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## **Assistive and Enabling Technology Needs of Elderly People in India: Issues and Initial Results**

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### ***Abstract***

*Assistive and Enabling Technology* encompasses a wide range of devices and services used to help older individuals. These technologies provide needed support and assistance in everyday life to both disabled and frail/ailing elderly, covering various needs, e.g. medical and daily activities such as personal care, housework, and leisure activities. A major constraint in adequate availability of the AET in the country has been the lack of awareness among the users as well as among the concerned professionals. Sustained efforts are needed to sensitize the stakeholders (users, designers, architects, technologists and other specialists, industry, service providers, etc) on the utility of AET and to create enabling environment in the country for development and propagation of AET. Also important is the issue of realistic need assessment among users for industries to take up the challenge of development and propagation of AET. The paper presents these concepts and the results of a need assessment study (possibly the first in the country) conducted with the elderly participants at the AISCCON-2008 conference. The study revealed that the majority of respondents lacked awareness of the devices mentioned in the questionnaire, but were willing to use provided these are made available at affordable costs. It was also noticed that the maximum difficulty was felt in the categories of 'Kitchen gadgets', 'Recreation/entertainment' and 'Architectural/home elements'. This initiative is expected to form the foundation for developing a countrywide assessment of AET through involvement of different stakeholders.

## ***Introduction***

In almost every country, the proportion of people aged over 60 years is growing faster than any other age group. This population ageing can be seen as a success story for public health policies and for socioeconomic development, but it also challenges society to adapt, in order to maximize the health and functional capacity of older people as well as their social participation and security. Maintaining autonomy and independence as one grows older is a key goal for both individuals and policy makers. Active ageing allows people to realize their potential for physical, social, and mental well-being throughout the life course and to participate in society, while providing them with adequate protection, security and care when they need (WHO, 2002).

The National Population Commission in India has estimated that the population of the elderly (age group 60 years and above) is expected to grow from 71 million in 2001 to 173 million by 2026. There are three different categories of old age (Neugarten, 1974): Young-old (55-75), Old-old (75-85) and Oldest-old (85+), but WHO in 2008 recognized that 60 years is the age of entering old age. The 'Young-old' represent the majority of older individuals who are relatively healthy, competent and satisfied with their life, and remain engaged in a variety of activities in the society. The 'Old-old' are those individuals who are frail, suffer from poor health, and are in need of medical attention, special care and other forms of support. Neugarten emphasised that aging individuals ought to be described in terms of both competencies and needs.

Many older people wish to remain in their own home, but are faced with gradual deterioration in their abilities. Most of the time they are fit enough to retain their independence but, sometimes they need help in their activities of daily living (ADL), such as bathing, climbing stairs, taking medicines, wearing clothes. For these individuals, use of assistive technology makes a difference between retaining their independent quality of life and self-respect.

## ***Assistive & Enabling Technology***

Two groups of older people are perceived for the assistive technologies- first those who require some support and assistance in everyday life yet are unlikely to define themselves as disabled. The second group would be older people with disabilities (having a disability from birth or acquired later in life). The first category of people may

be hesitant or simply not consider using devices what they would consider 'aids for people with disabilities'. Traditionally, the term 'Assistive Devices' has been used in India for devices primarily meant for the disabled people, e.g. devices for orthotic/prosthetic and mobility applications. There is another category of technology applications (generally referred as 'Wellness or Enabling Devices') for the prevention of deterioration, e.g. by encouraging physical exercise, enabling appropriate changes in lifestyle and changed roles in work, or used in a wide range of daily activities such as personal care, housework, and leisure activities (Cook et al., 1995). The latter category of devices is perceived to be free from the negative connotations of 'technology for disability'.

Goyal and Dixit (2008b) used the term "Assistive & Enabling Technologies (AET)" to cover both the above mentioned category of functions. AET is, therefore, an umbrella term for any device or system that allows an individual to perform a task they would otherwise be unable to do or increases the ease and safety with which the task can be performed. Some items of AET are accepted readily by most users as they serve both able and disabled users (e.g. reclining chairs, adjustable beds).

A major constraint in adequate availability of the AET and their adoption by the users has been the lack of user awareness as the information about AET has traditionally been aimed at the professionals rather than the users. The users would require information about AET appropriate to their needs, including details on the technology and its utility for the desired application, O&M requirements, sources of availability, cost of the device(s) as well as the running cost (if any), availability of support services (including helplines, user groups).

