the stove has been left on, medicines have been taken from the dispenser, food taken from the refrigerator/oven, etc.

Monitoring of activities can be extended to daily health checks, e.g. home instrumented with devices to measure heart rate, temperature, nutrition, etc. Such technologies are currently available, and also being developed, that will not only permit monitoring of the physiological status of an individual, but will also permit observation and knowledge of the psychological, cognitive, and behavioral health of an individual.

### **CONCLUSION**

Modern scientific and technological advancements have opened up new possibilities for elderly care to support comfortable and dignified living of older persons. With use of Assistive/Enabling Devices, the elders can look forward to safe and secure living, both inside home and outdoors. Such devices reduce dependence on the care givers and facilitate independent living for the elders. Community living concept is gaining acceptance in India, at least in urban areas where affordability is improving. Assistive 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.

The success of technology applications for elderly depends to a great extent on the policies and programmes that promote healthy ageing and provide means of dignified living. Of course, the technology systems must be reliable and simple in operation and maintenance, otherwise elders try to avoid it or discard it

once a fault occurs. The more they find easy and useful the system, the more they will adopt it and will encourage others. 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.