Assessment of the local demand of AEDs is essential to gauge the industry's response. Such surveys have been conducted in different parts of the world and have been successful in providing a long-term direction to the propagation of these devices (e.g. Cowan and Turner-Smith, 1999; Evans, 1990; Normie and Gavrish, 2001; Russell et al., 1997; Tam et al., 2003). Studies to explore the factors which govern the intention of elderly to use devices in order to maintain their independence have reported that attitudes vary, with socio-cultural milieu, gender and financial considerations being among the most deciding factors (Pain et al., 2007). Goyal and Dixit (2008b) discussed the need of AET in Indian context and elaborated on the various steps needed for

widespread application and diffusion of AET in the country. A critical pre-requirement in this case is the market assessment for determining potential demand of different technology products and services, especially to catalyze involvement of the industry. General perception among professionals working with elderly people is that sourcing of funding is another predicament in the accessibility of AET in the local setting.

### ***Issues***

'Assistive & Enabling Technology (AET)' has been defined in this paper as 'any device or system that allows an individual to perform a task that he/she would otherwise be unable to do, or increases the ease and safety with which the task can be performed' (Cowan and Turner-Smith 1999). It means that any product, instrument, strategy, service and practice which is prescribed by Rehabilitation Therapist for the older (including disabled people)– to prevent, compensate, relieve or neutralize the impairment, disability or handicap and make him/her independent in ADL and overall improve their quality of life. It is a technology based service that enables elderly populations in their daily lives, education, work or leisure.

With advances in health and medical technology, e.g. in availability of composite materials, microelectronics and improvements in the designs of products, need of AET is increasingly felt Goyal and Dixit (2008a). Enhanced awareness about these products coupled with affordability (especially by the middle income class) is also facilitating demand of these devices. The diffusion of AET, as in the case of any innovation, begins with early adopters who are willing to explore new possibilities and risk trial use, and lay the groundwork for others to follow. Thus, assessment and understanding of elder's perceptions of AET are essential in planning the future of such technologies. In the coming years, public initiatives through legislation and introduction of comprehensive insurance packages are also likely to contribute to the availability and diffusion of AET.

Goyal and Dixit (2008b) attempted to compile the available studies in India on the assessment of prevalence of chronic morbidity and the pattern of morbidities among the elderly people. Such morbidity profiles can be used for initial assessment of the need for the types of assistive and enabling devices.

## ***The Study***

A survey was conducted among a purposive sample of about 100 people in the age group of 60-85 years. The survey was conducted during the 8th National Conference of the All India Senior Citizens' Confederation on December 23-24, 2008 at the Chatarpur Temple Complex, New Delhi. The overall objectives of the survey were to:

- Initiate the process of scientific assessment of the AET needs of elderly people in India,
- Sensitize and create awareness among the potential users of AET and concerned professionals, and
- Use the information collected through this survey for focused discussions with subject specialists, planners, policy makers, funding agencies, researchers, industry, etc. to suggest strategies for advancement of AET.

The survey was conducted with the help of a semi-structured Assistive & Enabling Devices (AED) Questionnaire, which was designed to gather key information about the need of older persons for AEDs, based on self-assessment and preliminary interactions with the interviewers who are trained Occupational Therapist/Physiotherapist professionals. The development of the questionnaire is based on literature survey and perceptions of researchers and is considered only to be a preliminary assessment tool. The questionnaire was self-administered type with mainly close-ended questions, and was compiled as a pilot tool for purpose of this study. The experience gained through this study would facilitate future work to refine its content as well as approach.

The questionnaire comprised of three sections- the first section asked for general description like name, qualification, occupation, income, marital status, etc. Second section explored the person's felt difficulties in the activities of daily living and the third section sought specific information on the AEDs needs for assistance in key life functions and about the awareness of these devices. The section on AED contained a list of devices under each category, followed by a set of questions. First, it asks whether there is a difficulty or problem with this category of task/activity. Then it asks if the respondent is aware of the potential AED listed under that category. If the respondent is aware and using the device, whether there is a difficulty in use. In case the respondent is aware but not presently using the device, whether he/she would like to use in future (see Box below).

**Category/Common problem**

Is this a difficulty/ problem (Y/N)

**Potential AED**

Aware (A)/ not aware (NA)

Already using (A)/ like to use (L)

If using, difficulty in use (Y/N)

Keeping in view the socio-cultural acceptability and other considerations in national context, total 27 devices were included in the questionnaire, grouped under 10 categories, and the range of AEDs covered include simple items like ADL, kitchen gadgets, home elements, clothing, footwear, etc. (Table 1). An initial draft of the questionnaire covered about 50 devices, but was considered too lengthy and was later reduced to 27 devices. Before the end-user questionnaire was administered, it was pilot tested with Geriatric patients who visited the Geriatric clinic at the All India Institute of Medical Sciences, New Delhi. The complete Questionnaire may be looked at [www.oldagesolutions.org](http://www.oldagesolutions.org), which is a portal exclusively designed for technology interventions in issues concerning elderly care, and is organized by All India Institute of Medical Science, New Delhi.

SN	Category/Common problem	Potential AED
<b>I</b>	<b>Architectural/ Home Elements</b>	
1	Getting on/off toilet	Raised seat, Grab bars
2	Home safety	Security alarms
3	Difficulty knowing who is on entrance	Video intercom
<b>II</b>	<b>Aids to Daily Living</b>	
4	Difficulty remembering medication schedule	Medicine dispenser/cabinet
5	Difficulty opening jars, bottles	Jar opener/closer
6	Can't see clock/watch	Talking alarm clock/watch
7	Nail clipping	Magnifying toenail clipper
8	Easy reading or working while in bed	Lap desk with book holder
9	Makes back scrubbing easy	Back scrubber with hand loops on each end
<b>III</b>	<b>Kitchen Gadgets &amp; Appliances</b>	
10	Protection from sharp knives/blades	Kitchen finger protector
11	Better gripping and comfort for arthritic and Parkinson's patients	Utensils with finger bump grips or hand strap
<b>IV</b>	<b>Furniture</b>	
12	Rolling bed/Bed too low	Adjustable height bed
13	Getting in/out of bed	Bed rail
<b>V</b>	<b>Footweares</b>	
14	Difficulty tying shoelaces	Velcro fastenings shoes
<b>VI</b>	<b>Clothings</b>	
15	Difficulty with buttons/zippers	Velcro clothings

<b>SN</b>	<b>Category/Common problem</b>	<b>Potential AED</b>
16	Varicose veins	Pressure modification stockings
<b>VII</b>	<b>Communication</b>	
17	Difficulty reaching/dialing numbers/holding receiver	Cordless speaker phone with preset memory-dial, large buttons & numbers
18	Cellular calls to predefined numbers	Mobile phone with one touch call to family members, friends, helplines, doctors, security
<b>VIII</b>	<b>Sensory Functions</b>	
19	Low Vision	Eye glasses/ magnifiers
20	Enabling the blind to hear what they can't see	'E-Netra'- reads text and converts into voice
21	Hard of hearing	Hearing aids, visual alerting systems
22	Difficulty doing activities involving concentration or thinking	Memory games
<b>IX</b>	<b>Mobility</b>	
23	Difficulty walking	Walking stick, walkers, wheelchair, spinal braces
24	Difficulty climbing stairs	Stair glide, handrails
25	Loss of limbs	Prosthesis-artificial limbs
26	Difficulty standing for long periods	Height adjustable/tilting chairs/stool/ tables/desks
<b>X</b>	<b>Recreation/ Entertainment</b>	
27	Meaningful and occupying entertainment	CDs on traditions, historic movements, pilgrimage & tourist places, folk songs, etc.

Table 1: Category of common problems and AEDs for elderly

## **Results**

About 100 elderly people participated in the survey. On scrutiny of the questionnaire returned by the participants, it was noticed that only 85 questionnaires were filled properly, and only these were used for further analysis. The majority of respondents fall in the Young old and Old old categories (Table 2). Only 10 female responded as against 75 male. The population sample included 30 from rural areas and 55 from urban areas. 52% of the respondents have annual income less than Rs 1 lakh. The majority of respondents (69%) had completed graduation degree.

<b>Age Group</b>	<b>Number of People</b>
60-69	43 (51%)
70-79	40 (47%)
80-85	2 (2%)

Table 2: Age Group Distribution

Data related to the opinion of the elderly were analyzed using the SPSS statistical package. Descriptive answers were extracted and grouped for further evaluation. To ensure the accuracy of the survey, the number of respondents to each question was carefully counted and questions with contradictory answers were excluded from the analysis. The response for the questionnaire items is shown in Table 3. Responses to the individual devices were added in arriving at the total response under a particular category. The denominator in second column denotes the maximum number of responses expected for the particular category of device (e.g. for 4 devices in a category, the maximum response could be  $4 \times 85 = 340$ ). A generally low response under all categories also implies an inherent shortcoming of the survey mechanism (as mentioned at the end of the paper) and does not necessarily attribute a 'low response' from the respondents.

<b>Category/Common Problem (&amp; no. of items)</b>	<b>Response to 'Difficulty/problem'</b>	<b>Response to 'Awareness'</b>
<i>Aids to daily living (6)</i>	90/510 (18%)	170/510 (33%)
<i>Mobility(4)</i>	65/340 (19%)	110/340 (32%)
<i>Sensory functions (4)</i>	44/340 (13%)	100/340 (29%)
<i>Architectural/ home elements (3)</i>	54/255 (21%)	98/255 (38%)
<i>Kitchen gadgets &amp; appliances (2)</i>	46/170 (27%)	47/170 (28%)
<i>Communication (2)</i>	27/170 (16%)	66/170 (39%)
<i>Furniture (2)</i>	25/170 (15%)	48/170 (28%)
<i>Clothing (2)</i>	19/170 (11%)	31/170 (18%)
<i>Recreation/entertainment (1)</i>	22/85 (26%)	26/85 (31%)
<i>Footwear (1)</i>	10/85 (12%)	21/85 (25%)

Table 3: Category wise response to questionnaire items

The category wise pattern of response to the question of 'Is this a difficulty/problem' is listed in Table 3 (column-2). The respondents found Kitchen gadgets and Recreation/entertainment as the highest difficulty/problem categories. Architectural/home elements and mobility were expectedly considered the next two difficulty areas. For a good response to the ADL category, it appears that the respondents realized the utility of such items when informed about these difficulties/problems. This is apparent in their response to the next question on the level

of awareness (see Table 3-column 3), where this category was ranked third highest. A low response to the Communication category was a bit surprising, meaning thereby that they were generally contented with the presently available devices (which do not have elderly-specific features and designs).

The pattern of awareness responses to each of the category of devices is listed in Table 3 (column-3). This data shows that the respondents were least aware of the Clothing (Velcro clothings and pressure modification stockings), followed by Footwear (Velcro fastenings shoes), Furniture and Kitchen gadgets categories. The highest awareness was expectedly found in case of communication devices, followed by home elements, ADL and mobility categories. For individual devices, the highest response was found in case of home security systems and walking sticks, walkers and wheel chairs.

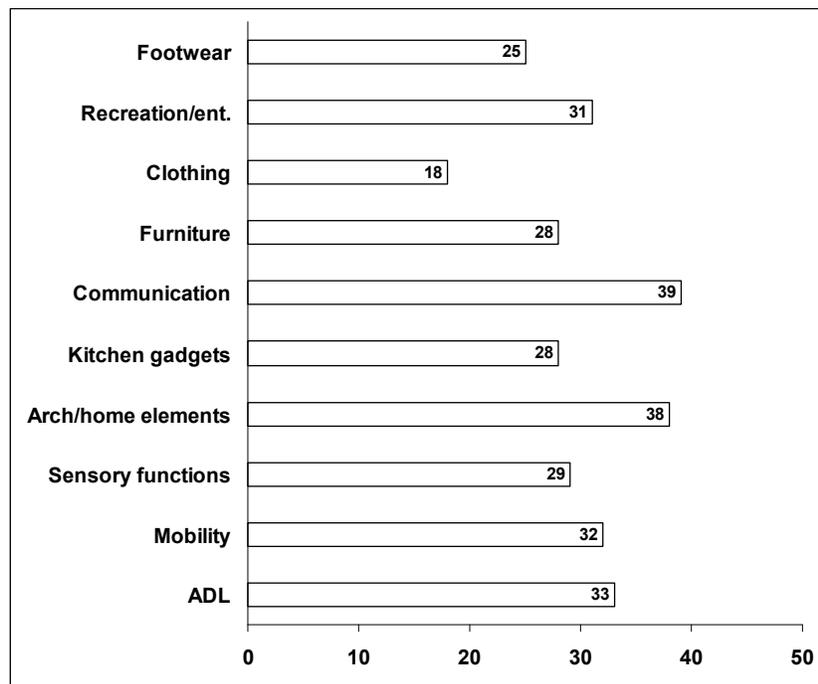


Fig. 1: Response (in %) to awareness of different AED categories

An intriguing feature among this survey was that two distinct classes were observed: (1) devices for which the level of awareness was high but willingness to use was low (e.g. walking aids, vision aids, cordless speaker phone, raised seat, grab bars, medicine dispenser) and (2) devices for which the level of awareness was low but willingness to use was high (e.g. video intercom, back scrubber, kitchen finger protector,

magnifying toenail clipper). For many other devices, the level of awareness and the willingness to use was almost matching. It appears that reasons for the former class of devices could largely lie in the traditional mindset or socio-cultural acceptance whereas the latter class of devices is governed by the pressing needs of the individuals.

### ***Discussion***

Although a pilot study, the results of this survey provided some useful insights to the issue of AET in India, including evidence of some of the perceived problems associated with the acceptance of AET. In the first place, a lower response to the identification of Common Problem (Table 3- column 2) as compared to the Awareness about Devices (Table 3- column 3) implies some kind of inhibition of expression or contentment with the prevailing situation. Special elderly-friendly designs of clothing, footwear, furniture, etc. are still neither available in open market nor talked about in India. The results also indicated that although many people have difficulty in performing various functions, they did not use any assistive device. This could be due to lack of knowledge of the AET or due to lack of easy availability in the market. Older Individuals were apparently not well aware of how assistive and enabling devices could help them in their daily lives. The results are not definitive, but do provide preliminary indicators of the choices elderly in India are willing to exercise to maintain the quality of life they wanted.

Awareness on AED is critically dependent on, and seemed to be triggered by, the professionals (e.g. Physicians, Occupational Therapists, Physio-therapists, Geriatric specialists), who in the present setup take note of the sensory and cognitive deficits, frailty, ailments, etc, when elderly visit them for consultation. Advocacy initiatives in regard to awareness concerning AET should, therefore, be planned with these specialists. Matching an individual's needs and abilities with appropriate device requires a basic knowledge of physical needs assessment techniques and an adequate knowledge on the available technology. This requires 'Training of Trainers' so that medical and para-medical professionals could undertake a larger role in creating awareness concerning AET. A Data Registry system should also be evolved to record the health concerns of elderly.

Health-care and Geriatric professionals feel that a majority of users would need financial support to acquire the necessary AET devices. Awareness (and consequently,

use) of AET also appeared to be critically linked to the existence of a legislative framework and Citizen Entitlements so created in the form of Welfare Rights. The technology in itself should satisfy the '3A' criteria: Appropriateness, Accessibility and Affordability, besides being simple to operate and maintain. Once a device matching the above criteria is made available in the market along with the necessary awareness and publicity, many potential users will probably buy these devices on their own, as was also concluded by Tam et al. (2003). For the rest, legislative support would be beneficial.

Involvement of the Industry in the process of raising awareness concerning AET is considered essential in order to achieve a sustainable solution to the issue of widespread use of AET in the country. The present survey, followed by a consultation with the medical and para-medical specialists, highlighted the urgent need of conducting similar surveys in different parts of the country.

**Study Limitations:** There were limitations to this survey. Questionnaire did not have any descriptive features and illustrations. Language used in the questionnaire was English, which was not easily understood by all participants. Due to ongoing proceedings of the seminar, the interviewers could not devote enough time with the respondents in explaining the devices. There were few participant aged 80<sup>+</sup> which is the most important age group likely to face difficulty in their ADL.

### **Conclusion**

Keeping in view the dimension of the aging population and the availability of healthcare infrastructure, greater reliance on home-based care would be more viable and tangible in the coming years. AET makes a big difference in the lives of disabled as well as frail and ailing elderly by providing them the ability to perform simple activities of daily living, such as bathing, climbing stairs, taking medicines, wearing clothes.

A major constraint in adequate availability of the AET and their adoption by the users has been the lack of awareness among users. The education of professionals and carers is another lubricant to appropriate adoption of AET. The user would also require information about AET appropriate to their needs, including details on the technology and its utility for the desired application, O&M requirements, sources of availability, cost of the device(s) as well as the running cost (if any), availability of support services

(including helplines, user groups). The first step towards achieving the above objective is to assess the requirement and demand of AET products and services in the country.

A need assessment study (possibly the first in the country) was conducted with the elderly participants at the 8<sup>th</sup> National Conference of the All India Senior Citizens' Confederation in December 2008 at New Delhi AISCCON-2008 conference. The results of this survey provided some useful insights to the issue of AET in India. A semi-structured AED Questionnaire was used among a sample of about 100 people, aged between 60-85 years. The AED questionnaire was designed to gather key information about the need of older persons for AEDs, based on self-assessment and preliminary interactions with the interviewers who are trained Occupational Therapist/Physiotherapist professionals. The questionnaire sought specific information on 27 devices grouped under 10 categories. The results from the survey indicated that many respondents did not use any device inspite of the fact that they had difficulty in their ADL, and were apparently not well aware of how these devices could help them in their lives. Highest awareness was noticed for the devices related to home safety and mobility, and the most 'like to use' devices were reported as security systems and for ADL. The need for special designs of furniture, kitchen gadgets and home design elements was also highlighted during the survey. Role of socio-demographic factors (e.g. age, gender, marital status, education, family structure, income level) in deriving the needs of AEDs for elderly needs to be systematically explored in future endeavors. This initiative is expected to form the foundation for developing a countrywide assessment of AET through involvement of different stakeholders.

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